

Health Consultation No. 1

Evaluation of Indoor Air Sampling at Brookside School

(FORMER) WHITE SWAN LAUNDRY AND CLEANER, INCORPORATED
(a/k/a MAGNOLIA AVENUE GROUND WATER CONTAMINATION SITE)

SEA GIRT, MONMOUTH COUNTY, NEW JERSEY

EPA FACILITY ID: NJSFN0204241

JULY 31, 2002

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:

**New Jersey Department of Health and Senior Services
Hazardous Site Health Evaluation Program
Consumer and Environmental Health Services
Division of Epidemiology, Environmental, and Occupational Health
Under a Cooperative Agreement with the
Agency of Toxic Substances and Disease Registry**

Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
CREG	Cancer Risk Evaluation Guide
EMEG	Environmental Media Evaluation Guide
EPA	United States Environmental Protection Agency
HCV	Health-based Comparison Value
IRIS	Integrated Risk Information System
MCHD	Monmouth County Health Department
ND	Not Detected
NJDEP	New Jersey Department of Environmental Protection
NJDHSS	New Jersey Department of Health and Senior Services
PCE	Perchloroethylene (tetrachloroethylene)
RfC	Reference Concentration
RMEG	Reference Dose Media Evaluation Guide
TCE	Trichloroethylene
VOC	Volatile Organic Chemical

Summary

This Health Consultation has been prepared in response to a request that was submitted in April 2002 by the U.S. Environmental Protection Agency (EPA) Region II and officials of the Brookside School to the Agency for Toxic Substances and Disease Registry (ATSDR) for an evaluation of indoor air sampling that was conducted at the school, located in Wall Township, Monmouth County, New Jersey. Concern has been raised about possible exposure by inhalation of chemicals that have been found in the groundwater in the vicinity of the (former) White Swan Laundry and Cleaner, Inc. (aka Magnolia Avenue Ground Water Contamination) site, also located in Wall Township, Monmouth County, New Jersey.

It is known that a shallow ground water plume containing trichloroethylene, *i.e.*, TCE, and tetrachloroethylene (perchloroethylene), *i.e.*, PCE, extends in an easterly direction from sources located in Wall Township (Monmouth), New Jersey. Moreover, the potential exists for exposure to these contaminants via inhalation of vapors that may have been transported from the ground water and subsequently into the indoor air of residences and other structures. Soil gas measurements are currently being performed by EPA to determine the contribution of site-related contaminants (including benzene) that have been found in soils to the concentrations of chemicals that have been detected in residential air samples.

The results of sampling show that benzene, carbon tetrachloride, and para-dichlorobenzene are present in the indoor air of the Brookside School at concentrations that slightly exceed ATSDR health-based comparison values (HCVs) and/or EPA Region III Risk-Based Concentrations (RBCs). Benzene is an ubiquitous substance that is a significant component of gasoline; it is commonly found at so-called "background" levels in the indoor air. The concentration of benzene that was found is similar to that found in many indoor air environments in urban and suburban areas. Carbon tetrachloride and para-dichlorobenzene have likely been introduced through routine maintenance activities at the school. Exposure to these chemicals, at the levels detected, is unlikely to cause adverse health effects.

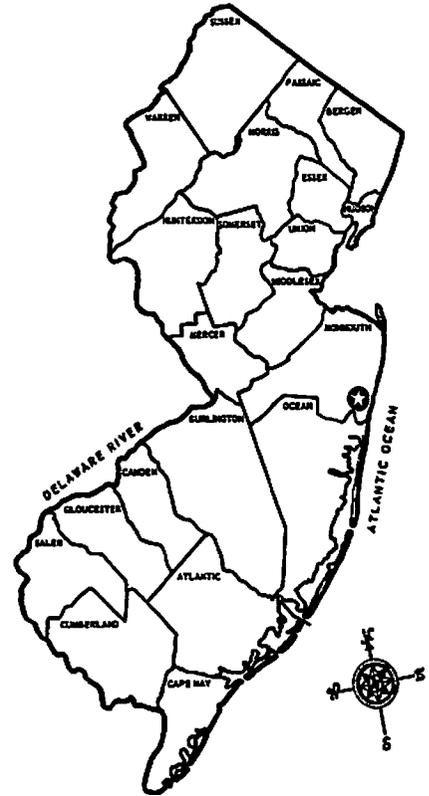
Several additional VOCs are present in the indoor air of the Brookside School, but their concentrations are below ATSDR HCVs and EPA RBCs; therefore, exposure to these chemicals, at the levels detected, is not likely to result in adverse health effects. Acetylene and propylene were detected in samples of the air at the Brookside School. Neither ATSDR nor EPA Region III has a health-based comparison value for acetylene or propylene. However, these chemicals have common indoor sources, and were detected at very low levels, so they do not represent any appreciable risk of an adverse health effect. Concentrations of all VOCs that were found in the Brookside School, particularly benzene, carbon tetrachloride, and para-dichlorobenzene, should be reduced through improved ventilation and HVAC operational procedures.

