California Regional Water Quality Control Board
Central Coast Region

895 Aerovista Place, Suite 101, San Luis Obispo, California 93401-7906
(805) 549-3147 • Fax (805) 543-0397
http://www.waterboards.ca.gov/centralcoast

Linda S. Adams
Secretary for
Environmental Protection

Arnold Schwarzenegger
Governor

TO: Private Well Owners in the Llagas Subbasin

DATE: February 21, 2007

SUBJECT: How to test your own well water for perchlorate

Olin is implementing a Central Coast Water Board approved monitoring and reporting program for wells in the Morgan Hill, San Martin, and Gilroy areas. Water Board staff provides the following technical guidance for the convenience of residents that may voluntarily wish to test their own water. Below are some basic guidelines for collecting your water sample from your own well.

1. Find a Certified Laboratory in your area.

You can go to the following website to get a complete list of laboratories certified for drinking water analyses by the Department of Health Services in California Department:

http://www.dhs.ca.gov/ps/ls/elap/html/lablist.htm

In the Morgan Hill, San Martin, and Gilroy area there are two certified laboratories:

TestAmerica
885 Jarvis Drive
Morgan Hill, CA 95037
Phone: (408) 776-9600

CM Analytical
6700 Brem Lane #10
Gilroy, CA
Phone: (408) 848-3619

2. Contact the laboratory of your choice and get a sample bottle and a chain of custody form from them. The laboratory will provide you with the proper sample bottle and size.

3. Once you have your sample bottle, determine where you will collect your sample. If your well has never been sampled, you may want to find the faucet or spigot closest to the well. Let the water run out of the faucet or spigot (remove any hoses attached to the spigot) for at least 1 minute before collecting your water sample. The sample will be collected in a 250-milliliter plastic bottle provided by the certified laboratory. Fill your sample bottle and cap the bottle. Then properly label the bottle and place the sample bottle in a chilled cooler (small cooler with ice). You must also fill out the chain of custody form that the laboratory provides and then you can deliver the bottle to the

laboratory. The sample should be analyzed for perchlorate using US Environmental Protection Agency Method 314.0.

4. Once the perchlorate results are available, the laboratory will report them in "micrograms per liter (µg/L)" or "parts per billion (ppb)." There is no difference between these units. According to the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA), 6.0 micrograms per liter is the level of perchlorate in drinking water that does not cause or contribute to adverse health effects. The California Department of Health Services (DHS) has also established a perchlorate Public Health Goal of 6.0 micrograms per liter. We have enclosed copies of the OEHHA "News Release" and DHS information on the Public Health Goal for perchlorate to help you understand the drinking water levels set by the State of California.

5. If the concentration of perchlorate is greater than 6.0 micrograms per liter, contact Olin Corporation at (800) 295-6141. In accordance with State Water Resources Quality Control Board Order No. WQ 2005-0007, Olin is required to provide replacement water service (e.g., bottled water) to owners of private domestic wells with perchlorate concentrations above 6.0 micrograms per liter that originated from discharges at the Olin facility at 425 Tennant Avenue, Morgan Hill.

Please contact Hector Hernandez (805) 542-4641 or Thea Tryon (805) 542-4776 at the Central Coast Water Board if you have any additional questions.

Sincerely,

Roger W. Briggs
Executive Officer

S:\Spills Cleanup Program\Regulated Sites\Santa Clara Co\OLIN Corp\Water Board\Bottled Water Termination\0207 Private Well Sampling Protocol.Doc

Enclosures:

1. Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, October 2003: *Guide to Public Health Goals (PHGs) for Chemicals in Drinking Water.*

2. Office of Environmental Health Hazard Assessment, California Environmental Health Agency, April 1, *News Release: State's Drinking Water Goal for Perchlorate Consistent with Findings of Major Federal Study.*

Guide to
Public Health Goals (PHGs)
for Chemicals in Drinking Water

Office of Environmental Health Hazard Assessment
California Environmental Protection Agency
October 2003

This guide explains how Public Health Goals (PHGs) developed by the Office of Environmental Health Hazard Assessment (OEHHA) help to maintain the quality of California's drinking water supplies.

