



## Results of the March 2009 Vapor Intrusion Evaluation at 163 Old River Road, Edgewater, N.J.

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### Executive Summary

This technical memorandum presents the results from the winter 2008–2009 vapor intrusion monitoring event at the Tomaso's Ristorante building (the former Jono's Restaurant and Cantina), at 163 Old River Road, Edgewater, New Jersey. This sampling event was conducted to verify that indoor air concentrations of vapor intrusion constituents of interest (COIs) remain below acceptable risk levels within the 163 Old River Road building. The March 2009 sampling event—which included the collection of three indoor air samples, two subslab samples and one outdoor air sample—was performed under assumed conservative operating conditions: during the heating season with the HVAC system and kitchen exhaust fans running and with all doors and windows closed.

It is reasonable to conclude from the results of the March 2009 monitoring event and on the basis of the current understanding of site conditions that the vapor intrusion pathway is not causing, as defined by the current regulatory framework, unacceptable risk concentrations of the COIs in the 163 Old River Road building. This conclusion is consistent with the conclusions from the March 2008 vapor intrusion sampling event (CH2M HILL, 2008) and with the conclusions from the two previous evaluations submitted in April 2007 (CH2M HILL, 2007a) and October 2007 (CH2M HILL, 2007b). Future changes in site conditions (e.g., land use, condition of the building) would require a reevaluation of the vapor intrusion (VI) pathway.

Supporting conclusions from the sampling event conducted in March 2009 are as follows:

- One COI, acrolein, was detected in indoor air at concentrations above the New Jersey Department of Environmental Protection (NJDEP) Rapid Action Level (RAL).<sup>1</sup> However, based on a comparison of the subslab soil gas, indoor air and outdoor air data it is reasonable to conclude that detections of acrolein in indoor air are not related to the potential vapor intrusion pathway. On the basis of these results, and in accordance with

<sup>1</sup> RALs "represent trigger levels for the initiation of prompt action at occupied buildings to further investigate the vapor intrusion pathway and/or minimize impacts to building occupants through the implementation of an interim remedial measure" (NJDEP, 2007).

NJDEP (2005) guidance, there was no need for prompt action to further investigate or reduce potential exposures in the building

- No constituents were detected in indoor air at concentrations above the NJDEP Health Department Notification Levels (HDNLs).<sup>2</sup> On the basis of these results, and in accordance with NJDEP (2005) guidance, there was no need to notify state or local health departments.
- Two constituents were detected at concentrations above the lowest EPA industrial and/or NJDEP nonresidential indoor air screening levels (IASLs) in indoor air; acrolein and naphthalene. The presence of acrolein in indoor air is likely an artifact of ambient or confounding sources. The concentrations of naphthalene in indoor air were below the EPA industrial IASLs for a  $10^{-5}$  target cancer-risk level and not considered as a significant risk.
- With the exception of 1,2,4-trimethylbenzene, acrolein, and naphthalene concentrations of COIs were below the EPA industrial SGSLs for a noncancer hazard quotient of 1 or a  $10^{-5}$  target cancer-risk level. The presence of acrolein in subslab soil gas is likely an artifact of confounding sources. Concentrations of 1,2,4-trimethylbenzene and naphthalene in subslab soil gas exceeded the EPA industrial SGSLs for a  $10^{-4}$  target cancer-risk level or a noncancer hazard quotient of 1.0 and the NJDEP nonresidential SGSLs. However, indoor air concentrations of 1,2,4-trimethylbenzene and naphthalene did not exceed unacceptable risk levels in indoor air, indicating significant attenuation is occurring.

The recommendation based on this vapor intrusion sampling event is the following: Conduct an additional vapor intrusion sampling event for the 2009–2010 heating season to confirm that indoor concentrations remain below the risk-based screening levels in indoor air or not related to vapor intrusion.

The need for future vapor intrusion activities at the building will be determined on the basis of the results of the 2009–2010 heating season monitoring event and the remedy selected in the Record of Decision.

## 1 Introduction

This technical memorandum presents the results from the March 2009 sampling event conducted to monitor the potential for vapor intrusion at the 163 Old River Road building, in Edgewater, New Jersey. The building sits on the Block 93 North property, west of the Quanta Resources property across River Road. It houses Tomaso's Ristorante, formerly Jono's Restaurant and Cantina; Tomaso's Ristorante opened for business in summer 2007, after the building had been vacant for several years. The building is approximately 6,000 ft<sup>2</sup> and consists of two stories with a single-story front dining area. A detailed description of the building was provided in the initial evaluation (CH2M HILL, 2007a).

<sup>2</sup> The HDNLs "indicate the need for the Department [of Environmental Protection] to inform the local and/or state health departments about the site and the associated vapor intrusion related indoor air concentrations for further evaluation and possible emergency actions" (NJDEP, 2007).

Samples of indoor air, subslab soil gas, and outdoor air were collected at the building on March 16 and 17, 2009 (see Section 2). The purpose of the winter 2008–2009 vapor intrusion monitoring event was to confirm the conclusions from previous sampling events (CH2M HILL, 2007a, 2007b, 2008) that vapor intrusion is not resulting in unacceptable concentrations of site-related constituents in indoor air. Sampling was conducted according to the U.S. Environmental Protection Agency (EPA)–approved work plan (CH2M HILL, 2009).

Vapor intrusion sampling and analysis procedures were performed in accordance with the following guidance documents:

- EPA (2002) OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils
- NJDEP (2005) Vapor Intrusion Guidance
- Interstate Technology and Regulatory Council (ITRC, 2007) Vapor Intrusion Pathway: A Practical Guideline

Upon receipt of the preliminary data from the laboratory, the indoor air sample results were compared to NJDEP RALs and HDNLs to determine if there was a need for prompt action to further investigate or reduce potential exposures in the building and if there was a need to notify state or local health departments (see Table 2). The results of this comparison were sent via e-mail to EPA on April 13, 2009. Once the laboratory data were validated, the results of the indoor air and subslab soil gas samples were compared to EPA risk-based screening levels (see Tables 3a and 4a for indoor air and subslab soil gas, respectively) and NJDEP screening levels (see Tables 3b and 4b for indoor air and subslab soil gas, respectively). The indoor air sample results were also compared to the outdoor air sample results to determine if constituent detections were the result of background sources in ambient air. The observations made from these comparisons are presented in Section 4.

## 2 Sampling Methods

The March 2009 vapor intrusion monitoring event at the 163 Old River Road building consisted of collecting indoor air samples at three locations (two on the first floor and one on the second), subslab soil gas samples from the two existing probes, and one outdoor air sample at the southeast corner of the building.

NJDEP and EPA reviewed and approved the sampling locations during a site visit on March 5, 2009. (See Table 1a for the sample-location key.) Figure 1 shows the indoor air, subslab soil gas, and outdoor air sample locations.

Weather information during the sampling collection period from 12 pm on March 16 to 12 pm on March 17 was obtained from the U.S. National Weather Service's Web site. The temperature ranged from 35 to 47°F. The barometric pressure ranged from 30.3 to 30.4 inches Hg. There was no precipitation.

Sampling activities were performed in accordance with the procedures set forth in the 2009 work plan (CH2M HILL, 2009), EPA-approved quality assurance project plan (QAPP) (CH2M HILL, 2005), and 2009 QAPP addendum (CH2M HILL, 2009). The SUMMA

canisters were managed and shipped to the laboratory under chain-of-custody procedures (Attachment A). The indoor air, subslab soil gas and outdoor air samples were analyzed for a shortened volatile organic compound (VOC) analyte list by EPA method TO-15. Constituents that exceeded the lowest screening criterion in subslab soil gas or indoor air during the March 2008 sampling event at either 115 River Road or 163 River Road were considered to be constituents of interest (COIs) for the 2009 vapor intrusion monitoring event; the COIs are presented in Tables 2-4b.

## 2.1 Building Inventory

A building inventory was conducted on March 16, 2009, to identify activities taking place in the sampling area, such as chemical or storage use, which could influence the indoor air-sampling results. The pilot lights on the stoves were lit at the time of the sampling event. The building owner/manager informed the field team that a pesticide application occurs typically every 2 weeks around the perimeter of the building. Within the building, the project team observed various industrial cleaning products, primarily of the Ecolab® brand, including a grease cutter, glass cleaner, and detergent(s). These products are not expected to be significant indoor sources of VOCs.

## 2.2 Indoor Air Sampling

The CH2M HILL field team collected three indoor air samples – one in the kitchen on the countertop (Q2-IA-01), one in the first floor dining room on a table near the center wall (Q2-IA-02), and one in the second floor dining room on a table in the southwest room (Q2-IA-03) (Figures 1 and 2). Indoor air samples were collected over a 24-hour period using 6-L SUMMA canisters equipped with flow controllers. The SUMMA canisters were placed on either tables or countertops at a height approximately 4 feet above the ground (roughly breathing zone height). The March 2009 indoor air-sampling log is provided in Table 1b.

The field team performed indoor air sampling during conditions that were more conservative than typical operating conditions. The building was unoccupied during the sample collection period – from Monday morning to Tuesday morning – because the restaurant was closed. Doors and windows remained shut during that time. The field team checked back periodically to ensure that doors and windows remained closed and that nobody had entered the building. Under typical operating conditions, restaurant workers and customers would have been opening and closing the doors; during warm weather months, the windows of the restaurant would have stayed open to allow outdoor air exchange. The heating system was set to operate at a typical temperature, i.e., 68°F. The vent fans over the stoves were turned on and left running for the entire sample collection period.

## 2.3 Subslab Soil Gas Sampling

The two existing subslab soil gas probes that were installed during the March 2008 event were checked for leaks using helium to ensure that ambient air was not introduced along with the subslab soil gas sample. The field team successfully collected subslab samples from both of the existing subslab soil gas probes – one in the storage room next to the stairs (Q2-VI-01) and one in the kitchen on the north side of the building, next to the water service closet (Q2-VI-02) (Figure 1). Subslab soil gas samples were collected at a flow rate of 200

mL/min (5-minute period) in 1-L SUMMA canisters equipped with critical orifices. The March 2009 subslab soil gas sampling log is provided in Table 1c.

## 2.4 Outdoor Air Sampling

The outdoor air sample was collected over a 24-hour period (March 21–22) synoptically with the indoor air samples using a 6-L SUMMA canister equipped with flow controller. At the one location on the south side of the building (Q2-OA-01) the SUMMA canister was chained to the fence at approximately 5 feet above ground surface. The SUMMA canisters were checked after 20 hours to ensure flow controllers were working properly and the canister pressure had not reached zero. The March 2009 outdoor air-sampling log is provided in Table 1b.

Outdoor air samples were also collected at three neighboring properties in March 2009 by similar methods. Q1-OA-04 and Q1-OA-06 were chained to the fence at approximately 5 feet above ground surface at the Quanta site. Q1-OA-07 was chained to a metal box at the ground surface at the ambulance building at 915 River Road. Q1-OA-04, Q1-OA-06 and Q1-OA-07 were collected synoptically with the indoor air and subslab soil gas samples collected at the 115 River Road Building March 21–22.

Q3-OA-01 was chained to the fence at approximately 5 feet above ground surface at the north side of the 103 River Road building. Q3-OA-01 was collected March 17–18 synoptically with the subslab soil gas samples collected at 103 River Road.

## 3 Analytical Results

Columbia Analytical Services (CAS), in Simi Valley, California, performed the analyses using EPA method TO-15. CAS is certified for TO-15 analyses by NJDEP (NJ Certification No. CA009).

Analytical results from the indoor air, outdoor air, and subslab soil gas samples are presented in Tables 2–4b.

A CH2M HILL chemist performed a data quality evaluation report (Attachment B). The QAPP addendum in the work plan describes the data quality evaluation procedures that address precision, accuracy, representativeness, completeness, and comparability parameters (CH2M HILL, 2006a). EPA (1999, 2002) individual method requirements and guidelines were used in this data quality evaluation. The data quality evaluation reports indicate that the project goals for data precision and accuracy, as measured by field and laboratory quality control (QC) indicators, have been met, and that analyte and method objectives for completeness were met.

