

WHAT IS PERCHLORATE?

Perchlorate anion (ClO_4^-) is a contaminant resulting from the solid salts of ammonium, potassium, or sodium perchlorate that can be found in groundwater and surface water. It is highly soluble, moves easily in surface water and groundwater, and breaks down very slowly in the environment.

WHAT IS PERCHLORATE USED FOR?

Ammonium Perchlorate, the form of perchlorate most commonly linked with environmental contamination, has been used primarily as a component of solid propellant for rockets, missiles and fireworks since the 1950s. Because of its relatively short shelf life, perchlorate was frequently removed and replaced in solid rocket systems as part of the country's missile and rocket inventory. As a result, perchlorate releases occurred in California, Utah, and other locations. Handling practices used today involve recovery and reuse of perchlorate.

Potassium perchlorate was once used to treat thyroid disorders in people who had Graves' disease. It is still used today on a limited basis to test patients for thyroid hormone production.

Perchlorate is also used in the production of matches, dyes, lubricating oils, air bag inflators, electroplating, rubber manufacturing, paint production and some chemical fertilizers.

HOW CAN I BE EXPOSED TO PERCHLORATE?

Because perchlorate is soluble, exposure occurs most frequently through consumption of contaminated water. However, evidence exists that perchlorate can be absorbed by plants, making it possible to be exposed by eating fruits and vegetables that have been irrigated with perchlorate-contaminated water. Laboratory tests for perchlorate are rapidly improving and can indicate if exposure has occurred.

Because perchlorates are salts in their solid form, exposure from inhalation is not common. However, perchlorate production workers may be exposed to dust from operations.

HOW CAN PERCHLORATE AFFECT MY HEALTH?

Perchlorate interferes with iodide uptake in the thyroid gland. Iodide is necessary to produce the thyroid hormones that regulate the body's metabolism and energy use.

Exposure to perchlorate can result in a condition known as hypothyroidism. Symptoms include feelings of tiredness and depression, dry and itchy skin, constipation, muscle cramps, and increased menstrual flow. Generally, symptoms in adults disappear when exposure stops.

To date, no evidence exists that links perchlorate with cancer in humans, but laboratory rats exposed to the chemical have developed thyroid tumors. There is also a concern that hypothyroidism may lead to effects in developing fetuses such as mental retardation and impairment in speech and fine motor skills.

The U.S. Environmental Protection Agency (EPA) has considered both thyroid tumors and neurodevelopmental effects in proposing a safe exposure limit, or reference dose, for perchlorate.

Health Risk Assessment Branch AFIERA/RSRE

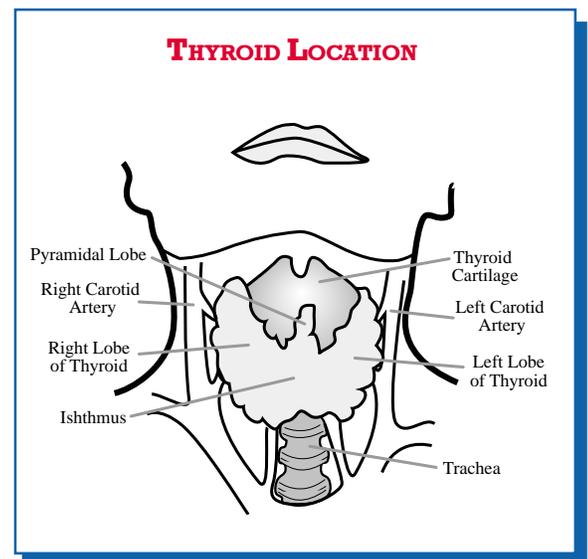
The Air Force Resource for Environmental Risk Evaluation and Communication

2513 Kennedy Circle
Brooks AFB, TX

78235-5116

Phone: 210-536-6050

Web: afiera.afms.mil/iera/rsr/rsre.html



Adapted from "Could It Be My Thyroid?" Jan 1996, copyright Sheldon Rubinfeld, M.D.

WHAT IS THE INTERAGENCY PERCHLORATE STEERING COMMITTEE (IPSC)?

The Interagency Perchlorate Steering Committee (IPSC) was formed in January 1998 to address perchlorate issues and to inform stakeholders about and involve them in technical and regulatory developments. IPSC now has representatives from 24 different government agencies and technical subcommittees to address many aspects of perchlorate research, including occurrence, human health effects, ecological effects, treatment technologies and analytical methodologies.

WHAT IS BEING DONE ABOUT PERCHLORATE?

While the Safe Drinking Water Act does not specifically address perchlorate, EPA has suggested a provisional drinking water range of 4-18 parts per billion (ppb) based on toxicity information from the early to mid-1990s.

In March 1998, EPA put perchlorate on its Contaminant Candidate List, stating that more information was needed about the chemical's occurrence and health effects. This list includes compounds that may require regulation because of their presence in public drinking water supplies.

In December 1998, EPA released its first risk characterization of perchlorate for external peer review by IPSC. This peer review, which was completed in February 1999, identified the need for additional

information to better assess the effects of perchlorate on human health and the environment.

In March 1999, EPA placed perchlorate under its Unregulated Contaminants Monitoring Rule (UCMR). Since January 2001, the rule has required large and representative small water systems to gather and report data on perchlorate to EPA. This information will be used by EPA to help establish the need for a perchlorate drinking water standard.

In January 2002, EPA released the draft health risk assessment document "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization" for external review. In this document, EPA proposes a safe drinking water limit of 1 ppb. The IPSC is conducting a peer review of the document and will publish a final report in the fall of 2002.

While EPA reviews the scientific and technical information needed to form a standard, several states have issued drinking water advisories for perchlorate, establishing preliminary values ranging from 1 ppb in Massachusetts to 18 ppb in Nevada.

WHAT IS THE NEXT STEP?

EPA plans to issue a final reference dose for perchlorate in the spring of 2003. The EPA's Office of Water will then use this information as well as data generated by the UCMR to determine if a drinking water standard is necessary.

ABOUT THE HEALTH RISK ASSESSMENT BRANCH OF AFIERA

The Health Risk Assessment Branch of the Air Force Institute for Environment, Safety and Occupational Health Risk Analysis (AFIERA) is a co-chair of the Ecological Impact/Transport and Transformation Subcommittee of the Interagency Perchlorate Steering Committee (IPSC). The Health Risk Assessment Branch serves as the Air Force resource for environmental risk evaluation and communication and provides a broad range of risk assessment and toxicology support to Air Force installations. For more information on perchlorate and related topics, please call the Health Risk Assessment Branch at (210) 536-6121.

WEB LINKS

There are also many sites with information available on the World Wide Web.

- Information on Perchlorate and regulatory status: (www.epa.gov/OGWDW/ccl/perchlor/perchlo.html)
- Information on the Interagency Perchlorate Steering Committee (IPSC): (www.epa.gov/safewater/ccl/perchlor/ipsc.html)
- A list of links on the Defense Environmental Network Information Exchange (DENIX) web site: (<https://osiris.cso.uiuc.edu/denix/Public/Library/Water/Perchlorate/links.html>)