

## Toxic Tort: Trichloroethylene in Residential Water Supply

*This case study summarizes the events surrounding the filing of a lawsuit by residents against a company for allegedly contaminating the local water supply with trichloroethylene, a chemical used in industrial cleaning and degreasing. It further illustrates how exposure evidence, historical factors, a residential questionnaire and a toxicological risk assessment can play pivotal roles in determining an outcome in litigation.*

TCE (1,1,2-trichloroethane or "trichloroethylene") is a colorless, transparent liquid used in manufacturing. It previously served as a degreaser, paint stripper, adhesive solvent and as an additive in paints and varnishes as well as in the manufacture of other chemicals. It is nonflammable at room temperature and evaporates readily into the air. TCE can leach into groundwater when improperly disposed of.

TCE and vinyl chloride are confirmed human carcinogens associated with non-Hodgkin's lymphoma, leukemia, kidney and liver cancer and other malignancies. Vinyl chloride is known to cause certain types of liver cancer.

Historically, people have been exposed to TCE through ingestion of contaminated groundwater and by inhaling vapors resulting from soil vapor intrusion. In this case, residents ingested TCE through well water and vapors evaporated from contaminated drinking water into indoor air during cooking, cleaning and washing, resulting in a quantifiable exposure dose.



Trichloroethylene (TCE) is used as an industrial cleaner and degreaser.<sup>[a]</sup>

### Chronic Ingestion of TCE and Vinyl Chloride from Contaminated Well Water

Eighty-eight residents commenced an action for personal injury and property damages due to defendants' alleged contamination of groundwater and drinking wells with trichloroethylene (TCE) and vinyl chloride. Plaintiffs claimed that the TCE and vinyl chloride emanated from property formerly used by defendant to manufacture electrical components. The plant used TCE and other solvents to clean component parts from approximately 1962 to 1967 with spent solvent disposed of in an on-site, unlined "evaporation pit."

### Historical Factors

In 1979, the defendant sampled the soil near one of the abandoned pits and detected chemicals within the soil. In 1985, the defendant hired an environmental company to further assess their industrial site and found TCE within the groundwater at levels thousands of times in excess of the state drinking water standard. However, the defendant notably failed to alert the nearby residents of these test results. The defendant also failed to test any of the plaintiffs' local drinking water wells. As a result of this inaction, the plaintiffs were needlessly exposed to TCE for an additional 15 years at which time governmental agencies finally initiated independent testing (year 2000).

### Toxicological Assessment of TCE and Vinyl Chloride Exposure

To assess the claim, the plaintiffs' expert hydrogeologist modeled historic well water TCE levels at each plaintiff's location. Dr. Sawyer prepared a residential screening questionnaire to ascertain TCE exposures via ingestion quantity, dermal absorption and inhalation using generally-accepted, peer-reviewed methodology. The results of the questionnaire were compiled and presented in court to demonstrate dose and the documented and potential effects of TCE and vinyl chloride exposures in well water. Additionally, Dr. Sawyer prepared a toxicological health risk assessment based on the exposure parameters of the 88 plaintiffs and an assessment of potential malignancies supported by human toxicological and epidemiological studies.

Dr. Sawyer was challenged by the defendant with numerous pre-trial arguments within motions to exclude. All of these motions were subsequently denied by the court.

## Notable Toxicological Factors Assessed by Dr. Sawyer

- Risk assessment results were based on a generally-accepted, peer-reviewed methodology.<sup>2</sup>
- The TCE well water level (average of all homes) exceeded the U.S. EPA Maximum Contaminant Level (MCL) by more than 7 times (average of plaintiff wells = 36.11 µg/L vs. the MCL of 5.0 µg/L.)<sup>3</sup>
- Historic TCE well water levels exceeded the U.S. EPA Residential Screening Level (RSL) by more than 15 times (average of plaintiff wells = 31.94 µg/L vs. the RSL of 2.0 µg/L.)
- The cancer risk assessment value exceeded the U.S. EPA benchmark value for "significantly increased risk."
- Met requirements for medical monitoring candidacy per ATSDR under CERCLA as published in the Federal Register.<sup>3</sup>
- TCE is a "confirmed human carcinogen." (ATSDR)<sup>1</sup>
- Vinyl chloride is a "confirmed human carcinogen." (ATSDR)<sup>4</sup>

