

# Health Consultation

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FORMER COOKEVILLE CLEANERS

COOKEVILLE, PUTNAM COUNTY, TENNESSEE

STATE OF TENNESSEE CDERP SITE #D-71-103

AUGUST 28, 2008

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Agency for Toxic Substances and Disease Registry  
Division of Health Assessment and Consultation  
Atlanta, Georgia 30333

## **Health Consultation: A Note of Explanation**

An ATSDR health consultation is a verbal or written response from ATSDR 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 which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

FORMER COOKEVILLE CLEANERS

COOKEVILLE, PUTNAM COUNTY, TENNESSEE

STATE OF TENNESSEE CDERP SITE #D-71-103

Prepared By:

Tennessee Department of Health  
Under cooperative agreement with the  
The Agency for Toxic Substances and Disease Registry

## Foreword

This document summarizes an environmental public health investigation performed by Environmental Epidemiology of the State of Tennessee Department of Health. Our work is conducted under a Cooperative Agreement with the federal Agency for Toxic Substances and Disease Registry. In order for the Health Department to answer an environmental public health question, several actions are performed:

*Evaluate Exposure:* Tennessee health assessors begin by reviewing available information about environmental conditions at a site. We interpret environmental data, review site reports, and talk with environmental officials. Usually, we do not collect our own environmental sampling data. We rely on information provided by the Tennessee Department of Environment and Conservation, U.S. Environmental Protection Agency, and other government agencies, businesses, or the general public. We work to understand how much contamination may be present, where it is located on a site, and how people might be exposed to it. We look for evidence that people may have been exposed to, are being exposed to, or in the future could be exposed to harmful substances.

*Evaluate Health Effects:* If people could be exposed to contamination, then health assessors take steps to determine if it could be harmful to human health. We base our health conclusions on exposure pathways, risk assessment, toxicology, cleanup actions, and the scientific literature.

*Make Recommendations:* Based on our conclusions, we will recommend that any potential health hazard posed by a site be reduced or eliminated. These actions will prevent possible harmful health effects. The role of Environmental Epidemiology in dealing with hazardous waste sites is to be an advisor. Often, our recommendations will be actions items for other agencies. However, if there is an urgent public health hazard, the Tennessee Department of Health can issue a public health advisory warning people of the danger, and will work with other agencies to resolve the problem.

If you have questions or comments about this report, we encourage you to contact us.

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## **Introduction**

The former Cookeville Cleaners Site is located at 1316 North Washington Avenue in Cookeville, Putnam County, Tennessee, 38501, DCERP Facility ID No. D-71-103. The cleaner was formerly located in a small lease space in a portion of a larger building which also housed a laundromat (Figure 1).

The Tennessee Department of Health (TDH), Environmental Epidemiology Program (EEP), was contacted on February 7, 2008, by the Tennessee Department of Environment and Conservation (TDEC), Drycleaner Environmental Response Program (DCERP), to evaluate the results of indoor air sampling conducted within the former cleaner's space as well as two ground-floor apartments which are located in the rear basement area of the cleaners building. As part of their continued commitment to maintaining former drycleaner sites for safe new uses, the TDEC DCERP recommended indoor air sampling as a component of the Combined Facility Inspection and Prioritization Investigation – Task Group A (FI/PIA) activities conducted at the site (TVG 2008).

## **Background**

The former Cookeville Cleaners (the Site) is located at 1316 North Washington Avenue, north of the downtown area of Cookeville, Tennessee. The drycleaning equipment and other supplies have been removed. The former cleaner space is now vacant and ready for a new occupant. The adjacent lease space is occupied by a Latin convenience market. This space formerly contained a laundromat. A restaurant occupies a stand alone building to the south and a hair salon is located in a separate building north of the Site.

The Site was investigated for contamination from its past use as a solvent-based drycleaner by TVG Environmental Inc. (TVG) of Nashville, Tennessee. A Phase II Environmental Site Assessment conducted at the Site in July 2007 determined that site soils contained the drycleaner chemical tetrachloroethylene (PCE), drycleaner chemical breakdown products, and compounds related to gasoline. Groundwater was not encountered during the Phase II assessment. The Site was then enrolled in the DCERP in late 2007. A Combined Facility Inspection (FI) and Prioritization Investigation – Task Group A (PIA) was performed by TVG, with an FI/PIA report submitted to DCERP in early 2008.

