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TCE Revisited: U.S. EPA Releases Long-Awaited Toxicity Reassessment of Trichloroethylene with Potentially Vast Implications on Historically Contaminated Sites, Industrial and Consumer Products, and Liability

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In a move with potentially far-reaching implications, on September 28, 2011, the U.S. Environmental Protection Agency (EPA) issued its long-awaited final health assessment for trichloroethylene (TCE). The Assessment follows two and a half decades of vigorous scientific and policy debate and sets forth conclusions suggesting that TCE is far more toxic and carcinogenic than was previously assumed. It portends a potential revisiting of TCE-related cleanup standards for soil, groundwater, and vapor intrusion at and adjacent to contaminated properties, including those previously granted regulatory closure, maximum contaminant levels for drinking water, and allowable levels of emissions from industrial facilities and from a variety of consumer products in which even small levels of TCE are typically used. It almost surely will become the subject of litigation on a variety of fronts and may well soon become a topic of legislation and rulemaking.

TCE USE AND EXPOSURE

TCE has been produced commercially since the 1920s, and was widely used by manufacturing companies as a metal degreaser. In the 1930s, TCE was introduced for use in dry cleaning, but was replaced in the 1950s by another chlorinated solvent, perchloroethylene (PCE). TCE has also been an ingredient of a variety of products including adhesives, paint strippers, paints, lacquers and varnishes, spot removers and typewriter correction fluid.

Because of TCE's widespread use before the advent of modern environmental regulations, it is one of the most common contaminants of concern at former manufacturing sites, military bases, and some dry cleaner locations. According to EPA, TCE is one of the most common chemicals found at its Superfund sites. As a dense, non-aqueous phase liquid, it is difficult and expensive to remediate in the soil and groundwater and, because it is volatile, it raises indoor air quality concerns in overlying buildings. Plaintiffs in toxic tort cases have also asserted, with varying degrees of success, that exposure to TCE is the cause of cancer and other personal injuries.

EPA'S HISTORY WITH TCE

EPA last completed a risk characterization for TCE in 1985. The agency attempted to update the assessment in 1987. However, disagreement between the Science Advisory Board and the agency over whether TCE should be classified as a probable or possible human carcinogen on EPA's Integrated Risk Information System (IRIS), led to EPA's removal of carcinogen information about TCE from IRIS in 1989.

In 2001, EPA released a revised draft health risk assessment that characterized TCE as "highly likely to produce cancer in humans." The draft was alternately praised and criticized by stakeholders and health experts. EPA hosted a symposium and an interagency consultation and submitted issue papers for further review. In 2009, EPA released an external review draft for public comment. In January 2011, the Science Advisory Board issued its review of EPA's draft assessment. Nine months later, EPA produced its 1,200-page final Assessment.

THE ASSESSMENT'S FINDINGS

The Assessment concludes that there is substantial potential for human exposure to TCE, since it has been widely found in ambient air, indoor air, soil and groundwater. It finds that TCE poses a potential human health hazard for non-cancer toxicity to the central nervous system, the kidney, the liver, the immune system, the male reproductive system, and the developing fetus, with more limited evidence of toxicity to the respiratory tract and the female reproductive system.

Following its 2005 Guidelines for Carcinogen Risk Assessment, EPA characterizes TCE as carcinogenic to humans (the highest classification) by all routes of exposure—oral, dermal, inhalation. For non-cancer effects, EPA establishes a reference concentration (RfC, the amount EPA estimates people could inhale over a 70-year lifetime without harm) of 0.0004 parts per million (ppm), also expressed as 2 micrograms per cubic meter, and a reference dose (RfD, the amount EPA estimates people could ingest over their life without harm) of 0.0005 milligrams per kilogram bodyweight per day (mg/kg/day). For cancer, the inhalation risk is 2×10^{-2} per ppm and the oral slope factor for cancer is 5×10^{-2} per mg/kg/day.

These risk levels are considered in setting standards, such as drinking water maximum contaminant levels (MCLs) or in preparing risk assessments for sites. Significantly, the levels in the final Assessment are below the levels widely criticized by industry and U.S. governmental agencies in the 2001 draft assessment.

POTENTIAL IMPLICATIONS OF THE ASSESSMENT

The Assessment has far-reaching implications, where the new TCE toxicity values may trigger a reassessment of a wide variety of regulatory standards, including:

- Establishing cleanup methods at the 761 Superfund sites and other contaminated properties where TCE has been identified as a contaminant
- Understanding the risk from vapor intrusion as TCE vapors move from contaminated groundwater and soil into the indoor air of overlying buildings
- Revising EPA's maximum contaminant level for TCE as part of the carcinogenic volatile organic compounds group in drinking water
- Developing appropriate regulatory standards limiting the atmospheric emissions of TCE (which is already identified as a hazardous air pollutant under the Clean Air Act).

At Superfund and other cleanup sites, the groundwater cleanup standard is typically based on EPA's MCL for drinking water, which is currently set at 5 parts per billion for TCE. If the MCL is lowered, as EPA has indicated it may be, cleanup costs could increase by billions of dollars. The effect on sites that have already been cleaned up and are currently being monitored is less clear, but levels of TCE above a new MCL could raise new questions.

The Assessment could also affect measures used to reduce vapor intrusion that can occur when volatile chemicals migrate from contaminated groundwater or soil into a building. In 2002, EPA issued draft guidance that provided recommendations on determining if the vapor intrusion pathway poses an unacceptable risk to human health at cleanup sites. EPA expects to issue a final and more stringent version of the vapor intrusion guidance in 2012. Revised vapor intrusion guidance could also have an effect on cleanups involving TCE since the toxicity values for TCE were based on the draft 2001 health assessment and were to be considered provisional. In addition, the Assessment could affect consumer product design and composition, as California and the federal government consider new green chemistry regulations and restrictions.

Morrison & Foerster's environmental lawyers have worked on TCE issues since the 1980s, including in Superfund litigation, hazardous waste, and a variety of water matters; in addressing vapor intrusion concerns arising at redeveloped properties; and with respect to consumer product content, disposal, and warning requirements. They have followed the scientific debate on TCE's toxicity and carcinogenicity throughout its extensive history and understand how EPA's new Assessment may affect a wide variety of clients and their interests.

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