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## A LITTLE ROCKET FUEL WITH YOUR SALAD?

by Gene Ayres

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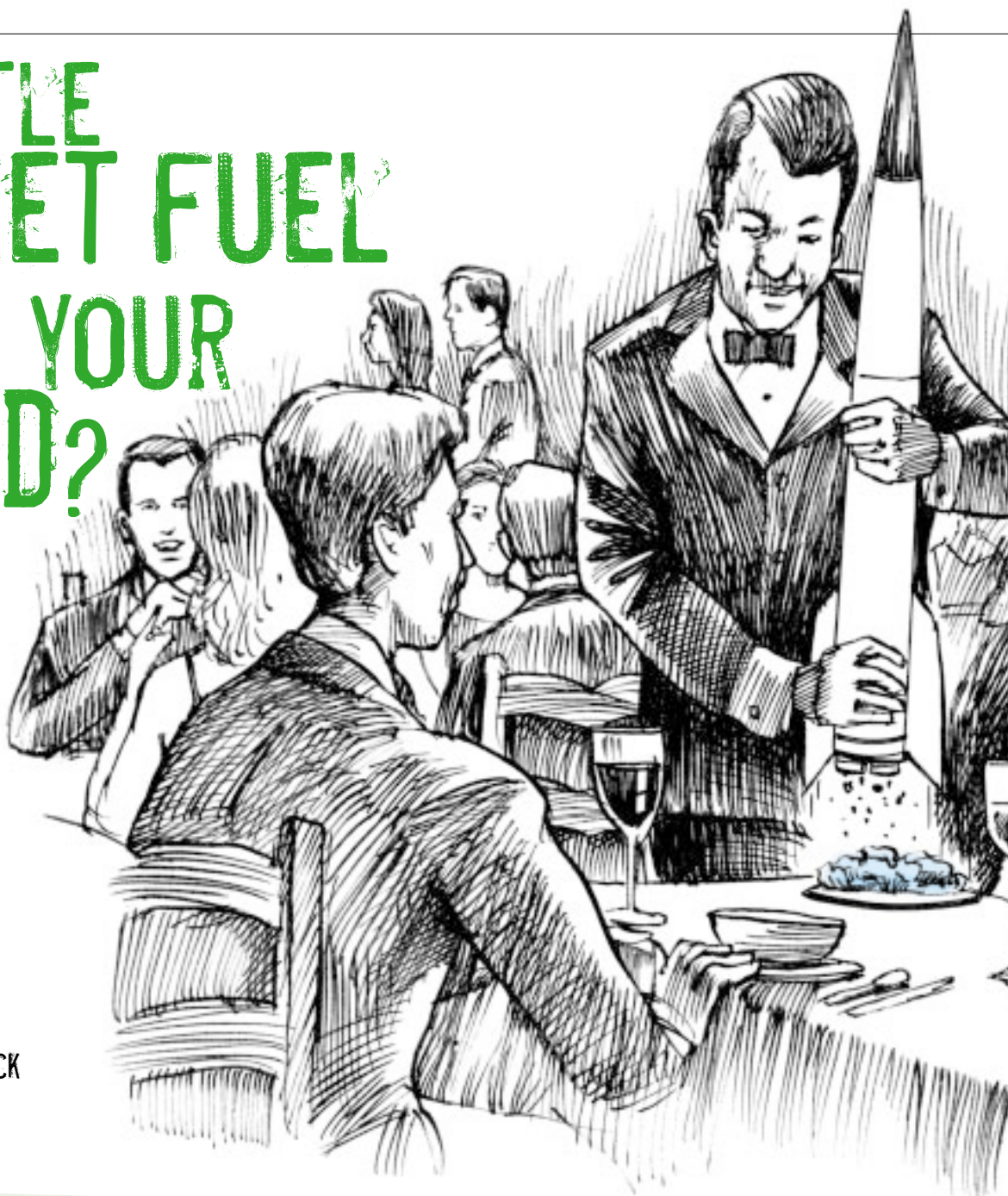
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# A LITTLE ROCKET FUEL WITH YOUR SALAD?

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**I SPENT TWO DECADES** living in Southern California, during which time I married, fathered a child, got divorced, and became a single parent. I finally left the Golden State in 1989, taking my young son with me because I was concerned about his health. It wasn't just the smog, although that was bad enough around our house in the San Fernando Valley, where chronic inversions turned the sky over the San Gabriel Mountains the color of dried blood. My son had been born with myriad allergies, and had experienced a terrifying reaction to the DPT vaccine (screaming fits suggestive of being tortured).

