

# Public Availability Session Groundwater Contamination

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**Millers Cleaners**

**323 S. Maize**

**Wichita, Kansas**

**September 13, 2016**

**Tyler Road Southern Baptist Church**

**Bob Jurgens, Section Chief**

**Kansas Dept. of Health & Environment**



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# Agenda

- What is the problem?
- Timeline of events to date
- What is the risk?
  - Action Levels
  - Health Concerns
- Emergency action – Interim alternative water supply
- Long term alternative water supply
- Long term corrective action



# What is the Problem?

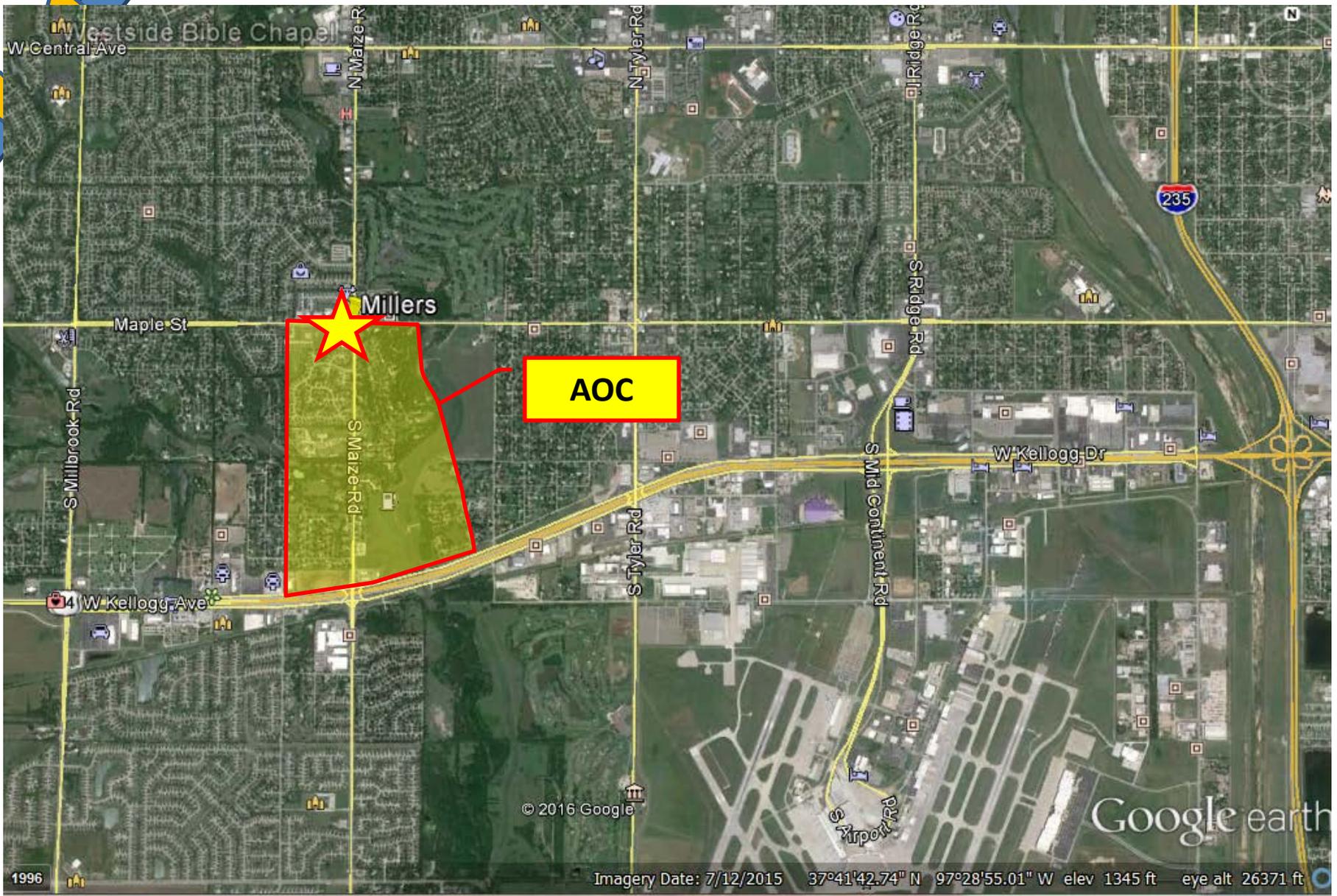
- Groundwater contamination from a former dry cleaner
- Impacted domestic water wells
  - Drinking water supply
  - Lawn & garden
- Millers Cleaners: 323 S. Maize
  - Dry cleaning machines: 1988 – 2008
    - PCE and petroleum solvents
    - Appears standard industry practices were followed
  - Drop-off Store: 2008 to present



