UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

5 POST OFFICE SQUARE – SUITE 100

BOSTON, MASSACHUSETTS 02109-3912

Memorandum

DATE: 1/7/15

FROM: Alex Sherrin

TO: Site File

SUBJ: Indoor Air Sampling Report for 830 Brownell Road, Williston, VT for the Commerce Street Plume NPL Site.

Introduction

A private single family residence located at 830 South Brownell Road in Williston, VT, is the subject of this investigation. The surrounding area is residential. Groundwater in the area is impacted with trichloroethylene (TCE) and perchloroethylene (PCE) and indoor air data from the State of Vermont indicates that the air in the basement and first floor have elevated levels of TCE and PCE. EPA Region I's Removal Program is reviewing the site to determine eligibility for a removal action to address risks posed by these impacts to indoor air. The source of the chlorinated solvents is the Commerce St Plume NPL Site.

Site Conditions

The single story residence has an unfinished basement that is approximately 6-7 feet below ground surface. The basement floor is poured concrete which has some minor cracking in it. The basement walls are cinder block also with some minor cracking. Several pipes perforate the wall including the main water supply, waste outlet, and a waste inlet from the garage bathroom. These perforations appear to be sealed.

The groundwater level is very shallow, and a sump pump operates often to keep the basement dry although it did not operate while the EPA sampling team was on-site. This sump was open to the basement, but the State of VT sealed it using a plastic covered sump with two ½ horsepower sump pumps with backup batteries after discovering the elevated levels of TCE in the basement air. In the summer, the homeowner keeps the basement windows open and operates fans to exchange basement air to prevent mold, and lately to mitigate the TCE/PCE risks.

The basement contains many other household and personal items including the furnace, hot water tank, washer and dryer, a work bench, shelves, clothing hanging on a rack and packed in bins, toys, and miscellaneous household goods.

Previous Sampling

The State of VT has conducted two sampling events with the following results.

Table 1: VT DEC Sampling Results

	July 2014	April 2014	EPA Residential 1x 10-4	EPA Residential HI = 3
TCE upstairs µg/m^3	0.55	3.8	43 µg/m^3	6 µg/m^3
PCE upstairs µg/m^3	0.68	1.8	940 µg/m^3	126 µg/m^3
TCE Basement µg/m^3	26	7.8		
TCE Basement Duplicate	30	7.2		
PCE Basement µg/m^3	1.1	<1.4		
PCE Basement Duplicate	1.0	<1.4		
Sump water µg/l	104	75		

The following is taken from an email from Mike Smith of the State of Vermont describing the conditions under which their air samples were collected.

> "During the April sampling event, the homeowner had a couple of large vent fans blowing in the basement to try to evaporate some of the water accumulating in the basement. He also had a basement window open. He refused to turn the fans off as he was very concerned about mold which may have been a problem in the past. While we would normally never take a sample under these conditions, I didn't want to miss the chance considering how hard it had been to schedule the sample event. We put the canisters as far away from the fans as possible but again, while it was not ideal, it was the best we could do.
>
> During the July event, the basement window was closed and he had only one small fan operating. The summa canisters were located in approximately the same place as in April. The higher results may be a more true approximation of the air quality in the basement than the April event due to the fans."

EPA Sampling

EPA Region 1 removal Program mobilized to the site on December 8, 2014, arriving at approximately 1100 hrs. The homeowner was present to open the house. EPA personnel included OSC Alex Sherrin and chemist Scott Clifford. The scope of work included:

- Surveying the basement for materials that may contain volatile organic compounds (VOCs) that may interfere with the indoor air sampling;

- Collecting and analyzing grab samples of indoor air to assess indoor air quality and direct summa canister sample placement; and
- Collecting 24 hour 6 L Summa Canister to assess indoor air quality.

House Survey

EPA conducted a survey of the basement to ensure that no other sources of TCE/PCE are present. Many items were found which may contain VOCs including paints, spray cans, solvents, and dry cleaning products. Approximately 50 items were found and removed from the house.

Grab Samples

A total of twelve grab samples of indoor air were collected as noted in Table 2 below. The results of the on-site analyses is also presented.

