



**PACIFIC
INSTITUTE**

Research for People and the Planet

November 5, 2008

Administrator Stephen L. Johnson
Water Docket, Environmental Protection Agency
2822T, 1200 Pennsylvania Ave., NW
Washington, D.C. 20460

RE: Drinking Water: Preliminary Regulatory Determination on Perchlorate,
Federal Register October 10, 2008, (73 FR 60262) (FRL-8727-6)
Docket Number: EPA-HQ-OW-2008-0692

Dear Mr. Stephen Johnson,

The Pacific Institute would like to formally submit the following comments on the Environmental Protection Agency's (EPA) Drinking Water Preliminary Regulatory Determination on Perchlorate. After reviewing the Preliminary Determination and relevant literature, we do not agree with the EPA's determination that regulating perchlorate presents no "meaningful opportunity for health risk reduction for persons served by public water systems." While we recognize that the science upon which the determination is based has been contested, our comments address a number of further concerns, including the protection of vulnerable populations; the impacts that the determination will have on remediation efforts and future monitoring; and the criteria for what is considered to be a "meaningful opportunity" for protection of public health.

Concern raised by the Children's Health Advisory Committee regarding the unique levels of exposure and developmental impacts of perchlorate on breast-fed infants were not addressed, and the reference dose¹ upon which the EPA based the preliminary decision may not adequately protect the health of breast-fed infants.

While the health risk posed by perchlorate to fetuses of pregnant women with hypothyroidism was considered in the preliminary regulatory determination, we are concerned that the health risk to breast-fed infants was not adequately addressed. Recommendations provided by the Children's Health Protection Advisory Committee (CHPAC) in its March 8, 2006 letter have not been appropriately adopted,² which is especially disconcerting in light of the U.S. Government Accountability Office's (GAO)

¹0.7 µg/kg/day, or 49 µg/day for an adult weighing 70kg

²Children's Health Protection Advisory Committee. (2006, March 8). Letter to Stephen L. Johnson, EPA Administrator. Accessed Oct. 28, 2008 from http://www.ewg.org/files/chpac-epa_ltr.pdf.

recent finding that the EPA has routinely failed to respond to this committee's findings.³ Despite the EPA's recognition that children may be more vulnerable to environmental hazards, the GAO found that the EPA has failed to proactively seek advice from the CHPAC and "largely disregarded key recommendations" from the committee.⁴ In the case of perchlorate, the committee emphasized the higher exposure of infants to perchlorate and greater susceptibility to serious negative effects associated with perchlorate exposure. Neither of these issues, however, was given adequate consideration in the Preliminary Determination.

- **Perchlorate is actively transported into human breast milk where it concentrates, resulting in exposure levels above the reference dose for infants feeding on this milk.** In the Preliminary Determination for perchlorate, the EPA used a reference dose designed to "estimate the daily oral dose that is likely to have no appreciable risk of deleterious effects during a lifetime"⁵ of 0.7 µg/kg/day. However, the CHPAC calculated that infants would be exposed to perchlorate levels approximately 5-10 times higher than this reference dose with a maternal exposure of 24.5 µg/L of perchlorate in water, plus a dietary intake of 8.4 µg/day. Because maternal exposure in this calculation is above the EPA's reference dose, we recalculated infant exposure with a total maternal perchlorate exposure equal to the reference dose (0.7 µg/kg/day). The results showed that *a breast-fed infant would be exposed to approximately 5-8 times the reference dose.*⁶
- **Infants are more susceptible to the serious neurological development effects of perchlorate, which can result in irreversible impacts.** Due to their life stage, infants can suffer serious neurodevelopmental impacts because their central

³ U.S. Government Accountability Office (GAO). (2008). Environmental Health: EPA Efforts to Address Children's Health Issues Need Greater Focus, Direction, and Top-level Commitment. Accessed November 4, 2008 from <http://www.gao.gov/new.items/d081155t.pdf>.

⁴ GAO. (2008). Environmental Health: EPA Efforts to Address Children's Health Issues Need Greater Focus, Direction, and Top Level Commitment. Retrieved Oct 27, 2008 from <http://www.gao.gov/new.items/d081155t.pdf>.

⁵ National Research Council (NRC). (2005). Health Implications of Perchlorate Ingestion. Washington, D.C.: The National Academies Press, 208.