According to TVG, the former cleaner's space is scheduled to be reused as an unidentified commercial business in the near future. The focus of this review is the indoor air within the former cleaner's space and two apartments which share the common (western) rear wall of the building containing the Latin convenience market and former laundromat. The DCERP is concerned that latent PCE vapors may have migrated into the ground-floor apartments which share the common wall. Indoor air samples were collected from the former cleaner's space as well as from the two ground-floor apartments. TDEC DCERP requested review of the indoor air data due to detections of low concentrations of PCE in the indoor air of the former cleaner and detections of low concentrations of 1,2-dichloroethane in one of the apartments.

## Discussion

### Introduction to Chemical Exposure

To determine whether persons have been or are likely to be exposed to chemicals, TDH EEP evaluates mechanisms that could lead to human exposure. An exposure pathway contains five parts:

- A source of contamination
- contaminant transport through an environmental medium
- a point of exposure
- a route of human exposure, and
- a receptor population.

An exposure pathway is considered complete if there is evidence that all five of these elements are, have been, or will be present at the site. A pathway is considered potential if there is a lower probability of exposure. If there is no evidence that at least one of the five elements listed is, has been, or will be present at the site, then it is considered an incomplete exposure pathway. For this site, there is a completed exposure pathway for the inhalation of drycleaner solvent vapors.

Physical contact alone with a potentially harmful chemical in the environment by itself does not necessarily mean that a person will develop adverse health effects. A chemical's ability to affect public health is controlled by a number of other factors, including:

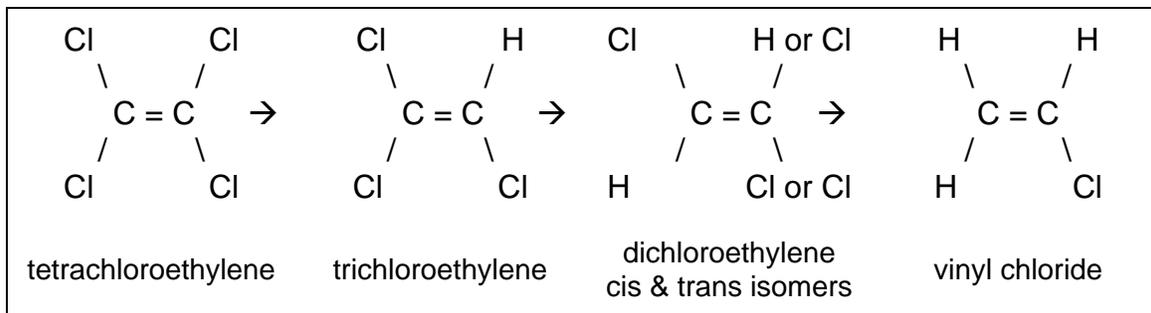
- The amount of the chemical that a person is exposed to (dose)
- the length of time that a person is exposed to the chemical (duration)
- the number of times a person is exposed to the chemical (frequency)
- the person's age and health status, and
- the person's diet and nutritional habits.

The purpose of this public health consultation is to examine any potential health hazard from PCE, TCE, and other drycleaner-related compounds present at the site. To evaluate exposure to a hazardous substance, health assessors often use health comparison values. If the chemical concentrations are below the comparison value, then health assessors can be reasonably certain that no adverse health effects will occur in people who might be exposed. If concentrations are above the comparison values for a particular chemical, then further evaluation of that chemical is in order.

### Drycleaner Solvent Explanation

The process of drycleaning is not truly dry, but it uses so little water that it has come to be known as drycleaning. Instead of water, chemical solvents are used in the cleaning process. The most commonly used solvent for drycleaning is tetrachloroethylene (PCE) or perc. It is colorless liquid and has sweet smell (ATSDR 1997). PCE is a volatile organic compound. It will quickly evaporate into a gas at room temperature. As its name implies, tetrachloroethylene has four chlorine anions on a two-carbon molecule. As these chlorine anions react, the molecule breaks

down into other chlorinated volatile organics. Each of these breakdown products has slightly different chemical properties and toxicities. The following diagram is an example of how one chemical can breakdown to form another.



