

Sent: Friday, February 27, 2009 1:40 PM

Subject: FORUM Q & A: UPDATE #2 -- CHROMIUM 6 ESTABLISHED AS CARCINOGEN

Dear Aquathin Dealer OnLine;

Research concludes that Chromium IV is a carcinogenic via both air and drinking water. In recent months, we've had Dealer inquiries over removing Chromium IV as far as Aquathin Hellas in Greece. Please read the update below.

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Alfred J. Lipshultz

President & CEO

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Chromium carcinogenic in drinking water; new standard in the works

Hexavalent chromium, the controversial 'Erin Brockovich' chemical, is carcinogenic in drinking water, scientists have concluded. California will soon propose a new health guideline for water supplies.

By Marla Cone

Editor in Chief

February 20, 2009

A controversial water contaminant made famous by Erin Brockovich and a small California desert town is carcinogenic.

That conclusion by federal scientists, culminating more than a decade of debate, is likely to trigger new, more stringent standards limiting the amount of hexavalent chromium allowable in water supplies.

It's been known for about 20 years that people can contract lung cancer when inhaling hexavalent chromium, also known as Chromium 6. But until now, toxicologists have been uncertain whether it causes cancer when swallowed.

National Toxicology Program scientists reported that their two-year animal study “clearly demonstrates” that the compound is carcinogenic in drinking water. Mice and rats contracted malignant tumors in their small intestines and mouths when they drank water containing several different doses of hexavalent chromium.

“I think it’s resolved, as much as it can be resolved,” said George Alexeeff, deputy director of scientific affairs at California’s Office of Environmental Health Hazard Assessment.

Based largely on the new cancer findings, California and U.S. Environmental Protection Agency officials are re-evaluating what concentration is safe in water supplies. Within a few weeks, California is expected to announce a proposal to set a new health guideline.

The Mojave Desert town of Hinkley, population of around 1,900, has the highest levels of hexavalent chromium reported in U.S. ground water. The compound seeped into water there from a Pacific Gas and Electric facility that used it to inhibit rust in cooling towers and discharged it into holding ponds in the 1950s and 1960s.

In 1996, PG&E paid a \$333 million settlement to about 600 residents of Hinkley after Brockovich, a law clerk, investigated the contamination and found high rates of cancer and other diseases. The town's plight drew national attention in 2000 from a film based on Brockovich's legal crusade. The payment was the largest tort injury settlement in U.S. history.

The animal study does not prove that people in Hinkley contracted cancer from drinking the tainted water. But it does resolve the debate over whether the contaminant is capable of causing some types of cancer.

Roberto Gwiazda, an assistant researcher at University of California at Santa Cruz’s Department of Environmental Toxicology, called the new study a “milestone,” saying it “settles the issue.”

However, Gwiazda said, using the new research “to support a drinking water standard is a different matter” because extrapolating it to humans remains controversial.

Hinkley’s ground water contained concentrations as high as 580 parts per billion, more than 10 times California’s current drinking water standard of 50 ppb for total chromium compounds. The national standard is 100 ppb.

Because of the cancer uncertainty, California has had a tumultuous history of setting water standards to protect people from chromium.

In 1999, after the Hinkley case, California set a water guideline, called a Public Health Goal, of 2.5 ppb. It was based on a 1968 study in Germany that found stomach tumors in animals that drank the substance. However, the U.S. EPA rejected that study as flawed and determined there was no evidence it was carcinogenic in water. California’s scientific advisors

agreed, so the state rescinded its goal in 2001 and reverted to the 50 ppb standard, which was adopted in 1977 and based on the risks of skin irritation, not cancer.

The debate focused on whether hexavalent chromium is neutralized in the stomach by gastric acids that turn it into Chromium 3, an essential nutrient.

California officials, seeking to resolve the controversy, asked the National Toxicology Program to conduct animal tests.

The study, published online in *Environmental Health Perspectives* in December, shows that although some of the substance is reduced in the stomach to Chromium 3, it's not enough to avoid toxic effects.

"Since they found tumors in the small intestine, that shows it was not eliminated in the stomach," Alexeeff said.

Cancer in the small intestine is "relatively rare" in animals, even those exposed to other chemicals, the scientists reported. In addition, chromium caused mouth cancers, and infiltrated the cells of many organs, including livers and pancreatic lymph nodes.

Mice and rats were exposed to four different doses, and they contracted cancer at lower levels than in the 1968 study, according to Michelle Hooth, a toxicologist at the National Institute of Environmental Health Sciences who was the study's lead scientist.

