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Hearing on

Perchlorate and TCE in Water

Before the
United States Senate
Committee on Environment and Public Works

Tuesday, May 6, 2008, at 10 a.m.

Submitted for the Record

Madame Chairman, distinguished Members of the Committee: my name is Richard Wiles, and I am the Executive Director at the Environmental Working Group (EWG), a nonprofit research and advocacy organization based in Washington, DC and Oakland, California. I would like to start by thanking the members of the Committee for this opportunity to testify today. We sincerely appreciate your interest in this important public health matter.

Perchlorate provides a textbook example of a corrupted health protection system, where polluters, the Pentagon, the White House and the EPA have conspired to block health protections in order to pad budgets, curry political favor, and protect corporate profits.

With perchlorate we have reached that rare moment in environmental health when there is nothing left to do but act. All the pieces needed to support strong health protections are in place: widespread and well-documented contamination of food, tap water and breast milk (FDA 2007, Murray et al. 2008, CADPH 2008, GAO 2005, Kirk et al. 2005, Kirk et al. 2007, Pearce et al. 2007), a clear understanding of the toxicity that identifies infants, children and women of childbearing age as populations at risk (Blount et al. 2006a, Blount et al. 2006b, CHPAC 2006, Ginsberg et al. 2007, MADEP 2006a, NRC 2005, OEHHA 2004), and a strong body of science that ties perchlorate exposures to demonstrable and potentially very serious adverse effects in the human population, anchored by a study of more than 1,100 women by the Centers for Disease Control (CDC) linking perchlorate levels in the population to dangerously low thyroid hormone levels in women of childbearing age (Blount et al. 2006a, Ginsberg et al. 2007).

It is rare that science provides us with such a clear picture of a pollutant's harmful effects, which have been termed "consistent with causality" by CDC scientists. It is even more unusual to have this level of evidence and do nothing.

Yet this Administration has failed to act.

Instead of action we have delay, and worse, we have the institutionalization of a new intergovernmental delay strategy replete with secret White House reviews of science and the shift of public health decision making away from agencies with the expertise, to agencies responsible for the pollution.

This begs the question, why? The answer is the enormous magnitude of the liability. Simply put, perchlorate is an environmental and public health nightmare of epic proportions for the Department of Defense (DoD) and its contractors, and rather than address it head-on, they have spent 50 years and millions of dollars trying to avoid it.

Ninety percent of all perchlorate in the U.S. was manufactured for use by DoD or NASA (GAO 2004). Perchlorate contamination of soil or water has been found in 35 states and the District of Columbia, with known contamination of 153 public water systems, serving about 25 million people in 28 states (GAO 2005). At least 61 DoD facilities are contaminated with perchlorate; 35 of these are listed on the National Priorities List for Superfund site designation, water at 29 of these is contaminated above the EPA "safe dose" of 24.5 parts per billion (EPA 2006a). Fifteen of the remaining 26 non-NPL listed sites are also contaminated above the EPA safe dose.

Hundreds of miles of the Colorado River are polluted with perchlorate. This not only means that the tap water of Las Vegas, Phoenix, Los Angeles and San Diego are contaminated, but also that the nation's winter vegetable crops – grown in the Imperial Valley of California and southwestern Arizona and irrigated with contaminated water – often contain high levels of perchlorate (EWG 2003, FDA 2007).

The goal of defense contractors and the Pentagon has been to stop promulgation of drinking water health protections that would force them to clean up their perchlorate mess, regardless of the health consequences for the American public. To date they have been successful.

Polluters and the Pentagon Collude to Block Public Health Protections

Perchlorate is a component of solid rocket propellant (fuel) that has been known to contaminate groundwater at Defense Department facilities and manufacturing locations for at least 50 years (CADWR 1964, GAO 2004, JAWA 1957). Perchlorate inhibits the uptake of iodine to the thyroid gland, which is essential to production of normal amounts of thyroid hormone. Thyroid hormone is critical for normal growth and development and inadequate levels during fetal development and infancy can result in intellectual deficits that persist throughout life (Haddow et al. 1999, Pop et al. 1999, Zoeller 2006).

In 1962, the Manufacturing Chemists Association (MCA, now known as the industry lobby group the American Chemistry Council) formed a chemical propellant toxicity "task group", which included representatives from four companies in the solid propellant industry. Members of this committee participated in a Department of Defense working group called the Inter-Agency Chemical Rocket Propulsion Group (ICRPG), which was, according to the MCA memos, "the first time that a government agency has asked

representatives of industry to participate in this type of committee activity." The goal then was the same as now, to avoid health protections that interfered with business. As put by the MCA "our active participation in the ICRPG program should be of great help in establishing safe but realistic rules and regulations without unnecessary and excessive restrictions to industrial operations" (MCA 1962, 1965).

