

## Risk Explanation Frequently Asked Questions

In an effort to provide well owners a better understanding of the regulations and health risk evaluation process, staff at the N.C. Department of Environment and Natural Resources (DENR) has put together the following health risk explanation FAQ sheet. This resource explains the regulations that apply to public and private drinking water supplies in North Carolina, discusses the health risk evaluations, and provides insight into how municipal water utilities safely provide drinking water to their customers.

### **Q: What different criteria are used to determine whether water is safe to drink in North Carolina?**

**A:** There are three different criteria used to determine the safety of drinking water in North Carolina. Each set of criteria is intended to help protect public health, but each serve a different purpose.

- Drinking Water Standards are set by the federal Safe Drinking Water Act and National Primary Drinking Water Regulations to govern the quality of drinking water delivered to customers of a public water supply. [These regulations nationally protect](#) approximately 300 million people's drinking water supply.
- Groundwater Quality Standards are established by the N.C. Environmental Management Commission (EMC) to protect the natural quality of the state's groundwater resources from discharges of waste or pollutants.
- Health Risk Evaluations are provided by the N.C. Department of Health and Human Services (DHHS) on a case-by-case basis to advise citizens about possible health risks from consuming their water, regardless of the source of the water or the source of the contaminant present in their water.

### **Q. What regulations apply to home drinking water supplies in North Carolina?**

**A.** The federal Safe Drinking Water Act authorizes the National Primary Drinking Water Standards, which are the federal regulations that cover which contaminants must be tested in drinking water from public water systems, and the levels that are considered acceptable. These standards are mandatory for all public water systems, which serve 15 or more connections (such as residences) or 25 or more year-round individuals. North Carolina bases its drinking water standards on the [federal regulations](#).

The federal Safe Drinking Water Act establishes public drinking water standards known as Maximum Contaminant Levels (MCLs) that are based on the following criteria:

- the potential adverse effects of the contaminant on the health of humans;
- the frequency and level of contaminant occurrence in public drinking water systems; and
- whether regulation of the contaminant presents a meaningful opportunity for reducing public health risks.

The Maximum Contaminant Level (MCL) is the highest level of a contaminant that the EPA allows in drinking water. According to the EPA, MCLs ensure that drinking water poses neither a short-term nor long-term health risk. The EPA sets MCLs at levels that are economically and technologically feasible. When the EPA looks at the health risk from drinking water consumption, it calculates the ingested amount as though individuals are drinking two liters of water per day for a 70 year lifetime. This is designed to be inclusive of all people, regardless of how much water they drink directly or through products that contain water.

Individual homes or small groups of homes on wells are not subject to the federal Safe Drinking Water Act. Private well owners are not required to monitor the water from their well. Nevertheless, the MCLs provide a metric against which private well owners can compare their water's purity.

**Q. What are North Carolina Groundwater Quality Standards?**

**A:** North Carolina's groundwater quality standards are found in [15A NCAC 02L .0202](#) and are established to protect the natural quality of the state's groundwater. They are the maximum allowable concentrations of a contaminant resulting from any discharge of contaminants to the land or waters of the state, that may be tolerated without creating a threat to human health, or otherwise rendering the groundwater unsuitable for its intended best usage as an existing or potential source of drinking water for humans.

**Q. What is a health risk evaluation (HRE)?**

**A.** A Health Risk Evaluation (HRE) is a review by an toxicologist in the N.C. DHHS to determine levels of risk associated with drinking, bathing and other uses of the water. In making this determination of risk, the DHHS relies on available scientific information including, but not limited to, the same information that formed the basis of federal drinking water standards and North Carolina groundwater quality standards.

**Q. What does it mean if the HRE from the DHHS suggests I do not drink the water?**

**A:** The HRE's intention is to provide well owners with information to manage the risk associated with their well water. The DHHS recognizes that there is inherent risk associated with drinking water that contains any level of contaminant. That level of risk increases when that contaminant level is higher. At levels of cancer risk greater than one-in-one-million, for example, the DHHS recommends you do not drink the water. In cases where DHHS issued 'do not drink' recommendations, private well owners are advised to participate in individual consultations with DHHS staff to find ways to reduce the risks associated with drinking their well water. A comparison of risks that the public is commonly exposed to is helpful in understanding this risk assessment:

**The National Safety Council's ['Risk Perspective Scale'](#):**

Risk of Dying Next Year from:

Accidental Drowning in a Bathtub:	1 in 818,015
Accidental Strangulation:	1 in 969,499
Excessive natural heat:	1 in 822,689
Accidental firearm discharge:	1 in 1,184,943
Accidental Drowning:	1 in 1,111,742

**Lifetime odds of death from:**

Getting struck by lightning:	1 in 136,011
Lethal dog bite:	1 in 103,798
Cataclysmic storm:	1 in 83,922

**Q. What is Chromium?**

**A.** Chromium is a naturally occurring metal that is widely present in soil and plants. Under most conditions, natural Chromium in the environment occurs as trivalent Chromium or Chromium 3. Hexavalent Chromium, or Chromium 6, occurs naturally in the environment from the erosion of natural Chromium deposits, and it can also be produced by industrial processes.

**Q: What are the federal and state drinking water regulations for Chromium?**

**A:** Both federal and state standards include regulations for total Chromium that include Chromium 3 and Chromium 6. The federal drinking water standard for total Chromium is 0.1 parts per million (mg/L) or 100 parts per billion (ug/L). In order to ensure that the greatest potential risk is addressed, the [EPA's regulation](#) assumes that a measurement of total Chromium is 100 percent Chromium 6, which is the more toxic form. If water from a public water system exceeds this federal standard, the system will need to treat or otherwise reduce the levels and the consumers will be notified. North Carolina's groundwater quality standard for Chromium is 10 ug/L. Public drinking water supplies are only required to meet the federal drinking water standard for Chromium, which is 100 ug/L, to be in compliance.