Contaminants in Drinking Water

California's regulatory drinking water standards protect the public from harmful substances, but no water supply is ever completely free of contaminants. Some, such as arsenic and uranium, can occur naturally. Others, such as fuels, industrial solvents, pesticides and metals, may enter water supplies from chemical spills and leaking tanks and pipelines, or they may be a legacy of agricultural and waste-disposal practices that predated modern environmental laws.

It is natural for people to want their drinking water to be completely free of all contaminants. However, preventing or removing all contamination often is not economically or technologically feasible. State health authorities are responsible for determining the levels of contaminants that, based on current laws and recommendations, can remain in water supplies without threatening human health.

Public Health Goals and Drinking Water Standards

To keep drinking water safe, the California Legislature passed the Calderon-Sher Safe Drinking Water Act of 1996. This law requires the Department of Health Services (DHS) to regularly test drinking water supplies and set standards for contaminants in the water. The Act also requires OEHHA to develop Public Health Goals (PHGs) for contaminants in California's publicly supplied drinking water.

PHGs Set at Levels That Protect Human Health

For carcinogens, OEHHA establishes the PHG at the "one-in-one-million" risk level. At that level, not more than one person in a population of one million people drinking the water daily for 70 years would be expected to develop cancer as a result of exposure to that chemical.

For chemicals that cause health effects other than cancer, OEHHA sets the PHG at a level that is not expected to cause any toxic effects, including birth defects and chronic illness.

What Is a Public Health Goal?

A PHG is the level of a chemical contaminant in drinking water that does not pose a significant risk to health. PHGs are not regulatory standards; however, state law requires DHS to set drinking water standards for chemical contaminants as close to the corresponding PHG as is economically and technically feasible.

In some cases, it may not be feasible for DHS to set the drinking water standard for a contaminant at the same level as the PHG. The technology to treat the chemicals may not be available, or the cost of treatment may be very high. DHS must consider these factors when developing a drinking water standard.

How Does OEHHA Establish a Public Health Goal?

The process for establishing a PHG for a chemical contaminant in drinking water is very rigorous. OEHHA scientists first compile all relevant scientific information available, which includes studies of the chemical's effect on laboratory animals and studies of humans who have been exposed to the chemical. The scientists use data from these studies to perform a *health*

risk assessment, in which they determine the levels of the contaminant in drinking water that could be associated with various adverse health effects. (For more information on health risk assessments, please see "A Guide to Health Risk Assessment," on OEHHA's Web site at www.oehha.ca.gov.) In performing the health risk assessment, OEHHA considers the following factors:

- Certain groups of people, such as pregnant women, young children, the elderly or persons with pre-existing illnesses, who may be especially susceptible to the chemical's adverse effects. The PHG must consider health effects on individuals in these groups.
- Accumulated effects of exposure to the chemical from other sources, such as food, air and soil, and other uses of drinking water, such as showering.
- The chemical's potential to interfere with bodily functions in a way that increases the risk of chronic health problems, such as liver damage.
- Possible synergistic effects from the combined exposure to the chemical in question and other chemicals, which may further increase health risks.

When calculating a PHG, OEHHA uses all the information it has compiled to identify the level of the chemical in drinking water that would not cause significant adverse health effects in people who drink that water every day for 70 years. OEHHA assumes that an adult will drink two liters of water per day and a child will drink one liter per day. OEHHA must also consider any evidence of immediate and severe health effects when setting the PHG.

OEHHA establishes the PHG at a level that provides protection against any known cancer and "noncancer" health effects associated with exposure to the chemical in question. For cancer-causing chemicals, OEHHA typically establishes the PHG at the "one-in-one million" risk level. At that level, not more than one person in a population of one million people drinking the water daily for 70 years would be expected to develop cancer as a result of exposure to that chemical. The "one-in-one million" risk level is widely accepted in the medical and scientific communities as the "negligible risk" standard.

