Health Consultation

Public Health Implications of Site-Related Indoor Air Exposures

CALDWELL TRUCKING COMPANY SUPERFUND SITE

FAIRFIELD TOWNSHIP (ESSEX COUNTY), NEW JERSEY

EPA FACILITY ID: NJD048798953

Prepared by:
New Jersey Department of Health

JANUARY 7, 2014

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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Summary

Introduction	The New Jersey Department of Health (NJDOH) and the Agency for Toxic Substances and Disease Registry (ATSDR) have reviewed environmental data to evaluate the public health implications of volatile organic compound (VOC) contamination in indoor air for residences investigated as part of the Caldwell Trucking Company (CTC) Superfund site located in Fairfield Township in Essex County. Vapor intrusion investigations were conducted from June 2006 through July 2010 by the United States Environmental Protection Agency (US EPA). The top priority of ATSDR and NJDOH is to ensure that the community around the site has the best information possible to safeguard its health.
Conclusions	*NJDOH and ATSDR have reached four conclusions for the CTC site.*
Conclusion 1	*NJDOH and ATSDR conclude that, based on available data from the US EPA vapor intrusion investigations from June 2006 through July 2010, past exposures to VOCs in indoor air at 13 residences identified below may have harmed people's health.*
Basis for Conclusion	For individuals at 9 properties (Residences A, B, E, F, G, I, L, M, and T), there is an increased risk for fetal heart malformations to have occurred from maternal exposures to indoor air containing elevated levels of TCE. Additionally, for Residences L and M, the lifetime excess cancer risk is considered a low increased risk of cancer effects for residents, including children. Exposures at these residences have been interrupted with the installation of a soil venting system (SVS) during April through December 2009. Indoor investigations conducted for these residences represent a snapshot in time; conditions within these locations may have changed over time and may not be representative of historical conditions.
Conclusion 2	*NJDOH and ATSDR conclude that, based on the June 2006 through July 2010 vapor intrusion investigation period, past exposures to VOCs in indoor air at three residences identified below may have harmed people's health. Current and future exposures to VOCs in indoor air for these residences may continue to be harmful to people's health.*

Basis for Conclusion	For individuals at two properties (Residences K and O) there is an increased risk for fetal heart malformations to have occurred from maternal exposures to indoor air containing elevated levels of TCE. The SVS installed in April 2008 at Residence O was removed in December 2009 at the request of the property owner. Exposures at Residence K *have not* been interrupted as the property owner has refused the US EPA's offer for the installation of a SVS. Therefore, unnecessary inhalation exposures will continue to individuals living at Residence K and possibly at Residence O.
Next Steps	The property owners at these residences should continue to be advised by the US EPA of the benefits of having a SVS installed to mitigate the potential for vapor intrusion and interrupt further exposures, particularly to TCE.
Conclusion 3	*NJDOH and ATSDR conclude that, based on the June 2006 through July 2010 vapor instruction investigation period, past, current and future exposures to VOCs in indoor air at the remaining properties evaluated, including two daycare centers, are not expected to harm people's health.*
Basis for Conclusion	For the remaining properties evaluated, including Daycare centers A and B, exposures to VOCs in indoor air are not expected to cause adverse non-cancer health effects. The lifetime excess cancer risk is considered a no apparent increase in risk. Fourteen of these properties have an operational SVS to mitigate any potential exposures to VOC contaminants in indoor air resulting from a vapor intrusion source. Additionally, sub-slab soil gas samples collected for the West Essex High School indicated no contaminants exceed the current New Jersey Department of Environmental Protection's Residential Soil Gas Screening Levels.
Conclusion 4	*NJDOH and ATSDR conclude that, based on the May 2007 through November 2007 vapor instruction investigation period, past, current and future exposures to VOCs in indoor air from vapor intrusion sources present below at the commercial and industrial properties evaluated are not expected to harm people's health.*
Basis for Conclusion	For the 2 commercial and 1 industrial properties evaluated, exposures to VOCs in indoor air from vapor intrusion sources are not expected to cause adverse non-cancer health effects. The lifetime excess cancer risk is considered a no apparent increase in risk. However, for the one industrial facility evaluated, methylene chloride was shown at elevated concentrations in indoor air which appear to be from operational sources and not vapor intrusion. The exposure

concentration of methylene chloride at this facility is below the federal Occupational Safety and Health Administration's recommended time weighted average for occupational exposures.

For More Information

Copies of this Health Consultation will be provided to concerned residents in the vicinity of the site via the township libraries and the Internet. NJDOH will notify area residents that this report is available for their review and provide a copy upon request. Questions about this Health Consultation should be directed to the NJDOH at (609) 826- 4984.

Statement of Issues

Based on ongoing vapor intrusion investigations initiated in 2006 by the United States Environmental Protection Agency (US EPA), this health consultation was prepared by the New Jersey Department of Health (NJDOH) and the federal Agency for Toxic Substances and Disease Registry (ATSDR).. This health consultation evaluates public health implications from exposures to site-related contamination detected in indoor air during investigations of the residential area and commercial properties near the Caldwell Trucking Company site located in Fairfield Township, Essex County. This health consultation was prepared through a cooperative agreement with the ATSDR and is a follow-up to earlier consultations prepared by the ATSDR and NJDOH initiated in 1988. This evaluation includes the review of the most recent vapor intrusion data related to the ongoing investigations being conducted for the site from June 2006 through July 2010.

Background and Site History

The Caldwell Trucking Company (CTC) site is located at 222 Passaic Avenue in Fairfield Township, Essex County, New Jersey (see inset). The site is situated on approximately 12 acres between O'Connor Drive and Sherwood Lane (block 2201/lot 17 and block 2302/lots 18 and 20) in an industrial/residential area. The site is bordered by residences to the north and east, West Essex Regional High School to the south, and commercial/industry businesses to the west.

Figure 1: Location of Caldwell Trucking Site

CTC collected septic (and allegedly chemical) waste from residential, commercial and industrial facilities beginning in 1933. From the early 1950s to 1973, CTC disposed of these wastes into unlined settling lagoons. After 1973, septic wastes were stored in underground storage tanks (USTs) installed by CTC. Waste disposal operations ceased by 1984 as CTC strictly became a waste transport facility until the company's cessation in 1988. CTC's long-term disposal operations contaminated soil and groundwater; however, other facilities operating in the area may have also contributed to area contamination.

Currently there are approximately 500 single family residences within one mile of the site. By 1981, over 300 private wells in the area of the site had been taken out of service due to groundwater contamination. These residences have been connected to the municipal water supply system.

The site is located on a floodplain of the Passaic River which is located approximately 4,000 feet to the northeast. Deepaval Brook and smaller tributaries are also located to the northeast of the site and drain to the Passaic River. Groundwater for the study area is documented to flow to the northeast towards the Passaic River.

Site-related contaminants detected in groundwater include trichloroethylene, 1,1,1-trichloroethane, and the associated degradation products. In addition, subsurface soils are contaminated with metals, volatile organic compounds (VOCs), polyaromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). VOCs have been detected in surface waters near the site, Deepaval Brook (including tributaries leading to this brook), and the Passaic River.

Remedial and Cleanup Actions

The site is currently divided into two units by the US EPA. Operable Unit 1 (OU1) addresses soil contamination within the site area and initial actions which included addressing contaminated private wells and the local municipal water supply well. Operable Unit 2 (OU2) focuses more specifically on groundwater contamination and associated vapor intrusion issues in the surrounding community area.

OU1 Area

In September 1986, selected remedies in EPA's Record of Decision (ROD) were initiated to address site-related contamination. These actions included providing an alternate potable water supply source to nearby residences potentially affected by groundwater contamination and low thermal temperature treatment followed by off-site disposal of approximately 28,000 cubic yards of contaminated soil from the site. In addition, the Township of Fairfield has opted to rely on the Passaic Valley Water Commission as the alternate potable water supply to the community. In 1989, 55 residences and 9 commercial businesses within the groundwater contaminant plume area were connected to the public water supply system.

To address contaminated site soils, in April 1993 the US EPA issued a unilateral administrative order (UAO) to 11 potentially responsible parties (PRPs). This UAO entailed US EPA modifications to the 1986 ROD to provide for the off-site treatment and disposal of select waste materials and the use of stabilization treatment to address remaining lead and VOC contaminated soils to comply with Resource Conservation and Recovery Act (RCRA) regulations. From August 1995 through September 2004, soil stabilization of approximately 43,500 cubic yards of contaminated site soils, including wetlands restoration, was completed. From June 1996 through March 1997, a soil vapor extraction (SVE) system was used to aid in reducing levels of VOC emissions during soil stabilization activities. Over 25,000 pounds of VOCs were documented to have been recovered and treated from contaminated soil during this operational period. Under the Wetlands Mitigation Project, restoration of nearby wetland areas affected by site-related contamination was completed in 2005 with biannual monitoring being conducted through 2010. The New Jersey Department of Environmental Protection (NJDEP) issued a letter in November 2010 approving the completion of the wetlands mitigation project. The US EPA considers remedial actions to address contamination within the OU1 area completed.

OU2 Area

In September 1989, a second ROD was signed by the US EPA requiring the installation of groundwater recovery wells to intercept the entire groundwater contaminant plume. A 1993 amendment to the ROD focused specifically on intercepting contaminated groundwater within the lower water table aquifer and the upper bedrock aquifer; addressing a nearby spring (seep) that receives contaminated recharge groundwater which flows into a tributary of the Deepaval Brook; and a program for sealing all remaining private wells, some still in use for irrigation purposes, within the contaminant groundwater plume area.

From May 1998 through July 2002, the PRPs used innovative technologies which included an iron reactive wall system and an enhanced biological treatment system to aid in reducing VOC concentrations in groundwater at the source area of the site. Construction of a groundwater pump and treat system, known as the O'Connor Drive Groundwater Extraction and Treatment System, was completed and operational by December 2008. Groundwater monitoring is conducted on a monthly basis from extraction wells and on a semi-annual and annual basis from a total of 65 groundwater monitoring wells and piezometers.

An upgrade to an existing air stripper system to treat contaminated surface water at the seep area was completed in June 2007. This upgrade included the installation of a larger air stripper and vapor phase carbon units to treat contaminated groundwater emanating from the seep area and groundwater extracted from wells in the vicinity of the seep area. The treated water and air now consistently meet discharge permit requirements.

In April 2007, vapor intrusion investigations were initiated at residential and commercial properties near the site. By August 2010, investigations were completed at approximately 82 residential properties, 13 commercial/industrial properties, 1 high school, and 2 daycare centers in the study area. Mitigation systems to prevent vapor intrusion have been installed at 18 properties; however, the resident for one of these properties requested this system be removed (December 2009) leaving the current mitigation system count at 17 properties. The US EPA indicated investigations at the West Essex High School and two daycare facilities in the vicinity of the site are complete with no further work required at these locations.

In 2010, additional monitoring wells were installed in the vicinity of the North Lagoon Area (NLA) to investigate a separate contaminant plume and investigate high TCE contamination near the eastern portion of the site. Investigations are ongoing.

Community Health Concerns

Based on review of site investigation information obtained from the US EPA, this health consultation has been provided to address any health concerns the community may have related to the health implications from inhalation of contaminants occurring from vapor intrusion associated with the CTC site. This health risk evaluation is based on vapor intrusion data collected by the US EPA during their investigations of the residential area for the period of April 2007 through August 2010.

Demographics

Using 2000 U.S. Census data, it is estimated that 4,577 individuals reside within a one-mile radius of the CTC site (see Figure 2).

Past ATSDR/NJDOH Involvement

In October 1988, the NJDOH and ATSDR released a public health assessment for the CTC site, which addressed exposure pathways to contaminated groundwater containing VOCs and to contaminated soil/dust containing VOCs, metals and PCBs. Other pathways included potential exposures to contaminated sediments and surface water containing VOCs. This assessment concluded the site posed a potential public health concern to site workers and the surrounding community (trespassing) regarding ingestion of contaminated potable well water (groundwater) and ingestion and dermal exposures to contaminated site soils. Additionally, there was a potential public health concern for exposures to the community from potentially contaminated sediment and surface water near the site for the Deepaval Brook.

An addendum to the 1988 health consultation was released by the NJDOH and the ATSDR in September 1990 to address site soils contaminated with lead and arsenic. At the time, the CTC site was utilized for recreational purposes (motorcycles) and as a thoroughfare by students from the nearby West Essex High School. The consultation concluded that soil contaminants were a public health concern and recommended measures to limit site accessibility. In response, the EPA installed security fencing for the site perimeter in 1990 to prevent unauthorized access and installed an impermeable membrane and crushed stone at on-site contaminated soil areas.

A site review and update assessment was released in August 1994 (revised August 1995) which addressed the primary public health issue regarding ingestion of contaminated private well water and remedial/exposure reduction actions being taken at the site and the surrounding community. The assessment concluded the CTC site constituted no apparent public health hazard, based on potable well data since 1988 that did not indicate a significant (if any) impact of the plume on residential wells. However, the assessment acknowledged additional private wells which had not been sampled are present in the area which poses a potential public health concern.

Environmental Contamination

An evaluation of site-related environmental contamination consists of a two tiered approach: 1) a screening analysis; and 2) a more in-depth analysis to determine public health implications of site-specific exposures. First, maximum concentrations of detected substances are compared to environmental media-specific health-based guideline comparison values (CVs). If concentrations exceed the environmental CV, these substances, referred to as Contaminants of Concern (COC), are selected for further evaluation. Contaminant levels above environmental CVs do not mean that adverse health effects are likely, but that further evaluation is necessary. Once exposure doses are estimated, they are further evaluated to determine the likelihood of adverse health effects.

Environmental Comparison Value Guidelines

There are a number of environmental CVs available for screening environmental contaminants to identify COCs. These include ATSDR Environmental Media Evaluation Guides

(EMEGs) and Reference Media Evaluation Guides (RMEGs). EMEGs are estimated contaminant concentrations that are not expected to result in adverse non-carcinogenic health effects. RMEGs represent the concentration in water or soil at which daily human exposure is unlikely to result in adverse non-carcinogenic effects. If the substance is a known or a probable carcinogen, ATSDR's Cancer Risk Evaluation Guides (CREGs) are also considered as comparison values. CREGs are estimated contaminant concentrations that would be expected to cause no more than one excess cancer in a million (10^{-6}) persons exposed over their lifetime (70 years). In the absence of an ATSDR environmental CV, other comparison values may be used to evaluate contaminant levels in environmental media. These include the US EPA Region 6 Human Health Media-Specific Screening Levels (SLs) and the NJDEP Soil Gas Screening Values (SGSV) for vapor intrusion sources (NJDEP 2013). These health-based benchmarks are derived from the evaluation of cancer and non-cancer effects using current toxicity criteria. The NJDEP SGSVs serve as a predictor of potential concern from a vapor intrusion source acting as a threat of inhalation exposure posed to occupants of a building, which include residences.

Substances exceeding applicable environmental CVs are identified as COCs and evaluated further to determine whether these contaminants pose a health threat to exposed or potentially exposed receptor populations. Contaminant levels above environmental CVs do not mean that adverse health effects are likely, but that further evaluation is necessary. If environmental CVs are unavailable, these contaminants are selected for further evaluation.

Groundwater Contamination

Groundwater sampling was conducted in October 2011 through December 2011 from approximately 132 groundwater monitoring wells throughout the site investigation study area. Data from this period indicates several compounds of concern were detected within the plume exceeding the NJDEP groundwater screening levels (GWSL) for vapor intrusion (NJDEP 2013). These compounds include 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane (Freon TR, Freon 113), 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, chloroethane, chloroform, cis,1,2-dichloroethene, methylene chloride, tetrachloroethylene (PCE), trichloroethylene (TCE) and vinyl chloride (Golder 2012). One detection of carbon tetrachloride at 3.2 micrograms per liter (µg/L) exceeded the NJDEP GWSL of 1 µg/L. However, the detection limit for this compound exceeded the NJDEP GWSL for approximately 73 monitoring well samples. Therefore, as the detection limits were elevated, it could not be determined if this compound may have exceeded the NJDEP GWSL for these monitoring well locations.

The predominant contaminants of concern in groundwater and the range of detections for this sampling period are as follows:

- 1,1,1-trichloroethane: range non-detect to 100,000 µg/L;
- 1,1-dichloroethane: range non-detect to 3,600 µg/L;
- 1,1-dichloroethene: range non-detect to 6,700 µg/L;
- Chloroform: range non-detect to 22,000 µg/L;
- Cis-1,2-dichloroethene: range non-detect to 10,000 µg/L;
- Methylene chloride: range non-detect to 88,000 µg/L;

- PCE: range non-detect to 12,000 µg/L; and
- TCE: range non-detect to 410,000 µg/L

Regarding the above contaminants, the highest concentrations detected within the groundwater plume are located below the former Northern Lagoon Area which is located in the northeast corner of the site.

Vapor Intrusion Investigation

Based on the extent of VOC contamination in groundwater, primarily with TCE, a vapor intrusion investigation was initiated for properties near the CTC site in June 2006. This investigation included the collection of sub-slab soil gas samples and indoor air samples. An evaluation of the resulting data was performed using a "multiple lines of evidence" approach to determine whether additional investigative sampling or mitigation measures were necessary for the properties tested. The "multiple lines of evidence" approach included assessment of the source of vapors (contaminated groundwater or unsaturated soils), sub-slab soil gas in the unsaturated zone above the source, and the vapor intrusion exposure point at target property (e.g. crawl space area, basement, living space area, etc).

Based on this multiple lines of evidence approach, a determination was made whether to collect and evaluate additional indoor air data at targeted properties. The US EPA indicates this sequential evaluation of independent lines of evidence provides a logical and cost-effective approach for identifying whether subsurface vapor intrusion is likely to contribute significantly to unacceptable indoor air quality (US EPA 2002a).

Soil gas data was used to identify locations with confirmed contaminants in soil gas which may act as a potential source for vapor intrusion. Site-related contaminants detected in soil gas and indoor air for the investigated properties has been evaluated for the sampling period of June 2006 through July 2010.

Sub-slab/Soil Gas - Residential/Daycare Centers/Schools

Based on the extent and concentration of contaminants within the groundwater plume, the US EPA identified 38 residential properties , two day care centers (identified as Daycare A and Daycare B), and the West Essex High School for soil gas evaluation. Due to the high groundwater table near the CTC site, sub-slab soil gas samples could not be collected at all properties under investigation by the US EPA. Soil gas samples were analyzed for targeted VOCs using US EPA Method TO-15 for samples collected during the June 2006 through April 2009 investigation period.

Compounds exceeding the US EPA's sub-slab soil gas guidance (SSGG) at 19 residential properties were as follows (NJDEP 2013):

- Benzene at 1 property;
- Carbon tetrachloride at 1 property;
- Chloroform at 15 properties;
- 1,4-dichlorobenzene at 1 property;

- 1,2-dichloroethane (1,2-DCA) at 4 properties;
- 1,1-dichloroethene (1-1-DCE) at 1 property;
- Cis-1,2-dichloroethene (1,2-DCE) at 2 properties;
- Methylene chloride at 2 properties;
- PCE at 12 properties;
- 1,1,1-trichloroethane at 1 property;
- TCE at 16 properties; and
- Vinyl Chloride at 2 properties.

A summary of sampled locations and COCs detected in sub-slab/soil gas samples for residential properties are presented in Table 1. Compounds exceeding the current NJDEP Residential Soil Gas Screening Levels (RSGSLs) occurred at 9 of the 38 residential properties investigated.

Chloroform (range non-detect to 43 $\mu g/m^3$) exceeded the US EPA's SSGG at Daycare A in two of eight samples.

Chloroform exceeded the current NJDEP RSGSL in one of eight samples analyzed. Sub-slab soil gas results for the December 2006 soil gas sampling event (two samples) from Daycare A were rejected as they did not pass quality assurance/quality control analysis.

Chloroform (range non-detect to 8.8 $\mu g/m^3$) exceeded the US EPA's SSGG at Daycare B in three of four samples; however, this compound was below the current NJDEP RSGSL.

A summary of sampled locations and COCs detected in sub-slab/soil gas samples for the above daycare centers are presented in Table 2.

1,2-dichloroethane (range non-detect to 4.5 $\mu g/m^3$) exceeded the US EPA's SSGG in three of four sub-slab soil gas samples collected from the West Essex High School. This compound did not exceed the current NJDEP RSGSL for all samples analyzed. A summary of sub-slab soil gas results for the West Essex High School are presented in Table 3.

Sub-slab/Soil Gas – Commercial/Industrial Properties

The US EPA identified 9 commercial and 2 industrial properties for soil gas evaluation. Soil gas samples were analyzed for targeted VOCs using US EPA Method TO-15 for samples collected during the May 2007 through November 2007 investigation period.

Compounds exceeding the US EPA's sub-slab soil gas guidance (SSGG) at 8 commercial and 2 industrial properties were as follows:

- Carbon tetrachloride at 1 industrial property;
- Chloroform at 5 commercial and 2 industrial properties;
- 1,2-DCA at 2 commercial properties;
- 1,1-DCE at 1 industrial property;
- Methylene chloride at 1 commercial property;

- PCE at 7 commercial and 2 industrial properties;
- TCE at 7 commercial and 2 industrial properties; and
- Vinyl chloride at 1 industrial property.

A summary of sampled locations and COCs detected in sub-slab/soil gas samples for commercial and industrial properties are presented in Table 4a and 4b, respectively+. Compounds exceeding the current NJDEP Residential Soil Gas Screening Levels (RSGSLs) were present at 2 commercial and 2 industrial properties investigated.

Indoor Air – Residential Properties

Based on sub-slab soil gas investigation results and property locations relative to the CTC site, the US EPA selected 57 properties for investigation of indoor air. Air samples were collected in basement (lowest level) areas and first floor areas over a 24-hour period using SUMMA® canisters and analyzed for the same targeted VOCs as the sub-slab/soil gas samples. Analysis was performed using US EPA Method TO-15 for samples collected during the June 2006 through July 2010 investigation period. Indoor air investigations were conducted during several periods throughout the sampling years to account for seasonal variability regarding detections of indoor air concentrations.