⁶ **Calculation of infant exposure to perchlorate:**

Nursing Infant Dose (µg/kg/d) = (µg/L in human milk/µg perchlorate ingestion-day)*[(24.5 µg perchlorate/L water)*(L water ingested/day)+ (baseline US dietary ingestion rate, µg/d)]*(L human milk ingested/day/infant body weight)

Modified formula used by us to estimate infant exposure, with *total maternal exposure* equal to EPA's reference dose of 0.7 µg/kg/day (assuming adult body weight of 70 kilograms, as was used by EPA in the Preliminary Regulatory Determination):

Maternal exposure: (0.7 µg/kg/day)*(70kg)= 49 µg/day

Nursing Infant Dose (µg/kg/d) = (µg/L in human milk/µg perchlorate ingestion-day)*(49 µg/day)*(L human milk ingested/day/infant body weight)

Aside from the maternal daily perchlorate exposure, we used the same parameter values as were used by the CHPAC. Please see the letter from CHPAC of March 8, 2006 for an explanation of these parameter values.

Our infant exposure calculations:

(0.458 day/L)*(49 µg/day)* (0.634 L milk/day/3.69 L) = 3.85 µg/kg/day

(0.737 day/L)*(49 µg/day)* (0.634 L milk/day/3.69 L) = 6.20 µg/kg/day

Calculation comparing infant exposure (calculated above) to the reference dose:

3.85 µg/kg/day / (0.7 µg/kg/day)= 5.5

6.20 µg/kg/day / (0.7 µg/kg/day)= 8.86

nervous system is still developing and is susceptible to small deficits of thyroid hormone level; they lack hormone reserves that adults have accumulated to buffer hormone deficits; and they may experience a slower clearance of perchlorate from their bodies.

Without an enforceable federal standard, the Department of Defense, which is a primary user of perchlorate in the U.S., will perform remediation efforts according to a patchwork of state and agency guidelines. According to the EPA, approximately 90 percent of perchlorate produced in the United States is for defense activities and NASA.⁷ Recognizing perchlorate contamination is a defense-related hazardous waste issue with significant potential impact on human health, the Department of Defense (DOD) designated perchlorate as an emerging contaminant and has taken some action to clean up contamination, mostly in the form of responding to requests made by the EPA and states—requests that relied on piecing together statutes, regulations, and the power of oversight agencies.⁸ While the DOD is responsible by law for remediation of contaminants regulated by the EPA or the state, its responsibility for what it classifies as “emerging contaminants” is not clearly defined.

In 2006, the DOD adopted its own management policy in which they are to comply with state or federal standards, whichever is most stringent. According to this policy, in the absence of state or federal standards, the DOD will manage its control action using 24 parts per billion (ppb) as the level of concern. Because a federal standard has not yet been established, the DOD must use state regulations to guide its remediation efforts. But while a handful of states have nonregulatory perchlorate-level guidelines, only two states—Massachusetts and California—have set enforceable perchlorate drinking-water standards (1 ppb and 6 ppb respectively). Perchlorate contamination and its potential adverse health impacts, however, is obviously a multistate issue.⁹ Without a federal standard, not only will the DOD have to overcome the difficult challenge of performing remediation efforts according to varied guidelines, but states that currently lack their own enforceable standards and have known sources of perchlorate may be left with remediation efforts based on the DOD’s 24 ppb management standard.

In the absence of a federal standard, remediation efforts by EPA and state officials of public drinking water systems contaminated by perchlorate have been shown to be nonexistent. DOD remediation efforts are not alone in their need for guidance from a federal perchlorate standard—cleanup of perchlorate in public drinking water systems has been shown to be nonexistent without a federal standard. According to research done by the GAO, “EPA and state officials told us they had not cleaned up contaminated public

⁷ EPA (2007). Perchlorate. Environmental Protection Agency, Federal Facilities Restoration and Reuse. Retrieved Oct. 24, 2008 from <http://www.epa.gov/fedfac/documents/perchlorate.htm>.

⁸ GAO (2007). Department of Defense Activities Related to Trichloroethylene, Perchlorate, and Other Emerging Contaminants. Government Accountability Office. July, 2007. Retrieved October 24, 2008 from <http://www.gao.gov/new.items/d071042t.pdf>.

