Reference

Julia Mullen

From: CPEO Moderator [cpeo@cpeo.org]
Sent: Wednesday, October 09, 2002 9:51 AM
To: cpeo-military@igc.topica.com
Subject: [CPEO-MEF] Perchlorate Health Risk and Emergency Response Action

[The following copy of the letter sent to Senator Paul S. Sarbanes was posted by Glenda Bowling, President, APGSCC (Aberdeen Proving Ground Superfund Citizens Coalition) <gbowling@comcast.net>]

October 8, 2002

Senator Paul S. Sarbanes
100 S. Charles Street
Tower 1, Suite 1010
Baltimore, MD 21201

Subject: Perchlorate Health Risk and Emergency Response Action

Dear Senator Sarbanes:

We are writing to explain the technical basis for our support for a 1 ppb limit for perchlorate in the drinking water in Aberdeen, Maryland. Please refer to the attached document titled "Important Facts about the History of Perchlorate Contamination in the Aberdeen Well Field" [*PASTED BELOW] for a brief summary of the discovery of perchlorate contamination in the Aberdeen well field, and a review of the evolution of our understanding of the technical issues surrounding this complex problem.

As you know, the US Environmental Protection Agency is in the process of evaluating the data on perchlorate. The process of evaluating perchlorate toxicity will provide the foundation for setting the Maximum Concentration Limit (MCL).

One of the first steps in developing the MCL is to determine the Lowest Observable Adverse Effect Level (LOAEL). The LOAEL for perchlorate is based on the following observations: perturbation in thyroid and pituitary hormones, thyroid histopathology and changes in brain morphometry. Based on a review of numerous laboratory studies, the EPA determined that the LOAEL for perchlorate is 0.01 mg/kg/day. This means that exposure to perchlorate at this level is likely to result in changes in thyroid and pituitary hormones, thyroid histopathology and brain morphometry.

Since it is the goal to set a limit that will not result in adverse effects, safety factors are applied to this number to extrapolate from the LOAEL to the No Observable Adverse Effects Level (NOAEL). Additional safety factors must be applied to account for differences in response between individual humans, the increased sensitivity of the fetus in utero, and for database inadequacies. For instance, we know that perchlorate can affect immune system function, but we currently do not understand how this happens.

The application of safety factors to the LOAEL is then used to calculate the reference dose (RfD). The reference dose is an exposure concentration that is expected to represent a safe level of exposure. In the revised draft toxicity assessment, which was released in January 2002 a reference dose of 0.00003 mg/kg/day was proposed for perchlorate.

When it is assumed that all perchlorate exposures will come from drinking water (a reasonable assumption in the case of Aberdeen Proving Ground) the Risk Based Concentration (RBC) = 1.1 ?g/L, which has been

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rounded down to 1 ?g/L. (Note that ?g/L = ppb.)

Based on this information, the state of Maryland has set a health advisory limit that indicates that when the drinking water supply is above 1 ppb, the consumers must be notified, and sensitive populations (defined as pregnant women, young children and people with hypothyroidism) should avoid drinking the water.

Controversies surrounding the calculation of the RBC are based on the studies included in the analysis, the endpoints used to determine toxicity, and the application of factors to account for uncertainty.

For example, the 4 ppb exposure limit is based on the inhibition of iodide uptake by the thyroid as the endpoint. In contrast, the new endpoints described above - changes in thyroid and pituitary hormones, thyroid histopathology and brain morphometry - are directly linked to pathologies stemming from perchlorate exposure, and include the neurological effects.

The state of Massachusetts used a different approach to calculation a limit for perchlorate in the drinking water. The 1.5 ppb exposure limit is based on inhibition of iodine uptake in children. US EPA and EPA Region III argue that since the most sensitive receptor is the fetus, then we must base exposure limits on consumption of water by adults (pregnant women).

The state of California includes a human study (Greer, et al, Environmental Health Perspectives, September 2002) whereby adult males were given perchlorate and the uptake of iodine was measured. Therefore this study used as an endpoint the uptake of iodine, as opposed to observed pathology. This study also makes the assumption that there is no thyroid deficiency in the US. The current proposed public health goal (PHG) is 6 ppb. A representative from the California Office of Environmental Health (Robert Howd) acknowledged that it is impossible to extrapolate potential exposure to the fetus based on this study. He also noted that the state is in the process of reassessing perchlorate toxicity, and while he could not reveal the likely outcome, he indicated that the new PHG is likely to be lower than the current PHG.