Exceedances of the environmental CVs for the following compounds detected in indoor air in either basement and/or first floor areas were as follows:

- Benzene at 6 properties;
- Carbon tetrachloride at 3 properties;
- Chloroform at 41 properties;
- 1,2-DCA at 4 properties;
- Methylene chloride at 1 property;
- 1,1,2,2-Tetrachloroethane at 1 property;
- PCE at 20 properties;
- TCE at 21 properties; and
- Vinyl Chloride at 2 properties.

A summary of VOC concentrations detected at the above locations is presented in Table 5a for basement areas and 5b for first floor areas. Only a partial list of the above properties was observed to have VOCs in sub-slab soil gas samples exceeding either the US EPA's SSGGs or the NJDEP RSGSLs which is presented in the summary of evaluated locations below.

Indoor Air – Daycare Centers

Indoor air investigations at Daycare A in January 2011 were conducted as part of the day care center's childcare licensing requirement managed by the NJDOH – Indoor Environments Program. Indoor air samples were collected by Daycare A center's hired consultant to fulfill their childcare operating licensing and is not part of the US EPA's vapor intrusion investigation of the CTC Superfund site. The January 2011 results detected chloroform and trichloroethylene in one of two samples at 0.4 $\mu g/m^3$ (estimated) and 0.7 $\mu g/m^3$ (estimated), respectively, exceeding their respective environmental CVs of 0.04 µg/m^3 and 0.2 µg/m^3. Benzene, 1,3-butadiene, and carbon tetrachloride also exceeded environmental CVs; however, they are considered to be within background levels as these compounds were also detected in ambient air at concentrations equal to or greater than detected in indoor air. Additionally, past sub-slab soil gas sampling, conducted as part of US EPA vapor intrusion investigations, indicated TCE was not detected in eight sub-slab soil gas samples collected during the December 2006 and April 2007 investigations. Therefore, it cannot be confirmed that the detection of this compound in indoor air during the January 2011 sampling is attributable to a vapor intrusion source. There were no other exceedances above environmental CVs.

There were no exceedances of environmental CVs in the two indoor air samples collected during the US EPA vapor intrusion investigation in June 2007 for Daycare B. Three indoor air samples were collected by NJDOH in April 2011 as part of Daycare B center's childcare operating licensing requirements. This sampling was not part of the US EPA's vapor intrusion investigation of the CTC Superfund site. Indoor air data for the April 2011 sampling event indicated there was one detection of 1,3-butadiene at 1.4 µg/m^3 exceeding its environmental CV of 0.03 µg/m^3. 1,3-butadiene was not detected in the remaining two samples.

A summary of analytical results for these daycare centers is presented in Tables 6a, 6b, and 6c. Indoor air data was reviewed for both daycare centers by the NJDOH – Indoor Environments Program as part of their Childcare Unit which reviews environmental data for all licensed daycare centers in New Jersey. This licensing program was initiated by the NJDOH in 2007. Based on their review, the above daycare centers were approved to operate in April and May 2011 (see Appendix C).

Indoor Air – Commercial/Industrial Properties

The US EPA selected 8 commercial and 1 industrial properties for indoor air investigation. Analysis was performed using US EPA Method TO-15 for samples collected during the June 2007 through April 2010 investigation period.

Exceedances of the environmental CVs for the following compounds detected in indoor air in either basement and/or first floor areas were as follows:

- Chloroform at 3 commercial properties;
- 1,2-DCA and methylene chloride at 1 industrial property;
- PCE at 1 commercial and 1 industrial property; and
- TCE at 1 industrial property.

A summary of VOC contaminants detected at commercial properties are presented in Table 7a and for the industrial property in Table 7b.

Summary of Volatile Organic Contaminants (VOCs) Exceeding Environmental Comparison Values in Indoor Air

Indoor Air		
Residences A through K (11 total) [(1)] **With Confirmed Soil Gas Contamination Soil Venting Systems Advised/Installed**	**VOCs - Potentially Present from Vapor Intrusion**	**VOCs - Likely Present from Consumer or Background Sources** [(3)]
A	carbon tetrachloride, 1,2-DCA, TCE	chloroform
B, C, D	chloroform, PCE, TCE	
E	PCE, TCE	
F	1,2-DCA, PCE, TCE	benzene, carbon tetrachloride, chloroform
G	chloroform, 1,2-DCA, PCE, TCE	methylene chloride
H	chloroform	
I	PCE, TCE	benzene, chloroform,
J		benzene, chloroform, 1,1,2,2 TCA, PCE
K	chloroform, TCE	benzene

Residences L through V (11 total) [(2)] **Without Confirmed Soil Gas Contamination Soil Venting Systems Advised/Installed**	**VOCs - Indeterminate Source (soil gas samples not collected due to high water table)**	**VOCs - Likely Present from Consumer or Background Sources** [(3)]
L	chloroform, methylene chloride, PCE, TCE	
M, O	chloroform, PCE, TCE, vinyl chloride	
N		chloroform, methylene chloride, TCE
P		chloroform
Q	benzene, chloroform, 1,2-DCA, PCE, TCE	
R	chloroform, methylene chloride, PCE, TCE	
S		chloroform, methylene chloride, PCE, TCE
T	methylene chloride, TCE, PCE	
U, V		chloroform, TCE
Remaining Residential Properties Without Confirmed Soil Gas Contamination No Soil Venting Systems Installed	**VOCs Likely Present from Consumer or Background Sources** [(3)]	
22	benzene, chloroform, 1,2-DCA, methylene chloride, PCE, TCE	
Daycare Centers	**VOCs Likely Present from Consumer or Background Sources** [(3)]	
Daycare A	Chloroform, TCE	
Daycare B	1,3-butadiene	

Commercial/Industrial Properties With Confirmed Soil Gas Contamination	VOCs - Potentially Present from Vapor Intrusion	VOCs - Likely Present from Consumer, Production or Background Sources (3)
2 Commercial Properties	chloroform, PCE, TCE	
1 Commercial Property		chloroform
1 Industrial Property	PCE, TCE	1,2-DCA, methylene chloride

(1) Note: 10 of the 11 residences exceeding US EPA SSGGs have sub-slab vapor venting systems (SVS) installed to mitigate vapor intrusion. Residence K - property owner declined to have SVS installed.
(2) Note: 7 of 11 properties have SVS installed to mitigate vapor intrusion. Residences N, R and V – property owners declined to have SVS installed. Residence O – SVS installed but later removed in December 2009 at property owner's request.
(3) Contaminant ruled out as originating from vapor intrusion. Therefore, the contaminant's presence in indoor air was concluded to originate from consumer or background sources.

Toxicological summaries for identified COCs are provided in Appendix A.

Discussion

The method for assessing whether a health hazard exists to a community is to determine whether there is a completed exposure pathway from a contaminant source to a receptor population and whether exposures to contamination are high enough to be of health concern. Site-specific exposure doses can be calculated and compared with health guideline CVs.

Assessment Methodology

An exposure pathway is a series of steps starting with the release of a contaminant in environmental media and ending at the interface with the human body. A completed exposure pathway consists of five elements:

1. source of contamination;
2. environmental media and transport mechanisms;
3. point of exposure;
4. route of exposure; and
5. receptor population.

Generally, the ATSDR considers three exposure categories: 1) completed exposure pathways, that is, all five elements of a pathway are present; 2) potential exposure pathways, that is, one or more of the elements may not be present, but information is insufficient to eliminate or exclude the element; and 3) eliminated exposure pathways, that is, a receptor population does not come into contact with contaminated media. Exposure pathways are used to evaluate specific ways in which people were, are, or will be exposed to environmental contamination in the past, present, and future.

When assessing an exposure risk to a COC, the US EPA recommends the 95 percent upper confidence limit (95% UCL) of the arithmetic mean should be used to determine the exposure point concentrations (EPC) for site-related contaminants (US EPA 1992). However, due to the limited sample size for the majority of the residences investigated, a 95% UCL could not be accurately determined. Therefore, for residences where five or more samples results were available the EPC was determined based on the 95% UCL and for residences where less than five sample results were available the EPC was determined based on maximum COC concentrations detected.

The exposed populations for identified areas of concern include children and adults (residents and employees) associated with the 22 residences, Daycare A, 2 commercial properties, and 1 industrial property identified in the Summary of Contaminants of Concern for Evaluated Locations. The evaluated exposure pathways for site-related contaminants are presented in Table 8.

Completed Exposure Pathways

Properties with Confirmed Soil Gas Contamination

Inhalation of COCs in Residential Indoor Air. There is a past completed exposure pathway at 10 residences (Residences A through I and K) regarding the inhalation of air contaminated with VOCs which may be attributable to vapor intrusion based on US EPA soil gas and indoor air sampling data. These VOCs include, carbon tetrachloride, chloroform, 1,2-DCA, , PCE, and TCE. The exposure pathway involves these contaminant vapors migrating upwards through contaminated subsurface media, groundwater and soil, and entering the interior of these residences. Contaminants not detected in soil gas or detected at concentrations below the NJDEP RSGSL were either considered to be present from an indeterminate source or attributable to background and/or consumer sources (see Table 9). Current and future exposures to site-related contaminants from vapor intrusion at 9 of these residences (A through I) are considered interrupted with the operation of SVS installed between August 2006 through December 2009. There is a past, present and future exposure pathway via vapor intrusion at 1 residence (Residence K), since the property owner at Residence K has refused the installation of a SVS. VOCs detected in indoor air above health guideline CVs for Residence K include benzene, chloroform and TCE.

There is a past, present and future exposure pathway at Daycare A regarding the inhalation of air contaminated with chloroform and trichloroethylene and at Daycare B regarding the inhalation of air contaminated with 1,3-butadiene; however, these compounds were not attributable to a vapor intrusion source and may be present from consumer-related sources. For Daycare A, both of these compounds were detected at estimated concentrations below the analytical reporting limit and were at very low concentrations. For Daycare B, 1,3-butadiene was present at a low concentration and only detected in one of the three samples collected.

Inhalation of COCs in Indoor Air at Commercial/Industrial Properties. There is a past, present, and future completed exposure pathway via vapor intrusion at 2 commercial properties and 1 industrial property regarding the inhalation of air contaminated with VOCs which may be attributable to vapor intrusion based on US EPA soil gas sampling data. These VOCs include chloroform, PCE and TCE at the commercial properties and PCE and TCE at the industrial property. The exposure pathway involves these contaminant vapors migrating upwards through contaminated subsurface media, groundwater and soil, and entering the interior of these buildings. There is an additional inhalation exposure pathway at the industrial property regarding 1,2-DCA and methylene chloride which was not shown to be attributable to a vapor intrusion source based on existing sampling data.

Properties without Confirmed Soil Gas Contamination

Inhalation of COCs in Residential Indoor Air. There is a past exposure pathway at 11 properties (Residences L through V) regarding the inhalation of air contaminated with VOCs. Due to the high groundwater table near the CTC site, sub-slab soil gas samples were not able to be collected at Residences L, M, O, Q, R, and T by the US EPA. Due to the lack of soil gas data for these properties and the absence of contaminants in soil gas for the remaining sampled properties, contaminants in indoor air could not be confirmed to be attributable to vapor intrusion. Indoor air contaminants detected at these residences include benzene, chloroform, 1,2-DCA, methylene chloride, PCE, TCE and vinyl chloride. Current and future exposures at 7 of these residences (L, M, P, Q, S, T and U) are considered interrupted with the operation of SVS installed August 2006 through December 2009. There is a present and future exposure pathway at 4 residences (Residences N, O, R and V), where property owners declined the US EPA recommended installation of SVS.

There is a past, present and future exposure pathway at an additional 22 residences where VOC contaminants in indoor air have exceeded environmental CVs. However, no soil gas samples were collected at these locations due to the high groundwater table; therefore, contaminants in indoor air could not be confirmed to be attributable to vapor intrusion. Additionally, contaminant levels at these locations were found to be very low. Due to the elevated groundwater table, the US EPA did not recommend mitigation measures to be performed. VOCs detected in indoor air above environmental CVs for these 22 residences include benzene, chloroform, 1,2-DCA, methylene chloride, PCE, TCE, and vinyl chloride.

Public Health Implications of Completed Exposure Pathways

Once it has been determined that individuals have or are likely to come in contact with site-related contaminants (i.e., a completed exposure pathway), the next step in the public health assessment process is the calculation of site-specific exposure doses. This is called a health guideline comparison which involves looking more closely at site-specific exposure conditions, the estimation of exposure doses, and comparison to health guideline CVs. Health guideline CVs are based on data drawn from the epidemiologic and toxicologic literature and often include uncertainty or safety factors to ensure that they are amply protective of human health.

If one is exposed to site-related contaminants, there are several factors that will determine whether they may be harmed. These factors include the amount of contaminant that enters the body, the duration and frequency that someone contacts the contaminant, and how one comes in contact with it. Additional considerations regarding potential adverse health effects from exposures to a contaminant include age, sex, diet, family traits, lifestyle, and state of health.

Non-Cancer Health Effects

To assess non-cancer health effects, ATSDR has developed Minimal Risk Levels (MRLs) for contaminants that are commonly found at hazardous waste sites. An MRL is an estimate of the daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of adverse, non-cancer health effects. MRLs are developed for a route of exposure, i.e., ingestion or inhalation, over a specified time period, e.g., acute (less than 14 days); intermediate (15-364 days); and chronic (365 days or more). MRLs are based largely on toxicological studies in animals and on reports of human occupational (workplace) exposures. MRLs are usually extrapolated doses from observed effect levels in animal toxicological studies or occupational studies, and are adjusted by a series of uncertainty factors or through the use of statistical models. In toxicological literature, the following observations include:

- no-observed-adverse-effect level (NOAEL); and
- lowest-observed-adverse-effect level (LOAEL).

A NOAEL is the highest tested dose of a substance that has been reported to have no harmful (adverse) health effects on people or animals. A LOAEL is the lowest tested dose of a substance that has been reported to cause harmful (adverse) health effects in people or animals. To provide additional perspective on these health effects, the calculated exposure doses were then compared to the applicable NOAEL or LOAEL. As the exposure dose increases beyond the MRL to the level of the NOAEL and/or LOAEL, the likelihood of adverse health effects increases.

When MRLs for specific contaminants are unavailable, other health based comparison values such as the US EPA's Reference Concentration (RfC) are used. The RfC is an estimate of a daily inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime of exposure.

When assessing an exposure risk to a COC, the US EPA recommends the 95 percent upper confidence limit (95% UCL) of the arithmetic mean contaminant concentration should be used to determine the exposure point concentrations (EPC) (US EPA 1992). Statistical analysis for data sets of 4 to 6 observations are not considered to be adequate for reliable analysis. Therefore, for residences where five or more samples results were available for area-specific locations within the home (i.e. basements vs. 1st floor samples), the exposure point concentration (EPC) was determined based on the 95% UCL. For residences where less than five sample results were available for area-specific locations, the EPC was determined based on maximum COC concentrations detected.

Exposure point concentrations for non-cancer health effects to indoor air contaminants were calculated using the following formula:

$$EPC_{\text{non-cancer}} = C \times ET \times EF$$

where EPC = exposure point concentration of contaminant in air (µg/m^3);
C = 95% UCL or maximum concentration of contaminant in air (µg/m^3);
ET = exposure time (hours/24 hours); EF = exposure frequency (days/365 days).

The following site-specific exposure assumptions (US EPA 2009b, 2011b) were used to calculate exposures doses to area residents and employees at commercial properties.

Exposed Population	**Hourly Exposure Assumptions**	**Daily Exposure Assumptions**
Adult/Child Residents	24 hours/day	350 days per 365 days
Adult Employees Daycare Children	12 hours/day	260 days per 365 days

<u>Inhalation of COCs in Indoor Air</u>

<u>TCE.</u> The current RfC for chronic inhalation exposure to TCE is 2 µg/m^3 (USEPA 2011c). Based on the EPC, the chronic RfC for TCE of 2 µg/m^3 was exceeded at 11 residential properties listed below (see Tables 9 and 10).

This RfC reflects the midpoint between RfC estimates for two adverse health effects (Study 1 1.9 µg/m^3 for adult immunological effects in mice and Study 2: 2.1 µg/m^3 for fetal heart malformations in rats). Regarding human health effects, specifically decreased thymus weights observed in mice from Study 1 and fetal heart malformations from Study 2, the predicted LOAELs for adult human inhalation exposures were derived using physiologically based pharmacokinetic (PBPK) modeling and route-to-route extrapolation to convert oral TCE doses in animals to a human equivalent concentration (HEC) in air.

The LOAELs for the two RfC studies are 190 µg/m^3 and 21 µg/m^3 which the US EPA attribute a small risk to develop the associated health effects when humans are chronically exposed to TCE at these concentrations (USEPA 2011c). There are many uncertainties in drawing conclusions on the development of critical health effects to occur based on extrapolated data from animal studies. However, the ATSDR regards individuals exposed to TCE concentrations near predicted LOAELs to pose a lower risk for harmful effects to occur while exposures exceeding predicted LOAELs posing a higher risk for harmful effects to occur.

For individuals at 11 properties (Residences A, B, E, F, G, I, K, L, M, O and T), there is an increased risk for fetal heart malformations to have occurred from maternal exposures to indoor air containing elevated levels of TCE that were either approaching or exceeding the LOAEL. For individuals at 8 properties (Residences E, G, I, K, L, M, O and T), there is an increased risk for adult immunological effects to occur as the EPC of TCE was approaching, and in one case exceeding (Residence M), the LOAEL.

The following summary compares inhalation exposures to the LOAELs and provides the potential risk of adverse effects for occupants in each of the buildings evaluated:

Area of Concern	**TCE EPC** ($\mu g/m^3$)	**Increased Risk of Adverse Health Effect**	
		Study 1: Adult Immunological Effects LOAEL 190 $\mu g/m^3$	**Study 2:** Fetal Heart Malformations LOAEL 21 $\mu g/m^3$
		Risk Potential for Health Effects	
Residences with Confirmed Soil Gas Contamination – SVS Advised/Installed			
Residences A, B, F	5.6 – 8.7	Unlikely	Yes
Residences E, G, I, K	24 - 78	Yes	Yes
Residences without Confirmed Soil Gas Contamination – Indeterminate Source SVS Advised/Installed			
Residences Q, R	3.4 - 4.5	Unlikely	Unlikely
Residences L, O, T	24 - 93	Yes	Yes
Residence M	359	Yes	Yes
Commercial/Industrial Properties with Confirmed Soil Gas Contamination			
2 Commercial Properties	1.1	Unlikely	Unlikely
1 Industrial Property	3.1	Unlikely	Unlikely

At all of the above residences, exposures are considered to be interrupted with the installation of SVS in 2006 through 2009 with the exception of Residences K and O. Exposures at Residence K are not considered interrupted as the property owners have refused the installation of a SVS to mitigate exposures. Exposures at Residence O may continue as the SVS installed in April 2008 was removed in December 2009 at the request of the property owners.

For Residence M, concentrations of TCE were detected in indoor air at 140 to 390 $\mu g/m^3$ in April 2007; however, for subsequent indoor air samples collected in June and September 2007, the range of TCE was non-detect to 1.5 $\mu g/m^3$. As the SVS for his residence was installed in April 2008 and no soil gas samples were collected, it cannot be determined if concentrations of TCE in indoor air in April 2007 were attributable to vapor intrusion or possibly from consumer-related sources. Additionally, based on this limited information it is unknown if past exposures remained elevated, specifically above the LOAELs of 190 $\mu g/m^3$ and 21 $\mu g/m^3$, where the possible risk of adverse health effects was elevated.

<u>Chloroform.</u> The current MRL for chronic inhalation exposure to chloroform is 100 $\mu g/m^3$. This MRL is based on an occupational study of a group of 68 workers exposed to chloroform at 2 to 205 parts per million (ppm) (approximately 9,800 to 1,000,000 $\mu g/m^3$) for a 1

to 4 year period. A LOAEL of approximately 9,800 µg/m^3 was derived for hepatic effects (hepatomegaly) observed in 25% of the workers (ATSDR 1997). The MRL is adjusted by an uncertainty factor of 100 for use of a LOAEL and human variability. The EPC of chloroform of 144 µg/m^3 at Residence A only slightly exceeds the chronic MRL and approximately 68 times lower than the LOAEL observed in the above study; therefore, non-cancer adverse health effects are not expected to occur to residents at this location. The MRL for intermediate inhalation exposure to chloroform, 245 µg/m^3 , was not exceeded at Residence A.

For Residence A, in indoor air samples collected in June 2007 indicated the range of chloroform was non-detect to 1.5 µg/m^3. Subsequent indoor air samples collected in January 2008 indicated the range of chloroform was 88 to 150 µg/m^3.A SVS for his residence was installed in November 2008; therefore, as long as the system is maintained, exposures should no longer occur. Due to the large discrepancy in concentrations of chloroform detected within this residence, past exposures may actually be less than the calculated EPC. Therefore, it is difficult to accurately estimate a past exposure dose to chloroform at Residence A due to the limited sampling data.

Methylene chloride. Although the EPC of methylene chloride is present above health-based comparison values for the investigated industrial property (see Table 12), it did not exceed the United States Occupational Safety and Health Administration's (OSHA) time weighted average (TWA) of 25 ppm (approximately 86,750 µg/m^3). Therefore, as this contaminant was related to an occupational exposure for this facility, additional evaluation was not conducted. Information pertaining to the EPC was provided to acknowledge the presence of this non site-related contaminant in indoor air at this facility.

Remaining VOCs. All remaining VOC contaminants detected in indoor air, including chloroform and trichloroethylene in Daycare A and 1,3-butadiene in Daycare B, were below health-based CVs (see Tables 9, 10, 11, 12 and 16).

Cancer Health Effects

The site-specific lifetime excess cancer risk (LECR) estimates the cancer potential of contaminants. LECR estimates are usually expressed in terms of excess cancer cases in an exposed population For perspective, the lifetime risk of being diagnosed with cancer in the United States is 44 per 100 individuals for males, and 38 per 100 for females (ACS 2011). Typically, CVs developed for carcinogens are based on one excess cancer case per 1,000,000 individuals. The NJDOH considers estimated cancer risks of less than one additional cancer case among one million persons exposed as insignificant or no increased risk (expressed exponentially as 10^{-6}).

