Environment and Public Works Committee Follow-Up Questions for Written Submission: Carol RowanWest, MassDEP

Questions from:

Senator Barbara Boxer

Question #1: Costs to states of no federal standard

Please describe the importance of having a federal perchlorate drinking water standard for the public and for state government?

A federal standard for perchorate would provide important national leadership on this threat to our drinking water and would drive the clean up of numerous public drinking water supplies across the United States. Health care costs associated with the necessary treatment of adverse health effects from exposure to perchlorate in drinking water would be avoided. The costs of treatment for thyroid gland effects including hypothyroidism, goiter, behavioral and neurotoxicity effects would be avoided.

A federal health-based standard would avoid the need for individual states to set standards and would eliminate the unnecessary duplication of efforts at the state level. Having a federal standard for perchlorate would be a more cost effective approach and would avoid diverting state resources unnecessarily.

Question #2: Resources of Developing State Standard

How much time and how many resources did Massachusetts expend to develop its perchlorate drinking water standard?

Our work to set a drinking water standard for perchlorate began in 2002 and concluded in 2006. We estimate that the resources spent in establishing a state perchlorate drinking water standard was approximately equal to 9.0 Full Time Equivalents (FTEs, or person-years) at a total cost of approximately $1.35 million. Resources included expertise from toxicologists, chemists, engineers, attorneys, and program managers.

If 3 or 4 other states took on this same effort, the total costs would run from $4 to $5.4 million dollars. These enormous costs would be avoided if EPA set a federal standard for perchlorate.

Question #3: Would a federal standard or health advisory have helped Massachusetts develop such a standard?

Yes. It's likely that we would have adopted it, thereby saving over one million dollars in state funding.

Senator Benjamin L. Cardin

Question #1: The contaminant Candidate List is growing as we are better able to detect new chemicals in our drinking water and as these new chemicals enter our environment. Based upon your work in your respective states, what is the best approach for prioritizing which emerging contaminants should be regulated?

EPA has a good approach for prioritizing chemicals under the Unregulated Contaminant Monitoring Rule. However, it appears that EPA did not have the ability, for some reason, to regulate perchlorate such that Massachusetts had to take on the work ourselves so that we could clean up contaminated sites and drinking water supplies to protect public health.

Question #2: Should the cost of reducing the contaminant concentration factor into decisions of what is a safe level for final regulatory determination purposes?

Yes. The Massachusetts Department of Environmental Protection (MassDEP) included the costs of treatment to reduce perchlorate in drinking water during deliberations on the final standard for perchlorate. EPA also considers costs when setting Maximum Contaminant Levels (MCLs).

Senator James M. Inhofe

Question #1: Under the Safe Drinking Water Act can individual states set their own drinking water standards even if EPA decides not to regulate a particular contaminant? If so, then what is the problem?

Yes, MassDEP has the authority to set drinking water standards when EPA does not act. However, when multiple states have an unregulated contaminant such as perchlorate in their drinking water supplies and EPA does not act, several problems arise such as:

- *multiple states must expend large amounts of resources to set standards;*
- *states are duplicating efforts, representing wasteful spending of scare resources;*
- *the drinking water levels set by states are likely to differ numerically, resulting in different cleanup standards for industry to meet and confusion regarding what is truly the health protection level; and,*
- *interstate trans-boundary issues when higher perchlorate groundwater levels from one state migrate into a state with lower standards.*

Under US EPA's Unregulated Contaminant Monitoring Rule, perchlorate was detected in 120 public water supplies in 26 states and 2 territories. If 26 states and 2 territories set a perchlorate drinking water standard, the estimated cost to develop that would be about $38 million dollars, based on Massachusetts estimated costs to set the standard. That huge expenditure would be avoided if EPA set a federal standard.

Question #2: Since treatment costs can be substantial, especially for small rural communities, shouldn't EPA science demonstrate the importance of treatment?

Yes.

Question #3: In your response to questioning, you mention that Massachusetts had nearly all of their toxicologists working full time to come up with a perchlorate drinking water standard. Have they put this effort into other chemicals regulations? Are you concerned that over focusing the state staff on one drinking water standard might take the focus off of other, equally or more pressing contaminants?

The level of effort MassDEP expended to address perchlorate has not been necessary to date for other individual chemical regulations. Perchlorate was somewhat unusual due to the known contamination source and threat to a major regional water supply, and the high level of controversy surrounding the issue. Yes, I am concerned about the level of effort and the diversion off work on other contaminants. This is another reason why it would have been beneficial if EPA had stayed on their track to set a perchlorate reference dose in early 2003, followed by a federal drinking water standard.

Question #4: You mentioned that your study found high levels of perchlorate in human breast milk, the highest being in a woman in Boston, where there was not perchlorate in the water. If this is the case, why do you think that perchlorate regulation in drinking water is the best way to address occurrence in the population?

I believe that the perchlorate levels in the breast milk are due in significant part to perchlorate in the food supply, which in turn is a result of the presence of perchlorate in drinking water and in water used for irrigation. There are several studies that demonstrate the uptake of perchlorate from water into the food supply. A list of scientific references for these studies is attached.