Then came the medfly. It was 1988, and I can still recall the sight of the State agricultural commissioner going on TV and dramatically drinking a glass of

malathion to reassure a panicky public that, despite the conspicuous presence of a skull and crossbones on all malathion containers (the pesticide was readily available at most garden centers), it was really quite harmless. Of course, we only had the man's word on that, as well as on what was really in his glass, but it was a classic case of the "as-seen-on-TV" school of credibility.

What had prompted this extraordinary demonstration was the discovery of a single medfly in the Port of Long Beach, some 20 miles south of Los Angeles. The big citrus producers had few, if any, commercial groves south of Ventura County, which was two mountain ranges north of Los Angeles. No matter. The medfly was capable of destroying entire groves of citrus, which would cost state growers untold millions. Governor



George Deukmejian declared a state of emergency. The Air National Guard was called out to begin spraying with malathion, despite howls of protest from the 11 million inhabitants of Los Angeles. Within a matter of weeks, as the panic in Sacramento spread south along the Central Valley, scores of choppers swarmed the skies over southern California, coming out at night like bats, to saturation-spray the entire urban area. It soon became apparent that malathion could take the paint off your car, but we were assured it was harmless to humans.

At the time I was recently divorced, and my son's

mother and I had separate households a few miles apart. We would trade phone calls, warning, "They're coming!" "Move your car, they're headed your way!" And then a nervous, "They're here!" Our son was acting up by then, having increasingly bad attacks of asthma, and developing behavioral problems. By age four, to make matters worse, he'd been diagnosed with attention deficit disorder (ADD).

We decided we'd had enough. It was agreed I would pack up, take the boy, and head for Florida, where my parents lived.

## AN INTRODUCTION TO ROCKET FUEL

Florida, however, proved to be anything but a safe haven. Within a few years of our move, a medfly turned up in the Port of Miami. Florida's response, while it didn't include drinking pesticide on TV, was if anything even more draconian. Florida, like California, is the turf of large agribusiness concerns, especially citrus growers. Like their West Coast counterparts before them, they flew into a panic. This, of course, led to the now no-longer-unprecedented decision to mount a preemptive strike. The state legislature quickly passed a new law, written (as since has become common practice) by the affected industry. The Florida law required that all citrus trees within 1,800 feet of an infected tree (the evident roving range of the average medfly) be destroyed. In the years since, the flies have continued to creep northward, and commercial groves and private yard trees alike have fallen before them. Lawsuits, protests, and petitions have done nothing to slow this preemptive juggernaut.

Not long after my move to Florida, my thyroid gland ceased functioning. I learned later that my ex-wife, as well as my brother Ed, both of whom had lived in California in those years, had also suffered hypothyroid disease. Doctors still don't know the cause, although—as we'd eventually learn—they have some suspects. In my case they blamed an unknown virus.

It wasn't until years later that we found that malathion wasn't the only toxic chemical to which we'd been exposed during our time in California. On December 16, 2003, *The Wall Street Journal* published an article by investigative reporter Peter Waldman on the history of California's experience with a chemical called perchlorate, a component of rocket fuel dating back to the first solid-fuel rockets of World War II. Perchlorates are actually a group of salts—ammonium perchlorate, potassium perchlorate, sodium perchlorate, cobalt perchlorate, and a score of others. They were developed mainly as oxidizer components for propellants and other explosive materials (including flares





and fireworks) in the 1940s, emerging into a full-bore industry during the Cold War buildup of the 1950s. They have more recently turned up in such diverse products as automobile airbags and certain fertilizers, particularly those produced in Chile.

Despite repeated efforts by California water managers and regulators to stop the dumping of rocket fuel and related toxic chemicals into the state's groundwater and wastewater systems, defense contractors such as Lockheed Martin and Aerojet General pumped and dumped millions of gallons of these chemicals into unlined pits or holding ponds, or injected them deep into the ground. They did this with impunity, considering themselves answerable only to the U.S. Department of Defense (DOD), whose view on the subject, according to Waldman, was that "its job is national security, not environmental safety." That view seems to persist today, as reflected in the recent push by DOD to attain wide-ranging exemption from environmental regulation and restriction.