According to the United States Department of Health and Human Services (USDHHS), the cancer class of contaminants detected at a site is as follows:

1 = Known human carcinogen
2 = Reasonably anticipated to be a carcinogen
3 = Not classified

The NJDOH uses the following cancer risk descriptions for health assessments:

Public Health Assessment/Health Consultation
Risk Description for New Jersey

LECR	Risk Description
$\geq 10^{-1}$	Increase
10^{-2} to $<10^{-1}$	
10^{-3} to $<10^{-2}$	
10^{-4} to $<10^{-3}$	Low increase
10^{-5} to $<10^{-4}$	No apparent increase
10^{-6} to $<10^{-5}$	
$< 10^{-6}$	No expected increase

LECRs were calculated using the following formula (US EPA 2009):

Exposure point concentrations for cancer health effects to indoor air contaminants were calculated using the following formula (US EPA 2009):

$$EPC_{cancer} = \frac{C \text{ x } ET \text{ x } EF \text{ x } ED}{AT}$$

where EPC = exposure point concentration of contaminant in air ($\mu g/m^3$);
C = 95% UCL or maximum concentration of contaminant in air ($\mu g/m^3$);
ET = exposure time (hours/day); EF = exposure frequency (days/year);
ED = exposure duration (years); and AT = averaging time (78 years).

$$LECR = EPC_{cancer} \text{ x } IUR$$

where EPC_{cancer} = exposure point concentration of contaminant in air ($\mu g/m^3$); and
IUR = inhalation unit risk of contaminant in air $(\mu g/m^3)^{-1}$

The LECR for residents was calculated by multiplying the cancer exposure point concentration in indoor air by the inhalation unit risk (IUR). The IUR is defined by the US EPA as the upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 $\mu g/m^3$ in air (US EPA 2008b). The inhalation CSF for carcinogens detected in indoor air was used to estimate the LECR to exposed individuals.

The following site-specific exposure assumptions (US EPA 2011) were used to calculate exposures doses to area residents and employees at commercial properties.

Exposed Population	**Hourly Exposure Assumptions**	**Daily Exposure Assumptions**	**Exposure Duration**
Adult/Child Residents	24 hours/day	350 days per 365 days	30 years adults 6 years children
Adult Employees Daycare Children	12 hours/day	260 days per 365 days	

Inhalation of COCs in Indoor Air

The risk of cancer for past exposures regarding the inhalation of indoor air contaminated with VOCs was evaluated for adults and children for properties identified from the June 2006 through July 2010 indoor air investigations.

The LECR was estimated using EPCs in indoor air using data from these same investigations. Site-specific assumptions and recommended exposure factors (US EPA 2009b, 2011b) were used to calculate the exposure concentration based on the exposure period as described in Tables 13, 14, 15, 17, and 18.

Residences with Confirmed Soil Gas Contamination – SVS Advised/Installed

Residences A through K (past). Based on the EPC of VOC exposure concentrations in the indoor air which were likely attributable to a vapor intrusion source, the range of LECRs were estimated to be approximately 1 in 1,000,000 to 9 in 100,000 for adults and children, respectively. This is considered no apparent increased risk (see Table 13).

Residences without Confirmed Soil Gas Contamination – SVS Advised/Installed

Residences L and M (past). Based on the EPC of VOC exposure concentrations in the indoor air, the range of LECRs were estimated to be approximately 1 in 10,000 to 4 in 10,000 for adults and children which is considered a low increased risk (see Table 14).

Residences N through V (past). Based on the EPC of VOC exposure concentrations in the indoor air, the range of LECRs were estimated to be approximately 1 in 100,000 to 8 in 100,000 for adults and children which is considered no apparent increased risk (see Table 14).

22 Remaining Residences without Confirmed Soil Gas Contamination – SVS Not Installed

Based on the EPC of VOC exposure concentrations in the indoor air, LECRs were estimated to be less than 3 in 100,000 for adults and children, which is considered no apparent increased risk (see Table 15).

Daycare Centers

Daycare A (past, present, future). Based on the EPC of chloroform and trichloroethylene in the indoor air, LECRs were estimated to be less than 2 in 1,000,000 for adults, which is considered no apparent increased risk. LECRs were estimated to be less than 1 in 1,000,000 for daycare children, which is considered a no expected increased risk (see Table 17).

Daycare B (past, present, future). Based on the EPC of 1,3-butadiene in the indoor air, LECRs were estimated to be approximately 6 in 1,000,000 for adults and 1 in 1,000,000 for children, which is considered no apparent increased risk (see Table 17).

Commercial/Industrial Properties with Confirmed Soil Gas Contamination

3 Commercial Properties (past, present, future). Based on the EPC of VOC exposure concentrations in the indoor air which were attributable to a vapor intrusion source, the range of LECRs were estimated to be approximately 1 in 100,000 for adult employees, which is considered no apparent increased risk (see Table 18).

1 Industrial Property (past, present, future). Based on the EPC of VOC exposure concentrations in the indoor air which were attributable to a vapor intrusion source, the LECR was estimated to be approximately 5 in 1,000,000 for adult employees, which is considered no apparent increased risk (see Table 18).

It is noted that indoor investigations conducted for all residences represent a snapshot in time where conditions within these locations may have changed over time and may not be representative of historical conditions.

Child Health Considerations

ATSDR recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination in their environment. Children are at greater risk than adults from certain kinds of exposures to hazardous substances because they eat and breathe more than adults. They also play outdoors and often bring food into contaminated areas. Children are also smaller, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most importantly, children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care.

Regarding non-cancer health effects associated with past inhalation exposures to TCE in indoor air, there is an increased risk for fetal heart malformations to have occurred from maternal exposures to indoor air containing elevated levels of TCE to pregnant women living at Residences G, I, L and M. Exposures at these residences have been interrupted with the installation of a SVS from April through October 2008.

The potential for non-cancer health effects associated with the inhalation of TCE in indoor air are low for past, current and future exposures regarding fetal heart malformations to occur to unborn children of pregnant women living at Residences E, K, O and T. Exposures at Residences E, O and T have been interrupted with the installation of a SVS from April 2008 through August 2009. Exposures at Residence K *have not* been interrupted as the property owner has refused the US EPA's offer for the installation of a SVS.

It is also noted that indoor investigations conducted for Residences E, G, I, K, L, M, O and T represent a snapshot in time where conditions within these locations may have changed over time and may not be representative of historical conditions.

Based on the EPC of VOC contaminants detected in indoor air and a 30-year exposure duration, there is no apparent increased risk of cancer effects for residents, including children, from past exposures at residences where these exposures have been interrupted with the installation of a SVS. The remaining residences evaluated were also determined to have no apparent increased risk of cancer for residents based on the EPC of VOC contaminants detected in indoor air.

Based on the EPC of carbon tetrachloride detected in indoor air for Daycare A, there is no expected increased risk of cancer for children. Environmental data for this facility was reviewed by the NJDOH Indoor Environments Program with a licensed approval letter issued in April 2011 (see Appendix C). Additionally, there were no COCs detected above applicable environmental screening values for Daycare B and the West Essex High School; therefore, no additional actions were recommended for these locations.

Conclusions

The CTC collected septic (and allegedly chemical) waste from residential, commercial and industrial facilities beginning in 1933. From the early 1950s to 1973, CTC had disposed of these wastes into unlined settling lagoons. After 1973, septic wastes were stored in underground storage tanks (USTs) installed by CTC. Waste disposal operations ceased by 1984 as CTC changed operations solely to waste transport until the company ceased operations in 1988. Contamination of soil and groundwater was caused by CTC's long-term disposal operations; however, other facilities operating in the area may have also contributed to area contamination. Following review and assessment of environmental data associated with the vapor intrusion investigation, the NJDOH and ATSDR have reached the following conclusions regarding exposures to residents for the CTC site:

NJDOH and ATSDR conclude that, based on available data from the US EPA vapor intrusion investigations from June 2006 through July 2010, past exposures to VOCs in indoor air at 9 residences may have harmed people's health. For individuals at 9 properties (Residences A, B, E, F, G, I, L, M, and T), there is an increased risk for fetal heart malformations to have occurred from maternal exposures to indoor air containing elevated levels of TCE. For Residences G and I, the lifetime excess cancer risk is considered no apparent increase in risk. For Residences L and M, the lifetime excess cancer risk is considered a low increased risk; however, the source of contamination at these residences has not been confirmed to originate from a vapor intrusion. It is also noted that indoor investigations conducted for these residences represent a snapshot in time where conditions within these locations may have changed over time and may not be representative of historical conditions. Exposures at these residences have been interrupted with the installation of a SVS during April through October 2008.

NJDOH and ATSDR conclude that, based on the June 2006 through July 2010 vapor intrusion investigation period, past, current and future exposures to VOCs in indoor air at two residences may have harmed people's health. For individuals at three properties (Residences K and O) there is an increased risk for fetal heart malformations to have occurred from maternal exposures to indoor air containing elevated levels of TCE. The lifetime excess cancer risk for these residences are considered a no apparent increase in risk. The SVS installed in April 2008 at Residence O was removed in December 2009 at the request of the property owner as TCE levels in indoor air had been decreasing. Exposures at Residence K *have not* been interrupted as the property owner has refused the US EPA's offer for the installation of a SVS. Therefore, unnecessary inhalation exposures will continue to individuals living at Residence K and possibly for individuals at Residence O.

NJDOH and ATSDR conclude that, based on the June 2006 through July 2010 vapor intrusion investigation period, past, current and future exposures to VOCs in indoor air are not expected to harm people's health. For the remaining properties evaluated, including Daycare centers A and B, completed exposures VOCs in indoor air are not expected to cause adverse non-cancer health effects. The lifetime excess cancer risk is considered no apparent increase in risk. Fourteen of these properties have an operational SVS to mitigate any potential exposures to VOC contaminants in indoor air resulting from a vapor intrusion source. Additionally, soil gas samples collected for the West Essex High School indicated no contaminants exceed the current NJDEP residential soil gas screening levels.

NJDOH and ATSDR conclude that, based on the May 2007 through November 2007 vapor intrusion investigation period for the commercial/industrial properties, past, current and future exposures to VOCs in indoor air are not expected to harm people's health. The lifetime excess cancer risk is considered no apparent increase in risk. However, for one industrial facility evaluated, methylene chloride was shown at elevated concentrations in indoor air which appear to be from operational sources and not vapor intrusion. The exposure concentration of methylene chloride at this facility is below the federal Occupational Safety and Health Administration's recommended time weighted average for occupational exposures.

Recommendations

1. The property owners at Residences K (US EPA Sample ID 2801-7) and O (US EPA Sample ID 2501-13) should continue to be advised by the US EPA of the benefits of having a SVS installed to mitigate the potential for vapor intrusion and interrupt further exposures, particularly to TCE. Additionally, sub-slab soil gas results have confirmed soil gas levels exceed environmental screening values for this property, where detections of TCE and PCE were the highest recorded for all residences investigated at this site.

2. For one residence (US EPA Sample ID 2801-1502), TCE was detected in indoor air at 3.7 $\mu g/m^3$ to 4.5 $\mu g/m^3$. The US EPA should consider follow-up investigation at this property to determine if the presence of TCE is due to vapor intrusion where the

installation of a SVS may be warranted to interrupt future exposures as they exceed the US EPA's current RfC for TCE at 2 μg/m^3.

3. The sub-slab soil venting system at Residence F (US EPA Sample ID 2501-27) should be re-inspected to determine its effectiveness in preventing sub-slab vapors from entering this residence. This recommendation is provided as sample results indicate TCE concentrations in indoor air have remained above the RfC after the installation of the SVS system on June 13, 2008 and TCE in soil gas is documented to exceed the NJDEP RSGSL.

4. Residence A (US EPA Sample ID 2502-7) had two significant detections of chloroform in indoor air in January 2008; however, it could not be determined whether this contaminant is attributable from a vapor intrusion source. Chloroform was not detected in the March 2009 soil gas sample which suggests that this contaminant is likely present from a consumer-related source(s). Regardless, as only one soil gas sample has been collected for this residence, the US EPA should consider additional investigation to confirm chloroform is not originating from a vapor intrusion source.

5. The US EPA should consider monitoring all SVS installed at properties under investigation at the CTC site to ensure these mitigation systems are effectively preventing vapor intrusion of site-related contaminants.

6. The US EPA should consider testing groundwater at evaluated locations where the soil gas testing was not performed due to the existence of a high groundwater table. Some evaluated locations had site-related contaminants detected in indoor air but it was not determined if a site-related source was present. Groundwater testing at these locations would identify whether contaminated groundwater exists and is possibly contributing to vapor intrusion.

7. The US EPA should continue with remedial investigations and evaluate feasibility studies to implement necessary actions to address contaminated groundwater and to eliminate any potential vapor intrusion exposure pathways to area residents within the groundwater plume. Short-term solutions should continue to be considered for buildings where elevated concentrations of site-related contaminants are present in soil gas increasing the threat of vapor intrusion or directly causing elevated contaminant concentrations in indoor air.

8. The US EPA should continue to implement remedial actions specified in their Record of Decision (ROD) for the OU2 study area to eliminate remaining exposure pathways from contaminated groundwater.

9. Residents are encouraged to contact their primary health care physician to discuss health concerns regarding exposure to site-related contaminants. Additionally, as the US EPA is actively addressing site contamination through remedial measures, residents are encouraged to follow US EPA's recommendations and allow them to take the measures necessary to reduce or prevent exposures.

Public Health Action Plan

The purpose of a Public Health Action Plan is to ensure that this Public Health Assessment not only identifies public health hazards, but also provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included is a commitment on the part of the ATSDR and the NJDOH to follow-up on this plan to ensure that it is implemented. The public health actions to be implemented by the ATSDR and NJDOH are as follows:

Public Health Actions Taken

1. The NJDOH and ATSDR reviewed information and relevant data to evaluate the potential health implications for inhalation exposures in indoor air for residences investigated by the US EPA within the study area.

2. A public health assessment and two health consultations and were completed for the site between October 1988 and August 1995. These documents evaluated the potential health implications for exposures to site-related contaminants for both on- and off-site sources. The NJDOH and ATSDR concluded that exposures to site-related contaminants were a public health concern and that additional investigation into source areas and areas of potential concern for exposures were needed to more fully assess the extent of risk associated with this site.

Public Health Actions Planned

1. Copies of this health consultation will be provided to concerned residents in the vicinity of the site via the township libraries and the Internet. Additionally, residents who contact the NJDOH will be provided assistance in understanding the findings of this report.

2. The NJDOH and the ATSDR will continue to review data as it is made available. This includes new information related to investigations and remedial actions taken for areas of concern within the OU2 study area as it is completed in the future.

3. The NJDOH and ATSDR will provide physician outreach to residents who have health concerns regarding past exposures to site-related contaminants. This would include, upon request, assistance with outreach between the resident's physician and trained experts who specialize in occupational and environmental related exposures to hazardous substances.

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REPORT PREPARATION

This Health Consultation for the Caldwell Trucking Company Superfund site, located in Fairfield Township within Essex County, New Jersey was prepared by the New Jersey Department of Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved agency methods, policies, procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented. ATSDR's approval of this document has been captured in an electronic database, and the approving agency reviewers are listed below.

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Table 1: Summary of Soil Gas Results - 38 Properties
Sample Period: June 2006 through May 2008
Caldwell Trucking Site, Essex County

Contaminant	Number of Samples	Number of Detections	Number of Residences Above 2007 EPA SS Guidance [(a)]	Concentration: micrograms/cubic meter				Above EPA SSGG	Above NJDEP RSGSL
				Minimum	Maximum	EPA SS Guidance [(a)]	NJDEP GVISLG [(b)]		
Current									
Acetone	6	2	0	ND	110	33,000	160,000	No	No
Benzene	6	3	1	ND	6.4	2.3	16	**Yes**	No
Bromodichloromethane	6	0		ND	ND	1	34	No	No
Bromoethene	6	0		ND	ND	0.57	22	No	No
Bromoform	6	0		ND	ND	16	80	No	No
Bromomethane	6	0	0	ND	ND	51	260	No	No
1,3-Butadiene	6	0		ND	ND	0.63	11	No	No
Methyl Ethyl Ketone (2-Butanone)	6	3		ND	2,400	51,000	260,000	No	No
Carbon disulfide	6	2		ND	160	7,300	36,000	No	No
Carbon tetrachloride	60	6	1	ND	1.4	1.2	31	**Yes**	No
Chlorobenzene	6	0	0	ND	ND	510	2,600	No	No
Chloroethane	60	0		ND	ND	22	110	No	No
Chloroform	60	23	15	ND	590	0.77	24	**Yes**	**Yes**
Chloromethane	60	8		ND	1.9	950	4,700	No	No
3-Chloropropene	6	0		ND	ND	NA	16	No	No
2-Chlorotoluene	6	0		ND	ND	NA	3,600	No	No
Cyclohexane	6	2		ND	2.3	62,000	310,000	No	No
Dibromochloromethane	6	0		ND	ND	0.75	43	No	No
1,2-Dibromoethane	6	0	0	ND	ND	0.031	38	No	No
1,2-Dichlorobenzene	6	0		ND	ND	1,500	7,300	No	No
1,3-Dichlorobenzene	6	0		ND	ND	110	550	No	No
Dichlorodifluoromethane	6	2		ND	4.3	1,800	9,100	No	No
1,1-Dichloroethane	60	11		ND	3,200	5,100	3,600	No	No
1,2-Dichloroethane	60	5	4	ND	8.9	0.69	2	**Yes**	**Yes**
1,1-Dichloroethene	60	9	1	ND	7,100	2,200	11,000	**Yes**	No
1,2-Dichloroethene (cis)	60	17	2	ND	56,000	370	1,800	**Yes**	**Yes**
1,2-Dichloroethene (trans)	60	3		ND	75	730	3,600	No	No
1,2-Dichloropropane	6	0	0	ND	ND	0.92	23	No	No
1,3-Dichloropropene (cis)	6	0		ND	ND	6.3	31	No	No

Table 1 (continued): Summary of Soil Gas Results - 38 Properties

Contaminant	Number of Samples	Number of Detections	Number of Residences Above 2007 EPA SS Guidance	Concentration: micrograms/cubic meter				Above EPA SSGG	Above NJDEP RSGSL
				Minimum	Maximum	EPA SS Guidance [a]	NJDEP GVISLG [b]		
VOLATILE ORGANIC COMPOUNDS									
1,3-Dichloropropene (trans)	6	0	0	ND	ND	6.3	31	No	No
1,2-Dichlorotetrafluoroethane	6	0		ND	ND	NA	NA	No	No
Ethylbenzene	6	1		ND	4.1	11,000	53,000	No	No
4-Ethyltoluene	6	2		ND	38	NA	NA	No	No
n-Heptane	6	3		ND	12	NA	NA	No	No
Hexachlorobutadiene	6	0		ND	ND	0.8	53	No	**No**
n-Hexane	6	1		ND	7.4	7,300	36,000	No	No
Methylene chloride	60	10	2	ND	42	11	190	**Yes**	No
Methyl isobutyl ketone	6	0	0	ND	ND	31,000	160,000	No	No
Methyl tert-butyl ether	6	1		ND	3.2	16	78	No	No
Styrene	6	1		ND	2	10,000	52,000	No	No
Tert-butyl alcohol	6	0		ND	ND	NA	3,300	No	No
1,4-Dichlorobenzene	6	1	1	ND	2,200	2.8	30	**Yes**	**Yes**
1,1,2,2-Tetrachloroethane	6	0	0	ND	ND	0.31	34	No	No
Tetrachloroethylene	60	29	12	ND	8,100	3.1	34	**Yes**	**Yes**
Toluene	6	3	0	ND	41	51,000	260,000	No	No
1,2,4-Trichlorobenzene	6	0		ND	ND	370	1,800	No	No
1,1,1-Trichloroethane	60	19	1	ND	16,000	10,000	51,000	**Yes**	No
1,1,2-Trichloroethane	60	0	0	ND	ND	1.1	27	No	No
Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	60	20		ND	77,000	310,000	1,600,000	No	No
Trichloroethene	60	29	16	ND	97,000	0.16	27	**Yes**	**Yes**
Trichlorofluoromethane (Freon 11)	6	2	0	ND	2.8	73,000	36,000	No	No
1,2,4-Trimethylbenzene	6	3		ND	31	NA	NA	No	No
1,3,5-Trimethylbenzene	6	2		ND	13	NA	NA	No	No
2,2,4-Trimethylpentane	6	1		ND	1.0	NA	NA	No	No
Vinyl chloride	54	3	2	ND	100	0.72	13	**Yes**	**Yes**
Total Xylenes	6	2	0	ND	19.6	1,100	5,500	No	No

(a) US EPA Sub-slab Soil Gas Guidance based on US EPA Region 3 risk-based concentrations for ambient air (published 2007).
(b) New Jersey Department of Environmental Protection Generic Vapor Intrusion Screening Levels for Soil Gas - Residential (published 2007).
ND - Not Detected
NA - No Screening Level

Table 2: Summary of Soil Gas Results - Daycare Facilities
Sample Period: December 2006; April 2007
Caldwell Trucking Site, Essex County

