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Perchlorate

EPA has released for public review and comment its revised draft toxicity assessment on perchlorate, which is the primary ingredient of solid rocket propellant. The draft assessment, entitled "[Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization](#)," is available at <http://www.epa.gov/ncea/> under "what's new". The Agency will also hold a peer review workshop open to the public on this draft assessment on March 5th and 6th 2002, in Sacramento, California. This meeting will be open to the public, and more information is available at www.epa.gov/fedrgrstr under the heading for Jan. 2. Following this opportunity for public and independent scientific input, EPA expects to finalize the document by late summer, 2002.

When finalized, this draft assessment will be an important update to the Agency's health and ecological assessment for potential risks resulting from exposure to perchlorate through drinking water and other sources. The revised human health and ecological risk estimates found in this draft document continue to undergo scientific review and analysis both within EPA and by the external scientific community. As with any draft EPA assessment containing a quantitative risk value, risk estimates in this review document are preliminary. Therefore, it is premature at this stage to interpret risk estimates in this draft document as final EPA conclusions on which the Agency could take risk management action. The draft risk estimate is not a drinking water standard, but is the first step in a lengthy process to determine if the agency should set a federal drinking water standard for this contaminant.

EPA, other federal agencies, states, water suppliers and industry are already addressing perchlorate contamination through a number of activities. EPA is monitoring for perchlorate in drinking water through the Unregulated Contaminant Monitoring Program and the U.S. Geological Survey is monitoring for perchlorate in surface water. In California, Superfund sites are employing new technologies to remove perchlorate from contaminated water. The Ground Water Remediations Technologies Analysis Center is collecting data on perchlorate treatment studies to provide a stronger scientific understanding of the effectiveness of perchlorate treatment.

The draft toxicity assessment provides additional scientific insight into the potential risks posed by perchlorate and ways to reduce those risks. Sensitive populations such as pregnant women should follow the advice of their health care provider regarding the amount and type of liquids, including water to be consumed. Concerns and questions about perchlorate

and the safety of tap water can be addressed by contacting local water utilities. Contact EPA's Safe Drinking Water Hotline at 1-800-426-4791 for general information on drinking water issues.

Frequently Asked Questions

What is Perchlorate?

Perchlorate is both a naturally occurring and man-made chemical. Most of the perchlorate manufactured in the United States is used as the primary ingredient of solid rocket propellant. Wastes from the manufacture and improper disposal of perchlorate-containing chemicals are increasingly being discovered in soil and water.

How Can Perchlorate Affect Human Health?

Perchlorate interferes with iodide uptake into the thyroid gland. Because iodide is an essential component of thyroid hormones, perchlorate disrupts how the thyroid functions. In adults, the thyroid helps to regulate metabolism. In children, the thyroid plays a major role in proper development in addition to metabolism. Impairment of thyroid function in expectant mothers may impact the fetus and newborn and result in effects including changes in behavior, delayed development and decreased learning capability. Changes in thyroid hormone levels may also result in thyroid gland tumors. EPA's draft analysis of perchlorate toxicity is that perchlorate's disruption of iodide uptake is the key event leading to changes in development or tumor formation.

What are the Preliminary Conclusions of the Draft Toxicity Assessment?

The EPA draft assessment concludes that the potential human health risks of perchlorate exposures include effects on the developing nervous system and thyroid tumors. The draft assessment includes a draft reference dose (RfD) that is intended to be protective for both types of effects. It is based on early events that could potentially result in these effects, and factors to account for sensitive populations, the nature of the effects, and data gaps were used. The draft RfD is 0.00003 milligrams per kilogram per day (mg/kg/day). The RfD is defined as an estimate, with uncertainty spanning perhaps an order of magnitude, of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of adverse effects over a lifetime. As with any EPA draft assessment document containing a quantitative risk value, that risk value is also draft and should not at that stage be construed to represent EPA policy. Thus, the draft RfD for perchlorate is still undergoing science review and deliberations both by the external scientific community and within the Agency.

The assessment provides a hypothetical conversion of the draft RfD to a drinking water equivalent level (DWEL), assuming factors of 70 kilogram (kg) body weight and 2 liter (L) of water consumption per day. The converted draft estimate would be 1 microgram per liter (ug/L) or 1 part per billion (ppb). If the Agency were to make a determination to regulate

perchlorate, the RfD along with other considerations would factor into the final value.