# Why is there a problem?

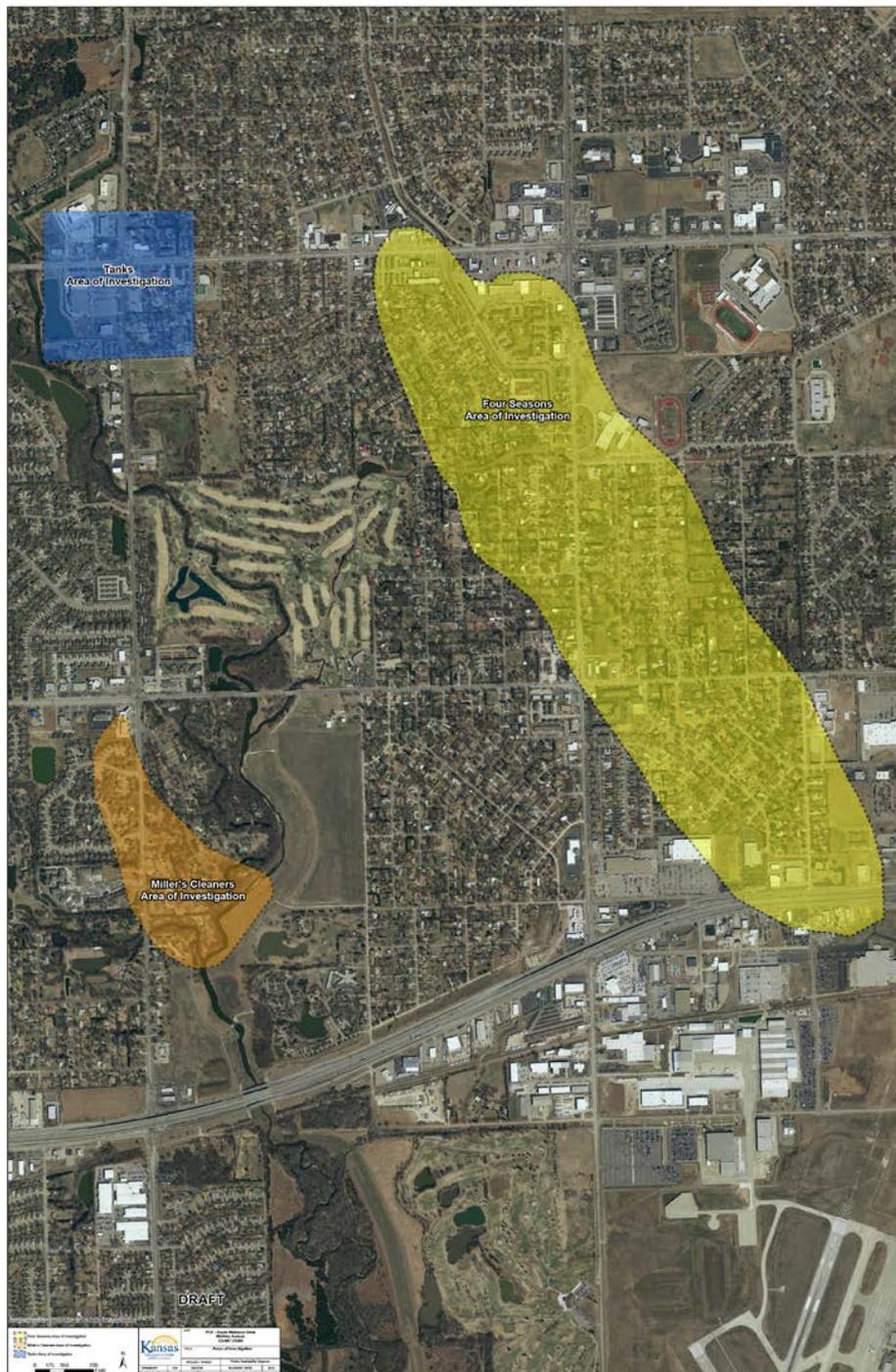
- Dry Cleaning Industry – Common sources of releases that were considered appropriate practice
  - Separator water into sewer lines
  - Filters disposed in dumpster – liquid drains out
  - Routine spills and leaks -  
No containment pans