Location	Contaminant	Number of Samples	Number of Detections	Concentration: micrograms/cubic meter				Above EPA SSGG	Above NJDEP RSGSL
				Minimum	Maximum	EPA SS Guidance [(a)]	NJDEP GVISLG [(b)]		
Daycare A	**VOLATILE ORGANIC COMPOUNDS**								
	Carbon tetrachloride	8	0	ND	ND	1.2	31	No	No
	Chloroethane	8	0	ND	ND	22	110	No	No
	Chloroform	8	2	ND	43	0.77	24	**Yes**	**Yes**
	Chloromethane	8	2	ND	3.1	950	4,700	No	No
	1,1-Dichloroethane	8	0	ND	ND	5,100	3,600	No	No
	1,2-Dichloroethane	8	0	ND	ND	0.69	2	No	No
	1,1-Dichloroethene	8	0	ND	ND	2,200	11,000	No	No
	1,2-Dichloroethene (cis)	8	0	ND	ND	370	1,800	No	No
	1,2-Dichloroethene (trans)	8	0	ND	ND	730	3,600	No	No
	Methylene chloride	8	0	ND	ND	38	190	No	No
	Tetrachloroethene	8	1	ND	2.6	3.1	34	No	No
	1,1,1-Trichloroethane	8	1	ND	4.4	10,000	51,000	No	No
	1,1,2-Trichloroethane	8	0	ND	ND	1.1	27	No	No
	Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	8	2	ND	10	310,000	1,600,000	No	No
	Trichloroethene	8	0	ND	ND	2.7	27	No	No
	Vinyl chloride	8	0	ND	ND	0.72	13	No	No
Daycare B	**VOLATILE ORGANIC COMPOUNDS**								
	Carbon tetrachloride	4	0	ND	ND	1.2	31	No	No
	Chloroethane	4	0	ND	ND	22	110	No	No
	Chloroform	4	3	ND	8.8	0.77	24	**Yes**	No
	Chloromethane	4	1	ND	1.9	950	4,700	No	No
	1,1-Dichloroethane	4	0	ND	ND	5,100	3,600	No	No
	1,2-Dichloroethane	4	0	ND	ND	0.69	2	No	No
	1,1-Dichloroethene	4	0	ND	ND	2,200	11,000	No	No
	1,2-Dichloroethene (cis)	4	0	ND	ND	370	1,800	No	No
	1,2-Dichloroethene (trans)	4	0	ND	ND	730	3,600	No	No
	Methylene chloride	4	1	ND	2.4	38	190	No	No
	Tetrachloroethene	4	3	ND	6.3	3.1	34	**Yes**	No
	1,1,1-Trichloroethane	4	0	ND	ND	10,000	51,000	No	No
	1,1,2-Trichloroethane	4	0	ND	ND	1.1	27	No	No
	Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	4	2	ND	22	310,000	1,600,000	No	No
	Trichloroethene	4	1	ND	7.5	2.7	27	**Yes**	No
	Vinyl chloride	4	0	ND	ND	0.72	13	No	No

(a) US EPA Sub-slab Soil Gas Guidance based on US EPA Region 3 risk-based concentrations for ambient air (published 2007).
(b) New Jersey Department of Environmental Protection Generic Vapor Intrusion Screening Levels for Soil Gas - Residential (published 2007).
ND - Not Detected
NA - No Screening Level

Table 3: Summary of Soil Gas Results - West Essex High School
Sample Period: April 2009
Caldwell Trucking Site, Essex County

Contaminant	Number of Samples	Number of Detections	Concentration: micrograms/cubic meter				Above EPA SSGG	Above NJDEP RSGSL
			Minimum	Maximum	EPA SS Guidance [a]	NJDEP GVISLG [b]		
VOLATILE ORGANIC COMPOUNDS								
Acetone	4	4	17	100	33,000	160,000	No	No
Benzene	4	2	ND	1.7	2.3	16	No	No
Bromodichloromethane	4	0	ND	ND	1	34	No	No
Bromoethene	4	0	ND	ND	0.57	22	No	No
Bromoform	4	0	ND	ND	16	80	No	No
Bromomethane	4	0	ND	ND	51	260	No	No
1,3-Butadiene	4	0	ND	ND	0.63	11	No	No
Methyl Ethyl Ketone (2-Butanone)	4	4	1.9	13	51,000	260,000	No	No
Carbon disulfide	4	1	ND	2.6	7,300	36,000	No	No
Carbon tetrachloride	4	0	ND	ND	1.2	31	No	No
Chlorobenzene	4	0	ND	ND	510	2,600	No	No
Chloroethane	4	0	ND	ND	22	110	No	No
Chloroform	4	4	1.7	12	0.77	24	No	No
Chloromethane	4	2	ND	14	950	4,700	No	No
3-Chloropropene	4	0	ND	ND	NA	16	No	No
2-Chlorotoluene	4	0	ND	ND	NA	3,600	No	No
Cyclohexane	4	2	ND	12	62,000	310,000	No	No
Dibromochloromethane	4	0	ND	ND	0.75	43	No	No
1,2-Dichlorobenzene	4	0	ND	ND	1,500	7,300	No	No
1,2-Dibromoethane	4	0	ND	ND	0.031	38	No	No
1,3-Dichlorobenzene	4	0	ND	ND	110	550	No	No
1,4-Dichlorobenzene	4	3	ND	2.6	2.8	30	No	No
Dichlorodifluoromethane	4	3	ND	3	1,800	9,100	No	No
1,1-Dichloroethane	4	0	ND	ND	5,100	3,600	No	No
1,2-Dichloroethane	4	3	ND	4.5	0.69	20	**Yes**	No
1,1-Dichloroethene	4	0	ND	ND	2,200	11,000	No	No
1,2-Dichloroethene (cis)	4	0	ND	ND	370	1,800	No	No

Table 3: Summary of Soil Gas Results - West Essex High School

Contaminant	Number of Samples	Number of Detections	Concentration: micrograms/cubic meter				Above EPA SSGG	Above NJDEP RSGSL
			Minimum	Maximum	NJDEP GVISL [(a)]	NJDEP GVISL [(a)]		
VOLATILE ORGANIC COMPOUNDS								
1,2-Dichloroethene (trans)	4	0	ND	ND	730	3,600	No	No
1,2-Dichloropropane	4	0	ND	ND	0.92	23	No	No
1,3-Dichloropropene (cis)	4	0	ND	ND	6.3	31	No	No
1,3-Dichloropropene (trans)	4	0	ND	ND	6.3	31	No	No
1,2-Dichlorotetrafluoroethane	4	0	ND	ND	NA	NA	No	No
Ethylbenzene	4	3	ND	3.4	11,000	53,000	No	No
4-Ethyltoluene	4	1	ND	3.2	NA	NA	No	No
n-Heptane	4	0	ND	ND	NA	NA	No	No
Hexachlorobutadiene	4	0	ND	ND	0.8	53	No	No
n-Hexane	4	3	ND	12	7,300	36,000	No	No
Methylene chloride	4	0	ND	ND	11	190	No	No
Methyl isobutyl ketone	4	0	ND	ND	31,000	160,000	No	No
Methyl tert-butyl ether	4	0	ND	ND	16	78	No	No
Styrene	4	2	ND	1.4	10,000	52,000	No	No
Tert-butyl alcohol	4	0	ND	ND	NA	3,300	No	No
1,1,2,2-Tetrachloroethane	4	0	ND	ND	0.31	34	No	No
Tetrachloroethene	4	0	ND	ND	3.1	34	No	No
Toluene	4	4	1.5	18	51,000	260,000	No	No
1,2,4-Trichlorobenzene	4	0	ND	ND	370	1,800	No	No
1,1,1-Trichloroethane	4	0	ND	ND	10,000	51,000	No	No
1,1,2-Trichloroethane	4	0	ND	ND	1.1	27	No	No
Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	4	0	ND	ND	310,000	1,600,000	No	No
Trichloroethene	4	3	ND	2.7	0.16	27	No	No
Trichlorofluoromethane (Freon 11)	4	4	1.7	5.5	73,000	36,000	No	No
1,2,4-Trimethylbenzene	4	3	ND	3.3	NA	NA	No	No
1,3,5-Trimethylbenzene	4	1	ND	1.1	NA	NA	No	No
2,2,4-Trimethylpentane	4	0	ND	ND	NA	NA	No	No
Vinyl chloride	4	0	ND	ND	0.72	13	No	No
Total Xylenes	4	3	ND	18.3	1,100	5,500	No	No

(a) US EPA Sub-slab Soil Gas Guidance based on US EPA Region 3 risk-based concentrations for ambient air (published 2007).

(b) New Jersey Department of Environmental Protection Generic Vapor Intrusion Screening Levels for Soil Gas - Residential (published 2007).

ND - Not Detected

NA - No Screening Level

Table 4a: Summary of Soil Gas Results - 9 Commerecial Properties
Sample Period: May 2007 through November 2007
Caldwell Trucking Site, Essex County

Contaminant	Number of Samples	Number of Detections	Number of Properties Above 2007 EPA SS Guidance (a)	Concentration: micrograms/cubic meter				Above EPA SSGG	Above NJDEP RSGSL
				Minimum	Maximum	EPA SS Guidance (a)	NJDEP GVISLG (b)		
Current									
1,1,1-Trichloroethane	21	9	0	2	93	10,000	51,000	No	No
Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	21	9		2	84	310,000	1,600,000	No	No
1,1,2,2-Tetrachloroethane	21	0		ND	ND	0.31	34	No	No
1,1-Dichloroethane	21	3		2.6	110	5,100	3,600	No	No
1,1-Dichloroethene	21	1		0.83	0.83	2,200	11,000	No	No
1,2-Dichloroethane	21	2	2	1.6	1.7	0.69	2	**Yes**	No
1,2-Dichloroethene (cis)	21	3	0	1.6	48	370	1,800	No	No
1,2-Dichloroethene (trans)	21	2		0.91	1.3	730	3,600	No	No
Carbon tetrachloride	21	0		0	ND	1.2	31	No	No
Chloroethane	21	0		0	ND	22	110	No	No
Chloroform	21	12	5	1.1	98	0.77	24	**Yes**	**Yes**
Chloromethane	21	2	0	1.1	1.9	950	4,700	No	No
Methylene chloride	21	5	1	1.7	14	11	190	**Yes**	No
Tetrachloroethylene	21	14	7	1.4	11	3.1	34	**Yes**	No
Trichloroethene	21	12	7	0.7	120	0.16	27	**Yes**	No
Vinyl chloride	21	0	0	0	ND	0.72	13	No	No

(a) US EPA Sub-slab Soil Gas Guidance based on US EPA Region 3 risk-based concentrations for ambient air (published 2007).
(b) New Jersey Department of Environmental Protection Generic Vapor Intrusion Screening Levels for Soil Gas - Residential (published 2007).
ND - Not Detected
NA - No Screening Level

Table 4b: Summary of Soil Gas Results - 2 Industrial Properties
Sample Period: May 2007 through November 2007
Caldwell Trucking Site, Essex County

Contaminant	Number of Samples	Number of Detections	Number of Properties Above 2007 EPA SS Guidance [(a)]	Concentration: micrograms/cubic meter				Above EPA SSGG	Above NJDEP RSGSL
				Minimum	Maximum	EPA SS Guidance [(a)]	NJDEP GVISLG [(b)]		
Current									
1,1,1-Trichloroethane	4	4	0	8	9,300	10,000	51,000	No	No
Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	4	4		1500	190,000	310,000	1,600,000	No	No
1,1,2,2-Tetrachloroethane	4	0		ND	ND	0.31	34	No	No
1,1-Dichloroethane	4	2		1	220	5,100	3,600	No	No
1,1-Dichloroethene	4	2	1	630	3,400	2,200	11,000	**Yes**	No
1,2-Dichloroethane	4	0	0	ND	ND	0.69	2	No	No
1,2-Dichloroethene (cis)	4	3		6200	27,000	370	1,800	No	No
1,2-Dichloroethene (trans)	4	0		ND	ND	730	3,600	No	No
Carbon tetrachloride	4	1	1	8800	8,800	1.2	31	**Yes**	No
Chloroethane	4	1	0	8.9	9	22	110	No	No
Chloroform	4	2	2	88	1,900	0.77	24	**Yes**	**Yes**
Chloromethane	4	0	0	ND	ND	950	4,700	No	No
Methylene chloride	4	1		1.8	2	11	190	No	No
Tetrachloroethylene	4	4	2	3.7	630,000	3.1	34	**Yes**	**Yes**
Trichloroethene	4	4	2	11	44,000	0.16	27	**Yes**	**Yes**
Vinyl chloride	4	1	1	0.77	1	0.72	13	**Yes**	No

(a) US EPA Sub-slab Soil Gas Guidance based on US EPA Region 3 risk-based concentrations for ambient air (published 2007).
(b) New Jersey Department of Environmental Protection Generic Vapor Intrusion Screening Levels for Soil Gas - Residential (published 2007).
ND - Not Detected
NA - No Screening Level

Table 5a: Summary of Indoor Air Results for Basement Samples - 57 Properties Total
Sample Period: June 2006 through July 2010
Caldwell Trucking Site, Essex County

Contaminant	Number of Samples	Number of Detections	Number of Residences Above CV	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
				Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
VOLATILE ORGANIC COMPOUNDS							
Acetone	6	6	0	13	76	30,000 EMEG [a]	No
Benzene	6	6	6	1.1	5.8	0.1 CREG	**Yes**
Bromodichloromethane	6	0	0	ND	ND	NA	No
Bromoethene	6	0		ND	ND	NA	No
Bromoform	6	0		ND	ND	0.9 CREG [b]	No
Bromomethane	6	0		ND	ND	20 EMEG	No
1,3-Butadiene	6	0		ND	ND	0.03 CREG	No
Methyl Ethyl Ketone	6	5		ND	8.8	5,000 RfC [c]	No
Carbon Disulfide	6	0		ND	ND	900 EMEG	No
Carbon Tetrachloride	75	2	2	ND	1.4	0.2 CREG	No
Chlorobenzene	6	0	0	ND	ND	NA	No
Chloroethane	75	0		ND	ND	10,000 RfC	No
Chloroform	75	32	25	ND	150	0.04 CREG	**Yes**
Chloromethane	75	33	0	ND	2.7	100 EMEG	No
3-Chloropropene	6	0		ND	ND	1 RfC	No
2-Chlorotoluene	6	2		ND	2.6	NA	No
Cyclohexane	6	2		ND	1.5	6,000 RfC	No
Dibromochloromethane	6	0		ND	ND	NA	No
1,2-Dibromoethane	6	0		ND	ND	0.002 CREG	No
1,2-Dichlorobenzene	6	1		ND	1.4	NA	No
1,3-Dichlorobenzene	6	0		ND	ND	NA	No
Dichlorodifluoromethane	6	6		4	54	NA	No
1,1-Dichloroethane	75	5		ND	13	NA	No
1,2-Dichloroethane	75	2	2	ND	1.9	0.04 CREG	**Yes**
1,1-Dichloroethene	75	8	0	ND	25	80 EMEG	No
cis-1,2-Dichloroethene	75	27		ND	210	NA	No
trans-1,2-Dichloroethene	75	0		ND	ND	800 EMEG	No
1,2-Dichloropropane	6	0		ND	ND	4 RfC	No
cis-1,3-Dichloropropene	6	0		ND	ND	0.3 CREG	No
trans-1,3-Dichloropropene	6	0		ND	ND	0.3 CREG	No
1,2-Dichlorotetrafluoroethane	6	0		ND	ND	NA	No
Ethylbenzene	6	4		ND	6.1	300 EMEG	No
4-Ethyltoluene	6	4		ND	40	NA	No
n-Heptane	6	6		0.9	8.6	NA	No

Table 5a (continued): Summary of Indoor Air Results for Basement Samples - 57 Properties Total
Sample Period: June 2006 through July 2010

Contaminant	Number of Samples	Number of Detections	Number of Residences Above CV	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
				Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
VOLATILE ORGANIC COMPOUNDS							
Hexachlorobutadiene	6	0	0	ND	ND	NA	No
n-Hexane	6	4		ND	6	2,000 EMEG [(a)]	No
Methylene Chloride	75	24	1	ND	140	100 CREG [(b)]	**Yes**
Methyl Isobutyl Ketone	6	0	0	ND	ND	3,000 RfC [(c)]	No
Methyl tert-Butyl Ether	6	1		ND	1.9	2,000 EMEG	No
Styrene	6	2		ND	3.5	900 EMEG	No
tert-Butyl Alcohol	6	0		ND	ND	NA	No
1,1,2,2-Tetrachloroethane	6	0	1	ND	ND	0.02 CREG	No
1,4-Dichlorobenzene	6	4	0	ND	39	60 EMEG	No
Tetrachloroethylene	75	22	17	ND	47	0.2 CREG	**Yes**
Toluene	6	6	0	5.3	41	300 EMEG	No
1,2,4-Trichlorobenzene	6	0		ND	ND	NA	No
1,1,1-Trichloroethane	75	19		ND	82	4,000 EMEG	No
1,1,2-Trichloroethane	75	0		ND	ND	0.06 CREG	No
Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	75	21		ND	150	NA	No
Trichloroethylene	75	34	21	ND	390	0.2 CREG	**Yes**
Trichlorofluoromethane	6	6	0	2.2	24	NA	No
1,2,4-Trimethylbenzene	6	5		ND	35	NA	No
1,3,5-Trimethylbenzene	6	3		ND	13	NA	No
2,2,4-Trimethylpentane	6	4		ND	10	NA	No
Vinyl Chloride	75	2	2	ND	3.8	0.1 CREG	**Yes**
Xylene (m,p)	6	5	0	ND	24	200 EMEG	No
Xylene (o)	6	5		ND	11	200 EMEG	No
Xylene (Total)	2	2		ND	6.1	200 EMEG	No
1,2-Dichloroethene (Total)	71	25		ND	210	800 EMEG	No
Tetrahydrofuran	2	0		ND	ND	NA	No
1,4-Dioxane	2	0		ND	ND	4,000 EMEG	No
Isopropyl Alcohol	2	0		ND	ND	NA	No
Methyl Butyl Ketone	2	0		ND	ND	30 RfC	No

(a) Environmental Media Evaluation Guidelines
(b) Cancer Risk Evaluation Guide
(c) USEPA Reference Concentration
ND - Not Detected
NA - No Screening Level

Table 5b: Summary of Indoor Air Results for First Floor Samples - 57 Properties Total
Sample Period: June 2006 through July 2010
Caldwell Trucking Site, Essex County

Contaminant	Number of Samples	Number of Detections	Number of Residences Above CV	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
				Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
VOLATILE ORGANIC COMPOUNDS							
Acetone	6	6	0	31	74	30,000 EMEG [a]	No
Benzene	6	6	6	0.73	3	0.1 CREG	**Yes**
Bromodichloromethane	6	1	0	ND	1.7	NA	No
Bromoethene	6	0		ND	ND	NA	No
Bromoform	6	0		ND	ND	0.9 CREG [b]	No
Bromomethane	6	0		ND	ND	20 EMEG	No
1,3-Butadiene	6	0		ND	ND	0.03 CREG	No
Methyl Ethyl Ketone	6	6		2.4	35	5,000 RfC [c]	No
Carbon Disulfide	6	0		ND	ND	900 EMEG	No
Carbon Tetrachloride	76	2	2	ND	1.4	0.2 CREG	**Yes**
Chlorobenzene	6	0	0	ND	ND	NA	No
Chloroethane	76	1		ND	1.7	10,000 RfC	No
Chloroform	76	49	38	ND	88	0.04 CREG	**Yes**
Chloromethane	76	59	0	ND	3.3	100 EMEG	No
3-Chloropropene	6	0		ND	ND	1 RfC	No
2-Chlorotoluene	6	0		ND	ND	NA	No
Cyclohexane	6	2		ND	1	6,000 RfC	No
Dibromochloromethane	6	0		ND	ND	NA	No
1,2-Dibromoethane	6	0		ND	ND	0.002 CREG	No
1,2-Dichlorobenzene	6	1		ND	3	NA	No
1,3-Dichlorobenzene	6	0		ND	ND	NA	No
Dichlorodifluoromethane	6	6		3.8	13	NA	No
1,1-Dichloroethane	76	2		ND	4	NA	No
1,2-Dichloroethane	76	2	2	ND	2.2	0.04 CREG	**Yes**
1,1-Dichloroethene	76	4	0	ND	7.9	80 EMEG	No
cis-1,2-Dichloroethene	76	24		ND	67	NA	No
trans-1,2-Dichloroethene	76	0		ND	ND	800 EMEG	No
1,2-Dichloropropane	6	0		ND	ND	4 RfC	No
cis-1,3-Dichloropropene	6	0		ND	ND	0.3 CREG	No
trans-1,3-Dichloropropene	6	0		ND	ND	0.3 CREG	No
1,2-Dichlorotetrafluoroethane	6	0		ND	ND	NA	No
Ethylbenzene	6	5		ND	2.6	300 EMEG	No
4-Ethyltoluene	6	3		ND	8.4	NA	No
n-Heptane	6	5		ND	13	NA	No

Table 5b (continued): Summary of Indoor Air Results for First Floor Samples - 57 Properties Total
Sample Period: June 2006 through July 2010

Contaminant	Number of Samples	Number of Detections	Number of Residences Above CV	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
				Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
VOLATILE ORGANIC COMPOUNDS							
Hexachlorobutadiene	6	0	0	ND	ND	NA	No
n-Hexane	6	5		ND	3.5	2,000 EMEG [a]	No
Methylene Chloride	76	27		ND	66	100 CREG [b]	**Yes**
Methyl Isobutyl Ketone	6	0		ND	ND	3,000 RfC [c]	No
Methyl tert-Butyl Ether	6	1		ND	1.8	2,000 EMEG	No
Styrene	6	3		ND	2.8	900 EMEG	No
tert-Butyl Alcohol	6	0		ND	ND	NA	No
1,1,2,2-Tetrachloroethane	6	1		ND	1.2	0.02 CREG	**Yes**
1,4-Dichlorobenzene	6	1		ND	12	60 EMEG	No
Tetrachloroethylene	76	16	13	ND	40	0.2 CREG	**Yes**
Toluene	6	6	0	3.7	19	300 EMEG	No
1,2,4-Trichlorobenzene	6	0		ND	ND	NA	No
1,1,1-Trichloroethane	76	15		ND	27	4,000 EMEG	No
1,1,2-Trichloroethane	76	0		ND	ND	0.06 CREG	No
Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	76	20		ND	46	NA	No
Trichloroethylene	76	29	17	ND	140	0.2 CREG	**Yes**
Trichlorofluoromethane	6	6	0	1.7	5.6	NA	No
1,2,4-Trimethylbenzene	6	5		ND	7.4	NA	No
1,3,5-Trimethylbenzene	6	2		ND	2.7	NA	No
2,2,4-Trimethylpentane	6	5		ND	4.1	NA	No
Vinyl Chloride	76	1	1	ND	1.2	0.1 CREG	**Yes**
Xylene (m,p)	6	5	0	ND	7.8	200 EMEG	No
Xylene (o)	6	5		ND	3.2	200 EMEG	No
Xylene (Total)	2	2		ND	7.8	200 EMEG	No
1,2-Dichloroethene (Total)	72	25		ND	67	800 EMEG	No
Tetrahydrofuran	2	1		ND	35	NA	No
1,4-Dioxane	2	0		ND	ND	4,000 EMEG	No
Isopropyl Alcohol	2	1		ND	91	NA	No
Methyl Butyl Ketone	2	0		ND	ND	30 RfC	No