## 4 Vapor Intrusion Screening Evaluation

### 4.1 Data Comparison to NJDEP RALs and HDNLs

Upon receipt from the laboratory, the indoor air sample results were compared to the NJDEP RALs and HDNLs. As stated in NJDEP's (2005) vapor intrusion guidance, RALs "represent trigger levels for the initiation of prompt action at occupied buildings to further

investigate the VI pathway and/or minimize impacts to building occupants through the implementation of an interim remedial measure (IRM).” Exceedances of HDNLs “indicate the need for the Department [NJDEP] to inform the local and/or state health departments about the site and the associated vapor intrusion related indoor air concentrations for further evaluation and possible emergency actions.”

The comparison of the indoor air sample results to the NJDEP RALs and HDNLs is presented in Table 2.

Acrolein exceeded the NJDEP RAL of  $0.04 \mu\text{g}/\text{m}^3$  in the three indoor air samples collected. The NJDEP HDNL of  $3.5 \mu\text{g}/\text{m}^3$  was not exceeded. The indoor air results ranged from  $0.52$  to  $2 \mu\text{g}/\text{m}^3$ . Acrolein was detected in both subslab soil gas samples at comparable concentrations:  $1.4$  and  $1.6 \mu\text{g}/\text{m}^3$ . Acrolein was detected in the outdoor air sample at  $2.1 \mu\text{g}/\text{m}^3$ . A comparison of subslab soil gas, indoor air, and outdoor air sample results for acrolein strongly suggests that concentrations of acrolein in indoor air are not due to vapor intrusion, particularly since the outdoor air concentration is the same as or greater than the indoor air concentrations, and subslab concentrations are similar or less than indoor air concentrations. Acrolein is a combustion byproduct present in cigarette smoke and automobile exhaust. EPA concurred with this conclusion in an e-mail dated April 27, 2009, stating that “the detected concentrations may likely be an artifact of ambient or confounding sources.”

With the exception of acrolein, there were no other constituents detected in indoor air at concentrations above the NJDEP RALs. On the basis of these results, and in accordance with NJDEP (2005) guidance, there was no need for prompt action to further investigate or reduce potential exposures in the building.

None of the constituents detected in indoor air were above the NJDEP HDNLs. On the basis of these results, and in accordance with NJDEP guidance (NJDEP, 2005), there was no need to notify state or local health departments.

#### 4.2 Data Comparison to EPA Risk-Based Screening Levels

The EPA indoor air screening levels (IASLs) for most of the COIs are based on the EPA (2009) Regional Screening Levels (RSLs) for air. The RSLs are derived assuming a  $10^{-6}$  target cancer risk level or a target noncancer hazard quotient of 1. The EPA IASLs for tetrachloroethene (PCE) and trichloroethene (TCE) are based on the New York State Department of Health (NYS DOH) air criteria for PCE (NYS DOH, 2003) and TCE (NYS DOH, 2006). Soil gas screening levels (SGSLs) were derived by applying the EPA (2002) OSWER Draft Vapor Intrusion Guidance generic default shallow soil gas-to-indoor air attenuation factor of 0.1 to the IASLs. For the carcinogenic COIs, the EPA risk management range of  $10^{-6}$  to  $10^{-4}$  was considered for this evaluation. Concentrations above this range (i.e., greater than  $10^{-4}$  cancer risk) generally require further action (remediation and/or mitigation of the VI pathway). Concentrations within the risk management range may require further action (further evaluation, additional sampling, etc) based on site conditions. For noncarcinogenic compounds, noncancer hazard quotients less than 1 was considered acceptable (no adverse health effects). Concentrations above a noncancer hazard quotient of 1 may require further action.

Because the 163 Old River Road building is currently used as a commercial establishment, the subslab soil gas analytical results were compared to EPA industrial screening levels. These comparisons are provided in Table 3a (indoor air) and Table 4a (subslab soil gas).

The following observations were based on a comparison of the indoor air analytical data to the EPA industrial IASLs:

- With the exception of acrolein, concentrations of all COIs in indoor air were below SGSLs based on a noncancer hazard quotient of 1; however, as discussed in Section 4.1 the presence of acrolein in indoor air is likely an artifact of ambient or confounding sources.
- Concentrations of the COIs in indoor air were below SGSLs based on a  $10^{-5}$  target cancer-risk level at all three indoor air sampling locations.
- With the exception of naphthalene, concentrations of all COIs in indoor air did not exceed IASLs based on the  $10^{-6}$  target cancer-risk level. TCE was not detected in any indoor air samples; however the reporting limit of  $0.15 \mu\text{g}/\text{m}^3$  exceeded the  $10^{-6}$  target cancer-risk level of  $0.05 \mu\text{g}/\text{m}^3$ .

The following observations were based on a comparison of the subslab soil gas analytical data to SGSLs derived using the EPA (2002, 2009) RSLs and default attenuation factor of 0.1:

- With the exception of 1,2,4-trimethylbenzene, acrolein, and naphthalene, COI concentrations in subslab soil gas were below SGSLs based on a noncancer hazard quotient of 1. As discussed in Section 4.1, the presence of acrolein in subslab soil gas is likely an artifact of confounding sources.
- With the exception of naphthalene, concentrations of all other COIs in subslab soil gas were below SGSLs based on the  $10^{-5}$  target cancer-risk level.
- Naphthalene subslab soil gas concentrations exceeded the SGSL based on a  $10^{-4}$  target cancer-risk level at one of the two sample locations.
- With the exception of chloroform, ethylbenzene and naphthalene, COI concentrations in subslab soil gas did not exceed the SGSLs based on  $10^{-6}$  target cancer-risk level. TCE was not detected in the subslab soil gas samples, however the reporting limit of  $0.85 \mu\text{g}/\text{m}^3$  exceeded the SGSL of  $0.5 \mu\text{g}/\text{m}^3$  based on a  $10^{-6}$  target cancer-risk level.

For informational purposes only, the indoor air and subslab soil gas analytical results were compared to the EPA residential IASLs and SGSLs. These comparisons are provided in Attachment C-1a (indoor air) and Attachment C-2a (subslab soil gas).

For information purposes the indoor air and subslab soil gas analytical data for PCE was also compared against a non-cancer-based screening level. This comparison was not provided in Tables 3a and 4a. For PCE the EPA (2009) RSL for a noncancer hazard quotient of 1.0 is  $1,200 \mu\text{g}/\text{m}^3$  for industrial air which is more than 1,000-times greater than the NYS DOH air criterion for PCE (NYS DOH, 2003) of  $1 \mu\text{g}/\text{m}^3$ . None of the indoor air or subslab soil gas PCE detections exceeded the more conservative cancer-based IASL or SGSL for PCE and therefore PCE detections in indoor air and subslab soil gas were well below the noncancer hazard quotient of 1 IASL or SGSL.

For information purposes, the indoor air and subslab soil gas analytical data for TCE was also compared against non-cancer-based screening levels. This comparison was not provided in Tables 3a and 4a. An EPA (2009) RSL based on noncancer inhalation toxicity is not available. EPA is currently completing a toxicity assessment for TCE. For TCE two noncancer screening values were considered; the NYS DOH noncarcinogenic air criterion of  $10 \mu\text{g}/\text{m}^3$  (NYS DOH, 2006) and the California Environmental Protection Agency (Cal EPA) inhalation reference exposure level of  $600 \mu\text{g}/\text{m}^3$  (Cal EPA, 2000). TCE detections in the three indoor air samples were below both of these screening levels and the TCE detections in the two subslab soil gas samples were below the SGSLs that would be generated by applying a subslab-soil-gas-to-indoor-air attenuation factor of 0.1.

### 4.3 Data Comparison to NJDEP Screening Levels

The NJDEP indoor air and subslab soil gas screening levels were obtained from Table 1 of the NJDEP (2005) vapor intrusion guidance.

For data evaluation purposes and to identify constituents that may be present at concentrations posing an unacceptable health risk indoor air and subslab soil gas analytical results were compared to nonresidential screening levels because the 163 Old River Road building is currently used as a commercial establishment. These comparisons are provided in Table 3b (indoor air) and Table 4b (subslab soil gas).

With the exception of acrolein and naphthalene, concentrations of all COIs in indoor air were below the NJDEP nonresidential IASLs. As discussed in Section 4.1, the presence of acrolein in indoor air is likely an artifact of ambient or confounding sources.

With the exception of 1,2,4-trimethylbenzene, acrolein, and naphthalene, concentrations of all COIs in subslab soil gas were below the NJDEP nonresidential SGSLs. As discussed in Section 4.1, the presence of acrolein in subslab soil gas is likely an artifact of confounding sources.

For informational purposes only the indoor air and subslab soil gas analytical results were compared to residential IASLs and SGSLs. These comparisons are provided in Attachment C-1b (indoor air) and Attachment C-2b (subslab soil gas).

### 4.4 Empirical Attenuation Factor

Empirical subslab-soil-gas-to-indoor-air attenuation factors (AFs) were calculated for the 163 Old River Road building using the March 2009 analytical data.

Consistent with the data evaluation and filtering approaches described in EPA's (2008) Vapor Intrusion Database technical support document, empirical AFs were only calculated for constituents that had relatively high subslab soil gas concentrations (e.g., greater than 100 times the indoor air) and indoor air concentrations which exceeded the IASLs and were greater than outdoor air concentrations. Putting these constraints on the data set limited the list of constituents for empirical AF calculation to naphthalene.

The empirical AFs calculated for naphthalene using the two subslab soil gas concentrations of 690 and  $330 \mu\text{g}/\text{m}^3$  and the three indoor air concentrations of 0.22, 0.43, and  $0.75 \mu\text{g}/\text{m}^3$  range from  $3\text{E}-04$  to  $2\text{E}-03$ , which are significantly lower than the generic default EPA (2002) shallow soil-gas-to-indoor-air attenuation factor of 0.1. This strongly indicates that subslab



soil gas concentrations attenuate much more significantly than suggested by the generic default attenuation factor.

#### 4.5 Evaluation of Aerobic Biodegradation Potential in Subslab Soil Gas

Petroleum hydrocarbons readily degrade to carbon dioxide in the presence of oxygen by microbes in soil within the vadose zone. Field measurements for oxygen and carbon dioxide were performed with a GEM2000 landfill gas meter to evaluate the potential for aerobic biodegradation in the subsurface vadose zone. These measurements are provided in Table 1c. The concentrations of oxygen were 18.8 and 17.9 percent. This indicates that there is an ample amount of oxygen available for aerobic biodegradation in the subslab soil gas. The concentrations of carbon dioxide were 0.1 and 1.8 percent, indicating that aerobic biodegradation is likely not occurring at significant rates because carbon dioxide is not present at elevated concentrations.

#### 4.6 Historical Data Comparison

The indoor air and subslab sample results from March 2008 and March 2009 were compared to determine if significant temporal variability is occurring in either the indoor air or subslab soil gas. Attachment D-1 provides the indoor air data comparison, and Attachment D-2 provides the subslab soil gas data comparison.

##### 4.6.1 Indoor Air

The indoor air sample data in March 2008 and March 2009 were generally similar; the results at each location were less than one order of magnitude different. The three indoor air sample locations yielded similar constituent concentrations during both the March 2008 and 2009 sampling events, confirming the previous building characteristic observation that the relatively large indoor air volume is well connected within the building.

##### 4.6.2 Subslab Soil Gas

In March 2008 detections observed at Q2-VI-02 (in the kitchen at the north end of the building) were generally higher than those at Q2-VI-01 (in the storage room at the south end of the building). In March 2009 the opposite occurred – COI concentrations were generally higher at Q2-VI-01. One exception was naphthalene; the concentrations of naphthalene were significantly higher in 2009 in both subslab soil gas samples.

The subslab soil gas sample results varied significantly for some constituents between the March 2008 and March 2009 sampling events.

