

# Letter Health Consultation

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MY VALET CLEANERS  
MEMPHIS, SHELBY COUNTY, TENNESSEE  
EPA FACILITY ID: TND982158966

**Prepared by the  
Tennessee Department of Health**

DECEMBER 10, 2009

Prepared under a Cooperative Agreement with the  
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Agency for Toxic Substances and Disease Registry  
Division of Health Assessment and Consultation  
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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LETTER HEALTH CONSULTATION

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STATE OF TENNESSEE  
**DEPARTMENT OF HEALTH**  
ENVIRONMENTAL EPIDEMIOLOGY PROGRAM  
1ST FLOOR CORDELL HULL BUILDING  
425 5TH AVENUE NORTH  
NASHVILLE, TN 37243

December 3, 2009

Ms. Nancy Boisvert, Program Manager  
Tennessee Department of Environment and Conservation  
Drycleaner Environmental response Program  
11<sup>th</sup> Floor, L&C Tower  
401 Church Street  
Nashville, TN 37243

Dear Ms. Boisvert:

The Tennessee Department of Health's (TDH) Environmental Epidemiology Program (EEP) has reviewed the indoor air sampling results provided for the My Valet Cleaners Site located at 6717 East Shelby Drive, Memphis, Shelby County, Tennessee, DCERP Facility No.: D-79-180. The cleaner is one of several tenants of a retail strip-mall shopping center. The cleaner occupies the northern-end suite of one of the buildings comprising the shopping center. A drycleaner has been located in this leased space since at least 1988. Reportedly, tetrachloroethylene (Perc or PCE) has been used as the drycleaning solvent at this facility since 1988. The Tennessee Department of Environment and Conservation's (TDECs) Drycleaner Environmental Response Program (DCERP) wanted to investigate if the indoor air of the former leased space of the cleaner and adjacent leased spaces were impacted by drycleaner-related chemicals.

Various investigations have been conducted at the site. These investigations sampled soil-gas and advanced boreholes from which soil samples were collected. EnSafe Inc. (EnSafe) of Memphis Tennessee, an approved contractor, performed the investigations (EnSafe 2006a, 2006b, 2007). Soil-gas and soil sample results suggest the area around the location of the drycleaning machine and the location of solvent storage is impacted by drycleaner-related chemicals. Because the concentrations of drycleaner-related chemicals in subsurface soil exceed 100 parts per million (ppm), the Drycleaner Environmental Response Program (DCERP) decided to sample indoor air in the two adjacent leased spaces. As a matter of practice, DCERP evaluates the vapor intrusion pathway for drycleaner-related compounds early in its investigations. These evaluations are completed to identify if these legacy chemicals may have an effect on indoor air quality in adjacent leased spaces in shopping centers, and as a result, impact the health of visitors or people who work in the leased spaces.

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Indoor air (vapor intrusion) sampling was performed on April 9, 2009, in the bar-b-que restaurant adjacent to the cleaners. Also on this date, sampling was performed in a tax preparation services leased space next door to the restaurant. Sampling was performed by EnSafe, using SUMMA canisters that had flow controllers calibrated to collect a sample over a minimum eight-hour time period (EnSafe 2009). Results of the April 2009 indoor air sampling are in Table 1.

The resulting indoor air concentrations were compared to indoor air health comparison values published by the Agency for Toxic Substances and Disease Registry (ATSDR) (ATSDR 2008). For chemicals for which ATSDR did not have comparison values, results were compared to U.S. Environmental Protection Agency (EPA) Regional Screening Levels for residential indoor air (EPA 2008). Residential values were used because of the involuntary exposure that would be experienced by people working in or visiting the leased spaces in the shopping center. These individuals make up a potentially exposed population at this site. The individuals are not like workers who work in an environment with chemicals and are told about the hazards of them (OSHA Right-To-Know laws). Workers that work with or in areas near chemicals willingly accept the risks by continuing to work with them or be in the same area as the chemicals and have access to, and training on, the use of personal protective equipment to protect them of known risks.

This review will specifically evaluate the indoor air concentrations of the chemical tetrachloroethylene (perchloroethylene or PCE) used in drycleaning. It will also evaluate the indoor air concentrations of chemicals which break down from PCE which include trichloroethylene (TCE) 1,2-dichloroethene (1,2-DCE) and vinyl chloride, if applicable.