(a) Environmental Media Evaluation Guidelines
(b) Cancer Risk Evaluation Guide
(c) USEPA Reference Concentration
ND - Not Detected
NA - No Screening Level

Table 6a: Summary of Indoor Air Results - Daycare Center A
Sample Period: January 2011
Caldwell Trucking Site, Essex County

Contaminant	Number of Samples	Number of Detections	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
			Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
VOLATILE ORGANIC COMPOUNDS						
Acetone	2	2	25	27	30,000 EMEG [(a)]	No
Benzene	2	2	1	1	0.1 CREG	No [(d)]
Bromodichloromethane	2	0	ND	ND	NA	No
Bromoethene	2	0	ND	ND	NA	No
Bromoform	2	0	ND	ND	0.9 CREG [(b)]	No
Bromomethane	2	0	ND	ND	20 EMEG	No
1,3-Butadiene	2	2	0.1 *	0.1 *	0.03 CREG	No [(d)]
Methyl Ethyl Ketone	2	0	ND	ND	5,000 RfC [(c)]	No
Carbon Disulfide	2	0	ND	ND	900 EMEG	No
Carbon Tetrachloride	2	2	0.5 *	0.6 *	0.2 CREG	No [(d)]
Chlorobenzene	2	0	ND	ND	NA	No
Chloroethane	2	0	ND	ND	10,000 RfC	No
Chloroform	2	2	0.4 *	0.4 *	0.04 CREG	**Yes**
Chloromethane	2	2	1	2	100 EMEG	No
3-Chloropropene	2	0	ND	ND	1 RfC	No
2-Chlorotoluene	2	0	ND	ND	NA	No
Cyclohexane	2	2	2	2	6,000 RfC	No
Dibromochloromethane	2	0	ND	ND	NA	No
1,2-Dibromoethane	2	0	ND	ND	0.002 CREG	No
1,2-Dichlorobenzene	2	0	ND	ND	NA	No
1,3-Dichlorobenzene	2	0	ND	ND	NA	No
Dichlorodifluoromethane	2	2	3	3	NA	No
1,1-Dichloroethane	2	0	ND	ND	NA	No
1,2-Dichloroethane	2	0	ND	ND	0.04 CREG	No
1,1-Dichloroethene	2	0	ND	ND	80 EMEG	No
cis-1,2-Dichloroethene	2	0	ND	ND	NA	No
trans-1,2-Dichloroethene	2	0	ND	ND	800 EMEG	No
1,2-Dichloropropane	2	0	ND	ND	4 RfC	No
cis-1,3-Dichloropropene	2	0	ND	ND	0.3 CREG	No
trans-1,3-Dichloropropene	2	0	ND	ND	0.3 CREG	No
1,2-Dichlorotetrafluoroethane	2	0	ND	ND	NA	No
Ethylbenzene	2	2	0.4 *	0.6 *	300 EMEG	No
4-Ethyltoluene	2	0	ND	ND	NA	No
n-Heptane	2	2	3	4	NA	No

Table 6a (continued): Summary of Indoor Air Results - Daycare Center A
Sample Period: January 2011

Contaminant	Number of Samples	Number of Detections	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
			Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
VOLATILE ORGANIC COMPOUNDS						
Hexachlorobutadiene	2	0	ND	ND	NA	No
n-Hexane	2	2	1	1	2,000 EMEG [(a)]	No
Methylene Chloride	2	2	2 **	5 **	100 CREG [(b)]	No
Methyl Isobutyl Ketone	2	2	1 *	1 *	3,000 RfC [(c)]	No
Methyl tert-Butyl Ether	2	0	ND	ND	2,000 EMEG	No
Styrene	2	0	ND	ND	900 EMEG	No
tert-Butyl Alcohol	2	0	ND	ND	NA	No
1,1,2,2-Tetrachloroethane	2	0	ND	ND	0.02 CREG	No
1,4-Dichlorobenzene	2	0	ND	ND	60 EMEG	No
Tetrachloroethylene	2	0	ND	ND	0.2 CREG	No
Toluene	2	2	5	6	300 EMEG	No
1,2,4-Trichlorobenzene	2	0	ND	ND	NA	No
1,1,1-Trichloroethane	2	0	ND	ND	4,000 EMEG	No
1,1,2-Trichloroethane	2	0	ND	ND	0.06 CREG	No
Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	2	0	ND	ND	NA	No
Trichloroethylene	2	1	ND	0.7 *	0.2 CREG	**Yes**
Trichlorofluoromethane	2	2	6	8	NA	No
1,2,4-Trimethylbenzene	2	2	0.3 *	0.5 *	NA	No
1,3,5-Trimethylbenzene	2	0	ND	ND	NA	No
2,2,4-Trimethylpentane	2	2	0.6 *	0.7 *	NA	No
Vinyl Chloride	2	0	ND	ND	0.1 CREG	No
Xylene (m,p)	2	2	1 *	2 *	200 EMEG	No
Xylene (o)	2	2	0.4	0.5 *	200 EMEG	No
Tetrahydrofuran	2	0	ND	ND	NA	No
1,4-Dioxane	2	0	ND	ND	4,000 EMEG	No
Isopropyl Alcohol	2	0	ND	ND	NA	No
Methyl Butyl Ketone	2	0	ND	ND	30 RfC	No

(a) Environmental Media Evaluation Guidelines
(b) Cancer Risk Evaluation Guide
(c) USEPA Reference Concentration
(d) - Considered background source as analyte detected in ambient air sample at an equal or greater concentration.
* - Estimated value
** - Analyte detected in method blank
ND - Not Detected
NA - No Screening Level

Table 6b: Summary of Indoor Air Results - Daycare Center B
Sample Period: June 2007
Caldwell Trucking Site, Essex County

Contaminant	Number of Samples	Number of Detections	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
			Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
VOLATILE ORGANIC COMPOUNDS						
Carbon tetrachloride	2	0	ND	ND	0.2 CREG (b)	No
Chloroethane	2	0	ND	ND	10,000 RfC (c)	No
Chloroform	2	0	ND	ND	0.04 CREG	No
Chloromethane	2	0	ND	ND	100 EMEG (a)	No
1,1-Dichloroethane	2	0	ND	ND	NA	No
1,2-Dichloroethane	2	0	ND	ND	0.04 CREG	No
1,1-Dichloroethene	2	0	ND	ND	80 EMEG	No
1,2-Dichloroethene (cis)	2	0	ND	ND	NA	No
1,2-Dichloroethene (trans)	2	0	ND	ND	800 EMEG	No
Methylene chloride	2	2	3	3.5	100 CREG	No
Tetrachloroethene	2	0	ND	ND	0.2 CREG	No
1,1,1-Trichloroethane	2	0	ND	ND	4,000 EMEG	No
1,1,2-Trichloroethane	2	0	ND	ND	0.06 CREG	No
Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	2	0	ND	ND	NA	No
Trichloroethene	2	0	ND	ND	0.2 CREG	No
Vinyl chloride	2	0	ND	ND	0.1 CREG	No

(a) Environmental Media Evaluation Guidelines
(b) Cancer Risk Evaluation Guide
(c) USEPA Reference Concentration
ND - Not Detected
NA - No Screening Level

Table 6c: Summary of Indoor Air Results - Daycare Center B
Sample Period: April 2011
Caldwell Trucking Site, Essex County

Contaminant	Number of Samples	Number of Detections	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
			Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
VOLATILE ORGANIC COMPOUNDS						
Acetone	3	3	6	33	30,000 EMEG [(a)]	No
Benzene	3	0	ND	ND	0.1 CREG	No
Bromodichloromethane	3	0	ND	ND	NA	No
Bromoethene	3	0	ND	ND	NA	No
Bromoform	3	0	ND	ND	0.9 CREG [(b)]	No
Bromomethane	3	0	ND	ND	20 EMEG	No
1,3-Butadiene	3	1	ND	1.4	0.03 CREG	**Yes**
Methyl Ethyl Ketone	3	0	ND	ND	5,000 RfC [(c)]	No
Carbon Disulfide	3	0	ND	ND	900 EMEG	No
Carbon Tetrachloride	3	0	ND	ND	0.2 CREG	No
Chlorobenzene	3	0	ND	ND	NA	No
Chloroethane	3	0	ND	ND	10,000 RfC	No
Chloroform	3	0	ND	ND	0.04 CREG	No
Chloromethane	3	3	1.2	1.3	100 EMEG	No
3-Chloropropene	3	0	ND	ND	1 RfC	No
2-Chlorotoluene	3	0	ND	ND	NA	No
Cyclohexane	3	0	ND	ND	6,000 RfC	No
Dibromochloromethane	3	0	ND	ND	NA	No
1,2-Dibromoethane	3	0	ND	ND	0.002 CREG	No
1,2-Dichlorobenzene	3	0	ND	ND	NA	No
1,3-Dichlorobenzene	3	0	ND	ND	NA	No
Dichlorodifluoromethane	3	2	ND	3.7	NA	No
1,1-Dichloroethane	3	0	ND	ND	NA	No
1,2-Dichloroethane	3	0	ND	ND	0.04 CREG	No
1,1-Dichloroethene	3	0	ND	ND	80 EMEG	No
cis-1,2-Dichloroethene	3	0	ND	ND	NA	No
trans-1,2-Dichloroethene	3	0	ND	ND	800 EMEG	No
1,2-Dichloropropane	3	0	ND	ND	4 RfC	No
cis-1,3-Dichloropropene	3	0	ND	ND	0.3 CREG	No
trans-1,3-Dichloropropene	3	0	ND	ND	0.3 CREG	No
1,2-Dichlorotetrafluoroethane	3	0	ND	ND	NA	No
Ethylbenzene	3	0	ND	ND	300 EMEG	No
4-Ethyltoluene	3	0	ND	ND	NA	No
n-Heptane	3	0	ND	ND	NA	No

Table 6c (continued): Summary of Indoor Air Results - Daycare Center B
Sample Period: April 2011

Contaminant	Number of Samples	Number of Detections	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
			Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
VOLATILE ORGANIC COMPOUNDS						
Hexachlorobutadiene	3	0	ND	ND	NA	No
n-Hexane	3	0	ND	ND	2,000 EMEG [(a)]	No
Methylene Chloride	3	0	ND	ND	100 CREG [(b)]	No
Methyl Isobutyl Ketone	3	0	ND	ND	3,000 RfC [(c)]	No
Methyl tert-Butyl Ether	3	0	ND	ND	2,000 EMEG	No
Styrene	3	0	ND	ND	900 EMEG	No
tert-Butyl Alcohol	3	0	ND	ND	NA	No
1,1,2,2-Tetrachloroethane	3	0	ND	ND	0.02 CREG	No
1,4-Dichlorobenzene	3	0	ND	ND	60 EMEG	No
Tetrachloroethylene	3	0	ND	ND	0.2 CREG	No
Toluene	3	2	ND	4.3	300 EMEG	No
1,2,4-Trichlorobenzene	3	0	ND	ND	NA	No
1,1,1-Trichloroethane	3	0	ND	ND	4,000 EMEG	No
1,1,2-Trichloroethane	3	0	ND	ND	0.06 CREG	No
Freon TF (1,1,2-Trichloro-1,2,2-trifluoroethane)	3	0	ND	ND	NA	No
Trichloroethylene	3	0	ND	ND	0.2 CREG	No
Trichlorofluoromethane	3	0	ND	ND	NA	No
1,2,4-Trimethylbenzene	3	0	ND	ND	NA	No
1,3,5-Trimethylbenzene	3	0	ND	ND	NA	No
2,2,4-Trimethylpentane	3	0	ND	ND	NA	No
Vinyl Chloride	3	0	ND	ND	0.1 CREG	No
Xylene (m,p)	3	0	ND	ND	200 EMEG	No
Xylene (o)	3	0	ND	ND	200 EMEG	No
Tetrahydrofuran	3	1	ND	2	NA	No
1,4-Dioxane	3	0	ND	ND	4,000 EMEG	No
Isopropyl Alcohol	3	3	5.4	22	NA	No
Methyl Butyl Ketone	3	0	ND	ND	30 RfC	No

(a) Environmental Media Evaluation Guidelines
(b) Cancer Risk Evaluation Guide
(c) USEPA Reference Concentration
(d) - Considered background source as analyte detected in ambient air sample at an equal or greater concentration.
ND - Not Detected
NA - No Screening Level

Table 7a: Summary of Indoor Air Results - 8 Commercial Properties
Sample Period: June 2007 through April 2010
Caldwell Trucking Company Site, Essex County

Contaminant	Number of Samples	Number of Detections	Number of Properties Above CV	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
				Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
Current							
1,1,1-Trichloroethane	20	1	0	ND	1.6	4,000 EMEG	No
Freon TF	20	3		1.5	7.7	NA	No
1,1,2-Trichloroethane	20	0		ND	ND	0.06 CREG	No
1,1-Dichloroethane	20	1		ND	0.93	NA	No
1,1-Dichloroethene	20	0		ND	ND	80 EMEG	No
1,2-Dichloroethane	20	0		ND	ND	0.04 CREG	No
1,2-Dichloroethene (cis)	20	3		0.91	6.7	NA	No
1,2-Dichloroethene (trans)	20	0		ND	ND	800 EMEG	No
Carbon tetrachloride	20	0		ND	ND	0.2 CREG	No
Chloroethane	20	0		ND	ND	10,000 RfC	No
Chloroform	20	3	3	1.1	1.6	0.04 CREG	**Yes**
Chloromethane	20	14	0	1.1	1.4	100 EMEG	No
Methylene chloride	20	13		2.1	4.2	100 CREG [(b)]	No
Tetrachloroethene	20	1	1	ND	2.5	0.2 CREG	**Yes**
Trichloroethene	20	4	3	0.64	3.1	0.2 CREG	**Yes**
Vinyl chloride	20	0	0	ND	ND	0.1 CREG	No

(a) Environmental Media Evaluation Guidelines
(b) Cancer Risk Evaluation Guide
(c) USEPA Reference Concentration
ND - Not Detected
NA - No Screening Level

Table 7b: Summary of Indoor Air Results - 1 Industrial Property
Sample Period: November 2007
Caldwell Trucking Company Site, Essex County

Contaminant	Number of Samples	Number of Detections	Number of Properties Above CV	Concentration: micrograms/cubic meter			Contaminant of Potential Concern
				Minimum	Maximum	Environmental Guideline Comparison Value (CV)	
VOLATILE ORGANIC COMPOUNDS							
1,1,1-Trichloroethane	2	1	0	ND	1.9	4,000 EMEG	No
Freon TF	2	2		10	25	NA	No
1,1,2-Trichloroethane	2	0		ND	ND	0.06 CREG	No
1,1-Dichloroethane	2	0		ND	ND	NA	No
1,1-Dichloroethene	2	0		ND	ND	80 EMEG	No
1,2-Dichloroethane	2	1	1	ND	0.86	0.04 CREG	**Yes**
1,2-Dichloroethene (cis)	2	2	0	0.79	2.1	NA	No
1,2-Dichloroethene (trans)	2	0		ND	ND	800 EMEG	No
Carbon tetrachloride	2	0		ND	ND	0.2 CREG	No
Chloroethane	2	0		ND	ND	10,000 RfC	No
Chloroform	2	0		ND	ND	0.04 CREG	No
Chloromethane	2	2		1.5	1.7	100 EMEG	No
Methylene chloride	2	2	1	7,300	9,700	100 CREG [(b)]	**Yes**
Tetrachloroethene	2	2		9.5	25	0.2 CREG	**Yes**
Trichloroethene	2	2		4.4	8.6	0.2 CREG	**Yes**
Vinyl chloride	2	0	0	ND	ND	0.1 CREG	No

(a) Environmental Media Evaluation Guidelines
(b) Cancer Risk Evaluation Guide
(c) USEPA Reference Concentration
ND - Not Detected
NA - No Screening Level

Table 8 – Evaluated Exposure Pathways

Pathway	Pathway Exposure Pathway Elements				Pathway Classification
	Environmental Medium	Route of Exposure	Location	Exposed Population	
Vapor Intrusion via Groundwater	Indoor Air	Inhalation	6 Residences	Adults/Children	Past – Completed Current and Future – Interrupted [(a)]
			1 Residence		Past, Current, and Future – Completed [(b)]
Vapor Intrusion via Groundwater	Indoor Air	Inhalation	2 Commercial	Adult	Past, Current and Future – Completed
			1 Industrial		
Indoor Air (vapor intrusion not established)	Indoor Air	Inhalation	4 Residences	Adults/Children	Past – Completed Current and Future – Interrupted [(c)]
			2 Residences		Past, Current, and Future – Completed [(d)]
			22 Properties Residential/Commercial		Past, Current, and Future – Completed
			Daycare A,B		Past, Current, and Future – Completed

(a) Considered interrupted as the US EPA is actively monitoring and are planning remedial actions to address site-related groundwater contamination. Note: 6 properties evaluated have sub-slab soil venting systems (SVS) installed to mitigate exposures from vapor intrusion.
(b) Property owner (Residence K) declined to have SVS installed; therefore, inhalation exposures due to vapor intrusion at this property are not considered interrupted.
(c) Inhalation exposures considered interrupted at 4 properties as SVS installed to mitigate exposures from vapor intrusion.
(d) Property owners declined to have SVS installed (Residence R; Residence O had SVE removed); therefore, inhalation exposures due to vapor intrusion at these properties are not considered interrupted.

Table 9: Comparison of Indoor Air Contaminant Concentrations with Health Guideline Comparison Values for Non-Cancer Health Effects: Residences with Confirmed Soil Gas Contamination – Sub-slab Soil Venting System Advised/Installed

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Contaminant Likely Present from Vapor Intrusion Source	Exposure Point Concentration (μg/m3) [a,b]	Health-Based Comparison Values ($\mu g/m^3$)	Exceedance of Health-Based Comparison Value
Residence A	carbon tetrachloride	**Yes**	1.3	benzene = 10 (C) [c] carbon tetrachloride = 100 (C) [d] chloroform = 98 (C) [c] 1,2-DCA = 2,000 (C) [c] methylene chloride = 600 (C) [d] PCE = 40 (C) [d] 1,1,2,2-tetrachloroethane = NA TCE = 2 (C) [d]	No
	chloroform	No	144		**Yes**
	1,2-DCA	**Yes**	2.1		No
	TCE	**Yes**	7.8		**Yes**
Residence B	chloroform	**Yes**	1.2		No
	PCE	**Yes**	7.2		
	TCE	**Yes**	8.7		**Yes**
Residence C	chloroform	**Yes**	6.0		No
	PCE	**Yes**	1.3		
	TCE	**Yes**	2.0		**Yes**
Residence D	chloroform	**Yes**	1.3		No
	PCE	**Yes**	2.0		
	TCE	**Yes**	0.6		
Residence E	PCE	**Yes**	3.0		No
	TCE	**Yes**	24.0		**Yes**
Residence F	benzene [e]	Indeterminate	2.4		No
	carbon tetrachloride	No	4.1		
	chloroform [g]	Indeterminate	4.6		
	1,2-DCA	**Yes**	1.0		
	PCE	**Yes**	1.4		
	TCE	**Yes**	5.6		**Yes**
Residence G	chloroform	**Yes**	1.7		No
	1,2-DCA	**Yes**	1.1		
	methylene chloride	Indeterminate	134		
	PCE	**Yes**	2.3		
	TCE	**Yes**	78		**Yes**
Residence H	chloroform	**Yes**	1.4		No

Table 9 (cont): Comparison of Indoor Air Contaminant Concentrations with Health Guideline Comparison Values for Non-Cancer Health Effects: Residences with Confirmed Soil Gas Contamination – Sub-slab Soil Venting System Advised/Installed

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Contaminant Likely Present from Vapor Intrusion Source	Exposure Point Concentration (µg/m3) [(a,b)]	Health-Based Comparison Values (µg/m^3)	Exceedance of Health-Based Comparison Value
Residence I	benzene [(e)]	Indeterminate	1.2	benzene = 10 (C) (c) carbon tetrachloride = 100 (C) (d) chloroform = 98 (C) (c) 1,2-DCA = 2,000 (C) (c) methylene chloride = 600 (C) (d) PCE = 40 (C) (d) 1,1,2,2-tetrachloroethane = NA TCE = 2 (C) (d)	No
	chloroform	No	3.1		
	PCE	**Yes**	6.5		
	TCE	**Yes**	67		**Yes**
Residence J	benzene [(e)]	No	1.2		No
	chloroform	No	10.5		
	1,1,2,2-tetrachloroethane	No	2.0		
	PCE	No	13.4		
Residence K	benzene [(e)]	Indeterminate	1.1		No
	chloroform	**Yes**	1.2		
	TCE	**Yes**	35		**Yes**

(a) - micrograms per cubic meter.
(b) - Exposure Point Concentration - derived based on maximum concentrations for less than 5 results or derived using Pro UCL Version 4.00.02 (EPA, 2007) when at least five results were available.
(c) - Agency for Toxic Substances and Disease Registry, Minimal Risk Level (I = Intermediate 15 - 364 days/year; C = Chronic >364 days/year).
(d) - US EPA 2011 Reference Concentration for chronic inhalation exposures.
(e) - Soil gas samples not collected for comparison.
Vapor Intrusion Category
Yes - Contaminant concentrations in soil gas shown to be higher than indoor air with indoor air results showing highest concentrations at the lowest level (basement).
No - Contaminant either not present in soil gas and/or indoor air results show highest concentrations on first floor indicating background or consumer sources present.
Indeterminate - Contaminant present in soil gas at concentrations generally lower than detected in indoor air with the highest concentrations shown at 1st floor (highest level) sample locations. Investigation samples for some of these locations were either not collected the same day as indoor air for relevant comparison or collected several months after the installation and operation of soil venting systems.
Note: Sub-slab Soil Venting Systems (SVS) installed at all properties in 2006 through 2009 except Residence K (US EPA offer declined).