⁹ GAO 2007 finds federal and state agencies have found perchlorate in groundwater, surface water, soil, or public drinking water systems at almost 400 sites representing over 37 states, in concentrations that ranged from 4 parts per billion (ppb) to more than 3.7 million ppb. <http://www.gao.gov/new.items/d07797t.pdf>

drinking water systems, principally because there was no federal drinking water standard or specific federal requirement to clean up perchlorate.”¹⁰

Ongoing monitoring of drinking water is needed to safeguard public health. The EPA’s preliminary decision to not regulate perchlorate was contingent on the fact that a relatively small number of public water systems currently contain levels of perchlorate at unsafe levels. While this may be true today, it may change, as perchlorate is widely used and easily leached. With uncertainties surrounding the extent of current contamination, and continued use of perchlorate,¹¹ the EPA should set a Primary Drinking Water Regulation to make ongoing monitoring mandatory.

According to GAO 2007, federal and state agencies have found perchlorate in groundwater, surface water, soil, or public drinking water systems at almost 400 sites in 37 states, in concentrations ranging from 4 ppb to more than 3.7 million ppb. The GAO contends that “it is difficult to determine the extent of perchlorate in the United States or the status of any cleanup actions because EPA does not centrally track or monitor perchlorate detections, environmental releases, or cleanup activities.”

Many potential sources of perchlorate contamination in the U.S. exist, including munitions manufacture and disposal, use of explosives in rock blasting, manufacture and use of fireworks, manufacture and use of safety flares, and use of Chilean nitrate fertilizers.^{12,13} In addition to these ongoing uses of perchlorate, there may be environmental contamination from historic releases, for example from manufacture and disposal. This widespread use is likely to lead to further water contamination, as perchlorate is readily leached from soil into groundwater due to its high solubility and persistence in the environment.

The EPA determined that regulating perchlorate in drinking water does not pose a meaningful opportunity to protect public health—even as its report recognizes that 900,000 people will remain exposed to perchlorate at levels that could exceed the health reference level, up to 30,000 of which are pregnant women at any given time. Protecting the health of these individuals, even if it is a small group, is significant, and the federal government has the capacity and responsibility to do so. We understand the need to balance costs and benefits in drinking water regulations, however, costs associated with the regulation of perchlorate will ostensibly be low, except in those cases where high levels of perchlorate exist and drinking water must be treated. For other

¹⁰ GAO. (2007). Perchlorate: EPA Does Not Systematically Track Incidents of Contamination. Retrieved Oct 27, 2008 from <http://www.gao.gov/new.items/d07797t.pdf>.

¹¹ Both Trumpolt et al. and Aziz et al. identify uncertainties in how current uses of perchlorate, e.g. in road flares and fireworks affect groundwater perchlorate levels. See footnotes 12,13.

¹² Trumpolt, C., M. Crain, G. Cullison, S. Flanagan, L. Siegel, and S. Lathrop. (2005). Perchlorate: Sources, Uses, and Occurrences in the Environment. Retrieved Oct 27, 2008 from [http://yosemite.epa.gov/r10/CLEANUP.NSF/PH/Arkema+Technical+Documents/\\$FILE/Perchlorate-Sources-Occurance-In-The-Environment.pdf](http://yosemite.epa.gov/r10/CLEANUP.NSF/PH/Arkema+Technical+Documents/$FILE/Perchlorate-Sources-Occurance-In-The-Environment.pdf).

¹³ Aziz, C., R. Borch, P. Nicholson, and E. Cox. (2006). Alternative Causes of Wide-Spread, Low Concentration Perchlorate Impacts to Groundwater. GeoSyntec Consultants, Guelph, ON, Canada. Retrieved Oct 27, 2008 from <http://www.springerlink.com/content/p8m017624280752w/>.

systems, costs can be limited to periodic monitoring (e.g., once in every 4 years, as is done with radionuclides). The cost of regulating perchlorate in our country's public drinking water, when compared with the myriad potential health-related costs, including added pressure on public health care systems, missed work and school days due to sickness, etc., may very likely prove the most cost-effective option.

In light of these concerns we sincerely hope that the EPA reevaluates its Preliminary Decision, taking into account the impact of this regulation on all vulnerable populations, the potential for remediation efforts, and the potential future contamination of drinking water. In addition, we hope that the agency fulfills its duty to protect the public health of the thousands of individuals who are affected by unsafe perchlorate exposure through public drinking water.

Sincerely,

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