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# Regional Map

Our Mission

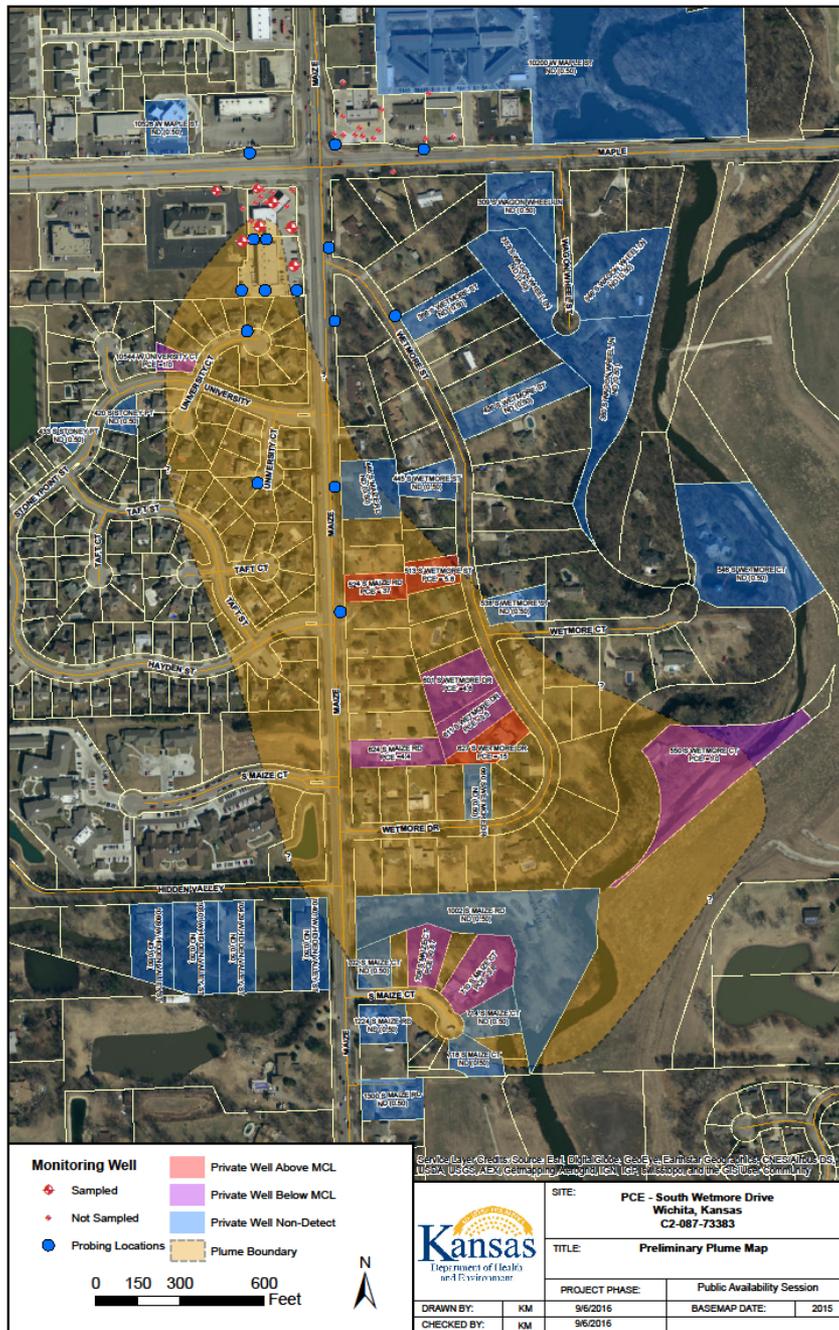


1s.



