

Agenda for South Hill TCE Project Public Presentation

Tuesday, May 23, 2006

**How is TCE, a chemical last used more than a quarter of a century ago, still of concern to the residents downhill of the source? How dangerous is it?
How does it move? What is its future?**

1. Introduction – Larry Cathles and Tammo Steenhuis, lmc19@cornell.edu and tss1@cornell.edu
2. Site History - Ken Deschere, kmd12@cornell.edu
3. Toxicology - Jennifer Smith, js485@cornell.edu
4. South Hill Geology –Rachel Shannon, rs364@cornell.edu
5. Hydrology –Adrian Harpold, aah38@cornell.edu
6. Subsurface Transport of TCE – M. Ekrem Cakmak, mec68@cornell.edu
7. TCE Transport in the South Hill – Adrian Harpold, aah38@cornell.edu
8. Spring Water and Basement Air Sampling –Veronica Morales, vlm8@cornell.edu
9. South Hill Economic Analysis - Ian Toevs, ict3@cornell.edu
10. Conclusions – Adrian Harpold, aah38@cornell.edu

This presentation was based on work for a student project. The report will be available in the Public Library by the end of June, on the SHIP website and on the Soil and Water website. For follow up, please contact Adrian Harpold; for specific questions refer to the presenters or the following references:

Site History:

South Hill history: <http://www.ithaca-ship.org/history.htm>

Letters from Walter Hang (Toxics Targeting President) to NYS DEC:

http://www.ithaca-ship.org/docs/2004-05-18_ToxicsTargetingLetter.pdf

Toxicology:

TOX FAQ's: <http://www.atsdr.cdc.gov/tfacts19.html>

Toxicological profile for TCE: <http://www.atsdr.cdc.gov/toxprofiles/tp19.html>

South Hill Geology:

Environmental Strategies Consulting, 2005. Groundwater Evaluation of Remediation Area, Emerson Power Transmission Facility Ithaca, New York.

Carl Cuipyllo, NYS DEC, 615 Erie Boulevard West, Syracuse, NY 13204-2400

Subsurface Transport of TCE:

Kueper, B.H., Wealthall, G.P., Smith, J.W.N., Leharne, S.A., Lerner, D.N., 2003. *An Illustrated Handbook Of DNAPL Transport and Fate In The Subsurface*, Published by Environmental Agency of U.K., Bristol.

More on dense non-aqueous phase liquids removal: <http://www.clu-in.org/>

Spring Water and Basement Air Sampling Proposed Strategy:

National Environmental Methods Index:

http://web1.er.usgs.gov/nemi/method_summary.jsp?param_method_id=4803

National Institute of Occupation Safety and Health TCE Analytical Methods:

<http://www.cdc.gov/niosh/nmam/pdfs/1022.pdf>

South Hill Economic Analysis:

Property Values: Jay Franklin at the Tompkins County Department of Assessment

Mitigation system costs: <http://www.infiltec.com/inf-fanr.htm>

Executive Summary

Trichloroethylene (TCE) was used by the Borg-Warner Corporation in their Morse Chain facilities on Ithaca's South Hill in the 1960's and 70's. In 1987, TCE was found in oil that had been taken from the surface of the large fire reservoir on the plant site. Further tests disclosed that TCE had formed a pond at the bottom of the reservoir. Other TCE spills of unknown sources, amounts and locations may have also occurred.

Both the health effects and economic fallout due to TCE contamination and transport are of major concern to the current residents of South Hill. Assemblywoman Barbara Lifton asked Cornell University to provide "another set of eyes" to examine data related to the spill on behalf of the community members. The purpose of this report is to provide the community members of South Hill with a report that addresses the scientific basis of these concerns as well as the limitations of our current understanding.

Toxicological effects of TCE have been shown, at least at the occupational level, to increase the risk of some cancers, liver and kidney damage, and headache/drowsiness. At lower concentrations adverse effects on the immune, respiratory and neurological system have been reported, though low-level long-term effects are not well studied. Economic impacts of concern include house devaluation and the operating costs associated with TCE mitigation systems. A primary concern of community members is the process of deciding of who will receive a mitigation system. A rough calculation of total expenses to Emerson balanced with the intrinsic benefit of a supportive group of community members suggests that alternate testing and mitigation strategies may be beneficial.

Testing and mitigation alone will not solve this contamination problem; it is necessary to understand TCE subsurface transport and persistence. Understanding the geology and hydrology of the South Hill aided in describing TCE behavior. Several

mechanisms were addressed in the report: diffusion, vapor intrusion, and contaminated water reaching the surface. However, it is difficult to deduce the relative importance of pathways without additional monitoring. Understanding transport pathways are crucial to developing effective remediation strategies. As a means of doing so, part of this project's objective was to formulate a simple and inexpensive plan to test two strongly suspected transport mechanisms, spring water and underground vapor intrusion. Tests for contaminated spring water may provide evidence of DNAPL sources upstream, and be indicative of contaminated water and/or vapor intrusion into nearby homes.

Finally, degradation of TCE in the environmental is likely minimal. TCE will biodegrade more readily in an oxygen-free environment. Unfortunately, TCE has a very low solubility in water; this limits biological degradation. TCE degradation is also retarded by cold subsurface temperatures. As a result, it can persist for decades. Further research on the microbiological flora, groundwater, pollution source(s), and sampling strategies is necessary in order to better understand what is happening to TCE in the subsurface. However, this report concludes that TCE could be present in small pockets within the subsurface, several mechanisms are likely transporting TCE to the surface (although molecular diffusion likely dominates), and remediation measures that focus on reducing TCE entering homes, rather than sources, will be more effective.