

HEALTH CONSULTATION

VIKING CLEANER FACILITY PHOENIX, MARICOPA COUNTY, ARIZONA

[EPA FACILITY ID: AZD981674443](#)

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HEALTH CONSULTATION

VIKING CLEANERS FACILITY PHOENIX, MARICOPA COUNTY, ARIZONA

INTRODUCTION

The Arizona Department of Environmental Quality (ADEQ) requested the Arizona Department of Health Services (ADHS) to determine whether [exposure](#) to tetrachloroethylene (PCE) in the indoor air of a vacant dry cleaning facility and an attached convenience store posed a health threat to workers renovating the former dry cleaners and the patrons and employees of the convenience store.

BACKGROUND

The former Viking Cleaners operated at 4029 North 32nd Street in Phoenix, Arizona, from 1954 until 2000. The building houses two businesses, Viking Cleaners, which is currently vacant but under renovation, and an attached convenience store that is currently in operation.

A source area investigation conducted by the Arizona Department of Environmental Quality from March 24 through 28, 2003, found that soil, soil gases, and [groundwater](#) beneath the former Viking Cleaners facility are contaminated with tetrachloroethylene, a [solvent](#) often used in dry cleaning operations. During the investigation, two soil borings were completed inside the Viking Cleaners facility and one outside in an area adjacent to the building. The maximum [concentration](#) detected in soil gas from this boring was 220,000 milligrams per cubic meter (mg/m³) and 6,600 milligrams per kilogram (mg/kg) in soil. This boring also yielded 200,000 micrograms of tetrachloroethylene per liter (µg/l) in a groundwater [sample](#) collected 49 feet below ground surface (ADEQ, 2003).

A limited number of indoor air samples were subsequently collected and analyzed in April 2003, to determine the extent of vapor [migration](#) into the former Viking Cleaners facility and convenience store. Tetrachloroethylene was found in both the former dry cleaning facility and in the convenience store. The Arizona Department of Health Services was asked to evaluate the limited number of indoor air samples and to determine if the levels of the [contaminant](#) constituted a [public health hazard](#).

HEALTH CONCERNS

Tetrachloroethylene is used by more than 80% of commercial dry cleaners (HSIA, 1999). Exposure to tetrachloroethylene can occur in the workplace or in the outdoor environment following releases to air, water, land, or groundwater. Tetrachloroethylene enters the body when breathed in with contaminated air or when consumed in contaminated food or water. Once in the body, tetrachloroethylene can remain, stored in fat tissue (EPA, 2003). The Agency for Toxic Substances and Disease Registry (ATSDR) reports that the health effects of breathing air or drinking water containing low levels of tetrachloroethylene are not known. The Department of Health and Human Services (DHHS) has determined that tetrachloroethylene may reasonably be anticipated to be a [carcinogen](#) (ATSDR, 1997).

The Arizona Department of Health Services is aware that there are numerous situations, particularly in the Phoenix and Tucson metropolitan areas, of environmental contamination from existing or former dry cleaning facilities. This consultation may serve as the forerunner of future public health evaluations of tetrachloroethylene contamination from dry cleaning facilities.

INDOOR AIR SAMPLING METHODS

Indoor air sampling was conducted on April 12 and 13, 2003 - a Saturday and Sunday - to minimize interference with renovation work being conducted at the dry cleaning facility. One Summa canister was placed in the convenience store and three canisters were placed in the dry cleaning facility. The Summa canisters valves were open on April 12, 2003. Approximately 24 hours later, the valves were closed and the canisters transported to the contractor, SECOR, and then to Precision Analytical Laboratories where the contents of the canisters were analyzed on April 16, 2003 (ADEQ,

2003). This sampling method does not capture the possible fluctuations in levels of vapors with different seasons or weather conditions.

The convenience store canister was placed on a table in a back storeroom. The canisters in the former dry cleaning facility were placed on top of a metal plate covering the sump, in the bathroom, and in a corner. These three locations correspond to Samples 1, 2, 3, in [Table 2](#).

DISCUSSION

Convenience Store Exposure

Employees of the convenience store attached to the former Viking Cleaners facility may be exposed to tetrachloroethylene vapors present in the store due to infiltration from the subsurface. Customers of the store may also be exposed to tetrachloroethylene vapors for short periods of time.

[Table 1](#) displays the 24-hour average concentrations of tetrachloroethylene present in indoor air at the convenience store adjacent to the former Viking Cleaners facility. The concentration is from the air sample collected inside the convenience store on April 12 and 13, 2003. [Table 1](#) compares the concentration measured in the sample to chronic (long-term) comparison values (CVs) developed by ATSDR for contaminants in air. Chronic exposure comparison values were used because it is possible that store employees may continue to work at the store for more than 1 year.

Comparison values are conservatively developed based on the most sensitive receptors. They are reference or screening values used in the public health assessment process to determine if the contaminants are present in the environment at levels that warrant further evaluation. The conclusion that a contaminant exceeds a comparison value does not mean that the contaminant will cause adverse health effects, but rather that there is a need for a more thorough, contaminant-specific investigation. Environmental concentrations below a comparison value are unlikely to cause adverse health effects regardless of exposure duration.