# Area Being Investigated

-  
Boundaries have not been confirmed

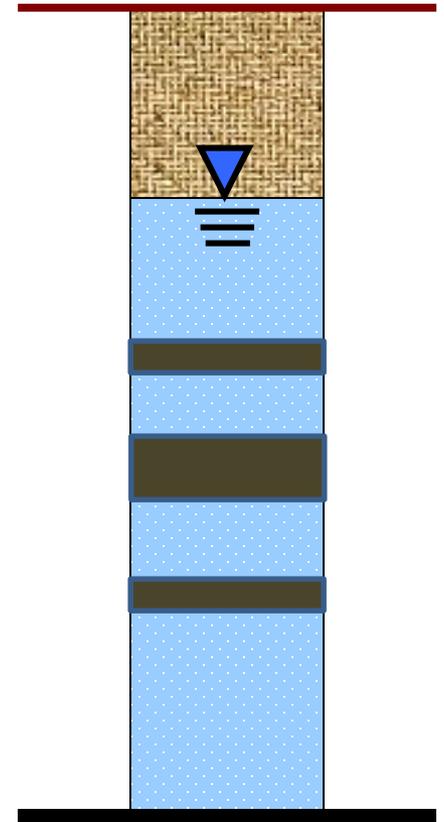


Our Mission: To

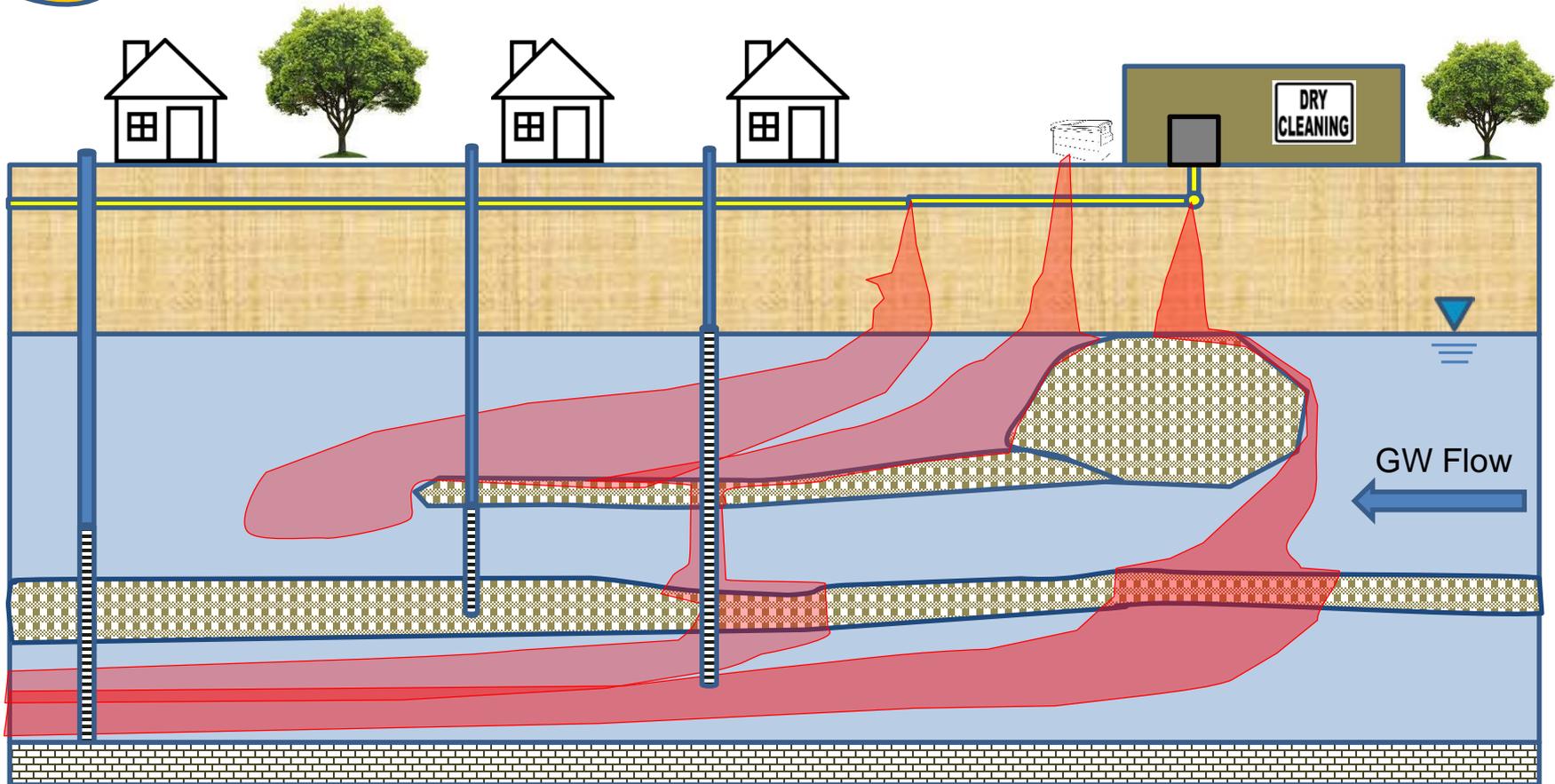


# General Geologic Conditions

- Clay to silty clay - surface to 20+ ft bgs
- Sand – 20 to 40+ feet bgs
- Clay 40+ to 90+ ft bgs
  - Clay is discontinuous(?)
- Sand – 90+ to 150+ ft bgs
  - Unknown depth(?)
  - Varies based on location within the plume



# Example of Contaminant Movement



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# PCE Investigation History

- 8/3/16: City of Wichita notifies KDHE of VOC contamination in domestic well on S. Wetmore
  - City provides maps depicting parcels with no public water supply accounts – represents likely domestic wells
- 8/4/16: KDHE seeks approval to use federal funding to identify the source of VOC contamination