That suggests California's new goal could be as stringent as the rescinded 2.5 ppb one.

Chromium is widely used in metal plating, stainless steel production, wood preservation and textile manufacturing. It has been detected in 30% of drinking water sources in California, at levels mostly under the existing 50 ppb state standard, according to the state health department.

Some of the rats and mice developed malignant intestinal tumors when fed doses as low as 57,000 ppb—100 times higher than the Hinkley water levels—for up to two years, Hooth said. The higher the dose, the more cancers found among the animals.

When setting a standard, scientists use high animal doses to extrapolate to a lower dose designed to protect people from a 70-year lifetime of exposure. Water standards are usually designed to keep the cancer risk to one case in every million or 100,000 people.

Gwiazda, who has served on EPA and California scientific advisory panels, said extrapolating the animal findings for humans creates uncertainty because the rodents had to be fed higher doses.

He said applying the data to humans assumes that the rodents' stomach eliminated the same fraction of chromium 6 at high doses that the human stomach would at lower doses.

"This assumption is flawed in my view because the stomach has a very high reducing capacity," Gwiazda said.

As a result, such extrapolations could lead to an overly restrictive water standard, he said. "On the other hand," he added, "there is probably a subpopulation of sensitive individuals with diminished stomach reducing capacity due to illness." For those people, a standard based on the animal data "may not be protective enough," he said.

There also is human evidence that drinking hexavalent chromium can cause cancer. A study in China found high rates of stomach cancers in people whose water was contaminated with so much chromium from a smelter that it had turned yellow.

California state scientists will release their draft Public Health Goal for public comment "within the next couple of weeks," said Sam Delson, the Office of Environmental Health Hazard Assessment's deputy director of external and legislative affairs.

The new study, Alexeeff said, "is a large foundation of our results." The National Toxicology Program released some of its initial data last year, but the full report came out in December.

The number that Alexeeff's staff recommends will then be used by the state's health department to formulate a maximum allowable amount for water supplies. The health department factors in the cost and technical feasibility when it sets that standard.

"We come up with a goal, and it's up to the health department to propose a maximum contaminant level," Alexeeff said.

U.S. EPA officials also are evaluating the national 100 ppb standard and plan to release their results this fall. The agency is required by federal law to review water standards every six years. The EPA had adopted a more stringent chromium standard in 1977 but raised the allowable amount in 1991 in response to the lack of cancer evidence.

EPA spokeswoman Enesta Jones said Thursday that hexavalent chromium is among 20 compounds selected in 2008 for review by the agency's Office of Research and Development. When officials there analyze all scientific literature, including the new study, they then will decide whether to change the old toxicity levels used to set standards for water and soil cleanup, she said.

Cleanup of Hinkley's contaminated water--an underground plume that is two miles long and one mile wide--began in the late 1980s and is continuing, according to California Water Resources Control Board documents. The contamination is still spreading, so the state issued its latest cleanup order to PG&E in August.

Brockovich, now president of a consulting firm, has since fought other legal battles related to chromium and other pollutants.

From: AQUATHIN TECH SUPPORT [mailto:techsupport@aquathin.com]
Sent: Thursday, May 31, 2007 3:52 PM
To: Info@Aquathin.Com (info@aquathin.com)
Subject: FORUM Q & A: UPDATE CHROMIUM 6 ESTABLISHED AS CARCINOGEN

Dear Aquathin Dealer OnLine, Splash NewsBulletin and Allergic Reaction NewsBulletin Members;

Back in August 2002, I emailed you the first Forum Q & A discussing Chromium 6 (pasted below for your convenience, and published on the Aquathin Website at Banks). Chromium 6 has evolved from "causing nosebleeds, etc." to "proven carcinogen" as you will read below in the article from the National Institute of Health Sciences. It is yet another example, as I have previously discussed, how our protection system handles newly discovered contaminants. To review, a new revolutionary chemical is produced to enhance a process or product > that chemical later shows up in the environment outside its intended use > that government agencies advise no concern because of low concentrations and low potential for harm > then discovers increasing concentrations that may cause i.e. rashes > then given MCL status and value > followed by lower MCL values due to carcinogenic concerns now in study > to carcinogen. And during these years, we continue to be exposed. **The Patented Aquathin RODI Process easily removes Chromium 6.**

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Alfred J. Lipshultz, President

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Source: [NIH/National Institute of Environmental Health Sciences](http://NIH/National Institute of Environmental Health Sciences)

Date: May 17, 2007

## **Chromium 6 In Drinking Water Causes Cancer In Lab Animals**

*Science Daily* — Researchers announced recently that there is strong evidence a chemical referred to as hexavalent chromium, or chromium 6, causes cancer in laboratory animals when it is consumed in drinking water. The two-year study conducted by the National Toxicology Program (NTP) shows that animals given hexavalent chromium developed malignant tumors.