For example, tetrachloroethylene (PCE) can breakdown to trichloroethylene (TCE), then to dichloroethylene (DCE), and then to vinyl chloride (VC). Each of these breakdown products can act independently. The only way to truly know the ratio of these breakdown products is to collect environmental samples. The drycleaner solvent, tetrachloroethylene, and all of its breakdown products plus their isomers were carefully considered in developing this report.

To evaluate exposure to a hazardous substance, health assessors often use health guidance values. If the chemical concentrations are below the guidance value, then health assessors can be reasonably certain that no adverse health effects will occur in people who are exposed. If concentrations are above the guidance values (ATSDR 2007a, 2008) for a particular chemical, then further site evaluation is needed.

ATSDR environmental media evaluation guidelines (EMEGs) and minimum risk levels (MRLs) are based on conservative assumptions about chemical exposure. EMEGs and MRLs consider non-cancer adverse health effects. Exposure durations are defined as acute (14 days or less), intermediate (15–364 days) and chronic (365 days or more) exposures. For cancer effects, ATSDR uses US Environmental Protection Agency (EPA) information to set their cancer risk evaluation guidelines (CREGs) for lifetime exposure.

### Environmental Sampling

During January 3 to 4, 2008, TVG, under the authorization of TDEC DCERP, performed indoor air monitoring in two locations within the former drycleaner (Figure 7). A Summa canister was deployed at breathing height both within the former cleaner's space, near the former location of the drycleaning machine. One Summa canister was also deployed in each of the two ground-floor apartments approximately in the middle of the outside wall of each apartment. Air samples were collected over a 24-hour time period and were analyzed by Environmental Science Inc. of Mount Juliet, Tennessee, using Method TO-15. Table 1 summarizes drycleaner related chemical results for the former cleaners space (TVG 2008).

**TABLE 1.** Indoor air data for the former Cookeville Cleaners lease space, Cookeville, Putnam County, TN. Collected on January 3 and 4, 2008, over 24 hours with a Summa canister (TVG). Analytical method detection limits were appropriately low. Values reported in parts per billion. Health screening guidelines based on chronic exposure duration (ATSDR 2007a, 2008).

Chemical	Acronym	Former Cleaners indoor air concentration	ATSDR MRL/EMEG (HI=1) (non-cancer)	ATSDR CREG (10 <sup>-6</sup> excess cancer risk)
		ppb	ppb	ppb
tetrachloroethylene	PCE	5.7	40	na
trichloroethylene	TCE	ND	100	0.9 <sup>NY</sup>
1,1-dichloroethylene	1,1-DCE	ND	20i	nc
cis-1,2-dichloroethylene	cis-1,2-DCE	ND	ngv	nc
trans-1,2-dichloroethylene	trans-1,2-DCE	ND	200i	nc
vinyl chloride	VC	ND	30i	0.04
1,1-dichloroethane	1,1-DCA	ND	ngv	ngv
1,2-dichloroethane	1,2-DCA	ND	600	0.01
<b>Notes:</b>				
ND	= not detected (above the analytical detection limit in the air sample)			
na	= not applicable (Due to a lack of federal guidance and the placement of PCE on a continuum between carcinogenic classifications, only the guidance value for non-cancer effects was considered.)			
NY	= New York State Department of Health's guidance (used in absence of federal guidance)			
i	= intermediate value for 15-364 days exposure; typically higher than a chronic value			
nc	= not classified as a carcinogen			
ngv	= no guidance value available			
<b>bold</b>	= value exceeds a guidance value			

Apartments A and B were both occupied as living space. To ensure the apartment residents safety, Apartments A and B were sampled concurrently with the air sampling within the former cleaner space. Table 2 below summarizes drycleaner-related chemical results for these apartments.

**TABLE 2.** Indoor air data for Apartments A and B at the former Cookeville Cleaners, Cookeville, Putnam County, TN. Collected on January 3 and 4, 2008, over 24 hours with a Summa canister (TVG). Analytical method detection limits were appropriately low. Values reported in parts per billion. Health screening guidelines based on chronic exposure duration (ATSDR 2007a, 2008).