- **1,2,4-Trimethylbenzene.** At Q2-VI-01, concentrations were 28 times higher in 2009. At Q2-VI-02, concentrations were 43 times lower in 2009.
- **1,3,5-Trimethylbenzene.** At Q2-VI-01, concentrations were 23 times higher in 2009. At Q2-VI-02, concentrations were 58 times lower in 2009.
- **Ethylbenzene.** At Q2-VI-01, concentrations were four times higher in 2009. At Q2-VI-02, concentrations were 259 times lower in 2009.
- **Naphthalene.** At Q2-VI-01, concentrations were 1,500 times higher in 2009. At Q2-VI-02, concentrations were 103 times higher in 2009.

- **n-Propylbenzene.** At Q2-VI-01, concentrations were 33 times higher in 2009. At Q2-VI-02, concentrations were 85 times lower in 2009.
- **Total xylenes.** At Q2-VI-01, concentrations were six times higher in 2009. At Q2-VI-02, concentrations were 352 times lower in 2009.

The March 2008 and March 2009 sampling results show significant temporal variability in the subslab soil gas samples. As discussed above, the temporal variability observed in the subsurface soil gas samples was much greater than that observed in the indoor air samples. This trend is typical and has been observed at other locations (ITRC, 2007).

## 5 Conclusions

The results from the March 2009 vapor intrusion monitoring event at the 163 Old River Road building indicate that a potential vapor intrusion pathway is not causing, as defined by the current regulatory framework, unacceptable concentrations of site-related constituents in indoor air under current site conditions. Future changes in site conditions (e.g., land use, condition of the building) would require a reevaluation of the VI pathway.

Although acrolein was detected in indoor air at concentrations above the NJDEP RAL and above the EPA and NJDEP IASLs, a review of multiple lines of evidence strongly suggests that the presence of acrolein in indoor air is an artifact of ambient or confounding sources. With the exception of acrolein, no other constituents were detected in indoor air at concentrations above NJDEP RALs. There were no constituents detected in exceedance of the HDNLs. Based on these results and in accordance with the NJDEP (2005) vapor intrusion guidance, there was no need for prompt action to further investigate or reduce potential exposures in the building, and there was no need to notify state or local health departments.

Concentrations of constituents in indoor air were below the EPA industrial IASLs based on a noncancer-hazard quotient of 1 or a  $10^{-5}$  target cancer-risk level except for acrolein; however, the presence of acrolein in indoor air is likely an artifact of ambient or confounding sources. One constituent in indoor air, naphthalene, exceeded the EPA industrial IASL for a  $10^{-6}$  target cancer-risk level. Two constituents – acrolein and naphthalene – exceeded the NJDEP nonresidential IASLs.

With the exception of 1,2,4-trimethylbenzene, acrolein, and naphthalene, concentrations of constituents in subslab soil gas were below the EPA industrial SGSLs based on a noncancer hazard quotient of 1 or a  $10^{-5}$  target cancer-risk level. The presence of acrolein in subslab soil gas is likely an artifact of confounding sources. Naphthalene concentrations exceeded the SGSLs based on a  $10^{-4}$  target cancer-risk level at one of the two subslab soil gas sample locations. Two constituents in subslab soil gas, chloroform and ethylbenzene, exceeded the EPA industrial IASLs based on a  $10^{-6}$  target cancer-risk level but were below the IASLs based on a  $10^{-5}$  target cancer-risk level. Three constituents exceeded the NJDEP nonresidential IASLs; 1,2,4-trimethylbenzene, acrolein, and naphthalene.

Indoor air concentrations measured in March 2009 were similar to concentrations measured in March 2008. Subslab soil gas concentrations measured at the two subslab soil gas probes for some constituents varied considerably between March 2008 and March 2009.

The March 2008 sample data confirms the previous observation that building characteristics may preclude a vapor intrusion pathway. These characteristics include the relatively large and connected indoor air volume, the thick slab (from 6 inches to 2 feet), and the elevated dining room floor. The empirical AFs calculated for the building using the March 2009 naphthalene detections ranged from 3E-04 to 2E-03.

## 6 Recommendations for Further Action

An additional monitoring event is proposed for the 2009–2010 heating season at the 163 Old River Road building. This additional monitoring will verify that indoor air concentrations of vapor intrusion COIs remain below acceptable risk levels. The monitoring event will include the following activities:

- Indoor air sample collection at the same three March 2009 indoor air sample locations (Q2-IA-01, Q2-IA-02, and Q2-IA-03)
- Subslab soil gas sample collection at the two existing subslab probes (Q2-VI-01 and Q2-VI-02)
- Outdoor air sample collection at the same March 2009 outdoor air location (Q2-OA-01)

A revised analyte list is proposed for the winter (heating season) 2009–2010 vapor intrusion sampling event. Constituents recommended for further monitoring are 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, carbon tetrachloride, chloroform, ethylbenzene, naphthalene, n-propylbenzene, and total xylenes. 1,4-Dichlorobenzene, bromodichloromethane, chlorodibromomethane, and TCE were not detected in subslab soil gas in either March 2008 or 2009 and are therefore not recommended for further monitoring. Tetrachloroethene is not recommended for further monitoring because subslab soil gas concentrations were below the lowest screening level, the EPA  $10^{-6}$  target cancer-risk level of  $10 \mu\text{g}/\text{m}^3$ , in March 2008 and 2009. Tetrahydrofuran is not recommended for further monitoring because SGSs and IASs are not available for this constituent. Acrolein is also not recommended for further monitoring because the March 2008 and 2009 sampling results indicate that its presence in indoor air, outdoor air and subslab soil gas is likely an artifact of ambient or confounding sources.

The need for additional vapor intrusion activities at the 163 Old River Road building will be evaluated on the basis of the results of 2009–2010 heating season monitoring event and the final remedy set forth in the Quanta Site Record of Decision.

## 7 References

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Tables

**TABLE 1a**

Sample Locations - Winter 2008 - 2009  
163 Old River Road Building  
Edgewater, New Jersey

**Indoor Air Sample Locations**

Location ID	Sample Location Description
Q2-IA-01	1st floor kitchen - counter top
Q2-IA-02	1st floor dining room - on table near wall
Q2-IA-03	2nd floor dining room - on table in SW room

**Subslab Sample Locations**

Location ID	Sample Location Description
Q2-VI-01	Storage room next to stairs
Q2-VI-02	Kitchen - north side next to water service closet

**Outdoor Air Sample Locations**

Location ID	Sample Location Description
Q2-OA-01	South side of building - chained to fence

**Additional Outdoor Air Sample Locations at Neighboring Properties**

Location ID	Sample Location Description
Q1-OA-04	North Site - chain to fence near end of ramp
Q1-OA-06	NE Site Corner - chain to fence near bulkhead
Q1-OA-07	Ambulance Building - 915 River Road - chain to orange box foot
Q3-OA-01	North side of 103 River Road building

TABLE 1b

Indoor and Outdoor Air Sampling Log - March 2009  
 163 Old River Road Building  
 Edgewater, New Jersey

Field ID	Location Description	Canister ID	Flow Controller ID	Pressure Gauge ID	Initial Canister Pressure ("Hg)	Start Date	Start Time	End Date	20 Hour Check Time	20 Hour Pressure ("Hg)	End Time	Final Pressure ("Hg)	Flow Controller Rate (ml/min)	Temp °F
Q2-IA-01-031709	Kitchen - counter top	AC01099	FC00194	AVG00872	-30	3/16/2009	12:05	3/17/2009	8:15	-8.5	10:26	-7	24 Hour Period	69
Q2-IA-02-031709	1st floor dinning room - on table near wall	AC01460	FC00768	AVG01023	-30	3/16/2009	12:06	3/17/2009	8:17	-10	10:29	-8	24 Hour Period	68
Q2-IA-03-031709	2nd floor dinnig room - on table in SW room	AC01551	FC00606	AVG01140	-30	3/16/2009	12:08	3/17/2009	8:19	-8	10:30	-6	24 Hour Period	69
Q2-DUP1-031709	Kitchen - counter top	AC01569	FC00152	AVG00638	-29.5	3/16/2009	12:05	3/17/2009	8:15	-7.5	10:26	-5.5	24 Hour Period	69
Q2-OA-01-031709	Southeast corner of bldg - chained to fence	AC01568	FC00574	AVG01124	-29.5	3/16/2009	12:13	3/17/2009	10:19	-5.5	10:35	-5.5	24 Hour Period	49

TABLE 1c  
 Subslab Soil Gas Sampling Log - March 2009  
 163 Old River Road Building  
 Edgewater, New Jersey

Field ID	Location Description	Canister ID	Flow Controller ID	Pressure Gauge ID	Date	Total VOCs in Probe (ppm)	Purge Start Time	Purge End Time	Purge Rate (mL/min)	Helium Leak Check (ppm)	Total VOCs (ppm)	O <sub>2</sub> (%)	CO <sub>2</sub> (%)	Sample Start Time	Initial Pressure ("Hg)	Sample Finish Time	Final Pressure ("Hg)	Temp (oF)
Q2-VI-01-031709	Storage room next to stairs	1SC00582	OA01090	AVG00524	03/17/09	21.4	11:01	11:10	200	0	1	17.9	0.1	11:15	-30	11:23	-2	65
Q2-VI-02-031709	Kitchen - north side next to water service closet	1SC00339	OA00742	AVG00227	03/17/09	3.4	11:32	11:41	200	0	1	18.8	1.8	11:43	-30	11:53	-3	63



TABLE 2

Indoor Air Analytical Data Compared to NJDEP RALs and HDNLs  
 163 Old River Road Building  
 Quanta Site, Edgewater, New Jersey

Cas #	Parameter Name	NJDEP RAL (µg/m³)	NJDEP HDNL (µg/m³)	Location											
				1st floor kitchen				1st floor dining room				2nd floor dining room			
				Q2-IA-01-031709		Q2-DUP1-031709		Q2-IA-02-031709		Q2-IA-03-031709					
				3/17/2009		3/17/2009		3/17/2009		3/17/2009					
				µg/m³		µg/m³		µg/m³		µg/m³					
95-63-6	1,2,4-Trimethylbenzene	1.40E+01	Not Available	5.20E-01	J	5.80E-01	J	4.40E-01	J	8.00E-01					
108-67-8	1,3,5-Trimethylbenzene	1.20E+01	Not Available	1.90E-01	J	2.20E-01	J	1.60E-01	J	2.90E-01	J				
106-46-7	1,4-Dichlorobenzene	3.00E+01	3.00E+02	2.90E-01		2.90E-01		3.10E-01		3.20E-01					
107-02-8	Acrolein	4.00E-02	3.50E+00	<b>6.30E-01</b>	J	<b>2.00E+00</b>		<b>6.30E-01</b>	J	<b>5.20E-01</b>	J				
71-43-2	Benzene	1.40E+01	1.40E+01	1.00E+00		1.20E+00		1.10E+00		1.20E+00					
75-27-4	Bromodichloromethane	1.00E+01	1.00E+02	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U				
56-23-5	Carbon tetrachloride	1.00E+01	1.00E+02	3.10E-01		4.00E-01		3.60E-01		3.70E-01					
67-66-3	Chloroform	8.00E+00	8.00E+01	1.50E-01	J	1.60E-01		1.40E-01	J	1.80E-01					
124-48-1	Chlorodibromomethane	7.00E+00	7.00E+01	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U				
100-41-4	Ethylbenzene	2.20E+03	4.30E+03	4.00E-01	J	4.20E-01	J	4.10E-01	J	4.20E-01	J				
91-20-3	Naphthalene	5.00E+00	5.00E+01	4.00E-01		4.30E-01		2.20E-01	J	7.50E-01					
103-65-1	n-Propylbenzene	2.20E+03	4.30E+03	1.10E-01	J	1.30E-01	J	9.70E-02	J	1.40E-01	J				
127-18-4	Tetrachloroethene	3.00E+01	3.00E+02	3.40E-01		3.90E-01		4.00E-01		4.00E-01					
109-99-9	Tetrahydrofuran	Not Available		7.60E-01	U	7.10E-01	U	7.60E-01	U	7.40E-01	U				
79-01-6	Trichloroethene	2.00E+01	2.00E+01	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U				
108-38-3	o-Xylene	Not Available		4.90E-01	J	5.00E-01	J	4.30E-01	J	5.10E-01	J				
NA	m&p-Xylene	Not Available		1.20E+00		1.30E+00		1.30E+00		1.30E+00					
1330-20-7	Xylenes (total) - sum of isomers	2.20E+02	4.30E+03	1.69E+00		1.80E+00		1.73E+00		1.81E+00					

Notes:

**6.30E-01** Bold and shaded indicates an exceedance of the NJDEP RAL.

6.30E-01 Outlined indicates an exceedance of the NJDEP HDNL.

