ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Public Health Assessment for

EAST 67TH STREET GROUNDWATER PLUME
ODESSA, ECTOR COUNTY, TEXAS
EPA FACILITY ID: TXN000606614
FEBRUARY 13, 2008

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the agency's opinion, indicates a need to revise or append the conclusions previously issued.

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PUBLIC HEALTH ASSESSMENT

EAST 67TH STREET GROUNDWATER PLUME

ODESSA, ECTOR COUNTY, TEXAS

EPA FACILITY ID: TXN000606614

Prepared by:

Texas Department of State Health Services
Epidemiology & Disease Surveillance Unit
Health Assessment & Toxicology Group
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

Foreword

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the Superfund law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, the U.S. EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment process allows ATSDR scientists and public health assessment cooperative agreement partners flexibility in document format when presenting findings about the public health impact of hazardous waste sites. The flexible format allows health assessors to convey to affected populations important public health messages in a clear and expeditious way.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high-risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries, to evaluate possible the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals, and community groups. To ensure that the report responds to the community's health concerns, an

early version is also distributed to the public for their comments. All the public comments that related to the document are addressed in the final version of the report.

Conclusions: The report presents conclusions about the public health threat posed by a site. Ways to stop or reduce exposure will then be recommended in the public health action plan. ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA or other responsible parties. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also recommend health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Manager, ATSDR Record Center Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E-60), Atlanta, GA 30333.

Executive Summary

The East 67th Street Groundwater Plume site was proposed to the National Priorities List (NPL) on September 27, 2006, which prompted the Texas Department of State Health Services (DSHS) to conduct this Public Health Assessment. This site is located just north of the city limits of Odessa, Ector County, Texas, and consists of a predominantly residential area with outlying commercial/industrial properties. The environmental medium of concern is groundwater, which has been contaminated with chlorinated solvents and their breakdown products.

The contamination was first observed in the Public Water Supply (PWS) for the Devilla Mobile Home Park. Additional wells were sampled, and monitoring wells were installed to determine the source of contamination and the extent of the contaminant plume. To evaluate the site, DSHS reviewed available data and site information to determine if the contaminated groundwater is currently, has in the past, or will in the future pose a public health hazard for residents who use groundwater.

No contaminants were identified above screening levels in the Devilla Mobile Home Park PWS. However, contaminants, including tetrachloroethene, *cis*-1,2-dichloroethene, and 1,2-dichloroethane, were identified at concentrations equal to or above the regulatory and/or health-based screening levels in some of the private wells. Exposure doses were estimated for those contaminants, and although they exceeded the initial screening criteria, the calculated exposure doses did not exceed the health guidelines for daily intake. 1,2-dichloroethane was further evaluated using the published cancer slope factor; and based on subsequent conservative calculations, there is no increased lifetime cancer risk associated with 1,2-dichloroethane.

Although the results of exposure dose calculations indicate that the unfiltered water (on average) is not likely to cause adverse health effects, all wells with contaminants above the regulatory standards have been modified with filtration systems. Based on this information, the groundwater at the site currently poses **no apparent public health hazard.** There are no contaminants above the regulatory screening levels in the PWS. Based on this information, water from the PWS poses **no apparent public health hazard.**

There are no historic groundwater sampling data, and no biological testing has been conducted to evaluate past exposures to groundwater. Due to this data gap, exposure to contaminated groundwater in the past has been estimated. Based on the calculated estimates for exposures in the past, the site poses **no apparent public health hazard.** The EPA and its contractors are in the process of obtaining water from the City of Odessa for the area. Based on this information, the water in the future will pose **no apparent public health hazard.** DSHS recommends the EPA continue to pursue alternative drinking water sources and ongoing review of analytical data.

Other contaminants, including metals and nutrients have been identified in on site drinking water. These contaminants are not part of the NPL investigation and will be evaluated in a separate Health Consultation report.

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Introduction

The East 67th Street groundwater plume site is located north of the city limits of Odessa in Ector County, Texas [1]. During routine sampling conducted by the Texas Commission on Environmental Quality (TCEQ) in 2005, chlorinated solvents were detected in one of four Public Water Supply (PWS) wells which service the Devilla Mobile Home Park on East 67th Street [2, 3]. Subsequent sampling identified measurable concentrations of contaminants in an additional 31 private drinking water wells in the area. The groundwater contamination consists of tetrachloroethene (also known as perchloroethene and/or PCE) and trichloroethene (TCE) and their associated degradation products: *cis*-1,2-dichloroethene (DCE); 1,1-DCE, 1,2-dichloroethane (DCA); and 1,1-DCA.

Groundwater in the area is used as a source of drinking water by residents and businesses, and the center of the plume is located at East 67th Street and Stevenson Avenue.

The Texas Department of State Health Services (DSHS) in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR) reviewed the environmental information available for the site. DSHS also evaluated the exposure pathways through which the public could contact contaminants from the site.

Purpose and Health Issues

ATSDR was established under the mandate of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. This act, also known as the "Superfund" law, authorized the U. S. EPA to conduct clean-up activities at hazardous waste sites. EPA was directed to compile a list of sites considered hazardous to public health. This list is termed the National Priorities List (NPL). The 1986 Superfund Amendments and Reauthorization ACT (SARA) directed ATSDR to prepare a public health assessment (PHA) for each proposed NPL site. [Note: Appendix A provides a list of abbreviations and acronyms used in this report.]

In conducting the PHA, three types of information are used: environmental data, community health concerns, and health outcome data. The environmental data are reviewed to determine whether people in the community might be exposed to hazardous materials from the NPL facility. If people are being exposed to these chemicals, ATSDR will determine whether the exposure is at levels that might cause harm. Community health concerns are collected to determine whether health concerns expressed by community members could be related to exposure to chemicals released from the facility. If the community raises concerns about specific diseases, health outcome data (information from state and local databases or health care providers) can be used to address those concerns. If ATSDR finds harmful exposures may have occurred, health outcome data also can be used to determine if illnesses are occurring and whether they could be associated with the hazardous chemicals released from the NPL facility.

In accordance with the Interagency Cooperative Agreement between ATSDR and the Texas DSHS, this PHA was prepared for the East 67th Street Groundwater Plume site. This PHA presents conclusions about whether exposures are occurring, and whether a health threat is present. In some cases, it is possible to determine whether exposures occurred in the past. However, a lack of appropriate historical data often makes it difficult to quantify past exposures.

If a threat to public health exists, recommendations are made to stop or reduce the threat to public health.

Background

The East 67th Street Groundwater Plume is located just north of the city limits of Odessa, Ector County, Texas. The center of the plume is located at the intersection of East 67th Street and Stevenson Avenue [2, 3]. The drinking water for residential and commercial/industrial properties in the area is obtained from the Trinity Aquifer. Thirty-one drinking water wells, located within a one-mile radius of the center of the plume, were identified with contaminants of concern [2].

Site History

PCE, TCE, and *cis*-1,2-DCE were detected in the PWS of Devilla Mobile Home Park in 2005 during regular monitoring by TCEQ. In March 2005, an additional 15 private drinking water wells were sampled. Three of these wells had elevated concentrations of PCE. The site was referred to the TCEQ Superfund Site Discovery and Assessment Team (SSDAT) for further evaluation. In April 2005, filtration systems were installed on the affected wells, and 31 additional private drinking water wells were sampled. Three of the 31 wells were identified with concentrations of PCE above the EPA Maximum Contaminant Level (MCL). Filtration systems were installed on these wells in May 2005, and 13 additional wells were sampled, but no additional filtration systems were warranted [2].

The site was transferred to the EPA Preliminary Assessment/Site Investigation Program for investigation in May 2005 [2, 3]. In July 2005, a total 48 drinking water wells, the Devilla Mobile Home Park PWS, and three monitoring wells were sampled for laboratory analysis of semi-volatile organic compounds, mercury, cyanide, pesticides, polychlorinated biphenyls (PCBs), and metals, as well as volatile organic compounds (VOCs).

The East 67th Street Groundwater Plume site was proposed to the NPL on September 27, 2006, based on the presence of chlorinated solvents in residential drinking water wells. Inclusion on the NPL allows federal funds and personnel to become available to further assess the nature and extent of the public health and environmental risks associated with the site.