Chemical	Acronym	Apartment A indoor air concentration	Apartment B indoor air concentration	ATSDR MRL/EMEG (HI=1) (non-cancer)	ATSDR CREG (10 <sup>-6</sup> excess cancer risk)
		ppb	ppb	ppb	ppb
tetrachloroethylene	PCE	ND	ND	40	na
trichloroethylene	TCE	ND	ND	100	0.9 <sup>NY</sup>
1,1-dichloroethylene	1,1-DCE	ND	ND	20i	nc
cis-1,2-dichloroethylene	cis-1,2-DCE	ND	ND	ngv	nc
trans-1,2-dichloroethylene	trans-1,2-DCE	ND	ND	200i	nc
vinyl chloride	VC	ND	ND	30i	0.04
1,1-dichloroethane	1,1-DCA	ND	ND	ngv	ngv
1,2-dichloroethane	1,2-DCA	<b>0.33</b>	ND	600	0.01
<b>Notes:</b>					
ND	= not detected (above the analytical detection limit in the air sample)				
na	= not applicable (Due to a lack of federal guidance and the placement of PCE on a continuum between carcinogenic classifications, only the guidance value for non-cancer effects was considered.)				
NY	= New York State Department of Health's guidance (used in absence of federal guidance)				
i	= intermediate value for 15-364 days exposure; typically higher than a chronic value				
nc	= not classified as a carcinogen				
ngv	= no guidance value available				
<b>bold</b>	= value exceeds a guidance value				

### Drycleaner Solvents and Breakdown Products

There were indoor air detections of the drycleaner solvent PCE in the former cleaner's space. Additionally, there was a detection of one chemical breakdown product of PCE, 1,2-dichloroethane in Apartment A. All other chemical breakdown products of PCE were not detected in indoor air in either the former cleaner's space or the two apartments. One additional chemical not related to drycleaning, chloromethane, was detected in indoor air in the former cleaner and in Apartment B. The origin of the chloromethane in the indoor air is unknown. All analytical detection limits were appropriately a fraction of a part per billion. Chloromethane is discussed further in the Appendix.

Concentrations of PCE, 1,2-dichloroethane, and chloromethane in the former cleaner's space and in both apartments were well below their respective Agency for Toxic Substances and Disease

Registry (ATSDR) minimal risk levels (MRLs). The ATSDR uses the no observed adverse effect level/uncertainty factor (NOAEL/UF) approach to derive MRLs for hazardous substances. MRLs are set below levels that, based on current information, might cause adverse health effects in the people most sensitive to such substance induced effects. MRLs are derived for acute (1 to 14 days), intermediate (>14 to 364 days), and chronic (365 days and longer) exposure durations, and for the oral and inhalation routes of exposure. ATSDR does not use serious health effects (such as irreparable damage to the liver or kidneys, or birth defects) as a basis for establishing MRLs. Exposure to a level above the MRL does not mean that adverse health effects will occur. In this case, the results are compared to chronic MRLs because the exposure would be over a long period of time for individuals working in the former cleaner's space. In cases where no chronic MRLs are published for a compound, the results are compared to intermediate MRLs.

The indoor air sampling at the former Cookeville Cleaners showed that most drycleaner solvent and breakdown products vapors were below the detection limit. In the drycleaner, PCE was detected at 5.7 parts per billion (ppb). 1,2-dichloroethane was detected at 0.33 ppb in Apartment A. The concentration of PCE in the drycleaner is well below the ATSDR chronic environmental media evaluation guide (EMEG) for air of 40 ppb.

1,2-dichloroethane is a National Toxicology Program Class 2 carcinogen, meaning that it is reasonably anticipated to be a human carcinogen. The CREG MRL is calculated for the upper 95<sup>th</sup> percentile of the cancer slope factor and assumes a life-time of exposure. A life-time of exposure would result in a theoretical life-time risk of developing an additional cancer of about 4 in one million (the real risk is between zero and 4 in a million). The concentration of 1,2-dichloromethane in Apartment A was well below the ATSDR chronic EMEG for air of 600 ppb, but was above the cancer risk evaluation guide (CREG) for a one in a million risk of excess cancer (0.01 ppb). This chemical is a drycleaner solvent breakdown product. The reported measured amount was 0.33 ppb for the 1,2-DCA in Apartment A. The calculated excess cancer risk would be  $3.55 \times 10^{-5}$ , using EPA's unit risk value of  $2.65 \times 10^{-5} (\mu\text{g}/\text{m}^3)^{-1}$ . This is within the typical  $10^{-4}$  to  $10^{-6}$  range used when considering risk from chemical hazards. This risk value is theoretical based on toxicology and mathematics. Additionally, the risk assumes a constant lifetime exposure. Actual exposure duration within the apartment would be much less.