NJDEP RALs and HDNLs are from the NJDEP Vapor Intrusion Guidance Table 2 (March 2007)

NJDEP = New Jersey Department of Environmental Protection

RAL = Rapid Action Level

HDNL = Health Department Notification Level

U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.

TABLE 3A

Indoor Air Analytical Data Compared to USEPA Industrial Air Risk-Based Screening Levels  
163 Old River Road Building  
Edgewater, New Jersey

Cas #	Parameter Name	USEPA Industrial IASLs			Location		Q2-IA-01		Q2-IA-02		Q2-IA-03		
		10-6 Target Risk ( $\mu\text{g}/\text{m}^3$ )	10-4 Target Risk ( $\mu\text{g}/\text{m}^3$ )	HQ=1 Target Risk ( $\mu\text{g}/\text{m}^3$ )	Location Description		1st floor kitchen		1st floor dining room		2nd floor dining room		
					Field Sample ID			Q2-IA-01-031709	Q2-DUP1-031709	Q2-IA-02-031709	Q2-IA-03-031709		
					Sample Date			3/17/2009	3/17/2009	3/17/2009	3/17/2009		
					Units			$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$		
95-63-6	1,2,4-Trimethylbenzene	NA	NA	3.1E+01		5.20E-01	J	5.80E-01	J	4.40E-01	J	8.00E-01	
108-67-8	1,3,5-Trimethylbenzene	NA	NA	2.6E+01		1.90E-01	J	2.20E-01	J	1.60E-01	J	2.90E-01	J
106-46-7	1,4-Dichlorobenzene	1.1E+00	1.1E+02	3.5E+03		2.90E-01		2.90E-01		3.10E-01		3.20E-01	
107-02-8	Acrolein	NA	NA	8.8E-02		6.30E-01	J	2.00E+00		6.30E-01	J	5.20E-01	J
71-43-2	Benzene	1.6E+00	1.6E+02	1.3E+02		1.00E+00		1.20E+00		1.10E+00		1.20E+00	
75-27-4	Bromodichloromethane	3.3E-01	3.3E+01	NA		1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U
56-23-5	Carbon tetrachloride	8.2E-01	8.2E+01	8.3E+02		3.10E-01		4.00E-01		3.60E-01		3.70E-01	
67-66-3	Chloroform	5.3E-01	5.3E+01	4.3E+02		1.50E-01	J	1.60E-01		1.40E-01	J	1.80E-01	
124-48-1	Chlorodibromomethane	4.5E-01	4.5E+01	NA		1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U
100-41-4	Ethylbenzene	4.9E+00	4.9E+02	4.4E+03		4.00E-01	J	4.20E-01	J	4.10E-01	J	4.20E-01	J
91-20-3	Naphthalene	3.6E-01	3.6E+01	1.3E+01		4.00E-01		4.30E-01		2.20E-01	J	7.50E-01	
103-65-1	n-Propylbenzene	Not Available				1.10E-01	J	1.30E-01	J	9.70E-02	J	1.40E-01	J
127-18-4	Tetrachloroethene <sup>1</sup>	1.0E+00	1.0E+02	NA		3.40E-01		3.90E-01		4.00E-01		4.00E-01	
109-99-9	Tetrahydrofuran	Not Available				7.60E-01	U	7.10E-01	U	7.60E-01	U	7.40E-01	U
79-01-6	Trichloroethene <sup>1</sup>	5.0E-02	5.0E+00	NA		1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U
108-38-3	o-Xylene	NA	NA	3.1E+03		4.90E-01	J	5.00E-01	J	4.30E-01	J	5.10E-01	J
NA	m&p-Xylene <sup>2</sup>	Not Available				1.20E+00		1.30E+00		1.30E+00		1.30E+00	
1330-20-7	Xylenes (total) - sum of isomers	NA	NA	4.4E+02		1.69E+00		1.80E+00		1.73E+00		1.81E+00	

## Notes:

**6.30E-01** Bold indicates an exceedance of the 10-6 target risk IASL.

**6.30E-01** Outlined indicates an exceedance of the 10-4 target risk IASL.

**6.30E-01** Shaded indicates an exceedance of the HQ=1 target risk IASL.

The IASLs are based on the EPA 2008 Regional Screening Levels (April 2009) for Industrial Air.

IASL = Indoor Air Screening Level

NA = Not applicable

U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.

<sup>1</sup> = USEPA Region II utilizes the New York State Department of Health Air Criterion for PCE and TCE.

<sup>2</sup> = m&p-xylene were added to o-xylene and compared to the screening levels for total xylenes.

TABLE 3B

Indoor Air Analytical Data Compared to NJDEP Nonresidential Screening Levels  
163 Old River Road Building  
Edgewater, New Jersey

Cas #	Parameter Name	NJDEP Nonresidential IASL ( $\mu\text{g}/\text{m}^3$ )	Location											
			Q2-IA-01				Q2-IA-02				Q2-IA-03			
			Location Description											
			1st floor kitchen				1st floor dining room				2nd floor dining room			
			Field Sample ID	Q2-IA-01-031709	Q2-DUP1-031709	Q2-IA-02-031709	Q2-IA-03-031709							
Sample Date	3/17/2009	3/17/2009	3/17/2009	3/17/2009										
Units	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$										
95-63-6	1,2,4-Trimethylbenzene <sup>1</sup>	1.00E+01	5.20E-01	J	5.80E-01	J	4.40E-01	J	8.00E-01					
108-67-8	1,3,5-Trimethylbenzene <sup>1</sup>	9.00E+00	1.90E-01	J	2.20E-01	J	1.60E-01	J	2.90E-01	J				
106-46-7	1,4-Dichlorobenzene <sup>2</sup>	3.00E+00	2.90E-01		2.90E-01		3.10E-01		3.20E-01					
107-02-8	Acrolein <sup>1,2</sup>	5.00E-01	<b>6.30E-01</b>	J	<b>2.00E+00</b>		<b>6.30E-01</b>	J	<b>5.20E-01</b>	J				
71-43-2	Benzene <sup>2</sup>	2.00E+00	1.00E+00		1.20E+00		1.10E+00		1.20E+00					
75-27-4	Bromodichloromethane <sup>2</sup>	3.00E+00	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U				
56-23-5	Carbon tetrachloride <sup>2</sup>	3.00E+00	3.10E-01		4.00E-01		3.60E-01		3.70E-01					
67-66-3	Chloroform <sup>2</sup>	2.00E+00	1.50E-01	J	1.60E-01		1.40E-01	J	1.80E-01					
124-48-1	Chlorodibromomethane <sup>2</sup>	4.00E+00	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U				
100-41-4	Ethylbenzene	1.50E+03	4.00E-01	J	4.20E-01	J	4.10E-01	J	4.20E-01	J				
91-20-3	Naphthalene <sup>1,2</sup>	2.00E-01	<b>4.00E-01</b>		<b>4.30E-01</b>		<b>2.20E-01</b>	J	<b>7.50E-01</b>					
103-65-1	n-Propylbenzene <sup>1,3</sup>	1.50E+03	1.10E-01	J	1.30E-01	J	9.70E-02	J	1.40E-01	J				
127-18-4	Tetrachloroethene <sup>2</sup>	3.00E+00	3.40E-01		3.90E-01		4.00E-01		4.00E-01					
109-99-9	Tetrahydrofuran	Not Available	7.60E-01	U	7.10E-01	U	7.60E-01	U	7.40E-01	U				
79-01-6	Trichloroethene <sup>2</sup>	3.00E+00	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U				
108-38-3	o-Xylene <sup>4</sup>	Not Available	4.90E-01	J	5.00E-01	J	4.30E-01	J	5.10E-01	J				
NA	m&p-Xylene <sup>4</sup>	Not Available	1.20E+00		1.30E+00		1.30E+00		1.30E+00					
1330-20-7	Xylenes (total) - sum of isomers	1.50E+02	1.69E+00		1.80E+00		1.73E+00		1.81E+00					

## Notes:

**6.30E-01** Bold and shaded indicates an exceedance of the NJDEP Nonresidential IASL.

NJDEP Generic IASLs are from the NJDEP Vapor Intrusion Guidance Table 1 (March 2007)

NJDEP = New Jersey Department of Environmental Protection

IASL = Indoor Air Screening Level

U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.

<sup>1</sup> = Screening levels were provided by NJDEP for these constituents because generic screening levels were not included in the NJDEP Vapor Intrusion Guidance.

<sup>2</sup> = The NJDEP IASLs for these constituents defaults to the method analytical reporting limit because it is higher than the risk-based screening level.

<sup>3</sup> = NJDEP in conjunction with USEPA's National Center for Environmental Assessment determined that it is appropriate to use ethylbenzene as an analog for n-propylbenzene in the development of a screening value. This screening value is not defensible as the primary driver in making cleanup decisions since it is based on limited information.

<sup>4</sup> = o-xylene and m&p-xylene were added together and compared to the screening level for total xylenes.

TABLE 4A

Subslab Soil Gas USEPA Risk-Based Screening Levels  
163 Old River Road Building  
Edgewater, New Jersey

Cas #	Parameter Name	USEPA Industrial SGSLs			Units		
		10-6 Target Risk ( $\mu\text{g}/\text{m}^3$ )	10-4 Target Risk ( $\mu\text{g}/\text{m}^3$ )	HQ=1 Target Risk ( $\mu\text{g}/\text{m}^3$ )	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	
					Location	Q2-VI-01	Q2-VI-02
					Location Description	Storage Room	Kitchen
					Field Sample ID	Q2-VI-01-031709	Q2-VI-02-031709
					Sample Date	3/17/2009	3/17/2009
					Units	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
95-63-6	1,2,4-Trimethylbenzene	NA	NA	3.1E+02	6.90E+02		4.90E+01
108-67-8	1,3,5-Trimethylbenzene	NA	NA	2.6E+02	2.10E+02		1.20E+01
106-46-7	1,4-Dichlorobenzene	1.1E+01	1.1E+03	3.5E+04	8.50E-01	U	8.00E-01
107-02-8	Acrolein	NA	NA	8.8E-01	1.60E+00		1.40E+00
71-43-2	Benzene	1.6E+01	1.6E+03	1.3E+03	3.40E+00		1.70E+00
75-27-4	Bromodichloromethane	3.3E+00	3.3E+02	NA	8.50E-01	U	3.80E-01
56-23-5	Carbon tetrachloride	8.2E+00	8.2E+02	8.3E+03	2.80E-01	J	1.30E+00
67-66-3	Chloroform	5.3E+00	5.3E+02	4.3E+03	1.30E+00		1.00E+01
124-48-1	Chlorodibromomethane	4.5E+00	4.5E+02	NA	8.50E-01	U	8.00E-01
100-41-4	Ethylbenzene	4.9E+01	4.9E+03	4.4E+04	1.80E+02		5.80E+00
91-20-3	Naphthalene	3.6E+00	3.6E+02	1.3E+02	6.90E+02		3.30E+02
103-65-1	n-Propylbenzene		Not Available		1.50E+02		3.90E+00
127-18-4	Tetrachloroethene <sup>1</sup>	1.0E+01	1.0E+03	NA	3.00E+00		3.70E+00
109-99-9	Tetrahydrofuran		Not Available		4.50E+00		8.00E-01
79-01-6	Trichloroethene <sup>1</sup>	5.0E-01	5.0E+01	NA	8.50E-01	U	8.00E-01
108-38-3	o-Xylene	NA	NA	3.1E+04	5.00E+02		1.30E+01
NA	m&p-Xylene <sup>2</sup>		Not Available		9.10E+02		2.00E+01
1330-20-7	Xylenes (total) - sum of isomers	NA	NA	4.4E+03	1.41E+03		3.30E+01

## Notes:

**6.30E-01** Bold indicates an exceedance of the 10-6 target risk SGSL.

**6.30E-01** Outlined indicates an exceedance of the 10-4 target risk SGSL.

**6.30E-01** Shaded indicates an exceedance of the HQ=1 target risk SGSL.

The SGSLs are based on the EPA 2008 Regional Screening Levels (April 2009) for Industrial Air.