Land and Natural Resource Use

The groundwater plume is located within the Trinity Aquifer, which consists of the Antlers Formation/Trinity Sands. The water bearing zone is unconfined in this area, and overlain by the Ogallala Formation. Because there is no confining layer (i.e. clay or marl beds), the water from the Ogallala is interconnected with the Trinity [2]. The water table is recharged from rainfall and partially from discharges of the overlying Eolian Sands formation. Based on well logs prepared by the drilling company, the wells in the areas are screened within 70 to 150 feet below grade surface (bgs); therefore, they are all receiving water from the same depth within the Trinity [2]. Based on the Screening Site Inspection Report, groundwater flows from the west to the southeast, and the source of the contamination has not been determined [3].

Demographics

The East 67th Street Groundwater Plume site is located in an unincorporated area of Ector County, north of Odessa, Texas [Figure 2]. Based on 2000 US Census data, 1,547 and 4,395 residents live within a half-mile and one-mile radius, respectively, of the intersection of Stevenson and East 67th Street [Figure 3]. Based on site reconnaissance and demographic information, the area is densely populated, and residents are of mid to low socioeconomic status.

Site Visit

On October 19, 2006, DSHS personnel visited the location of the groundwater plume (the site) prior to attending an EPA-hosted availability session. Properties to the north, south, and east of the center of the plume consist of residential dwellings. Properties to the west are predominantly commercial and industrial.

During the EPA availability session, residents spoke with representatives from EPA, TCEQ, and DSHS. DSHS personnel answered citizens' questions regarding human health effects associated with the contaminants and whether they should use the wells as a water source for pets. Additionally, one resident asked for an interpretation of the analytical data and data qualifiers and was curious about the uses, source, and health effects of 1,4-dioxane [4]. Information pertaining to these concerns is provided within this document.

Environmental Contamination/Pathways Analysis/Public Health Implications

Introduction

Chemical contaminants in the environment do not always result in adverse health effects in people. Adverse health effects are possible only when people actually come into contact with the chemicals. It is this contact (exposure) that people have with the contaminants that determines the potential health hazards and drives the public health assessment process.

People can be exposed to contaminants by breathing, eating, drinking, or coming into direct contact with a substance containing the contaminant. This section reviews available information to determine whether people in the community have been, currently are, or in the future could be exposed to contaminants associated with this site.

To determine whether people are exposed to site-related contaminants, investigators evaluate the environmental and human components leading to human exposure. This analysis consists of evaluating the five elements of an exposure pathway:

1.) The source of contamination,
2.) How the contaminant is transported through an environmental medium,
3.) Where the exposure occurs,
4.) How the contaminant gets into the body, and
5.) A receptor population.

Exposure pathways can be complete, potential, or eliminated. For a person to be exposed to a contaminant, the exposure pathway must be complete. A **completed pathway** is when all five

elements in the pathway are present and exposure has occurred, is occurring, or will occur in the future. A **potential pathway** is missing at least one of the five elements, but could be complete in the future. An **eliminated pathway** is missing one or more elements and will never be completed. The following discussion incorporates only those pathways relevant and important to the site, as shown in Appendix B.

Because exposure does not always result in adverse health effects, we also must evaluate whether the exposure could be sufficient to pose a hazard to people in the community. The factors that influence whether exposure to a contaminant or contaminants could or would result in adverse health effects include:

- The toxicological properties of the contaminant,
- How much of the contaminant the individual is exposed to,
- How often and/or how long the exposure occurs,
- The manner in which the contaminant enters or contacts the body, and
- The number of contaminants involved in the exposure.

Once exposure occurs, characteristics such as age, sex, genetics, health, nutritional status, and lifestyle influence how that person absorbs, distributes, metabolizes, and excretes the contaminant.

When identifying plausible potential exposure scenarios, the first step is assessing the potential public health significance of the exposure. This is done by comparing contaminant concentrations to health assessment comparison (HAC) values for both noncarcinogenic and carcinogenic end points. HAC values are media-specific chemical concentrations used to screen contaminants for further evaluation. Exceeding an HAC value does not necessarily mean that a contaminant represents a public health threat, but does suggest that the contaminant warrants further consideration.

Noncancer comparison values are also known as *environmental media evaluation guides* (EMEGs) or *reference dose media evaluation guides* (RMEGs). They are based on ATSDR's minimal risk levels (MRLs) and EPA's reference doses (RfDs), respectively. MRLs and RfDs are estimates of daily human exposure to a contaminant that is unlikely to cause adverse noncancer health effects over a lifetime. Cancer risk comparison values are also known as *carcinogenic risk evaluation guides* (CREGs). They are based on EPA's chemical-specific cancer slope factors and an estimated excess cancer risk of 1-in-1-million persons exposed for a lifetime. Standard assumptions are used to calculate appropriate HAC values [5].

In 1974, the U.S. Congress passed the Safe Drinking Water Act which required that EPA determine safe levels of chemicals in public drinking water. EPA has set the maximum contaminant level goal (MCLG) for PCE at 0 parts per billion (ppb). An MCLG of 0 ppb has also been set for 1,2-DCA. The MCLG is the level at which the EPA has determined there are no potential health risks. Based on the MCLGs, the MCLs are enforceable standards that take into account technical feasibility and potential health risks. Thus, the MCL is set as close to the MCLG as possible, considering present technology and resources [6].

Environmental Contamination

This section contains information about specific contaminants associated with the site; however, inclusion in this section does not imply that a particular contaminant represents a threat to public health. DSHS relied on the information provided in the referenced documents and assumed that adequate quality assurance/quality control (QA/QC) procedures were followed with regard to data collection, chain-of-custody, laboratory procedures, and data reporting.

Groundwater

Groundwater sampling data were collected from the Devilla Mobile Home Park PWS, private residential wells, and commercial wells. These samples were analyzed for volatile organic compounds (VOCs) to document the presence and extent of chlorinated solvent contamination. The concentrations of chemicals in the groundwater were compared to ATSDR's HAC values and EPA's MCLs.

The EPA has set an MCL of 5 parts per billion (ppb) for PCE, TCE, and 1,2-DCA. The MCLs for *cis*-1,2-DCE and 1,1-DCE are 70 ppb and 7 ppb, respectively. There is no current MCL or alternative HAC value for 1,1-DCA. Of these contaminants, only 1,2-DCA has a HAC value (CREG, 0.4 ppb) that is more stringent than its MCL (5 ppb).

Data were collected from wells in the plume area and compared to the following US EPA MCLs:

Chemical	MCL
PCE	5 ppb
TCE	5 ppb
1,2-DCA	5 ppb
1,2-DCE	70 ppb
1,1-DCE	7 ppb

Public Water Supply Well

The only affected public water system is the Devilla Mobile Home Park PWS (ID #0680069). The PWS currently has four active groundwater wells, which empty into a common tank with a capacity to serve as many as 50 residential dwellings [7, 8].

Although the contamination was first identified in the PWS well (GW-58), contaminants in this well are below the MCLs; therefore, a filtration system has not been installed. PWS well GW-58 is being monitored on a quarterly basis. The other three wells which provide water to the PWS have not had detectable concentrations of site-related contaminants [8].

Private Water Supply Wells

Groundwater samples from private wells at 24 residential addresses and 3 commercial addresses were collected during the May 2006 sampling event. Incomplete sets of data were reviewed from the July 2005 and August 2006 sampling events to establish a trend in the concentration of contaminants and to insure that all affected wells have filtration systems.

In the May 2006 data set, PCE concentrations ranged from not detected to 37 ppb; TCE ranged from not detected to an estimated 2.4 ppb; *cis*-1,2-DCE ranged from not detected to 70 ppb; and 1,2-DCA ranged from not detected to an estimated 2.1 ppb. Of these, only PCE and *cis*-1,2-DCE

exceeded their respective MCLs. Although 1,2-DCA did not exceed its MCL, it did exceed a more stringent HAC value (CREG 0.4 ppb) and was further evaluated for this health assessment. TCE did not exceed the MCL, and no other health criteria (i.e., HAC values) are currently available from ATSDR. For these reasons, TCE is not considered a contaminant of concern at this time.

The TCEQ has installed filtration systems on wells to remove contaminants which exceeded the MCL [2, 3]. Filtration units were installed on eight wells, as of the May 2006 sampling event [9]. Sampling is conducted every three months to verify that the filtration systems are effective at removing the contaminants. Contaminants were not detected after the affected groundwater passed through the final filter. Sample results for the January and July 2007 sampling events have also been reviewed. The review of the additional data did not influence the outcome of this health assessment. See Appendix E.