Groundwater flow at the site is undetermined at this time as groundwater was not encountered during the previous investigation. Based on topography, it would generally be assumed that groundwater would flow westward toward lower-lying areas. According to the TVG FI/PIA report, groundwater flow data from a former gasoline station and petroleum products bulk plant located approximately 160 feet south of the former drycleaner suggests southerly groundwater flow with a benzene contaminant plume migrating to the west.

It is the EEPs view that the concentrations within the former cleaner's space and in both Apartments A and B do not create an indoor air health hazard to occupants of the space.

### ***Evaluation of Tetrachloroethylene (PCE) $\text{Cl}_2\text{C}=\text{CCl}_2$***

PCE is commonly called "perchloroethylene" or "perc" in the drycleaning industry. Introduced in the 1930s, PCE is the solvent, or cleaning agent, most often used by professional drycleaners.

PCE removes stains and dirt from all common types of fabric. Additionally, PCE can be reclaimed after the drycleaning process and reused, helping to make it a cost-effective professional cleaner.

Tetrachloroethylene (PCE) is a clear, colorless liquid said to produce a sharp, sweet smell. It evaporates very readily at room temperature. PCE is a synthetic chemical and is often used as a starting point for the manufacture of other chemicals (ATSDR 1997). People can detect the smell of PCE in the air at 1 part per million (ppm) or more. The background concentration of PCE in the environment is usually less than 1 ppb. PCE has been widely used in the drycleaning industry for decades. Clothes brought home from a drycleaners may release small amounts of PCE into the air. The significance of exposure to small amounts of PCE is unknown, but to date, they appear to be relatively harmless (ATSDR 1997). The concentration of PCE in the former Cookeville Cleaner lease space was not an apparent health hazard.

### ***Evaluation of 1,2-Dichloroethane (1,2-DCA) $ClCH_2-CH_2Cl$***

Also called ethylene dichloride, 1,2-dichloroethane (1,2-DCA), is a clear liquid that is not found naturally in the environment. 1,2-DCA evaporates at room temperature and is known to have a pleasant smell and sweet taste. 1,2-DCA is commonly manufactured for use in products that remove grease, glue, and dirt (ATSDR 1994) and as a precursor in the manufacture of polyvinyl chloride plastics. The 1,2-DCA found at the former Cookeville Cleaners Site is believed to be a degradation product from drycleaner solvents.

Small amounts of 1,2-DCA in water or soil will evaporate into the air. 1,2-DCA does not remain in the air, but this chemical is readily broken down by reacting with other compounds formed by the sun. 1,2-DCA found in soil from spills or improper disposal can travel through the ground into underground water. In water or soil, 1,2-DCA can persist for long periods of time. Only small amounts of 1,2-DCA have been shown to be taken up by plants or animals.

Experiments in animals showed that once breathed into the body, 1,2-DCA goes to many organs of the body, but usually leaves in the breath within 1 or 2 days. The breakdown products of 1,2-DCA leave the body quickly in urine. People accidentally exposed to large amounts of 1,2-DCA through breathing or swallowing often developed nervous system disorders or kidney disease. Longer-term exposure to low doses of 1,2-DCA also caused kidney disease in animals. Evidence from animal studies suggests that 1,2-DCA probably does not produce birth defects or affect reproduction. Exposure to 1,2-DCA has so far not been associated with cancer in humans (ATSDR 1994). 1,2-dichloroethane is listed by the International Agency for Research on Cancer (IARC) as 2B, possibly carcinogenic to humans because of limited human evidence and less than sufficient evidence in animals (ATSDR 2003). The concentration of 1,2-DCA in Apartment A at the former Cookeville Cleaners would not create an indoor health hazard.

