

memo

DATE: December 14, 2020

TO: Michele Mabry, Supervisor, Minnesota Pollution Control Agency (MPCA)

FROM: Emily Hansen, Health Assessor, Site Assessment and Consultation, Minnesota Department of Health (MDH)

SUBJECT: Shakopee Public Library & Ron's Cleaners Vapor Intrusion Site Health Consultation

At MPCA's request, I have reviewed available site data and documents from the Shakopee Public Library & Ron's Cleaners Vapor Intrusion site. The site is currently under investigation by the MPCA's Site Assessment Program as part of a soil vapor re-evaluation project. The purpose of this document is to provide information to the community about tetrachloroethylene (PCE) contamination in soil vapor, the possibility of exposure to PCE, and any potential health risks related to vapor intrusion at and near this site. The document also provides recommendations to protect health.

What is tetrachloroethylene (PCE) and how does it move through the environment?

PCE is a chemical used for dry cleaning, degreasing metal parts, and in the production of other chemicals. It can be found in consumer products, including some adhesives, automotive parts cleaners, and stain removers.

PCE that has been spilled or dumped on the ground can pollute soil and move down through the soil and into groundwater. Contaminated groundwater may also flow away from the area where the pollution was released. Because PCE moves into air easily, it is not usually found in surface soils or in open surface waters.

PCE can evaporate from the polluted soil and groundwater and rise toward the ground surface. If PCE vapors encounter a building's slab or basement walls as they travel to the surface, they may enter through cracks in the foundation, around pipes, or through a sump or drain system. In this way, the vapors enter buildings and contaminate indoor air. This process, when pollution moves from air spaces in soil to indoor air, is called vapor intrusion.

Site Background

In 2002, PCE was identified in soil and shallow groundwater at 235 Lewis Street South, prior to construction of the Shakopee Public Library building (see map below). The property was formerly used as a laundromat from approximately the 1950s to 1970 and presumably provided dry cleaning services. Groundwater samples were collected between 50 to 60 feet below the surface within the bedrock. Concentrations of PCE in groundwater were up to 45 µg/L, which is well above drinking water guidance values. Groundwater beneath the site is expected to flow to the north-northwest towards the Minnesota River (RESPEC, 2002). Also in 2002, an underground storage tank containing PCE was found and excavated, along with the surrounding contaminated soil.

In addition to removing the contaminated soils, the Library was constructed with a vapor barrier and a partial passive soil vapor mitigation system. The site was "closed" in 2003 because these response actions were completed and the groundwater contamination was not thought to represent a potential threat to health or the environment.

Because awareness of the potential for vapor intrusion into buildings near contaminated sites has increased in recent years, the MPCA is re-evaluating previously closed sites for vapor intrusion potential. This site was first investigated for soil vapor in March 2019 and PCE was found at levels that require action to protect health.

Health concerns from breathing PCE

In general, most exposures to PCE in air from vapor intrusion are to low amounts that are not likely to affect health. The possibility of health effects depends on the amount of PCE in air and how long people breathe it.

Exposure to PCE may increase the risk of cancer based on studies in workers or animals breathing very high levels of these contaminants (thousands of times greater than what may be found in the indoor air from vapor intrusion). The studies suggest there may be an increase in bladder cancer, non-Hodgkin’s lymphoma, and multiple myeloma. PCE exposure to rodents also increases liver tumors and leukemias.

It is not known whether children are more susceptible than adults to the effects of PCE. There is not conclusive evidence from human studies that PCE exposure is linked to effects to a developing fetus.

Evaluation of possible exposures to PCE and potential risks are described below.

Intrusion Screening Values

MDH and MPCA develop Intrusion Screening Values (ISVs) for PCE and other volatile chemicals to evaluate the vapor intrusion pathway. ISVs are used to screen out buildings unlikely to pose a health concern due to the vapor intrusion pathway, as well as determine when action may be needed to protect health. An ISV is an amount of a chemical in micrograms per cubic liter of air ($\mu\text{g}/\text{m}^3$) that is safe for people to breathe. The PCE ISVs protect people from increased cancer risk and other effects that may be associated with excessive exposure to PCE. There are two sets of ISVs, residential and commercial/industrial, based on the amount of time people may spend at home or work.

A sub-slab ISV is an amount of a chemical in soil vapor beneath a building that is not expected to result in indoor air levels that exceed the ISV. The decision to mitigate buildings is based on an exceedance of the sub-slab ISV (33 times the ISV). This is a protective amount that accounts for the building foundation as a barrier to soil vapor entry and the dilution that occurs when vapors do move into indoor air.

