



This factsheet summarizes the Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS) toxicity profile for trichloroethylene (TCE) (<http://www.epa.gov/iris/subst/0199.htm>) and implications for human health risk assessments (HHRAs) and Five-Year Reviews conducted under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

Background

The Department of Defense (DOD) endorses IRIS toxicity values as preferred values for use in CERCLA HHRAs (DOD Memorandum: *Actions in Response to Perchlorate Releases*, September 21, 2007). Until the IRIS TCE toxicity profile was finalized, Naval CERCLA sites had flexibility in selecting TCE toxicity values used in HHRAs. On-going HHRAs should use the IRIS toxicity values for TCE. Additionally, when conducting Five-Year Reviews, IRIS toxicity values should be considered to ensure continued protectiveness of remedies.

Toxicity Facts and Screening Levels

The IRIS TCE toxicity profile includes toxicity values to evaluate cancer and non-cancer effects of TCE by both the oral and inhalation exposure (Table 1). The IRIS TCE profile considered three different endpoints when looking at cancer risk: kidney cancer, non-Hodgkin lymphoma, and liver cancer. One significant change is that TCE is now considered to have a mutagenic mode of action (MMA) for kidney cancer. This means that when the kidney cancer endpoint is evaluated, additional modifications to the risk calculations are recommended by EPA. Table 2 compares the old EPA June 2011 Regional Screening Levels (RSLs) with the November 2011 RSLs based on the IRIS toxicity values.

Implications for HHRAs and Five-Year Reviews

HHRAs and five-year reviews conducted after September 2011 should use IRIS toxicity values for TCE. These IRIS toxicity values are generally more conservative than toxicity values previously used. Although more conservative, with the exception of the child receptor, the use of the IRIS toxicity values should not have significant impact on the calculated risk. For the child receptor the MMA adjustment for kidney cancer should be considered. When the MMA adjustment is incorporated for the child receptor (e.g., day care), the calculated risk will be significantly more conservative and may drive site management decisions. Additionally, site management decisions may be driven by non-cancer hazards since they are now more conservative based on incorporating the IRIS oral reference dose.

When conducting five-year reviews for sites with a remedy for TCE, consider how the IRIS TCE toxicity values impact any site-specific risk-based cleanup levels. Since the IRIS toxicity values are not incorporated into the Maximum Contaminant Levels (MCLs), sites with groundwater cleanup levels at the MCL would not be impacted by these new toxicity values.

Table 1. TCE IRIS Toxicity Values

Cancer		Non-Cancer	
Oral (mg/kg-day) ⁻¹	Inhalation (µg/m ³) ⁻¹	Oral (mg/kg-day)	Inhalation (mg/m ³)
4.6E-02	4.1E-06	5.0E-04	2.0E-03

Table 2. TCE Screening Levels

	Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Residential Air (µg/m ³)		Industrial Air (µg/m ³)		Tap Water (µg/L)	
	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer
EPA RSL Nov 2011	0.91	4.4	6.4	20	0.43	2.1	3.0	8.8	0.44	2.6
EPA RSL June 2011	2.8	25	14	100	1.2	10	6.1	44	2	21