"Previous studies have shown that hexavalent chromium causes lung cancer in humans in certain occupational settings as a result of inhalation exposure," said Michelle Hooth, Ph.D., NTP study scientist for the technical report. "We now know that it can also cause cancer in animals when administered orally."

The study findings were announced at the National Institute of Environmental Health Sciences (NIEHS) after the NTP Board of Scientific Counselors Technical Reports Review Subcommittee completed its independent peer review of the sodium dichromate dihydrate research report. Sodium dichromate dihydrate is an inorganic compound containing hexavalent chromium that was used in the NTP studies. The NTP is located at the NIEHS, part of the National Institutes of Health.

Hexavalent chromium compounds are often used in electroplating, leather tanning, and textile manufacturing and have been found in some drinking water sources.

Male and female rats and mice were given four different doses of sodium dichromate dihydrate in their drinking water ranging from 14.3 mg/l to 516 mg/l for two years. The lowest doses given to the animals in the study were ten times higher than what humans could consume from the most highly contaminated water sources identified in California.

The researchers report finding significant increases in tumors at sites where tumors are rarely seen in laboratory animals. Male and female rats had malignant tumors in the oral cavity. The studies conducted in mice found increases in the number of benign and malignant tumors in the small intestine, which increased with dose in both males and females.

"We found that hexavalent chromium is absorbed from the gastrointestinal tract," said Hooth. "After it is orally administered, it is taken up by the cells in many tissues and organs."

Hexavalent chromium has been brought to the public's attention in many ways, most notably in the movie "Erin Brockovich." Eleven members from the California Congressional Delegation sent a letter to the NTP Director requesting the NTP conduct the studies. Nominations for studying this compound also came from the California Environmental Protection Agency and the California Department of Health Services. The NTP began work on this compound after gaining input from the public and a panel of scientific experts about the study design.

The two-year study is one of several studies that NTP has completed on this chemical.

Note: This story has been adapted from a news release issued by NIH/National Institute of Environmental

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From: AQUATHIN TECH SUPPORT [mailto:techsupport@aquathin.com]

Sent: Tuesday, August 27, 2002 9:09 AM

To: Info@Aquathin.Com

Subject: FORUM Q & A: WHAT IS CHROMIUM 6 AND WHAT DISEASE(S) DOES IT CAUSE

Dear Aquathin Dealer OnLine, Splash NewsBulletin and Allergic Reaction NewsBulletin Members;

Due to a recent inquiry concerning the pollutant Chromium 6, I thought it would be a good idea to create a Forum Q & A from an email sent to an Authorized Aquathin Dealer about a year ago, at time the movie entitled Erin Brokovich hit theatres, which dealt with Chromium 6 devastation and cover ups. NOTE: in the first article below within the Highlights section, you will see that this problem exists at 2/3s of the priority toxic clean up sites across the nation. Also, below is a very timely quick read concerning costs to clean up. Your Aquathin patented RODI system readily removes this contaminate. I love my Aquathin.

Warmest regards to all,

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ToxFAQs™ for

Chromium

CAS#

Chromium (III) 16065-83-1

Chromium (IV) 18540-29-9

February 2001

This fact sheet answers the most frequently asked health questions about chromium. For more information, you may call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to chromium occurs from ingesting contaminated food or drinking water or breathing contaminated workplace air. Chromium(VI) at high levels can damage the nose and can cause cancer. Chromium has been found at 1,036 of the 1,591 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is chromium?

Chromium is a naturally occurring element found in rocks, animals, plants, soil, and in volcanic dust and gases. Chromium is present in the environment in several different forms. The most common forms are chromium(0), chromium(III), and chromium(VI). No taste or odor is associated with chromium compounds.

Chromium(III) occurs naturally in the environment and is an essential nutrient. Chromium(VI) and chromium(0) are generally produced by industrial processes.

The metal chromium, which is the chromium(0) form, is used for making steel. Chromium(VI) and chromium(III) are used for chrome plating, dyes and pigments, leather tanning, and wood preserving.

What happens to chromium when it enters the environment?

- Chromium enters the air, water, and soil mostly in the chromium(III) and chromium(VI) forms.
- In air, chromium compounds are present mostly as fine dust particles which eventually settle over land and water.
- Chromium can strongly attach to soil and only a small amount can dissolve in water and move deeper in the soil to underground water.
- Fish do not accumulate much chromium in their bodies from water.