### **Concentrations of Other Compounds in Site Indoor Air**

The indoor air samples collected also identified the presence of other compounds including acetone, benzene, bromodichloromethane, tert-Butyl alcohol, chloroform, chloromethane, cyclohexane, ethanol, freon-11, freon-12, heptane, n-hexane, 2-Propanol, styrene, toluene, 1,2,4-

trimethylbenzene, 2,2,4-trimethylpentene, and x&p xylene and o-xylene. Many of these compounds are associated with petroleum products or paint. With the location of the gas station and former bulk petroleum products facility located two parcels to the south of the former cleaner's space, some of the gasoline-related chemicals may have come from this facility. Concentrations of these compounds that have established ATSDR MRLs are below their respective comparison value MRLs. Therefore, the concentrations of these compounds at the site do not indicate a health hazard. A discussion of the non-drycleaning related compounds with the highest concentrations in the indoor air samples follows in the Appendix.

### **Future Site Activities**

If any future remedial activities are conducted at the cleaners, such as injection of in-situ chemical oxidant or bioremediation fluids, a redistribution of contaminants may occur. Therefore, consideration should be given to sampling the indoor air from the two apartments which share the wall with the cleaners again after any remedial product injection.

Depending on the type of commercial business reuses the former cleaner's space, future indoor air monitoring may be necessary if it is shown that a groundwater plume exists beneath the building.

### **Child Health Considerations**

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than adults from certain kinds of exposure to hazardous substances (ATSDR 1997, 1998). Children have lower body weights than adults. Although children's lungs are usually smaller than adults, children breathe a greater relative volume of air compared to adults. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus, adults need as much information as possible to make informed decisions regarding their children's health. In preparation of this health document, the health of children was thoughtfully considered. The lease space is currently vacant. The site is locked and no indications of trespassing were noted in this urban, well-travelled and visited area. No physical hazards are present. No health threats unique to children that require special attention were observed during this drycleaner investigation of the former Cookeville Cleaners.

Children residing the apartments were also considered as part of this health consultation. It is unknown if children reside in the apartments. Concentrations of drycleaner and other chemicals detected in the apartments are not at concentrations which would pose a health hazard to children.

## **Conclusions**

1. No apparent public health hazard exists because of onsite drycleaner chemical vapors or breakdown products within the former Cookeville Cleaners site, DCERP Facility ID No. D-71-103 in Cookeville, Tennessee.
2. No public health hazard exists due to the inhalation of indoor air in the adjacent common-wall ground-floor apartments. Concentrations of drycleaner chemical and breakdown product vapors are below conservative guidance values protective of human health.
3. An indeterminate public health hazard exists due to drycleaner chemical and breakdown chemical vapors within the Latin convenience market as no indoor air testing was performed in this lease space.

## **Recommendations**

1. If site conditions or use should change than the site should be re-evaluated for potential health hazards to any new population.
2. Any reevaluation would include DCERP or the DCAC collecting and testing additional indoor air samples for drycleaning solvent and breakdown products.

## **Public Health Action Plan**

1. This report and any needed explanation will be provided to the TDEC DCERP. Upon request, this report will also be provided to the property owner, or a future lessee should the former cleaner space be redeveloped.
2. TDH EEP will continue to work with TDEC DCERP as the site continues through the DCERP regulatory process.
3. TDH EEP will be available to review additional data should the need arise.

