

Collegeville Area Air Monitoring Results
Fourth Intensive
November 17-22, 2008

Introduction:

On January 4, 2005, the Pennsylvania Department of Environmental Protection (Department or DEP) began air monitoring at two locations in the Collegeville area when screening with DEP's Mobile Analytical Unit (MAU) indicated concentrations of trichloroethylene, or TCE, that warranted further investigation. Monitoring sites were established at a YMCA in Trappe, and at the Evansburg State Park in Lower Providence Township. The monitoring site at the YMCA was moved to Ursinus College in Collegeville in May 2007 due to closure of the YMCA building.

The Department determined that the average annual concentration of TCE was higher in 2005-2007 at the Collegeville area sites compared to other monitoring sites in Pennsylvania. The resulting excess lifetime cancer risk due to inhaling the TCE was higher as well. In response to this data, DEP worked with two area facilities that manufacture narrow tubing and used TCE in their manufacturing processes. Both facilities, Superior Tube and Accellent, were in compliance with existing regulatory requirements, but agreed to implement voluntary TCE emission reduction measures.

During 2007, Superior Tube reformulated its lubricant and consolidated certain degreasing operations, resulting in a 60% decrease in emissions on an annualized basis. On February 13, 2008, Superior Tube submitted an application for a minor operating permit modification to incorporate these changes into its operating permit and make them enforceable. The application also requested that the Department authorize the use of n-propyl bromide, an approved EPA solvent, in its degreasers. If the switch to n-propyl bromide proves successful over time, Superior Tube will have completely eliminated the use of TCE at its facility. On May 1, 2008, DEP issued a revised Operating Permit to Superior Tube that incorporates all of the TCE emission reduction measures.

Accellent installed carbon adsorbers, air pollution control equipment, on its two large degreasers that account for approximately 95% of its TCE emissions. The adsorbers were installed in a staged approach. The first began operating in October 2007; the second in March 2008. Accellent is optimizing the performance of both adsorbers and is currently reducing its TCE emissions from the facility by approximately 50%. The Department is working with Accellent to incorporate the use of the adsorbers into its operating permit.

In 2007, DEP applied for and was awarded, a federal community scale grant from EPA to expand sampling in the Collegeville area. As part of the work plan, DEP installed a background monitoring site in Spring City that began sampling in January 2008. The grant also allows the Department to conduct four intensive sampling studies during 2008 involving additional canister samples and the MAU. (This report summarizes the results of the fourth intensive study). Lastly, the grant will allow DEP to contract with an

independent researcher to compile all study data, perform data analysis, risk analysis and emissions modeling.

Discussion of Results:

During the "intensive" studies, DEP collects three different types of samples—24 hour canister samples, a four minute "grab" sample of air taken by the MAU, and tedlar "bag" samples taken by inspectors for approximately 30 seconds. The grab and bag samples are analyzed by a gas chromatograph/mass spectrometer located in the MAU. The canister samples are the same as those collected at the established monitoring sites in Evansburg, Collegeville and Spring City. The canisters are sent to the DEP laboratory for analysis.

The canister sample results, when averaged over time, are used to determine excess lifetime cancer risk due to inhalation of TCE at the measured concentrations. The grab and bag samples are representative of short term exposure. To put short term exposure into perspective, the Occupational Safety and Health Administration (OSHA) limits TCE exposure to an average concentration of 100 parts per million (ppm) for an 8-hour workday, 40-hour workweek. A 15-minute exposure to TCE should not exceed 300 ppm. The OSHA standards are based on preventing central nervous system effects. The primary concern due to exposure to n-propyl bromide is reproductive problems in both men and women. While there is no OSHA exposure limit for n-propyl bromide, the EPA considers exposures below the ranges of 17-22 ppm, to be protective of the female reproductive system, 18-30 ppm, to be protective of the male reproductive system, and 20 ppm, to ensure reproductive success.

All of the concentrations detected for the canister, grab and bag samples were in parts per billion. This is well below the concentrations of concern for occupational exposure which are in parts per million. Note that 1 part per million is 1000 times more than 1 part per billion.

Nineteen canisters were collected over the study period and analyzed for TCE. The results ranged from non-detect to 3.1 parts per billion (ppb) at the various locations. Two samples were collected at the Collegeville monitoring site. The average of the 2 samples was 0.045 ppb. In comparison, the average concentration of TCE at the site for 2007 was 0.75 ppb. Only fifteen of the canisters were analyzed for n-Propyl bromide due to problems in the laboratory. Of the samples analyzed, n propyl bromide was detected in six and ranged from 0.24 to 12 ppb.

The following table is a summary of the grab and bag samples taken over the study period:

Sample Type	Date	Total # Collected	# Non-detects TCE	# w TCE (range, ppb)	# Non-detects nPB	# w nPB (range, ppb)
Grab	11/17/2008	2	2	0	2	0
Bag	11/17/2008	1	1	0	1	0
Grab	11/18/2008	20	16	4 (0.12-5.18)	20	0
Bag	11/18/2008	4	3	1 (9.42)	3	1 (20.47)
Grab	11/19/2008	19	2	17 (0.11-2.13)	19	0

Sample Type	Date	Total # Collected	# Non-detects TCE	# w TCE (range, ppb)	# Non-detects nPB	# w nPB (range, ppb)
Bag	11/19/2008	4	3	1 (0.45)	3	1 (1.17)
Grab	11/20/2008	4	0	4 (0.14-3.35)	4	0
Bag	11/20/2008	2	1	1 (1.87)	1	1 (5.72)

Detailed sample results for the canister, grab and bag samples are contained in Appendices A and B.

Appendices:

Appendix A: MAU Results

Appendix B: Canister Results

Appendix C: Map 1 of MAU Study Area

Appendix D: Map 2 of MAU Study Area