Based on the results of the sampling of the indoor air in the Brookside School, it is not likely that any exposure has occurred that would result in adverse health effects. There is no evidence that

inhalation of the air in the school would cause exposure at a level of public health significance, *i.e.*, the public health hazard category is **“No Apparent Public Health Hazard”**.

Purpose and Statement of Issues

In April 2002 the U.S. Environmental Protection Agency (EPA) Region II requested that the Agency for Toxic Substances and Disease Registry (ATSDR) assist in evaluating the public health implications of exposure to contaminants that had been detected in indoor air sampling of approximately 220 residences in Wall Township, Monmouth County, New Jersey (see inset). The sampling of indoor air was conducted during the period December 2001 - February 2002, in conjunction with the on-going investigation of releases of hazardous substances from the (former) White Swan Laundry and Cleaner site and from other nearby sources of ground water contaminants. Concern has been expressed by local officials regarding the potential for exposure, by inhalation, to chlorinated hydrocarbons, especially tetrachloroethylene (PCE) and trichloroethylene (TCE), that have been found to be present in the nearby shallow ground water, and could potentially volatilize into occupied structures.



On February 5, 2002, sampling was conducted at the Brookside School to determine if contaminants in the shallow ground water had been transported and volatilized inside the school. At the request of local school officials and the EPA, the New Jersey Department of Health and Senior Services (NJDHSS), working jointly under a cooperative agreement with the Superfund Site Assessment Branch, Division of Health Assessment and Consultation, ATSDR, has been asked to review and evaluate the results of indoor air sampling that was recently conducted at the school. The following discussion describes and evaluates the indoor air sampling results.

Background

Site History

In 1997 the Monmouth County Health Department (MCHD) became aware of the contamination of irrigation wells in the vicinity of Magnolia Avenue in Wall Township, Monmouth County, New Jersey by tetrachloroethylene (PCE). During 1999 and 2000, the MCHD and the New Jersey Department of Environmental Protection (NJDEP) performed a joint study of shallow ground water that identified a plume of PCE and trichloroethylene (TCE) contamination about 2.5 miles

long and one mile wide. The contamination plume was found to extend from Wall Township to the east into the Borough of Sea Girt (NJDEP, 2001).

During the period 1998 to 2000, NJDEP conducted site investigations at facilities that had been identified as potential sources of the ground water contamination. Soil and ground water samples collected at three sites confirmed that a release of volatile organic compounds (VOCs) had occurred at each of the sites. The three sources that NJDEP determined to have contributed to the Magnolia Avenue ground water contamination are: (1) the White Swan Laundry and Cleaners (aka: Fleet Bank or Summit Bank property), located on Sea Girt Avenue; (2) the Gulf Service Station, located at the intersection of State Highway 35 and Sea Girt Avenue; and (3) Sun Cleaners, located on State Highway 35 (NJDEP, 2001).

On February 23, 2001, Fleet Bank, the owner of the (former) White Swan Laundry and Cleaner property, entered into a memorandum of agreement with the NJDEP to conduct a site investigation and remedial investigation at the site; high concentrations of PCE contamination were found in the shallow groundwater beneath the property. Ground water was also sampled at three educational facilities in the vicinity of the site, *i.e.*, Sea Girt Elementary School, Old Mill School, and Brookside School. Based on these results, NJDEP determined that a ground water plume of contamination may have adversely effected the indoor air quality of nearby residential properties (NJDEP, 2001).