  - KDHE contacts Kansas One-Call to clear utilities for groundwater probing investigation
- 8/5/16: EPA grants approval to use Site Assessment funding for initial investigation
  - KDHE begins sampling domestic and lawn & garden wells



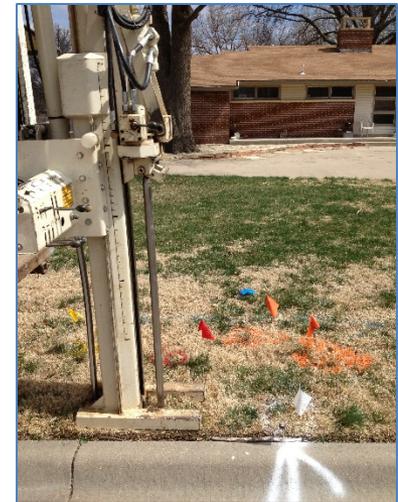
# PCE Investigation History

- 8/9-11/16: KDHE Site Assessment Program on-site to investigate the source of S. Wetmore contamination
  - Direct push probes, domestic wells, lawn & garden wells
- 8/11/16: Bottled water ordered and delivered on 8/12/16 to first property w/PCE contamination
- 8/23-24/16: 2<sup>nd</sup> round of KDHE groundwater investigation confirms Millers Cleaners is the source of the contamination
  - Transferred to KDHE Dry Cleaner Remediation Program



