Health Consultation

SUNOCO SITE
(AKA MOUNT PLEASANT STREET)

GREENSBURG, WESTMORELAND COUNTY, PENNSYLVANIA

EPA FACILITY ID: PAD982362626

SEPTEMBER 28, 2007

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR 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 which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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Prepared By:

Pennsylvania Department of Health
Under a Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

TABLE OF CONTENTS

Summary

At the request of a concerned community member, the Pennsylvania Department of Health (PADOH) prepared this health consultation to determine if residents in six homes at the intersection of Mount Pleasant Street and South Urania Avenue in Greensburg, PA who reside near a Sunoco gas station are exposed to volatile organic compounds (VOCs) in their homes at levels that would be considered a public health hazard. The Pennsylvania Department of Environmental Protection (PADEP) has been conducting environmental testing of the site including the six homes. The PADOH prepared this health consultation under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR).

The source of the potential contamination is gasoline spills that occurred at the Sunoco station in both 1989 and 1991. Since that time there have been numerous investigations of odors as well as a soil removal effort. Residents on Mount Pleasant Street have reported gasoline-like odors as well as other unidentifiable odors inside their homes on numerous occasions over the years. Environmental sampling to identify the source of the odors and any potential exposure to contaminants has included soil-gas, indoor air, and groundwater monitoring.

Recent environmental sampling of the sewer gas, indoor air, and passive soil-gas surveys found 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, methyl tert butyl ether (MTBE), toluene, and benzene. All five chemicals are constituents of gasoline. However, most of the contaminants were also found in the field and trip blanks indicating the chemicals are also found in the ambient air around the site. Despite cleanup/remediation efforts, groundwater monitoring wells closest to the gas station revealed MTBE is still in the groundwater, but at lower concentrations then before the cleanup occurred (HC#1).

Methylene chloride and methyl isobutyl ketone were also found in the indoor air samples but they are not constituents of gasoline. A source for these two chemicals has not been identified; however, some common household products do contain these chemicals and may have attributed to some of the indoor air results. Methylene chloride was found in the groundwater field and trip blanks as well suggesting there may be another source.

Chloromethane and chloroform were found in all the indoor air samples. They are typically found in sewer and treated drinking water respectively Despite the additional environmental sampling since the last HC in 2004 (HC#1), one of the homes still has not had an adequate indoor air sample during an “odor” incident. Indoor air samples at this home during one of these “odor” incidents should be taken.

Currently, based on the data submitted by PADEP, the Sunoco site represents *no apparent public health hazard*. PADOH and ATSDR recommend that residents should properly use, store, and dispose of VOC-containing household products. The interpretation, conclusions, and recommendations regarding the Sunoco Site are site-specific and do not necessarily apply to any other site.

Background and Statement of Issues

Site Description and History

The Sunoco Site (the Site) is located in a mixed residential and commercial area of Greensburg, Westmoreland County. A Sunoco gas station is across the street from the homes evaluated in this document. The Sunoco station is bordered to the north by Euclid Avenue, to the east by railroad tracks, to the south by Mount Pleasant Street, and to the west by South Urania Avenue. Residents are using municipal water. Gasoline spills have occurred at the Sunoco station in both 1989 and 1991.

According to the residents complaints, two houses on Mount Pleasant Street that are not adjacent to each other have observed unidentifiable odors in their basements during the same time periods. The earliest report of gasoline vapors documented was August 1985. Gasoline vapors have been reported many times over the years. The temporary exhaust fans were put in the basements of these two homes. The basement drains were temporarily re-capped in 1994 until the odors went away, and recapped when the odors appeared again in December 1995. The drains were uncapped in June 1996. Unidentifiable odors were investigated at the one home in December 1997. In 1999, the one home reported gasoline vapors in the basement. The home had a cracked sewer line past the trap Sunoco had installed. Two months later Sunoco replaced the sewer piping system. In November 2000, the one home across from Sunoco reported vapors in the home. An inspection revealed sewer gas from the floor drain and an open pit with the sewer line. Gasoline vapors were not detected. Sunoco sealed the open pit and installed a P-trap (a curved U section of pipe to trap and prevent odors coming out of drains by keeping a layer of water in the pipe) on the sewer line. There was still concern that volatile organics (VOCs) from subsurface vapor intrusion into the indoor air of these residences might be occurring. A resident from one of these houses contacted ATSDR and expressed concerns about possible health effects from the odors in 2003. PADOH and ATSDR conducted a health consultation (HC#1) to address these concerns which was published by ATSDR in 2004. At that time, sufficient indoor air sampling had not been performed to make any conclusions about health effects from potential exposure to VOCs. The HC#1 did conclude that the lack of P-traps, and cracked sewer lines contributed to some of the reported odor problems in the past. P-traps have been installed and cracked sewer lines have been repaired. Recommendations were made for additional air sampling for VOCs. The additional air sampling has been completed and was evaluated for this current health consultation (HC#2).

Until 1985, the site was owned by Ashland Oil. Ashland Oil operated a retail service and repair facility, sold gasoline, and sold other petroleum products. No earlier site information was found.

