

# **Information on Chromium from Apple Valley Ranchos Water Company**

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Recently, there has been media coverage about chromium in drinking water, including an article in the [Apple Valley News](#). Since this is a rapidly developing water quality issue, Apple Valley Ranchos Water Company wants to keep you informed on the latest developments. We hope this newsletter will help answer any questions you may have.

## **What is Chromium?**

Chromium is a naturally occurring element, the 11<sup>th</sup> most common in the earth's crust. It is also an inorganic chemical that is used in many industrial processes including electroplating, wood treatment, pigments manufacture and cooling tower treatment for corrosion control. Chromium exists in more than one form. The two most common species of chromium are chromium 3 (trivalent chromium) and chromium 6 (hexavalent chromium).

## **Where is Chromium found?**

Chromium is found in air, soil, water, and food. Even rainwater contains chromium with an average concentration of 0.2 to 1 part per billion. (A part per billion is equivalent to one drop of water in a swimming pool.)

## **Is Chromium a health hazard?**

That depends on the form of chromium, how one is exposed to it, and the amount to which one is exposed. Scientists have established that breathing airborne chromium 6 can cause cancer. On the other hand, if you take a multi-vitamin, you'll probably see chromium included as one of the minerals, because chromium 3 is a nutritional element necessary for proper brain function.

## **Is Chromium 6 a health hazard if ingested rather than inhaled?**

In a study conducted in Germany in 1968, the researchers concluded that chromium 6 added to the drinking water of laboratory rats had caused stomach cancer in two of 66 female rats. However, that study has been criticized, and the U.S. Environmental Protection Agency (U.S. EPA) has stated that it believes there is no evidence that chromium 6 causes cancer when ingested. The World Health Organization (WHO) has stated that there is not enough evidence to indicate that chromium 6 in drinking water causes cancer. According to the WHO, there is evidence that when chromium 6 enters the stomach, gastric acids reduce it to harmless chromium 3, the dietary nutrient.

## **What are the sources of human ingestion of Chromium?**

According to the WHO, food contributes about 93-98 percent of total chromium intake in humans while water contributes 1.9-7 percent. Foods with the highest concentrations of chromium include meat, fish, fruit, and vegetables. Chrome-plated utensils used in the preparation of food may contribute to chromium levels. Chromium may also be contained in drinking water.

## **What is the drinking water standard for Chromium?**

The U.S. EPA has established a national drinking water standard for total chromium of 100 parts per billion (ppb.). Water utilities in California must meet the stricter state standard for total chromium of 50 ppb. "Total chromium" includes both chromium 3 and chromium 6. There is currently no proposed or existing drinking water standard for chromium 3 or chromium 6 alone. The California Department of Health Services (CDHS) is currently considering setting a standard specific to chromium 6. The CDHS must consider several factors before setting a revised standard for chromium 6 including occurrence, detectability, ability to remove it from water, and the cost of treatment.

## **I've heard about a "Public Health Goal" for Chromium in water. What is the "Public Health Goal"?**

The California Office of Environmental Health Hazard Assessment (OEHHA) has published a Public Health Goal (PHG) for total chromium at 2.5 ppb. The PHG is the level below which a contaminant will cause no adverse health effects over a lifetime of exposure. A Public Health Goal is a health risk assessment, not a proposed drinking water standard. OEHHA based its PHG for total chromium on the 1968 study discussed in the section above titled "Is Chromium 6 a health hazard if ingested rather than inhaled?"

## **How much Chromium is found in Apple Valley's water?**

Apple Valley Ranchos Water Company has been sampling for total chromium since 1978 and had not detected it prior to last year. However, new laboratory methods allow measurement of chromium below 10 parts per billion. In September 2000, AVR sampled all of its wells for total chromium and chromium 6 with the new methods. Total chromium was found in all wells and chromium 6 was found in 21 of our 22 wells. Total chromium levels were between 2.4 and 11 ppb with an average of 5.8 ppb. This is well below the state standard of 50 ppb. Chromium 6 was not found in one well and, in the others, was measured at concentrations to 8 ppb with an average of 3.4 ppb. All wells were sampled again in December 2000. The average total chromium dropped by about 50 percent to 3.26 ppb. Chromium 6 levels remained about the same at 3.4 ppb.

## **How do these findings compare to Hinkley, California?**

The levels in Apple Valley's wells are thousands of times lower than the chromium 6 levels found in Hinkley, California and made famous by the movie *Erin Brokovich*. Levels in Hinkley were as high as 24,000 ppb. Unlike Hinkley, we believe the chromium in our wells is naturally occurring rather than caused by industrial activities.

## **What treatment is used to remove Chromium from drinking water?**

The federal and state approved technologies for lowering levels of total chromium in drinking water include coagulation/filtration, ion exchange, reverse osmosis, and lime softening. However, there is currently no recognized treatment technology to remove chromium at the low levels found in AVR's wells. AVR is closely following research that is currently ongoing on treatment of chromium in drinking water. When we have obtained sufficient information, we will be preparing a report on the cost of treating for the removal of chromium from the drinking water.

## **What is the Apple Valley Ranchos Water Company doing to address Chromium 6 in drinking water?**

AVR continues to sample quarterly for the presence of chromium 6 in drinking water and reports results to local and state officials. We are working cooperatively with and support the CDHS efforts in determining if a drinking water standard for chromium 6 is needed, and if so, at what level the standard should be set. Depending on the outcome of the CDHS' review of standards for chromium 6, treatment may not be necessary. AVR will keep you informed on developing information.

## **How can I learn more?**

You can learn more about chromium by visiting the California Department of Health Services web site at [www.dhs.cahwnet.gov/ps/ddwem/chemicals/Chromium6/Cr+6index.htm](http://www.dhs.cahwnet.gov/ps/ddwem/chemicals/Chromium6/Cr+6index.htm).

The EPA has a consumer fact sheet on chromium that can be accessed at [www.epa.gov/OGWDW/dwh/c-ioc/chromium.html](http://www.epa.gov/OGWDW/dwh/c-ioc/chromium.html).

The World Health Organizations' site on chromium can be found at [www.who.int/water\\_sanitation\\_health/gdwq/Chemicals/Chromiumfull.htm](http://www.who.int/water_sanitation_health/gdwq/Chemicals/Chromiumfull.htm).

AVR's website also contains water quality information at [www.avrwater.com](http://www.avrwater.com).

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