# PCE Investigation History

- Ongoing: Sampling private wells
- Planned:
  - KDHE supplemental field investigation to delineate the contamination with mobile laboratory
  - Direct Push sampling
  - Install groundwater monitoring wells
  - Investigate source area
  - Remediate source area
- Connect homes within the plume and a buffer zone to existing city water supply
- City install water mains





# What is PCE?

- PCE (aka. tetrachloroethylene or perchloroethylene) was a solvent used at the dry cleaner
- Clear, colorless liquid that has a sharp, sweet odor and evaporates quickly
- PCE degrades to
  - Trichloroethylene (TCE)
  - Cis 1,2-dichloroethylene (DCE)
  - Vinyl chloride (VC)
- Routine dry cleaning operations – Industry standard
  - Separator water disposal through the sewer system
  - Disposal of spent filters in dumpsters
  - Leaks/Spills



# Non Carcinogenic Health Risk - PCE

- Exposure to PCE can cause adverse non-cancer effects on the human nervous system.
- Long-term exposure to PCE can also pose a potential human health hazard to reproduction and development, and to the kidney, liver, immune and hematologic systems.
- People exposed to high levels of PCE (>100,000 ppb vapor), even for brief periods, may experience symptoms such as dizziness, fatigue, headaches, confusion, nausea, and skin, lung, eye and mucous membrane irritation.



# Carcinogenic Health Risk - PCE

- EPA has determined that PCE is a “likely human carcinogen.”
- In laboratory studies, PCE has been shown to cause cancer in rats and mice when they ingest or inhale it.
- There is also suggestive evidence, from several studies of workers in the laundry and dry cleaning industry, that PCE exposure is associated with elevated risks of certain types of cancer (including bladder, non-Hodgkin lymphoma, and multiple myeloma—blood cancer).



# How is the risk calculated?

PCE risk is calculated based on a chronic exposure. Risk based calculations are commonly based on a 20 to 30 year exposure.

- Chronic health effects - Prolonged or repeated exposures over many days, months or years. Symptoms may not be immediately apparent.
- Acute health effects - Sudden and severe exposure and rapid absorption of the substance. Normally, a single large exposure is involved. Acute health effects are often reversible. Examples: carbon monoxide or cyanide poisoning



# Maximum Contaminant Level

- Drinking Water
  - PCE = 5 ppb
  - TCE = 5 ppb
  - Cis 1,2-DCE = 70 ppb
  - Vinyl Chloride = 2 ppb
- Determined by EPA, adopted by KDHE
- Based on probability of an additional cancer incidence.



# What is 1 ppb?

- 1 Part per billion ppb = 1 microgram per Liter
- 1/1,000th teaspoon of dye in a 21-foot diameter by 4-foot deep swimming pool;
- 1 sheet in a roll of toilet paper stretching from New York to London;
- 1 marble among 20 football fields covered with marbles; or
- 1 inch in 15,782 miles.



# Removal Management Level

- Groundwater Concentration – ppb

Exposure	Child PCE	Child TCE	Child VC	Adult PCE	Adult TCE	Adult VC
Non-Carcinogen	104	7.7	108	156	9.9	205
Ingestion	282	23.5	141	657	54.8	329
Inhalation	250	12.5	626	250	12.5	626
Dermal	489	147	1,750	1,100	329	4,150
Carcinogen	974	21.8	1.5	974	21.8	1.5

- Based on probability of an additional cancer incidence.
- Used to determine when showering, washing is allowed.



# Alternative Drinking Water

1. Immediate hookup to existing city water mains. Any home above MCL or within designated buffer zone.
2. Bottled water for homes above MCL, but below RML.
3. Point of Entry (whole house) Carbon Filtration. Any home above the RML. **NONE IDENTIFIED TO DATE**
4. Install city water mains and connect all homes in the ***final*** area of concern.



