

**Frequently Asked Questions (FAQ)**  
**Norman's Drinking Water**  
**February 16, 2011**

The City of Norman has appointed a Technical Advisory Committee to review and advise the City concerning the regulations of Chromium 6. This group has been formed to supplement staff knowledge and supply advice and consultation on specific technical matters. The Committee and City staff has developed the following frequently asked questions for your information.

**ABOUT NORMAN'S DRINKING WATER**

**Is Norman's public water safe to drink?**

Yes. Norman's water is safe to drink for all members of our community. Our water meets or exceeds all U.S. and State of Oklahoma water quality standards. These standards have been developed to protect public health.

**How does the City ensure the water is safe to drink?**

The City of Norman routinely tests water at several points in the distribution system. The City publishes an annual report detailing the water quality and relationship to standards. The 2010 report can be accessed online: [Online Consumer Confidence Report](#). If our testing shows that we have violated any regulated compound, we are required to notify the public in accordance with the Safe Drinking Water legislation.

**Does Norman tap water exceed the EPA guidelines for chromium?**

No. Test results from 2011 demonstrate that water samples from points all over the distribution system were less than the 100 parts-per billion (ppb) standards.

**What is a part-per-billion (ppb)?**

One part-per-billion, or ppb, is 1 out of 1,000,000,000. In terms of drinking water, ppb is considered by weight. One ppb of chromium in a water sample means that out of the total weight of the sample, 0.00000001% of it is chromium and 99.9999999% is everything else. Here are some analogies to put 1 ppb in perspective<sup>3</sup>:

- One drop of water in 20 Olympic sized swimming pools
- One second in nearly 32 years, or
- One pinch of salt in 10 tons of potato chips

**Where is the chromium coming from? Why are the levels in Norman higher than other communities?**

The chromium in City of Norman water is naturally occurring. While chromium in ground water can result from pollution, the chromium in Norman's well water results from natural processes that allow chromium to dissolve from the rocks into the ground water.

**Why is central Oklahoma groundwater in particular susceptible to naturally occurring chromium?**

The answer is a confluence of many factors. These include the geologic history of the region, physical and chemical properties of the rocks, chemical makeup of the ground water, and regional climate.

**Can't the City simply switch to a different source of water? What can the City do to reduce chromium in Norman's water?**

First, keep in mind that Norman's chromium levels are below EPA threshold and not considered harmful to health. The City of Norman's water supply predominantly is drawn from Lake Thunderbird. The amount of water in the lake that can be extracted and maintain reasonable lake levels is at its maximum. So growth in Norman's population and demand for potable water was met by the drilling of additional ground water wells.

Additional close by surface water sources currently do not exist. At the moment, the only other option appears to be treatment of ground water. Several possible treatment technologies have been and will continue to be discussed. While several of these treatment methods may be viable, increased costs will likely be necessarily passed on to consumers.

**What is the City doing about it? How are they working with the Environmental Protection Agency (EPA)?**

In accordance with the recent sampling guidance developed by the EPA, the City of Norman immediately sent dozens of water samples for hexavalent chromium analysis. The first results were returned in January of 2011, confirming that the levels of chromium-6 in groundwater wells were below the EPA and State of Oklahoma regulatory requirements. The chromium 6 results ranged from 7.4 to 93 ppb from the well samples and the results of the tap water samples ranged from <5 to 54 ppb. Since all of these levels are below the EPA standard, no action is required and Norman's water is in compliance with standards set to protect public health.

In a pro-active means to anticipate any potential lowering of the chromium standard or possible development of a separate chromium-6 standard, the City of Norman has formed a Management Policy Group of City Officials and a Chromium Technical Advisory Committee to investigate, communicate, and implement measures that will assure Norman remains in compliance with the scientific consensus on water quality and public health. The City has been in contact with the EPA to receive guidance for maintaining the latest policies and procedures.

## ABOUT CHROMIUM

### What is chromium?

Chromium is an essential nutrient for human life, ingested through the daily diet. People obtain their needed chromium through many foods, including whole grains, eggs, cheese, and broccoli. Chromium helps regulate metabolism, such that people with a chromium deficiency may develop symptoms similar to diabetes<sup>2</sup>. Several brands of multivitamin supplements include chromium. Here are some other facts about chromium:

- Chromium is one of the naturally occurring chemical elements that make up the Earth; small amounts of chromium give the red color to rubies.
- Most people are familiar with it because it can be concentrated, purified, and converted to various chemical forms for different uses, such as chrome plating on vehicle parts.
- The largest use of chromium today is in metallic alloys. Stainless steels typically contain 10-20% chromium, giving them excellent resistance to corrosion (rusting).
- Most "silverware" in common use today is actually made from a stainless steel alloy that also contains nickel, with the highest quality having the highest chromium content. For example, a high quality tableware would be 18/10, having 18% chromium and 10% nickel<sup>1</sup>.