Table 1 – Summary of Sample Results (ppb), May 2006

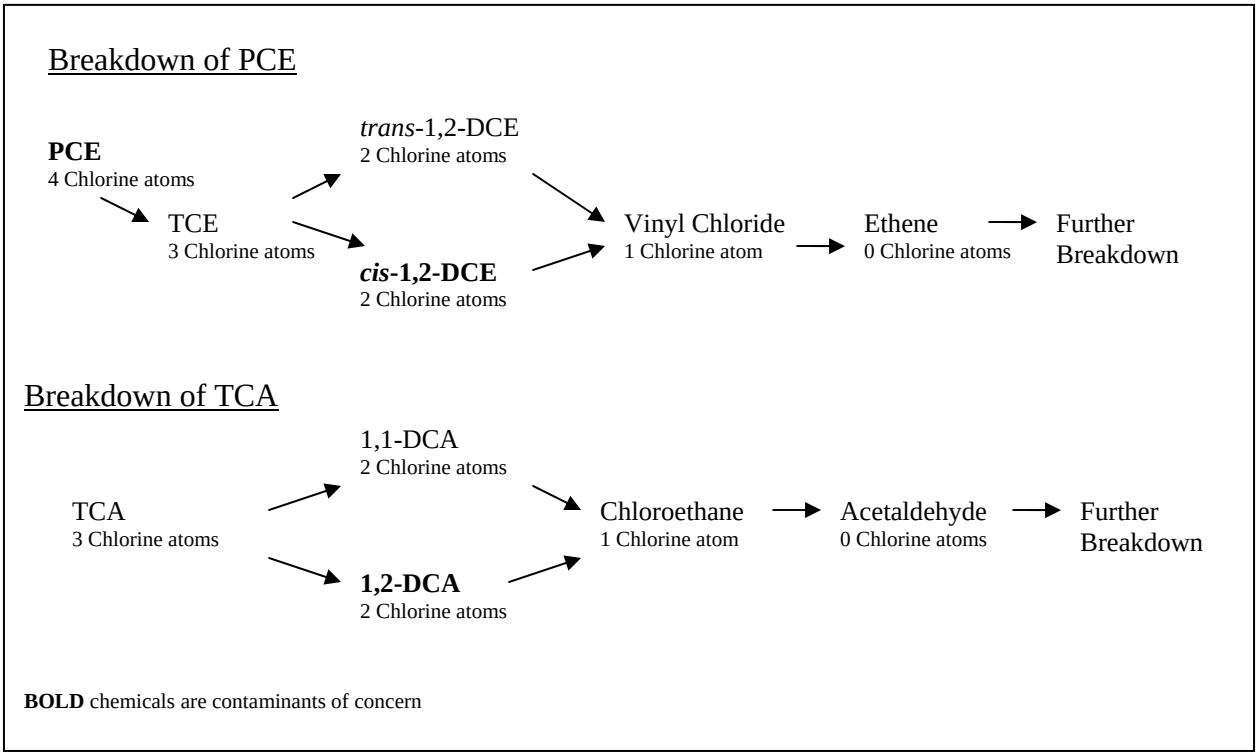
Contaminant	MCL	Average Concentration Prior to Filtration	Range of Concentrations		
			Prior to Filtration	*Mid-Filtration*	*After Filtration*
PCE	5	3.7	ND to 37	All ND	All ND (<0.5 ppb)
TCE	5	1.01	ND to 2.4[b]	All ND	All ND (<0.5 ppb)
cis-1,2-DCE	70	4.1	ND to 70	ND to 22	All ND (<0.5 ppb)
1,2-DCA	5 (CREG is 0.4)	0.884	ND to 2.1[b]	ND to 2.3[b]	All ND (<0.5 ppb)

ND not detected above the detection limit for the analytical method used
a averages were calculated using half of the detection limit when the values were ND
b estimated value

Contaminants of Concern

The contaminants of concern within the 67th Street groundwater plume are chlorinated solvents, a class of man-made chemicals. However, through natural processes, more highly chlorinated solvents can degrade to less chlorinated forms. For example, through bacteria-mediated processes, PCE can be degraded to TCE, and trichloroethane (TCA) can be degraded to DCA [10]. So while there are many different contaminants present in the plume, it is likely they are all products of PCE and TCA degradation. This is illustrated in the following text box.

Figure 1 – Summary of Solvent Degradation



Pathways Analysis

Groundwater at the site is currently used for drinking water, food preparation, bathing, and for commercial businesses purposes. Sampling data indicate that water from private wells historically contained PCE, *cis*-1,2-DCE and 1,2-DCA in excess of current drinking water standards. Contaminants, particularly volatile organic compounds that enter the home in potable water, present a situation in which residents could be exposed via multiple pathways. These include direct ingestion of the water, inhalation of the contaminant due to volatilization (when the contaminant becomes a gas and enters the air), and absorption of the contaminant through the skin during bathing. Thus, we would consider these all to be past completed exposure pathways. Currently, filtration systems on the private drinking wells are reducing contaminant concentrations to levels below analytical detection limits.

Of the data reviewed, the following chemicals were detected at concentrations above the MCLs:

- PCE
- *cis*-1,2-DCE
- 1,2-DCA

Ingestion of groundwater, inhalation due to indoor volatilization, and absorption through the skin are the exposure pathway of concern on site. Data to estimate the duration of exposure is not currently available. Default parameters, which assume a daily exposure, have been used to estimate exposure doses.

Data for air, soil and surface water were not available for review. However, we do not expect exposure to these media at this site to be a significant exposure pathway. The probability of regular inhalation, ingestion or dermal contact with the contaminants is low from air, soil or surface water exposures. In addition, the concentrations of contaminants in air, surface water and surface soils would be low due to evaporation and/or percolation. There is no perched groundwater or shallow saturated zone at the site, which might allow vapor intrusion from contaminated groundwater to enter residential or commercial structures.

Exposure might have occurred in the past during the initial chemical release, but it is not expected to cause any adverse health effects due to the likely short duration of exposure. Therefore we believe that the outdoor air, soil, and surface water pathways pose no apparent public health hazard. The conclusion category definitions, which are used to determine what type of, if any, health hazard, are shown on Table 2. The exposure pathway analysis is summarized in Appendix B.

Toxicologic Evaluation

Tetrachloroethene

Tetrachloroethene (PCE) is a man-made solvent most commonly used in dry cleaning and as a degreaser to clean mechanical parts. There are several names for PCE, including tetrachloroethylene, perchloroethene, perc, and perchlor. PCE, like other chlorinated solvents, is a VOC with a distinctive sweet odor that can be detected by most people at concentrations of one part PCE per one million parts of air (1 part per million or 1 ppm). Some people can smell PCE at concentrations as low as 0.3 ppm [11].

A release of PCE from dry cleaners, industrial operations, or waste sites can affect soil, air, or water. Background levels of PCE are found in food and drinking water. When PCE is released, it quickly evaporates in air and is broken down by sunlight. However, if PCE gets into subsurface soils or groundwater, it can persist until it is broken down by bacteria or other attenuating processes. Degradation or "breakdown" products of PCE include TCE and DCE [10].

PCE has been detected above the US EPA MCL in several wells. Using half of the detection limit, an average concentration was calculated. Exposure doses were estimated using the average concentration, and the calculated dose for adults and children were below ATSDR's MRL. Based on this information, adverse non-cancer health effects are not anticipated. The average concentration of PCE prior to filtration is below the MCL. Based on this information, cancer health effects are not anticipated. Wells with PCE above the MCL are on filtration systems.

People are usually exposed to PCE by eating contaminated food or water. PCE does not readily pass through the skin. At the East 67th Street site, the most common exposure pathway is from drinking the water or breathing contaminated air during showering or washing dishes prior to the installation of filtration systems.

Studies have shown that high concentrations of PCE in air (100s to 1000s ppm in air) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Observations of dry cleaning workers, exposed to an average concentration of 15 ppm in air indicated that response times to stimuli were longer after exposure for approximately 10 years [11]. Studies with pregnant rats have shown behavioral changes, consisting of decreased neuromuscular ability, in offspring when the mother is exposed to 900 ppm PCE in air during the first 20 days of gestation. No changes were observed in rats exposed to 100 ppm PCE in air.

An increase in liver weight and enzymes was observed in mice which were fed 1,000 to 2,000 milligrams of PCE per kilogram of body weight per day (mg/kg/day) and 500 mg PCE/kg/day for five days. In a similar study, liver weight was increased in mice fed 100 mg/kg/day for six weeks. Changes in kidney weights of male rats were observed at 400 mg PCE/kg/day after 90 days.

Repeated or extended skin contact with high concentrations of PCE, as seen in accidental exposures to workers or hobbyists, may result in skin irritation.

