

# CENTRAL ELMORE WATER & SEWER AUTHORITY (CEW&SA)

## GEOSMIN

Geosmin is an [organic compound](#) with a distinct earthy flavor and aroma, and is responsible for the earthy taste of [beets](#) and a contributor to the strong scent ([petrichor](#)) that occurs in the air when rain falls after a dry spell of weather or when soil is disturbed. It is produced by a variety of microorganisms. Chemically, it is a [bicyclic alcohol](#) with [formula C<sub>12</sub>H<sub>22</sub>O, a derivative of \[decalin\]\(#\). Its name is derived from the Greek γεω- "earth" and ὀσμή "smell".](#)

### Frequently Asked Questions (FAQ)

#### What is causing the taste and odor experienced by some customers served by CEW&SA?

Recent test results, from a private, third party accredited laboratory, confirm the presence of geosmin, a naturally occurring compound found in surface waters (ie. lakes, rivers, streams, and dams).

#### What is geosmin?

Geosmin is a naturally occurring compound produced by bacteria in soil and algae found in surface water. Geosmin produces the odor of overturned rich soils and is present in foods such as beets, spinach, and mushrooms. Geosmin and MIB (2-Methyl-iso-Borneol) are naturally occurring compounds found in surface waters (rivers and dams) as organic molecules produced by blue-green algae. Bright sun, warm temperatures and nutrients result in ideal growing conditions for the algae. The compounds are produced inside the algae cells and are only released when the algae die.

#### Why does it occur?

Apart from the sunlight and raised temperatures, algae require nutrients to grow and some of the dams have suffered from upstream negative environmental impacts that have raised the nutrient levels, which support these algal blooms.

#### Where is the odor and taste occurring?

There are reports of an earthy, musty-type odor/taste in the water coming from a variety of areas served by Central Elmore Water & Sewer Authority. We have experienced most of the calls from Customers who live on a dead-end line.

#### Is the water quality affected?

While the taste and odor can be unpleasant, geosmin is not ***toxic or harmful***. The ***water remains safe to drink***. On-going testing continues to show an absence of harmful bacteria and other pathogens in the water.

#### How long will the taste and odor last?

It is impossible to predict the onset of an incidence of geosmin, or how long it will last. Geosmin compounds have been shown to remain in lakes and reservoirs for days to months.

#### Can the taste and odor be reduced at the tap?

To make the water taste better, try chilling it, adding ice cubes, a slice of lemon, or a few drops of lemon juice.

### **What does it smell like?**

Geosmin typically produces an earthy or musty odor as is found in the odor of overturned rich soils, and is present in some foods such as beets, spinach, and mushrooms.

### **Why do we smell it?**

The human nose is extremely sensitive to geosmin. If you poured a teaspoon of geosmin into the equivalent of 200 Olympic-sized swimming pools, you would still be able to smell it.

The general threshold for human detection is about 15 ng/l (15 nanograms per litre = 15 parts per trillion). However people with sensitive palets can detect these compounds in drinking water when the concentration is as low as 5 ng/l.

Heating the water increases the volatility of these compounds, which explains why the smell is more easily detected when you are in the shower or when used for hot beverages.

### **How does CEW&SA detect it?**

Prior to September of this year 2013 CEW&SA had never experienced geosmin in the water supply; so had not routinely tested for this naturally occurring compound. CEW&SA has engaged a private, third party accredited laboratory to provide on-going testing for geosmin.

CEW&SA continues to follow a rigorous protocol of regular monitoring of both the raw and treated waters across our service area. On-going testing continues to show an absence of harmful bacteria and other pathogens in the water. ***The water remains safe to drink.***

### **Can it be removed from the drinking water?**

Geosmin is not removed by conventional water treatment processes used by CEW&SA's water treatment facility.

There are several proven treatment technologies for removing geosmin from drinking water including granular or powdered activated carbon; oxidation with ozone or advanced oxidation processes (AOPs); bio filtration; or some combination of each. The actual technology used at a specific plant is highly dependent on the chemistry of the source water. Any engineered treatment solution must first be evaluated to ensure the installation of a system to treat geosmin does not negatively impact the current treatment processes.

### **Does geosmin occur elsewhere?**

Geosmin is common in many jurisdictions across Canada, the United States, and elsewhere in the world.

### **Will CEW&SA be investing in treatment processes to remove geosmin?**

As always, the health and safety of customers will be foremost. CEW&SA has consulted with Regulatory Agencies, Engineering Consultants, Equipment Manufacturers as well as other Water Systems and Chemical Companies. After reviewing all the research available in an effort to identify future infrastructure investments to improve water quality including taste and odor control; the Board of Directors on October 18, 2013 voted unanimously to invest in a Powder Activated Carbon (PAC) System to be installed at our Intake Facility. Management and Staff are currently expediting the purchase process to have the PAC System installed as soon as possible.

**Robert L. Prince, Jr.**  
**General Manager**