The SGSLs were derived from the EPA 2008 RSLs by applying the EPA Vapor Intrusion Guidance (Nov 2002) default attenuation factor of 0.1.

SGSL = Soil Gas Screening Level

NA = Not applicable

U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.

<sup>1</sup> = USEPA Region II utilizes the New York State Department of Health Air Criterion for PCE and TCE.

<sup>2</sup> = m&p-xylene were added to o-xylene and compared to the screening levels for total xylenes.

TABLE 4B

Subslab Soil Gas Analytical Data Compared to NJDEP Nonresidential Screening Levels  
163 Old River Road Building  
Edgewater, New Jersey

Cas #	Parameter Name	NJDEP Nonresidential SGSL ( $\mu\text{g}/\text{m}^3$ )	Location		Units	
			Location Description	Q2-VI-01	Q2-VI-02	
			Field Sample ID	Storage Room	Kitchen	
			Sample Date	Q2-VI-01-031709	Q2-VI-02-031709	
			Units	3/17/2009	3/17/2009	
			$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$		
95-63-6	1,2,4-Trimethylbenzene <sup>1</sup>	5.10E+02	<b>6.90E+02</b>		4.90E+01	
108-67-8	1,3,5-Trimethylbenzene <sup>1</sup>	4.30E+02	2.10E+02		1.20E+01	
106-46-7	1,4-Dichlorobenzene <sup>2</sup>	3.20E+01	8.50E-01	U	8.00E-01	U
107-02-8	Acrolein <sup>1</sup>	1.00E+00	<b>1.60E+00</b>		<b>1.40E+00</b>	
71-43-2	Benzene <sup>2</sup>	2.60E+01	3.40E+00		1.70E+00	
75-27-4	Bromodichloromethane <sup>2</sup>	3.40E+01	8.50E-01	U	3.80E-01	J
56-23-5	Carbon tetrachloride <sup>2</sup>	3.10E+01	2.80E-01	J	1.30E+00	
67-66-3	Chloroform <sup>2</sup>	2.40E+01	1.30E+00		1.00E+01	
124-48-1	Chlorodibromomethane <sup>2</sup>	4.30E+01	8.50E-01	U	8.00E-01	U
100-41-4	Ethylbenzene	7.40E+04	1.80E+02		5.80E+00	
91-20-3	Naphthalene <sup>1</sup>	6.00E+00	<b>6.90E+02</b>		<b>3.30E+02</b>	
103-65-1	n-Propylbenzene <sup>1,3</sup>	7.40E+04	1.50E+02		3.90E+00	
127-18-4	Tetrachloroethene <sup>2</sup>	3.60E+01	3.00E+00		3.70E+00	
109-99-9	Tetrahydrofuran	Not Available	4.50E+00		8.00E-01	U
79-01-6	Trichloroethene <sup>2</sup>	2.70E+01	8.50E-01	U	8.00E-01	U
108-38-3	m-Xylene <sup>4</sup>	Not Available	5.00E+02		1.30E+01	
NA	o&p-Xylene <sup>4</sup>	Not Available	9.10E+02		2.00E+01	
1330-20-7	Xylenes (total) - sum of isomers	7.70E+03	1.41E+03		3.30E+01	

## Notes:

**6.30E-01** Bold and shaded indicates an exceedance of the NJDEP Nonresidential SGSL.

NJDEP Generic SGSLs are from the NJDEP Vapor Intrusion Guidance Table 1 (March 2007)

NJDEP = New Jersey Department of Environmental Protection

SGSL = Soil Gas Screening Level

U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.

<sup>1</sup> = Screening levels were provided by NJDEP for these constituents because generic screening levels were not included in the NJDEP Vapor Intrusion Guidance.

<sup>2</sup> = The NJDEP SGSLs for these constituents defaults to the method analytical reporting limit because it is higher than the risk-based screening level.

<sup>3</sup> = NJDEP in conjunction with USEPA's National Center for Environmental Assessment determined that it is appropriate to use ethylbenzene as an analog for n-propylbenzene in the development of a screening value. This screening value is not defensible as the primary driver in making cleanup decisions since it is based on limited information.

<sup>4</sup> = o-xylene and m&p-xylene were added together and compared to the screening level for total xylenes.

TABLE 5

Outdoor Air Analytical Data  
 163 Old River Road Building  
 Quanta Site, Edgewater, New Jersey

		Location		Q2-OA-01		Q1-OA-04		Q1-OA-06		Q1-OA-07		Q3-OA-01	
		Location Description		South side of bldg		Quanta Site - north		Quanta Site -		915 River Road		North side of the	
		Field Sample ID		Q2-OA-01-031709		Q1-OA-04-032209		Q1-OA-06-032209		Q1-OA-07-032209		Q3-OA-01-031809	
		Sample Date		3/17/2009		3/22/2009		3/22/2009		3/22/2009		3/18/2009	
		Units		$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$	
Cas #	Parameter Name												
95-63-6	1,2,4-Trimethylbenzene	4.30E-01	J	2.0E-01	J	2.9E-01	J	3.0E-01	J	5.90E-01	J		
108-67-8	1,3,5-Trimethylbenzene	2.00E-01	J	7.2E-02	J	1.5E-01	J	1.0E-01	J	2.10E-01	J		
106-46-7	1,4-Dichlorobenzene	3.10E-01		1.5E-01		1.5E-01		4.6E-01		4.70E+00			
107-02-8	Acrolein	2.10E+00		3.6E-01	J	2.3E-01	J	5.1E-01	J	6.80E-01			
71-43-2	Benzene	1.10E+00		8.7E-01		8.5E-01		1.0E+00		1.30E+00			
75-27-4	Bromodichloromethane	1.40E-01	U	1.4E-01	U	1.3E-01	U	1.2E-01	U	1.30E-01	U		
56-23-5	Carbon tetrachloride	4.40E-01		4.2E-01		4.2E-01		4.9E-01		5.50E-01			
67-66-3	Chloroform	1.30E-01	J	8.8E-02	J	1.0E-01	J	1.1E-01	J	1.50E-01			
124-48-1	Chlorodibromomethane	1.40E-01	U	1.4E-01	U	1.3E-01	U	1.2E-01	U	1.30E-01	U		
100-41-4	Ethylbenzene	4.10E-01	J	2.4E-01	J	4.2E-01	J	3.4E-01	J	5.20E-01	J		
91-20-3	Naphthalene	1.40E-01	J	2.8E-01	U	2.1E-01	U	2.4E-01	U	3.50E-01			
103-65-1	n-Propylbenzene	1.20E-01	J	7.1E-01	U	6.5E-02	J	6.5E-02	J	1.50E-01	J		
127-18-4	Tetrachloroethene	3.70E-01		2.1E-01		2.2E-01		3.0E-01		5.90E-01			
109-99-9	Tetrahydrofuran	7.00E-01	U	7.1E-01	U	6.5E-01	U	6.1E-01	U	6.60E-01	U		
79-01-6	Trichloroethene	1.40E-01	U	1.4E-01	U	1.3E-01	U	1.9E-01		3.10E-01			
108-38-3	o-Xylene	4.50E-01	J	2.6E-01	J	2.6E-01	J	3.6E-01	J	5.70E-01	J		
NA	m&p-Xylene	1.30E+00		6.9E-01	J	1.3E+00		1.0E+00		1.60E+00			
1330-20-7	Xylenes (total) - sum of isomers	1.75E+00		9.5E-01	J	1.6E+00	J	1.4E+00	J	2.17E+00	J		

## Notes:

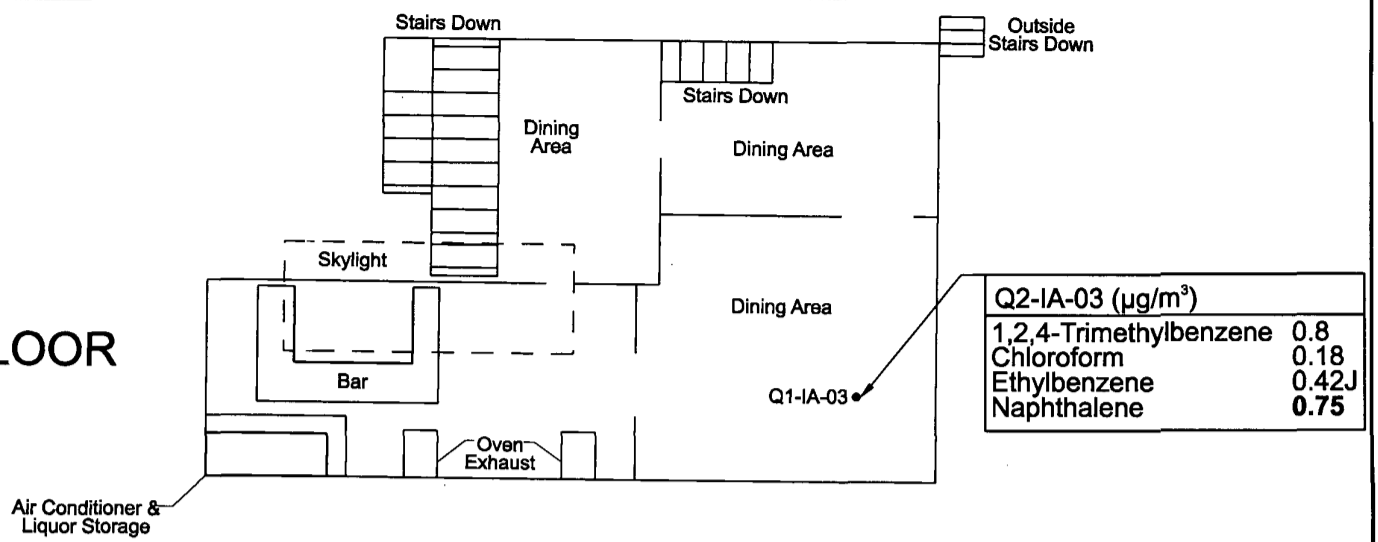
U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.