The health effects of breathing or drinking low concentrations of PCE are unknown. The U.S. Department of Health and Human Services (DHHS) has determined that PCE may reasonably be anticipated to be a carcinogen [11]. The International Agency for Research on Cancer (IARC) has determined that PCE is "probably carcinogenic to humans" based on limited human evidence and sufficient animal evidence. There is not enough information to evaluate the potential cancer risk to exposed populations. However, the average concentration prior to filtration at the site (3.7 ppb) was below the MCL (5 ppb). Based on this information, cancer health effects are not anticipated.

Once in the body, one to three percent of the PCE is converted to trichloroacetic acid, which is excreted in urine. Unmetabolized PCE is exhaled through the lungs. The half-life of PCE in vessel-rich tissue, muscle, and adipose tissue of humans has been estimated to be 12 to 16 hours, 30 to 40 hours, and 55 hours, respectively [11].

Based on available data from 2005 and 2006 sampling events, PCE concentrations in groundwater wells in the East 67th Street area have exceeded the MCL (5 ppb). An average PCE concentration was calculated (3.7 ppb) using half the detection limit for non-detected concentrations from the May 2006 data set. Using the calculated average, an exposure dose was estimated using the following default parameters: intake rate of water for adults, two liters of water per day (L/day); intake rate of water for children, 1 L/day; availability factor, 1; exposure frequency, 1 to reflect daily exposure; adult body weight, 70 kg; and child body weight 16 kg. The estimated doses for adults (1.06×10^{-4} mg/kg/day) and for children (2.31×10^{-4} mg/kg/day) were 100 times less than the established MRL (0.05 mg/kg/day) for acute (0 to 14 days) exposure and 100 times less than the EPA's oral RfD (0.01 mg/kg/day) for chronic (more than 365 days) exposure. [See Table 3.] Based on these calculations, no adverse non-cancer health effects are anticipated.

The MRL for acute oral exposure is based on animal studies in which mice exposed to 5 mg/kg/day PCE through a feeding tube exhibited hyperactivity. The exposure concentration was

extrapolated by dividing the animal exposure by 100 to account for uncertainties, including use of a Lowest Observed Adverse Effect Level (LOAEL), use of animal effects to predict human effects, and variability among humans [11].

cis-1, 2-Dichloroethene

There are a few forms of dichloroethene (DCE). Both *cis*-1,2-DCE and *trans*-1,2-DCE are used to produce solvents, and they are breakdown products of PCE and TCE degradation. Only the *cis* form exceeds screening values.

DCE breaks down slowly in groundwater but evaporates quickly from soil and surface water. Once in the air, DCE takes about five to twelve days to break down half of the contamination [12]. DCE has a harsh, sharp odor, and people can begin to smell it at concentrations as low as 17 ppm in air.

Potential exposure pathways for DCE in general include inhalation, ingestion, or dermal contact. Specifically, these exposures can occur during cooking, bathing, washing dishes, or showering with contaminated water.

Breathing high levels of DCE can cause drowsiness, nausea, or tiredness. Breathing very high levels can result in death. Animals exposed to high levels had liver, heart, and lung damage. 50% of mice exposed to 21,723 ppm for six hours died. An animal study indicated that a smaller fetus may result when pregnant animals inhale *trans*-1,2-DCE; effects were seen in offspring of animals exposed to 12,000 ppm *trans*-1,2-DCE in air for six hours on days six through 17 of gestation. The potential long-term health effects from breathing air with low concentrations of DCE are not known [12].

cis-1,2-DCE was detected above the US EPA MCL in two wells. More than half of the available data show that 1,2-DCE was not detected. Using half of the detection limit, an average concentration was calculated. Exposure doses were estimated using the average concentration, and the calculated doses were below the available standard based on this information, adverse health effects are not anticipated. Both wells with 1,2-DCE at or near the MCL are on filtration systems.

Ingestion of low amounts (290 mg *cis*-1,2-DCE/kg/day for 14 days) by animals caused decreased number of red blood cells, and liver effects were observed in 90-day studies at concentrations as low as 97 mg *cis*-1,2-DCE/kg/day. No effects on blood were observed when rats were exposed to 32 mg *cis*-1,2-DCE/kg/day, and no effects on liver function were observed at 17 mg *cis*-1,2-DCE/kg/day. The MRLs are based on these No Observed Adverse Effects Levels (NOAELs). Long-term human health effects due to exposure to low concentrations are not known.

Tests on breath, blood and urine can be used to detect DCE exposures. These tests are not routinely used, as the breakdown products in the body are the same as with exposure to other chemicals. The EPA has determined that DCE (*cis*-1,2-dichloroethene) is not classifiable as to human carcinogenicity [12]. No information is available to evaluate the cancer risk due to DCE

exposure. The concentrations on site are relatively low (below the MCL). Based on current literature, cancer health effects are not anticipated.

Available analytical data from the July 2005, May 2006, and August 2006 sampling events indicate that a total of three samples collected from two different wells equaled or exceeded the MCL (70 ppb) with concentrations of 83 ppb, 70 ppb, and 100 ppb.

An average concentration (4.1 ppb) from the May 2006 data was calculated using half the detection limit for non-detected concentrations. Using the calculated average, an exposure dose was estimated using default parameters as specified for PCE. [See Table 3]. The estimated doses for adults (1.17×10^{-4} mg/kg/day) and children (2.56×10^{-4} mg/kg/day) were more than 1,000 times below the established MRL (0.3 mg/kg/day) for intermediate (15 to 365 days) exposure. The two wells are now on filtration systems. The estimated exposure does from drinking the unfiltered water at the site were much lower than those associated with adverse health effects.

1,2,-Dichloroethane (DCA)

1,2-DCA is a man-made solvent with a reported pleasant smell and sweet taste. It is used to make polyvinylchloride (PVC), vinyl, and other materials in the plastics industry. Additionally, it is used as a solvent and degreaser. 1,2-DCA can result from TCA breakdown [10].

When 1,2-DCA gets into soil or surface water, it quickly evaporates into air. It can remain in air for months, during which time it can be carried long distances or transported back to soil in rain. Very little 1,2-DCA gets taken up by plants and fish [13].

In the past, the most likely exposure routes at the site were from drinking contaminated water and breathing in contaminated air while showering and/or washing dishes with contaminated water. Once ingested, 1,2-DCA is quickly broken down and excreted in urine or exits the body during exhalation [13].

Accidental exposure to high concentrations of 1,2-DCA has been associated with nervous system disorders, as well as kidney disease and lung problems. Studies in which 1,2-DCA was placed on the skin of animals resulted in lung tumors [13].

Intermittent exposure over 14 days to high levels of 1,2-DCA (100 ppm) in air has been shown to cause death in rabbits. In other animals, death was observed at higher concentrations, and necropsies

1,2-DCA was not detected above the US EPA's MCL of 5 ppb. Most of the available data show that 1,2-DCA was not detected. Using half of the detection limit, an average was calculated which exceeded ATSDR's CREG value, which is conservative to protect public health. Exposure doses were estimated using the average, and the calculated dose was below the available standard, indicating that no adverse non-cancer health effects are anticipated. Using the calculated dose, a lifetime cancer risk was estimated. Based on the estimated cancer risk, there is no apparent increased risk of cancer from 1,2-DCA exposure.

showed kidney, lung and heart effects.

Animal studies, which administered 1,2-DCA in drinking water, have established a dose of 58 mg 1,2-DCA/kg/day for 13 weeks as the LOAEL. At this concentration, changes in kidney weights were observed that indicated tubular regeneration from damage. Humans who consumed pure 1,2-DCA died, predominantly from circulatory problems. In a similar scenario, ingestion of 570 mg 1,2-DCA/kg/day resulted in liver damage.

DHHS has determined that 1,2-DCA may reasonably be expected to cause cancer. IARC has determined that 1,2-DCA can possibly cause cancer in humans. EPA has determined that 1,2-DCA is a probable human carcinogen [13].

Medical tests are available to determine if a person has been exposed to 1,2-DCA. However, the tests require special equipment, and because 1,2-DCA leaves the body quickly, the test would have to be conducted within days of exposure. If conducted quickly, the test would only be able to determine if a person was exposed, but it would not be able to tell if health effects will occur.

The EPA has established an MCL of 5 ppb for 1,2-DCA. None of the sampling data exceeded the EPA MCL. Therefore, the data were evaluated against other HAC values to determine if 1,2-DCA may be of concern.