Subsequent to presentation of Dr. Sawyer's report, the U.S. National Toxicology Program, the International Agency for Research on Cancer (IARC) and the U.S. EPA determined (through peer-reviewed studies) that sufficient, scientifically credible evidence existed that trichloroethylene exposure can induce several different types of cancer. In 2015, the National Toxicology Program (NTP) recommended a change in TCE's cancer classification to Group 1 ("*Known Human Carcinogen*").<sup>5</sup>

## Outcome

A protracted, three week trial ensued during which Dr. Sawyer offered expert testimony with respect to his toxicological assessment and formal report. In view of the overwhelming toxicological evidence, the demonstrable negligence in failing to alert residents and failing to test residential drinking water wells for contamination, in addition to the fact that the court denied all motions to exclude expert testimony damaging to their position in litigation, defendants elected to settle the case prior to a likely verdict in favor of plaintiffs.

## Summary

In toxicological cases, weight-of-evidence (WOE) determinations can greatly affect the outcome. Dr. Sawyer successfully rebutted repeated motions-to-exclude by virtue of the application of unbiased, peer-reviewed methodologies and by drawing upon documented and historical facts-in-evidence during expert testimony and depositions. The comprehensive report(s), expert opinions and compilation of questionnaire data presented in court were instrumental in bringing about a conclusion to this case. TCAS strongly recommends that any individual, company or government agency engaged in litigation matters concerning exposure to TCE and/or vinyl chloride always retain the services of an experienced, impartial expert toxicologist.

*(Disclaimer: Toxicology case studies are impartial and objective summaries of toxicological matters in which TCAS was retained for the purpose of assessing health-based factors which, in some cases, led to a determination of causation. No names or identifying information have been provided due to privacy and legal considerations. In the above matter, Dr. Sawyer was retained by plaintiffs.)*

---

## Notes and References

1. ATSDR, Division of Toxicology and Environmental Medicine, "[Toxicological Profile for Trichloroethylene](#)," 2014
2. U.S. EPA, "[Trichloroethylene Hazard Summary](#)," 2000
3. Federal Register, U.S. EPA, "[Trichloroethylene Health Risk Assessment](#)," 2001, Vol. 66, No. 227
4. ATSDR, Division of Toxicology and Environmental Medicine, "[Toxicological Profile for Vinyl Chloride](#)," 2006
5. National Toxicology Program, "[Report on Carcinogens: Monograph on Trichloroethylene](#)," U.S. Department of Health and Human Services, January 2015

---

## Images

a. Image by [Keith Beard](#), Salt Lake City, UT

A Message from Dr. William R. Sawyer  
Chief Toxicologist, TCAS, LLC



*"TCE and vinyl chloride contamination are not uncommon in the U.S. In some cases, historic contamination can be assessed by reconstructing toxicological data to arrive at scientifically credible findings."*

[Home](#) | [Experience](#) | [Toxic Substances](#) | [Case Studies](#) | [CV](#) | [News](#) | [About](#) | [Site Map](#) | [Contact](#)  
[Toxic Exposures](#) | [Environmental Testing](#) | [Risk Assessment](#) | [Forensic Toxicology](#) | [Causation Evaluation](#)  
[Dioxin](#) | [LNAPL](#) | [Hazardous Substances](#) | [Heavy Metals](#) | [Alcohol Toxicology](#) | [Drugs of Abuse](#)  
[Environmental Hazards](#) | [Industrial Chemicals](#) | [Hydrocarbons](#) | [Metals & Compounds](#) | [Pesticides](#)  
[Pharmaceutical Toxicology](#) | [Consumer Products](#) | [Human Health Risk Assessments](#)

## Toxicology Consultants & Assessment Specialists, LLC

(800) 308-0080 or send a message

6450 Pine Avenue, Sanibel, FL 33957 (239) 472-2436

29 Fennell Street, Skaneateles, NY 13152 (315) 685-2345

View Dr. Sawyer's profiles on [LinkedIn.com](#), [AlmExperts.com](#) and [Jurispro.com](#)

Copyright 2017 TCAS, LLC, All Rights Reserved

---

This is an informational and instructional website devoted to toxicology. It presents both original and edited public-domain content compiled as a useful educational resource. References and footnotes have been included wherever possible and image sources have been cited where appropriate. Although most pages can be printed or downloaded as PDF files (and we encourage you to make constructive use of our information), this website is copyrighted and material may only be reproduced and/or distributed with prior permission from TCAS, LLC.