Thirty years later, as accumulating evidence of contamination and potential health effects raised the specter of tight drinking water standards, industry formed the Perchlorate Study Group (PSG), consisting of Aerojet, Alliant Techsystems, American Pacific/Western Electrochemical Company, Atlantic Research Corporation, Kerr-McGee Chemical Corporation, Lockheed Martin, Thiokol Propulsion Group, and United Technologies Chemical Systems. In 1992, in cooperation with the Air Force, the PSG began a high-stakes campaign to block or weaken proposed standards that has continued to this day (EWG 2001).

An extraordinary report by Environment California documents in detail the multi-million dollar, decade-long PSG campaign to manipulate science in favor of perchlorate polluters and the military (EC 2006). The agenda of PSG as expressed in an internalAerojet presentation was "to provide EPA witha scientific based argument to justify a higherRfD (safe dose) and thus a more reasonable remediationstandard." This is not a scientific research agenda, this is science designed and paid for to produce a specific outcome – a "higher" or weaker, RfD that allows higher levels of pollution in drinking water.

For the past 15 years, the PSG, DoD, and industry polluters – more recently in collusion with the White House –have run an aggressive misinformation campaign that published bogus science, blocked good science, stacked independent science panels, and even went so far as to intimidate scientific journals to rewrite articles when they thought they might be "damaging" to their position.

- **1999: DoD and the Air Force block EPA study of perchlorate in food**

  The EPA and the Air Force were key players on an inter-agency committee formed in 1998 to evaluate potential health risks from perchlorate contamination. In April of 1999 this committee met to set research priorities, deciding that a study looking at the potential uptake of perchlorate into food crops was top priority, followed by research into effects on wildlife habitat. These two studies would divide half a million dollars in funds from the Army. But the crop study was never done (Danelski and Beeman 2003).

  In June of 1999, Col. Dan Rogers of the Air Force wrote to Steven McCutcheon at the EPA's National Exposure Laboratory after his group found that greenhouse lettuce absorbed and concentrated perchlorate from irrigation water. In his email, Rogers advised McCutcheon to halt some of the lab's ongoing efforts, writing: "PLEASE, PLEASE, PLEASE do not arrange for taking or accepting samples from any of the Western states." Ninety percent of lettuce consumed in the U.S. between December and March is grown in California and Arizona with Colorado River water that is contaminated with perchlorate (EWG 2003). A few months later, Rogers wrote to EPA officials stating that no agency had permission to publish articles

on perchlorate without "complete agreement from all the executive members" of the inter-agency committee, including the Air Force, adding that "any attempt to publish would not be looked upon favorably by the DoD" (Danelski and Beeman 2003).

Years later, the Food and Drug Administration finally conducted tests on perchlorate in food and found that perchlorate contamination is widespread in the food supply (FDA 2007).

- **2002: Perchlorate Study Group tampers with article in a leading academic journal**

  When the nationally known science writer Rebecca Renner was assigned to write a story about the findings of the pivotal toxicity study on perchlorate, known as the Greer study, she wrote a piece that put the study's findings of no effects at low doses in context by also reporting the EPA's concerns that perchlorate might harm the developing fetus, and that many animal studies pointed to concerns at low levels of exposure.

  When the perchlorate industry's consultants got an advance copy of it, they concluded that the article was "potentially very damaging" to their clients and pressured the journal to rewrite it, without the consent of the author (Danelski 2004).

  According to industry documents and invoices obtained through litigation, industry consultants went back and forth with the journal's editors through at least five drafts of the article, and ultimately leveraged publication of an article that painted perchlorate in a highly favorable light. Renner was entirely unaware that her piece had been rewritten.

  Several years later, when the documents came to light and she understood what had happened, Renner was stunned. "My name was misused, and my journalistic reputation was misused," she told the Riverside Press Enterprise. "It is outrageous that my article was changed by people working for industries that have a totally vested interest and a huge stake in the outcome of this issue, and that it was changed in a covert way" (Danelski 2004).

- **2003: White House stacks National Academy of Sciences (NAS) panel with industry consultants**

  The White House, the Department of Defense, and perchlorate industry consultants had undue influence on what should have been a purely scientific review of EPA's perchlorate risk assessment by the NAS. Documents obtained by Natural Resource Defense Council through public records request show that senior White House political officials with no scientific expertise actively participated in reviewing the scientific charge sent to the National Academy of Sciences on perchlorate and that White House and Pentagon officials were involved in discussions about who should be appointed to the NAS panel (NRDC 2005).

