



Proposed Public Health Goal for Perchlorate

A fact sheet by Cal/EPA's
Office of Environmental Health Hazard Assessment

The Office of Environmental Health Hazard Assessment (OEHHHA) has prepared this fact sheet to provide general information about its proposed Public Health Goal (PHG) within the range of 2 to 6 parts per billion (ppb) for perchlorate, a drinking water contaminant.

What Is Perchlorate? Perchlorate is a chemical used to facilitate combustion of rocket and missile fuel, explosives, fireworks, and road flares. It may also be used in air-bag inflation systems, lubricating oils, and the manufacture of paints and many industrial goods. In the past, physicians used perchlorate to treat Graves' Disease, a disorder that causes an overproduction of thyroid hormones.

Perchlorate in Ground and Drinking Water. Outdated disposal practices in the decades prior to modern environmental laws allowed perchlorate to contaminate groundwater, particularly near weapons and rocket fuel manufacturing facilities and disposal sites, research facilities, and military bases.

Perchlorate can persist for many years in ground and surface water and is difficult to remove with standard water treatment processes. The Department of Health Services (DHS) in 2000 reported detections (down to the lowest measurable level) of perchlorate in 44 public drinking water systems, with 23 systems indicating levels greater than 18 ppb. Contamination is even more extensive in some locations. Perchlorate levels of up to 260 ppb were also detected in wells near weapons manufacturing facilities in Sacramento and Los Angeles counties, and levels of up to 150 ppb were measured near other locations, including the site of a former munitions plant in Santa Clarita and a research facility in Pasadena. Perchlorate has also been found in a number of drinking water and monitoring wells in Riverside and San Bernardino counties.

Perchlorate is used in air bag inflation systems, lubricating oils, and the manufacture of paints and industrial goods. It is also used in rocket and missile fuel.

Health Effects of Perchlorate. One of the more serious human health effects observed in scientific studies is perchlorate's disruption of thyroid hormone production. The thyroid produces two principal hormones, triiodothyronine (T3) and thyroxine (T4), which help to regulate the body's metabolism and physical growth. To produce these hormones, the thyroid needs iodine, which the body absorbs from iodized salt, seafood, and other foods. Perchlorate, however, blocks the transport of iodine to the thyroid gland. If the blockage persists and the thyroid's iodide reserves are significantly reduced, the thyroid may decrease its production of T3 and T4. The pituitary gland and the hypothalamus, which regulate thyroid hormones, in turn elevate their own hormone production to compensate for the lowered levels of T3 and T4. Because T3 and T4 hormones are essential to the body's production of energy and rate of metabolism, as well as to mental performance, any notable imbalance can

significantly impair all of these functions. Inhibited thyroid function can result in hypothyroidism and, in rare cases, thyroid tumors.

Pregnant women and their developing fetuses may suffer the most serious health effects from perchlorate contamination in drinking water, particularly in the first and second trimesters of pregnancy. During this period, the fetal thyroid is not yet fully functional, so the mother's thyroid must be able to produce enough extra T4 hormone to enable her baby's brain to develop properly.

Because pregnancy already places a strain on the maternal endocrine system, pregnant mothers and their fetuses are particularly susceptible to perchlorate's inhibition of iodine intake. Women with critically low levels of iodine can miscarry, or their developing fetuses can suffer congenital hypothyroidism, which may stunt the fetus's physical growth and impede proper development of its central nervous system. Even moderate to mild iodine deficiency during pregnancy has been linked to impaired brain development and lower IQs for children born under these conditions.

Establishing the Proposed PHG for Perchlorate. Under the California Safe Drinking Water Act, OEHHA is required to develop PHGs for chemical contaminants in California's publicly supplied drinking water. A PHG is the level of a chemical contaminant in drinking water that, based upon currently available data, does not pose a significant risk to health. It represents an optimal level that the state's drinking water providers should strive to achieve if it is possible to do so. State law requires DHS to set regulatory drinking water standards as close to the corresponding PHGs as is economically and technically feasible.

In developing the proposed PHG for perchlorate, OEHHA conducted a thorough analysis of all available scientific studies on perchlorate's health effects. OEHHA proposed a PHG within the range of 2 to 6 ppb for perchlorate because it determined that levels within this range would not pose a hazard to pregnant woman and their developing fetuses, the groups with the greatest sensitivity to perchlorate. This amount of perchlorate in drinking water also would not be expected to increase the risk of thyroid tumors.

OEHHA proposed a PHG within the range of 2 to 6 ppb to protect the health of pregnant woman and their developing fetuses, the groups with the greatest sensitivity to perchlorate.

In December 2002, OEHHA posted a revised PHG document on its Web site and announced a 45-day public-comment period. OEHHA will consider the comments it receives when setting the final PHG. The proposed PHG document is available for downloading from OEHHA's Web site at <http://www.oehha.ca.gov/>. Further information on PHGs is also available on OEHHA's Web site or can be obtained by contacting OEHHA at (916) 324-7572, or by mail at P.O. Box 4010, Sacramento, CA, 95812-4010.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see California's official "Flex Your Power" Web site at www.flexyourpower.ca.gov.