



New York State Department of Health  
Center for Environmental Health

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# Health Consultation Public Comment Draft

## **Hopewell Precision Area Contamination**

TOWN OF EAST FISHKILL,  
DUTCHESS COUNTY, NEW YORK

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## **SUMMARY**

### **INTRODUCTION**

A New York State Department of Health (DOH) and Agency for Toxic Substances and Disease Registry (ATSDR) priority is to provide the community with the best information available about how contaminants from the Hopewell Precision Area Contamination site might affect their health.

This health consultation summarizes the progress made on the recommendations presented in the 2007 Public Health Assessment (PHA). This includes an evaluation of the additional site data collected during the remedial investigation conducted at the site from January 2006 through August 2007 and a summary of the resulting actions taken by the United States Environmental Protection Agency (EPA) to protect public health.

Between February 2006 and March 2007, the EPA implemented an expanded soil vapor intrusion investigation at the Hopewell Precision Area Contamination site. During the course of the investigation, the EPA collected 208 sub-slab (below building) samples and 14 indoor air (inside building) samples from nearby residences.

The EPA defined the nature and extent of the groundwater and soil-vapor contamination from the Hopewell Precision site through the investigation of groundwater contamination and soil vapor. The result of this investigation forms the basis for the conclusions and recommendations in this document by ATSDR and DOH. The EPA issued a Record of Decision to bring a public water supply to the study area and a second Record of Decision to use aerobic cometabolic biodegradation to remediate the contaminated aquifer while continuing to monitor for and address any occurrences of soil vapor intrusion. Aerobic cometabolic biodegradation is a technology that accelerates contaminant degradation by enhancing the existing micro-organisms in the groundwater.

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### **CONCLUSION 1**

DOH and ATSDR conclude that, currently, site-related contamination is not expected to harm people's health from using water from private wells for drinking, bathing and cooking.

### **BASIS**

This is because treatment systems have been installed on private wells where contaminants were found to be above the DOH's Maximum Contaminant Levels (MCLs). These systems are monitored and maintained to make sure that contaminants remain below the MCLs. Health risks associated with past exposure to site-related chemicals in drinking water are estimated to be minimal to moderate for both cancer and non-cancer effects.

## **NEXT STEPS**

EPA and the New York State Department of Environmental Conservation (DEC) will maintain the installed treatment systems and monitor the quality of treated water until contaminant levels in the groundwater are below MCLs or until the planned public water supply system is installed and residences have been connected to it. Although all currently known exposures to site-related contaminants above MCLs have been mitigated, if new private wells are installed within the study area, additional treatment systems may be needed.

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## **CONCLUSION 2**

DOH and ATSDR conclude that breathing indoor air in buildings potentially affected by soil vapor contaminants is not expected to harm people's health.

## **BASIS**

This is because actions were taken to reduce exposure. Based on information gathered before and during the remedial investigation, public health actions were needed at the Hopewell Precision Area Contamination site to reduce exposure to site-related volatile organic compounds (VOCs) via inhalation. Health risks for past exposure to site-related chemicals in indoor air as a result of soil vapor intrusion are estimated to be minimal or low for both cancer and non-cancer effects.

## **NEXT STEPS**

EPA will maintain the soil vapor mitigation systems (sub-slab depressurization systems) until contaminated environmental media have been remediated and an evaluation has been performed to verify that the potential for exposure has been alleviated.

EPA will institute a periodic soil vapor intrusion sampling plan so that all homes in the study area will have been sampled at least once and that previously sampled homes will be revisited to determine if conditions have changed.

EPA has advised the Town of East Fishkill that anyone building a new home over the contaminant plume should install a sub-slab depressurization system to prevent or mitigate exposure to site-related contaminants.

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## **FOR MORE INFORMATION**

If you have questions about the investigation at the Hopewell Precision Area Contamination site, please contact the EPA at 1-212-637-4240. If you have questions about this health consultation or other health concerns about this site, please contact Kristin Kulow (DOH) at 1-607-432-3911.

## **BACKGROUND AND STATEMENT OF ISSUES**

### **A. Site Description and History**

The Hopewell Precision Area Contamination site is in the Hamlet of Hopewell Junction, Dutchess County, New York (Appendix A, Figure 1). The source of contamination is believed to be the Hopewell Precision facility, an active sheet metal fabrication and painting business. The facility, which opened in 1977, originally operated at 15 Ryan Drive but was moved to 19 Ryan Drive in 1981. Since 1981, a moving company has occupied the property at 15 Ryan Drive. The combined size of these two adjacent properties is 5.7 acres. The facility and the associated groundwater and soil vapor contamination plumes are in a semi-rural, mostly residential area.