The table below describes the different types of ISVs for PCE.

Type of Intrusion Screening Value	PCE Concentration	Description
Residential ISV	3.4 $\mu\text{g}/\text{m}^3$	A safe indoor air level that protects all people from health effects
Residential Sub-Slab ISV (33X ISV)	110 $\mu\text{g}/\text{m}^3$	A safe level in soil vapor beneath a home
Commercial/Industrial ISV	33 $\mu\text{g}/\text{m}^3$	A safe indoor air level for people who may have exposures in the workplace over many years
Commercial/Industrial Sub-Slab ISV (33X ISV)	1,100 $\mu\text{g}/\text{m}^3$	A safe level in soil vapor beneath a workplace

Mitigation systems

Mitigation systems (sub-slab depressurization systems, or SSDS) installed to reduce chemical vapors from the soil gas are essentially the same as systems commonly used to reduce radon levels in homes.

SHAKOPEE PUBLIC LIBRARY HEALTH CONSULTATION MEMO

An SSDS can be active or passive. An active SSDS prevents soil gases from entering the home by using a fan to create a slight vacuum beneath the slab relative to the interior air pressure to draw up the gases from below the building slab. The soil gases are vented through a pipe to the outside air above the home. Passive systems operate without the fan and are typically less effective.

An active SSDS was installed at the Shakopee Public Library in April 2020. PCE was not detected in indoor air during the initial confirmation testing (testing done after installation to demonstrate a system is effective). The testing also showed the system provides adequate pressure differential to prevent vapor from moving into the building. A second round of confirmation testing is expected to occur this winter.

Soil Vapor Sampling

MPCA contractors conducted soil vapor sampling in the area of the site during several sampling events in 2019 and 2020. Below is a table summarizing the sampling and results, followed by a more detailed description.

Date	Type and location of sampling	PCE concentrations/findings
March/June 2019	Soil vapor in right-of-way on Lewis Street, East 3 rd Ave, and around Library	Not detected to 37,000 µg/m ³
June/September 2019	Sub-slab vapor beneath Library	9.5 to 1,440,000 µg/m ³
September 2019	Indoor air inside Library	2.5 to 5.1 µg/m ³
September 2019	Soil and soil vapor at 129 Holmes St. S. adjacent to the former Ron’s Cleaners	3,800 and 62,000 µg/m ³ PCE detected in soil TCE also found in soil vapor
Beginning in Feb 2020	Sub-slab vapor sampling beneath six properties near the library	Four of the six properties require mitigation
June 2020	Soil vapor in right-of-way north of the library on Lewis Street and on 1 st Ave East and 2 nd Ave East	101 to 7,360 µg/m ³

Soil vapor sampling was conducted in March 2019 and again in June 2019 in the public right-of-way on Lewis Street, East 3rd Avenue, and surrounding the Shakopee Public Library building (see map below). All but one sample contained PCE, with concentrations ranging from 22 µg/m³ to 37,000 µg/m³. No other chemicals detected were above levels of concern.

