

July 20, 2007

The Honorable John D. Dingell
United States House of Representatives
Committee on Energy and Commerce
Washington, DC 20515

Dear Mr. Chairman:

I am attaching a copy of answers to questions that were directed to me after my testimony before the Subcommittee on Environment and Hazardous Materials on April 25, 2007, at the hearing entitled "Perchlorate: Health and Environmental Impacts of Unregulated Exposure."

I would like to thank you for the opportunity to testify at this hearing. The Environmental Working Group will continue to work on this issue and would be happy to provide any further assistance to the committee regarding this matter.

Sincerely,

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Questions from the Honorable Joe Barton and the Honorable John Shimkus

- 1) I would like to clarify that the Environmental Working Group (EWG) recommended an MCL in drinking water of “no higher than 1 ppb”. Current technology exists that allows for clean up to levels below 1 ppb, which is consistent with our recommendation. Based on the most recent study from the CDC, women with lower iodine levels may still have significant changes in their thyroid hormone levels even at this low level of exposure, but our recommendation of an MCL is limited by the available technology.

- 2) Perchlorate is a competitive inhibitor of iodine uptake by the thyroid gland. Iodine is one of the building blocks of thyroid hormone. Thus, perchlorate exposure can prevent adequate levels of iodine from being taken up by the thyroid gland, resulting in less iodine available for thyroid hormone synthesis. Two other environmental exposures that work by the same mechanism are nitrate and thiocyanate (1). Other factors that may also influence thyroid hormone levels include age, sex, race, pregnancy, body mass index, tobacco smoking, inflammatory conditions, and menopause.

The CDC scientists who conducted the most recent study (the Blount study) were very careful to take these multiple factors into consideration, as noted in this quote:

We selected a broad number of covariates to evaluate the independence of the perchlorate relationship. These covariates were: age, race/ethnicity, body mass index (BMI), serum albumin, serum cotinine (a marker of tobacco smoke exposure), estimated caloric intake, pregnancy status, post-menopausal status, premenarche status, serum C-reactive protein, hours fasting before sample collection, urinary thiocyanate, urinary nitrate, and use of selected medications.

As a result, these experienced CDC scientists went on to conclude, “These associations of perchlorate with T4 and TSH are coherent in direction and **independent of other variables known to affect thyroid function...**” (2).

Several states have set an MCL for perchlorate that is far less than the current EPA reference dose of 24.5 ppb, although none has set an MCL lower than 1 ppb. Most states did not have the information from the most recent CDC study available at the time that they were setting their MCLs. While EWG applauds their efforts to protect the public health of their citizens by setting MCLs based on the data available at the time, we encourage them to revisit the issue in light of the new CDC data.

Environmental Working Group

- 3) It is not accurate to state that roughly one-third of women in the U.S. have a form of hypothyroidism that contributes to decreased iodine uptake. It is accurate to say that a recent epidemiological study from the CDC suggests that the roughly one third of women in the U.S. with lower iodine levels are particularly susceptible to the effects of perchlorate (2).

Other environmental exposures that may exert similar effects on thyroid hormone levels include nitrate and thiocyanate, both of which were taken into account by the CDC scientists when they conducted their study.