### **Bar-B-Que Restaurant Leased Space**

The bar-b-que restaurant is located immediately adjacent to the My Valet Cleaners leased space. Indoor air was sampled on April 9, 2009, during normal business hours. There were detections of the drycleaner chemical PCE and one of the chemicals that breaks down from PCE in the indoor air sample collected. Keeping in mind the My Valet Cleaners is still operating, we are basing our evaluation on the worst case scenario - that source of all of the PCE in indoor air in the restaurant is from subsurface soil and/or groundwater contamination. This assumption is valid as there are high concentrations in soils beneath the location of the drycleaning machine in the cleaner.

The amount of time customers spend in the leased space is relatively small. Again, no one is living in this space. The health effects comparison values are set with long-term lifetime exposures in mind. The comparison values are calculated to represent inhalation exposures that are 24 hours per day, 7 days per week, and 365 days per year.

The concentration of PCE in the indoor air of the bar-b-que restaurant was compared to the ATSDR non-cancer health effects environmental media evaluation guide (EMEG) for a chronic exposure for PCE. The non-cancer EMEG is set at 40 parts per billion (ppb). The measured PCE concentration in the restaurant is 97 ppb. However, the PCE EMEG applies to people with 24 hour per day, 7 days per week exposure to PCE and is highly protective. People visiting the bar-b-que restaurant do not experience these types of exposures. Studies of PCE toxicity suggest effects to liver and kidneys with effects showing up with human lowest observed adverse-effects

levels (LOAELs) at approximately 20 parts per million. This is approximately 1,000 times higher than levels measured in the restaurant. These non-cancer effects are important endpoints for PCE. The levels measured in the indoor air of the restaurant leased space are less than the LOAEL and therefore should not create non-cancer health effects to those breathing the indoor air of the restaurant.

There is concern for the restaurant owner or any employees who may spend longer periods of time, over several years, in the restaurant. The PCE concentration of 97 ppb in the restaurant is above the 1 in 10,000 excess cancer risk screening value of 6 ppb (EPA 2008). Thus the PCE concentration in indoor air exceeds the excess cancer risk considered acceptable by EPA (EPA 1991). A site-specific exposure risk was calculated for workers working in the restaurant 6 days per week, 50 weeks per year, for 3 years. For this occupational setting, a calculated health comparison value would be 74 ppb at a risk of 1 in 10,000 excess cancers. Based on a cancer health effects reference concentration, the measured indoor air concentration of 97 ppb is greater than this calculated one excess cancer occurrence in 10,000. Given that PCE is on a sliding scale for carcinogenicity and that this risk value assumes a continuous exposure and over a lifetime, this theoretical risk value would be an overestimation of the actual circumstances. However, EEP believes even though the risk is low, there is an unacceptable cancer risk that may harm the health of adults working long hours in the restaurant.

TCE was also detected in the restaurant's indoor air at a concentration of 8.9 ppb. For TCE exposure, this concentration is slightly above the EPA provisional reference dose of 7.4 ppb for non-cancer health effects. The TCE concentration is however within the  $10^{-6}$  to  $10^{-4}$  excess cancer range of 0.22 to 22 ppb for TCE established by EPA (EPA 1991, 2008). Therefore, EEP does not expect an elevated non-cancer or cancer risk due to TCE that may harm people's health from breathing air in the restaurant.

The amount of fresh air exchange in the bar-b-que restaurant is unknown.

### **PCE and TCE Mixture**

PCE and TCE are both present in the bar-b-que restaurant. There are possible additive health effects from these chemicals to an exposed population. It is possible that PCE and TCE jointly act in an additive manner to impair nervous system function. There is no evidence to indicate that these chemicals jointly act on the nervous system in a less-than-additive or greater-than-additive mode.

The effect of PCE on TCE's liver and kidney toxicity was projected to occur by a less-than-additive joint action based on *in vivo* evidence that PCE inhibits the metabolism of TCE in humans under occupational exposure conditions, and evidence that TCE and PCE act in a less-than-additive manner to cause liver and kidney peroxisomal proliferation. In summary, the available data provide no evidence of greater-than-additive interactions among TCE or PCE that might cause liver and kidney effects to occur.

A component-based hazard index approach that assumes additive joint toxic action and uses ATSDR MRLs based on neurological impairment is recommended for exposure-based assessments of possible health hazards from exposure to mixtures of TCE and PCE. There is no

evidence to indicate that greater-than-additive interactions would cause liver and kidney effects to occur at exposure levels lower than those influencing the nervous system.

Based on the concentrations of PCE and TCE identified at this site, it is unlikely that additive health effects caused by the presence of both PCE and TCE in indoor air would create any increased health effects to those who breathe the indoor air by visiting or working in the restaurant.