Gasoline vapors were first reported by residents in 1985. To date, many monitoring wells have been installed and with periodic sampling of the groundwater has occurred. Additional reports of odors have been documented over time, and sampling for soil vapor intrusion has occurred. The sewer lines to each of the houses on Mount Pleasant Street around the site have been investigated for P-traps and leaks in 1999 and 2000. A list of each relevant historical event with the site including gasoline spills, sample events, and sample results through April 2004 can be found in the ATSDR HC#1 (“Sunoco Site (a/k/a Sunoco Service Station) Greensburg,

Westmoreland County, Pennsylvania EPA Facility ID: PAD982362626 dated October 18, 2004") [1]. It should be noted that Sunoco bought one of the residential properties with odor complaints in February 1999 (the Sunoco house). Sunoco has since remediated the groundwater on that property and installed monitoring wells around the home. A vapor extraction system was on the property for some time but no vapor mitigation system was observed by PADEP during the indoor air sampling. A vapor intrusion mitigating system was installed in another one of the homes in 2006 [2]. Since the last HC (HC#1), a number of indoor air samples, groundwater monitoring well samples, and sub-surface soil gas sampling events have been performed by PADEP contractors.

In response to the recommendations of the first ATSDR health consultation (HC#1), PADEP subsequently collected indoor air sampling with Summa canisters for 24 hours in 6 of the 8 houses along Mt. Pleasant Street and the Sunoco gas station. The indoor air has been sampled three times in one of the homes with high methylene chloride results and at least once in the other homes. If a question about the results or a significant analyte appeared, the home indoor air was sampled a second time to verify the result. A total of eight homes are down gradient and across the street from the gasoline station along Mt. Pleasant Street. The site characterization recognized these homes to be in the area of possible contamination and impacted by the gas station. The owners of the other two houses did not grant PADEP access to their homes for indoor air sampling.

Site Visit

On November 21, 2006, a PADOH Health Assessment Program representative viewed the site with a PADEP representative. During this site visit, PADOH took notes and photographs regarding the site, and discussed the reported odor problems with the homeowners. The possibility of more sampling data and a future monitoring well to be installed at the other end of Mount Pleasant Street was discussed.

Sampling Events

On June 6, 2006, PADEP and Sunoco both sampled the indoor air in 6 of the 8 homes and the Sunoco station with Summa canisters placed side by side. The samples were collected for a period of 24 hours. The pump on the Summa canisters draws in a small amount of air every hour to make a representative sample of the air over the 24 hours in one day. Evaluation of the data from the Sunoco air samples collected showed the summa canister from one of the houses may have had technical problems. On November 14, 2006, PADEP resampled the indoor air from 3 of the 6 homes to verify previous levels of methylbenzenes and 1,4 –dichlorobenzene. [3] The chemicals analyzed were much lower in concentration from the other two sampling events.

PA DEP sampled the groundwater monitoring wells on May 24, 2006 and the seep on May 25, 2006 for VOCs, dissolved metals, and dissolved solids. PADEP and Sunoco sampled the monitoring wells on the June 6, 2006.

The tap water samples from two homes were analyzed on November 11, 2006 confirming the municipal water as the chloroform source. Sunoco sampled the gas station with one passive soil gas sample over a period of one week, ending on June 29, 2006. A total of 40 passive soil-gas samplers were placed around the 8 houses, monitoring wells, and the Sunoco station on June 19, 2006. The next day, one sampler was found removed from the ground. This sampler was considered invalid and not analyzed due to its removal from the soil during the testing period.

Sample Results

Fuel/gasoline Related Contaminants Detected

The June 6, 2006 indoor air sampling by Sunoco contractors detected 40 ug/m^3 of 1,2,4-trimethylbenzene and 11ug/m^3 1,3,5-trimethylbenzene, both from the same home. The rest of the homes had sampling results were 3.9 ug/m^3 or below to non-detects. The PADEP results from June 6, 2006 did not correspond with Sunoco's data for this home. Additional sampling from the house on November 14, 2006 by PADEP did not find 1,2,4-trimethylbenzene or 1,3,5-trimethylbenzene above 6.2 ug/m^3, the value currently used by EPA to screen both chemicals.

The maximum benzene indoor air concentration found in one home was 4.20 ug/m^3 on September 13, 2005. The other homes had sample results which ranged from 3.9 ug/m3 to 0.84 or non-detect for benzene vapors. Additional indoor air samples from this home averaged 1.2 ug/m^3 of benzene in the air.

Non-fuel/gasoline Related Contaminants Detected

The only non-fuel related VOCs that were detected predominantly in the indoor air of one home, and not the other five homes was 440 ug/m^3 methylene chloride and 1400 ug/m^3 methyl isobutyl ketone [4]. Methylene chloride is a common ingredient in degreaser, furniture stripping solvent, laboratory solvent, liquid in bubble lights and dippy birds, and a refrigerant known as R-30 [1,5,6,7]. Methyl isobutyl ketone is a solvent in paint, adhesives, and pharmaceutical manufacturing [8, 9]. Methyl isobutyl ketone was detected only once out of three sampling events for this home.

The highest detected indoor air sample of 1,4 – dichlorobenzene was 77.0 ug/m^3. One other home found 1,4 –dichlorobenzene, however, the result was much lower. The other homes had non-detects for 1,4- dichlorobenzene. The owner reportedly cleaned the house before sampling the indoor air. The results are comparable to the June 6, 2006 data collected from the Sunoco contractor. The indoor air from this home was resampled on November 14, 2006 and results showed 63 ug/m^3 1,4-dichlorobenzene.