In addition, the US Food and Drug Administration (FDA) which regulates contaminants in commercial food crops, has conducted national surveys and has reported perchlorate in a wide variety of food. As stated, "FDA recognizes the potential for perchlorate contamination in food through the use of contaminated irrigation water, processing water, and source waters for bottling". FDA has reported levels of perchlorate in lettuce, collards, spinach, carrots, broccoli, green beans and milk. I believe the source of perchlorate in food is from contaminated water used for irrigation.

Lastly, it is important to note that consumption of perchlorate contaminated drinking water will add to other exposures and raise the potential risks to our nation' s infants.

Question #5: You mentioned that the science is settled, but omit a study by the American Thyroid Association, a group of medical doctors specializing in thyroid function, which used a state's public funds and the NAS that contradict your

findings. Are you aware of any published and peer reviewed scientific studies about what effects, if any, occur on an infant who is breast feeding based upon perchlorate exposure? I so, please share them with the Committee.

MassDEP's review of all of the pertinent perchlorate health effects studies is located in the following documents:

www.mass.gov/dep/toxics/perchlorate-toxicity-061206.doc
www.mass.gov/dep/toxics/perchlorate-addendum-061206.doc

Given the mechanism of action of perchlorate, the substantial literature documenting neuro-developmental deficits in infants born to iodine deficient mothers are of direct relevance to this issue. These are discussed at length in our report as previously cited. Additional published studies related to this issue which further support MassDEP's concern about breast milk perchlorate exposures include: 1) Ginsberg et al, 2007, which concluded that EPA's Preliminary Remediation Goal (PRG) of 24.5 parts per billion would lead to a 7-fold increase in breast milk perchlorate concentrations, causing 90% of nursing infants to exceed the National Academy of Sciences and EPA's reference dose; 2) Kirk et al, 2005 and 2007, which demonstrate that significant levels of perchlorate are present in the breast milk of nursing mothers in the U.S.; and, 3) Blount et al, 2006, which documents an association between perchlorate exposure and altered thyroid function in US women.

MassDEP. 2004. Perchlorate Toxicological Profile And Health Assessment - Final Draft. Massachusetts Department of Environmental Protection, Office of Research and Standards. Boston, MA

Andrea B. Kirk, Jason V. Dyke, Clyde F. Martin and Purnendu K. Dasgupta. 2007. Temporal Patterns in Perchlorate, Thiocycnate and Iodide Excretion in Human Milk. Environmental Health Perspectives 115 (2): 182-186

Andrea B. Kirk, P. Kalyani Martinelango, Kang Tian, Aniruddha Dutta, Erneste Smith, Purnendu K. Dasgupta. 2005. Perchlorate and Iodide in Dairy and Breast Milk. Environ Sci Technol 39: 2011-2017.

Benjamin C. Blount, James L. Pirkle, John D. Osterloh, Liza Valentin-Blasini, and Kathleen L. Caldwell
2006. Urinary Perchlorate and Thyroid Hormone Levels in Adolescent and Adult Men and Women Living in the United States. Environmental Health Perspectives 114 (12): 1865-1871

Gary L. Ginsberg, Dale B. Hattis, R. Thomas Zoeller and Deborah C. Rice (2007). Evaluation of the U.S. EPA/OSWER Preliminary Remediation Goal (PRG) for Perchlorate in Groundwater: Focus on Exposure to Nursing Infants. Environmental Health Perspectives 115 (3): 361-369

References: Accumulation of Perchlorate in Food

Jackson, A., et al. (2005) Perchlorate Accumulation in Forage and Edible Vegetation. *Journal of Agricultural and Food Chemistry*. 53, 369-373.

Sanchez, C.A. et al. (2005 Accumulation and Pechlorate Exposure Potential of Lettuce Produced in the Lower Colorado River Region. Journal of Agricultural and Food Chemistry. 53: 5479-5486.

Sanchez, C.A. et al. (2006). Potential Perchlorate Exposure from Citrus sp. Irrigated with Contaminated Water. *Analytica Chimica Acta:* 567; 33-38.

U.S. EPA. (2004). A Study on the Accumulation of Perchlorate in Young Head Lettuce. EPA/600/r-03/003.

U.S. EPA Office of Groundwater and Drinking Water. (2006). Regulatory Determination Support Document for Selected Contaminants from the Second Drinking Water Contaminant Candidate List (CCL2). Part III. What About the Remaining CCL2 Contaminants? (Draft).

Urbansky, E.T. et al. (1999). Perchlorate in the Environment. Risk Exposure for Perchlorate. *Symposia Papers Presented Before eh Division of Environmental Chemistry American Chemical Society. New Orleans. Preprints of Extended Abstracts. 39(2): 66-68.*

Yu, L. et al. (2003). Uptake of Perchlorate in Terrestrial Plants. *Ecotoxicology and Environmental Safety.*