ATSDR has established a CREG of 0.4 ppb (Appendix C). CREGs are established at concentrations which are unlikely to cause increased risk of cancer. The May 2006 data, the most complete data set available, was examined for 1,2-DCA exceedances. Of the 23 data values, five had analytical detection limits of 5 ppb, and the others had a detection limit of 0.5 ppb. An average was calculated, using unfiltered groundwater sample data, by taking half of the detection limit and using estimated values, where applicable. The calculated average (0.884 ppb) exceeds the CREG.

An exposure dose was calculated for 1,2-DCA, using the previously mentioned default parameters [Table 3]. The estimated doses for adults (2.53×10^{-5} mg/kg/day) and children (5.53×10^{-5} mg/kg/day) were below the established MRL (0.2 mg/kg/day) for intermediate (15 to 365 days) exposure. No chronic MRL has been established. The MRL is based on the previously mentioned drinking water study in lab animals where 58 mg/kg/day was established as the minimal LOAEL for kidney effects, and the MRL was calculated by dividing the LOAEL by uncertainty factors (totaling 300) to insure that the MRL is protective of human health [13].

Using the calculated exposure dose based on a 30-year exposure period (the natural, upper-bound 90th percentile value for time spent at one residence) and lifetime of 70 years, a lifetime cancer risk was estimated to be 9.82×10^{-7} (Table 4). Any estimate less than 1×10^{-6} (or less than one in 1,000,000) is considered no increased risk.

Chemical Mixtures

Chemical mixtures refers to the concept of simultaneous exposure to multiple chemicals, as seen with PCE, DCE, and 1,2-DCA at this site. It is possible that chemicals with the same target

organ may have additive effects on that target organ. The *Guidance Manual for the Assessment of Joint Toxic Action of Chemical Mixtures*, prepared by ATSDR, was used to evaluate the potential health effects from exposure to mixtures of chemicals [14].

Dose additivity and non-cancer health effects are evaluated by calculating hazard quotients (HQ) using the estimated exposure doses and available health guideline values. (HQ = exposure dose/MRL). If two of the calculated HQs for chemicals with the same target organ exceed 0.1 then further evaluation of the mixture is warranted [14].

Although the contaminants of concern have common target organs, specifically the kidneys and liver, there is no evidence to indicate that the levels present will cause an additive effect. None of the HQs calculated for this site were near or above 0.1 for adult or child exposure. More specifically, calculated HQs for PCE, DCE, and 1,2-DCA were orders of magnitude less than 0.1 for adults and children. Based on this information, non-cancer health effects are not anticipated for the chemical mixture. There is insufficient evidence to evaluate the cancer health effects for the mixture.

Public Health Implications

In the past, residents who drank contaminated groundwater were likely exposed to contaminants at levels above current regulatory standards, and in the case of 1,2-DCA, current health standards. Based on this information, we have concluded that in the past, the PCE, DCE, and 1,2-DCA in the private well water could have been above the MCLs. Exposure doses were calculated to estimate the potential for adverse health effects. Default parameters and a daily intake were assumed. Based on the currently available data and calculated exposure doses, in the past, the use of this groundwater posed no apparent public health hazard.

Filtration systems have been placed on the wells with contaminants above the MCLs, making the previously completed exposure pathways no longer “complete”. Based on the criteria that exposure may occur but is not at concentrations expected to cause any adverse health effects, we have concluded that contaminants in the water currently pose no apparent public health hazard.

Community Concerns

During the October 19, 2006 availability session, one resident inquired about the data qualifiers for 1,4-dioxane. In addition, he asked about the health effects of the contaminant. Per this request, information pertaining to 1,4-dioxane is provided in Appendix D. Other general questions at the meeting pertained to health effects of the on-site contaminants. Handouts which described the contaminants and their health effects were distributed during the meeting.

Health Outcome Data

Health outcome data record certain health conditions that occur in populations. These data can provide information on the general health of communities living near a hazardous waste site. They also can provide information on patterns of specified health conditions. Some examples of health outcome databases are tumor registries, birth defects registries, and vital statistics.

Information from local hospitals and other health care providers also can be used to investigate patterns of disease in a specific population.

Although the available data indicate some contaminants are above the screening values, estimated exposure doses, which were calculated using worst-case scenario default parameters, are well below MRLs and RfDs. Additionally, lifetime cancer risk calculations, which were calculated for a 30-year exposure period and a 70-year lifetime, indicated that there is no increased risk of developing cancer. Based on this information, a review of health outcome data is not warranted at this time.

Children's Health Considerations

DSHS and ATSDR recognize that the unique vulnerabilities of infants and children demand special consideration. Children may be at greater risk than adults for certain kinds of exposures to hazardous substances emitted from waste sites and emergency events. Children may be more likely to be exposed because they play outdoors and often bring food into contaminated areas. They are shorter than adults, which mean they breathe dust, soil, and heavy vapors close to the ground. Children also are smaller, resulting in higher doses of chemical exposure per body weight. Children's developing bodies may sustain permanent damage if toxic exposures occur during critical growth stages. Children depend completely on adults for risk identification, their personal welfare, housing decisions, and access to medical care.

To address the potential health effects of the on-site contaminants to children, exposure doses were calculated using conservative default parameters, including a 16 kg body weight, 1 L/day ingestion rate, and a daily exposure. The estimated doses fell well below the screening values established for the onsite contaminants.

Conclusions

1. The Texas Department of State Health Services (DSHS) reviewed available water sampling data from the Devilla Mobile Home Park Public Water System. The data indicate the water at the PWS poses **no apparent public health hazard**.

2. Data indicate that levels of PCE, DCE, and/or 1,2-DCA in some wells exceeded their respective MCLs or health comparison values. Calculated exposure doses were below health-based screening levels. Based on the currently available data and calculated exposure doses, in the past, the use of this groundwater posed **no apparent public health hazard**.

3. Currently, the filtration systems installed on the private water wells appear to be effective at keeping contaminant levels below current health-based standards. Based on this information, we have concluded that the contaminants in the private water wells currently pose **no apparent public health hazard**.

4. The EPA and its contractors are in the process of obtaining water from the City of Odessa for the area. Based on this information, the water in the future will pose **no apparent public health hazard.**

Recommendations

1. The U.S. Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ) should continue to monitor and maintain private well filtration systems to ensure proper operation until water from the City of Odessa becomes available.

Public Health Action Plan

Actions Completed

1. In 2005, TCEQ identified PCE, TCE, and DCE at detectable levels in the Devilla Mobile Home Park PWS. In March 2005, TCEQ began sampling the private wells in the area, and additional sampling was conducted in April and May, 2006 and January and July 2007.

2. The TCEQ installed filtration systems on wells that exceeded the MCLs for PCE and/or DCE in April and May, 2005.

3. In May, 2005, the site was forwarded to the EPA Preliminary Assessment/Site Investigation Program for additional investigation. Forty-eight private wells and one PWS well were sampled in July 2005.

4. In May 2006, the TCEQ conducted groundwater sampling to verify the effectiveness of the water filtration systems in removing PCE and DCE. The TCEQ also performed routine maintenance of the water filtration units on residential wells that had previously exceeded the MCLs for PCE and/or DCE.

5. In September 2006, the TCEQ conducted a Hazard Ranking System (HRS) report for the East 67th Street Groundwater Plume, and the site was proposed to the NPL on September 27, 2006.

6. On October 19, 2006, representatives of EPA, TCEQ, and DSHS participated in an availability session for concerned residents to answer questions about health effects associated with the contaminants on site.

7. Additional data were reviewed from the EPA after the initial technical review of this document. See Appendix E.

8. From November 9 to December 13, 2007, the public was given the opportunity to make comments regarding the conclusions and recommendations of this health assessment document. No comments or concerns were received by the Texas DSHS.

Actions Planned

1. As part of the EPA response action, private residences with contaminated wells will be offered to replace their existing water supply with connection to the City of Odessa public water supply systems [21].

2. The contaminant filtration systems, installed by the TCEQ on the private wells, will be removed after the owners are connected to a public water supply, or if the connection is declined [21].

3. DSHS will send letters explaining potential health effects from ingesting contaminated groundwater to homeowners/residents that refuse to connect with a public water supply.

4. DSHS and ATSDR will review any additional environmental sampling results as they become available.

5. DSHS will review incoming data for metals and nutrients, which were not part of the Superfund evaluation. These data will be evaluated to determine if adverse health effects are possible, and results will be released in a Health Consultation report.