Chloroform was found in the indoor air of all six houses and the gas station. The highest observed indoor air concentration of chloroform found in one home by PADEP was 23.0 ug/m^3. The presence of chloroform in indoor air was confirmed by Sunoco's environmental sampling contractors who found 17.00 ug/m^3 chloroform on the same day. PADEP suspected the likely source of the indoor chloroform was municipal water. This was confirmed by water tests on the tap water conducted by PADEP on two of the homes [3]. All of the homes are on the same municipal water system.

Laboratory analysis of the soil-gas samplers detected the highest amount of chloromethane gas in the front of the four homes across the street closest to the gas station. Chloromethane was found in the sewer gas sampling monitoring points surrounding the entire site and in the background outdoor air samples. Chloromethane is found in chlorinated water, cigarette smoke, and is a byproduct of burned materials such as grass, wood, plastic, and charcoal [10]. The other chemicals found in the soil-gas survey are currently found in fuel. The highest amount of benzene, toluene, 1,2,4 – trimethylbenzene, and methyl cyclohexane (used in jet fuel, solvent for organic synthesis and cellulose ethers) were found around the Sunoco house [11]. This house is also closest to the Cohen Oil Company on Mount Pleasant Street [2]. Soil-gas surveys are used to locate possible sources of contaminants to help with monitor well drilling and are not to be used to quantify a contaminant concentration.

Quality Assurance and Quality Control

In preparing this health consultation, ATSDR and PADOH relied on the information provided in the referenced documents. ATSDR and PADOH reviewed the quality assurance and quality control measures that were followed regarding data gathering, chain-of-custody, laboratory procedures, and data reporting. ATSDR and PADOH expected and presumed that to ensure the accuracy of the data, extreme care was taken during all aspects of sample collection. ATSDR and PADOH also assumed that the laboratory only used certified, clean sampling collection devices. Once samples were collected, ATSDR and PADOH expected they were stored according to the method protocol and were delivered to the analytical laboratory as soon as possible. Finally, ATSDR and PADOH presumed that laboratory Standard Operating Procedures and other procedures and guidance for sample analysis, reporting, and chains of custody were followed. The analyses, conclusions, and recommendations in this health consultation are valid only if the reference documents are complete and reliable.

As noted earlier, during one round of indoor air sampling, Sunoco hired another company to take air samples along side PADEP's summa canisters [4]. Due to many variables such as pressurization, volume size, analyst, method repeatablility, and sample dilution, there are different contaminant detection levels listed on lab reports. Two different concentrations may be labeled Not Detected or "N.D." when in fact the true concentration could be anywhere from zero to the non-detection level number printed on the lab report. Lab results from PADEP and the

Sunoco consultants were reviewed. If the results were not comparable, discrepancies were noted.

Discussion

Pathway Analysis

PADOH evaluated residents' exposure to the odors by looking for a completed exposure pathway. For an exposure pathway to be completed, all the following elements must be present:

1) a source of contamination;
2) transport through an environmental medium;
3) a point of exposure;
4) a route of human exposure, and;
5) a receptor population.

Completed pathways for the contaminants found are listed below.

Source of Contamination	Transport via Environmental Medium	Point of Exposure	Route of Exposure	Receptor Population
Documented Fuel Spills and Gasoline Vapors (Benzene) from Station and Engine Exhaust	Soil/Air	Soil-gas/ Ambient OutdoorAir/Indoor Air	Inhalation	Residents on Mount Pleasant Street
Methylene Chloride (Source Unknown) and 1,4-Dichlorbenzene from Cleaning Products	Air	Indoor Air	Inhalation	Residents on Mount Pleasant Street
Chloroform from Chlorinated Drinking Water	Tap Water to Air	Indoor Air	Inhalation	Residents on Mount Pleasant Street

To determine the likelihood of possible health effects from exposure to site-specific chemicals, ATSDR has developed health-based comparison values (CVs). CVs are derived for each media (air, soil, water) and reflect an estimated chemical concentration that is well below levels that are known or anticipated to result in adverse health effects. ATSDR uses these values to help health assessors make consistent decisions about what substance concentrations or dose levels associated with site exposures might require a closer look.

Comparison values are not thresholds of toxicity. CVs should not be used to predict adverse health effects. These values serve only used as guidelines to provide an initial screen of site specific chemicals. Although concentrations at or below the relevant comparison value may reasonably be considered safe, it does not automatically follow that any environmental concentration that exceeds a comparison value would be expected to produce adverse health effects.

Health guidelines are derived based on data drawn from the epidemiologic and toxicologic literature with uncertainty or safety factors applied to ensure that they are amply protective of human health. ATSDR's minimal risk level (MRL) and EPA's reference doses, reference concentrations, and cancer slope factors are the health guidelines most commonly used in the public health assessment screening process.

Environmental guidelines are derived from the health guidelines and represent concentrations of a substance (e.g., in water, soil, and air) to which humans may be exposed via a particular exposure route during a specified period of time without experiencing adverse health effects. ATSDR's environmental guidelines include environmental media evaluation guides (EMEGs) and cancer risk evaluation guides (CREGs).

In general, comparison values are derived for substances for which adequate toxicity data exist for the exposure route of interest. Where possible, comparison values are generally available for three specified exposure periods: acute (14 days or less), intermediate (15 to 365 days), and chronic (more than 365 days). Comparison values are also generally available for two exposure routes: ingestion and inhalation.