- 4) While EWG supports all efforts to conduct further studies on the relationship between perchlorate exposure and thyroid hormone levels, there is sufficient scientific evidence to support an MCL of no higher than 1 ppb. In addition, we would like to point out that there have been instances where one particular study was used by a group of scientists to determine the toxic level of a chemical. For example, the National Academy of Sciences and EPA have consistently relied on the Greer study from 2002 to justify the reference dose of 24.5 ppb for perchlorate. This study was conducted on small numbers of people and did not take into account the iodine status of the participants, which we now know is a critically important variable (3). The Blount study provides valuable information that the Greer study did not by including larger numbers of participants (2299 in the Blount study vs. 37 in Greer study) and by identifying a subpopulation of women who are especially vulnerable to perchlorate; EWG supports the principle that all the current scientific literature on perchlorate be taken into consideration when setting a reference level.
- 5) The Blount study does not definitely show that perchlorate caused the changes in thyroid hormone levels; it shows a strong association between perchlorate exposure and changes in thyroid hormone levels. The CDC scientists who conducted this study took the greatest care in accounting for other factors that may have influenced these findings.
- 6) The Blount study shows that for a sub-population of women with lower iodine levels, exposure to perchlorate at levels far below the EPA reference dose is associated with changes in TSH levels to the degree that these levels would be considered in the range consistent with sub-clinical hypothyroidism. This is a medical condition that requires treatment if a woman becomes pregnant in order to prevent abnormal brain development in the developing fetus. EWG estimates that based on the Blount study, exposure to perchlorate at just 5 ppb in water could place more than 2 million women of childbearing age at risk for thyroid hormone levels that are lower than optimal for fetal brain development and would require medical intervention to restore thyroid levels to the normal range.
- 7) With all due respect to Dr. Utiger and his extensive clinical and academic experience, I would like to bring up some points regarding iodine supplementation. Dr. Utiger stated the following in his written testimony:

Environmental Working Group

One way to minimize the action of perchlorate on the thyroid is to increase iodide intake. Indeed, such an increase would benefit the entire U.S. population, given that iodide intake decreased by approximately 50% between 1971-74 and 2000-2002, and conversely the proportions of people with mild or moderate iodide deficiency increased substantially.

However, the Public Health Committee of the American Thyroid Association noted in a publication from 2006:

Although the current data do not lead to a recommendation of fortification or supplementation with iodine for the U.S. population as a whole, this may not be the case to meet the increased needs of pregnancy and lactation. Without specific physiologic evidence of iodine deficiency in the United States at this time, and with the most recent U.S. survey reporting a median value of 173 ug/L, which is within that currently recommended for pregnancy, the rationale for iodine supplementation during pregnancy is tenuous (4).

These statements from the ATA clearly indicate that it does not believe there would be a benefit from increasing iodine intake by the whole population. In addition, here are a few other points about iodine supplementation:

- a. There is no question that iodine deficiency is a serious problem and a major cause of low thyroid hormone levels and goiter in some developing nations. The CDC periodically monitors iodine status in the US and as recently as 2005, scientists from the CDC and University of Kansas Medical Center analyzed CDC data and determined “the current stability of the U.S. iodine intake and **continued adequate iodine nutrition for the country**” (5). This analysis suggests that the vast majority of the US population is not in an iodine deficient state. Therefore, public health measures to encourage increased iodine intake by the general population are not justified by current CDC data or supported by the American Thyroid Association and I would venture to suggest that our population is not iodine deficient but is, in fact, perchlorate overloaded.
- b. While it is true that the Blount study suggests that women with lower iodine levels are more susceptible to perchlorate and increasing their iodine intake would potentially mitigate the effects of the chemical in these women, how would one go about identifying these women? According to CDC data, the majority of women in this country are iodine sufficient and able to adequately compensate for effects of perchlorate. In fact, public health interventions aimed at increasing iodine intake in the general population through iodination of food products could expose

Environmental Working Group

millions of people to excess iodine intake because it would not be feasible to identify those with iodine insufficiency. Excess iodine intake is associated with autoimmune thyroiditis and certain types of thyroid cancer. Measures aimed at increasing iodine intake of the US population to counteract the effects of perchlorate are not without risk and increasing iodine intake in an already iodine sufficient population could have clear negative consequences as mentioned above.

