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# Soil and Water Sampling for Hexavalent Chromium in Northwest Missouri

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Field Services Division fact sheet

6/2009

## Background

In April 2009 the Missouri Department of Natural Resources, working with the Missouri Department of Health and Senior Services (DHSS) and the U.S. Environmental Protection Agency (EPA), began a comprehensive investigation into the use of tannery sludge as fertilizer on farm fields in northwest Missouri. The concerns surround the presence of hexavalent chromium in the sludge.

## Initial Testing and Results

The first phase of testing related to this investigation included sampling on May 1 at four northwest Missouri farms that records indicated received tannery sludge for distribution as fertilizer. In total seven soil samples and four water samples were taken at these sites.

The results of these samples are being compared to a screening level developed by DHSS and EPA of 86 parts per million in agricultural fields. This reflects the level of hexavalent chromium an adult human can be exposed to over a lifetime, above which, would increase their likelihood of contracting cancer to greater than 1 in 100,000. As is Department of Natural Resources practice, in order to protect the privacy of the landowners of the property from which the samples were taken, results are identified only by sample numbers. All samples were taken from within a four-county area of northwest Missouri where tannery sludge was applied to the land as fertilizer.

### What is Hexavalent Chromium?

Hexavalent chromium, or chromium (VI), is one the three most common forms of chromium. Chromium is a naturally-occurring element found in rocks, animals, plants, and soil. No taste or odor is associated with chromium compounds.

Chromium (VI) and chromium (III) are used for chrome plating, dyes and pigments, leather tanning, and wood preserving.

Breathing air that contains chromium (VI) can cause irritation to the lining of the nose, nose ulcers, runny nose, and breathing problems such as asthma, cough, shortness of breath, or wheezing. In workers, it has been shown to cause nose, sinus, and lung cancers.

Ingestion of soil, food, or water that contains chromium (VI) can cause irritation, ulcers in the stomach and intestines, and anemia (your body does not have enough healthy red blood cells). In animals, ingestion of chromium(VI) in drinking water has been shown to cause cancers of the mouth, tongue, and intestines.

Regarding water samples, the most conservative benchmark is a maximum contaminant level (MCL) for total chromium, which is 100 ppb also known as micrograms per liter (ug/L). There was no hexavalent chromium detected in any of the water samples. The samples were taken from one private well and two surface water sources (two separate ponds on separate properties). The results are below.

<u>Sample #</u>	<u>Sample description</u>	<u>Media</u>	<u>Hexavalent Chromium Result</u>
0910052	SS-01	Soils	Non-detect (< 13 ppm)
0910053	SS-02	Soils	22 mg/kg
0910055	SS-03	Soils	20 mg/kg
0910056	Replicate-SS-03	Soils	49 mg/kg
0910057	WS-02	Water	Non detect (< 10 ppb)
0910058	WS-03	Water	Non detect (< 10 ppb)
0910059	Duplicate-WS-03	Water	Non detect (< 10 ppb)
0913584	SS-06; 0- to 2-inch depth	Soils	Non detect (< 5.1 ppm)
0913585	SS-06; 6- to 8-inch depth	Soils	29 mg/kg
0913586	SS-06; 10- to 12-inch depth	Soils	28 mg/kg
0910054	WS-01	Water	Non detect (< 10 ppb)

## **Continuing Testing**

Detection of hexavalent chromium, albeit at levels far below screening levels, has prompted the Department to conduct a second round of testing. This series of tests, scheduled to begin in July 2009, will be conducted on three types of farms in northwest Missouri: those with a history of light sludge application; those with a history of moderate sludge application, and those with a history of heavy sludge application.

The Department of Natural Resources will also be testing specific farm fields in northwest Missouri believed not to have been treated with tannery sludge used as fertilizer. This will help the state determine what level of the material exists naturally in northwest Missouri farmland.

## **For More Information**

For more information about farm field testing in northwest Missouri, contact:

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Field Services Division/Environmental Services Program  
P.O. Box 176, Jefferson City, MO 65102-0176  
Brian Allen  
1-800-361-4827 or 573-526-3380 office

For more information on health-related effects of chromium (VI), contact Missouri Department of Health and Senior Services.  
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