Minimal Risk Levels (MRLs)
A MRL is an estimate of daily human dose to a substance (in milligrams per kilogram per day [mg/kg/day] for oral exposures and parts per billion [ppb] or micrograms per cubic meter [$\mu g/m^3$] for inhalation exposures) that is likely to be without noncarcinogenic health effects during a specified duration of exposure based on ATSDR evaluations.

ATSDR has developed environmental guidelines for substances in drinking water, soil, and air. ATSDR's environmental guidelines include environmental media evaluation guides (EMEGs), cancer risk evaluation guides (CREGs), and reference dose media evaluation guides (RMEGs). These guidelines are derived in a uniform way using health guidelines and standard default exposure assumptions. These default exposure assumptions generally represent high estimates of exposure (greater than the mean, approaching the 90^{th} percentile), based on observed ranges of human activity patterns (e.g., water ingestion rates, residence times). Guidelines are available to evaluate both child and adult exposures.

Environmental Media Evaluation Guides (EMEGs)
EMEGs are estimated contaminant concentrations that are not expected to result in adverse noncarcinogenic health effects based on ATSDR evaluation. EMEGs are based on ATSDR MRLs and conservative assumptions about exposure, such as intake rate, exposure frequency and duration, and body weight.

Reference Dose Media Evaluation Guides (RMEGs)
ATSDR derives RMEGs from EPA's oral reference doses, which are developed based on EPA evaluations. RMEGs represent the concentration in water or soil at which daily human exposure is unlikely to result in adverse noncarcinogenic effects [12].

Cancer Risk Guides (CREGs)

CREGs are estimated contaminant concentrations that would be expected to cause no more than one excess cancer in a million (10^{-6}) persons exposed during their lifetime (70 years). ATSDR's CREGs are calculated from EPA's cancer slope factors (CSFs) for oral exposures or unit risk values for inhalation exposures. These values are based on EPA evaluations and assumptions about hypothetical cancer risks at low levels of exposure.

Cancer risk for inhalation is determined using the EPA risk based concentration table (RBC) and ATSDR cancer risk evaluation guide (CREG) numbers. If no CREG is available, the EPA cancer slope factor is used. Cancer risk is usually calculated for 30 years using adult parameters as defaults in the calculations unless an individual assessment is needed for a specific time frame or using different factors. Sometimes sample collection problems, the testing equipment, dilution factor, outside contaminants and such need to be addressed and evaluated for validity. Non-carcinogenic chemical exposure results are evaluated using factors for children such as 10 m^3/day inhalation rate and 16 kg body weight.

The highest concentration found for each chemical from the lab results was used to calculate the highest possible exposure from a conservative perspective. Cancer risk calculations were determined using the highest contaminant concentration in ug/m^3 and multiplied by the inhalation unit risk factor in (ug/m^3)-1 whenever available. If the CREG was then available, then the risk was calculated using that value to estimate the cancer risk exposure. A theoretical cancer risk of 6E-05 was calculated for this excess lifetime cancer risk is broken down by categories to determine one additional cancer per 1 million people. The cancer risks calculated for the other chemicals found in the homes are considered “insignificant or no increase risk”. The home with the complaint has not had an adequate air sample taken during one of the “odor” incidents.

Cancer risks are calculated for chemicals determined to be carcinogens or possible carcinogens when possible for 30 years of exposure. The formula used:

CR = ED x IUR x EY/70 years,

CR = Cancer Risk ED = Exposure Dose in ug/m3

IUR = Inhalation Unit Risk in $(ug/m^3)^{-1}$ EY = Exposure in years

It is assumed the most time anyone lives in one place is 30 years.

The highest contaminant concentration in ug/m^3 was multiplied by the inhalation unit risk factor in $(ug/m^3)^{-1}$, multiplied by 30 years and then divided by 70 years.

The EPA has quantified the lifetime cancer risk by categories. A cancer risk of $1x10^{-6}$ was determined to be one additional cancer per 1 million people or $1x10^{-6}$ = 1 in million to mean

"insignificant or no increase risk". The higher the number, the greater the increased risk for cancer. For example, $1x10^{-5}$ = 1 in 100,000 with "no apparent increased risk" but $1x10^{-4}$ = 1 in 10,000 has a "low increased risk".

This chemical discussion is based on the results found. Highest concentration and comparison values for each indoor air chemical discussed can be found in Table 1. Chloroform in the drinking water found can be found in Table 2.

Contaminant Evaluation

Exposures to methyl isobutyl ketone, chloroform, MTBE, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and toluene from the indoor air sampled were found below their corresponding MRLs for chronic or intermediate exposure. These chemicals will not be further evaluated in this HC document, since it was determined that they do not pose an increased cancer or non-cancer risk of concern since the levels detected are below their corresponding CVs.

Benzene, 1,4- dichlorobenzene, methylene chloride, and chloroform (drinking water) were detected above corresponding CVs and are further evaluated below:

Benzene

PADEP and Sunoco both tested the buildings (the six homes on Mount Pleasant Avenue and the Sunoco gas station) for benzene in the indoor air. Subsurface soil-gas results revealed the highest benzene mass directly across the street from the gas station on Mount Pleasant Street. A smaller amount of benzene from the soil-gas results was at the other end of Mount Pleasant Street. Benzene is a constituent of gasoline expected to show up in the test results because air vapors around gas stations are anticipated to contain benzene. The outdoor background air samples confirm that benzene is also in the air surrounding the homes. Benzene has a sweet odor. It is used to make other chemicals to manufacture plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, glues, furniture wax, dyes, detergents, drugs, and pesticides. Benzene is also a natural part of crude oil and cigarette smoke. Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. Children can be affected by benzene exposure in the same ways as adults. Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene will affect fertility in men [13]. Long-term exposure to high levels of benzene in the air can cause leukemia, particularly acute myelogenous leukemia causing cancer in blood-forming organs.