Table 1. Tetrachloroethylene levels in the convenience store on April 12 and 13, 2003

Chemical	Concentration 24-hour average	ATSDR chronic exposure comparison value	Does the concentration exceed the comparison value?	Is the concentration at a level of health concern?
Tetrachloroethylene	108 µg/m ³	271 µg/m ³	No	No

The concentration of tetrachloroethylene found in the one indoor air sample of the convenience store is lower than the chronic exposure comparison value. This suggests that exposure, based on the limited sampling, to indoor air at the convenience market does not pose a public health threat to store employees or customers.

Exposures to Current Renovation Workers

Trade workers currently renovating the portion of the building formerly occupied by Viking Cleaners may also be exposed to tetrachloroethylene inside the facility due to infiltration of vapors from the subsurface. Tetrachloroethylene concentrations are higher in the former dry cleaning facility than in the convenience store.

[Table 2](#) displays the 24-hour average concentrations of tetrachloroethylene present in the three indoor air samples collected from the former dry cleaning facility on April 12 and 13, 2003. Although three samples were collected, the levels might not reflect seasonal or weather-related fluctuations in levels. Tetrachloroethylene concentration ranged from 884 µg/m³ to 1,292 µg/m³, with an overall average concentration of 1,065 µg/m³ (1.065 mg/m³). Sample 1 was taken from the sump, Sample 2 from the bathroom, and Sample 3 was taken from a corner of the building.

[Table 2](#) compares the sample concentrations to the intermediate (short-term) comparison values, developed by ATSDR for contaminants in air, to determine whether the measured concentrations warrant additional review. The intermediate exposure comparison value is a chemical concentration in air below which adverse health effects are unlikely to occur for short-term exposures (2 weeks to 1 year), as is the case for the current renovation workers.

As a reminder, comparison values are not used to determine the specific adverse health effects from exposure; rather, they are used to determine if there is the need for a more thorough, contaminant-specific investigation.

Table 2. Tetrachloroethylene levels in the former Viking Cleaners April 12 and 13, 2003

	Concentration 24-hour average	ATSDR intermediate exposure comparison value	Does the concentration exceed the comparison value?	Is the concentration at a level of health concern?
		1,356 µg/m ³		
Sample 1	884 µg/m ³		No	No
Sample 2	1,020 µg/m ³		No	No
Sample 3	1,292 µg/m ³		No	No

The concentrations of tetrachloroethylene found in the indoor air of the former Viking Cleaners are lower than the intermediate exposure comparison value. This suggests that exposure to indoor air at the former dry cleaning facility currently under renovation does not pose a public health threat to trade workers. The maximum concentration of tetrachloroethylene measured in the former dry cleaning facility (1,292 µg/m³) is also substantially lower than the American Conference of Governmental Industrial Hygienists 8-hour time weighted average (8-Hour TWA) recommended exposure limit of 170,000 µg/m³ (170 mg/m³).

CHILD HEALTH CONSIDERATIONS

ATSDR and ADHS recognize that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contaminants in air. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. ATSDR comparison values, which were used to evaluate exposures to tetrachloroethylene, specifically consider the unique vulnerabilities of infants and children.

CONCLUSIONS

- The levels, based on the limited data available, of tetrachloroethylene found in indoor air in the convenience store attached to the former Viking Cleaners facility pose no public health hazard to employees and customers.
- The indoor air in the former Viking Cleaners facility under renovation currently poses no public health hazard to workers. However, if future business activities change, a follow-up environmental investigation should be conducted to ensure that the facility does not pose a public health hazard.

RECOMMENDATIONS

Any environmental remediation of the contaminated soils beneath the former Viking Cleaners facility should include a detailed health and safety plan that protects the employees of the convenience store.

A follow-up environmental investigation and public health consultation should be conducted at the former Viking Cleaners facility after renovation activities are completed if the facility will be used for future business activities.

PUBLIC HEALTH ACTION PLAN

The ADHS will work with the ADEQ to ensure that an environmental investigation and follow up health consultation are conducted if the former Viking Cleaners facility is used for future business activities.

REFERENCES

(ADEQ) Arizona Department of Environmental Quality. 2003. Field data sheet and precision analytical laboratories reports. April 16, 2003.

(ATSDR) Agency for Toxic Substances and Disease Registry. 1997. ToxFAQs for tetrachloroethylene (PERC). U.S. Department of Health and Human Services. Available from URL: <http://www.atsdr.cdc.gov/tfacts18.html>. Last accessed June 23, 2003.

(EPA) U.S. Environmental Protection Agency. 2003. Compliance assistance for dry cleaners. Available from URL: <http://www.epa.gov/region02/capp/dryclean.htm>. Last accessed June 4, 2003.

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CERTIFICATION

This Viking Cleaners Facility Health Consultation was prepared by the Arizona Department of Health Services under cooperative agreement with the Agency for Toxic Substances and Disease Registry. It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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

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