The U.S. Environmental Protection Agency (EPA) has a very different view than DOD, although no one in either organization denies that perchlorates are highly toxic. No one from DOD has volunteered to drink a glassful of the stuff, to my knowledge. Nineteen recent studies tracked by the Washington-based Environmental Working Group (EWG) between 1997 and 2002 have associated perchlorates with thyroid damage ranging from metabolic and hormone disruption

to cancer in adults, and with impaired neurological and bone development in fetuses. They have linked the chemical to reduced IQs, mental retardation, loss of hearing or speech, deficits in motor skills, and (surprise, surprise) learning disorders and ADD in children. Studies in rats have found tumors developing at extremely early stages. And these studies only focus on the apparent effects of perchlorates in water. EPA scientists now believe that the levels of this chemical to which Californians and others are being exposed are far too high. And they wonder what happens when huge quantities of this water pass through the

roots of irrigated vegetable crops and end up concentrating in someone's salad.

## WHO WORRIES ABOUT MISSILE FUEL IN OUR FOOD, WHEN THERE'S A MISSILE CRISIS IN OUR BACK YARD?

Perchlorates were first developed by a group of aeronautics engineers at the California Institute of Technology in Pasadena, led by a Hungarian immigrant professor named Theodore von Karman. He and a group of colleagues from the university founded Aerojet, which pioneered "jet-assisted" takeoff rockets that enabled the new generation of military jets to take off from the decks of aircraft carriers. They also developed the Minuteman missile. The developers dubbed perchlorates "powdered oxygen" for their rapid and intense combustibility.

As it happens, these chemicals break down over time, and require replacement—hence the large-scale dumping over the decades. Aerojet was first warned to stop dumping as early as 1949, at its Azusa manufacturing plant east of Pasadena, by Los Angeles County engineers who even then were aware of the likely dangers to groundwater. Aerojet ignored those warnings and many others that followed, and received

no sanctions. At one point, to further facilitate its perchlorates disposal, the company hooked itself up to a public sewer line.

In 1951, Aerojet moved north to Sacramento and the suburb of Rancho Cordova. According to Peter Waldman, the company's unlined holding ponds and pits leached up to 1,000 gallons of liquid waste and 300 pounds of ammonium perchlorate into the local aquifer every day. Today, a number of families there are suffering from cancer and other ailments alleged to be attributable to perchlorates. With Southern California left eating Aerojet's dust, other authorities took up the pursuit. In 1952, the California Central Valley Regional Water Pollution Control Board issued a resolution specifically intended to block further dumping of perchlorates into local groundwater or the nearby American River. Nothing changed. Aerojet's defense was

that, according to guidelines issued by the DOD, its unlined holding ponds and pits were quite adequate methods of disposal.

By 1957, an underground toxic plume had spread across several square miles east of Sacramento. According to a national task force and *The Wall Street Journal*, the plume ranged in perchlorates concentration from 3.5 to 5 parts per billion (ppb). Surely, scientists began to hypothesize, this had to be bad for you. That year, a study at Harvard University found that perchlorates passed through the placenta of guinea pigs and affected the development of the thyroid and its hormones that regulate growth and development.

Still, Aerojet continued its stonewalling, even refusing to disclose exactly what chemicals it was using. In 1962, the board tried again, passing a resolution prohibiting Aerojet from disposing of anything "deleter-



ous to human, animal, plant, or aquatic life.”

At this point, national security once again assumed priority—in the form of the Cuban Missile Crisis. Nothing I have seen in the accounts of that time suggests that anyone saw any irony in the possibility that American missiles might be poisoning the American people in order to protect them from a theoretical attack by missiles from another country.

And so, again, nothing changed. Over the ensuing decades, thousands of tons of these toxic chemicals were deposited into open ditches, canals, holding ponds, and pits. Only in 1985 did perchlorates finally become a “drinking water problem,” when they were detected by the EPA in wells serving 42,000 households in the vicinity of Aerojet’s original plant in Azusa, back in Southern California.

In 1992, the EPA turned to the Centers for Disease Control in Atlanta for help. CDC declared that “the effects of low level perchlorate ingestion need to be described as soon as possible.” So the EPA went back to the 1952 Harvard study linking the chemicals to thyroid damage, and issued its first health assessment, recommending an “initial reference dose” of no more than 4 ppb in drinking water. In response, DOD insisted that the reference dose should be 42,000 ppb. The dispute remains unresolved, although DOD has since shifted its estimate of acceptable levels sharply downward. While EPA holds firmly to its recommended level of 4 ppb, the people who brought us Agent Orange and Gulf War Syndrome now tell us that 200 ppb is safe.