A study of 30 cities from 16 states found the average indoor air contains 1.8 E-03 ppm benzene, therefore; the benzene from the indoor air samples of these homes was not unexpected [14]. The indoor air of all the homes sampled had benzene levels above the EPA RBC for benzene, 0.23 ug/m^3. The highest concentration found was 4.2 ug/m^3 (1.32E-03 ppm) from September 13, 2005, before a sub-slab ventilation system was installed. The calculated cancer risk for this concentration is 1.0 E-05 for "no apparent increased risk". This home has been tested numerous times with benzene concentrations around 1.2 ug/m^3 (3.77E-04 ppm). The calculated human equivalent concentration for LOAEL was 2.55 ppm for acute inhalation [15]. The inhalation intermediate calculated for the human equivalent concentration LOAEL was 1.8 ppm. The highest concentration in ppm from the air tests is well below the LOAEL numbers. Benzene was also found in the trip and field blanks of the monitoring well samples. Increased adverse health effects are not expected from exposure to benzene at the levels detected.

1,4- Dichlorobenzene

PADEP and Sunoco both sampled for 1,4-dichlorobenzene, a man-made chemical. It has a pungent odor. It may be found in deodorant blocks, moth balls, and air fresheners. Inhaling the vapor or dusts of 1,4- dichlorobenzene at very high concentrations may cause burning and tearing of the eyes, coughing, difficult breathing, and an upset stomach. Dizziness, headaches, and liver problems have also been observed in people exposed to very high levels of 1,4-dichlorobenzene. There is limited evidence that inhaling 1,4-dichlorobenzene may decrease lung function. Animal studies showed inhaling 1,4-dichlorobenzene harmed their kidneys, liver, and blood [16]. 1,4- dichlorobenzene is possibly carcinogenic.

One home showed significant 1,4-dichlorobenzene concentrations that were not found in the other homes. The resident admitted to using cleaning supplies before the summa canisters were placed in the home. The 77 ug/m^3 (0.013 ppm) concentration found was above the 60 ug/m^3 EMEG/MRL. The EPA proposed IRU puts the theoretical cancer risk at 1.3 E-4 for 1 in 10,000 cancer risk. The proposed RfC is 80 ug/m^3 compared to the current chronic RMEG/RfC of 800 ug/m^3. The levels in this home are not expected to be consistently high and therefore not a chronic exposure risk if it was due to extensive housecleaning.

Another home was found with 45 ug/m^3 of 1,4 dichlorobenzene. The other homes had non-detects below the EPA RBC of 0.28 ug/m^3 (4.7 E-5 ppm), which is well below the proposed RBC. The MRL for acute inhalation is 2.0 ppm, intermediate inhalation MRL is 0.2 ppm, and chronic inhalation MRL is 0.01 ppm [17]. Adverse health effects are not expected from exposure to 1,4- dichlorobenzene at the levels detected.

Methylene chloride

Both PADEP and Sunoco tested the buildings for methylene chloride. Methylene chloride has a mild sweet odor detectable at 200 ppm. It is used as a paint stripper, industrial solvent, Freon 30, cleaner, "dippy birds", Christmas "bubble lights", a pesticide, and in aerosol containers [18]. It is also found in pet flea and tick products [19]. It was once used to decaffeinate coffee. An

MRL of 0.6 ppm has been derived for acute inhalation exposure [20]. An MRL of 0.3 ppm has been derived for both intermediate inhalation exposure and chronic inhalation exposure. Observed neurological effects include dizziness, headache, confusion, memory loss, and in-coordination. There are very limited human studies. The highest concentration was found in house with the complaint at 440 ug/m^3 or 0.127 ppm. The maximum concentration is well below the chronic MRL. After three rounds of testing, methylene chloride is confirmed to be in the house. Various levels of methylene chloride have been detected in this house since 2005 and give the range of results (66-440 ug/m^3). It is not clear why methylene chloride air sample results have been consistently higher in this home than the others, with levels of methylene chloride higher on the first floor rather than the basement. The calculated theoretical excess cancer risk from the highest levels seen is 1 in 10,000 which is considered a "*low increased risk*" for cancer from 30 years of exposure. Methylene chloride has been found in the other homes at lower concentrations such as 14 ug/m^3 (4.0 E-03 ppm) or low enough to be non-detected. Methylene chloride has been found in the field and trip blanks in the groundwater. The EPA has determined that methylene chloride is a probable cancer-causing agent in humans. Animal studies have shown liver tumors from exposure to methylene chloride [21]. The EPA has determined over a 70 year lifespan of continuous methylene chloride exposure, the calculated risk of 10^{-6} risk level corresponds to 0.006 ppm [22]. The other homes have no increased cancer risk. Adverse health effects are not expected from exposure to methylene chloride at the levels detected.