Table 10: Comparison of Indoor Air Contaminant Concentrations with Health Guideline Comparison Values for Non-Cancer Health Effects: Residences without Confirmed Soil Gas Contamination – Sub-slab Soil Venting System Advised/Installed

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) [a,b]	Health-Based Comparison Values (µg/m^3)	Exceedance of Health-Based Comparison Value
Residence L [e]	chloroform	3.5	benzene = 10 (C) [c] carbon tetrachloride = 100 (C) [d] chloroform = 98 (C) [c] 1,2-DCA = 2,000 (C) [c] methylene chloride = 600 (C) [d] PCE = 40 (C) [d] 1,1,2,2-tetrachloroethane = NA TCE = 2 (C) [d] vinyl chloride = 100 (C) [d]	No
	methylene chloride	34		
	PCE	6.5		
	TCE	93		**Yes**
Residence M [e]	chloroform	5.2		No
	PCE	23.0		
	TCE	359		**Yes**
	vinyl chloride	3.4		No
Residence N	chloroform	1.2		No
	methylene chloride	1.7		
	TCE	0.6		
Residence O [e]	chloroform	3.9		No
	PCE	3.4		
	TCE	43		**Yes**
	vinyl chloride	1.5		No
Residence P	chloroform	6.5		No
Residence Q [e]	benzene	5.6		No
	chloroform	3.7		
	1,2-DCA	1.8		
	PCE	2.9		
	TCE	4.5		
Residence R [e]	chloroform	6.8		No
	methylene chloride	51		
	PCE	45		**Yes**
	TCE	3.4		

Table 10 (cont.): Comparison of Indoor Air Contaminant Concentrations with Health Guideline Comparison Values for Non-Cancer Health Effects: Residences without Confirmed Soil Gas Contamination – Sub-slab Soil Venting System Advised/Installed

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) [a,b]	Health-Based Comparison Values ($\mu g/m^3$)	Exceedance of Health-Based Comparison Value
Residence S	chloroform	1.2	benzene = 10 (C) [c] carbon tetrachloride = 100 (C) [d] chloroform = 98 (C) [c] 1,2-DCA = 2,000 (C) [c] methylene chloride = 600 (C) [d] PCE = 40 (C) [d] 1,1,2,2-tetrachloroethane = NA TCE = 2 (C) [d] vinyl chloride = 100 (C) [d]	No
	methylene chloride	1.8		
	PCE	11.5		
	TCE	1.5		
Residence T [e]	methylene chloride	7.3		No
	PCE	6.1		
	TCE	24		**Yes**
Residence U	chloroform	3.9		No
	TCE	1.8		
Residence V	chloroform	2.1		No
	TCE	1.2		

(a) - micrograms per cubic meter.
(b) - Exposure Point Concentration based on mean concentration - derived based on maximum concentrations for less than 5 results or derived using Pro UCL Version 4.00.02 (EPA, 2007) when at least five results were available.
(c) - Agency for Toxic Substances and Disease Registry, Minimal Risk Level (I = Intermediate 15 - 364 days/year; C = Chronic >364 days/year).
(d) - US EPA 2011 Reference Concentration for chronic inhalation exposures.
(e) - Soil gas not collected at these locations due to high water table. Soil gas results for remaining residences were either non-detect or had detections below both the US EPA and NJDEP screening criteria. Residence P had one detection of PCE exceeding the US EPA screening criteria; however, this compound was not detected in indoor air.
Note: Sub-slab Soil Venting Systems (SVS) installed at all properties in 2006 through 2009 except Residences N, R & V (US EPA offer declined). Residence O had SVS installed in April 2008 but system removed at owners request in December 2009.

Table 11: Comparison of Indoor Air Contaminant Concentrations with Health Guideline Comparison Values for Non-Cancer Health Effects: Properties without Confirmed Soil Gas Contamination – No Sub-slab Soil Venting System

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) [a,b]	Number of Residences with Detections	Health-Based Comparison Values ($\mu g/m^3$)	Number of Residences Exceeding Comparison Values
22 Remaining Properties	Chloroform	2.22	22	chloroform = 98 (C) [c] 1,2-DCA = 2,000 (C) [c] PCE = 40 (C) [d] TCE = 2 (C) [d]	0
	1,2-DCA	0.82	1		
	PCE	2.75	6		
	TCE	1.23	2		1 [e]

(a) - micrograms per cubic meter.

(b) - Exposure Point Concentrationderived - based on maximum concentrations for less than 5 results or derived using Pro UCL Version 4.00.02 (EPA, 2007) when at least five results were available.

(c) - Agency for Toxic Substances and Disease Registry, Minimal Risk Level (I = Intermediate 15 - 364 days/year; C = Chronic >364 days/year).

(d) - US EPA 2011 Reference Concentration for chronic inhalation exposures.

(e) - US EPA sample identification for this property is 2801-1502.

Sample Calculation: Exposure concentrations to PCE in indoor air were calculated using the following formulas:
EPC = C x ET x EF x ED/AT
where

EPC = exposure point concentration of contaminant in air ($\mu g/m^3$);
C = concentration of contaminant detected in air ($\mu g/m^3$);
ET = exposure time (hours/day);
EF = exposure frequency (days/year);
ED = exposure duration (years); and
AT = averaging time (years).

PCE EPC = (2.87 $\mu g/m^3$) x (24 hrs/24 hrs - day) x (350 days/365 days - year) = 2.75 $\mu g/m^3$

Table 12: Comparison of Indoor Air Contaminant Concentrations with Health Guideline Comparison Values for Non-Cancer Health Effects: Commercial/Industrial Properties – No Sub-slab Soil Venting System

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) [a,b]	Number of Properties with Detections	Health-Based Comparison Values ($\mu g/m^3$)	Number of Commercial/Industrial Properties Exceeding Comparison Values	Exceedance of Health-Based Comparison Value
2 Commercial Properties	Chloroform	0.4	3	chloroform = 98 (C) [c] 1,2-DCA = 2,000 (C) [c] methylene chloride = 600 (C) [d] PCE = 40 (C) [d] TCE = 2 (C) [d]	0	No
	PCE	0.9	1			
	TCE	1.1	3			
1 Industrial Property	1,2-DCA	0.3	1		0	No
	Methylene Chloride	3,455			1	**Yes**
	PCE	8.9			0	No
	TCE	3.1				

(a) - micrograms per cubic meter.
(b) - Exposure Point Concentrationderived - based on maximum concentrations for less than 5 results or derived using Pro UCL Version 4.00.02 (EPA, 2007) when at least five results were available.
(c) - Agency for Toxic Substances and Disease Registry, Minimal Risk Level (I = Intermediate 15 - 364 days/year; C = Chronic >364 days/year).
(d) - US EPA 2011 Reference Concentration for chronic inhalation exposures.

Sample Calculation: Exposure concentrations to PCE in indoor air for commercial properties were calculated using the following formulas:
EPC = C x ET x EF x ED/AT
where

EPC = exposure point concentration of contaminant in air ($\mu g/m^3$);
C = concentration of contaminant detected in air ($\mu g/m^3$);
ET = exposure time (hours/day);
EF = exposure frequency (days/year);
ED = exposure duration (years); and
AT = averaging time (years).

PCE EPC = (2.5 $\mu g/m^3$) x (12 hrs/24 hrs - day) x (260 days/365 days - year) = 0.9 $\mu g/m^3$

Table 13: Calculated Lifetime Excess Cancer Risk from Inhalation Exposures to Indoor Air Contaminants: Residences with Confirmed Soil Gas Contamination – Sub-slab Soil Venting System Advised/Installed

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (μg/m3) [a,b]	Exposure Duration (years) [c]	Exposed Population	USEPA IUR [d] $(\mu g/m3)^{-1}$	LECR	LECR Sum Attributable from Vapor Intrusion Source [e]	LECR Sum Site-Related and Other Sources
Residence A	carbon tetrachloride	0.5	30 [c]	Adult/Child	benzene = 7.8E-06 carbon tetrachloride = 6E-06 chloroform = 2.3E-05 1,2-DCA = 2.6E-05 methylene chloride = 1.06E-08 PCE = 2.6E-07 1,1,2,2-tetrachloroethane = 5.8E-05 TCE = 4.1E-06	3.10E-06	3.07E-05	1.30E-03
	chloroform [d]	55				1.27E-03		
	1,2-DCA [d]	0.8				2.11E-05		
	TCE	3.0				6.47E-06		
Residences B	chloroform	0.5				1.10E-05	1.90E-05	1.90E-05
	PCE	2.8				7.19E-07		
	TCE	3.4				7.27E-06		
Residences C	chloroform	2.3				5.34E-05	5.53E-05	5.53E-05
	PCE	0.5				1.34E-07		
	TCE	0.8				1.68E-06		
Residences D	chloroform	0.5				1.19E-05	1.25E-05	1.25E-05
	PCE	0.8				2.01E-07		
	TCE	0.2				4.71E-07		
Residence E	PCE	1.1				2.97E-07	2.03E-05	2.03E-05
	TCE	9.2				2.00E-05		
Residence F	benzene [d]	0.9				7.19E-06	1.51E-05	7.21E-05
	carbon tetrachloride [d]	1.6				9.56E-06		
	chloroform [d]	1.8				4.03E-05		
	1,2-DCA	0.4				1.03E-05		
	PCE	0.5				1.35E-07		
	TCE	2.2				4.68E-06		

Table 13 (cont.): Calculated Lifetime Excess Cancer Risk from Inhalation Exposures to Indoor Air Contaminants: Residences with Confirmed Soil Gas Contamination – Sub-slab Soil Venting System Advised/Installed

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) (a,b)	Exposure Duration (years) (c)	Exposed Population	USEPA IUR (d) (µg/m3)$^{-1}$	LECR	LECR Sum Attributable from Vapor Intrusion Source (e)	LECR Sum Site-Related and Other Sources
Residence G	chloroform	0.7	30 (c)	Adult/Child	benzene = 7.8E-06 carbon tetrachloride = 6E-06 chloroform = 2.3E-05 1,2-DCA = 2.6E-05 methylene chloride = 1.06E-08 PCE = 2.6E-07 1,1,2,2-tetrachloroethane = 5.8E-05 TCE = 4.1E-06	1.53E-05	9.08E-05	9.13E-05
	1,2-DCA	0.4				1.05E-05		
	methylene chloride (d)	52				5.16E-07		
	PCE	0.9				2.30E-07		
	TCE	30				6.47E-05		
Residence H	chloroform	0.6				1.27E-05	1.27E-05	1.27E-05
Residence I	benzene (d)	0.4				3.45E-06	5.66E-05	8.72E-05
	chloroform (d)	1.2				2.71E-05		
	PCE	2.5				6.52E-07		
	TCE	26				5.59E-05		
Residence J	benzene (d)	0.5				3.74E-06	1.34E-06	1.43E-04
	chloroform (d)	4.1				9.33E-05		
	1,1,2,2-tetrachloroethane (d)	0.8				4.49E-05		
	PCE	5.2				1.34E-06		
Residence K	benzene (d)	0.4				3.16E-06	3.97E-05	4.29E-05
	chloroform	0.4				1.02E-05		
	TCE	14				2.96E-05		

(a) - micrograms per cubic meter.

(b) Exposure Point Concentrations - derived based on maximum concentrations for less than 5 results or derived using Pro UCL Version 4.00.02 (EPA, 2007) when at least five results were available.

(c) - Based on EPA recommended length of residency for current residents. Exposure Assumptions: 365 days a year exposure frequency, exposed years 0 through 30 years, 78 years averaging time (USEPA 2011b).

(d) - Contaminant either not detected or not detected above screening values in sub-slab soil gas samples.

(e) - LECR Sum - based on contaminants of concern which were present in soil gas above screening levels and could be attributed to a vapor intrusion source.

Note: Sub-slab Soil Venting Systems (SVS) installed at all properties in 2006 through 2009 except Residence K (US EPA offer declined).

Table 14: Calculated Lifetime Excess Cancer Risk from Inhalation Exposures to Indoor Air Contaminants: Residences without Confirmed Soil Gas Contamination – Sub-slab Soil Venting System Advised/Installed

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) [a,b]	Exposure Duration (years) [c]	Exposed Population	USEPA IUR [d] $(\mu g/m3)^{-1}$	LECR	LECR Sum
Residence L [e]	chloroform	1.4	30 [C]	Adult/Child	benzene = 7.8E-06 carbon tetrachloride = 6E-06 chloroform = 2.3E-05 1,2-DCA = 2.6E-05 methylene chloride = 1.06E-08 PCE = 2.6E-07 1,1,2,2-tetrachloroethane = 5.8E-05 TCE = 4.1E-06	3.14E-05	1.10E-04
	methylene chloride	13				1.29E-07	
	PCE	2.5				6.52E-07	
	TCE	36				7.75E-05	
Residence M [e]	chloroform	2.0				4.58E-05	3.71E-04
	PCE	8.9				2.30E-06	
	TCE	144				3.12E-04	
	vinyl chloride	1.3				1.14E-05	
Residence N	chloroform	0.4				1.02E-05	1.07E-05
	methylene chloride	0.7				6.64E-09	
	TCE	0.2				5.11E-07	
Residence O [e]	chloroform	1.5				3.48E-05	7.63E-05
	PCE	1.3				3.36E-07	
	TCE	17				3.60E-05	
	vinyl chloride	0.6				5.19E-06	
Residence P	chloroform	2.5				5.77E-05	5.77E-05
Residence Q [e]	benzene	2.1				1.67E-05	7.20E-05
	chloroform	1.4				3.31E-05	
	1,2-DCA	0.7				1.82E-05	
	PCE	1.1				2.88E-07	
	TCE	1.7				3.76E-06	

Table 14 (cont.): Calculated Lifetime Excess Cancer Risk from Inhalation Exposures to Indoor Air Contaminants: Residences without Confirmed Soil Gas Contamination – Sub-slab Soil Venting System Advised/Installed

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) (a,b)	Exposure Duration (years) (c)	Exposed Population	USEPA IUR (d) $(\mu g/m3)^{-1}$	LECR	LECR Sum
Residence R (e)	chloroform	2.6	30 (C)	Adult/Child	benzene = 7.8E-06 carbon tetrachloride = 6E-06 chloroform = 2.3E-05 1,2-DCA = 2.6E-05 methylene chloride = 1.06E-08 PCE = 2.6E-07 1,1,2,2-tetrachloroethane = 5.8E-05 TCE = 4.1E-06	6.05E-05	6.80E-05
	methylene chloride	20				1.96E-07	
	PCE	17				4.51E-06	
	TCE	1.3				2.84E-06	
Residence S	chloroform	0.4				1.02E-05	1.26E-05
	methylene chloride	0.7				7.01E-09	
	PCE	4.4				1.15E-06	
	TCE	0.6				1.28E-06	
Residence T (e)	methylene chloride	2.8				2.80E-08	2.06E-05
	PCE	2.4				6.14E-07	
	TCE	9.2				2.00E-05	
Residence U	chloroform	1.5				3.48E-05	3.63E-05
	TCE	0.7				1.52E-06	
Residence V	chloroform	0.8				1.87E-05	1.97E-05
	TCE	0.5				1.04E-06	

(a) - micrograms per cubic meter.

(b) Exposure Point Concentrations - derived based on maximum concentrations for less than 5 results or derived using Pro UCL Version 4.00.02 (EPA, 2007) when at least five results were available.

(c) - Based on EPA recommended length of residency for current residents. Exposure Assumptions: 365 days a year exposure frequency, exposed years 0 through 30 years, 78 years averaging time (USEPA 2011b).

(d) - Inhalation Unit Risk (cancer slope factor) for human inhalation exposure.

(e) - Soil gas not collected at these locations due to high water table. Soil gas results for remaining residences were either non-detect or had detections below both the US EPA and NJDEP screening criteria. Residence P had one detection of PCE exceeding the US EPA screening criteria; however, this compound was not detected in indoor air.

Note: Sub-slab Soil Venting Systems (SVS) installed at all properties in 2006 through 2009 except Residences N, R & V (US EPA offer declined). Residence O had SVS installed in April 2008 but system removed at owners request in December 2009

Table 15: Calculated Lifetime Excess Cancer Risk from Inhalation Exposures to Indoor Air Contaminants - Properties without Confirmed Soil Gas Contamination – No Sub-slab Soil Venting System

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) [a,b]	Number of Residences with Detections	Exposure Duration (years) [c]	Exposed Population	USEPA IUR [d] $(\mu g/m3)^{-1}$	LECR	LECR Sum
22 Remaining Properties	chloroform	0.86	22	30	Adult/Child	chloroform = 2.3E-05 1,2-DCA = 2.6E-05 PCE = 2.6E-07 TCE = 4.1E-06	1.97E-05	3.17E-05
	1,2-DCA	0.31	1				8.15E-06	
	PCE	1.06	6				2.75E-07	
	TCE	1.66	2				3.60E-06	

(a) - micrograms per cubic meter.

(b) Exposure Point Concentrations - derived based on maximum concentrations for less than 5 results or derived using Pro UCL Version 4.00.02 (EPA, 2007) when at least five results were available.

(c) - Based on EPA recommended length of residency for current residents. Exposure Assumptions: 365 days a year exposure frequency, exposed years 0 through 30 years, 78 years averaging time (USEPA 2011b).

(d) - Inhalation Unit Risk (cancer slope factor) for human inhalation exposure.

Sample Calculation: Exposure concentrations to PCE in indoor air and LECRs were calculated using the following formulas:
EPC = C x ET x EF x ED/AT
where

EPC = exposure point concentration of contaminant in air ($\mu g/m^3$);
C = concentration of contaminant detected in air ($\mu g/m^3$);
ET = exposure time (hours/day);
EF = exposure frequency (days/year);
ED = exposure duration (years); and
AT = averaging time (years).

PCE EPC = (2.87 $\mu g/m^3$) x (24 hrs/24 hrs - day) x (350 days/365 days - year) x (30 years/78 years) = 1.06 $\mu g/m^3$

LECR = EPC x IUR
where

EPC = exposure point concentration of contaminant in air ($\mu g/m^3$); and
IUR = inhalation unit risk of contaminant in air $(\mu g/m^3)^{-1}$

LECR = 1.06 $\mu g/m^3$ x 0.00000026 $\mu g/m^{3\,(-1)}$ = 2.75E-07

Table 16: Comparison of Indoor Air Contaminant Concentrations with Health Guideline Comparison Values for Non-Cancer Health Effects: Daycare A and Daycare B

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) (a,b)	Health-Based Comparison Values ($\mu g/m^3$)	Exceedance of Health-Based Comparison Value
Daycare A	chloroform	0.1	98 (C) (c)	No
	TCE	0.2	2 (C) (d)	No
Daycare B	1,3-butadiene	0.5	2 (d)	No

(a) - micrograms per cubic meter.
(b) - Exposure Point Concentration - based on maximum concentrations detected.
(c) - Agency for Toxic Substances and Disease Registry, Minimal Risk Level (I = Intermediate 15 - 364 days/year; C = Chronic >364 days/year).
(d) - US EPA 2011 Reference Concentration for chronic inhalation exposures.

Table 17: Calculated Lifetime Excess Cancer Risk from Inhalation Exposures to Indoor Air Contaminants - Daycare A and Daycare B

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) (a,b)	Exposure Duration (years) (c)	Exposed Population	USEPA IUR (d) ($\mu g/m3)^{-1}$	LECR	LECR Sum
Daycare A	chloroform	0.06	30	Adult Worker	2.30E-05	1.31E-06	1.72E-06
	TCE	0.1				4.10E-07	
	chloroform	0.01	6	Child	4.10E-06	2.63E-07	3.45E-07
	TCE	0.02				8.20E-08	
Daycare B	1,3-butadiene	0.20	30	Adult Worker	2.30E-05	6.00E-06	6.00E-06
		0.04	6	Child	4.10E-06	1.20E-06	1.20E-06

(a) - micrograms per cubic meter.

(b) Exposure Point Concentration - based on maximum concentrations detected.

(c) - Based on start of operations. Exposure Assumptions: 260 days a year (5days/week) at a 12 hours/day exposure frequency, 78 years averaging time (USEPA 209b; 2011b).

(d) - Inhalation Unit Risk (cancer slope factor) for human inhalation exposure.

Table 18: Calculated Lifetime Excess Cancer Risk from Inhalation Exposures to Indoor Air Contaminants - Commercial/Industrial Properties – No Sub-slab Soil Venting System

Caldwell Trucking Company Site, Essex County

Exposure Point Indoor Air	Contaminant of Concern	Exposure Point Concentration (µg/m3) [(a,b)]	Number of Residences with Detections	Exposure Duration (years) [(c)]	Exposed Population	USEPA IUR [(d)] (µg/m3)$^{-1}$	LECR	LECR Sum Attributable from Vapor Intrusion Source [(e)]	LECR Sum Site-Related and Other Sources
2 Commercial Properties	chloroform	0.1	3	30	Adult	chloroform = 2.3E-05 1,2-DCA = 2.6E-05 methylene chloride = 1.06E-08 PCE = 2.6E-07 TCE = 4.1E-06	3.40E-06	5.23E-06	5.23E-06
	PCE	0.3	1				8.90E-08		
	TCE	0.4	3				1.74E-06		
1 Industrial Property	1,2-DCA	0.3	1				1.09E-06	2.04E-06	7.86E-06
	Methylene Chloride	3,455					4.73E-06		
	PCE	8.9					3.17E-07		
	TCE	3.1					1.72E-06		

(a) - micrograms per cubic meter.

(b) Exposure Point Concentrations - derived based on maximum concentrations for less than 5 results or derived using Pro UCL Version 4.00.02 (EPA, 2007) when at least five results were available.

(c) - Based on EPA recommended length of residency for current residents. Exposure Assumptions: 365 days a year exposure frequency, exposed years 0 through 30 years, 78 years averaging time (USEPA 2011b).

(d) - Inhalation Unit Risk (cancer slope factor) for human inhalation exposure.

(e) - LECR Sum - based on contaminants of concern which were present in soil gas above screening levels and could be attributed to a vapor intrusion source.