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Certification

This public health assessment for the East 67th Street Groundwater Plume site located in Odessa, Ector County, Texas was prepared by the Texas Department of State Health Services (DSHS) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR) in accordance with approved methodologies and procedures existing at the time this health assessment was initiated. Editorial review was completed by the Cooperative Agreement partner.

Technical Project Officer, CAT, CAPEB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health assessment and concurs with its findings.

Team Lead, CAT, CAPEB, ATSDR

Tables and Figures

Table 2 – ATSDR Public Health Conclusion Categories

CATEGORY A. **URGENT PUBLIC HEALTH HAZARD**•	**CATEGORY B.** **PUBLIC HEALTH HAZARD**•	**CATEGORY C.** **INDETERMINATE PUBLIC HEALTH HAZARD**	**CATEGORY D.** **NO APPARENT PUBLIC HEALTH HAZARD**•	**CATEGORY E.** **NO PUBLIC HEALTH HAZARD**
This category is used for sites where short-term exposures (<1 year) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.	This category is used for sites that pose a public health hazard due to the existence of long-term exposures (>1 year) to hazardous substances or conditions that could result in adverse health effects.	This category is used for sites in which critical data are *insufficient* with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.	This category is used for sites where human exposure to contaminated media might be occurring, might have occurred in the past, and/or might occur in the future, but the exposure is not expected to cause any adverse health effects.	This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.
Criteria: Evaluation of available information† indicates that site-specific conditions or likely exposures have had, are having, or are likely to have in the future, an adverse effect on human health and requires immediate action or intervention. Such site-specific conditions or exposures might include the presence of serious physical or safety hazards, such as open mine shafts, poorly stored or maintained flammable/explosive substances, or medical devices which, upon rupture, could release radioactive materials.	**Criteria**: Evaluation of available relevant information† suggests that, under site-specific conditions of exposure, long-term exposures to site-specific contaminants (including radionuclides) have had, are having, or are likely to have in the future, an adverse effect on human health that requires one or more public health interventions. Such site-specific exposures might include the presence of serious physical hazards, such as open mine shafts, poorly stored or maintained flammable/explosive substances, or medical devices, which, upon rupture, could release radioactive materials.	**Criteria**: The health assessor must determine, using professional judgment, the criticality of such data and the likelihood that the data can be obtained and will be obtained in a timely manner. Where some data are available, even limited data, the health assessor is encouraged to the extent possible to select other hazard categories and to support their decision with clear narrative that explains the limits of the data and the rationale for the decision.	**Criteria**: Evaluation of available information† indicates that, under site-specific conditions of exposure, exposures to site-specific contaminants in the past, present, or future are not likely to result in any adverse effects on human health.	**Criteria**: Sufficient evidence indicates that no human exposures to contaminated media have occurred, none are now occurring, and none are likely to occur in the future.

• Each of these designations represents a professional judgment made on the basis of critical data that ATSDR regards as sufficient to support a decision.
It does not imply, however, that the available data are necessarily complete. In some cases, additional data may be required to confirm or further support the decision.

† Examples include environmental and demographic data; health outcome data; community health concerns information; and toxicologic, medical, and epidemiologic data.

Table 3 – Estimated Exposure Dose Calculations

Estimated PCE exposure doses for the East 67th Street GW Plume

ATSDR Acute Oral MRL:	0.05	mg/kg/day
EPA Chronic Oral RfD:	0.01	mg/kg/day

	adults	children
Dose=C*CF*IR*EF/BW (mg/kg/day)	0.00011	0.00023
C=contaminant concentration (µg/L)	3.7	3.7
CF=conversion factor (convert µg/L to mg/L)	0.001	0.001
IR=intake rate of water (L/day)	2	1
AF=bioavailability factor (%, assumed 100% or 1)	1	1
EF=exposure factor (unitless, default value)	1	1
BW=body weight (kg)	70	16

Estimated *cis*-1,2-DCE exposure doses for the East 67th Street GW Plume

ATSDR Intermediate Oral MRL:	0.3	mg/kg/day

	adults	children
Dose=C*CF*IR*EF/BW (mg/kg/day)	0.00012	0.00026
C=contaminant concentration (µg/L)	4.1	4.1
CF=conversion factor (convert µg/L to mg/L)	0.001	0.001
IR=intake rate of water (L/day)	2	1
AF=bioavailability factor (%, assumed 100% or 1)	1	1
EF=exposure factor (unitless, default value)	1	1
BW=body weight (kg)	70	16

Estimated 1,2-DCA exposure doses for the East 67th Street GW Plume

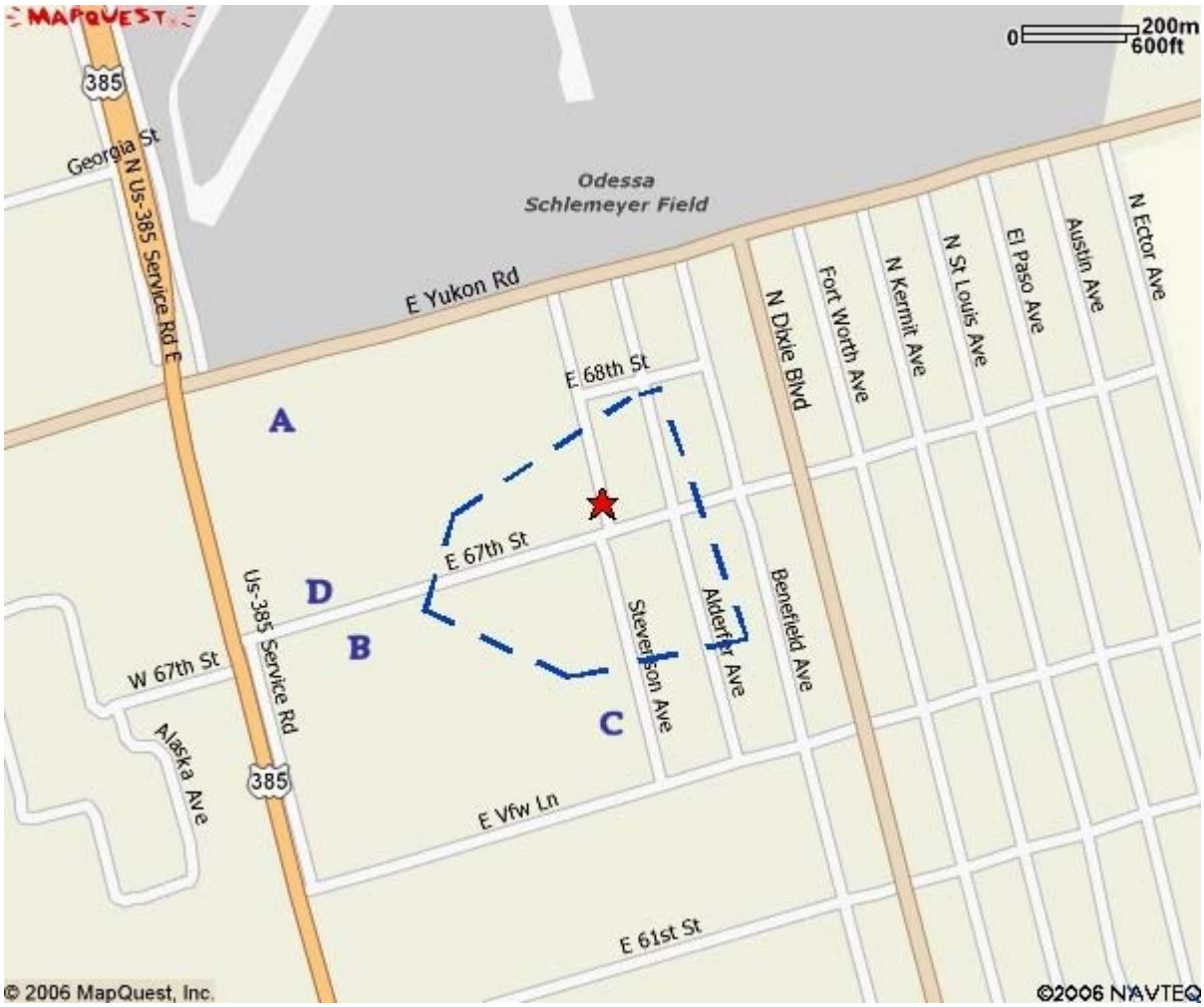
ATSDR Intermediate Oral MRL:	0.2	mg/kg/day

	adults	children
Dose=C*CF*IR*EF/BW (mg/kg/day)	0.000025	0.000055
C=contaminant concentration (µg/L)	0.884	0.884
CF=conversion factor (convert µg/L to mg/L)	0.001	0.001
IR=intake rate of water (L/day)	2	1
AF=bioavailability factor (%, assumed 100% or 1)	1	1
EF=exposure factor (unitless, default value)	1	1
BW=body weight (kg)	70	16

Table 4 – Estimated Cancer Risk Calculation for 1,2-DCA

Estimated Cancer Risk Based on Adult Exposure to 1,2-DCA	
ER=estimated theoretical risk=CSF*dose	**9.82E-07** (This is considered no increased risk.)
dose=C*IR*EF/BW	1.08E-05
C=contaminant concentration (mg/L)	0.88400
CF=conversion factor (convert µg/L to mg/L)	0.001
IR=intake rate of water (L/day)	2
EF=exposure factor (unitless)	0.42739726
years of residence	30
days per week	7
weeks per year	52
years in a lifetime	70
days in a year	365
BW=body weight (kg)	70
CSF=cancer slope factor (mg/kg/d)-1	0.091

Figure 2 – Estimated Plume Location



Adapted from TCEQ Hazard Ranking System Documentation Record, 2006.