### Why talk about "hexavalent chromium" or chromium-6? How is it different from the chromium found in vitamin supplements?

There are three basic forms of chromium: Chromium metal ("zero-valent chromium"), the form of chromium needed by our bodies ("chromium-3" or "trivalent chromium"), and the form of chromium known to cause harmful health effects ("chromium-6" or "hexavalent chromium"). "Total" chromium is the sum of all three types. Vitamin supplements contain manufactured inorganic or organic complexes of Chromium-3 in the form of chromium chloride, chromium nicotinate, chromium picolinate, high-chromium yeast, and chromium citrate.

### Don't our bodies naturally convert hexavalent chromium to the non-toxic chromium-3 form?

Most of the chromium-6 ingested into the stomach will be converted to chromium-3 (the non-toxic form) due to the conditions inside your body. If all the hexavalent chromium ingested were converted to trivalent chromium, then you would simply pass any excess out normally. However, a small percentage of the hexavalent chromium may enter your body before it converts to trivalent chromium.

### Why is chromium in the news now? Wasn't anyone previously aware of chromium in the water?

A special interest organization, "Environmental Working Group" released a study in December of 2010 demonstrating the presence of hexavalent chromium in the tap water of communities around the United States. While the report brings attention to the issue, it has been known for decades that hexavalent chromium is present in water across the country in these low levels, including Norman.

### **How much chromium is in Norman's water?**

The U.S. Environmental Protection Agency (EPA) has regulated total chromium since 1992, setting the standard to 100 parts per billion. The City of Norman's water has been below the regulatory limit in every test sample since the regulation was enacted.

The EPA has completed 2 comprehensive reviews of the health data concerning chromium 6 in drinking water since this time and has not found the scientific or public health data to justify change the regulatory level. A third review is underway and expected to be completed later this year.

The U.S. Geological Survey completed an extensive survey of the water quality of the local Oklahoma City-Norman area groundwater in the late 1980's, publishing several reports indicating the presence of chromium and other chemicals in many groundwater wells. The levels of chromium were all below what would later become the EPA standard of 100 parts per billion.

### **Is the EPA going to change the threshold it considers safe?**

Periodically, the EPA reviews its standards. In March of 2010 the EPA determined that enough new scientific evidence had been collected to warrant reviewing the 100 ppb total chromium standard. A draft of an extensive review of the health effects of hexavalent chromium was released to the scientific community for review in September of 2010. The review should be completed in 2011, and any modification to the existing standard will likely be proposed in 2012 or 2013.

### **What are the potential health effects of hexavalent chromium?**

Here is some information from the EPA regarding the potential effects of drinking water containing hexavalent chromium<sup>4</sup>:

"The current standard is set at 100 parts per billion. EPA's regulation assumes that the sample is 100% chromium-6. This means the current chromium standard has been as protective and precautionary as the science of that time allowed. The current standard is based on potential adverse dermatological effects over many years, such as allergic dermatitis.

New health effects information has become available since the original standard was set, and EPA is reviewing this information to determine whether there are new health risks that need

to be addressed. When the review is complete, we will consider this and other information to decide whether the drinking water standard for total chromium needs to be updated.

In the draft human health assessment for chromium-6 that was released in September 2010 by EPA for independent expert peer review and public comment, EPA is proposing to classify hexavalent chromium (or chromium-6) as likely to cause cancer in humans when ingested over a lifetime. EPA will make a final determination by the end of 2011."

### **Didn't we just go through this with arsenic?**

Very similar geologic and climatic factors that cause arsenic levels to be higher in some regional ground waters are responsible for the elevated levels of chromium. In 2002, the EPA lowered the drinking water standard for arsenic from 50 ppb to 10 ppb. Municipalities were allowed three years to become compliant with the new standard. The City of Norman used a number of strategies to reduce the arsenic levels in the water supply, including an innovative pilot active treatment project. We anticipate that similar measures will be effective if the need arises to decrease chromium levels in response to a change in EPA standard.