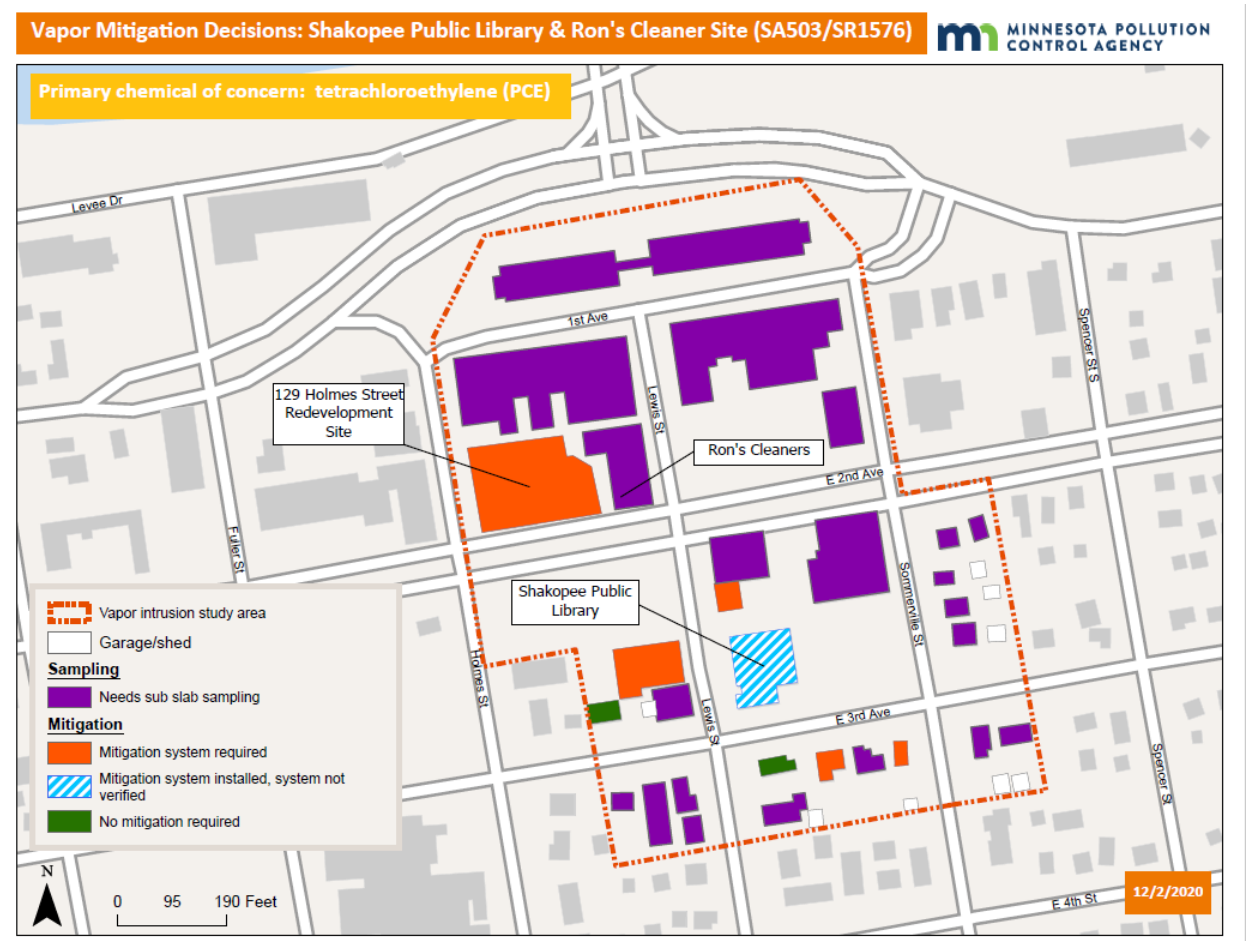
Twelve sub-slab samples were collected beneath the Library during the June 2019 sampling event and in September 2019. Results ranged from 9.5 to 1,440,000 µg/m³ PCE. Also in September 2019, six indoor air samples were collected inside the Library. The indoor air results ranged from 2.5 to 5.1 µg/m³ PCE. One outdoor air sample was collected and PCE was not detected.

Also in September 2019, in a separate effort, three soil samples and two soil vapor samples were taken on the east side of the vacant former Shakopee City Hall Property at 129 Holmes Street South (see map

SHAKOPEE PUBLIC LIBRARY HEALTH CONSULTATION MEMO

below). These samples were collected to determine if the adjacent dry cleaner at 140 Lewis St. S. (formerly Ron’s Cleaners) resulted in soil or soil vapor impacts to the property for future redevelopment purposes. PCE was detected in two of the three soil samples at very low levels, indicating a release had occurred. PCE soil vapor concentrations were 3,800 and 62,000 $\mu\text{g}/\text{m}^3$. Trichloroethylene (TCE), a breakdown product of PCE, was also found above its sub-slab 33x ISV. Information provided by MPCA indicates Ron’s Cleaners used PCE in their operations.

Beginning in early 2020, sub-slab samples were collected at six additional properties. PCE concentrations were below levels that require mitigation for two residences (shown in green in the map below). PCE concentration were above levels that require mitigation for two additional residential properties and two commercial properties (shown in orange). Results of indoor air samples taken at Pablo’s Restaurant showed very low concentrations of PCE in indoor air, while PCE was not detected in the apartments above.



In June 2020, additional soil vapor sampling was conducted in the right-of-way one block north of the library on Lewis Street and on 1st Avenue East and 2nd Avenue East. The purpose of this sampling was to further define the magnitude and extent of the vapors from the Shakopee Library property as well as investigate the potential vapors associated with the former Ron’s Cleaners property (currently Best Cleaners). PCE results from these 11 samples ranged from 101 to 7,360 $\mu\text{g}/\text{m}^3$.

