

# Health Consultation

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Main Street Groundwater Plume Site  
(a/k/a Burnet Groundwater)

Burnet, Burnet County, Texas

EPA FACILITY ID: TXN0006070441

**Prepared by**  
**Texas Department of State Health Services**

February 25, 2016

Prepared under a Cooperative Agreement with the  
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Agency for Toxic Substances and Disease Registry  
Division of Community Health Investigations  
Atlanta, Georgia 30333

## **Health Consultation: A Note of Explanation**

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

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## Summary

### Introduction

The Main Street Groundwater Plume site is located in Burnet County, Texas, approximately one mile south of the city of Burnet and 12 miles west of the city of Bertram. The site consists of groundwater contaminated with tetrachloroethylene (PCE) originating from an unknown source that was released into the underlying Ellenburger-San Saba aquifer. Groundwater contamination was identified in 2010 through routine monitoring of the Bertram Public Water Supply well (BPWS-G).

In 2012 and 2013, the Texas Commission on Environmental Quality (TCEQ) collected groundwater samples from 20 wells, including private and public water supply (PWS) wells, within a 4-mile radius of the BPWS-G well to determine the degree and extent of groundwater contamination. TCEQ detected PCE in nine of these wells.

The Environmental Protection Agency (EPA) proposed the Main Street Groundwater Plume site to the National Priorities List on March 26, 2015. Currently, there is not enough data available to complete a Public Health Assessment for this site; however, available data were evaluated to determine if residents drinking water from public and private water supply wells are at risk for adverse health effects.

### Conclusions

The Texas Department of State Health Services (DSHS) and the Agency for Toxic Substances and Disease Registry (ATSDR) reached two conclusions in this health consultation:

#### Conclusion 1

Based on the 2012 and 2013 groundwater sampling results, exposure to PCE from drinking water from the private and PWS wells sampled is not expected to harm people's health.

#### Basis for Conclusion

Concentrations of PCE were below comparison values (CVs) in all samples evaluated and are below levels of health concern.

#### Conclusion 2

Exposure to PCE through other water uses, such as lawn irrigation and swimming pools, are expected to be minimal and not harmful to health.

#### Basis for Conclusion

It is possible for individuals to inhale PCE that has volatilized from groundwater used for irrigation purposes or swimming pools; however, these exposures are not expected to be significant due to the large quantities of outdoor air that dilute the airborne contaminants. Incidental ingestion and dermal contact of water during swimming is also possible, but exposure is considered very limited due to the minimal amount of water expected to be ingested and the low concentration of PCE expected to be present in the water.

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Limitations

This health consultation report is based on a limited number of groundwater samples. DSHS evaluated groundwater samples collected from 20 wells during 2012-2013. The source and extent of PCE contamination have not been determined so it is possible that other wells may contain PCE.

Recommendations

This report evaluates the drinking water exposure pathway at a point in time and may not be representative of past exposures. Other exposure pathways such as vapor intrusion, dermal contact, and inhalation were either not evaluated or qualitatively evaluated because of the limited scope of the investigation.

Based on the 2012 and 2013 sampling results, the following recommendations are appropriate and protective of public health:

1. Individuals concerned about their exposures to PCE in water are advised to speak with their health care provider.
2. DSHS will provide health education material to the City of Bertram.
3. ATSDR and DSHS recommend that EPA continue their investigation of groundwater contamination and source identification.

Next Steps

- The final version of this document will be made available to community members, city officials, the TCEQ, EPA and other interested parties.
- DSHS will continue to work with EPA and TCEQ and evaluate additional data as it becomes available. The results will be summarized in additional health consultations or a Public Health Assessment.

For More Information

If you have concerns about your health, we recommend that you contact your health care provider. For more information about this health consultation, you may contact the DSHS, Public Health Assessment and Consultation Program at (800) 588-1248.