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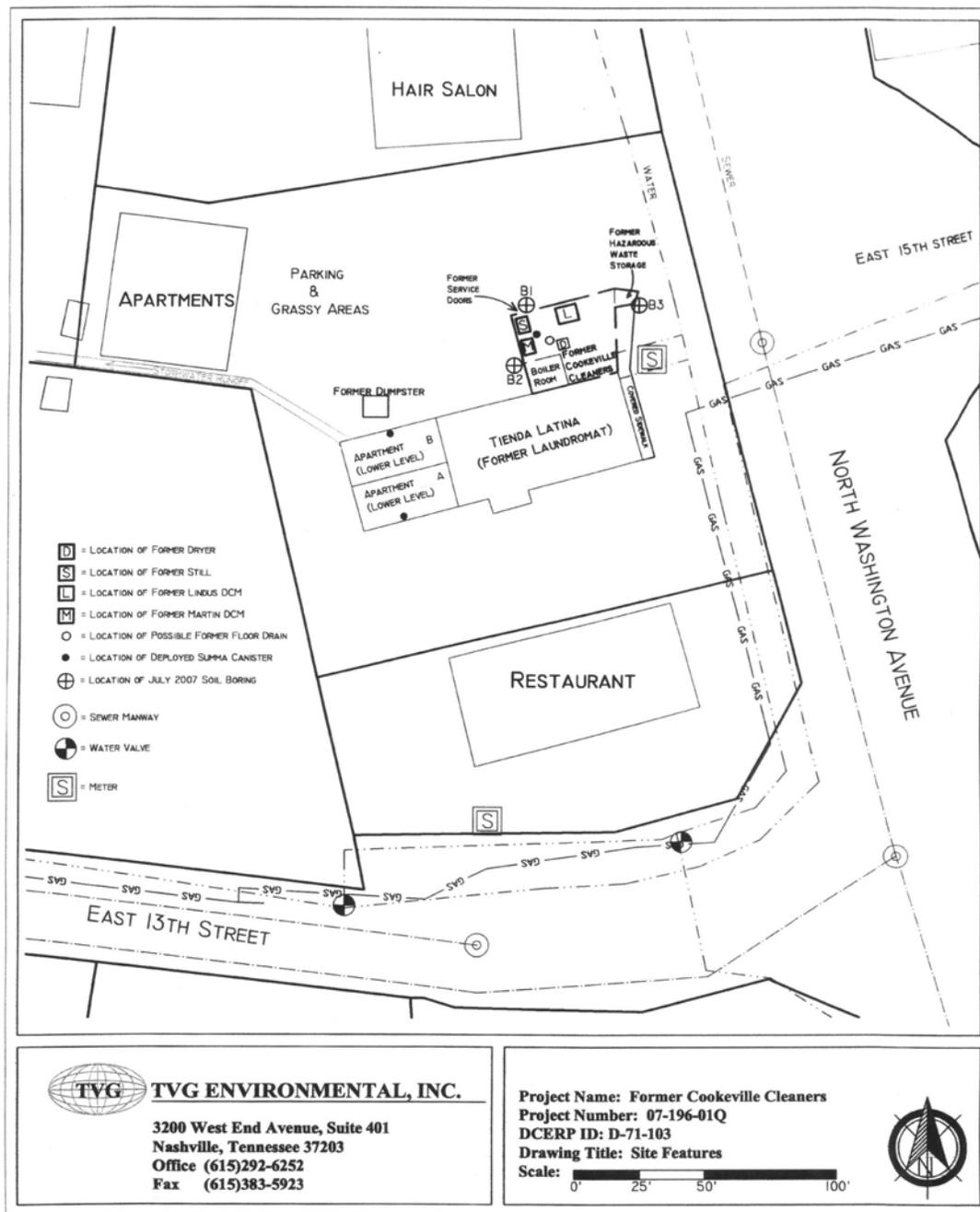
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**FIGURE 1** - Site Details - Former Cookeville Cleaners Lease Space. Drawing Credit: TVG Environmental Inc., Combined Facility Investigation/Prioritization Investigation - Task Group A Report, January 2008.

## APPENDIX

### *Acetone*

Acetone vapors were also detected in air samples from the cleaner and from both apartments. Acetone vapor concentrations were detected at 2.1 ppb in the former cleaner and at 20 ppb in Apartment A and 12 ppb in Apartment B. The ATSDR MRL for chronic exposure to acetone is 13,000 ppb. Whatever the source of the acetone vapors at the site, they do not pose a potential health risk.

### *Ethanol*

Ethanol (ethyl alcohol) vapors were also identified in air samples from the former cleaner at 44 ppb and in air samples from both apartments; apartment A at 3100 ppb and 2400 ppb in Apartment B. Ethanol is used in alcoholic beverages, for fuel, as an antiseptic, and solvent in perfumes and paints. There is not an established MRL for this compound.