Figures



## SECOND FLOOR



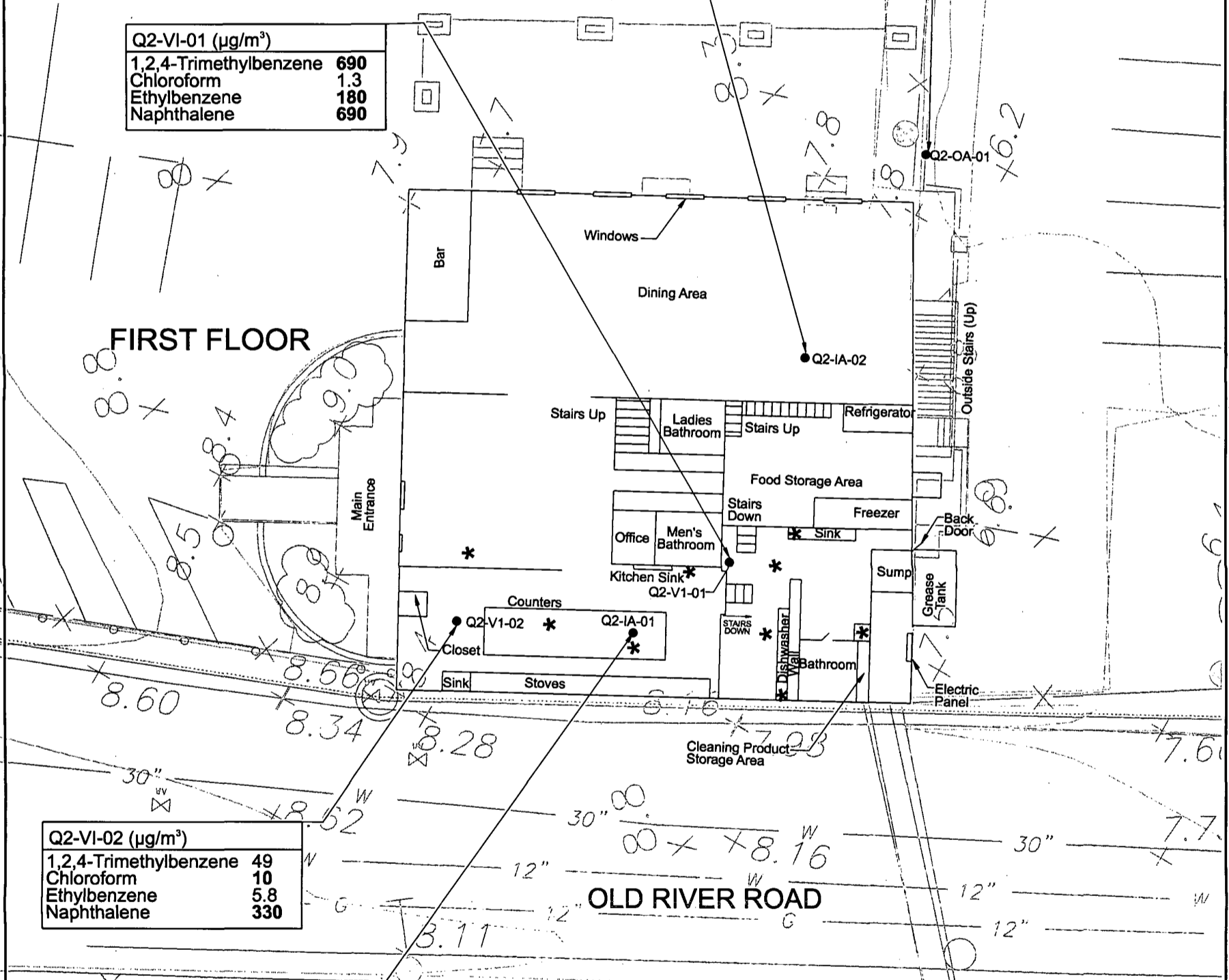
Q2-IA-03 ( $\mu\text{g}/\text{m}^3$ )	
1,2,4-Trimethylbenzene	0.8
Chloroform	0.18
Ethylbenzene	0.42J
Naphthalene	0.75

Q2-OA-01 ( $\mu\text{g}/\text{m}^3$ )	
1,2,4-Trimethylbenzene	0.43J
Chloroform	0.13J
Ethylbenzene	0.41J
Naphthalene	0.14J

Q2-IA-02 ( $\mu\text{g}/\text{m}^3$ )	
1,2,4-Trimethylbenzene	0.44J
Chloroform	0.14J
Ethylbenzene	0.41J
Naphthalene	0.22J

Q2-VI-01 ( $\mu\text{g}/\text{m}^3$ )	
1,2,4-Trimethylbenzene	690
Chloroform	1.3
Ethylbenzene	180
Naphthalene	690

## FIRST FLOOR



Q2-VI-02 ( $\mu\text{g}/\text{m}^3$ )	
1,2,4-Trimethylbenzene	49
Chloroform	10
Ethylbenzene	5.8
Naphthalene	330

Q2-IA-01 ( $\mu\text{g}/\text{m}^3$ )	
1,2,4-Trimethylbenzene	0.58J
Chloroform	0.16
Ethylbenzene	0.42J
Naphthalene	0.43

Parameter Name	USEPA Industrial IASLs			NJDEP Nonresidential IASL ( $\mu\text{g}/\text{m}^3$ )	USEPA Industrial SGSLs			NJDEP Nonresidential SGSL ( $\mu\text{g}/\text{m}^3$ )
	10-6 Target Risk ( $\mu\text{g}/\text{m}^3$ )	10-4 Target Risk ( $\mu\text{g}/\text{m}^3$ )	HQ=1 Target Risk ( $\mu\text{g}/\text{m}^3$ )		10-6 Target Risk ( $\mu\text{g}/\text{m}^3$ )	10-4 Target Risk ( $\mu\text{g}/\text{m}^3$ )	HQ=1 Target Risk ( $\mu\text{g}/\text{m}^3$ )	
1,2,4-Trimethylbenzene	NA	NA	31	10	NA	NA	310	510
Chloroform	0.53	53	430	2	5.3	530	4300	24
Ethylbenzene	4.9	490	4400	1500	49	4900	44000	74000
Naphthalene	0.36	36	13	0.20	3.6	360	130	6

\* Floor Drains  
 Bold results exceed USEPA or NJDEP screening levels.



Figure 1  
 163 Old River Road Building  
 Winter 2008-2009  
 Vapor Intrusion Monitoring Event  
 Sampling Locations - First and Second Floors

Quanta Resources Superfund Site  
 Edgewater, New Jersey

June 2009

File Name

163\_rr\_2009.dgn



Attachment A  
Chain of Custody

# Air - Chain of Custody Record & Analytical Service Request



2655 Park Center Drive, Suite A  
 Simi Valley, California 93065  
 Phone (805) 526-7161  
 Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle  
 1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No. **POA00974**

Company Name & Address (Reporting Information) CH2M HILL 3011 SW Williston Road Gainesville, FL 32608			Project Name <b>Quanta Resources</b>					CAS Contact <b>Kate Aquilera</b>		Comments e.g. Actual Preservative or specific instructions  FP = Final Pressure
Attn: Amy Klopfer			Project Number <b>385722 HW: 20.24.VI.JN</b>					Analysis Method and/or Analytes		
Project Manager <b>John Rendall</b>			P.O. # / Billing Information CH2M Hill A/D PO Box 241329 Denver CO 80224					TO-15 Reduced List Per SOW		
Phone <b>352.335.5877</b>		Fax <b>352.271.4870</b>	Sampler (Print & Sign) <b>Leslie Baechler</b> <i>[Signature]</i>							
Email Address for Result Reporting <b>amy.klopfer@ch2m.com</b>										
Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Sample Type (Air/Tube/Solid)	Canister ID (Bar Code # - AC, SC, etc.)	Flow Controller (Bar Code # - FC #)	Sample Volume			
Q2-IA-01-031709	①-5.5	3/17/09	1026	air	AC01099	FC00194	6L	X	FP-7	
Q2-IA-02-031709	②-5.5	3/17/09	1029	air	AC01460	FC00768	6L	X	FP-8	
Q2-IA-03-031709	③-4.7	3/17/09	1030	air	AC01551	FC00606	6L	X	FP-6	
Q2-DVP1-031709	④-3.7	3/17/09	—	air	AC01569	FC00152	6L	X	FP-5.5	
Q2-OA-01-031709	⑤-2.3	3/17/09	1035	air	AC01508	FC00574	6L	X	FP-5.5	
Q2-VI-01-031709	⑥-10.2	3/17/09	1123	air	ISC00582	OA01090	1L	X	FP-2	
Q2-VI-02-031709	⑦-10.8	3/17/09	1153	air	ISC00539	OA00742	1L	X	FP-3	

Report Tier Levels - please select		PLEASE REFER TO SOW		Project Requirements (MRLs, QAPP)	
Tier I - (Results/Default if not specified) _____	Tier III - (Data Validation Package) 10% Surcharge _____	EDD required Yes / No _____			
Tier II - (Results + QC) _____	Tier V - (client specified) _____	Type: _____	EDD Units: _____		
Relinquished by: (Signature) <i>[Signature]</i>	Date: 3/10/09	Time: 1530	Received by: (Signature) <i>[Signature]</i>	Date: 3/10/09	Time: 1605
Relinquished by: (Signature) <i>[Signature]</i>	Date: _____	Time: _____	Received by: (Signature) _____	Date: _____	Time: _____
Relinquished by: (Signature) _____	Date: _____	Time: _____	Received by: (Signature) _____	Date: _____	Time: _____

Attachment B  
Data Quality Evaluation Report

# Honeywell Quanta 163 Old River Road Air Sampling Data Quality Evaluation Report

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## Introduction

The objective of this Data Quality Evaluation (DQE) report is to assess the data quality of analytical results for the air samples collected at the Honeywell Quanta site in March 2009. Individual method requirements and guidelines from the USEPA Contract Laboratory National Functional Guidelines for Organic Data Review, October 1999 were used in this assessment.

This report is intended as a general data quality assessment designed to summarize data issues.

## Analytical Data

This DQE report covers 6 normal environmental samples and 1 field duplicate sample. These sample results were reported as one sample delivery group, P0900974. Samples were analyzed for the method listed in **Table 1** below. The analyses were performed by Columbia Analytical Services, (CAS) located in Simi Valley, California.

**TABLE 1**  
Analytical Parameter, Method and Laboratory

Parameter	Method	Laboratory
Volatile Organic Compounds	TO-15	CAS

The assessment of data includes a review of: (1) the chain-of-custody (CoC) documentation; (2) holding-time compliance; (3) the required quality control (QC) samples at the specified frequencies; (4) flagging for method blanks; (5) laboratory control spiking samples; (6) surrogate spike recoveries for organic analyses; (7) analytical spike data; (8) calibration data, and other method-specific criteria.

Field samples were also reviewed to ascertain field compliance and data quality issues. This included a review of field duplicate samples.

The data flags used in this assessment are defined below:

- J = Analyte is present but the reported value may not be accurate or precise (estimated).
- R = The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

- U = Analyte was not detected at the specified detection limit.
- UJ = Analyte was not detected and the specified detection limit may not be accurate or precise (estimated).
- X -= Result was excluded. The data are associated with re-runs and dilutions and are excluded because another useable result exists. (There can only be a single valid result per parameter per sample.)

## Findings

The overall summaries of the data validation findings are contained in the following sections below. No qualification of data was necessary.

### Holding Times

All holding-time criteria were met.

### Method Blanks

Method blanks were analyzed at the required frequency and were free of contamination.

### Field Duplicates

One field duplicate was collected and analyzed as required for this event. All precision criteria were met.

### Surrogates

All surrogates were recovered within laboratory established QC limits.

### Laboratory Control Samples

Laboratory control samples were analyzed as required and were recovered within laboratory established QC limits.

### Calibration

Initial and continuing calibrations were analyzed as required and were within laboratory established QC limits.

### Chain of Custody

Each sample was documented in a completed CoC. All sample container criteria were met.

### Overall Assessment

The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision-making process. The procedures for assessing the precision, accuracy, representativeness, completeness, and comparability parameters (PARCC) were based on the USEPA Contract Laboratory National Functional Guidelines for Organic Data Review, October 1999. The following summary highlights the PARCC findings for the above-defined events:

1. The completeness objectives were met for all method/analyte combinations.
2. The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggest that the project goals have been met.