Legend:

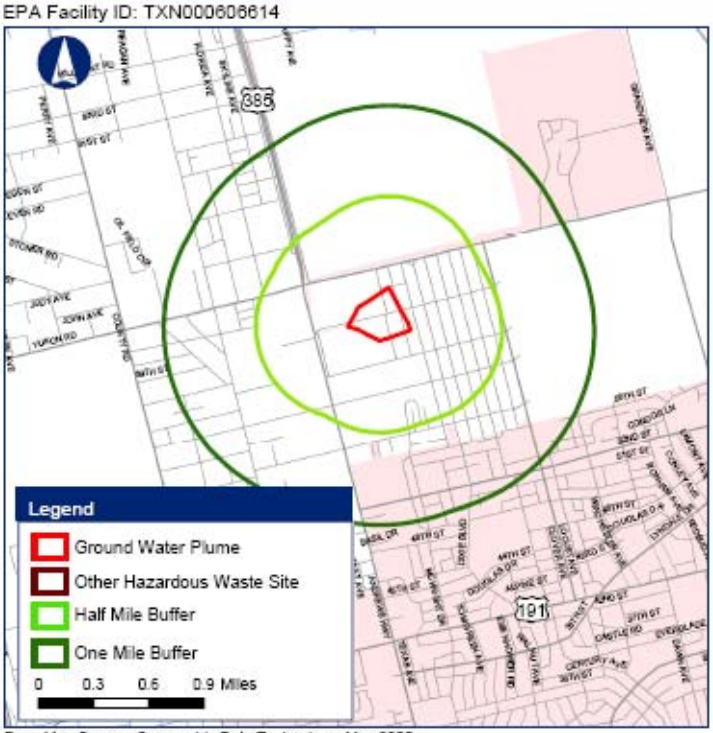
- estimated center of the plume at East 67th Street and Stevenson Avenue
- estimated plume boundaries, as determined by TCEQ

A – general location of Cotton Pipe
B – general location of CASE-Permian
C – general location of Devilla Mobile Home Park
D – general location of Brenntag

Figure 3 – Site Location and Demographic Information

East 67th Street
Odessa, Texas

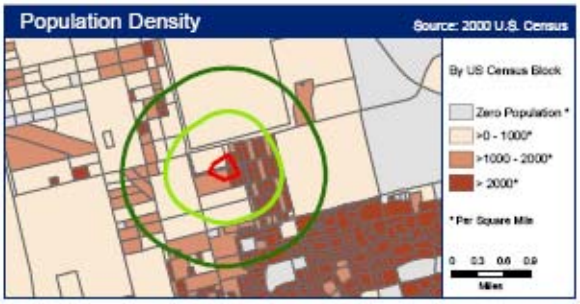
EPA Facility ID: TXN000606614

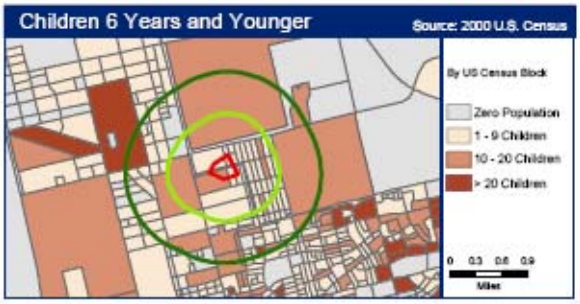


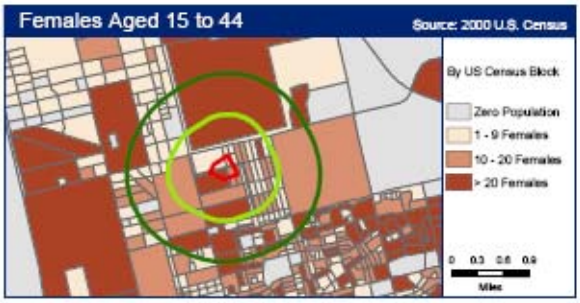
Base Map Source: Geographic Data Technology, May 2005.
Site Boundary Data Source: ATSDR Geospatial Research, Analysis, and Services Program, Current as of Generate Date (bottom left-hand corner).
Coordinate System (All Panels): NAD 1983 StatePlane Texas Central FIPS 4203 Feet

Demographic Statistics Within Area of Concern*	0.5mi	1mi
Total Population	1,547	4,395
White Alone	1,358	3,782
Black Alone	22	89
Am. Ind. & AK Native Alone	13	38
Asian Alone	0	9
Native Hawaiian & Other Pacific Islander Alone	2	2
Some Other Race Alone	116	380
Two or More Races	37	96
Hispanic or Latino**	268	1,022
Children Aged 6 & Younger	167	450
Adults Aged 65 & Older	193	542
Females Aged 15 to 44	337	960
Total Housing Units	736	1,970

Demographics Statistics Source: 2000 U.S. Census
* Calculated using an area-proportion spatial analysis technique
** People who identify their origin as Hispanic or Latino may be of any race.







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Appendices

Appendix A – Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
bgs	Below grade surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (1980)
CREG	Cancer Risk Evaluation Guide
DCA	1,1- and/or 1,2-dichloroethane
DCE	*cis*- and/or *trans*-1,2-dichloroethene, *cis*- and/or *trans*-1,2-dichloroethylene
DHHS	Department of Health and Human Services
DSHS	Department of State Health Services
EMEG	Environmental Media Evaluation Guide
EPA	Environmental Protection Agency
HAC	Health Assessment Comparison value
HRS	Hazard Ranking System
IARC	International Agency for Research on Cancer
IRIS	Integrated Risk Information System
kg/day	kilograms per day
LOAEL	Lowest Observed Adverse Effect Level
MCL	Maximum Contaminant Level
MEK	Methyl ethyl ketone
mg/kg/day	milligrams of substance per kilogram of body weight per day
MRL	Minimal Risk Level
ND	The analyte was not detected above the method detection limit
NOAEL	No Observed Adverse Effect Level
NPL	National Priorities List
NTP	National Toxicology Program
PCB	Polychlorinated biphenyls
PCE	Tetrachloroethene, perchloroethene
PHA	Public Health Assessment
ppb	Parts per billion
ppm	Parts per million
PVC	Polyvinyl chloride
PWS	Public Water System
QA/QC	Quality Assurance/Quality Control
RfD	Reference Dose
RMEG	Reference Dose Media Evaluation Guide
SSDAT	Superfund Site Discovery and Assessment Team
SARA	Superfund Amendments and Reauthorization Act (1986)
TCA	Trichloroethane
TCE	Trichloroethene, trichloroethylene
TCEQ	Texas Commission on Environmental Quality
VOC	Volatile Organic Compound

Appendix B – Completed Exposure Pathway Evaluation of the East 67th Street NPL site

EXPOSURE PATHWAY ELEMENTS								
Pathway Name	Contaminants of Concern	Source	Transport Media	Point of Exposure	Route of Exposure	Exposed Population	Time	Conclusions
Groundwater								
Private wells	PCE, DCE, 1,2-DCA	chemical release (location unknown)	groundwater	in residences and businesses using the affected groundwater	ingestion, inhalation◙, dermal contact	affected area residents and businesses	past present future	**Indeterminate public health hazard** **No apparent public health hazard:** with properly installed, operating, and maintained filtration systems or an alternative water supply (when city water becomes available).
public water supply	Chlorinated VOCs	chemical release (location unknown)	groundwater	in residences using affected groundwater	ingestion, inhalation◙, dermal contact	affected area residents	past present future	**Indeterminate public health hazard** **No apparent public health hazard:** with ongoing monitoring and future connection to the city water line.

