



Pavillion, Wyoming Groundwater Investigation

U. S. ENVIRONMENTAL PROTECTION AGENCY

REGION 8

AUGUST 2010

January 2010 Sampling Results and Site Update

Background

Pavillion, Wyoming is located in Fremont County, about 20 miles northwest of Riverton. The concern is groundwater contamination, based on resident complaints about smells, tastes, and adverse changes in water quality in private wells. EPA was first contacted by community members in 2008.

In March 2009, EPA sampled 39 individual wells to evaluate potential impacts to human health and the environment. Based on these results, EPA refined the area of potential concern and determined a second round of investigation was needed.

EPA's primary and immediate focus in Pavillion is assessing water contaminants, health concerns and ensuring residents have access to safe drinking water.

What did we sample?

In January 2010, EPA conducted a second round of sampling in Pavillion. This effort included 17 private wells, 4 stock/irrigation wells, 2 municipal wells, and surface water and sediment from Five Mile Creek. In addition, EPA sampled 3 shallow groundwater monitoring wells and soils and production fluids from 4 gas production wells owned by EnCana, the primary natural gas operator in the area.

EPA collected samples from 41 locations, each of which was analyzed for over 300 different constituents by 4 different laboratories. This resulted in thousands of individual pieces of data, each of which was carefully reviewed to ensure its validity. The Analytical Results Report, which can be found on our website, discusses in detail the process of ensuring the validity of data.

What did we find?

EPA's sampling results show that groundwater in Pavillion contains a number of organic compounds and inorganic constituents. Two drinking water wells have compounds detected above an EPA primary drinking water standard—one well for lead and phthalate and one well for nitrate.

EPA's primary concern is the presence of several organic hydrocarbons found in low levels in domestic wells and in higher concentrations in shallow monitoring wells.

EPA found a widespread incidence of low levels of organic compounds in drinking water wells. Overall, 17 of 19 drinking water wells sampled in January 2010 show detections of total petroleum hydrocarbons. Additional compounds detected include naphthalene, phenols and methane.

EPA's analysis of samples taken from monitoring wells in Pavillion indicates high levels of petroleum compounds such as benzene, xylene, methylcyclohexane, naphthalene, and phenol. This shallow groundwater is hydrologically connected to the drinking water aquifer. Wyoming DEQ and EnCana have recognized this contamination and have been working to evaluate and address it.

Methane detected in 7 drinking water wells was found to be of thermogenic origin, meaning it originated within the natural gas reservoir. One drinking water well showed methane resulting from microbial activity, known as biogenic methane.

Without more information on flow direction and contaminant movement, uncertainty exists regarding future impacts to drinking water wells. Sample results reflect a single snapshot in time and EPA cannot identify trends or changes in condition.

EPA also found a number of inorganic constituents in both domestic and monitoring wells. These constituents, such as sodium, sulfates, and magnesium, are generally within ranges seen in previous studies. Four pesticides were detected in 4 private wells at very low concentrations less than 10 parts per trillion, also consistent with previous studies.

EPA was able to confirm and quantify the concentrations of some compounds that were tentatively identified during our March 2009 sampling. Eleven wells were confirmed to have tris 2-butoxyethanol phosphate, also known as 2 BE-P or TBEP, at concentrations less than 5 parts per billion. TBEP is used as a plasticizer and in other commercial products. Adamantane compounds were also confirmed in 4 wells at low concentrations. Adamantane compounds are commonly associated with hydrocarbon production fluids, and can be found in other products.

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Next Steps

EPA has not reached any conclusions about how constituents of concern are occurring in domestic wells.

EPA has installed two monitoring wells and recently conducted soil gas measurements. These efforts will build upon prior sampling events and help EPA better understand the groundwater hydrology and how compounds of concern may be occurring in the aquifer. EPA will communicate the results of this investigation with the community and stakeholders in 2011.

EPA is working closely with partners and EnCana to ensure that affected residents receive water and to evaluate potential sources. This includes securing access to alternate water sources, as well as evaluating potential long-term solutions, such as water treatment systems and infrastructure. EPA and partners will work on the details of agreements over the next several weeks and will consult with the community to ensure actions taken meet local needs.

NEED MORE INFORMATION?



<http://www.epa.gov/region8/superfund/wy/pavillion>

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The Agency for Toxic Substances and Disease Registry (ATSDR), a federal agency of the U.S. Department of Health and Human Services, has been working closely with the EPA and state agencies since 2009 to examine potential health effects from contaminated groundwater and well water in Pavillion. Making sure people are safe from chemical exposure is ATSDR's top priority. ATSDR examined data EPA gathered from private wells, groundwater monitoring wells, and stock and irrigation wells.

Health Recommendations:

People who are using private well water should use other water for cooking and drinking.

- Inorganic constituents in the water including sodium, magnesium, iron, selenium, sulfate, and nitrates could cause health effects.
- Petroleum hydrocarbons, which are not usually found in drinking water, were found in many wells.
- No health risks are expected from breathing in water while showering or using evaporative coolers.

People whose wells contain methane should take specific precautions.

- Scientists do not believe there is enough methane in well water to cause health problems or explosions. However, people whose wells contain methane should take extra steps to be cautious.
- Use ventilation when taking showers. Open a window or door or run a bathroom fan.
- Avoid fires or ignition sources in closed rooms where water is running.

These recommendations are based on several factors, including chemicals found in the well water, the possibility of further contamination from nearby groundwater, and the lack of health information for some of the compounds found.

The samples reflect a single snapshot in time and cannot provide a picture of well water quality over time.

Next steps:

- ATSDR will continue to work closely with EPA to protect the health of people in Pavillion.
- ATSDR recommends further monitoring of well water.
- ATSDR recommends further analysis of compounds where health effects are unknown.

For more information regarding health concerns and best practices, please contact:

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