## THE UNLUCKY EMPLOYEES OF LUCKY FARMS

The concept of bioaccumulation has become chillingly familiar to those who have followed the stories of PCBs, mercury, and other contaminants that may be found

### PRECAUSION SOBRE EL AGUA DE LAS PIPAS DE RIEGO

Esta nota es para informarles de los peligros de el agua de las pipas de riego. El agua de las pipas “NO SIRVE” para tomar, ni tampoco el agua de las pipas pintadas de rojo. Podría causar cáncer o defectos de nacimiento. Favor de tomar agua solamente de la que se especifique como agua “BUENA”, de los barriles o recipientes anaranjados o de la llave que esta el el shop (taller).

### PRECAUTION CONCERNING IRRIGATION WATER FROM THE SPRINKLERS.

I have been informed of the dangers if I drink irrigation water from the sprinklers, valves, or faucets that are marked red. This water may cause cancer or birth defects. I know that I am only to drink water from the orange coolers. And drink only from the water specified as “good” water, which is the faucet located by the shop.

Yanival de la Torre  
Nombre del empleado-Employee name

1889  
Numero del empleado-Employee number

11/09  
Fecha-Date

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in low levels in insects or algae, but that concentrate as they rise through the food chain. The same kind of concentration can occur as polluted ground water is consumed by irrigated plants.

The first clues that perchlorates were accumulating in vegetables emerged around October 1996, when a commercial grocers’ farm, Lucky Farms of San Bernardino, California, began handing a release form to its employees—“todos los empleados”—which it required them to sign. The disclaimer stated, in English and Spanish:

I have been informed of the dangers if I drink irrigation water from the sprinklers, valves, or faucets that are marked red. This water may cause cancer or birth defects. I know that I am only





times that amount.

A flurry of behind-the-scenes legal activity quickly followed. By May 7, 1998, Lockheed Martin had engaged the services of the Los Angeles law firm of Gibson, Dunn & Crutcher to represent it in a secret settlement agreement with Lucky Farms. Evidently intimidated by the defense contractor's heavy guns being brought to bear, Lucky Farms backed off making any threat of a lawsuit. Lockheed Martin, in turn, generously offered to pay for the cost of Weck Laboratories' testing—an offer that was apparently accepted, because no further action was taken. Instead, Lucky Farms continued to require signed releases from its employees (see documents, page 16) and continued with

business as usual, at least until 1999. Lettuce continued to be shipped to markets throughout the country.

In 1999, the EPA swung ponderously into action, ordering a study by its National Environmental Research Laboratory in Athens, Georgia. The new study found that perchlorate accumulated in leaves by factors of 100 or more times the agency's recommended levels. The researchers also found that lettuce leaves were capable of absorbing and storing up to 95 percent of the perchlorates in the water supply. This meant that even small levels of perchlorate in the water could concentrate into extremely high levels in the lettuce leaves.

Curiously, the EPA discounted this study due to the fact that the water used in the study had excessive

## HAVE YOU HEARD THIS ONE BEFORE?

The perchlorate story brings together three all-too-familiar themes of the modern military-industrial saga:

**First**, there's the technological hubris that so often surrounds a major new invention. Immediate beneficiaries become so focused on the invention's primary intended use that they overlook the secondary, often slower-acting and less visible, effects on health or the environment. The dramatic Cold War takeoff of the rocket industry, with little thought to its eventual, insidious effects on the health of millions of people, parallels the histories of many other lucrative technologies—from thalidomide to DDT to breast implants—that have been rushed into use. Not coincidentally, the fiery power of rockets, and the apparent lack of thought about what longer-term effects might follow, was replicated on a grand scale in the "shock and awe" with which the U.S. launched its rocket-raining war on Iraq.