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## **Background and Statement of Issues**

### **Purpose**

The Texas Department of State Health Services (DSHS) in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR) evaluated the public health significance of groundwater contamination with tetrachloroethylene (PCE) that underlies Burnet County, Texas, known as the Main Street Groundwater Plume site. The United States Environmental Protection Agency (EPA) proposed the Main Street Groundwater Plume site to its National Priorities List (NPL) on March 26, 2015 [1].

A list of acronyms and abbreviations used in this report is included in Appendix A and background information about PCE is included in Appendix B.

### **Site Description and History**

The Main Street Groundwater Plume site is located between County Road 340 and County Road 340 A in Burnet County, Texas, approximately one mile south of the city of Burnet and 12 miles west of the city of Bertram. The site consists of groundwater contaminated with tetrachloroethylene (PCE) originating from an unknown source that was released into the underlying Ellenburger-San Saba aquifer. The groundwater contamination was first identified in 2010 during routine sampling of the Bertram Public Water Supply well (BPWS-G). Although levels were below EPA's maximum contaminant level (MCL)<sup>1</sup>, PCE was consistently detected over time [2]. Other volatile organic compounds from well BPWS-G were not detected [3].

The area surrounding well BPWS-G is predominantly rural with commercial businesses located along Highways 29 and 281, the main thoroughfares of Burnet [4]. Well BPWS-G provides approximately half of the water supply to residences within the city of Bertram. Although well BPWS-G is located just outside the city limits of Burnet, it does not provide water to residents living in Burnet. Residences outside the city limits of Burnet and Bertram rely on private groundwater wells for their water supply. There are approximately 13 active PWS wells and over 200 private wells within a 4-mile radius of well BPWS-G [2].

In 2012 and 2013, the Texas Commission on Environmental Quality (TCEQ) collected groundwater samples from 20 wells, including both private and PWS wells, within a 4-mile radius of the BPWS-G well to determine the degree and extent of groundwater contamination. Sampled wells were selected based on their location relative to potential sources and potential receptors. To date, a source of the contamination has not been identified [2]. TCEQ detected PCE in nine of the wells sampled.

## **Discussion**

### **Limitations**

This health consultation report is based on a limited number of groundwater samples. DSHS evaluated groundwater samples collected from 20 wells during 2012-2013. The source and extent of PCE contamination have not been determined so it is possible that other wells may contain PCE.

This report evaluates the drinking water exposure pathway at a point in time and may not be representative of past exposures. Other exposure pathways such as vapor intrusion<sup>2</sup>, dermal contact,

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<sup>1</sup> MCLs are enforceable regulations established by EPA for contaminants in public water systems.

<sup>2</sup> Vapor intrusion is a process by which chemicals in soil and groundwater migrate to indoor air above a contaminated site.

and inhalation were either not evaluated or qualitatively evaluated because of the limited scope of the investigation.

### Data Used

In 2012 and 2013, the TCEQ collected groundwater samples from 20 wells, including 16 private and 4 PWS. The sampling results are presented in Table 1. DSHS compared these results to ATSDR health-based comparison values (CVs) for drinking water. CVs included in this evaluation are ATSDR's environmental media evaluation guide (EMEG) and cancer risk evaluation guide (CREG). EMEGs represent concentrations of substances in water to which humans may be exposed during a specified period of time without experiencing non-cancerous adverse health effects, while CREGs are media-specific comparison values that are used to identify concentrations of cancer-causing substances that are unlikely to result in a significant increase of cancer rates in an exposed population [5].

All samples were analyzed for PCE using EPA's Region 6 Laboratory in Houston, Texas. Data reviewed in this report were collected by the TCEQ using standard procedures and were reviewed by the EPA for quality assurance/quality control. Thus, DSHS and ATSDR assumed adequate quality assurance/quality control procedures were followed with regard to data collection, chain of custody, laboratory procedures, and data reporting. EPA qualified data collected from six wells in 2012 as unusable due to interference in both laboratory and field blanks. DSHS did not include these results in the current evaluation.