**Q: What is Vanadium?**

**A:** Vanadium is a naturally occurring element in soil, water and air. It is found in the earth's crust, rocks, iron ores and crude petroleum deposits. Naturally occurring [Vanadium is found](#) in most geologic settings in North Carolina, especially in the rocks of the Piedmont. As a result, elevated dissolved concentrations of Vanadium in groundwater are prevalent in parts of the Charlotte Belt, Milton Belt, Murphy Belt, Raleigh Belt and the Triassic Basin. No federal drinking water standard for Vanadium currently exists.

Daily intakes of [Vanadium from food](#) ranging from 10 to 20 ug/L have been reported by the U.S. Agency for Toxic Substances and Disease Registry. Nationally, average Vanadium concentrations in tap water are approximately 1 ug/L. Assuming that you drink approximately two liters of water a day, a daily intake of approximately 2 ug/L of Vanadium from tap water can be estimated for adults nationally. In the absence of natural sources of Vanadium, N.C. has an Interim Maximum Allowable Concentration\* (IMAC) of 0.3 ug/L.

The EPA is examining how prevalent Vanadium is in U.S. drinking water supplies and at what level it occurs. Many water utilities nationwide are [currently testing](#) for Vanadium.

**Q: How are public water supplies dealing with Chromium 6 and Vanadium?**

In order to ensure that tap water from public drinking water systems does not present an unhealthy risk to consumers, the EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Established limits for contaminants in bottled water must meet the same MCLs under Food and Drug Administration (FDA) regulations.

The EPA is currently conducting research on Vanadium and Chromium 6 in public drinking water systems nationwide to assess their occurrence and levels and to determine if further regulatory action is warranted. Nationwide data collection is ongoing, after which the EPA will make the determination if they need to further regulate those constituents and at what levels.

While North Carolina has a groundwater quality standard of 10 ug/L that is protective for Chromium 6, the DHHS has developed a health screening level for Chromium 6, using a method consistent with 15A NCAC 02L at 0.07 ug/L based on its independent review of current literature corresponding to a one in a million lifetime cancer risk level.

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\* An Interim Maximum Allowable Concentration is an interim standard established by the Division of Water Resources for a constituent that does not already have an established groundwater standard. An IMAC is based upon the scientific information available at the time of its development, but it is not subject to the rigorous review associated with established groundwater standards. An IMAC is not a federal standard and is not applicable to public water supplies that are regulated under the Safe Drinking Water Act.

The EPA references California as an example of another state dealing with Chromium 6 regulations, which last year set its state drinking water standard at 10 ug/L, the same as N.C. The following chart is a snapshot of Chromium 6 levels in public water supplies across the nation.

City	Chromium 6 level (ug/L)	Water Report	Population (approx.)
Atlanta, GA	0.11 – 0.21	<a href="#">2014 Water Report</a>	448,000
Charlotte, NC	0.042 - 0.1	<a href="#">2014 Water Report</a>	792,000
Chicago, IL	0.097 - 0.264	<a href="#">2014 Water Quality Results</a>	9.2 million
Greensboro, NC	0.05 - 0.16	<a href="#">2014 Water Quality Report</a>	279,000
Honolulu, HI	.032 - 9.8	<a href="#">2011 Chromium 6 Results (most recent data)</a>	374,000
Madison, WI	Nd - 1.9	<a href="#">2014 Water Quality Report</a>	243,000
Norman, OK	0.08 - 97	<a href="#">2014 Consumer Confidence Report</a>	118,000
Raleigh, NC	0.03 - 0.082	<a href="#">2014 Consumer Confidence Report</a>	431,000
Riverside, CA	0.08 - 1.7	<a href="#">2014 Water Quality Report</a>	316,000

The City of Raleigh’s water utility notes on its website, “[Yes, your water is safe to drink!](#) Chromium-6 is currently regulated as part of the 'total Chromium' drinking water standard under the Federal Safe Drinking Water Act (SDWA). This standard addresses all forms of Chromium, including Chromium 6.”

The City of Charlotte’s water utility [notes](#) in its 2014 annual Water Quality Report, “Drinking water provided by Charlotte Water meets and exceeds all state and federal drinking water standards. Our state-certified water treatment operators and nationally accredited lab staff conducted thousands of drinking water tests in 2014, far exceeding the required amount. Even the highest contaminant levels detected were well below federal limits.”

**Q: Is any background information available to compare to my test results?**

**A:** DENR has conducted a limited study of groundwater quality near several of Duke Energy’s coal-fired power plants to evaluate the distribution of metals and other parameters that may be naturally occurring or associated with coal-burning activities. DENR is conducting the testing to determine natural conditions in areas with the same geological formations as the drinking water wells near the coal ash storage facilities. The areas selected are not connected to the groundwater beneath the coal-fired power plant facilities. This reconnaissance of groundwater quality is part of the state’s efforts to develop a general understanding of groundwater quality in the areas where the comprehensive site assessments are being conducted.

We are also researching the distribution of metals across the state from published sources including the US Geological Survey and county well water supply data.

**Q. Where can I find additional information?**

- [North Carolina Division of Water Resources](#)
- [North Carolina Department of Health and Human Services](#)

- For health related questions contact the DHHS Occupational and Environmental Epidemiology Branch at (919) 707-5900.
- 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>
- [NSF International](#) and the [Water Quality Association](#) certify home treatment products for removal of contaminants, including Vanadium and Chromium 6.