How might I be exposed to chromium?

- Eating food containing chromium(III).
- Breathing contaminated workplace air or skin contact during use in the workplace.
- Drinking contaminated well water.
- Living near uncontrolled hazardous waste sites containing chromium or industries that use chromium.

How can chromium affect my health?

Chromium(III) is an essential nutrient that helps the body use sugar, protein, and fat.

Breathing high levels of chromium(VI) can cause irritation to the nose, such as runny nose, nosebleeds, and ulcers and holes in the nasal septum.

Ingesting large amounts of chromium(VI) can cause stomach upsets and ulcers, convulsions, kidney and liver damage, and even death.

Skin contact with certain chromium(VI) compounds can cause skin ulcers. Some people are extremely sensitive to chromium(VI) or chromium(III). Allergic reactions consisting of severe redness and swelling of the skin have been noted.

How likely is chromium to cause cancer?

Several studies have shown that chromium(VI) compounds can increase the risk of lung cancer. Animal studies have also shown an increased risk of cancer.

The World Health Organization (WHO) has determined that chromium(VI) is a human carcinogen.

The Department of Health and Human Services (DHHS) has determined that certain chromium(VI) compounds are known to cause cancer in humans.

The EPA has determined that chromium(VI) in air is a human carcinogen.

How does chromium affect children?

We do not know if exposure to chromium will result in birth defects or other developmental effects in people. Birth defects have been observed in animals exposed to chromium(VI).

It is likely that health effects seen in children exposed to high amounts of chromium will be similar to the effects seen in adults.

How can families reduce the risk of exposure to chromium?

- *Children should avoid playing in soils near uncontrolled hazardous waste sites where chromium may have been discarded.*
- *Although chromium(III) is an essential nutrient, you should avoid excessive use of dietary supplements containing chromium.*

Is there a medical test to show whether I've been exposed to chromium?

Since chromium(III) is an essential element and naturally occurs in food, there will always be some level of chromium in your body. There are tests to measure the level of chromium in hair, urine, and blood. These tests are most useful for people exposed to high levels. These tests cannot determine the exact levels of chromium that you may have been exposed to or predict how the levels in your tissues will affect your health.

Has the federal government made recommendations to protect human health?

EPA has set a limit of 100 µg chromium(III) and chromium(VI) per liter of drinking water (100 µg/L).

The Occupational Safety and Health Administration (OSHA) has set limits of 500 µg water soluble chromium(III) compounds per cubic meter of workplace air (500 µg/m³), 1,000 µg/m³ for metallic chromium(0) and insoluble chromium compounds, and 52 µg/m³ for chromium(VI) compounds for 8-hour work shifts and 40-hour work weeks.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for chromium (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop E-29
Atlanta, GA 30333
Phone: 1-888-422-8737
FAX: (404)498-0057

Industry Outlook - 8/26/2002 12:11:00 PM

Chromium 6 removal could cost \$315 million

LOS ANGELES — Removal of chromium 6, arsenic and other pollutants from county-owned drinking water wells in northern Los Angeles County could cost \$315 million, according to a report from the county Department of Public Works.

The [Los Angeles Times](#) reported that a review was ordered by county supervisors after more than two dozen wells in the Santa Clarita and Antelope valleys tested positive for higher-than-normal concentrations of chromium 6.

In addition to the capital costs of developing new storage capacity, expanding distribution, and implementing new technology and water treatment systems, the report by McGuire Environmental Consultants Inc. estimates that the annual cost of maintaining the infrastructure could reach \$28.6 million, the newspaper said.

The cost of a less aggressive approach to removing chemical pollutants would range from \$27 million to \$63.2 million, the report said, and maintaining the system under the more modest plan would cost \$360,000 to \$1.2 million annually, according to the Times.

Chromium 6, used in paint, chrome plating and other manufacturing processes, has been detected in water systems throughout California. The chemical is considered carcinogenic when inhaled, but its danger to people when ingested is unclear, the newspaper said.

State and federal governments limit chromium in water as a means of regulating chromium 6. Federal guidelines hold total chromium to 100 parts per billion (ppb), while the state limit is 50 ppb.

The state Office of Environmental Health Hazard Assessment recommended in 1999 that the amount of chromium allowed in drinking water be lowered to 2.5 ppb.

The same agency later withdrew that recommendation, acknowledging that its initial risk assessment was flawed, according to the article.