◙ = volatilization (changing to a gas) during the use of tap water

Appendix C – ATSDR and EPA Comparison Values (ppb)

Chemical Name	Hierarchy Level 1			Hierarchy Level 2					Hierarchy Level 3	
	Chronic EMEG		CREG	Intermediate EMEG		RMEG		LTHA	MCL	MCLG
	Child	Adult		Child	Adult	Child	Adult			
1,1-dichloroethane	–	–	–	–	–	–	–	–	–	–
1,2-dichloroethane	–	–	**0.4**	2,000	7,000	–	–	–	5	0
1,1-dichloroethene	90	300	–	–	–	500	2,000	–	**7**	7
cis-1,2-dichloroethene	–	–	–	3,000	10,000	–	–	70	**70**	70
Tetrachloroethylene	–	–	–	–	–	100	400	10	**5**	0
Trichloroethene	–	–	–	–	–	–	–	–	**5**	0
1,4-dioxane	1,000	4,000	**3**	6,000	20,000	–	–	–	**5**	–

NOTES

EMEG: Environmental Media Evaluation Guide (ATSDR)

CREG: Cancer Risk Evaluation Guide for 1 x 10-6 cancer risk

RMEG: Reference Dose Media Evaluation Guide

LTHA: Lifetime Health Advisory for drinking water (EPA)

MCL: Maximum Contaminant Level (EPA)

MCLG: Maximum Contaminant Level Goal (EPA)

BOLD: Indicates the most conservative value

– : Indicates that no value is currently available

Appendix D – 1,4-Dioxane

1,4-Dioxane is a water soluble stabilizer that is common in mixtures of TCA [15]. In 1985, the Food and Drug Administration limited the amount of 1,4-dioxane that could be included in cosmetics, shampoos, and detergents [16]. Because of its water solubility and other chemical properties, it is often difficult to detect with common analytical techniques [15]. A review of the data indicated all results were qualified with an "R" or "unusable," and below the detection limit for the anlytical method used. In some cases, the detection limit was reported as 20 ppb, and in other samples, it was reported as 100 ppb. Additional sampling data will be reviewed when it becomes available.

A citizen was concerned about 1,4-dioxane. He wanted to know what the data qualifier UR meant. The "U" indicated that 1,4-dioxane was not detected in the sample, and the "R" indicated that the data were "unusable". 1,4-dioxane is difficult to analyze for in water samples, often resulting in "unusable" results. Based on the available data and information from IRIS, health effects from 1,4-dioxane are not anticipated.

When released into air, reactions with other compounds may create new chemicals. 1,4-dioxane does not readily degrade in water, and it is quickly transported from soil to water. It does not accumulate in pets or animals [16].

When air, food, or water that is contaminated with 1,4-dioxane enters the body, it quickly enters the bloodstream. Relatively smaller amounts can get into the bloodstream from dermal (skin) exposure. Once in the bloodstream, 1,4-dioxane is converted into metabolites. The metabolites quickly leave the body in urine, and neither 1,4-dioxane nor its metabolites are known to accumulate in the body [16].

Very little information is available about the health effects of 1,4-dioxane in humans, but the main health effects from 1,4-dioxane exposure include the liver and kidneys. Short term, high exposures to contaminated air can cause drowsiness and/or death. It is not known if 1,4-dioxane causes reproductive effects.

Medical tests are available to determine if a person has been exposed to 1,4-dioxane. However, the tests require special equipment, and because 1,4-dioxane leaves the body quickly, the test would have to be conducted within days of exposure. If conducted quickly, the test will only be able to determine if a person was exposed, but it will not be able to tell if health effects will occur.

On the basis of inadequate evidence in humans and sufficient evidence in experimental animals, the International Agency for Research on Cancer has determined that 1,4-dioxane is possibly carcinogenic to humans. The U.S. Department of Health and Human Services considers 1,4-dioxane as reasonably anticipated to be a human carcinogen on the basis of sufficient evidence of carcinogenicity in experimental animals. EPA has established that 1,4-dioxane is a probable human carcinogen on the basis of inadequate evidence in people and sufficient evidence in animals.

Because of difficulties with laboratory analysis and the ensuing data qualifications, no assumptions can be made as to the levels of 1,4-dioxane on site or the associated health effects. However, according to the Integrated Risk Information System (IRIS), which is maintained by the US EPA Office of Research and Development, concentrations as high as 300 ppb still do not pose an "unacceptable" cancer risk [17].

ATSDR has established chronic EMEGs for non-cancer health effects of 1,000 ppb and 4,000 ppb 1,4-dioxane for children and adults. None of the data obtained for the site exceed the non-cancer HAC values for 1,4-dioxane.

Appendix E – Additional Data Review

Additional data were received subsequent to the initial technical review of this report. The results of the additional sampling event did not affect the outcome of this assessment, as discussed in the following sections.

Sample data were reviewed from the January and July 2007 sampling events. The data indicate one filtration system required maintenance. The maintenance was promptly conducted. A PWS well was identified with contaminants above the MCLs. The system mixes water from several wells, and it is unlikely that adverse health effects will occur. The well was removed from the system. No other contaminants were identified above health screening values.

January 2007 Sampling Event

In January 2007, nine residential wells, three commercial wells, and four PWS wells were sampled. The summary of the results are shown in the following table. No additional private drinking water wells were identified where contaminants were above the MCL. One residential well with a filtration system was identified with cis-1,2-DCE and 1,2-DCA above their respective MCLs after filtration. This was a relatively new development, meaning the length of time that the residents at that location were exposed was relatively short (less than one year). The MCLs are based on a lifetime of exposure. The filters at this location were promptly changed after TCEQ received the sampling results [18]. Although no adverse health effects were anticipated from drinking the water from this well, DSHS requested additional data to determine that the filtration system at that location was working properly (see the July 2007 data review below).

PCE was slightly elevated in one of the Devilla PWS supply wells. This system has a holding tank which mixes water from several wells. The concentration of PCE was relatively low (7.2 ppb) compared to the MCL (5 ppb). EPA recommended that the well be removed from the system as a precaution [19].

Table 5 – Summary of Sample Results (ppb), January 2007

Contaminant	MCL	Average Concentration of All Wells[a] (prior to filtration)	Range of Concentrations in Filtered Systems		
			Prior to Filtration	*Mid-Filtration*	*After Filtration*
PCE	5	4.8	ND to 22.4	All ND	All ND
TCE	5	0.9	ND to 3.4	All ND	All ND
cis-1,2-DCE	70	7.3	ND to 80.3	ND to 97.8	ND to 82.1
1,2-DCA	5 (CREG is 0.4)	0.7	ND to 1.9	ND to 3.7	ND to 3.4

ND not detected above the detection limit for the analytical method used, <1 ppb
a averages were calculated using half of the detection limit when the values were ND

July 2007 Sampling Event

In July 2007, 27 residential wells, two commercial wells, and one PWS well were sampled. The summary of the results are shown in the following table. No additional private drinking water wells were identified where contaminants were above the MCL. The filtration system previously identified as faulty, received maintenance by TCEQ, and is working properly based on the July data set. Data from a different residential well with a filtration system (GW-22) indicated that contaminants were not detected in the mid-filtration sample, but were detected in the post-filtration sample at concentrations below the MCLs. This is likely due to a clerical error or switched sample canisters [20]. This and all other wells will be observed during future sampling events to insure that filtration systems on all wells are functioning properly, and no new filtration systems are required.

Table 6 – Summary of Sample Results (ppb), July 2007

Contaminant	MCL	Average Concentration of All Wells[a] (prior to filtration)	Range of Concentrations in Filtered Systems		
			Prior to Filtration	*Mid-Filtration*	*After Filtration*
PCE	5	2.5	ND to 25	All ND	ND to 3.4[b]
TCE	5	0.9	ND to 1.5	All ND	All ND
cis-1,2-DCE	70	4.6	ND to 99	ND to 17	ND to 0.55[b]
1,2-DCA	5 (CREG is 0.4)	0.35	ND to 1.5	ND to 1.7	All ND

ND not detected above the detection limit for the analytical method used, <0.5 ppb
a averages were calculated using half of the detection limit when the values were ND
b highest values were from GW-22. All other filtered systems were ND for these contaminants. Mid-filtration values at this well were ND.