Attachment C  
Residential Screening Level Comparison

Attachment C-1a - Indoor Air Analytical Data Compared to USEPA Residential Air Risk-Based Screening Levels

Attachment C-1b - Indoor Air Analytical Data Compared to NJDEP Residential Screening Levels

Attachment C-2a - Subslab Soil Gas Analytical Data Compared to USEPA Residential Risk-Based Screening Levels

Attachment C-2b - Subslab Soil Gas Analytical Data Compared to NJDEP Residential Screening Levels

ATTACHMENT C-1a

Indoor Air Analytical Data Compared to USEPA Residential Air Risk-Based Screening Levels  
 163 Old River Road Building  
 Edgewater, New Jersey

Cas #	Parameter Name	USEPA Residential IASLs			Location		Q2-IA-01		Q2-IA-02		Q2-IA-03	
		10-6 Target Risk ( $\mu\text{g}/\text{m}^3$ )	10-4 Target Risk ( $\mu\text{g}/\text{m}^3$ )	HQ=1 Target Risk ( $\mu\text{g}/\text{m}^3$ )	Location Description		1st floor kitchen		1st floor dining		2nd floor dining	
					Field Sample ID	Sample Date	Q2-IA-01-031709	Q2-DUP1-031709	Q2-IA-02-031709	Q2-IA-03-031709		
		Units										
95-63-6	1,2,4-Trimethylbenzene	NA	NA	7.3E+00	5.20E-01	J	5.80E-01	J	4.40E-01	J	8.00E-01	
108-67-8	1,3,5-Trimethylbenzene	NA	NA	6.3E+00	1.90E-01	J	2.20E-01	J	1.60E-01	J	2.90E-01	J
106-46-7	1,4-Dichlorobenzene	2.2E-01	2.2E+01	8.3E+02	2.90E-01		2.90E-01		3.10E-01		3.20E-01	
107-02-8	Acrolein	NA	NA	2.1E-02	6.30E-01	J	2.00E+00		6.30E-01	J	5.20E-01	J
71-43-2	Benzene	3.1E-01	3.1E+01	3.1E+01	1.00E+00		1.20E+00		1.10E+00		1.20E+00	
75-27-4	Bromodichloromethane	6.6E-02	6.6E+00	NA	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U
56-23-5	Carbon tetrachloride	1.6E-01	1.6E+01	2.0E+02	3.10E-01		4.00E-01		3.60E-01		3.70E-01	
67-66-3	Chloroform	1.1E-01	1.1E+01	1.0E+02	1.50E-01	J	1.60E-01		1.40E-01	J	1.80E-01	
124-48-1	Chlorodibromomethane	9.0E-02	9.0E+00	NA	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U
100-41-4	Ethylbenzene	9.7E-01	9.7E+01	1.0E+03	4.00E-01	J	4.20E-01	J	4.10E-01	J	4.20E-01	J
91-20-3	Naphthalene	7.2E-02	7.2E+00	3.1E+00	4.00E-01		4.30E-01		2.20E-01	J	7.50E-01	
103-65-1	n-Propylbenzene		Not Available		1.10E-01	J	1.30E-01	J	9.70E-02	J	1.40E-01	J
127-18-4	Tetrachloroethene <sup>1</sup>	1.0E+00	1.0E+02	NA	3.40E-01		3.90E-01		4.00E-01		4.00E-01	
109-99-9	Tetrahydrofuran		Not Available		7.60E-01	U	7.10E-01	U	7.60E-01	U	7.40E-01	U
79-01-6	Trichloroethene <sup>1</sup>	5.0E-02	5.0E+00	NA	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U
108-38-3	o-Xylene	NA	NA	7.3E+02	4.90E-01	J	5.00E-01	J	4.30E-01	J	5.10E-01	J
NA	m&p-Xylene <sup>2</sup>		Not Available		1.20E+00		1.30E+00		1.30E+00		1.30E+00	
1330-20-7	Xylenes (total) - sum of isomers	NA	NA	1.0E+02	1.69E+00		1.80E+00		1.73E+00		1.81E+00	

Notes:

**6.30E-01** Bold indicates an exceedance of the 10-6 target risk IASL.

**6.30E-01** Outlined indicates an exceedance of the 10-4 target risk IASL.

**6.30E-01** Shaded indicates an exceedance of the HQ=1 target risk IASL.

The IASLs are based on the EPA 2008 Regional Screening Levels (April 2009) for Residential Air.

IASL = Indoor Air Screening Level

NA = Not applicable

U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.

<sup>1</sup> = USEPA Region II utilizes the New York State Department of Health Air Criterion for PCE and TCE.

<sup>2</sup> = m&p-xylene were added to o-xylene and compared to the screening levels for total xylenes.



ATTACHMENT C-1b

Indoor Air Analytical Data Compared to NJDEP Residential Screening Levels  
 163 Old River Road Building  
 Edgewater, New Jersey

Cas #	Parameter Name	NJDEP Residential IASL (µg/m³)	Location														
			Q2-IA-01				Q2-IA-02				Q2-IA-03						
			1st floor kitchen				1st floor dining				2nd floor dining						
			Field Sample ID	Sample Date	Units		Field Sample ID	Sample Date	Units		Field Sample ID	Sample Date	Units				
			Q2-IA-01-031709	3/17/2009	µg/m³		Q2-DUP1-031709	3/17/2009	µg/m³		Q2-IA-02-031709	3/17/2009	µg/m³		Q2-IA-03-031709	3/17/2009	µg/m³
95-63-6	1,2,4-Trimethylbenzene <sup>1</sup>	7.00E+00	5.20E-01	J	5.80E-01	J	4.40E-01	J	8.00E-01								
108-67-8	1,3,5-Trimethylbenzene <sup>1</sup>	6.00E+00	1.90E-01	J	2.20E-01	J	1.60E-01	J	2.90E-01	J							
106-46-7	1,4-Dichlorobenzene <sup>2</sup>	3.00E+00	2.90E-01		2.90E-01		3.10E-01		3.20E-01								
107-02-8	Acrolein <sup>1,2</sup>	5.00E-01	6.30E-01	J	2.00E+00		6.30E-01	J	5.20E-01	J							
71-43-2	Benzene <sup>2</sup>	2.00E+00	1.00E+00		1.20E+00		1.10E+00		1.20E+00								
75-27-4	Bromodichloromethane <sup>2</sup>	3.00E+00	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U							
56-23-5	Carbon tetrachloride <sup>2</sup>	3.00E+00	3.10E-01		4.00E-01		3.60E-01		3.70E-01								
67-66-3	Chloroform <sup>2</sup>	2.00E+00	1.50E-01	J	1.60E-01		1.40E-01	J	1.80E-01								
124-48-1	Chlorodibromomethane <sup>2</sup>	4.00E+00	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U							
100-41-4	Ethylbenzene	1.10E+03	4.00E-01	J	4.20E-01	J	4.10E-01	J	4.20E-01	J							
91-20-3	Naphthalene <sup>1,2</sup>	2.00E-01	4.00E-01		4.30E-01		2.20E-01	J	7.50E-01								
103-65-1	n-Propylbenzene <sup>1,3</sup>	1.10E+03	1.10E-01	J	1.30E-01	J	9.70E-02	J	1.40E-01	J							
127-18-4	Tetrachloroethene <sup>2</sup>	3.00E+00	3.40E-01		3.90E-01		4.00E-01		4.00E-01								
109-99-9	Tetrahydrofuran	Not Available	7.60E-01	U	7.10E-01	U	7.60E-01	U	7.40E-01	U							
79-01-6	Trichloroethene <sup>2</sup>	3.00E+00	1.50E-01	U	1.40E-01	U	1.50E-01	U	1.50E-01	U							
108-38-3	m-Xylene <sup>4</sup>	Not Available	4.90E-01	J	5.00E-01	J	4.30E-01	J	5.10E-01	J							
NA	o&p-Xylene <sup>4</sup>	Not Available	1.20E+00		1.30E+00		1.30E+00		1.30E+00								
1330-20-7	Xylenes (total) - sum of isomers	1.10E+02	1.69E+00		1.80E+00		1.73E+00		1.81E+00								

Notes:

**6.30E-01** Bold and shaded indicates an exceedance of the NJDEP Residential IASL.

NJDEP Generic IASLs are from the NJDEP Vapor Intrusion Guidance Table 1 (March 2007)

NJDEP = New Jersey Department of Environmental Protection

IASL = Indoor Air Screening Level

U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.

<sup>1</sup> = Screening levels were provided by NJDEP for these constituents because generic screening levels were not included in the NJDEP Vapor Intrusion Guidance.

<sup>2</sup> = The NJDEP IASLs for these constituents defaults to the method analytical reporting limit because it is higher than the risk-based screening level.

<sup>3</sup> = NJDEP in conjunction with USEPA's National Center for Environmental Assessment determined that it is appropriate to use ethylbenzene as an analog for n-propylbenzene in the development of a screening value. This screening value is not defensible as the primary driver in making cleanup decisions since it is based on limited information.

<sup>4</sup> = o-xylene and m&p-xylene were added together and compared to the screening level for total xylenes.

ATTACHMENT C-2a

Subslab Soil Gas Analytical Data Compared to USEPA Residential Risk-Based Screening Levels

163 Old River Road Building

Edgewater, New Jersey

		USEPA Residential SGSLs			Location	
		10-6	10-4	HQ=1	Q2-VI-01	Q2-VI-02
Cas #	Parameter Name	Target Risk ( $\mu\text{g}/\text{m}^3$ )	Target Risk ( $\mu\text{g}/\text{m}^3$ )	Target Risk ( $\mu\text{g}/\text{m}^3$ )	Storage Room	Kitchen
					Q2-VI-01-031709	Q2-VI-02-031709
					3/17/2009	3/17/2009
					$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
95-63-6	1,2,4-Trimethylbenzene	NA	NA	7.3E+01	6.9E+02	4.9E+01
108-67-8	1,3,5-Trimethylbenzene	NA	NA	6.3E+01	2.1E+02	1.2E+01
106-46-7	1,4-Dichlorobenzene	2.2E+00	2.2E+02	8.3E+03	8.5E-01	8.0E-01
107-02-8	Acrolein	NA	NA	2.1E-01	1.6E+00	1.4E+00
71-43-2	Benzene	3.1E+00	3.1E+02	3.1E+02	3.4E+00	1.7E+00
75-27-4	Bromodichloromethane	6.6E-01	6.6E+01	NA	8.5E-01	3.8E-01
56-23-5	Carbon tetrachloride	1.6E+00	1.6E+02	2.0E+03	2.8E-01	1.3E+00
67-66-3	Chloroform	1.1E+00	1.1E+02	1.0E+03	1.3E+00	1.0E+01
124-48-1	Chlorodibromomethane	9.0E-01	9.9E+01	NA	8.5E-01	8.0E-01
100-41-4	Ethylbenzene	9.7E+00	9.7E+02	1.0E+04	1.8E+02	5.8E+00
91-20-3	Naphthalene	7.2E-01	7.2E+01	3.1E+01	6.9E+02	3.3E+02
103-65-1	n-Propylbenzene	Not Available			1.5E+02	3.9E+00
127-18-4	Tetrachloroethene <sup>1</sup>	1.0E+01	1.0E+03	NA	3.0E+00	3.7E+00
109-99-9	Tetrahydrofuran	Not Available			4.5E+00	8.0E-01
79-01-6	Trichloroethene <sup>1</sup>	5.0E-01	5.0E+01	NA	8.5E-01	8.0E-01
108-38-3	o-Xylene	NA	NA	7.3E+03	5.0E+02	1.3E+01
NA	m&p-Xylene <sup>2</sup>	Not Available			9.1E+02	2.0E+01
1330-20-7	Xylenes (total) - sum of isomers	NA	NA	1.0E+03	1.4E+03	3.3E+01

Notes:

**6.30E-01** Bold indicates an exceedance of the 10-6 target risk SGSL.

Outlined indicates an exceedance of the 10-4 target risk SGSL.

Shaded indicates an exceedance of the HQ=1 target risk SGSL.

The SGSLs are based on the EPA 2008 Regional Screening Levels (April 2009) for Residential Air.

The SGSLs were derived from the EPA 2008 RSLs by applying the EPA Vapor Intrusion Guidance (Nov 2002) default attenuation factor of 0.1.

SGSL = Soil Gas Screening Level

NA = Not applicable

U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.

<sup>1</sup> = USEPA Region II utilizes the New York State Department of Health Air Criterion for PCE and TCE.

<sup>2</sup> = m&p-xylene were added to o-xylene and compared to the screening levels for total xylenes.