### *2-Propanol*

2-Propanol, also called isopropyl alcohol, is used as a gasoline additive, as rubbing alcohol, a cleaner and a solvent. 2-Propanol was identified in the air samples from the former cleaner at 1.3 ppb, and in air samples from Apartment A at 12 ppb and in Apartment B at 15 ppb. There is not currently an MRL established by ATSDR for 2-Propanol.

### *Heptane*

Heptane is a colorless flammable liquid with the odor of gasoline. It's used as a non-polar solvent and as a solvent for rubber cement. Heptane was not detected in the former cleaner space but was detected at 3.2 and 2.7 ppb, respectively, in Apartments A and B. There is not currently an MRL established by ATSDR for Heptane.

### *Benzene*

The chemical vapor, benzene, was detected in minor amounts in air samples from the former cleaner and from both apartments. Benzene is not a breakdown product of the drycleaner solvent tetrachloroethylene, but a component of gasoline. The benzene could be from the former bulk petroleum site south of the former cleaner. Or the benzene may be part of the normal ambient air for the urban area in which the cleaners was located as it is a component of automobile exhaust. Benzene was measured at 0.42 ppb in the former cleaner and at 0.51 ppb in Apartment A and at 0.55 ppb in Apartment B. The ATSDR MRL for chronic exposure to benzene in air is 3 ppb. This value is likely related to or represents background ambient air levels. This means that benzene vapors, whatever their source, are not a potential health threat.

### ***Toluene***

Toluene was also detected in the former cleaner's space and in both apartments. The concentration of toluene in air in the former cleaner space was 0.76 ppb while toluene was detected at 1.7 and 1.4 ppb in air in Apartments A and B, respectively. Like benzene, the toluene is a component of gasoline and could be from the former bulk petroleum facility located south of the cleaner. Or the toluene may be part of the normal ambient air for the urban area in which the cleaners was located as it is a component of automobile exhaust. The ATSDR MRL for chronic exposure to toluene is 80 ppb. Therefore, the toluene vapors are not a potential health risk in the former cleaner or in either apartment.

### ***Chloromethane***

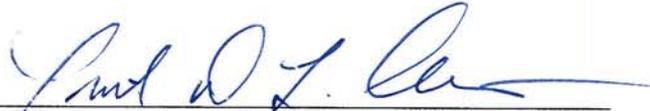
Chloromethane, also known as methyl chloride, was detected in indoor air within the former drycleaner lease space and in indoor air in Apartment B. The concentration of chloromethane in air in the former cleaner space was 0.41 ppb while chloromethane was detected at 0.62 ppb in air in Apartment B. Chloromethane is a breakdown product of carbon tetrachloride which is not one of the solvent used in drycleaning. Carbon tetrachloride could be an ingredient in one of the spot removing fluids drycleaners use.

The ATSDR MRL for chronic exposure to chloromethane is 50 ppb. Therefore, the concentrations of the chloromethane vapors are not considered to be carcinogenic and are not a potential health hazard in the former cleaner or in Apartment B.

The EPA has determined chloromethane is a possible human carcinogen and the Occupational Safety and Health Administration (OSHA) has set work place levels for chloromethane at 100 parts per; million for an 8-hour work day in a 40 hour work week.

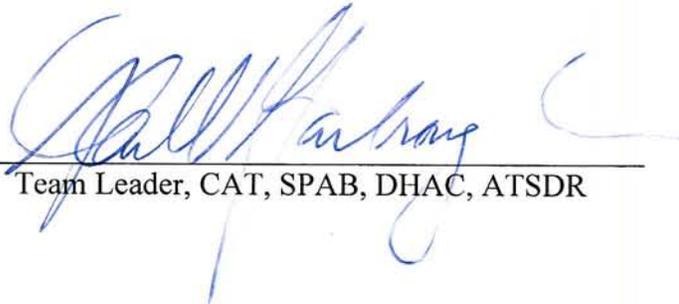
### Certification

This Public Health Consultation: *Former Cookeville Cleaners, DCERP Facility ID No. D-71-103, Cookeville, Putnam County, Tennessee*, 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.



Technical Project Officer, CAT, SPAB, DHAC, ATSDR

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



Team Leader, CAT, SPAB, DHAC, ATSDR