Table 2: EPA Grab Sample Data

Sample Number	Location and Rational for Sampling.	TCE Result (ug/m^3)[A]	PCE Result (ug/m^3)[A]
G1	Basement behind the Furnace. General basement air.	ND (2.7)	ND (1.4)
G2	Basement at the clothes rack – Detect off-gassing from drycleaned clothes	ND (2.7)	ND (1.4)
G3	Basement above the ground water sump. Detect off-gassing from ground water	ND (2.7)	ND (1.4)
G4	Basement at the waste sump. Detect off-gassing of VOCs from waste sump.	ND (2.7)	ND (1.4)
G5	Basement at the main water inlet. Detect vapors entering through perforation in wall.	ND (2.7)	ND (1.4)
G6	Basement in the crack in the cinder block wall. Detect Vapors entering basement through cracks.	ND (2.7)	ND (1.4)
G7	Basement in the space at the top of the cinder block wall. Detect vapors entering basement through cinder block openings	ND (2.7)	ND (1.4)
G7 Dup	Basement in the space at the top of the cinder block wall (see G7).	ND (2.7)	ND (1.4)
G8	First Floor kitchen. Detect vapors on first floor.	ND (2.7)	ND (1.4)
G9	Basement at the wood bench for tools. General basement air.	ND (2.7)	ND (1.4)
G10	Basement above the tool box at the bottom of the stairs. General basement air.	ND (2.7)	ND (1.4)
G11	Basement at the washer and dryer. General basement air.	ND (2.7)	ND (1.4)
G12	Basement under the furnace in the sump. Detect vapors entering through sump under the furnace.	ND (2.7)	ND (1.4)

[A] The Detection Limits (DLs) of 2.7 and 1.4 ug/m^3 were calculated from the ppbv DLs provided in NERL's report.

Summa Canister Sampling Method

24-hour 6-L Summa Canister were used to collect indoor air samples to assess the air quality. Sampling method used was the Standard Operating Procedures are ECASOP-CanisterSampling.SOP.Rev5. The canisters were placed between 3 pm and 4 pm on December 8, 2014, at locations indicated in Table 3 below. Indoor canisters were placed at approximately waist height at locations noted below. The outside canister was placed in an open area in the yard upwind of the house. Note that this location was placed inside the backyard fence because the homeowner warned us that the canister would be stolen if it was placed in the front yard which was not fenced. A duplicate sample was also be collected in the basement. The canister pressure readings were all observed to be minus 30 mm Hg.

As noted in the sampling brief, the basement windows were closed for the entire 24 hour sampling period. The basement fans were not operating, and no smoking was observed.

Table 3: Summa Canister Sample Data

Sample Number	Location and Rational for Sampling.	TCE Result (ug/m^3)	PCE Result (ug/m^3)
S1	Basement near the clothes hanging on the rack. General basement air on the north side.	ND (<0.094)	ND (<0.094)
S2	Basement next to the ground water sump. General basement air on south side.	ND (<0.094)	ND (<0.094)
S2 Dup	Basement next to the ground water sump (See S2)	ND (<0.094)	ND (<0.094)
S3	First Floor Kitchen. General Kitchen air.	ND (<0.094)	1.3
S4	Outside in the backyard upwind of the house. Ambient Air/background sample.	ND (<0.094)	ND (<0.094)

TCE Screening level for residents is 6 ug/m^3 based on a non-cancer HI of 3.

PCE Screening level for residents is 125 ug/m^3 based on non-cancer HI of 3.

The summa canisters were collected on December 9, 2014, between 3 and 3:30 pm. The pressure readings were noted prior to closing the canisters. All readings were between minus 6 and minus 7 mm Hg. The regulators were removed and all equipment packed and the chain-of-custody forms were completed prior to transport. The samples were delivered to the New England Regional Laboratory (NERL) on December 10, 2014 at 4 pm by OSC Sherrin.

Analytical Method

The analytical method was EPA Method TO-15.

Reporting and Conclusions

The contaminants of concern at the site are TCE and PCE, and the results are summarized in the Table 2 above. The data show that TCE was not detected in any of the Grab Samples or the Summa Canister samples, and PCE was not detected in any of the Grab Samples or the Summa Canister samples with the exception of the kitchen sample S3. S3 contained 1.3 ug/m^3 of PCE. Since the basement air did not contain PCE, it is unlikely that vapor intrusion is the source. In addition, PCE was not detected in sample S4 collected outside so an ambient air source is unlikely. The homeowner stated that he dry cleaned his uniforms regularly and stored them in the bedroom closet. Since dry-cleaned clothes off-gas PCE, it is possible that this is the source of PCE detected in the kitchen which is located close to the bedroom.

Several other VOCs were detected in the summa canister samples including VOCs such as BTEXs (Benzene, Toluene, Ethylbenzene, and Xylene) and halogenated VOCs such as methylene chloride and dichlorodifluoromethane. These may be the result of storing paints, sprays cans, solvents, etc. in the basement by the homeowner. They are not contaminants of concern at the Commerce Street Plume NPL Site and are not considered to be attributable to the NPL site.

Data Quality

The sampling procedures followed the Standard Operating Procedures are ECASOP-CanisterSampling.SOP.Rev5. The sampling locations were appropriate for assessing the indoor air in the basement and first floor. The NERL analytical report indicates that all the data quality parameters were within QA limits. In addition, the lab blank only detected methyl ethyl ketone (MEK) which is not a contaminant of concern at the NPL site. The data presented is representative of site conditions and is appropriate for determining if a removal action is warranted.