**Second**, there's the secrecy and denial—and attempted coverup—that repeatedly accompanies the rise or perpetuation of highly risky but lucrative industries. Think of the decades-long coverup of the health effects of tobacco smoke, or the chemical industry effort to destroy the credibility of Rachel Carson after the publication of her book *Silent Spring*, or the Cheney-Bush administration's collusion with fossil-fuel industries to distract public attention from the dangers of climate change, which far exceed those of terrorism but pose an unwanted challenge to those industries. In the case of perchlorates, it's likely that a large part of the coverup has yet to be exposed. But already, there's a telling pattern—

in the Air Force's dog-ate-my-homework story that someone stole its study results; in the refusals of Lucky Farms or Weck Labs to speak; in the Department of Agriculture's unexplained cancellation of a perchlorate study for *other* irrigated crops (what about our tomatoes, chard, and grapes?); and most of all, in the White House gag order that has made both the EPA and the Pentagon clam up. We talked with a top official of EPA's San Francisco office, who said his agency had worked long and hard to determine its recommended level of 4 ppb, and was prepared to make those recommendations final, when "someone" stepped in and requested that the data be turned over to the National Academy of Science for review. And there, so far, it has remained.

**Third**, and perhaps most dangerous of all, there is the familiar presumption—once unthinkable but now pervasive—that scientific findings are not matters of public knowledge but proprietary industrial or government information that the holders need disclose only if it is to their financial or political advantage to do so. While the rocket-fuel contamination is mainly an American problem (it's mainly Americans who make and shoot off rockets), the water that flows through our lettuce—and through the Earth's hydrological cycle—is a global commons. The knowledge of what happens to it is an essential part of the global public domain. So, why are all the unanswered questions about perchlorates being treated like a national security secret? The need to keep our water clean is common sense, not rocket science.





amounts of perchlorates in it and was presumably not representative of typical California irrigation water, though these doses weren't anywhere near the concentrations of those found in the Rancho Cordova and Azusa plumes. Even more curiously, EPA also concluded that "foods do not contribute to" perchlorate accumulation in the human body—an assertion that appears to be directly contradicted by the 1952 Harvard study and the 19 studies that followed.

## SHADES OF SILKWOOD

By 2002, sources of perchlorates in irrigation water were being traced to the Colorado River, which was found to be seriously contaminated from Las Vegas to the Mexican border. This was especially troublesome news, since Colorado River water was the sole source of irrigation water for the entire Coachella and Imperial Valley regions, which produce 90 percent of America's lettuce. On July 14, 2001, *The Sacramento Bee* reported that 20 million people in California, Arizona, and Nevada had some level of perchlorates in their drinking water, averaging between 5 and 10 ppb. According to *The Wall Street Journal*, scientists have traced perchlorates found in the Los Angeles water supply 400 miles up the Colorado River to Lake Mead, above Hoover Dam. From there, according to the *Journal's* Waldman, they tracked the plume 10 miles west up a desert riverbed called the Las Vegas Wash, to a giant ammonium perchlorate plant in Henderson, Nevada, owned and operated by Oklahoma City-based Kerr-McGee Corporation. The Las Vegas

Wash is the main drain leading into Lake Mead, the primary source of water for Las Vegas and the lower Colorado River.

Kerr-McGee is the company that was featured in the movie *Silkwood*, based on the story of Karen Silkwood, a chemical technician at the company who claimed that her employer was exposing its unwitting employees to plutonium radiation. Silkwood was killed in an unwitting one-car crash while gathering evidence implicating the company. This time, rather than trying to hide its involvement and providing the plot for another movie, Kerr-McGee has sued the Pentagon for reimbursement of cleanup costs. Its plant is now closed but continues to leak 900 pounds of perchlorate a day into the Las Vegas Wash.

Other lawsuits have been filed as well, including a class action suit by the residents of Rancho Cordova, where Aerojet operated with impunity all those years. Many residents there have developed thyroid and other cancers. These suits, against Lockheed Martin and others, have gone nowhere, except to the extent that the State of California agreed to pay the cost of a suit by a Rancho Cordova water company that, according to *The Sacramento Bee*, "accuses pollution enforcers of having willfully allowed Aerojet Corp. to contaminate the ground water with rocket fuel." So, Aerojet continues to escape unscathed, while the people who tried for decades to stop it from perchlorate dumping end up taking the hit.

In April 1999 the EPA convened an "eco-summit" of representatives from the Air Force (the prime perchlorates consumer, other than NASA), a coalition of

perchlorate manufacturers and users called the Perchlorate Study Group, and members of five Indian tribes whose livelihoods are based on produce farming along the lower Colorado River. The DOD promised a grant of \$650,000, or less than one-fourth the cost of a single cruise missile, according to *The Los Angeles Times*, for a so-called “real world” study that would test a variety of crops through the auspices of the U.S. Department of Agriculture. Then, after consultations with the Food and Drug Administration, the project was indefinitely postponed.