### Results

PCE was detected in 7 of the 16 private water wells with a maximum concentration of 9.3 micrograms per liter ( $\mu\text{g/L}$ ) and in 2 of the 4 PWS wells with a maximum concentration of 3.5  $\mu\text{g/L}$  (Table 1). The public water supply well with the maximum concentration of 3.5  $\mu\text{g/L}$  is no longer in operation due to historical *Escherichia coli* (*E. coli*) contamination. Concentrations of PCE in all samples collected were below CVs. Ingestion of water with PCE levels below CVs is not expected to result in harmful health effects. While people may also be exposed to PCE by inhalation during showering and bathing, these exposures are not expected to result in harmful effects due to the low concentrations of PCE detected in the samples.

In addition to being exposed to PCE through drinking water, it is possible for individuals to inhale PCE that has volatilized from groundwater used for irrigation purposes or swimming pools; however, these exposures are not expected to be significant due to the large quantities of outdoor air that dilute the contaminants that have become airborne. Incidental ingestion and dermal contact of water during swimming is also possible, but exposure is considered limited due to the minimal amount of water expected to be ingested and the low concentration of PCE expected to be present in the water.

**Table 1. Groundwater sampling results collected from 16 private and 4 public water system wells in 2012 and 2013 [2].**

Well Type	Number of Wells Sampled	Concentration Range (µg/L)	Comparison Values (µg/L)	Number of Exceedances above Comparison Values
Private	16	ND-9.3	17 – CREG	0
Public	4	ND-3.5	80 – child EMEG 280 – adult EMEG	0

CREG – Cancer Risk Evaluation Guide  
µg/L – micrograms per liter

EMEG – Environmental Media Evaluation Guide  
ND – not detected at reported quantitation limit (0.5 µg/L)

## Conclusions

The Texas Department of State Health Services (DSHS) and the Agency for Toxic Substances and Disease Registry (ATSDR) reached two conclusions in this health consultation:

1. Based on the 2012 and 2013 groundwater sampling results, exposure to PCE from drinking water from the private and PWS wells sampled is not expected to harm people's health. Concentrations of PCE were below comparison values (CVs) in all samples evaluated and are below levels of health concern.
2. Exposure to PCE through other water uses, such as lawn irrigation and swimming pools, are expected to be minimal and not harmful to health. It is possible for individuals to inhale PCE that has volatilized from groundwater used for irrigation purposes or swimming pools; however, these exposures are not expected to be significant due to the large quantities of outdoor air that dilute the airborne contaminants. Incidental ingestion and dermal contact of water during swimming is also possible, but exposure is considered very limited due to the minimal amount of water expected to be ingested and the low concentration of PCE expected to be present in the water.

## Recommendations

Based on the 2012 and 2013 sampling results, the following recommendations are appropriate and protective of public health:

1. Individuals concerned about their exposures to PCE in water are advised to speak with their health care provider about their health concerns.
2. DSHS will provide health education material to the City of Bertram.
3. ATSDR and DSHS recommend that Environmental Protection Agency (EPA) continue their investigation of groundwater contamination and source identification.

## Public Health Action Plan

The public health action plan for the site contains a description of actions that will be taken by DSHS, ATSDR, and other government agencies at the site. The purpose of the public health action plan is to ensure that this health consultation both identifies public health hazards and provides a plan of action

designed to mitigate and prevent harmful human health effects resulting from breathing, drinking, or touching hazardous substances in the environment. Included is a commitment on the part of DSHS and ATSDR to follow up on this plan to ensure that it is implemented.

**Actions Planned**

1. The final version of this document will be made available to community members, city officials, the EPA, the Texas Commission on Environmental Quality (TCEQ) and other interested parties.
2. DSHS will continue to work with EPA and TCEQ, and evaluate additional data as it becomes available. The results will be summarized in additional health consultations or a Public Health Assessment.