# Private Water Connections

1. KDHE pays for city connection fees and plumber
  1. KDHE Access Agreement/pressure regulator acknowledgment or waiver must be signed
2. Typically open trenching, but horizontal boring is being evaluated.
3. Final Area of Concern will be based on KDHE comprehensive Investigation
  1. S. Wetmore Dr., S. Wetmore Ct.,  
S. Maize Rd., S. Maize Ct.,  
W. Hidden Valley St.
  2. S. Wagon Wheel Ln. is **not** included





# City Water Main

1. Requires design, bidding and installation
  - S. Maize Ct.
  - W. Hidden Valley St.
2. Capital cost paid by KDHE, no specials for water mains
3. City Ordinance – Questions?
  - “...prohibits the installation of *new personal use* wells and requires cessation of use of *existing* wells...”
  - Contact Wichita/Sedgwick County Environmental Health Dept. at 316-268-8351



# Use of Lawn & Garden Wells

Ways of using the water	How you can protect your health
Watering lawns, washing cars, gardening or playing in the sprinkler	<ul style="list-style-type: none"><li>• Cold water releases fewer VOCs, and using the water outdoors allows remaining VOCs to escape into the air where they are diluted and cannot be breathed in as easily.</li><li>• Avoid drinking or accidentally swallowing the water.</li><li>• Use a sprinkler when watering the lawn or garden. This will promote volatilization of the VOCs.</li><li>• Studies indicate that plant uptake of PCE are negligible and do not pose a serious risk to human health. Residents should thoroughly wash plants and vegetables from the garden.</li></ul>
Filling private pools, spas and wading pools	<ul style="list-style-type: none"><li>• Wait 24+ hours after filling the pool before using it to allow some of the VOCs to volatilize.</li><li>• Make sure the pool is kept outside and not covered.</li><li>• Avoid drinking or swallowing the water. Supervise children and pets.</li></ul>

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# Use of Lawn & Garden Wells

Ways of using the water	How you can protect your health
Using the water in indoor shops or garages, greenhouses or other enclosed areas	<ul style="list-style-type: none"><li>· VOCs will “off-gas” into the indoor air, which means that you can breathe in the chemicals.</li><li>· Make sure the area is well ventilated by keeping doors and windows open, and using exhaust fans, if possible.</li><li>· Keep the time spent in the area where the water is used to a minimum.</li></ul>
Watering animals, pets and birds	<ul style="list-style-type: none"><li>· Animals can be affected by VOCs in a similar manner as humans.</li><li>· A hose and spray nozzle can be used to fill a bucket or other container. The spray will help promote volatilization. A full bucket of water can be left overnight to allow additional time for the VOCs to volatilize.</li></ul>

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# Water Well Sampling

- KDHE's Dry Cleaning Program will sample homes determined to possibly be impacted by the Four Seasons Dry Cleaning contamination.
- Sampling your own well:
  - EPA Method 8260
  - Analyzed by an accredited laboratory for VOCs
    - Accredited laboratories in Kansas
    - <http://www.kdheks.gov/labs/index.html>
    - Some environmental consultants can assist with collecting and analyzing water samples.
- Wichita/Sedgwick County Environmental Health Department – 316-268-8351



# Corrective Action

- KDHE Dry Cleaning Program – Project Lead
- Source Investigation – Investigate soil contamination
- Expanded Site Assessment – Investigate Groundwater impacts
  - Vertically and spatially
- Remedial Design and Implementation
  - Soil
  - Groundwater



# Questions



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[www.kdheks.gov](http://www.kdheks.gov)



**Bob Jurgens: 785-296-1914, [bjurgens@kdheks.gov](mailto:bjurgens@kdheks.gov)**

**Kevin Moon, Proj. Mgr: 785-296-8025, [kmoon@kdheks.gov](mailto:kmoon@kdheks.gov)**

**Joe Dom, Unit Mgr: 785-296-4367, [jdom@kdheks.gov](mailto:jdom@kdheks.gov)**

**Farah Ahmed, Public Health Officer: 785-296-6426, [fahmed@kdheks.gov](mailto:fahmed@kdheks.gov)**

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