Does perchlorate cause cancer?

Perchlorate is associated with disruption of thyroid function which can potentially lead to thyroid tumor formation. This draft toxicity assessment accounts for both developmental and tumor formation effects.

Does My Water Contain Perchlorate?

There have been confirmed perchlorate releases in at least 20 states throughout the United States. Additional information and maps detailing those sites are available in Chapter 1 of the draft of the "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization." EPA, other federal agencies, states, water suppliers and industry are already actively addressing perchlorate contamination through monitoring for perchlorate in drinking water and surface water. The full extent of perchlorate contamination is not known at this time.

What Is Being Done about Perchlorate?

The draft toxicity assessment will undergo peer review, and once it is finalized, the reference dose will be used in EPA's ongoing efforts to address perchlorate problems. EPA's draft reference dose represents a preliminary estimate of a protective health level and is not a drinking water standard. In the future, EPA may issue a Health Advisory that will provide information on protective levels for drinking water. This is one step in the process of developing a broader response to perchlorate including, for example, technical guidance, possible regulations and additional health information. A federal drinking water regulation for perchlorate, if ultimately developed, could take several years.

In 1998, perchlorate was placed on EPA's Contaminant Candidate List for consideration for possible regulation. In 1999, EPA required drinking water monitoring for perchlorate under the Unregulated Contaminant Monitoring Rule (UCMR). Under the UCMR, all large public water systems and a representative sample of small public water systems are required to monitor for perchlorate over the next two years to determine whether the public is exposed to perchlorate in drinking water nationwide.

How is perchlorate removed from water?

Several types of treatment systems designed to reduce perchlorate concentrations are operating around the United States, reducing perchlorate to below the 4 ppb quantitation level. Biological treatment and ion (anion) exchange systems are among the technologies that are being used, with additional treatment technologies under development.

Many other perchlorate studies have been completed during the last several years. A May 2000 summary of 65 perchlorate treatment studies is available online at www.frtr.gov/perchlorate (click on "Treatment Technology," then look for "GWRTAC Technology Summary"). The summary report was prepared by the Ground-Water Remediation Technologies Analysis Center. Most of the projects described in the report

are bench-scale and pilot-scale demonstrations of water treatment technologies, although several entries describe full-scale systems and soil treatment methods. Most of the projects employ biological treatment methods or ion (anion) exchange technology, although reverse osmosis, nanofiltration, granular activated carbon, and chemical reduction are also discussed. Results of federally-funded perchlorate treatment research managed by the American Water Works Research Foundation (AWWARF) are also becoming available (see <http://www.awwarf.com/research/spperch.asp>)

What are the next steps to developing a final toxicity assessment?

EPA will accept comments on the draft toxicity assessment document until March 6, 2002. Comments received by February 19, 2002, will be made available at the peer review workshop. This peer review will provide an independent review of the scientific information and interpretation used in the draft document. Please contact the Eastern Research Group (ERG), an EPA contractor, for more information on the comment process at (781) 674-7272.

As part of the review, an external peer review workshop will be held in Sacramento, CA on March 5 and 6, 2002. The peer review meeting is open to the public and an opportunity will be provided for oral public comment. The workshop is being organized and convened by ERG. In order to accommodate interested parties, please register for the workshop either by e-mail (meetings@erg.com) or by calling the ERG registration line at (781) 674-7374. The deadline for registration is February 25, 2002.

Is perchlorate-contaminated water safe to drink?

EPA's draft toxicity assessment is preliminary and thus, it is difficult to make definitive recommendations at this stage. It is also important to recognize that estimates contained in this draft assessment are designed to be conservative. In other words, there are adjustment factors built into this estimate to help account for uncertainties in the underlying data and information used. Other factors that influence the answer to this question include how much water is consumed, the degree of perchlorate contamination and the health status of the consumer.

Can pregnant women and children drink the water?

Sensitive populations, like pregnant women, children and people who have health problems or compromised thyroid conditions, should follow the advice of their health care provider regarding the amount and type of liquids, including water that should be consumed.

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