On October 25, 2001, the NJDEP conducted indoor air quality testing of three residential properties and one commercial property located near the Fleet Bank property. NJDEP provided the residents, and the owners of the commercial property, with fans for ventilating the basements of each of the buildings where PCE was detected.

At the request of the NJDEP, EPA announced plans on December 5, 2001 to take over the investigation in order to further characterize the contaminated ground water that underlies portions of Wall Township and the Borough of Sea Girt, and to determine if groundwater contaminants had volatilized in the indoor air of nearby structures. EPA also announced that they agreed to evaluate the site for potential listing on the National Priorities List (NPL), *i.e.*, Superfund. Since that time, EPA has collected and analyzed about 300 indoor air samples from at least 220 residential and business locations.

EPA has installed ventilation systems at all homes with PCE levels that are considered an immediate risk to public health, *i.e.*, greater than $60 \mu\text{g}/\text{m}^3$ (micrograms per meter cubed) and NJDEP is working with the homeowners whose residences were found to have elevated PCE concentrations, *i.e.*, between 6 and $60 \mu\text{g}/\text{m}^3$, and are interested in undertaking remedial measures. [Note: A companion Health Consultation (ATSDR, 2002) to this document specifically addresses residential exposure to PCE.] In April 2002, EPA sent the indoor air sampling results of the 220 residences to the respective homeowners (EPA, 2002). Included with this letter was a summary,

provided by ATSDR and NJDHSS, of the public health consequences of exposure to airborne PCE and benzene.

Summary of Previous ATSDR Activities

In October 1999, at the request of the MCHD and the EPA, ATSDR was asked to review the information that was then available regarding the ground water contamination, and to advise the community about the usage of the irrigation wells. ATSDR determined that the PCE that had been found in the ground water from irrigation wells posed no risk to human health, providing the water was used for non-potable purposes only. It was recommended that the extent of the plume be further characterized, and that the Sea Girt Municipal Well Field be monitored monthly for PCE (ATSDR, 1999).

Community Concerns

In conjunction with the survey of indoor air quality that has been conducted in the residences in Wall Township and Sea Girt, officials at two schools, the Brookside School and the Old Mill School, requested that the indoor air in their schools also be sampled and analyzed.

Discussion

Indoor Air Sampling at the Brookside School

Sampling of the indoor air at the Brookside School shows low concentrations of several VOCs to be present. The levels of benzene, carbon tetrachloride, and para-dichlorobenzene that were found in the indoor air exceed ATSDR HCVs and/or EPA Region III RBCs. Acetylene and propylene were also detected, but neither ATSDR nor EPA has a health-based comparison value for these chemicals. The remaining compounds that were analyzed were either not detected, or were found at concentrations that are below ATSDR HCVs and EPA RBCs. Exposure to these chemicals is not expected to result in any adverse health effect.

Health Assessment Methodology

In the course of creating a health assessment or consultation, ATSDR evaluates the environmental and human components that lead to human exposure from releases of hazardous substances at a site. An exposure pathway consists of five elements: (1) a source of contamination; (2) transport through an environmental medium; (3) a point of human exposure; (4) a route of human exposure; and (5) a receptor population. ATSDR categorizes exposure pathways in three groups: (1) "completed pathways", that is, those in which exposure is reasonably expected to have occurred, to be occurring, or to occur in the future; (2) "potential pathways", that is, those in which exposure might have occurred, may be occurring, or may yet occur, and (3) "eliminated pathways", that is,

those that can be eliminated from further analysis because at least one of the five elements listed above is missing and will never be present, or in which no contaminant of concern can be identified.