### **Tax Service Leased Space**

The tax service occupies a leased space in the shopping center adjacent to the bar-b-que restaurant. The tax service is the second leased space from the My Valet Cleaner. Sampling of the indoor air of the tax service resulted in a 39 ppb concentration of PCE. This concentration is nearly equal to the ATSDR chronic exposure non-cancer effects EMEG comparison value for a hazard index of 1 of 40 ppb. With studies of PCE toxicity suggesting effects to liver and kidneys showing up with human lowest observed adverse-effects levels (LOAELs) at approximately 20 parts per million, there should not be any non-cancer health effects from breathing the indoor air of the tax service.

The tax service indoor air PCE measurement is greater than the 6 ppb concentration excess cancer effects of 1 in 10,000 ( $10^{-4}$ ) for PCE listed in the regional screening levels table suggested for use by EPA (EPA 2008). Again, given that PCE is on a sliding scale for carcinogenicity and that these risk values assume a continuous exposure and over a lifetime, these theoretical risk values are highly protective and would be an overestimation of the actual circumstances. Therefore, if just using the EPA comparison value concentration alone, there is a potential for an extremely low risk of having an excess cancer due to inhaling indoor air within the tax service leased space. However, using actual work hours and length of employment, considering if workers worked 6 days each week for 50 weeks, over a three year time period, a calculated health comparison value would be 74 ppb at a risk of 1 in 10,000 excess cancers. Similar to the exposure in the bar-b-que restaurant, the actual exposure in the tax service would be less than this calculated comparison value. This would be a worst case scenario. This theoretical risk value would be an overestimation of the actual circumstance. The potential for adverse cancer health effects from breathing indoor air in the tax service leased space is extremely low. TCE was not measured in the indoor air of the tax service area.

### **EEP concludes:**

Indoor air in the bar-b-que restaurant contained elevated levels of PCE and TCE. There is the potential for adults working long hours over many years in the restaurant to experience a long-term exposure to PCE by breathing indoor air. This exposure may result in an elevated cancer risk from breathing indoor air that may harm the health of workers keeping long hours. Members of the general public who visit the restaurant would have a limited exposure to PCE and should not experience any increased non-cancer or cancer health effects by breathing the indoor air of the restaurant.

Indoor air in the tax service leased space contained elevated levels of PCE. TCE was not detected in indoor air in the tax service. Given the worst-case scenario, at the current concentration of PCE, it is unlikely that adults working long hours over many years in the tax

service to experience a potential long-term exposure to PCE. Members of the general public who visit the tax service would also have a limited exposure to PCE and should not experience any adverse non-cancer or cancer health effects by breathing the indoor air of the tax service.

### **EEP recommends:**

Future actions should be imperative for the site. Future actions should include reducing the levels of PCE and TCE in indoor air of the bar-b-que restaurant and tax service leased spaces.

One sampling event has been conducted. PCE concentrations in the restaurant and tax service are elevated. The leased space (reportedly a pizza restaurant) adjacent to the tax service was not included in the vapor intrusion sampling event. Any future activities considered for the bar-b-que restaurant and the tax service should also be considered for the pizza restaurant space.

The shopping center owner should give consideration to various options for decreasing the amount of PCE in the indoor air of these leased spaces. Consideration of some type of physical alteration to reduce the amount of PCE in the indoor air of the restaurant should be undertaken in the next year to insure the health of the worker(s). These could include sealing of any cracks in the floor of these leased spaces or increasing the air flow and ventilation of these leased spaces. EEP suggests DCERP follow up with the shopping center owner to identify what activities can be conducted to reduce the amount of PCE in indoor air. Additional indoor air sampling in the bar-b-que restaurant, the tax service, and pizza restaurant should be conducted if adjustments were made to the air handling systems of these leased spaces.

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Sincerely,

Joseph P. George  
Environmental Health Assessor  
Tennessee Department of Health  
Environmental Epidemiology Program

**TABLE 1.** Indoor air sampling results for leased spaces near the My Valet Cleaners facility, Memphis, Shelby County, TN. Samples were collected on April 9, 2009, over an approximate 8-hour time period during normal working hours with Summa canisters (EnSafe 2009). Values are reported in parts per billion (ppb). Health screening guidelines based on chronic exposure duration for greater than 365 days (ATSDR 2008) unless otherwise noted and EPA Risk-Based Concentrations (EPA 2008).