Sample Calculation: Exposure concentrations to PCE in indoor air and LECRs were calculated using the following formulas:

EPC = C x ET x EF x ED/AT

where

EPC = exposure point concentration of contaminant in air (µg/m^3);
C = concentration of contaminant detected in air (µg/m^3);
ET = exposure time (hours/day);
EF = exposure frequency (days/year);
ED = exposure duration (years); and
AT = averaging time (years).

PCE EPC = (2.5 µg/m^3) x (12 hrs/24 hrs - day) x (260 days/365 days - year) x (30 years/78 years) = 0.3 µg/m^3

LECR = EPC x IUR

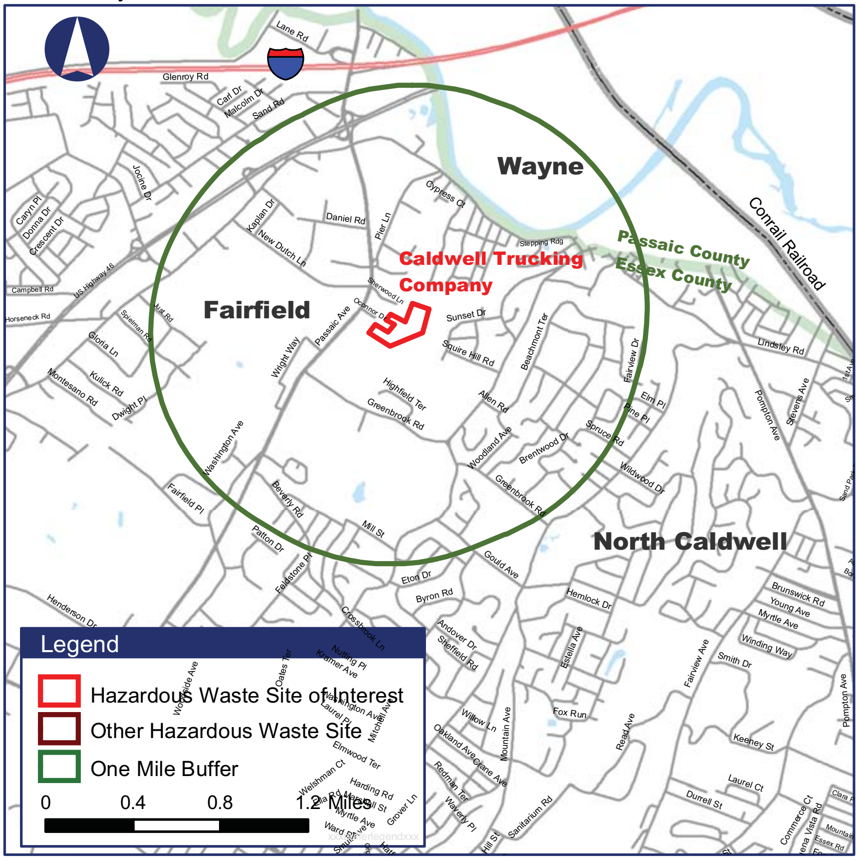
where

EPC = exposure point concentration of contaminant in air (µg/m^3); and
IUR = inhalation unit risk of contaminant in air (µg/m^3)$^{-1}$

PCE LECR = 0.3 µg/m^3 x 0.00000026 µg/m$^{3\,(-1)}$ = 8.09E-08

Caldwell Trucking Company
Fairfield, NJ

EPA Facility ID: NJD048798953



Base Map Source: Geographic Data Technology, May 2005.
Site Boundary Data Source: ATSDR Geospatial Research, Analysis, and Services Program, Current as of Generate Date (bottom left-hand corner).
Coordinate System (All Panels): NAD 1983 StatePlane New Jersey FIPS 2900 Feet

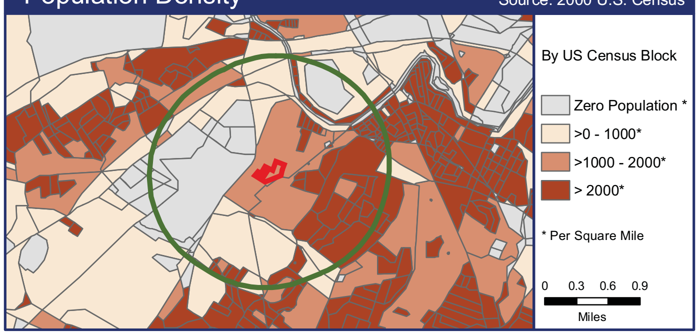
Site Location: Essex County, NJ

Demographic Statistics
Within One Mile of Site*

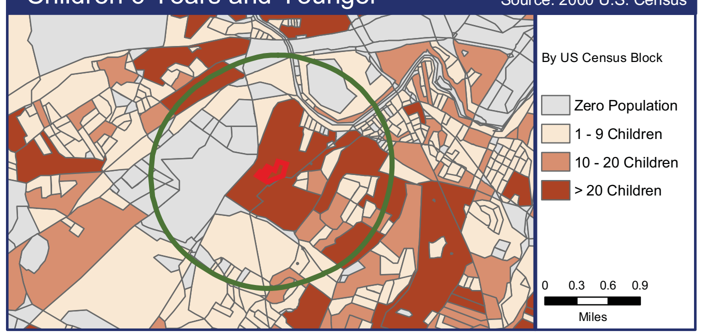
Total Population	4,577
White Alone	4,226
Black Alone	30
Am. Indian & Alaska Native Alone	6
Asian Alone	227
Native Hawaiian & Other Pacific Islander Alone	0
Some Other Race Alone	41
Two or More Races	47
Hispanic or Latino**	165
Children Aged 6 and Younger	394
Adults Aged 65 and Older	712
Females Aged 15 to 44	810
Total Housing Units	1,594

Demographics Statistics Source: 2000 U.S. Census
* Calculated using an area-proportion spatial analysis technique
** People who identify their origin as Hispanic or Latino may be of any race.

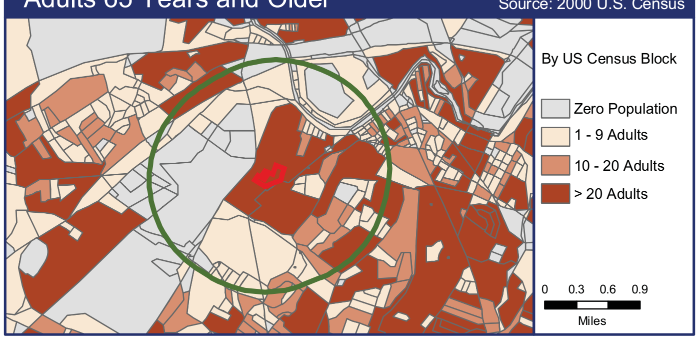
Population Density
Source: 2000 U.S. Census



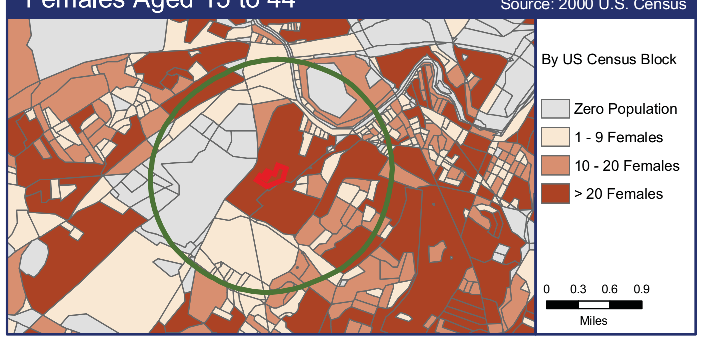
Children 6 Years and Younger
Source: 2000 U.S. Census



Adults 65 Years and Older
Source: 2000 U.S. Census



Females Aged 15 to 44
Source: 2000 U.S. Census



<project=04007><userid=JXA0><geo=ESSEX COUNTY, NJ><keywords=NJD048798953, Caldwell, Trucking>

Figure 2: Demographics information for the Caldwell Trucking Company site based on the 2000 census data.

Appendix A

Toxicological Summaries

The toxicological summaries provided in this appendix are based on ATSDR's ToxFAQs (http://www.atsdr.cdc.gov/toxfaq.html). Health effects are summarized in this section for the chemicals of concern found off-site in area private wells and in indoor air of evaluated residences and occupied buildings. The health effects described in the section are typically known to occur at levels of exposure much higher than those that occur from environmental contamination. The chance that a health effect will occur is dependent on the amount, frequency and duration of exposure, and the individual susceptibility of exposed persons.

Benzene. Benzene is a widely used chemical formed from both natural processes and human activities. Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities. Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and other synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include emissions from volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke. Industrial processes are the main source of benzene in the environment.

Once benzene enters the environment:

- It can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.
- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

People can be exposed to benzene from several sources. Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions. Vapors (or gases) from products that contain benzene, such as glues, paints, furniture wax, and detergents, are sources of exposure. Air around hazardous waste sites or gas stations will contain higher levels of benzene. Exposures can also occur when working in industries that make or use benzene.

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

The major effect of benzene from long-term exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries, but we do not know for certain that benzene caused the effects. It is not known whether benzene will affect fertility in men.

Long-term exposure to high levels of benzene in the air can cause leukemia, particularly acute myelogenous leukemia, often referred to as AML. This is a cancer of the bloodforming organs. The Department of Health and Human Services (DHHS) has determined that benzene is a known carcinogen. The International Agency for Research on Cancer (IARC) and the EPA have determined that benzene is carcinogenic to humans.

Children can be affected by benzene exposure in the same ways as adults. It is not known if children are more susceptible to benzene poisoning than adults. Benzene can pass from the mother's blood to a fetus. Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

Carbon tetrachloride. Carbon tetrachloride is a manufactured chemical that does not occur naturally. It is a clear liquid with a sweet smell that can be detected at low levels. Carbon tetrachloride is most often found in the air as a colorless gas. It is not flammable and does not dissolve in water very easily. It was used in the production of refrigeration fluid and propellants for aerosol cans, as a pesticide, as a cleaning fluid and degreasing agent, in fire extinguishers, and in spot removers. Because of its harmful effects, these uses are now banned and it is only used in some industrial applications.

Carbon tetrachloride moves very quickly into the air upon release, so most of it is in the air. It evaporates quickly from surface water. Only a small amount sticks to soil particles; the rest evaporates or moves into the groundwater. It is very stable in air (lifetime 30-100 years). It can be broken down or transformed in soil and water within several days. When it does break down, it forms chemicals that can destroy ozone in the upper atmosphere. It does not build up in animals. We do not know if it builds up in plants.

People can be exposed by breathing contaminated air near manufacturing plants or waste sites, breathing workplace air where the compound used, and drinking contaminated water near manufacturing plants and waste sites. Other sources of exposure include breathing contaminated air and skin contact with water while showering or cooking with contaminated water, swimming or bathing in contaminated water and contact with or ingesting contaminated soil at or near waste sites.

High exposure to carbon tetrachloride can cause liver, kidney, and central nervous system damage. These effects can occur after ingestion or breathing carbon tetrachloride, and possibly from exposure to the skin. The liver is especially sensitive to carbon tetrachloride because it enlarges and cells are damaged or destroyed. Kidneys also are damaged, causing a build up of wastes in the blood. If exposure is low and brief, the liver and kidneys can repair the damaged cells and function normally again. Effects of carbon tetrachloride are more severe in persons who drink large amounts of alcohol.

If exposure is very high, the nervous system, including the brain, is affected. People may feel intoxicated and experience headaches, dizziness, sleepiness, and nausea and vomiting. These effects may subside if exposure is stopped, but in severe cases, coma and even death may occur. There have been no studies of the effects of carbon tetrachloride on reproduction in humans, but studies in rats showed that long-term inhalation may cause decreased fertility.

Studies in humans have not been able to determine whether or not carbon tetrachloride can cause cancer because usually there has been exposure to other chemicals at the same time. Swallowing or breathing carbon tetrachloride for years caused liver tumors in animals. Mice that breathed carbon tetrachloride also developed tumors of the adrenal gland. The Department of Health and Human Services (DHHS) has determined that carbon tetrachloride may reasonably be anticipated to be a carcinogen. The International Agency for Research on Cancer (IARC) has determined that carbon tetrachloride is possibly carcinogenic to humans, whereas the EPA determined that carbon tetrachloride is a probable human carcinogen.

The health effects of carbon tetrachloride have not been studied in children, but they are likely to be similar to those seen in adults exposed to the chemical. We do not know whether children differ from adults in their susceptibility to carbon tetrachloride.

A few survey-type studies suggest that maternal drinking water exposure to carbon tetrachloride might possibly be related to certain birth defects. Studies in animals showed that carbon tetrachloride can cause early fetal deaths, but did not cause birth defects. A study with human breast milk in a test tube suggested that it would be possible for carbon tetrachloride to pass from the maternal circulation to breast milk, but there is no direct demonstration of this occurring.

Chloroform. Chloroform is a colorless liquid with a pleasant, nonirritating odor and a slightly sweet taste. It will burn only when it reaches very high temperatures. In the past, chloroform was used as an inhaled anesthetic during surgery, but it isn't used that way today. Today, chloroform is used to make other chemicals and can also be formed in small amounts when chlorine is added to water. Other names for chloroform are trichloromethane and methyl trichloride.

Chloroform evaporates easily into the air. Most of the chloroform in air breaks down eventually, but it is a slow process. The breakdown products in air include phosgene and hydrogen chloride, which are both toxic. It doesn't stick to soil very well and can travel through soil to groundwater. Chloroform dissolves easily in water and some of it may break down to other chemicals. Chloroform lasts a long time in groundwater. Chloroform doesn't appear to build up in great amounts in plants and animals.

People can become exposed through drinking water or beverages made using water containing chloroform, breathing indoor or outdoor air containing it, especially in the workplace, eating contaminated food, and skin contact with water that contains it, such as in swimming pools.

Breathing about 900 parts of chloroform per million parts air (900 ppm) for a short time can cause dizziness, fatigue, and headache. Breathing air, eating food, or drinking water containing high levels of chloroform for long periods of time may damage your liver and kidneys. Large amounts of chloroform can cause sores when chloroform touches your skin. It isn't known whether chloroform causes reproductive effects or birth defects in people.

Animal studies have shown that miscarriages occurred in rats and mice that breathed air containing 30 to 300 ppm chloroform during pregnancy and also in rats that ate chloroform during pregnancy. Offspring of rats and mice that breathed chloroform during pregnancy had birth defects. Abnormal sperm were found in mice that breathed air containing 400 ppm chloroform for a few days.

The Department of Health and Human Services (DHHS) has determined that chloroform may reasonably be anticipated to be a carcinogen. Rats and mice that ate food or drank water with chloroform developed cancer of the liver and kidneys.

1,2-Dichloroethane. 1,2-Dichloroethane, also called ethylene dichloride, is a manufactured, colorless liquid with a pleasant smell and sweet taste. It is primarily used in the production of vinyl chloride which is used to make a variety of plastic and vinyl products.

Breathing high levels of 1,2-dichloroethane can cause nervous system disorders, liver and kidney diseases, and affect the lungs and immune system. Livers, kidneys and lungs were the target organs in chronic exposures studies in animals. Studies have not been conclusive that 1,2-dichloroethane causes cancer in humans. In animal studies, increases in stomach, mammary gland, liver, lung, and endometrium cancers have been seen following inhalation, oral and dermal exposures. Exposure to 1,2-dichloroethane has not been shown to affect fertility in people or animals. The US Environmental Protection Agency (EPA) has determined that 1,2-dichloroethane is a probably human carcinogen and the International Agency for Cancer Research (IARC) considers it to be a possible human carcinogen.

Methylene chloride. Methylene chloride is a colorless liquid with a mild, sweet odor. Another name for it is dichloromethane. Methylene chloride does not occur naturally in the environment. Methylene chloride is used as an industrial solvent and as a paint stripper. It may also be found in some aerosol and pesticide products and is used in the manufacture of photographic film.

Methylene chloride is mainly released to the environment in air. About half of the methylene chloride in air disappears in 53 to 127 days. Methylene chloride does not easily dissolve in water, but small amounts may be found in drinking water. We do not expect methylene chloride to build up in plants or animals.

The most likely way to be exposed to methylene chloride is by breathing contaminated air. Breathing the vapors given off by products containing methylene chloride. Exposure to high levels of methylene chloride is likely if methylene chloride or a product containing it is used in a room with inadequate ventilation.

If you breathe in large amounts of methylene chloride you may feel unsteady, dizzy, and have nausea and a tingling or numbness of your finger and toes. A person breathing smaller amounts of methylene chloride may become less attentive and less accurate in tasks requiring hand-eye coordination. Skin contact with methylene chloride causes burning and redness of the skin.

We do not know if methylene chloride can cause cancer in humans. An increased cancer risk was seen in mice breathing large amounts of methylene chloride for a long time. The World Health Organization (WHO) has determined that methylene chloride may cause cancer in humans. The Department of Health and Human Services (DHHS) has determined that methylene chloride can be reasonably anticipated to be a cancer-causing chemical. The EPA has determined that methylene chloride is a probable cancer-causing agent in humans.

It is likely that health effects seen in children exposed to high amounts of methylene chloride will be similar to the effects seen in adults. We do not know if methylene chloride can affect the ability of people to have children or if it causes birth defects. Some birth defects have been seen in animals inhaling very high levels of methylene chloride.

1,1,2,2-Tetrachloroethane. 1,1,2,2-Tetrachloroethane is a manufactured, colorless, dense liquid that does not burn easily. It is volatile and has a sweet odor. In the past, it was used in large amounts to produce other chemicals, as an industrial solvent to clean and degrease metals, and as an ingredient in paints and pesticides. Commercial production of 1,1,2,2-tetrachloroethane for these uses has stopped in the United States. It presently is used only as a chemical intermediate in the production of other chemicals.

In the environment most 1,1,2,2-tetrachloroethane released to the environment eventually moves to the air or ground water. It does not attach to soil particles when released to land. When released to surface water, much of it will evaporate to the air while the rest may break down in the water. Breakdown of the chemical in the environment is slow; it takes about 1 year for half of the chemical to disappear from groundwater and 2 months in air. 1,1,2,2-Tetrachloroethane does not build up significantly in the bodies of fish or other organisms.

People can become exposed through the following pathways:

- The general public is not expected to be exposed to significant amounts of 1,1,2,2-tetrachloroethane. It is not commonly found in drinking water, soil, or food.
- Higher concentrations have been found occasionally in private well water that may have been used for drinking.
- You may be exposed to 1,1,2,2-tetrachloroethane if you live near a hazardous waste site that contains it or near an industrial building where the chemical is used.
- Since production of the chemical has stopped, most workers would not be exposed to it.
- If spills or accidents occur at work, exposure will likely be by breathing in vapors or through skin contact.

Most of the 1,1,2,2-tetrachlooethane that you may ingest or inhale will enter the bloodstream. Breathing very high concentrations of 1,1,2,2 tetra¬chloro¬ethane can rapidly cause drowsiness, dizziness, nausea, and vomiting. Most people recover from these effects once they are in fresh air. Breathing high levels of 1,1,2,2 tetra-chloro-ethane for a long time can cause liver damage. Drinking very large amounts of 1,1,2,2-tetrachloroethane can cause shallow breathing, faint pulse, decreased blood pressure, and possibly unconsciousness. Liver damage has been observed in animals orally exposed to lower doses for a long time.

It is not known whether 1,1,2,2-tetrachloroethane causes cancer in humans. In a long-term study, 1,1,2,2-tetrachloroethane caused an increase in liver tumors in mice, but not in rats. The International Agency for Research on Cancer (IARC) has determined that 1,1,2,2-tetrachloroethane cannot be classified as to its ability to cause cancer in humans, while the EPA has determined that it is a possible human carcinogen.

Exposure of children to large amounts of 1,1,2,2-tetra¬chloroethane will probably cause the same effects observed in adults (i.e., fatigue, vomiting, dizziness, liver damage, stomachache). It is not known whether children are more or less susceptible to the effects of 1,1,2,2-tetra¬chloroethane than adults. Some effects have been observed in animals born to females exposed to 1,1,2,2-tetrachloroethane during pregnancy. This occurred at exposure levels that were also toxic to the mothers. A very small number of studies in animals do not suggest that 1,1,2,2-tetrachloroethane is a developmental toxin.

Tetrachloroethylene (PCE). PCE is a manufactured chemical that is widely used for dry cleaning of fabrics and for metal-degreasing. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor. Most people can smell PCE when it is present in the air at a level of approximately 7,000 micrograms per cubic meter or more, although some can smell it at even lower levels. People are commonly exposed to PCE when they bring clothes from the dry cleaners.

High concentrations of PCE can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Irritation may result from repeated or extended skin contact with it. These symptoms occur almost entirely in work (or hobby) environments when people have been exposed to high concentrations. In industry, most workers are exposed to levels lower than those causing obvious nervous system effects, although more subtle neurological effects are possible at the lower levels. The health effects of breathing in air or drinking water with low levels of PCE are not known. Results from some studies suggest that women who work in dry cleaning industries where exposures to PCE can be quite high may have more menstrual problems and spontaneous abortions than women who are not exposed. Results of animal studies, conducted with amounts much higher than those that most people are exposed to, show that PCE can cause liver and kidney damage. Exposure to very high levels of PCE can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant.

The U.S. Department of Health and Human Services (USDHHS) has determined that PCE may reasonably be anticipated to be a carcinogen. PCE has been shown to cause liver tumors in mice and kidney tumors in male rats.

Trichloroethylene (TCE). TCE is a nonflammable, colorless liquid with a somewhat sweet odor and a sweet, burning taste. It is used mainly as a solvent to remove grease from metal parts, but it is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers. TCE dissolves a little in water, and can remain in groundwater for a long time. It quickly evaporates from water, so it is commonly found as a vapor in the air. People can be exposed to TCE by breathing air in and around the home which has been contaminated with TCE vapors from shower water or household products, or by drinking, swimming, or showering in water that has been contaminated with TCE. Breathing small amounts of TCE may cause headaches, lung irritation, dizziness, poor coordination, and difficulty concentrating. Breathing large amounts of TCE may cause impaired heart function, unconsciousness, and death. Breathing it for long periods may cause nerve, kidney, and liver damage. Drinking large amounts of TCE may cause nausea, liver damage, unconsciousness, impaired heart function, or death. Drinking small amounts of TCE for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women, although the extent of some of these effects is not yet clear. Skin contact with TCE for short periods may cause skin rashes.