**Preparers of Report**

This Health Consultation for the Main Street Groundwater Plume site was prepared by the DSHS under a cooperative agreement with ATSDR. It is in accordance with the approved agency methods, policies, and procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented.

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**Appendix A: Acronyms and Abbreviations**

ATSDR	Agency for Toxic Substances and Disease Registry
BPWS-G	Bertram Public Water Supply Well
CV	comparison value
CREG	Cancer Risk Evaluation Guide
DSHS	Texas Department of State Health Services
EMEG	Environmental Media Evaluation Guide
EPA	United States Environmental Protection Agency
µg/L	micrograms per liter
ND	not detected
PCE	Tetrachloroethylene
PWS	Public Water System
TCEQ	Texas Commission on Environmental Quality



## Appendix B: PCE (tetrachloroethylene)

Tetrachloroethylene (also known as tetrachloroethene or perchloroethylene and abbreviated as PCE) is a man-made chemical that is commonly used in dry cleaning and metal-degreasing operations. Additionally, it is used as a building block for making other chemicals and is found in some household products such as water repellants, spot removers, adhesives, and wood cleaners [6].

PCE is a liquid at room temperature and evaporates easily into the air. Most PCE that gets into surface water and soil evaporates quickly into the air where it may persist for several months before being broken down into other chemicals. PCE in soil may also travel into the groundwater where it can last for decades. Under some conditions, PCE in groundwater is broken down into other compounds by bacteria, while under other conditions it sticks to soil. It does not build up in aquatic animals. Although PCE has been detected in fruits and vegetables, it is not clear if uptake of PCE occurred while the plants were growing or at some point after harvesting [6].

Exposure to PCE generally occurs by inhalation or ingestion. PCE is frequently found in the air because of evaporation from industrial or dry cleaning operations. Groundwater near these types of facilities or hazardous waste sites ~~also~~ may also be contaminated with PCE. There is a potential for this contamination to end up in private and public drinking water wells. Occupational exposures also occur in those people that work with PCE. Regardless of the exposure route (breathing, eating, drinking, or touching), most PCE leaves the body from the lungs during exhalation. A small amount of PCE travels to the liver and is broken down to other compounds and excreted in urine within a few days [6].

PCE has been used as an anesthetic because it causes loss of consciousness. Single exposures involving inhalation of high concentrations of PCE in closed or poorly ventilated areas can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in sleeping or walking, unconsciousness, or death. Most of these types of exposures and health effects occur with accidental exposures to high concentrations of PCE in occupational (or hobby) environments. Some men occupationally-exposed to PCE and other chemicals showed decreases in sex drive, sperm quality, and reproductive hormone levels [6].

Animal studies using inhalation and ingestion exposures have shown that PCE can cause liver and kidney damage as well as liver and kidney cancer. These studies were conducted using levels of PCE that are much higher than those most people are exposed to and the relevance of these studies to humans is unclear. There is evidence for neurological and neurobehavioral effects at low exposures to PCE. This evidence is primarily from studies of inhalation exposure. Based on the available data and studies, the effects after oral exposure are expected to be similar [6].

The National Toxicology Program has categorized PCE as reasonably anticipated to be a human carcinogen based on sufficient evidence of carcinogenicity in animals. Inhalation of PCE has resulted in an increased incidence of liver tumors in male and female mice. Increased incidences of leukemia in male and female rats and rare kidney tumors in male rats also have been noted [7].

PCE in the body can be detected by breath and blood tests. PCE that is stored in fat is slowly released to the bloodstream and can be detected in the breath for weeks following high concentration exposures. Breakdown products of PCE can be detected in blood and urine for several days after exposure;

however, exposure to other chemicals can produce the same breakdown products and these tests cannot definitively identify exposure to PCE [6].

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The responses to the survey will help ATSDR determine if we are providing useful and meaningful information to you. ATSDR greatly appreciates your assistance as it is vital to our ability to provide optimal public health information.

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