ATTACHMENT C-2b

Subslab Soil Gas Analytical Data Compared to NJDEP Residential Screening Levels

163 Old River Road Building  
Edgewater, New Jersey

Cas #	Parameter Name	NJDEP Residential SGSL (µg/m <sup>3</sup> )	Location		Q2-VI-01		Q2-VI-02	
			Location Description		Storage Room		Kitchen	
			Field Sample ID		Q2-VI-01-031709		Q2-VI-02-031709	
			Sample Date		3/17/2009		3/17/2009	
			Units		µg/m <sup>3</sup>		µg/m <sup>3</sup>	
95-63-6	1,2,4-Trimethylbenzene <sup>1</sup>	3.60E+02	<b>6.9E+02</b>			4.9E+01		
108-67-8	1,3,5-Trimethylbenzene <sup>1</sup>	3.10E+02	2.1E+02			1.2E+01		
106-46-7	1,4-Dichlorobenzene <sup>2</sup>	3.00E+01	8.5E-01	U		8.0E-01	U	
107-02-8	Acrolein <sup>1</sup>	1.00E+00	<b>1.6E+00</b>			<b>1.4E+00</b>		
71-43-2	Benzene <sup>2</sup>	1.60E+01	3.4E+00			1.7E+00		
75-27-4	Bromodichloromethane <sup>2</sup>	3.40E+01	8.5E-01	U		3.8E-01	J	
56-23-5	Carbon tetrachloride <sup>2</sup>	3.10E+01	2.8E-01	J		1.3E+00		
67-66-3	Chloroform <sup>2</sup>	2.40E+01	1.3E+00			1.0E+01		
124-48-1	Chlorodibromomethane <sup>2</sup>	4.30E+01	8.5E-01	U		8.0E-01	U	
100-41-4	Ethylbenzene	5.30E+04	1.8E+02			5.8E+00		
91-20-3	Naphthalene <sup>1</sup>	3.00E+00	<b>6.9E+02</b>			<b>3.3E+02</b>		
103-65-1	n-Propylbenzene <sup>1,3</sup>	5.30E+04	1.5E+02			3.9E+00		
127-18-4	Tetrachloroethene <sup>2</sup>	3.40E+01	3.0E+00			3.7E+00		
109-99-9	Tetrahydrofuran	Not Available	4.5E+00			8.0E-01	U	
79-01-6	Trichloroethene <sup>2</sup>	2.70E+01	8.5E-01	U		8.0E-01	U	
108-38-3	m-Xylene <sup>4</sup>	Not Available	5.0E+02			1.3E+01		
NA	o&p-Xylene <sup>4</sup>	Not Available	9.1E+02			2.0E+01		
1330-20-7	Xylenes (total) - sum of isomers	5.50E+03	1.4E+03			3.3E+01		

Notes:

**6.30E-01** Bold and shaded indicates an exceedance of the NJDEP Nonresidential SGSL.

NJDEP Generic SGSLs are from the NJDEP Vapor Intrusion Guidance Table 1 (March 2007)

NJDEP = New Jersey Department of Environmental Protection

SGSL = Soil Gas Screening Level

U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.

<sup>1</sup> = Screening levels were provided by NJDEP for these constituents because generic screening levels were not included in the NJDEP Vapor Intrusion Guidance.

<sup>2</sup> = The NJDEP SGSLs for these constituents defaults to the method analytical reporting limit because it is higher than the risk-based screening level.

<sup>3</sup> = NJDEP in conjunction with USEPA's National Center for Environmental Assessment determined that it is appropriate to use ethylbenzene as an analog for n-propylbenzene in the development of a screening value. This screening value is not defensible as the primary driver in making cleanup decisions since it is based on limited information.

<sup>4</sup> = o-xylene and m&p-xylene were added together and compared to the screening level for total xylenes.

Attachment D

Historical Data Comparison - 2008 and 2009

Attachment D-1 - Indoor Air Analytical Data Comparison - March 2008 and 2009

Attachment D-2 - Subslab Soil Gas Analytical Data Comparison - March 2008 and 2009

**ATTACHMENT D-1**

Indoor Air Analytical Data Comparison - March 2008 and 2009  
 163 Old River Road Building  
 Quanta Resources Site  
 Edgewater, NJ

Cas #	Parameter Name	Q2-IA-01 1st floor kitchen								Q2-IA-02 1st floor dining Room			
		Q2-IA-01-032508 3/25/2008 µg/m <sup>3</sup>		Q2-DUP1-032508 3/25/2008 µg/m <sup>3</sup>		Q2-IA-01-031709 3/17/2009 µg/m <sup>3</sup>		Q2-DUP1-031709 3/17/2009 µg/m <sup>3</sup>		Q2-IA-02-032508 3/25/2008 µg/m <sup>3</sup>		Q2-IA-02-031709 3/17/2009 µg/m <sup>3</sup>	
		UNITS											
95-63-6	1,2,4-Trimethylbenzene	1.0E+00		9.10E-01	J	5.20E-01	J	5.80E-01	J	4.10E-01	J	4.40E-01	J
108-67-8	1,3,5-Trimethylbenzene	3.8E-01	J	3.00E-01	J	1.90E-01	J	2.20E-01	J	9.50E-01	U	1.60E-01	J
106-46-7	1,4-Dichlorobenzene	2.3E-01	J	9.60E-01	U	2.90E-01		2.90E-01		2.10E-01	J	3.10E-01	
107-02-8	Acrolein	6.0E-01	U	1.10E+00	U	6.30E-01	J	2.00E+00		1.00E+00	U	6.30E-01	J
71-43-2	Benzene	1.0E+00		8.50E-01		1.00E+00		1.20E+00		7.60E-01		1.10E+00	
75-27-4	Bromodichloromethane	9.6E-01	U	9.60E-01	U	1.50E-01	U	1.40E-01	U	9.50E-01	U	1.50E-01	U
56-23-5	Carbon tetrachloride	3.1E-01	J	4.40E-01	J	3.10E-01		4.00E-01		3.90E-01	J	3.60E-01	
67-66-3	Chloroform	2.3E-01	J	9.60E-01	U	1.50E-01	J	1.60E-01		9.50E-01	U	1.40E-01	J
124-48-1	Chlorodibromomethane	9.6E-01	U	9.60E-01	U	1.50E-01	U	1.40E-01	U	9.50E-01	U	1.50E-01	U
100-41-4	Ethylbenzene	6.5E-01	J	5.70E-01	J	4.00E-01	J	4.20E-01	J	3.50E-01	J	4.10E-01	J
91-20-3	Naphthalene	6.2E-01		3.80E-01		4.00E-01		4.30E-01		3.20E-01		2.20E-01	J
103-65-1	n-Propylbenzene	2.6E-01	J	9.60E-01	U	1.10E-01	J	1.30E-01	J	9.50E-01	U	9.70E-02	J
127-18-4	Tetrachloroethene	3.1E-01	J	2.70E-01	J	3.40E-01		3.90E-01		3.00E-01	J	4.00E-01	
109-99-9	Tetrahydrofuran	9.6E-01	U	9.60E-01	U	7.60E-01	U	7.10E-01	U	9.50E-01	U	7.60E-01	U
79-01-6	Trichloroethene	9.6E-01	U	9.60E-01	U	1.50E-01	U	1.40E-01	U	9.50E-01	U	1.50E-01	U
108-38-3	o-Xylene	9.7E-01		8.60E-01	J	4.90E-01	J	5.00E-01	J	4.50E-01	J	4.30E-01	J
NA	m&p-Xylene	2.5E+00		2.30E+00		1.20E+00		1.30E+00		1.30E+00	J	1.30E+00	
1330-20-7	Xylenes (total) - sum of isomers	3.5E+00		3.16E+00		1.69E+00		1.80E+00		1.75E+00		1.73E+00	

Notes:

U = Below laboratory reporting limits  
 J = Data below calibration curve for that constituent, quantity estimated.

**ATTACHMENT D-1**

Indoor Air Analytical Data Comparison - March 2008 ar  
 163 Old River Road Building  
 Quanta Resources Site  
 Edgewater, NJ

LOCATION ID		Q2-IA-03			
LOCATION DESCRIPTION		2nd floor dining room			
FIELD SAMPLE ID		Q2-IA-03-032508		Q2-IA-03-031709	
SAMPLE DATE		3/25/2008		3/17/2009	
UNITS		µg/m <sup>3</sup>		µg/m <sup>3</sup>	
Cas #	Parameter Name				
95-63-6	1,2,4-Trimethylbenzene	1.10E+00		8.00E-01	
108-67-8	1,3,5-Trimethylbenzene	3.80E-01	J	2.90E-01	J
106-46-7	1,4-Dichlorobenzene	1.60E-01	J	3.20E-01	
107-02-8	Acrolein	9.50E-01		5.20E-01	J
71-43-2	Benzene	8.10E-01		1.20E+00	
75-27-4	Bromodichloromethane	7.90E-01	U	1.50E-01	U
56-23-5	Carbon tetrachloride	4.70E-01	J	3.60E-01	
67-66-3	Chloroform	7.90E-01	U	1.80E-01	
124-48-1	Chlorodibromomethane	7.90E-01	U	1.50E-01	U
100-41-4	Ethylbenzene	4.30E-01	J	4.20E-01	J
91-20-3	Naphthalene	4.20E-01		7.50E-01	
103-65-1	n-Propylbenzene	2.20E-01	J	1.40E-01	J
127-18-4	Tetrachloroethene	2.80E-01	J	4.00E-01	
109-99-9	Tetrahydrofuran	7.90E-01	U	7.40E-01	U
79-01-6	Trichloroethene	7.90E-01	U	1.50E-01	U
108-38-3	o-Xylene	6.10E-01	J	5.10E-01	J
NA	m&p-Xylene	1.60E+00		1.30E+00	
1330-20-7	Xylenes (total) - sum of isomers	2.21E+00		1.81E+00	

## Notes:

U = Below laboratory reporting limits  
 J = Data below calibration curve for that  
 constituent, quantity estimated.

**ATTACHMENT D-2**

Subslab Soil Gas Analytical Data Comparison - March 2008 and 2009

163 Old River Road Building

Quanta Resources Site

Edgewater, NJ

Cas #	Parameter Name	Q2-VI-01 Storage Room		Q2-VI-02 Kitchen			
		Q2-VI-01-032408	Q2-VI-01-031709	Q2-VI-02-032508		Q2-VI-02-031709	
		3/24/2008	3/17/2009	3/25/2008		3/17/2009	
		UNITS	UNITS	UNITS		UNITS	
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
95-63-6	1,2,4-Trimethylbenzene	2.50E+01	6.90E+02	2.10E+03		4.90E+01	
108-67-8	1,3,5-Trimethylbenzene	9.00E+00	2.10E+02	6.90E+02		1.20E+01	
106-46-7	1,4-Dichlorobenzene	1.90E+00 U	8.50E-01 U	5.90E+00 U		8.00E-01 U	
107-02-8	Acrolein	2.30E+00	1.60E+00	1.80E+00 U		1.40E+00	
71-43-2	Benzene	1.90E+00 U	3.40E+00	5.90E+00 U		1.70E+00	
75-27-4	Bromodichloromethane	1.90E+00 U	8.50E-01 U	5.90E+00 U		3.80E-01 J	
56-23-5	Carbon tetrachloride	4.20E-01 J	2.80E-01 J	5.90E+00 U		1.30E+00	
67-66-3	Chloroform	8.70E+00	1.30E+00	1.40E+00 J		1.00E+01	
124-48-1	Chlorodibromomethane	1.90E+00 U	8.50E-01 U	5.90E+00 U		8.00E-01 U	
100-41-4	Ethylbenzene	5.00E+01	1.80E+02	1.50E+03		5.80E+00	
91-20-3	Naphthalene	4.60E-01 J	6.90E+02	3.20E+00 J		3.30E+02	
103-65-1	n-Propylbenzene	4.60E+00	1.50E+02	3.30E+02		3.90E+00	
127-18-4	Tetrachloroethene	2.10E+00	3.00E+00	4.20E+00 J		3.70E+00	
109-99-9	Tetrahydrofuran	1.90E+00 U	4.50E+00	7.90E+00		8.00E-01 U	
79-01-6	Trichloroethene	1.90E+00 U	8.50E-01 U	5.90E+00 U		8.00E-01 U	
108-38-3	o-Xylene	6.60E+01	5.00E+02	3.50E+03		1.30E+01	
NA	m&p-Xylene	1.90E+02	9.10E+02	8.10E+03		2.00E+01	
1330-20-7	Xylenes (total) - sum of isomers	2.56E+02	1.41E+03	1.16E+04		3.30E+01	

**Notes:**

U = Below laboratory reporting limits

J = Data below calibration curve for that constituent, quantity estimated.