ATSDR follows a two-step process to assess the public health issues that are related to exposure pathways at hazardous waste sites. First, ATSDR obtains representative environmental monitoring data for the site and compiles a list of site-related contaminants. This list of contaminants is compared to health-based comparison values (HCVs) to identify those contaminants that do not have a realistic possibility of causing adverse health effects. [Appendix A contains a description of terms and definitions that pertain to HCVs.] Second, for the remaining contaminants, ATSDR evaluates site-specific conditions to determine what exposure scenario is realistic for a given exposure pathway. For the assumed exposure scenario, ATSDR determines an exposure dose, and compares this dose to scientific studies to determine whether the extent of exposure indicates a potential public health hazard. The health-based comparison values that are presented in this report are concentrations of contaminants below which, the current public health literature suggest, are unlikely to result in adverse health effects. These comparison values are conservative because they include safety factors that are intended to protect the most sensitive populations. ATSDR typically uses HCVs as follows: if a contaminant is never found at levels greater than its comparison value, exposure to the contamination is considered to be "safe" or "harmless". If, conversely, a contaminant is found at a concentrations that are greater than its HCV, ATSDR designates the pollutant as a contaminant of concern and examines it further in the assessment. Because HCVs are based on conservative assumptions, the presence of a contaminant at concentrations greater than an HCV does not necessarily suggest that adverse health effects will occur within the exposed population. Moreover, these health-comparison values are conservative, since they are assume continuous exposure over long-time frames (usually more than 30 years).

Analysis of Exposure Pathways and Contaminants of Concern

The exposure pathway of concern evaluated in this Health Consultation is exposure by inhalation to ground water contaminants that partition between the ground water and soils, and then volatilize and infiltrate the indoor air of the school.

Studies that have been conducted by the EPA have shown that most homes in the U.S. have measurable levels of volatile organic chemicals (VOCs) in indoor air. Although it is well known that outdoor air contains many VOCs, the EPA studies found that the concentrations of organic chemicals in indoor air are usually higher than the concentrations that are found in outdoor, *i.e.*, ambient air. These higher indoor air levels of VOCs presumably come from consumer products that are brought into the homes, from evaporation of home construction materials, and from personal activities. EPA studies showed that certain human activities were associated with increased levels of chemicals in indoor air. Examples of these activities are:

- * smoking indoors increases benzene, xylene, ethyl benzene, and styrene levels in indoor air;
- * bringing dry cleaning home increases the levels of PCE in indoor air;

- * using hot water in the home increases chloroform levels in indoor air; and
- * using room air fresheners, toilet bowl deodorizers, and moth crystals leads to higher levels of para-dichlorobenzene in indoor air (EPA, 1987).

Soil/gas measurements are currently being performed by EPA to determine the contribution of site-related contaminants (including benzene) that have been found in soils to the concentrations of chemicals that have been detected in residential air samples.

Public Health Implications

The aromatic hydrocarbons benzene, toluene, ethyl benzene, and xylenes, together known as BTEX, that were found in the air samples are primary constituents of gasoline. Benzene, classified by EPA as a known human carcinogen (carcinogenicity category A), is found in gasoline and automobile emissions, and is also a constituent of some paints, adhesives, and particle board. Since the maximum concentration of benzene, $1.56 \mu\text{g}/\text{m}^3$ in Table 1, is less than indoor "background" levels of benzene that are typically found in the indoor air in homes (about $6 \mu\text{g}/\text{m}^3$ on average), it is likely that the benzene and the other BTEX compounds that were detected came from indoor sources within the Brookside School. Benzene was the only BTEX detected above ATSDR HCVs and/or EPA RBCs. However, the measured concentrations of benzene represent little or no additional lifetime cancer risk beyond the cancer risk due to background levels. Consequently, no adverse health effects are expected from exposure to the levels of benzene that were found in the Brookside School air samples.

Carbon tetrachloride is a colorless liquid that is commonly used as a solvent in varnishes, lacquers, and resins. It has been classified in EPA carcinogenicity category B2, *i.e.*, a probable human carcinogen. The maximum concentration of carbon tetrachloride that was found in the Brookside School, *cf.* $0.57 \mu\text{g}/\text{m}^3$ in Table 1, is slightly above EPA Region III's RBC and about eight times higher than ATSDR's HCV. Although carbon tetrachloride was detected at levels above these comparison values, the HCVs and RBCs are calculated by assuming long-term, continuous, exposures that are not likely to occur in a school setting. Therefore, it is unlikely that the concentrations of carbon tetrachloride that were detected would result in adverse health effects.