Instead, the Air Force, according to records obtained through the Freedom of Information Act by *The Riverside (CA) Press-Enterprise*, obtained a \$500,000 grant from DOD earmarked for two studies: perchlorates in crops, and perchlorates in wild plants and animals. Yet the first study, it seems, was never done—or if it was, the findings were never disclosed. Other documents, obtained by the Environmental Working Group, indicate that the Air Force did in fact conduct a second study of greenhouse-grown lettuce. In October 2002, at an industry-sponsored perchlorate conference in Ontario, California (not far from Aerojet’s original plant in Azusa), EWG questioned Air Force spokesman David Mattie about the second lettuce study and was told that the study had in fact been completed, but “someone walked away with the data.”

When prodded for the results under the Freedom of Information Act, the Air Force then claimed that any findings are “fully exempt from disclosure until the formally sponsored EPA peer review is complete.”

In the spring of 2003, the lettuce finally hit the fan. On April 2, California’s U.S. Senator Diane Feinstein accused the Defense Department of “dragging its feet in the cleanup of rocket fuel from old military facilities, which state officials say has contaminated hundreds of wells in California.” On April 27, reporters David Danelski and Douglas Beeman of *The Riverside Press-Enterprise* released the results of a study commissioned by the newspaper of 18 winter lettuce samples and one mustard greens sample harvested in the Imperial and Coachella Valleys, both irrigated by the Colorado River. All 19 samples tested were found to be contaminated with perchlorates. A spokesman for the U.S. Department of Agriculture insisted that the levels found by *The Press-Enterprise* were too low to pose a health risk, but nevertheless expressed concern that other crops might also be contaminated.

The day after the *Press-Enterprise* story, the EWG released its own study of 22 samples of lettuce purchased at Northern California supermarkets. EWG had found four to be contaminated with perchlorates. This study received more national attention than the *Press-Enterprise* one, possibly because some of the EWG findings, based on tests conducted at Texas Tech University,

showed levels of contamination “as much as 20 times as high as the amount California considers safe for drinking water.”

In the meantime, renewed attention was focused on the EPA, which while talking tough about recommended levels, has yet to make any firm decision pending a peer review by the National Academy of Sciences. EPA said it needed to see the review before it could issue any regulations, reports, or guidelines on the subject of perchlorates.

So what has become of that review? EPA has been less than forthcoming on this subject. Sometime in the weeks since the most recent revelations of the presence of perchlorates in the U.S. food supply, the White House issued a gag order to the EPA prohibiting its researchers or scientists from discussing perchlorates with the press. Interestingly, during the unfolding of these events, EPA chief Christine Todd Whitman resigned. Calls requesting information on this matter have gone unanswered, but Whitman’s home state of New Jersey is one of many states threatened by the discovery of perchlorates in its water. Furthermore, New Jersey—“The Garden State”—is one of the country’s biggest sources both of vegetable produce and of perchlorate manufacturing.

California Congresswoman Lois Capps, in quick response to the two lettuce studies, wrote to the White House—together with 57 other members of the House of Representatives—demanding explanation and rescinding of the reported EPA gag order, noting that “perchlorate is known or suspected to be a contaminant in hundreds of locations in 43 states. It has been confirmed in more than 100 drinking water sources in 19 states including Texas, California, Arizona, Nebraska, Iowa, New York, Maryland, and Massachusetts.... It is highly disturbing to think that the agency charged with protecting our environmental health and safety could be barred from discussing an increasingly prevalent and potentially dangerous chemical contaminant like perchlorate. Americans deserve to get information from the scientists who work on their behalf. President Bush should see to it that this ‘gag order’ is lifted immediately.” The White House did not respond.

Meanwhile, while the EPA has since shown a willingness to talk with *World Watch* about the issue and openly acknowledges the gravity of the situation, it has still not established any firm safety standards for perchlorates, which remain completely unregulated at both the state and Federal levels. At a time when the secretary of defense often seems to hold as much sway as the Congress, which makes the laws, the Pentagon doesn’t want standards. So far, Kerr-McGee is the only defense contractor to have voluntarily embarked on cleaning up its mess, which in its case was inherited from an old Navy lab at the same site.