- c. While it is easy to suggest measures that are aimed at increasing the iodine intake of the general population, public health interventions that are aimed at changing peoples behavior (using iodized salt, eating foods rich in iodine, using prenatal vitamins that contain iodine) can take years to enact and often do not have optimal compliance. For example, although anti-smoking campaigns have been in place for decades, CDC estimates that 20% of adults are still smokers. It is estimated that only 50% to 60% of the population uses iodized salt. In addition, mandatory salt iodization has never been enacted in the US, even in the 1930s when iodine deficiency was a major public health issue. Even the seemingly simple intervention of increasing the use of iodized salt could take years before significant numbers of the population change their behaviors, and as noted above, this might result in excessive iodine intake by a significant portion of the population. Therefore, while EWG agrees that increasing iodine intake among iodine insufficient and pregnant women may mitigate the effects of perchlorate exposure, the practicalities involved in carrying out this public health measure may result in delays that would still put millions of women at risk of the health effects related to perchlorate exposure. The public health measures that would reduce the health effects of perchlorate exposure in the shortest amount of time and reach the greatest number of people are to set the MCL for perchlorate in drinking water at no higher than 1 ppb and minimize perchlorate contamination of food.
- 8) In EWG's testimony, we clearly state that we recommend an MCL for perchlorate in drinking water of no higher than 1 ppb. A level of 0.5 ppb is considered to be no higher than 1 ppb. We fully support efforts to treat drinking water to a level of 0.5 ppb.
 - 9) EWG is concerned about all sources of exposure to perchlorate, and we will continue to work with the committee, the FDA, and the EPA to ensure that health standards for perchlorate in food and water are based on the best available science and provide protections for widely recognized vulnerable sub populations.

Questions from the Honorable Albert Wynn

- 1) Thyroid function is determined by the status of thyroid hormone levels; levels of T3 and T4 (the biologically active thyroid hormones) that are lower than normal are consistent with an underactive thyroid (hypothyroidism) and levels higher

Environmental Working Group

than normal are consistent with an overactive thyroid (hyperthyroidism). In the CDC study, women with lower iodine levels who were exposed to perchlorate at doses commonly found in the environment were found to have small to medium changes in their thyroid hormone levels. What this study tells us is that for some women who have thyroid hormone levels in the high normal range, exposure to perchlorate at levels commonly found in the environment are associated with changes in thyroid hormone levels from the normal to the abnormal range. This is especially alarming if these women become pregnant because it may result in sub-optimal levels of thyroid hormone being available for their developing fetus and subsequent abnormal brain development.

- 2) The results from the most recent CDC studies, when extrapolated to the general public, suggest that the one third of American women who have lower iodine levels are especially susceptible to the effects of perchlorate. This is approximately 43 million women nation wide, including 22 million of childbearing age (15-44).
- 3) EWG strongly encourages the EPA to take action on perchlorate by setting an MCL that takes into account the most recent research from the CDC and breast milk studies. We know that the current EPA RfD of 24.5 is grossly inadequate; the breast milk studies prove that this current RfD is resulting in breast milk levels of perchlorate that are exposing breast feeding infants to levels that exceed the EPA RfD. The longer that EPA delays this action, the more likely the chance that millions of vulnerable members of the population will continue to be exposed to unsafe levels of this thyroid toxin.

References

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- 2) Blount BC, Pirkle JL, Oserloh JD, Valentin-Blasini L, Caldwell KL. 2006. Urinary perchlorate and thyroid hormone levels in adolescent and adult men and women living in the United States. *Environmental Health Perspectives* 114(12): 1865-71.
- 3) Greer MA, Goodman G, Pleus RC, Greer SE. 2002. Health effects assessment for environmental perchlorate contamination: the dose response for inhibition of thyroidal radioiodine uptake in humans. *Environmental Health Perspectives* 110(9): 927-37.

Environmental Working Group

- 4) The Public Health Committee of the American Thyroid Association. 2006. Iodine supplementation for pregnancy and lactation- United States and Canada: recommendation of the American Thyroid Association. *Thyroid* 16(10): 949-951.
- 5) Caldwell KL, Jones R, Hollowell JG. 2005. Urinary iodine concentration: United States National Health and Nutrition Examination Survey 2001-2002. *Thyroid* 15(7) 692-699.