In November 2020, the former owner of Ron’s Cleaners enrolled in the state Superfund Program to cooperatively investigate contamination (in groundwater, soil, and soil vapor) that may be from their past operations.

Drinking Water

The known contaminated groundwater at this site is relatively shallow. MPCA reviewed the Minnesota Well Index and did not identify any actively used wells within the areas of known groundwater contamination. Additional assessment may be needed to rule out the possibility that private or non-community wells not recorded in the well index may be located in areas of affected groundwater.

Municipal water in Shakopee comes from deep groundwater aquifers. The city has 18 wells ranging from 218 to 800 feet deep. PCE has not been detected in city wells, which are monitored regularly for this and other chemicals. For more information on drinking water quality in Shakopee, see the Consumer Confidence Report: [Shakopee 2019 Drinking Water Report \(PDF\) \(http://shakopeeutilities.com/wp-content/uploads/2020/07/2019-CCR.pdf\)](http://shakopeeutilities.com/wp-content/uploads/2020/07/2019-CCR.pdf).

Conclusions

MDH concludes that staff and visitors of the Shakopee Public Library may have been exposed to low levels of PCE in indoor air resulting from vapor intrusion in the past – prior to mitigation in 2020. The Library property is a source of PCE contamination, as demonstrated by the environmental data collected in 2002 and the extremely high concentration of PCE vapor (1,440,000 $\mu\text{g}/\text{m}^3$) found in a sub-slab sample in June 2019. Indoor air concentrations of PCE in the Library in September 2019, while not of health concern, likely represented a completed pathway from the soil vapor beneath the building to the indoor air. No other testing was done to measure PCE in the Library's indoor air.

The City of Shakopee took action to mitigate the Library in April 2020 and PCE was not detected in indoor air during the first round of confirmation testing. Additional confirmation testing is expected to occur in early 2021.

It appears likely that the former Ron's Cleaners is an additional source of PCE contamination, as indicated by the PCE concentrations in soil and the soil vapor at an adjacent property.

The extent of groundwater contamination associated with the site is largely unknown. PCE contamination was identified in the shallow groundwater beneath the Shakopee Public Library property in 2002.

The boundaries of the soil vapor plumes are not defined. Occupants of a small number of homes and businesses may have been exposed or may currently be exposed to low levels of PCE in indoor air from vapor intrusion. As indicated in purple on the figure above, additional properties need sub-slab sampling to determine if there is a risk of vapor intrusion at those locations. Health risk from vapor intrusion exposures is expected to be low. However, if mitigation systems are needed to protect current or future occupants of any of these buildings, they should be installed.

Recommendations

- MDH recommends that additional testing is conducted to fully define the boundaries of the soil vapor plume. This includes conducting sub-slab sampling on additional buildings in every direction, as shown on the map above.
- MDH recommends that vapor mitigation systems are installed in all buildings that are shown to be at risk for vapor intrusion to prevent exposure to PCE in indoor air.
- Additional groundwater sampling is needed to understand the extent of the groundwater contamination. A well receptor survey should be conducted to identify and address the possibility of exposure to PCE from private or non-community wells.

Reports Reviewed

Braun, 2020. Site Summary Report--Shakopee Public Library, 235 Lewis Street South, Shakopee, Minnesota; MPCA Project IDs: VP15640 and SA0000503. Prepared for Minnesota Pollution Control Agency. Prepared by Braun Intertec Corporation and dated September 2, 2020.

WSB, 2019. Limited Phase II Environmental Site Assessment, Former Shakopee City Hall, 129 Holmes Street South, Shakopee, MN 55379. Prepared by WSB and dated September 12, 2019.

WSB, 2019. Phase I Environmental Site Assessment, Former Shakopee City Hall, 129 Holmes Street South, Shakopee, MN 55379. Prepared by WSB and dated September 19, 2019.

RESPEC, 2002. Phase II Investigation Report, Shakopee Public Library, 235 Lewis Street South, Shakopee, MN. April 23, 2002.

Minnesota Department of Health
Site Assessment and Consultation
625 North Robert St.
PO Box 64975
St. Paul, MN 55164-0975
651-201-4897
health.hazard@state.mn.us
www.health.state.mn.us

12/14/20

To obtain this information in a different format, call: 651-201-4897.