

Perchlorate in the Lower Umatilla Basin Groundwater Management Area - Issues and Answers



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Background

During the early 1990's, the Lower Umatilla Basin was identified as an area of elevated nitrate in groundwater. During fall 2003, the Department of Environmental Quality (DEQ) and the Environmental Protection Agency (EPA) initiated testing for perchlorate in addition to routine nitrate testing. Low concentrations (1 to 25 parts per billion (ppb)) of perchlorate were detected in over half of the water wells tested.

Additional samples were collected in June 2004, November 2004, December 2004, January 2005, and April 2005. Again, low concentrations of perchlorate were detected in surface water and groundwater. The highest concentration detected to date is 30 ppb in a monitoring well only used for testing groundwater conditions.

What is perchlorate?

Perchlorate can be a naturally occurring chemical in the environment or it can be manufactured for industrial use. Ammonium perchlorate and sodium perchlorate are examples of manufactured perchlorate salts. Perchlorate salts are used primarily as oxidizers in solid rocket fuel, missiles, and some explosive compositions. Other uses of perchlorate include highway safety flares, fireworks, matches, some dyes, lubricating oils, electroplating and medical supplies.

Perchlorate can occur naturally in some mineral formations such as Chilean nitrates. Chilean nitrates have been used as a component in some fertilizers. Perchlorate easily dissolves in water and so can be carried into lakes and ponds, streams and rivers, and can migrate into the groundwater from overlying soils.

Is perchlorate a health risk?

Perchlorate disrupts iodine uptake in the thyroid gland and can interfere with thyroid hormone production. Due to possible adverse health effects, people should avoid using water containing perchlorate for drinking and cooking. Pregnant women, children, infants and

individuals with thyroid disorders are considered to be the populations most sensitive to the effects of perchlorate.

At what level is perchlorate safe in drinking water?

There currently is no federal or Oregon drinking water standard for perchlorate. There is ongoing national debate about what level of perchlorate is safe. On January 10, 2005, the National Academy of Sciences (NAS) released their report on the health affects of perchlorate exposure. In addition, based on EPA's risk assessment, perchlorate in drinking water should not exceed 24.5 ppb (assumes that 100 percent of the perchlorate is from drinking water). This would be considered a "safe" level and the highest concentration of perchlorate in drinking water that is not expected to pose any significant risk to human health.

In addition to perchlorate being found in water, it may also accumulate in food (including milk). If the additional exposures from these other sources are included, the level that would be considered safe in drinking water could be as low as 4.9 ppb.

Why am I hearing about perchlorate now?

In the past few years, perchlorate contamination has become a national issue. The NAS study estimates that more than 11 million people, in 35 states, have perchlorate in their drinking water at concentrations of 4 ppb or higher.

In fall 2003, groundwater testing found perchlorate in over half of the 133 wells sampled in the Umatilla basin. Since then, DEQ and EPA have been testing for perchlorate in soils, groundwater, and surface water in several additional assessments in the area.

To date, of all the wells where perchlorate has been detected, concentrations have ranged from non-detect to 30 ppb. The wells tested have included monitoring wells (used for testing groundwater), irrigation wells, domestic

(household water) wells, community wells, and a livestock watering well.

What is the extent of the affected area?

The 2003 sampling event was not designed to delineate the full extent of perchlorate occurrence. Rather, perchlorate was added to the area-wide Groundwater Management Area (GWMA) analysis as a first screen to determine if perchlorate was generally present in the GWMA.

The other sampling events have been more limited in geographic scope to fill in some of the data gaps. In order to determine the appropriate next steps, DEQ is currently working with EPA and consulting with the Oregon Department of Health and Human Services (DHS), Oregon Department of Agriculture and the Agency for Toxic Substances and Disease Registry (ATSDR) to design additional monitoring studies to better define the extent of the contamination and identify possible sources.

How do I know if my well water contains perchlorate?

The only way to know if perchlorate is present is to have a sample of water from the well tested specifically for perchlorate. If your well was tested as part of the sampling event conducted by DEQ/EPA you should have received results of that testing (You would have signed an authorization form prior to the sample being taken. If you did not sign such a form your well was not tested by DEQ/EPA).

If your well was not included in the sampling event and you would like to have your water tested, you may contact private testing laboratories. Before you pay a lab to test for perchlorate, ask the lab if they can detect perchlorate and at what level. They should be able to reliably report values to 1 ppb (1 part per billion or 1 microgram per liter). Specify that EPA Drinking Water Method 314.0 and all associated quality assurance procedures be used. Three labs in Oregon are approved by the EPA to conduct perchlorate tests for public drinking water systems:

Neilson Research Analytical Consulting Lab.
245 S. Grape St.
Medford, OR, 97501,
(541) 770-5678

Umpqua Research Company
626 NE Division St.
Myrtle Creek, OR, 97457
(541)-863-2680

CH2M Hill Applied Sciences Lab.
2300 NW Walnut Blvd.
Corvallis, OR
(541)-752-4271

Usually, the cost of a test is \$60-\$90. For a complete EPA list of labs that have passed performance evaluations, visit www.epa.gov/safewater/ucmr/ucmr1/index.html

All well water users are encouraged to regularly test their own water for the presence of potential contaminants including, but not limited to, nitrate and perchlorate.