Para-dichlorobenzene, which has a mothball-like odor, is a chemical that is found in formulations of air deodorants and insecticides. It is classified in EPA carcinogenicity category C, *i.e.*, a possible human carcinogen. The maximum concentration that was found in the Brookside School, *cf.* $0.6 \mu\text{g}/\text{m}^3$ in Table 1, slightly exceeds EPA Region III's RBC, but does not exceed ATSDR's HCV. Since RBCs are derived by assuming long-term, continuous exposure, intermittent short term exposure to para-dichlorobenzene, such as that occurring at the Brookside School, is not likely to result in adverse health effects.

The three Freons, *i.e.*, dichlorodifluoromethane (aka Freon 12), fluorotrichloromethane (aka Freon 11), and trichlorotrifluoroethane (aka Freon 113), that were identified in the air samples are used as refrigerants and as aerosol propellants. They were probably introduced to the school through operation of the heating, ventilation, and air conditioning (HVAC) system. Since the concentrations that were found are below ATSDR HCVs and EPA RBCs, exposure to these chemicals at the levels detected is not likely to result in any adverse health effects.

The other chlorinated VOCs that were found in the air samples, including chloromethane and methylene chloride, are solvents that are commonly used in consumer products. It is likely that these species were introduced to the school through routine building operations, such as through the use of cleaning products. The occasional exposure to these chlorinated VOCs, which were found at concentrations below their respective HCVs and RBCs, is unlikely to result in adverse effects to human health.

Acetylene, a gas that is used in welding, can act as an asphyxiant when its concentration becomes sufficiently high to displace oxygen (HSDB, 2002). The levels detected in the Brookside School air samples are well below those that would constitute a health threat for asphyxiation.

Propylene is a gas that is ubiquitous in the environment. Biological sources of propylene include garlic, essential oils, fir trees, Scotch pine, and natural gases; it is also released by germinating beans, corn, cotton, and pea seeds. Propylene can also be released into the environment by incomplete combustion, *e.g.*, combustion of biomass, natural gas, cigarettes, and gasoline. There are little data on typical indoor air concentrations, except for some studies of smoked-filled taverns where the levels of propylene due to cigarette smoking were about 100 times greater than the maximum level detected at the Brookside School. The levels detected at the Brookside School are in the low range of the levels detected in the ambient air in rural areas of the United States and Britain (HSDB, 2002). The levels detected in the school do not represent any appreciable risk of an adverse health effect.

Neither of the potentially site-related contaminants PCE and TCE was found in the indoor air of the school. Since there is no evidence of exposure to PCE or TCE, no adverse health effects can occur.

Conclusions

The results that are presented in Table 1 show that low concentrations of several VOCs are present in the indoor air of the Brookside School. The concentrations of benzene, carbon tetrachloride, and para-dichlorobenzene that were found are slightly above ATSDR HCVs and/or EPA Region III RBCs. Since continuous, long-term exposure, *i.e.*, 24 hours per day, 7 days per week for more than 30 years, is not likely within an educational setting such as the Brookside School, exposure to these chemicals at the measured concentrations is unlikely to cause adverse

health effects. The concentrations of benzene that were found are similar to those found in indoor air environments in urban and suburban areas.

Several other VOCs, including dichlorodifluoromethane (aka Freon 12™), methyl chloride, trichlorofluoromethane (aka Freon 11™), methylene chloride, trichlorotrifluoroethane (aka Freon 113™), toluene, ethyl benzene, and xylenes, were detected at concentrations that are below EPA's RBCs and ATSDR's HCVs; therefore, exposure to these chemicals is not likely to result in adverse health effects.

Acetylene and propylene were also detected at low concentrations in samples of the indoor air at the Brookside School. Neither ATSDR nor EPA Region III has a health-based comparison value for either chemical. However, these chemicals have common indoor sources and were detected at very low levels. The concentrations of acetylene and propylene that were detected in the school are not unusual, and do not represent any appreciable risk of an adverse health effect.

Neither PCE nor TCE was detected in the indoor air of the Old Mill school, so there is no evidence of exposure to these chemicals.

In summary, none of the chemicals that were found in the indoor air of the Brookside School were present at a concentration of public health concern. As a result, inhalation of the indoor air in the school is not likely to have an adverse effect on human health, *i.e.*, the public health hazard category is "No Apparent Public Health Hazard". [See Appendix B for definitions of public health hazard categories.]