For chemicals that do not cause cancer, OEHHA sets the PHG at a level that is not expected to cause any toxic effects, including birth defects and chronic illness. OEHHA reviews scientific studies of a chemical and identifies the lowest level of exposure to the chemical that caused no observed health effects in those studies. OEHHA then adds a "safety margin" to account for uncertainties and gaps in information on the chemical's toxicity. The PHG is commonly set at 100 to 3,000 times below the "no observable effect level," depending on the type of toxicity associated with the chemical, and the amount of scientific information available. OEHHA assumes people will drink the water daily for many years

OEHHA's Role in Protecting Water Quality

OEHHA is part of the California Environmental Protection Agency. Its professional staff includes toxicologists, epidemiologists, physicians, biostatisticians, and research scientists who are located in offices in Sacramento and Oakland. OEHHA is responsible for assessing health risks posed to the public by hazardous chemicals and provides its scientific expertise in this area to other state regulatory agencies. Through its risk assessments and its development of Public Health Goals (PHGs), OEHHA assists the Department of Health Services in developing regulatory standards for chemicals in the state's drinking water.

when developing a PHG to protect against noncancer health effects. This assumption of lifelong exposure to a contaminant is a standard practice in risk assessment.

Many drinking water contaminants are associated with both cancer and noncancer health effects. In those cases, OEHHA will determine the two levels that adequately protect against cancer and noncancer health effects, and then set the PHG at the lower of the two levels. This helps ensure the PHG is set at a health-protective level.

Who Keeps Drinking Water Safe?

U.S. Environmental Protection Agency (U.S. EPA) sets national drinking water standards and grants authority to each state to administer its own drinking water program.

California Department of Health Services (DHS) is the regulatory agency with the authority to set and enforce drinking water standards for the state. It may maintain standards at levels set by U.S. EPA, or it may set more stringent standards. Through its Drinking Water Program, the department works with **county health departments** to license and monitor public water systems and set standards for privately owned wells.

California Environmental Protection Agency (Cal/EPA) includes the **Office of Environmental Health Hazard Assessment**, the **State Water Resources Control Board** and nine **Regional Water Quality Control Boards.** The water boards evaluate the quality of the state's surface water and groundwater, and regulate the storage and discharge of materials and pollutants that affect water quality. OEHHA develops Public Health Goals for drinking water.

Local governments may oversee commercial, private or agricultural use of land affecting water quality.

Public water systems have the ultimate responsibility for keeping water safe. Any system that serves more than 25 people or 15 service connections must regularly test its water supplies and meet state and federal regulatory standards.

After developing a draft PHG, OEHHA posts the document on its Web site (www.oehha.ca.gov/water/phg/index.html) and holds a public-review period and at least one public workshop to solicit comments from interested parties. The draft document is also reviewed by one or more independent scientists from the University of California or another academic institution, as well as the U.S. Environmental Protection Agency. OEHHA considers these comments before determining the final PHG.

Final PHG documents are posted on OEHHA's Web site. OEHHA is mandated by law to review a published PHG at least every five years and revise it, as necessary, based on any new scientific data. OEHHA maintains an updated list of PHGs on its Web site at (www.oehha.ca.gov/water/phg/allphgs.html).

How Are Public Health Goals Used to Set Regulatory Standards for Chemicals in Drinking Water?

PHGs are necessary guides for making decisions about the levels of chemical contaminants in drinking water, but these guidance levels are just one element that DHS must consider when maintaining the quality of drinking water. By law, DHS must set the state's regulatory standards, known as *Primary Maximum Contaminant Levels* (MCLs), as close as possible to the PHG levels that OEHHA establishes. However, DHS must also consider the cost and technical feasibility of treating or preventing chemical contamination.

The Calderon-Sher Safe Drinking Water Act requires OEHHA to develop a PHG for each drinking water contaminant that is regulated with an MCL. OEHHA must also develop a

PHG before DHS can establish an MCL for a contaminant for the first time. DHS must review a primary MCL at least every five years and amend it, if necessary, to make it as close to the corresponding PHG as is feasible. DHS could amend an MCL if the PHG evaluation indicates that the contaminant is more or less toxic than was previously believed, or if new technology is available to reduce concentrations to levels closer to the PHG.

Is Water Safe to Drink if Contaminant Levels Exceed Public Health Goals?

