

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
DIVISION OF SPILL PREVENTION AND RESPONSE  
CONTAMINATED SITES PROGRAM**

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**Fact Sheet**

**Additional Information about Exposure to TCE**

**Prepared by:** Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Contaminated Sites Program (DEC).

**Purpose:** To provide information to the regulated community on potential adverse health effects of trichloroethylene (TCE) exposure to women of child-bearing age and identify measures that can be taken to reduce potential exposure. This information is provided as a precautionary approach and is based on updated studies and guidance provided by the U.S. Environmental Protection Agency. (See references at the end of this fact sheet.)

**Background:** TCE is a volatile organic compound that may exist on its own or in mixtures with other compounds. It is used primarily as an industrial solvent and degreaser, as well as in dry-cleaning, adhesives, paint removers, spot removers and other products. Once released into the environment, TCE can move through the soil, groundwater and air. It is moderately soluble in water and therefore can migrate from soil to groundwater after a large release. TCE-contaminated groundwater can move from commercial or industrial sites where releases occurred to other occupied areas such as office buildings, schools or residential housing. TCE vapors can emanate from the contaminated soil and groundwater into buildings.

TCE has been shown to cause cancer and non-cancer adverse health effects on humans. People can be exposed to TCE through direct contact with contaminated soil; by drinking, showering or bathing with contaminated groundwater; and by breathing vapors both outdoors and in buildings overlying contaminated areas.

DEC has developed the following regulations and guidance that pertain to TCE contamination:

- Site Cleanup Rules, 18 AAC 75.325-.390 (DEC, August 2012) – Describes contaminated site characterization and cleanup requirements, and defines soil and groundwater cleanup levels (for TCE and other contaminants).
- Vapor Intrusion Guidance for Contaminated Sites (DEC, October 2012) – Describes a systematic approach to evaluate whether TCE (or other contaminant) vapors may be moving upward into a building from an underground source.

**Updated Guidance:** Due to potential adverse health effects on developing embryos, EPA Region 10 in December 2012 released guidance addressing the need to limit TCE exposure in women who may be pregnant.

**Discussion:**

- Research has demonstrated that exposure to TCE during a sensitive 21-day time period in the first trimester of pregnancy could have harmful effects on the fetus immune system and heart development.
- While EPA continues to develop more specific national guidelines regarding risk-based TCE exposure concentrations, Region 10 calculated risk-based concentrations and released its December 2012 guidance mentioned above recommending the values be considered as “not to be exceeded” levels for women of child-bearing age who could be pregnant.
- It is important to note that the calculated tap-water risk-based concentration is lower than the current drinking water Maximum Contaminant Level (MCL), which is considered the safe drinking water level.
- The TCE soil and groundwater cleanup levels in the DEC Site Cleanup Rules and the target TCE concentrations in the DEC Vapor Intrusion Guidance referenced above **do not** take into account these recently identified short-term TCE exposure risks. Therefore, DEC is using the December 2012 EPA Region 10 guidance to evaluate the nature and extent of TCE contamination at sites and to make risk-management and cleanup decisions in a manner that minimizes potential health risks posed by TCE.

**Recommendation:** In light of EPA’s December 2012 guidance, DEC recommends the TCE levels shown below for indoor air, soil and drinking water should not be exceeded, as averaged over any 21-day period of time, when women of child-bearing age may be exposed. Because of this short 21-day period, DEC should be notified immediately if these levels are known or suspected to be exceeded.

Receptor	Pathway and Target Media	Target Level		
Home Resident	Indoor air	2.0 micrograms per cubic meter of air		
	Soil (direct contact or inhalation)	<b>Arctic Climate Zone</b> 7.6 milligrams per kilogram of soil	<b>Less than 40 inches precipitation climate zone</b> 5.2 milligrams per kilogram of soil	<b>Greater than 40 inches precipitation climate zone</b> 3.8 milligrams per kilogram of soil
	Tap water in residence	2.5 micrograms per liter of water		
Commercial or Industrial Worker	Indoor air	8.4 micrograms per cubic meter of air		

- If necessary, Alaska laws and regulations provide DEC with the authority to direct the installation of interim protective measures. Such measures may include, but are not limited to:
  - Installing and operating indoor air treatment units. (Examples include granular activated carbon filtration units);
  - Installing and maintaining sub-slab vapor mitigation systems to prevent vapors from moving into a building;
  - Utilizing engineering controls to increase air flow and exchange rates, remove TCE from tap water and prevent exposure to contaminated soil. (Examples include heating and ventilation system modifications, water filtration systems and soil caps/covers); and
  - Changing the building use to limit women of child-bearing age from being exposed.

DEC will work with responsible parties, affected property owners and property managers to evaluate and implement protective measures as soon as feasible. In addition, if the TCE concentration exceeds the values in the above table, DEC may contact the Alaska Department of Health and Social Services or another health agency to request a health consultation.

**References:**

U.S. Environmental Protection Agency Region 10 (December 2012). *OEA Recommendations Regarding Trichloroethylene Toxicity in Human Health Risk Assessments*. Link:

<http://dec.alaska.gov/spar/csp/docs/OEA%20recommendations%20TCE%20dec%202012.pdf>.

U.S. Environmental Protection Agency (2011). IRIS Toxicity Profile for Trichloroethylene (CASRN 79-01-6). Washington D.C., EPA. Link: <http://www.epa.gov/iris/subst/0199.htm>.

Alaska Department of Environmental Conservation (April 2012). *18 AAC 75.325 - .390 - Site Cleanup Rules*. Link: [http://dec.alaska.gov/spar/csp/reg\\_rev.htm](http://dec.alaska.gov/spar/csp/reg_rev.htm). (Go to Article 3.)

Alaska Department of Environmental Conservation (October 2012). *Vapor Intrusion Guidance for Contaminated Sites*. Link:

<http://dec.alaska.gov/spar/csp/guidance/Vapor%20Intrusion%20Guidance.pdf>.