Chloroform- Drinking Water Chlorination

The indoor air from the homes was sampled for chloroform by PADEP and Sunoco. Chloroform was found in the air vapor and in the public drinking water from PADEP's environmental sampling. Chloroform is a colorless liquid with a pleasant, non-irritating odor and a slightly sweet taste [23]. It is used to make other chemicals and can also be formed in small amounts in chlorinated water. Chloroform vapor was found in all the environmentally sampled homes from 0.37 ug/m^3 to 23 ug/m^3. Breathing 900 ppm for a short time can cause dizziness, fatigue, and headache. Breathing air, eating food, or drinking water containing high levels of chloroform for long periods of time may damage your liver and kidneys. Public drinking water companies are required to monitor and test the drinking water on a daily basis to meet PADEP safe drinking water standards. Animal studies have shown that miscarriages occurred in rats and mice that inhaled air containing 30 to 300 ppm chloroform during pregnancy and also in rats that ate chloroform during pregnancy. Chloroform may reasonably be anticipated to be a carcinogen. Studies found the intermediate inhalation MRL for humans was 0.05 ppm. The chronic inhalation value MRL for humans was 0.02 ppm [24]. The maximum concentration of indoor air chloroform in one home was a June 6, 2006 PADEP sample, 23 ug/m^3 (4.7 E-03 ppm). This concentration equates to a theoretical excess cancer risk of 2.3 E-04, which is considered *"a low to moderate risk."* The indoor air sample taken by Sunoco contractors during the same sampling event in that home found 17 ug/m^3 (3.48E-03 ppm), which is comparable. Other sources of chloroform may have been inside the home during the sampling event. Chloroform was not

detected or estimated due to the low concentrations in the indoor air of the same home on November 14, 2006. Sample results from the other homes did not detect chloroform at levels of concern.

Child Health Considerations

PADOH and ATSDR recognize that infants and children may be more vulnerable to chemical exposure than adults. As part of their child health considerations, PADOH and ATSDR are committed to evaluating childhood exposure scenarios that potentially involve children. Considering exposure to indoor residential air at the Sunoco Site from, children may have an increased vulnerability due to many factors including:

1) children weigh less than adults, resulting in higher doses of chemical exposure relative to body weight;
2) children have higher rates of respiration;
3) metabolism and detoxification mechanisms differ in both the very young and very old and may increase or decrease susceptibility and;
4) exposure to contaminants during different stages of growth development in children may result in permanent damage if toxic exposures occur during critical growth periods.

Benzene, methylene chloride, 1,4-dichlorobenzene, and chloroform vapors are heavier than air, allowing higher concentrations of the vapors to collect closer to the ground and airways of children. Children may visit, but do not live in the homes with the maximum 1,4-dichlorobenzene, benzene, and methylene chloride concentrations evaluated as worse case scenarios. If children did live in these homes, recommendations would be made to prohibit living quarters such as bedrooms in the basement, to install a vapor intrusion system, find cleaning products without 1,4-dichlorbenzene and to follow the proper storage, use, and disposal procedures of household products.

Conclusions

1. PADOH and ATSDR conclude the Sunoco Site currently poses *no apparent public health hazard to the residents* based on the sampling results provided to and reviewed by PADOH.

2. Although the site poses no apparent public health hazard, air sampling at one household has consistently detected methylene chloride vapors at levels of concern. These levels do not appear to be site related and may be due to some other source.

3. Past exposures to VOCs in the indoor air in the residential location in the vicinity of the site represent an *indeterminate health hazard* because historical indoor air sampling data is not available.

4. *Future potential exposures* to VOCs via inhalation from this site represent an indeterminate public health hazard. The petitioner has stated the last three rounds of air sampling at the home did not take place during an "odor" incident. Since adequate air sampling of the "odor" apparently did not occur during one of these times, a *determination can not be made as to the potential health hazards* to those individuals in the residence as a result to exposure to the levels of chemicals during such reported odor incidents.

Recommendations

1. PADOH and ATSDR recommend that residents should properly use, store, and dispose of VOC-containing household products.
2. PADEP will be make an attempt to collect an air sample from the home during a future odor event in an attempt to locate the cause and identify the odor if possible.
3. After removal of the old refrigerator and any other items that may be contributing to the methylene chloride air vapors in the home are removed, another round of indoor air sampling should be taken to rule out possible indoor air sources.

Public Health Actions Completed

1. A PADOH representative has met individually with concerned residents, provided fact sheets, and made recommendations to homeowners.
2. Additional environmental sampling was requested via HC#1 and as a result, information was collected by PADEP.
3. Through this health consultation, the data collected was evaluated to make a public health determination which
   - Increased knowledge and awareness of VOC product use, storage, and disposal and;
   - Negated perceived environmental risks.

Public Health Actions Planned

1. ATSDR and PADOH will make this health consultation available to the residents and will be available to answer the residents' health questions.

2. PADEP will try to work with concerned homeowners to attempt to find a feasible way to respond to and collect air samples from the residence during an "odor" incident.

3. PADOH will evaluate future sampling results, as needed, and if necessary prepare a third health consultation or a technical assistance document that addresses the public health significance of the data. This recommendation will be implemented at the discretion of the PADOH following the receipt of future sampling results.

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Certification

This health consultation for the Mount Pleasant Street Site was prepared by the Pennsylvania Department of Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry. It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated. Editorial review was completed by the cooperative agreement partner.