As long as drinking water complies with all MCLs, it is considered safe to drink, even if some contaminants exceed PHG levels. A PHG represents a health-protective level for a contaminant that DHS and California's public water systems should strive to achieve *if* it is feasible to do so. However, a PHG is *not* a boundary line between a "safe" and "dangerous" level of a contaminant, and drinking water can still be considered acceptable for public consumption even if it contains contaminants at levels exceeding the PHG.

For example, suppose the actual level of a contaminant in many drinking water sources were high enough to pose a "ten-in-one million" cancer risk. (At that level, not more than ten cancer cases would be expected in a population of one million people as a result of drinking water containing that level of the contaminant daily for 70 years.) As explained on page 3, OEHHA typically establishes the PHG for cancer-causing contaminants at the "one-in-one million" risk level. However, a "ten-in-one million" risk is widely considered by health and scientific authorities to be acceptable as long as it is not feasible to further reduce the risk. State law would allow DHS to set the MCL for the contaminant at the level posing a "ten–in-one million" risk of cancer if it were not feasible to set the standard at a lower level. In this case, levels of the chemical exceeding the PHG and below the MCL would be considered acceptable for protection of public health.

Even if a PHG is not immediately achievable, it still represents an important long-term goal for California drinking water. The PHG helps give researchers an incentive to develop new or improved cost-effective water-treatment technologies that can feasibly reduce contaminants to PHG levels.

How Can the Public Learn More About Contaminants in the Water?

California law requires that public water systems inform consumers about the quality of their drinking water through the following reports:

Annual Consumer Confidence Reports

Public water systems are required to send each customer an annual consumer confidence report that describes the source of the water supply and any contaminants detected in it. The report must list the current level of a contaminant as well as its PHG and primary MCL. The report must also disclose if an MCL was exceeded and include a plainly worded statement of associated health concerns.

Exceedance Reports

Water systems with more than 10,000 service connections by law must prepare an exceedance report every three years if one or more chemical contaminants exceed PHG levels. The report provides information on health risks posed by the contaminants as well as the costs and technology needed to reduce the contaminants to the PHG level. The report must also explain

what action, if any, the local water supplier has planned to address the contamination. The water supplier must hold a public hearing on the report.

Other Notification Requirements

When a contaminant in a public drinking water source exceeds the primary MCL, the water supplier must notify its customers in accordance with DHS requirements. In instances where there is an imminent threat to human health, the water supplier would have to provide immediate notice to customers. The law requires DHS to approve the content of such notices.

Sources of Additional Information

Office of Environmental Health Hazard Assessment
OEHHA's Web site (www.oehha.ca.gov) contains draft and final PHG documents, announcements of public workshops and comment periods on draft PHGs, copies of this fact sheet, and other fact sheets concerning health risk assessment, diesel exhaust, children's health and other topics. For more information, contact:

Office of Environmental Health Hazard Assessment
Pesticide and Environmental Toxicology Section
1001 I Street, P.O. Box 410
Sacramento, California 95812
(916) 324-7572

California Department of Health Services
The DHS Division of Drinking Water and Environmental Management posts information on PHGs and MCLs on its Web site. Contact:

Division of Drinking Water and Environmental Management
Department of Health Services
P.O. Box 942732
Sacramento, California 94234-7320
(916) 322-2308
www.dhs.ca.gov

Local Public Water System, County Health Department or County Environmental Health Department
The best source of information on contaminants in your local drinking water supply is usually the local water supplier. For contact information, check your water bill or call your city's public works department. If your source of drinking water is a private well, contact your county health or environmental health department for water quality standards and testing information.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see California's official "Flex Your Power" Web site at www.flexyourpower.ca.gov.

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

NEWS RELEASE

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT

FOR IMMEDIATE RELEASE:
Release No. 05- 02
April 1, 2005

CONTACT: Allan Hirsch
(916) 324-0955
www.oehha.ca.gov

State's Drinking Water Goal For Perchlorate Consistent With Findings Of Major Federal Study

SACRAMENTO – The California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) today announced that the state's Public Health Goal (PHG) for perchlorate in drinking water is consistent with the findings of a recent report on the chemical by the National Academy of Sciences (NAS). In light of the favorable NAS findings, OEHHA has determined that the PHG does not need to be revised.