  These groups were successful in appointing a highly biased panel, which initially included a paid industry expert witness and two other paid consultants to the

perchlorate industry. While the litigation consultant was forced to resign, the two other consultants remained on the panel. Ultimately the NAS panel recommended a safe exposure level for perchlorate that has not been supported by a single state regulatory review or any subsequent scientific research (CHPAC 2006, EWG 2007, Ginsberg et al. 2005, Ginsberg et al. 2007, MADEP 2006a, NRC 2005, NRDC 2005, OEHHA 2004).

- **2005: EPA and the NAS rely on a single, underpowered, industry funded study to set "safe" exposure level. Subsequent peer-reviewed research shows that the study authors obscured adverse effects at low doses**

  A single, tiny, industry-funded study, known as the "Greer study," is the basis of the EPA's proposed safe dose level for perchlorate. It wasn't supposed to be; EPA originally wanted also to include the results of animal studies that involved dosing pregnant rats with perchlorate to determine its effects on critical periods of development. But incredibly, the National Academy of Sciences decided that the Greer study – which dosed 37 healthy adults with perchlorate for just 14 days, and did not monitor iodide intake – was sufficient on its own to form the basis of a drinking water standard. This, in spite of the study's obvious shortcomings, including the fact that an experiment on healthy adults provides no basis for understanding perchlorate's effects on infants and children, and the fact that a study with just 37 subjects, and a very short two week duration, has very limited statistical power. Even worse, the NAS did not perform its own evaluation of the raw data, but instead relied on the industry's interpretation of the study results. (Danelski 2005, EWG 2006)

  The study's authors claimed that their data showed no effects from perchlorate in the lowest dose group. But a subsequent EPA analysis found that the study's design was so weak it had virtually no chance of detecting any kind of statistically significant effect at that dose. A peer-reviewed study published in 2005 showed that the industry's analysis of the data obscured important findings (Ginsberg and Rice 2005). These independent scientists found that four of the seven individuals in the lowest dose group had perchlorate-related reductions in iodide uptake, indicating that there was in fact an effect at this dose level. The authors noted that the Greer study data point towards "a more sensitive subgroup," a conclusion that was confirmed by the 2006 CDC study finding perchlorate-related effects on thyroid hormone levels from far lower exposures to perchlorate in women with low iodide intake (Blount et al. 2006a, Ginsberg and Rice 2005).

This campaign to distort the science and delay regulation has been largely successful. Although two states, California and Massachusetts, have set drinking water standards for perchlorate that are more protective than what DoD and perchlorate polluters want, at the federal level there has been no meaningful action to protect public health from perchlorate in water or food.

In fact, since 1996 when the Safe Drinking Water Act was last amended, the EPA has not finalized a single new health standard for any contaminant, except where ordered by the courts or the Congress (Grumbles 2007). Beginning in 2002 and every

year for the past seven years, DoD has sought a congressional exemption from all state and federal environmental laws for uses of chemical constituents in military munitions, including perchlorate (Christen 2003, CRS 2006, GAO 2008, Seelye 2002, Thacker 2004).

In 2007, the EPA formally decided not to adopt a drinking water standard for perchlorate. Unless ordered by Congress the agency is not likely to develop one until well into the next decade (EPA 2007, EPA 2008a). The EPA's current position is that it is "undertaking efforts to help the Agency determine if regulation of perchlorate in drinking water would represent a meaningful opportunity for reducing risks to human health" (EPA 2008b).

Perchlorate contaminates the drinking water of about 25 million Americans in 28 states (GAO 2005). Although two states with significant contamination problems have adopted enforceable drinking water standards, California (6 parts per billion), and Massachusetts (2 ppb), the other 26 depend on the EPA (CADPH 2008, MADEP 2006b). Most of these 26 remaining states do not have the resources or expertise either to develop health standards or to enforce them, particularly in the face of combined opposition from the Pentagon and defense contractors. These states depend on the U.S. EPA to set health standards to protect them from potent pollutants like perchlorate. This is clearly a "meaningful opportunity for reducing risks to human health," but EPA has chosen not to act.

Tap Water is the Top Public Health Priority

Perchlorate contaminates food as well as water. A 2008 study by scientists at the U.S. Food and Drug Administration (FDA) found that three quarters of 285 commonly consumed foods and beverages are contaminated with perchlorate (Murray et al. 2008). The investigation found perchlorate in 90 percent of lettuce samples and 101 out of 104 bottled milk products. Two-year-olds appear to be particularly vulnerable because they eat substantial amounts of food relative to their small size. According to FDA's results, every day, the average two-year-old will be exposed to more than half of the EPA's safe dose of perchlorate from food alone (EWG 2008, Murray et al. 2008).