CDR Alan G. Parham, REHS, MPH

Technical Project Officer, CAT, CAPEB, DHAC, ATSDR

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

Alan Yarbrough

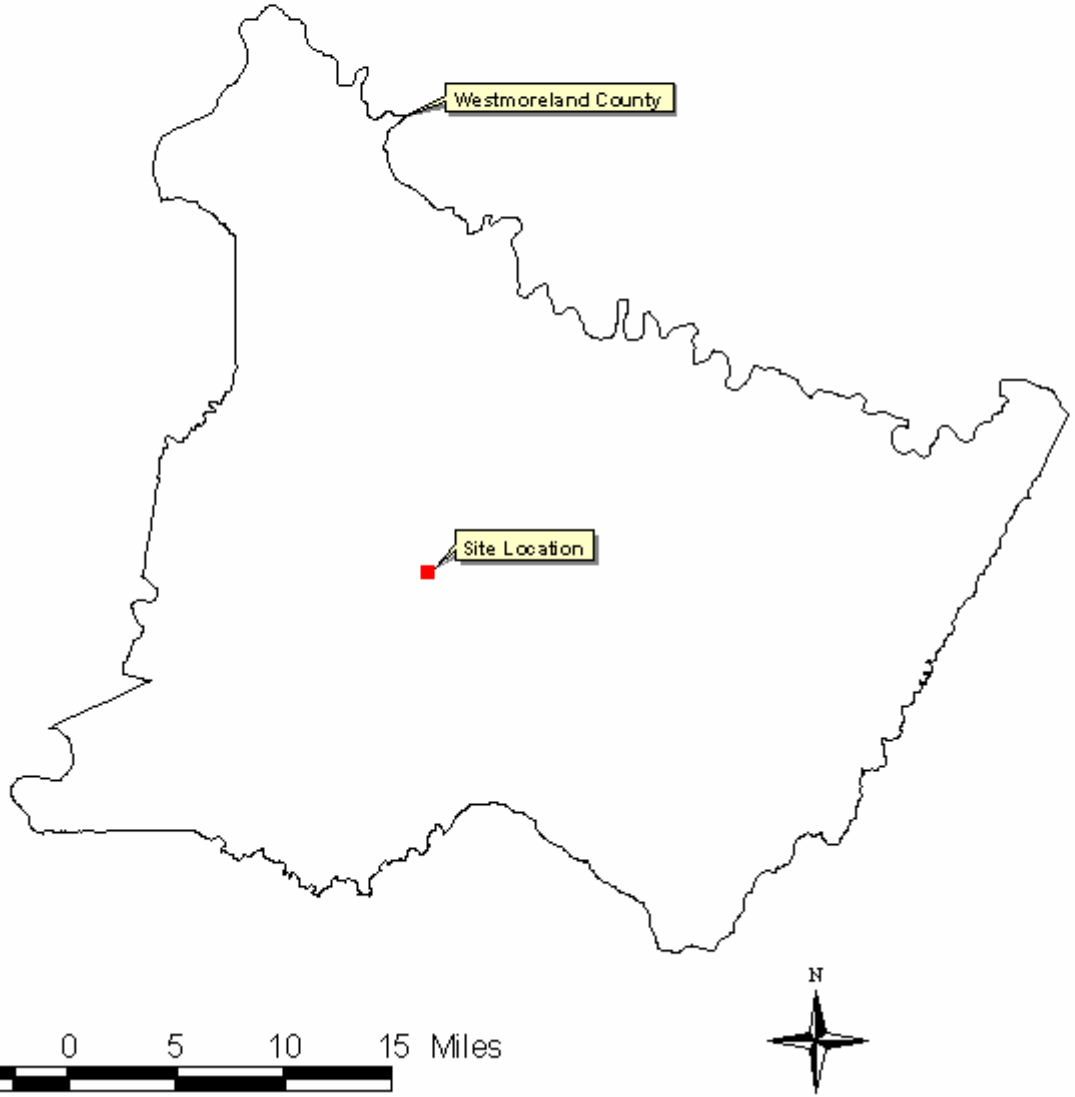
Team Leader, CAT, SPAB, DHAC, ATSDR

Appendix A

Figures

Figure 1

Sunoco Site Location Map



Legend

Site Location

Westmoreland County

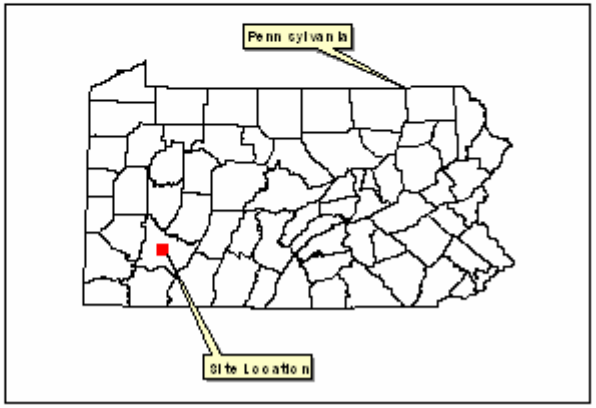


Figure 2

Sunoco Site Topographic Map (1993)

