

**SALINA'S GROUNDWATER CONTAMINATION**  
**ENVIRONMENTAL HEALTH ISSUE PROFILE**  
Community Action for a Renewed Environment (CARE)  
Environmental Sustainability for the Salina Community

**Issue:** Groundwater contamination

**Background:**

When European settlers first came to the Kansas territory, essentially all of the streams, rivers, lakes, springs, and groundwater were of good quality and could be used for human consumption without the need for treatment. With growth of the human population and spread of modern agricultural, and commercial and industrial practices, much of our surface water and groundwater must now be treated to be fit for human consumption. Groundwater contamination can be costly to clean up or remove. It can render water supplies unusable, greatly affecting a community's ability to provide the quantity or quality of water needed for residents or local industries.

The city of Salina receives its drinking water from underground wells and the Smoky Hill River. These sources of water are being affected by groundwater contamination that enters the water supply in many different ways. Some of the major sources of contamination are former dry-cleaning sites, grain silos, and petroleum underground storage tanks (UST).

**Definitions:**

**MCL:** (Maximum Contaminant Level) This is the maximum concentration of a contaminant allowed in your finished drinking water as regulated by the U.S. EPA and KDHE under the Safe Drinking Water Act.

**Microgram per liter (ug/l):** parts per billion. 1000 parts per billion = 1 part per million.

**Volatile contaminant:** These are chemicals that have a relatively low boiling temperature and tend to evaporate into the air. Most are soluble to some degree in water and many have adverse health effects.

**Vapor Intrusion:** These volatile contaminants in the soil and groundwater can move through the soil as a dilute vapor and enter the basement or crawlspace of a home, school, or other building. Occupants inside the buildings may be exposed to chemical hazards by breathing the contaminants.

**Standards:**

The U.S. Environmental Protection Agency (EPA) and the Kansas Department of Health and Environment (KDHE) have developed drinking water standards for the contaminants detected in the local aquifer and groundwater. These maximum contaminant levels (MCL) for the following chemicals of concern in Salina are as follows:

<b>Contaminant Name</b>	<b>Abbreviation</b>	<b>Source</b>	<b>MCL (ug/l)</b>
Perchloroethylene	PCE	Dry Cleaning	5
Carbon tetrachloride	CC14	Grain Fumigant	5
1,2 Dichlorethane	1,2 DCA	Grain Fumigant	5

Ethylene dibromide	EDB	Grain Fumigant	0.2
Trichloroethylene	TCE	Degreaser	5
Benzene	Together these UST compounds are abbreviated as BTEX	Petroleum UST	5
Toluene		Petroleum UST	10
Ethylbenzene		Petroleum UST	700
Total xylenes		Petroleum UST	10,000

### **Community-Specific Indicators**

What does the data say? Groundwater contamination comes from many sources. There are many contaminated areas in the community. Some of these include former dry cleaners, grain storage facilities, and gas stations. While many sites are being monitored, multiple sites are not being actively cleaned up.

Who is affected? Anyone who uses water provided by the city of Salina is potentially affected. Also affected are those who use private wells installed in the local aquifer.

How is the community affected? Much of the local drinking water is pumped from the aquifer by municipal water supply wells. Several wells are in close proximity to the areas where contaminants have been detected. Some of these wells are currently being affected by these contaminants. Water being taken from the local aquifer has to be treated to eliminate several of these volatile contaminants from the drinking water supply. There are currently air-stripper treatment systems in place that are managing the problem, but in the future, some contaminants may not be adequately removed by this system.

If contaminants spread, more groundwater will be affected, reducing the available supply of water that does not have to be treated. This will ultimately result in greater cost for cleaning or treatment. Residences and businesses located in the vicinity of these contaminated areas (also known as contaminant plumes) are potentially subject to vapor intrusion into the home or building, and direct inhalation of the volatile contaminants. Some residences have lawn and garden wells that do not get tested or treated like municipal wells. If located in contaminated areas, volatiles could be released when wells are used, leading to human exposure. Volatiles in the water could be inhaled by people, such as kids running through lawn sprinklers.

What are the environmental conditions? Groundwater can move easily through much of the sandy aquifer, which provides water to the city wells and provides about 50% of our drinking water supply. Other areas of contaminated water may reach the wells if the pollutants are not cleaned up or properly managed.

What are the contributing factors and behaviors of the community?

- Lack of awareness is a big factor.
- Current methods (air strippers) are only managing the situation for now, and there are ongoing operating and maintenance costs for these systems.
- State and federal regulators have limited time and funding to clean up or to compel responsible parties to clean up contamination.

- There is lack of funding to have multiple areas of contamination at abandoned sites cleaned up.
- Contaminant plumes that are not being adequately managed will continue to spread and contaminate more groundwater. This could also lead to increased potential for human exposure to volatile contaminants from vapor intrusion into homes, commercial businesses, and schools.

How does the community protect itself?

- Seek support from EPA and KDHE to enforce regulations to have responsible parties clean up the contamination.
- Seek funding from state or federal superfund program to have abandoned sites cleaned up.
- Seek funding from brownfields programs to clean up applicable areas of contamination.
- Seek funding from state water plan or similar programs to investigate and remediate contaminated sites.
- Provide education about volatile organic contamination of groundwater and vapor intrusion into buildings.

**Data Sources:**

**Where did the data come from?:**

[http://kansas.kdhe.state.ks.us/pls/certop/lresults?SelStr=\(psnam=;pcnty=SALINE;pdist=;pcity=Salina;pbasn=;plegl=TS R S:\)](http://kansas.kdhe.state.ks.us/pls/certop/lresults?SelStr=(psnam=;pcnty=SALINE;pdist=;pcity=Salina;pbasn=;plegl=TS R S:))

[http://www.epa.gov/safewater/contaminants/dw\\_contamfs/tetrchl.html](http://www.epa.gov/safewater/contaminants/dw_contamfs/tetrchl.html)

<http://www.epa.gov/safewater/contaminants/index.html#rads>

<http://public1.kdhe.state.ks.us/BERREGT/BERREG.nsf/NCUPERMWEB?OpenForm>

<http://kansas.kdhe.state.ks.us:80/pls/certop/IopX?id=C508570919>

[http://www.epa.gov/safewater/contaminants/dw\\_contamfs/benzene.html](http://www.epa.gov/safewater/contaminants/dw_contamfs/benzene.html)

[http://www.epa.gov/safewater/contaminants/dw\\_contamfs/12-dichl.html](http://www.epa.gov/safewater/contaminants/dw_contamfs/12-dichl.html)

**Age of Data:**

1996 to 2009

**More data needed?**

Yes, additional time and study is needed to review existing files and site data. This will help to better define the levels of contamination and the extent of contaminant plumes in the local aquifer. More information is needed regarding the potential for vapor intrusion into local homes, schools, and commercial buildings from the volatile contaminant plumes.

*Paper prepared by Wes McCall and Mark Boyle, January 2010.*