EPA has repeatedly cited uncertainty about food contamination with perchlorate as a reason to delay health protections for tap water exposures (EPA 2007, Grumbles 2007). The rationale for this position has always been obscure, but in the face of these new data from FDA, food contamination can no longer be considered an obstacle, rather it must be considered the primary reason to reduce tap water exposures.

Cleaning up perchlorate pollution in tap water is the critical first step to protecting children's health from the contaminant. This is in part because it is readily achievable, but also because in most cases where tap water is contaminated it accounts for at least half, and in many cases the vast majority of exposure to perchlorate (EWG 2008).

Perchlorate contamination of food is extremely difficult to control. Water exposures, in contrast, are readily controllable. The statutory framework to control food exposures is muddled, whereas the legal framework to control drinking water exposures is

clear. From a practical perspective, it is not obvious how to reduce food exposures because the source of a substantial portion of food contamination is not known. With water the clean up technology is identified, straightforward, and effective. And ironically, cleaning up one major polluted water source, the Colorado River, will substantially reduce perchlorate levels in some of the most contaminated foods.

EWG's analysis of FDA's new data shows that very small exposures to perchlorate, as low as one part per billion (ppb) in tap water, could expose some children to an unsafe dose of the compound (EWG 2008). In this light, every proposed or final drinking water standard fails to protect at least some two-year-olds from routine, daily, unsafe exposure to perchlorate when food and water exposures are combined. A two-year-old of average size could exceed EPA's safe exposure level for perchlorate (the reference dose, or RfD) by drinking water with just 4 ppb of perchlorate contamination. A smaller child drinking more than an average amount of water will face the same risks from far lower amounts of perchlorate (EWG 2008).

A recent US Government Accountability Office (GAO) report found that 28 states had at least one public water system that was contaminated with perchlorate at 4 ppb or over (GAO 2005). New Jersey has proposed a tap water standard of 5 ppb, California allows up to 6 ppb, and the U.S. EPA has proposed a limit of 24 ppb, none of which would protect two-year-olds from being chronically overexposed to perchlorate.

Children are More Sensitive to the Harmful Effects of Perchlorate

Not only do children have higher exposures to perchlorate when compared with adults, they are also particularly susceptible to its adverse effects. Perchlorate acts by inhibiting the thyroid gland from taking up iodine from circulating blood. Because iodine is the building block for thyroid hormone, perchlorate exposure can result in decreased thyroid hormone production by the thyroid gland. Adequate circulating levels of thyroid hormone are critical to maintaining normal growth and brain development during childhood. Inadequate levels of thyroid hormones can result in stunted growth and delays in intellectual development (CHPAC 2006, Ginsberg et al. 2007, Haddow et al. 1999, Pop et al. 1999, Zoeller et al. 2002, Zoeller 2006).

Children are also especially vulnerable to perchlorate because of their unique physiology. Perchlorate acts as an inhibitor of iodine uptake by the thyroid gland. Because of their rapid growth and development, children require more iodine per unit of body weight than adults. In fact, young children require 3 times more iodine per kilogram of body weight than non-pregnant adults (WHO 1998). A thyroid toxin like perchlorate that impacts the uptake of iodine by the thyroid gland will have a greater impact on children than adults.

Children could be protected from these effects by a strong federal drinking water standard for perchlorate. But the EPA has decided that this is not needed. Meanwhile dangerous exposures continue.

EPA "Safe" Dose for Perchlorate is not Really Safe

No state health agency that has independently evaluated perchlorate toxicity has agreed that the EPA's estimate of a safe exposure level for superfund sites, the so-called Preliminary Remediation Goal (PRG) of 24.5 parts per billion (ppb), is an appropriate or safe exposure value for drinking water (EPA 2006, OEHHA 2004, MADEP 2006). California has set a drinking water standard at 6 ppb, New Jersey has proposed one at 5 ppb, and Massachusetts has set a safe level for perchlorate at 2 ppb.

EPA's own children's health experts concur. In March, 2006, the EPA's top independent scientific advisory group on children's health, the Children's Health Protection Advisory Committee, wrote a very strong letter to the EPA Administrator arguing that the 24.5 ppb PRG is not protective of children (CHPAC 2006). The agency ignored the advice of its own children's health experts and in May of 2006 responded that it was standing by the guidance (EPA 2006b).