Some studies with mice and rats have suggested that high levels of TCE may cause liver, kidney, or lung cancer. Some studies of people exposed over long periods to high levels of TCE in drinking water or in workplace air have found evidence of increased cancer. The National Toxicology Program has determined that TCE is “reasonably anticipated to be a human carcinogen,” and the International Agency for Research on Cancer (IARC) has determined that trichloroethylene is “probably carcinogenic to humans.”

Vinyl chloride. Vinyl chloride is a colorless gas. It has a mild, sweet odor. It is a manufactured substance that does not occur naturally. It can be formed when other substances such as trichloroethane, trichloroethylene, and tetrachloroethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC). PVC is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials. Vinyl chloride is also known as chloroethene, chloroethylene, and ethylene monochloride.

Liquid vinyl chloride evaporates easily. Vinyl chloride in water or soil evaporates rapidly if it is near the surface. Vinyl chloride in the air breaks down in a few days to other substances, some of which can be harmful. Small amounts of vinyl chloride can dissolve in water. Vinyl chloride is unlikely to build up in plants or animals that you might eat.

People can become exposed by breathing vinyl chloride that has been released from plastics industries, hazardous waste sites, and landfills, breathing vinyl chloride in air or during contact with your skin or eyes in the workplace, and drinking water from contaminated wells.

Breathing high levels of vinyl chloride can cause you to feel dizzy or sleepy. Breathing very high levels can cause you to pass out, and breathing extremely high levels can cause death.

Some people who have breathed vinyl chloride for several years have changes in the structure of their livers. People are more likely to develop these changes if they breathe high levels of vinyl chloride. Some people who work with vinyl chloride have nerve damage and develop immune reactions. The lowest levels that produce liver changes, nerve damage, and immune reaction in people are not known. Some workers exposed to very high levels of vinyl chloride have problems with the blood flow in their hands. Their fingers turn white and hurt when they go into the cold.

The effects of drinking high levels of vinyl chloride are unknown. If you spill vinyl chloride on your skin, it will cause numbness, redness, and blisters.

Animal studies have shown that long-term exposure to vinyl chloride can damage the sperm and testes.

The U.S. Department of Health and Human Services has determined that vinyl chloride is a known carcinogen. Studies in workers who have breathed vinyl chloride over many years showed an increased risk of liver, brain, lung cancer, and some cancers of the blood have also been observed in workers.

It has not been proven that vinyl chloride causes birth defects in humans, but studies in animals suggest that vinyl chloride might affect growth and development. Animal studies also suggest that infants and young children might be more susceptible than adults to vinyl chloride-induced cancer.

Appendix B

Indoor Air Quality Information Sources

The following sources of information are provided as a reference to homeowners and business owners regarding actions and preventative measures on how to help improve the quality of indoor air within their homes or workplace.

"Healthy Indoor Air for America's Homes – Indoor Air Hazards Every Homeowner Should Know About." USEPA. EPA 402-K-98-002. June 2002 available at: http://www.montana.edu/wwwcxair/

"The Inside Story – A Guide to Indoor Air Quality." USEPA. EPA 402-K-93-007. April 1995 available at: http://www.epa.gov/iaq/pubs/index.html

"Health Buildings, Health People: A Vision for the 21st Century." USEPA. EPA 402-K-01-003. October 2001 available at: http://www.epa.gov/iaq/pubs/index.html

"Indoor Air Pollution: An Introduction for Health Professionals." USEPA. EPA 402-R-94-007. 1994 available at: http://www.epa.gov/iaq/pubs/index.html

"What You Should Know About Using Paint Strippers." Consumer Product Safety Commission. CPSC Publication # F-747-F-95-002. February, 1995 available at: www.cpsc.gov/cpscpub/pubs/423.html

"Healthy Indoor Painting Practices." USEPA. EPA 744-F-00-001. May 2000 available at: www.cpsc.gov/cpscpub/pubs/456.pdf

Many of these sources are available in print through the website contact or through:

New Jersey Department of Health and Senior Services
Indoor Environments Program
PO Box 369
Trenton, NJ 08625-0369
609-631-6749
Access on line at:http://www.state.nj.us/health/eoh/tsrp/index.html

Appendix B: Uses and Typical U.S. Background Concentrations of Typical Contaminants Detected in Residential Vapor Intrusion Investigations

Chemical	Usage[a]	Sources of Common Exposure[b]	Background Concentrations ($\mu g/m^3$)[c]
Acetone	Solvent; paint strippers; rubber cement; cleaning fluids; nail polish remover.	See Usage.	2 - 80[d]; 16[g]; 19 (indoor)[g]
Benzene	Solvents, gasoline, resins and plastics; nylon; paints; adhesives (especially carpet); printing; pesticides; detergents/disinfectants; dyes; photographic processing	Gasoline emissions; cigarette smoke; paints and adhesives; particle board and wood composites; wood smoke	1 – 18 (mean average range) Various New Jersey cities[b]
1,3-Butadiene	Intermediate (potential impurity) in many plastics and polymers; fungicides; latex paint; acrylics; fuel formulations	Vehicle emissions; tobacco smoke; wood fires; waste incinerators; electric wire coatings; thermal degradation of plastics	0.38 (indoor) 14 (cigarette smoke)[d]
Chloroform	Refrigerant manufacturing; raw material for polytetrafluoroethylene plastics; insecticidal fumigant; solvent; cleansing agent in fire extinguishers; by-product in chlorination of potable water; former use in cough syrup, toothpastes, and toothache compounds..	Bathroom showers using chlorinated water; see Usage.	10-500 (10 min shower)[d]; 0.5 - 4 [d]; 0.1 - 2 [g]
1,4 - Dichlorobenzene	Deodorant; pesticide; resins and plastics; solvent; dyes; degreaser; wood preservative; motor oils; paint	Mothballs; toilet deodorants; air fresheners; tobacco smoke; pesticide application	3.45 (indoor non-smoker)[d]; 10.22(indoor smoker)[d]; 1 - 4 (average outdoor)[d] 0.08-240 (indoor - study)[g]
1,2 - Dichloroethane	Manufacture of vinyl chloride; formerly used in varnish, paints, finish removers, adhesives, soaps, degreasing agent	Fugitive emissions from industries, treatment plants, hazardous waste sites; landfills; occupational settings; ambient air	0.3 (indoor non-smoker avg)[f]; 0.03 (indoor non-smoker avg)[f]; 0.04-0.4 (outdoor - study)[f]
Ethylbenzene	Production of synthetic rubber; general and resin solvent; gasoline additive.	Self-serve gasoline fill-ups; vehicle emissions; painting; new or remodel construction.	1 - 12 (outdoor - average) [d]
n-Hexane	Gasoline; rubber cement; typing correction fluid; perfume aerosols; cleaning agent; paint diluent; alcohol denaturant; solvent in extraction of soybean oil, cottonseed oil and other seed oils. Constituent in natural gas.	Combustion of motor fuels, heating oil fuels or other petroleum products; natural gas; glues, stains, paints, varnishes, adhesives, and cleaning agents.	14 (average outdoor) [d]; 7 [g]
Methylene Chloride	Industrial solvent; hairspray; paint strippers; spray paint; rug cleaners; insecticides; furniture polish.	See Usage	Less than 10[d] ; 0.17 (average)[g]
Methyl t-Butyl Ether (MTBE)	Used as an octane booster in gasoline (gasoline refinement)	Automobile gasoline refueling; inside automobiles when driving; refueling lawn mowers; chain-saws; or other gasoline-powered equipment	3.6 (median) [d] ; Less than 1 (estimated average)[f]

Appendix B: (Cont'd.)

Chemical	Usage[a]	Sources of Common Exposure[b]	Background Concentrations (μg/m³)[c]
Tetrachloroethylene (PCE)	Solvent; degreaser; dry cleaning and textile production; water repellants; pharmaceuticals; pesticides; refrigerants; insulating fluids; correction fluid (e.g., white out) and inks; adhesives	Dry cleaned garments; paint removers; fabric cleaning products (e.g., stain removers, etc.); lubricants; wood products	1-4 (average)[d]; 7 (average)[g]
Trichloroethylene (TCE)	Solvent; degreaser; dry cleaning and textile production; adhesives, paint removers; correction fluid (e.g., white out) and spot removers	Present main use as a metal degreaser; dry cleaned garments; paint removers; fabric cleaning products (e.g., stain removers, etc.)	0.2-4 (ambient average)[f]
1,2,4-Trimethylbenzene	Dyes, fragrances, and plastics; solvent and paint thinner; sterilizing agent; degreaser; gasoline additive; synthetic wood products.	Self-serve gasoline fill-ups; indoor painting or printing	10-12 (indoor)[d] 2.8 - 5.9 (outdoor)[f]
1,3,5-Trimethylbenzene	Building materials; Dyes; UV inhibitor in plastics; solvent and paint thinner; gasoline additive.	Self-serve gasoline fill-ups; indoor painting or printing; new or remodel construction.	3-8 (indoor)[d] 3-15 (outdoor) [d]
Toluene	Manufacture of benzoic acid, explosives, dyes, artificial leather, perfumes; solvent for paints, lacquers, gums, and resins; printing inks; gasoline additive; spot removers; cosmetics; antifreeze; adhesive solvent in plastic toys and model airplanes.	Self-serve gasoline fill-ups; vehicle emissions; cigarette smoke; consumer products; nail polish; indoor painting; new or remodel construction (carpets).	3 - 140 (outdoor) [d] 42 (outdoor - average) [d] 20 – 60 μg/cigarette [d]
Xylenes (Total)	Manufacture of benzoic acid; dyes, hydrogen peroxide, perfumes, insect repellants, epoxy resins, pharmaceuticals, paints, varnishes, general solvent for adhesives and paints; gasoline additive; used in leather industry.	Self-serve gasoline fill-ups; vehicle emissions; indoor painting; new or remodel construction.	17 (outdoor - average) [d]

[a]National Library of Medicine's (NLM) Hazardous Substances Data Bank (HSDB)
[b]ATSDR Toxicological Profile
[c]The background concentrations presented are not specific to Lyndhurst, New Jersey in particular, but are presented to provide the homeowner some perspective as to levels typically found in U.S. homes.
[d]HSDB, 2002, at www.toxnet.nlm.nih.gov
[e]Chemical profiles at www.scorecard.org
[f]EPA, 1988
[g]Tox Profile at www.atsdr.cdc.gov
[h]EPA, 1999

Fact Sheet

Evaluating Indoor Air near VOC Contaminated Sites

What are VOCs?

Volatile organic compounds (VOCs) are a class of chemicals that readily evaporate at room temperature. Gasoline, dry cleaning fluid, degreasing agents (solvents) and paint thinners are several examples of products that contain these compounds. VOCs may be found in soil and/or ground water due to spillage onto the ground, leaks from underground storage tanks and other types of discharges.

How VOCs in soil or ground water can affect indoor air

If VOCs contaminate soil or ground water at a site, it is important to evaluate nearby buildings for possible impacts from **vapor intrusion**. Vapor intrusion occurs when gases from the contaminated soil or ground water seep through cracks and holes in foundations or slabs of buildings and accumulate in basements, crawl spaces or living areas, as shown in the diagram below.

A variety of factors can influence whether vapor intrusion will occur at a building located near soil or ground water contaminated with VOCs. These include, but are not limited to, the concentration of the contaminants, the type of soil, the depth to ground water, the construction of the building, the condition of the foundation or slab and the existence of underground utilities that can create pathways for vapors to travel.

Short term exposure to high levels of organic vapors can cause eye and respiratory irritation, headache and/or nausea. Breathing low levels of organic vapors over a long period of time may increase an individual's risk for respiratory ailments, cancer and other health problems.

Organic vapors can be present inside a building at potentially harmful levels without being detectable by odor. **Sub-slab soil gas testing**, **near-slab soil gas testing** and/or **indoor air testing** are usually required to determine whether vapor intrusion is occurring at a property.

Testing for vapor intrusion

If your home or building is located near VOC-contaminated soil or ground water, NJDEP or an environmental contractor may ask permission to evaluate your property for vapor intrusion. This process typically involves first conducting sub-slab soil gas testing to check for vapors beneath the building, followed by indoor air testing, if necessary. During sub-

(over)

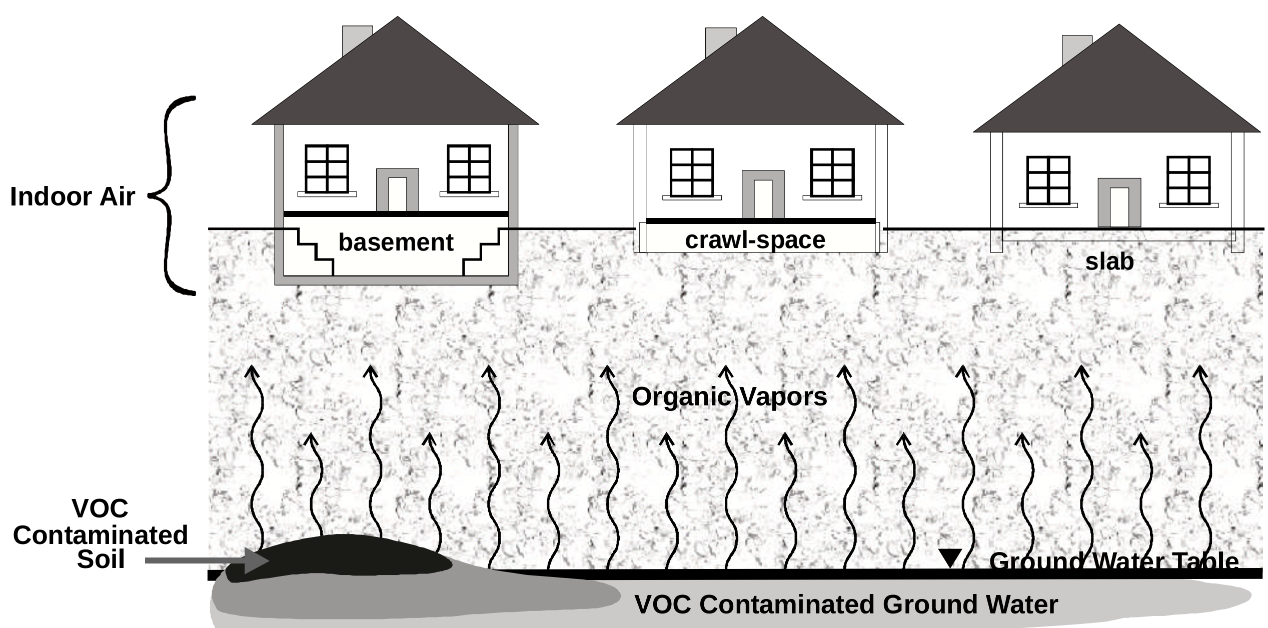


Diagram adapted from USEPA's *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Ground Water and Soils, November 2002*

(continued)

slab testing, a small hole is bored through the basement floor or slab and a sample of the **soil gas** (the air trapped between the soil particles) is collected using an evacuated air testing canister (see below). If it is not possible to collect a soil gas sample from beneath the floor or slab, the sample may be collected by placing a probe in the soil directly adjacent to the building (near-slab testing). The soil gas sample is then sent to a certified laboratory to be analyzed for VOCs. If the analysis shows VOCs related to the subsurface contamination are present above NJDEP's Soil Gas Screening Levels (SGSL), then indoor air testing is necessary.

During indoor air testing, a canister is placed in the basement, crawl space or other part of the building for a period of time (normally 24 hours). If the analysis of the indoor air sample shows VOCs related to the subsurface contamination are present above NJDEP's Indoor Air Screening Levels (IASL), vapor intrusion is likely occurring. Additional evaluation of the property may be needed to confirm this finding.

Background contamination

Many materials and substances commonly found in commercial and residential settings, such as paints, paint thinners, gasoline-powered machinery, certain building materials and cleaning products, dry cleaned clothing and cigarette smoke, contain VOCs that may be detected by indoor air testing. Even VOCs from motor vehicle emissions and other outdoor sources can contaminate indoor air. When VOCs from these sources are detected during indoor air testing, they are referred to as **background contamination.**

Sometimes it can be difficult to determine whether the VOCs detected inside a building are due to vapor intrusion, background contamination or a combination of both. Before your building is evaluated for vapor intrusion you should receive a copy of NJDEP's *Instructions for Occupants – Indoor Air Sampling Events*. Please follow these instructions to minimize background contamination and help ensure that the test results are as definitive as possible.

Addressing vapor intrusion

If testing confirms vapor intrusion is causing potentially harmful levels of VOCs to accumulate inside a building, a **subsurface depressurization system** may be installed at the property. The system prevents vapors from entering the building by continuously venting the contaminated air beneath the basement slab or crawl space to the exterior of the structure. Subsurface depressurization systems are also used throughout the country to reduce levels of naturally occurring radon gas in buildings. See NJDEP's fact sheet titled *Subsurface Depressurization Systems* for more information about how these systems work.

***Instructions for Occupants — Indoor Air Sampling Events*, the *Subsurface Depressurization Systems* fact sheet and general information about vapor intrusion can be found in NJDEP's Vapor Intrusion Guidance Document, which is available at http://www.state.nj.us/dep/srp/guidance/vaporintrusion**

An evacuated air testing canister. The pressure inside the canister is initially set lower than the indoor air, causing air to flow into the canister when the valve is opened.

Information for Residents and Property Owners

Contact Name ______________________

Agency/Company ______________________

Phone Number ______________________

Email Address ______________________

NJDEP Contact & Phone Number ______________________
(if different than above) ______________________

Sampling Date/Time ______________________

Notes/Instructions ______________________

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Appendix C

New Jersey Department of Health & Senior Services
Daycare Center Approval Letters
Fairfield Township, Essex County, New Jersey

State of New Jersey
DEPARTMENT OF HEALTH AND SENIOR SERVICES
CONSUMER, ENVIRONMENTAL AND OCCUPATIONAL HEALTH SERVICE
PO BOX 369
TRENTON, N.J. 08625-0369
www.nj.gov/health

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

MARY E. O'DOWD, M.P.H.
Acting Commissioner

APR 06 2011

Mr. Raymond Damiano
Early Learning Center
56 Pier Lane
Fairfield, NJ 07004

Re: Early Learning Center; Essex County
DCF License #: 07EAR0001

Dear Mr. Damiano:

As a child care center, Early Learning Center is subject to the rules promulgated by the Department of Children and Families, specifically N.J.A.C. 8:50 – 4.2; Procedure for Issuance of Safe Building Interior Certification.

As part of the license renewal process, the Department of Health and Senior Services (Department) has reviewed the information submitted regarding the current conditions and historical uses of the building located at 56 Pier Lane in Essex County. This information included a Preliminary Assessment Report, and a Child Care Center Approval Letter issued by the Department of Environmental Protection (DEP).

Based on the above information, the Department will not require any additional actions at this time. However, if conditions within the child care center change or if there is a change in adjacent business operations within the building, further evaluation may be required.

If you have any questions, please contact Chris Agnew with the Indoor Environments Program at (609) 826-4923.

Sincerely,

Chris Agnew
Research Scientist
Consumer, Environmental & Occupational
Health Service

CA: aw

c: Ron Corcory, Department of Environmental Protection
Gary Sefchik, Department of Children and Families
Joseph Eldridge, Director, Consumer, Environmental & Occupational Health Service

State of New Jersey
DEPARTMENT OF HEALTH AND SENIOR SERVICES
CONSUMER, ENVIRONMENTAL AND OCCUPATIONAL HEALTH SERVICE
PO BOX 369
TRENTON, N.J. 08625-0369
www.nj.gov/health

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

MARY E. O'DOWD, M.P.H.
Acting Commissioner

MAY 11 2011

Ms. Silvia Martins
A-Z Academy
264 Passaic Avenue
Fairfield, NJ 07004

Re: A-Z Academy; Essex County
DCF License # 07A-Z0001

Dear Ms. Martins:

As a licensed child care center, your facility is subject to the rules promulgated by the Department of Health and Senior Services (Department), specifically N.J.A.C. 8:50-4.2; Procedure for Issuance of Safe Building Interior Certification.

The Department has reviewed the information submitted regarding the current conditions and historical uses of the building located at 264 Passaic Avenue in Essex County. This information included a Preliminary Assessment Report, A Child Care Center Approval Letter issued by the Department of Environmental Protection (DEP) and analytical results from air samples collected in April 2011.

Based on the above information and a walk-through of the facility, the Department will not require any additional actions at this time. However, if conditions within the child care center change, further evaluation may be required.

If you have any questions, please contact Amal Shah with the Indoor Environments Program at (609) 826-4923.

Sincerely,

Chris Agnew
Research Scientist
Consumer, Environmental & Occupational
Health Service

AS: aw

c: Ron Corcory, Department of Environmental Protection
Gary Sefchik, Department of Children and Families
Joseph Eldridge, Consumer, Environmental & Occupational Health Service

Appendix D

ATSDR Glossary of Terms

ATSDR Glossary of Terms

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency with headquarters in Atlanta, Georgia, and 10 regional offices in the United States. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances. ATSDR is not a regulatory agency, unlike the U.S. Environmental Protection Agency (EPA), which is the federal agency that develops and enforces environmental laws to protect the environment and human health. This glossary defines words used by ATSDR in communications with the public. It is not a complete dictionary of environmental health terms. If you have questions or comments, call ATSDR's toll-free telephone number, 1-888-422-ATSDR (1-888-422-8737).
The glossary can be accessed online at http://www.atsdr.cdc.gov/glossary.html

Other glossaries and dictionaries:
Environmental Protection Agency (http://www.epa.gov/OCEPAterms/)

National Center for Environmental Health (CDC)
(http://www.cdc.gov/nceh/dls/report/glossary.htm)

National Library of Medicine (NIH)
(http://www.nlm.nih.gov/medlineplus/mplusdictionary.html)

For more information on the work of ATSDR, please contact:
Office of Policy and External Affairs
Agency for Toxic Substances and Disease Registry
1600 Clifton Road, N.E. (MS E-60)
Atlanta, GA 30333
Telephone: (404) 498-0080