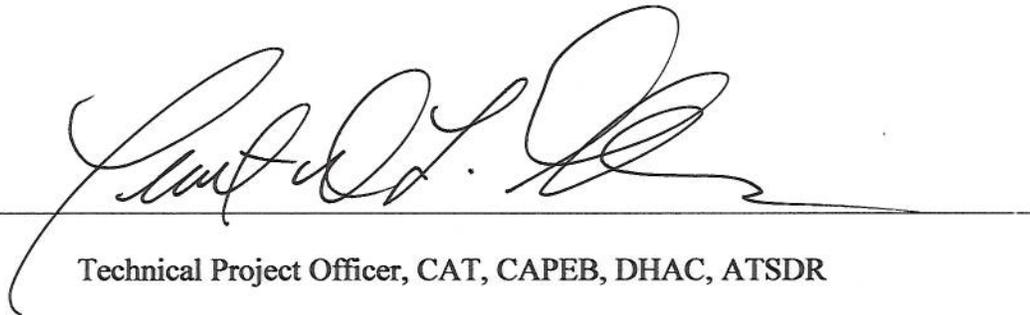
Chemical / Sampling Data and Location	Acronym	April 9, 2009 Bar-B-Que Restaurant Leased Space	April 9, 2009 Tax Service Leased Space	ATSDR Chronic MRL/EMEG (unless noted) (non-cancer risk)	ATSDR CREG (unless noted) (10 <sup>-6</sup> excess cancer risk)
		ppb	ppb	ppb	ppb
Tetrachloroethylene	PCE	<b>97</b>	<b>39</b>	40	0.06 <sup>E</sup>
Trichloroethylene	TCE	<b>8.9</b>	<0.060	7.4 <sup>E</sup>	0.22 <sup>E</sup>
<i>cis</i> -1,2-dichloroethylene	<i>cis</i> -1,2-DCE	<0.19	<0.19	ngv	nc
<i>trans</i> -1,2-dichloroethylene	<i>trans</i> -1,2-DCE	<0.20	<0.20	200i	nc
1,1-dichloroethene	1,1-DCE	<0.32	<0.32	20i	nc
1,1-dichloroethane	1,1-DCA	<0.11	<0.11	ngv	0.38 <sup>E</sup>
1,2-dichloroethane	1,2-DCA	<0.13	<0.13	600	0.01
vinyl chloride	VC	<0.093	<0.093	30i	0.04

**Notes:**

- ATSDR MRL/EMEG = Agency for Toxic Substances and Disease Registry Minimum Risk Level / Environmental Media Evaluation Guide (ATSDR 2008). Chronic non-cancer exposure comparison values (exposure greater than 365 days) used to determine if chemical concentrations warrant further health-based screening.
- ATSDR CREG = Agency for Toxic Substances and Disease Registry Cancer Risk Evaluation Guide (ATSDR 2008). Cancer risk comparison values for cancer risk of 1 excess cancer in 1,000,000 people used to determine if chemical concentrations warrant further health-based screening.
- <0.060 = not detected in the air sample (above the analytical detection limit shown for compounds listed)
- 97** = indoor air concentration is the same or greater than both non-cancer comparison value for the chemical and the 1 in 1,000,000 excess cancer comparison value for the chemical.
- <sup>E</sup> = EPA Regional Screening Levels for Residential Indoor Air (EPA 2008)
- <sup>I</sup> = ATSDR comparison intermediate value for 15-365 days exposure; typically higher than a chronic value
- nc = not classified as a carcinogen
- ngv = no guidance value available

### Certification

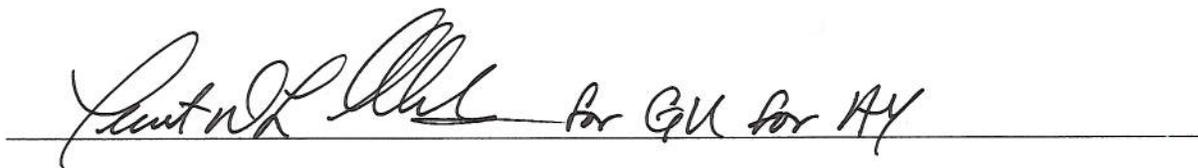
The Letter Health Consultation: *My Valet Cleaners* was prepared by the Tennessee Department of Health, Environmental Epidemiology under a Cooperative Agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was prepared in accordance with the approved methodology and procedures that existed at the time the health consultation was begun. Editorial review of this document was performed by the Cooperative Agreement partner.



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Technical Project Officer, CAT, CAPEB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR has reviewed this public health consultation and concurs with the findings.



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Team Leader, CAT, CAPEB, DHAC, ATSDR