### **What should I do?**

Water supplied by the City of Norman meets or exceeds standards and is safe to drink for all of our citizens. Water filters are not necessary unless prescribed by a physician. While many people concerned about water quality choose bottled water, it's worth noting that bottled water is regulated by the U.S. Food and Drug Administration to the same standard of 100 ppb total chromium. There's no reason to believe, unless provided with evidence for a specific brand and lot, that the bottled water will have lower hexavalent chromium.

According to the EPA<sup>4</sup>:

“Ensuring safe drinking water for all Americans is a top priority for EPA and the agency has a standard for total chromium – which includes chromium-6 - which water systems must meet by law. According to the most recent data, all public water facilities are in compliance with the existing total chromium standards. However, citizens concerned about the safety of their drinking water can take additional steps. Consumers of public water can check their provider’s website to access the provider’s consumer confidence report (CCR) or contact the provider to ask if their tap water contains chromium. You can find contact information for your public water system on your water bill. Consumers served by private wells can have their water tested by a state certified laboratory. You can find one in your area by calling the Safe Drinking Water Hotline at 800-426-4791 or by contacting your state water certification officer. Contact information for your state can be found at <http://water.epa.gov/scitech/drinkingwater/labcert/>.

If a consumer is concerned about chromium in their water, then they can consider installing a home treatment unit that has been certified to remove chromium-6

(hexavalent chromium). NSF International <http://www.nsf.org/Certified/DWTU/> and the Water Quality Association <http://www.wqa.org/siteologic.cfm?id=1165> provide lists of treatment devices they have certified."

### Where can I get more information?

Oklahoma Department of Environmental Quality, water quality division:  
<http://www.deq.state.ok.us/WQDnew/index.htm>

Oklahoma Water Resources Board: <http://www.owrb.ok.gov/util/waterfact.php>

U.S. Environmental Protection Agency

- Chromium overview: <http://water.epa.gov/drink/info/chromium/index.cfm>
- Chromium in ground water:  
<http://water.epa.gov/drink/contaminants/basicinformation/chromium.cfm>
- Hexavalent chromium in drinking water:  
<http://water.epa.gov/drink/contaminants/basicinformation/upload/Chromium6inDrinkingWater.pdf>
- Draft toxicological report on hexavalent chromium:  
[http://cfpub.epa.gov/ncea/iris\\_drafts/recordisplay.cfm?deid=221433](http://cfpub.epa.gov/ncea/iris_drafts/recordisplay.cfm?deid=221433)
- Arsenic studies in Norman: <http://www.epa.gov/ada/gw/arsenic.html>

U.S. Geological Survey, Oklahoma Water Science Center (<http://ok.water.usgs.gov/>)

- Becker, Carol J., 2006, *Comparison of ground-water quality in samples from selected shallow and deep wells in the Central Oklahoma Aquifer, 2003-2005*: U.S. Geological Survey [Scientific Investigations Report 2006-5084](#), 55 p.
- Parkhurst, David L., Christenson, Scott C., and Schlottmann, Jamie L., 1994, *Ground-water-quality assessment of the Central Oklahoma--Analysis of available water-quality data through 1987*: U.S. Geological Survey Water-Supply Paper 2357-B, 74 p. [Available Online](#)
- Tortorelli, R.L., 2009, *Water use in Oklahoma, 1950-2005*: U.S. Geological Survey [Scientific Investigations Report 2009-5212](#), 49 p.

### Notes:

<sup>1</sup> "Chromium—Makes Stainless Steel Stainless?" (2010) S.J. Kropschot and J. Doebrich, U.S. Geological Survey Fact Sheet 2010–3089 <http://pubs.usgs.gov/fs/2010/3089/pdf/fs2010-3089.pdf>

<sup>2</sup> "Chromium in parenteral nutrition: too little or too much?" (2009) A. Moukarazel, *Gastroenterology* 2009;137:S18 –S28.

<sup>3</sup> "What does ppm or ppb mean?" <http://www.nesc.wvu.edu/ndwc/articles/ot/fa04/q&a.pdf>, accessed 2/5/2011.

<sup>4</sup> "Chromium-6 in Drinking Water" (December 2010) EPA 815-F-10-005, <http://water.epa.gov/drink/contaminants/basicinformation/upload/Chromium6inDrinkingWater.pdf>, accessed 2/1/2011.