The PHG, which was published in March 2004, identifies 6 parts per billion as a level of perchlorate in drinking water that does not cause or contribute to adverse health effects. Perchlorate is primarily produced for use in rocket fuel, explosives, fireworks, road flares and air-bag inflation systems, and has been detected in a number of California drinking water sources.

"The National Academy of Sciences report on perchlorate provides strong support for the approach that we took in developing our public health goal," OEHHA Director Dr. Joan E. Denton said. "The federal report, along with earlier peer reviews of our perchlorate assessment by University of California scientists, reinforces the solid scientific foundation that underlies California's efforts to safeguard drinking water from threats posed by perchlorate."

The NAS report, released in January 2005, evaluated the U.S. Environmental Protection Agency's 2002 Draft Toxicological and Risk Characterization for Perchlorate. In its report, the NAS examined scientific issues that were relevant to OEHHA's PHG for perchlorate. When it published the PHG in 2004, OEHHA announced it would review the NAS report upon its completion and, if necessary, revise the PHG. OEHHA has concluded no revision is needed because of the consistency between the NAS findings and OEHHA's assessment of perchlorate.

The key NAS findings were:

- The health effects of perchlorate should be assessed using data from clinical studies involving humans, rather than laboratory animals. The NAS specifically recommended the use of a well-regarded 2002 study in which healthy volunteers were administered perchlorate. OEHHA used that same study to assess perchlorate's health effects and develop the PHG.

- The perchlorate health effect of primary concern is the reduction of the uptake of iodide, an essential nutrient, by the thyroid gland (a butterfly-shaped gland in the

throat). While not harmful by itself, inadequate iodide uptake may lead to the harmful disruption of proper thyroid function. The NAS report said that the initial reduction of iodide uptake "is the key event that precedes all...effects of perchlorate exposure," and that focusing on the reduction of iodide uptake "is the most health protective and scientifically valid approach." OEHHA's perchlorate assessment similarly focused on the reduction of iodide uptake as the critical health effect.

- The fetuses of pregnant women are "the most sensitive population" to perchlorate's health effects, the NAS report said. OEHHA similarly concluded that pregnant women and fetuses were most sensitive to perchlorate after evaluating the chemical's health effects on adults, infants and lactating women, as well as pregnant women and fetuses. To ensure that a perchlorate assessment does not underestimate the chemical's effects on pregnant women and fetuses, the NAS recommended the same approach that OEHHA used in developing its PHG.

OEHHA did not identify any findings or recommendations in the report that conflicted with its PHG assessment. OEHHA and the NAS chose different methods for identifying general levels of perchlorate exposure that would not cause health effects, but the NAS report did not disagree with the method used by OEHHA. The NAS report did not calculate a safe level of perchlorate in drinking water, as this was outside the request made to the NAS.

In publishing the PHG, OEHHA used data from the 2002 study cited by NAS to identify 6 parts per billion as a level of perchlorate in drinking water that is protective of human health, including the health of pregnant women and fetuses. Impairment of thyroid function in pregnant women may affect the fetus and result in delayed development and decreased learning capability.

In a parallel development, OEHHA announced that a newly released study of perchlorate levels in human breast milk did not produce sufficient information to justify any revisions to the PHG. The study, published in February 2005 and authored by three Texas Tech University researchers, found elevated levels of perchlorate in breast milk samples from throughout the United States, including California. While important, the study did not find any correlation between perchlorate levels in the breast milk and drinking water of study participants, and was not designed to identify the sources of the perchlorate found in breast milk.

OEHHA will continue to monitor new scientific developments concerning perchlorate. State law requires OEHHA to review and, as necessary, update each PHG every five years.

State law next requires the California Department of Health Services (DHS) to set a regulatory drinking water standard for perchlorate that is as close to the PHG as is economically and technically feasible. A PHG is not a regulatory requirement, and it is not a boundary between "safe" and "dangerous" levels of a chemical in drinking water. PHGs are health-protective goals for drinking water contaminants that DHS uses in establishing drinking water standards. OEHHA develops PHGs for all regulated drinking water contaminants.

The Office of Environmental Health Hazard Assessment is one of six entities within the California Environmental Protection Agency. OEHHA's mission is to protect and enhance public health and the environment by objective scientific evaluation of risks posed by hazardous substances.

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