In September of 2006, the Centers for Disease Control and Prevention (CDC) published the first major epidemiological study on the potential health impacts of chronic perchlorate exposure. This landmark study of 1,100 women, which correlated measured perchlorate in urine with thyroid hormone levels, found a statistically significant, dose-dependent association between perchlorate exposure and changes in thyroid hormone levels in all women in the study (Blount et al 2006a). This study showed convincingly that measurable adverse health effects from perchlorate exposure occur at levels previously thought to be safe, and at exposure levels commonly experienced in the population.

The effects on thyroid hormones were particularly pronounced in women with lower iodine intake. Among these women, a urinary perchlorate level of only 5 parts per billion was associated with a 16 percent change in thyroid hormone levels, compared to the median level found in the study. The authors noted that 36 percent of U.S. women have iodine intakes in the range identified as "lower" in the study (Blount et al 2006a). For about 1 in 10 of these women, if they were exposed to 5 parts per billion of perchlorate in drinking water, the resulting hormone disruption would require treatment for sub-clinical hypothyroidism, according to a consensus of clinical endocrinologists (Cooper 2004, EWG 2006).

In response to questions from Republican Congressmen Joe Barton and John Shimkus of the House Committee on Energy and Commerce challenging these findings, the CDC was extraordinarily clear: "We do not think that confirmatory analysis is necessary to validate Blount's analysis of the NHANES data," showing that perchlorate exposure is tightly linked to lowered thyroid levels in one third of American women (CDC 2007). Adding that, "Although we understand that conclusions of causality can rarely be drawn based on a single study, when viewed within the context of the available literature, the findings of the Blount study are consistent with causality."

Although the EPA assumes that exposure to 24.5 ppb perchlorate in drinking water will have no adverse effects, the CDC study established that much lower exposures were having measurable, harmful effects on women's thyroid hormone levels (Blount et al. 2006a). EPA's safe dose, or RfD, is based on questionable interpretation of

perchlorate exposure in 36 adults. The CDC study is based on real-world measured perchlorate levels in more than 1,100 women, the population of concern.

Although the CDC study did not look at perchlorate exposure in children, the findings are worrisome because children are especially vulnerable to perchlorate. The FDA study of perchlorate in food shows that children have higher baseline exposure to this contaminant from food when compared with adults (Murray et al. 2008). The combined evidence from the FDA and CDC studies shows that young children have daily perchlorate exposures from food at levels that have been shown to cause statistically significant changes in thyroid hormone levels in women with lower iodine levels (Blount et al. 2006, Murray et al. 2008, EWG 2008). This is especially concerning because any decrease in thyroid hormone levels in children can disrupt normal growth and development (CHPAC 2006, Ginsberg et al 2007, Zoeller et al 2002). If these children live in any of the 28 states in which drinking water is contaminated with perchlorate, their exposure is even greater.

Trichloroethylene, or TCE

While my testimony has focused on perchlorate, I do want to touch on trichloroethylene (TCE). TCE is a colorless, liquid metal degreaser with military, industrial, maintenance, and consumer uses. According to ATSDR, TCE is pervasive in the environment and has been found in water systems, foods and the air. According to ATSDR, inhaling or drinking TCE can lead to disorientation, coma and death. The National Toxicology Program has found that trichloroethylene is "reasonably anticipated to be a human carcinogen," the International Agency for Research on Cancer has determined that trichloroethylene is "probably carcinogenic to humans," and the National Academies of Science has found that TCE is associated with cancer in humans. TCE has also been linked to neurotoxic, developmental, reproductive and teratogenic effects (ATSDR 2003, NRC 2006).

Like perchlorate, EPA delayed setting a safe drinking water standard for TCE for years, needlessly exposing the public to this dangerous chemical. Unlike perchlorate, EPA did finally set a safe drinking water standard of 5 ppb for TCE in 1989, ten years after the issuance of nonenforceable guidance. Only then did DoD begin to take action to control TCE (Stephenson 2007). Unfortunately, the last two decades of science have shown us that the current drinking water standard does not protect public health and must be lowered.

Congressional Action is Needed

This testimony and the attached timeline document a 50-year orchestrated campaign by the Pentagon and perchlorate polluters, later joined by the White House and ultimately the EPA, to avoid public health protections from perchlorate at all costs.

It is abundantly clear that without congressional intervention the public will not receive the protection that is so clearly justified by the science, and so obviously

necessary given universal human exposure and clearly identified high-risk populations including infants, children, and women of child-bearing age and their babies.

Environmental Working Group commends Senator Boxer for her leadership on this issue and strongly urges this Committee to move quickly to pass *The Protecting Pregnant Women and Children From Perchlorate Act of 2007*, S. 150, and Senator Clinton's *Toxic Chemical Reduction Act of 2007*, S.1911. We can delay no longer – the time for action is now.

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