In our view, the nation is slowly converging on 1 ppb for perchlorate as the level that is protective of sensitive human receptors. We believe that it makes sense from a scientific perspective to advocate a Risk Based Concentration of 1 ppb for perchlorate at Aberdeen Proving Ground.

This information has been provided to you so that you will have a better understanding of 1) the technical issues surrounding perchlorate contamination at APG; 2) the legal and moral obligation APG has to initiate an emergency interim remedial response under CERCLA and the SDWA; and 3) the need for you to act at once to protect your constituents health regarding potentially additional unnecessary exposure to perchlorate emanating from APG. We hope you find it helpful. Please contact us if you have any questions. For technical questions, our technical advisor, Cal Baier-Anderson, can be reached at (410) 535-9598. We would like to meet with you, EPA and APG officials ASAP to resolve this most urgent matter. Thank you in advance for your interest.

Sincerely,

Glenda Bowling
President, APGSCC
198 Sunnyside Drive
Aberdeen, Maryland 21001
(410) 272-5925

*Important Facts about the History of Perchlorate Contamination in the Aberdeen Well Field

Prepared for APGSCC by
Cal Baier-Anderson, Ph.D.
University of Maryland, Baltimore
Program in Toxicology
October 8, 2002

• APG first tested groundwater in the vicinity of the Aberdeen well field for the presence of perchlorate based on a request from APGSCC. APGSCC was concerned because four of the 11 production wells are located on APG property in the vicinity of Camp Stanton, an active training range. Moreover, the capture zone for the well field includes a significant area of groundwater beneath APG property.

• The perchlorate was first detected in the vicinity of the well field in April 2001.

• Upon further testing, the perchlorate was found in the groundwater throughout the well field. Most of the detections were in the vicinity of Camp Stanton.

• In May 2002, APG confirms that perchlorate is used in many training aids, including obscurant smokes and simulators. Testing of residues from use of these aids indicates the presence of residual perchlorate.

• In June 2002 perchlorate was first detected in one of the on-post wells. Production well 9 had a detection of 4.3 ppb of perchlorate and no detects the finished water. The City shut down well 9 on June 13, 2002. The laboratory's reporting limit was 4.0 ppb.

• On July 31, 2002, APG contractors revised the method to detect perchlorate down to 0.2 ppb. The new reporting limit was set at 1 ppb.

• On July 31, 2002, using the newly revised analytical methods, perchlorate was detected in three more production wells, one of which was off-post. The perchlorate was not detected in the finished water because it is diluted below the reporting limit of 1 ppb. It is expected that the concentrations in the production wells and finished water will continue to fluctuate, and the City of Aberdeen indicates that it will continue to rely on dilution to provide safe drinking water to the City.

• On August 20, 2002 Maryland Department of the Environment issued a public health advisory for perchlorate concentrations above 1 ppb in the finished water via a letter to City of Aberdeen. This was the concentration that EPA Region III Risk Assessors had indicated should be protective of human health.

• On September 4, 2002 APGSCC send EPA Region III a letter requesting that EPA require APG to take emergency interim action by placing portable ion exchange filters on the affected wells, followed by permanent action by installing a permanent ion exchange treatment system to treat all wells.

• On September 21, 2002 APGSCC writes to APG to request that all training activities in the vicinity of the Aberdeen well field be relocated away from these important groundwater resources.

• In a September meeting between EPA, APG, MDE and APGSCC it is determined that APG has not yet delineated the perchlorate plume. APG is asked to re-collect groundwater samples and analyze the samples using the revised analytical method (mdl of 0.2 ppb).

• At the September 2002 meeting of the APG Restoration Advisory Board,

Ken Stachiw, Director of the APG Installation Restoration Program, explains that it is inevitable that we will see higher concentrations of perchlorate in the wells, based on the concentrations found in the well field.

• Samples taken on September 24th (with results released on October 1) indicated that perchlorate was found in the finished water at 1 ppb. This is water distributed to and consumed by the citizens of Aberdeen. In response to these results, Aberdeen immediately shut down one well and cut production on three others to 50% of capacity.

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Julia Mullen

From: CPEO Moderator [cpeo@cpeo.org]
Sent: Wednesday, October 09, 2002 10:22 AM
To: cpeo-military@igc.topica.com
Subject: Re: [CPEO-MEF] Perchlorate Health Risk and Emergency

[POSTED BY Cal Baier-Anderson <cbaie001@umaryland.edu>]

Hi Lenny -
Please note that in the Sarbanes letter, the symbol for micrograms did not come out right. Therefore ?g/L actually means micrograms/L and that micrograms/L = ppb

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