Recommendations

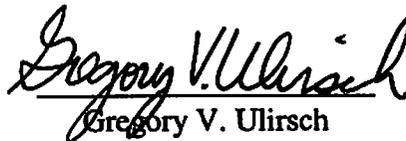
Recommendations to Cease/Reduce Exposure

As with any school or office building, the indoor air quality of the Brookside School may be improved by using well known methods, *e.g.*, additional ventilation should be provided by running the HVAC system at 100% outside air after using cleaning chemicals, or after an indoor pesticide treatment. Indoor concentrations of carbon dioxide, a surrogate that indicates the adequacy of ventilation, should not exceed 1000 parts per million by volume (ppmv). The indoor air quality of the Brookside School may also be improved by minimizing use of cleaning products that contain large quantities of chlorinated solvents and other VOCs.

If it is determined that ground water beneath the school contains site-related contaminants, it is recommended that, if ground water enters the school, either in the basement or via a sump, the indoor air be periodically monitored for VOCs.

Certification

This Health Consultation was prepared by the New Jersey Department of Health and Senior Services (NJDHSS) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It has been produced in accordance with approved methodology and procedures existing at the time the Health Consultation was begun.



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



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Appendices

Appendix A: Description of Comparison Values

Description of Comparison Values

ATSDR's Comparison Values are media-specific concentrations that are considered to be "safe" under default conditions of exposure. They are used as screening values in the preliminary identification of site-specific chemical substances that the health assessor has selected for further evaluation of potential health effects.

Generally, a chemical is selected for evaluation because its maximum concentration in air, water, or soil at the site exceeds one of ATSDR's Comparison Values. However, it cannot be emphasized strongly enough that Comparison Values are not thresholds of toxicity. While 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. Indeed, the whole purpose behind highly conservative, health-based standards and guidelines is to enable health professionals to recognize and resolve potential public health problems before they become actual health hazards. The probability that adverse health outcomes will actually occur as a result of exposure to environmental contaminants depends on site-specific conditions and individual lifestyle and genetic factors that affect the route, magnitude, and duration of actual exposure, and not solely on environmental concentrations.

Screening values based on non-cancer effects are generally based on the level at which no health adverse health effects (or the lowest level associated with health effects) found in animal or (less often) human studies, and include a cumulative margin of safety (variously called safety factors, uncertainty factors, and modifying factors) that typically range from 10-fold to 1,000-fold or more. By contrast, cancer-based screening values are usually derived by linear extrapolation with statistical models from animal data obtained at high exposure doses, because human cancer incidence data for very low levels of exposure are rarely available. Cancer risk estimates are intended to represent the upper limit of risk, based on the available data.

Listed and described below are the types of comparison values that the ATSDR and the NJDHSS used in this Health Consultation:

Cancer Risk Evaluation Guides (CREGs) are estimated concentrations of contaminants in an environmental medium (such as drinking water) that are expected to cause no more than one excess cancer case for every million persons who are continuously exposed to the concentration for an entire lifetime (equaling a risk of 1×10^{-6}). These concentrations are calculated from the EPA's cancer slope factors, which indicate the relative potency of carcinogenic chemicals. Only chemicals that are known or suspected of being carcinogenic have CREG Comparison values.

Environmental Media Evaluation Guides (EMEGs) and Reference Dose Media Evaluation Guides (RMEGs) are estimates of chemical concentrations in an environmental medium (such as drinking water) that are not likely to cause an appreciable risk of deleterious, non-cancer health effects, for fixed durations of exposure. These guides may be developed for special sub-populations such as children. EMEGs are based on ATSDR's Minimal Risk Level (MRL) while RMEGs are based on the EPA's Reference Dose (RfD).

Other health-based guides may also be used as Comparison Values, including drinking water Maximum Contaminant Levels (MCLs) established by the EPA or the NJDEP.