What should I do if my well water contains perchlorate?

If perchlorate has been detected in your well, or in nearby wells, you may want to consider appropriate treatment or an alternate source of water for drinking and cooking.

Can perchlorate be removed from my drinking water?

First, before choosing a treatment option, consult with the various manufacturers and consider re-testing for perchlorate and for general water chemistry by a competent and experienced lab. This testing will confirm whether there is a need for treatment and help design a better treatment system.

Two types of treatment systems are currently used to treat perchlorate in water at the levels found in this geographic area: anion exchange resins and reverse osmosis systems. Information on the full range of treatment systems for perchlorate is available at: www.clu-in.org/contaminantfocus/default.focus/sec/perchlorate/cat/Treatment_Technologies/

In the reverse osmosis treatment method, water is forced through a semi-permeable polymer membrane, leaving behind dissolved salts that are unable to penetrate the membrane. The concentrate contains rejected dissolved matter, including the perchlorate. Reverse osmosis treatment systems used for removal of perchlorate in water should be certified under the National Sanitation Foundation/American National Standards Institute (NSF/ANSI) Standard 58: Reverse Osmosis Drinking Water Treatment Systems. Information on these systems is available at:

www.nsf.org/consumer/drinking_water/perchlorate_reduction.asp?program=WaterTre

The National Sanitation Foundation website (www.nsf.org) provides a list of reverse osmosis units that have been independently verified to reduce perchlorate.

With the anion exchange resin technique, perchlorate is replaced by an innocuous anion, usually chloride in the water. Different types of resins can be targeted specifically for the removal of perchlorate and nitrates from water. General water chemistry is useful to know, as other common ions present in water, such as sulfate, may affect the longevity of the resins. Information on this treatment method is available at:

http://purolite.biz/POU_POE_Perchlorate_Removal.pdf

What effect can perchlorate have on agriculture?

The effect on irrigated agriculture is an emerging research area and the meaning of the limited results is being debated. DEQ and the Oregon Department of Agriculture are working with Oregon State University (OSU) to help answer questions about perchlorate affects on agriculture. OSU's report is expected in June/July 2005.

Where do we go from here?

As investigation into the regional groundwater progresses, DEQ will distribute additional information as it becomes available. This will allow people in the affected area to make informed decisions about their source of drinking water.

DEQ and stakeholders will be working together to plan next steps based upon the analysis of existing data, new data collected at the Navy's Boardman bombing range, the results of OSU's study and new information emerging on the national level.

Where can I get more information about perchlorate in Oregon?

For more information on perchlorate in Oregon visit DEQ's perchlorate web page at <http://www.deq.state.or.us/er/PerchlorateSites.htm>

Where can I go to get more information on the Lower Umatilla Basin?

For more information on the Lower Umatilla Basin visit the DEQ web site at www.deq.state.or.us/wq/groundwater/lubgwma.htm. Updates to this FAQ and other information related to perchlorate will be posted at that site as it becomes available.

For general information on drinking water in the Lower Umatilla Basin, contact:

Gary Burnett, Drinking Water Program
Oregon Department of Human Services
700 SE Emigrant, Suite 240
Pendleton, OR 97801
(541) 276-8006x352

Gary.F.Burnett@state.or.us or
www.oregon.gov/DHS/ph/dwp/index.shtml

For information on DEQ investigations and sampling, contact:

John Dadoly
Oregon Department of Environmental Quality
700 SE Emigrant, Suite 330
Pendleton, OR 97801
(541) 278-4616

dadoly.john@deq.state.or.us

For more technical information on perchlorate occurrence and treatment, contact:

Harry Craig
EPA, Region 10
811 SW 6th Avenue
Portland OR 97204
(503) 326-3689

craig.harry@epa.gov

For more technical information on the toxicology and health effects of perchlorate, contact:

Julius Nwosu
EPA, Region 10 – OEA-095
1200 Sixth Avenue
Seattle, WA 98101
(206) 553-7121 or (800) 424-4EPA
nwosu.Julius@epa.gov

Additional information can be found at:

<http://www.epa.gov/>
and enter "perchlorate" in the search box.

The US Food and Drug Administration has provided additional information at:

<http://www.cfsan.fda.gov/~dms/clo4qa.html>