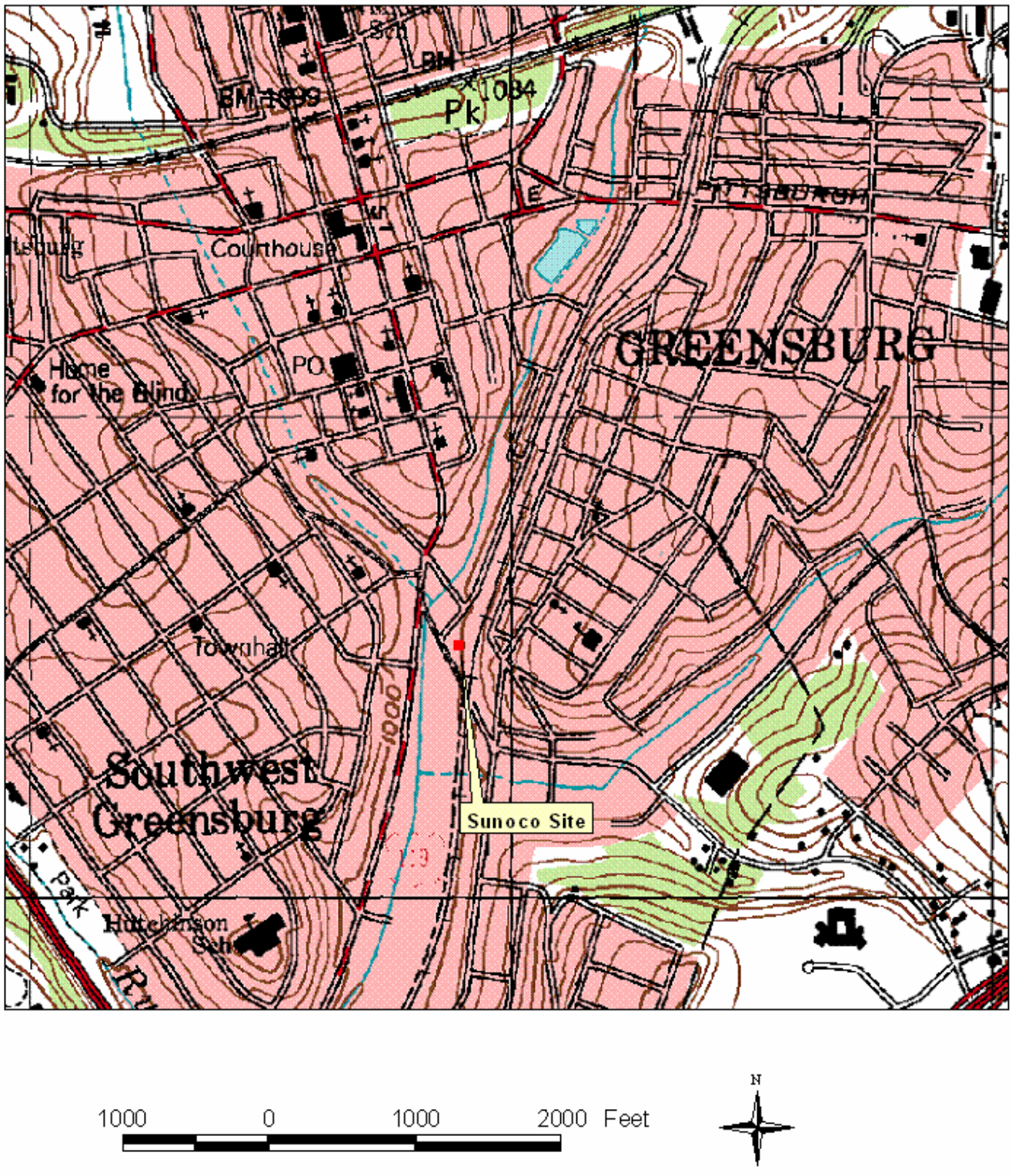


Figure 3

Aerial Photograph of Sunoco Site (April, 1994)

500 0 500 Feet

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Appendix B

Tables

Table 1 – Indoor Air Chemicals Discussed

Indoor Air Chemicals	Highest Concentration Detected ug/m^3	Comparison Values ug/m^3	Source	DHHS (NTP)	IARC	EPA
Benzene	4.20	0.1, 0.23	CREG, EPA III RBC	1	1	A
Chloroform	17.00	0.04, 0.077	CREG, EPA III RBC	2	2B	LI
1,4-Dichlorobenzene	77.00	0.28	EPA III RBC	2	2B	C
Methylene Chloride	440.00	2.0, 3.8	CREG, EPA III RBC	2	2B	B2

Table 2. Chlorinated Drinking Water Discussed

Water Chemicals	Highest Concentration Detected ug/L	Comparison Values ug/L	Source	DHHS (NTP)	IARC	EPA
Chloroform	29.00	80, 0.15	MCL, EPA III RBC	2	2B	LI

DL – Detection Level
RMEG – Reference Dose Media Evaluation Guide
J – Indicates an estimated value, below the quantification limit, but above the method detection limit.
EPA Chronic Oral RfD – Environmental Protection Agency Chronic Oral Dose
IARC – International Agency for Research on Cancer
NTP – National Toxicology Program
PWS EPA – Public Water Supply Environmental Protection Agency
† - Intermediate Reference Dose Media Guide

Cancer Class:
EPA (based on 1986 cancer assessment guidelines)
B2 = probably human carcinogen (inadequate human, sufficient animal studies)
C = Possible human carcinogen (no human, limited animal studies); but limited human data)
LI = Likely human carcinogen (cancer potential established)

NTP 2 = Reasonably anticipated to be a carcinogen
3 = Not classified

IARC 1 = Carcinogenic to humans (sufficient human evidence)
2B = Possibly carcinogenic to humans (limited human evidence; less than sufficient evidence in animals)