Appendix B: ATSDR Public Health Hazard Categories

ATSDR's Interim Public Health Hazard Categories

Category / Definition	Data Sufficiency	Criteria
<p>A. Urgent Public Health Hazard</p> <p>This category is used for sites where short-term exposures (< 1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.</p>	<p>This determination represents a professional judgement based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.</p>	<p>Evaluation of available relevant information* indicates that site-specific conditions or likely exposures have had, are having, or are likely to have in the future, an adverse impact on human health that requires immediate action or intervention. Such site-specific conditions or exposures may include the presence of serious physical or safety hazards.</p>
<p>B. Public Health Hazard</p> <p>This category is used for sites that pose a public health hazard due to the existence of long-term exposures (> 1 yr) to hazardous substance or conditions that could result in adverse health effects.</p>	<p>This determination represents a professional judgement based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.</p>	<p>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 impact on human health that requires one or more public health interventions. Such site-specific exposures may include the presence of serious physical or safety hazards.</p>

Category / Definition	Data Sufficiency	Criteria
<p>C. Indeterminate Public Health Hazard</p> <p>This category is used for sites in which “critical” data are <i>insufficient</i> with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.</p>	<p>This determination represents a professional judgement that critical data are missing and ATSDR has judged the data are insufficient to support a decision. This does not necessarily imply all data are incomplete; but that some additional data are required to support a decision.</p>	<p>The health assessor must determine, using professional judgement, 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.</p>
<p>D. No Apparent Public Health Hazard</p> <p>This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past, and/or may occur in the future, but the exposure is not expected to cause any adverse health effects.</p>	<p>This determination represents a professional judgement based on critical data which ATSDR considers sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.</p>	<p>Evaluation of available relevant 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 impact on human health.</p>
<p>E: No Public Health Hazard</p> <p>This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.</p>	<p>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</p>	

* *Such as environmental and demographic data; health outcome data; exposure data; community health concerns information; toxicologic, medical, and epidemiologic data; monitoring and management plans.*

Table 1. Air Sampling at Brookside School, Wall Township, February 5, 2002 (ppbv; in parentheses, $\mu\text{g}/\text{m}^3$)

Chemical	Sample				MW	TSP (ppbv)	ATSDR HCV	RfC (ppbv)
	1	2	3	4				
Acetylene	0.91	0.86	1.10	1.06	26	1.06	NONE	NONE
Propylene	0.40	0.40	0.56	0.56	42	1.72	NONE	NONE
Dichlorodifluoromethane	0.52	0.50	0.49	0.47	121	4.95	NONE	180
Methyl chloride	0.31	0.37	0.42	0.47	71	2.90	50	1.8C
Methyl bromide	ND	ND	0.05U	0.03U	95	3.88	5	5.1
Fluorotrichloromethane	0.36	0.36	0.22	0.21	137	5.60	NONE	730
Methylene chloride	0.07	0.07U	0.05U	0.03U	85	3.48	(3CREG)	3.8C
Trichlorotrifluoroethane	0.09	0.10	0.11	0.12	197	8.06	NONE	31000
Benzene	0.41	0.41	0.49 (1.56)	0.46	78	3.19	(0.1CREG)	0.22C
Carbon Tetrachloride	0.09 (0.57)	0.09	0.03U	0.02U	154	6.30	(0.07CREG)	0.12C
Trichloroethylene*	ND	ND	ND	ND	130	5.32	(40)RfC, UR	0.016C*
Toluene	0.36	0.41	0.58	0.58	92	3.76	80	420
n-Octane	ND	ND	ND	0.05U	114	4.66	NONE	NONE
Tetrachloroethylene	ND	ND	ND	ND	166	6.79	40UR	0.63C*
Ethylbenzene	0.05U	0.06U	0.07U	ND	106	4.33	1000int	1.6C**
m/p-Xylene	0.15	0.17	0.19	0.18	106	4.33	100total	7300
o-Xylene	0.07	0.09U	0.09U	0.09U	106	4.33	100total	7300
Paradichlorobenzene	0.10 (0.6)	0.12U (0.72)	ND	ND	147	6.01	100	0.28C*

BOLD - exceeds EPA Region III RfC or ATSDR HCV

U - estimated, below detection limit

MW - molecular weight

ND - not detected

C - designated as carcinogen by EPA Region III

UR - Under review by ATSDR

CREG - ATSDR Cancer Risk Evaluation Guide

* Carcinogenicity not assessed by IRIS

** EPA IRIS indicates category D (carcinogenicity not classifiable)

NB: $\mu\text{g}/\text{m}^3 = \text{ppbv} \times \text{MW}/24.45$ at room temperature