The waste products associated with the Hopewell Precision Facility included paints, thinners, and degreasing solvents. Allegedly, paint and thinners were dumped directly to the ground outside of the building at 15 Ryan Drive on a daily basis and waste degreasing solvents were dumped on a biweekly basis. Proper disposal of trichloroethene (TCE) used in site operations could not be documented due to missing waste manifest documents. EPA first investigated this site in response to a letter written by a concerned citizen. EPA confirmed the allegations of dumping during a site inspection in November 1979. At that time, several punctured and leaking 55-gallon drums of various chemicals, and empty paint and solvent cans were identified on-site. A removal action was performed, which properly disposed of the identified waste. In March 1980, EPA sampled the on-site process well and found low-level volatile organic compound (VOC) contamination. The site was subsequently referred to DEC for further investigation.

DEC completed an investigation of the site in 1984 and again in 1987 (DEC, 1987). As part of these investigations, DEC installed three on-site groundwater monitoring wells in May of 1985. Subsequent sampling identified one well with 1,1,1-trichloroethane (1,1,1-TCA) at 23 micrograms per liter (mcg/L) and trace levels of other VOCs. In June 1985, the Dutchess County Health Department sampled four private wells (two residential and two businesses, including the Hopewell Precision on-site well). No VOCs were detected in any of the samples.

In April 1993, the site owners completed a limited site investigation which included sampling of the three previously installed groundwater monitoring wells and two residential private wells. DEC collected samples at the same time during this investigation. TCE was only detected in one on-site monitoring well at a level below the New York State Department of Health's MCLs for public water supplies. In 1994, based on the results of these investigations, DEC decided to remove the Hopewell Precision site from the New York State Registry of Inactive Hazardous Disposal Waste Sites.

In February 2003, as part of EPA's effort to make decisions about additional actions on former sites, they sampled 75 residential wells near the Hopewell Precision site. Analysis of the samples revealed that five residential wells were contaminated with TCE

at levels ranging from 1.2 mcg/L to 250 mcg/L. At that time, DEC, on behalf of the DOH, requested EPA conduct a removal action at the site (i.e., installation of point-of-entry treatment systems on residential wells). A removal action is a short-term measure taken to reduce human exposure.

EPA initiated the removal action at the site in March 2003. Subsequently, EPA expanded the scope of its investigation to include sampling of sub-slab soil vapor, indoor air, and additional drinking water wells. Prior to 2006, EPA collected sub-slab soil vapor samples from 206 buildings and indoor air samples from 103 buildings (mainly residential) located over the plume. Based on those results, EPA installed sub-slab depressurization systems at 46 buildings that were determined by EPA to be impacted or to have the potential to be impacted by soil vapor intrusion. A sub-slab depressurization system functions by applying a low level of suction or vacuum below the building's foundation. The vacuum created prevents vapors beneath the building from entering the structure and, instead, vents them to the outside.

As of the spring of 2006, 51 treatment systems for private drinking water (37 by EPA and 14 by DEC) had been installed to address the TCE contamination, 1,1,1-TCA contamination, or both. With the exception of one homeowner who has refused the installation of treatment systems to remove 1,1,1-TCA from their drinking water, no known completed exposure pathways to site-related contaminants in excess of the DOH MCLs exist for the site.

The DOH completed a PHA on September 28, 2007 (ATSDR 2007) to evaluate human exposure pathways for contaminants related to the Hopewell Precision Area Contamination site. This evaluation included data collected from 2003 to the spring of 2006. The DOH and ATSDR recommended that the EPA: finish defining the nature and extent of the groundwater and soil-vapor contamination from the Hopewell Precision site through the ongoing remedial investigation; maintain the installed sub-slab depressurization systems until the contamination levels are below EPA site-specific target levels; continue monitoring potentially affected private wells, soil vapor and indoor air in the area, with treatment systems or mitigation systems added as appropriate; and, consider a permanent, long-term remedy for groundwater users.

In addition, several public meetings have been conducted to answer health concerns raised by residents and to discuss the current activities taking place at the site. DOH and ATSDR also requested resident assistance in identifying their health care providers so that educational outreach to the health care providers could be targeted. Area physicians were informed of the availability of the "Physician Outreach Packet" which contains several informative ATSDR documents and reference material.

The DOH completed a health consultation; Health Statistics Review of Cancer and Birth Outcomes on December 15, 2010 (ATSDR 2010). The health statistics review looked at health outcomes among the population near the Hopewell Precision site and compared them with expected outcomes based on statewide data. A summary of these results is provided in the health outcome data evaluation section below.

The remedial investigation defined the nature and extent of the contamination at the study site. Based on those data, the EPA issued a Record of Decision in September 2008 (EPA 2008) to bring a public water supply to the study area and issued a July 2009 Record of Decision (EPA 2009) to use aerobic cometabolic biodegradation to remediate the contaminated aquifer while continuing to monitor for and address any occurrences of soil vapor intrusion. Aerobic cometabolic biodegradation is an innovative technology that accelerates contaminant degradation by enhancing the existing micro-organisms present in the groundwater.

## **B. Statement of Issues**

This health consultation summarizes the progress made on the recommendations presented in the 2007 PHA. This includes an evaluation of the additional site data collected during the Remedial Investigation conducted at the site from January 2006 through August 2007 and a summary of the resulting actions taken by the EPA to protect public health.

## **DISCUSSION**

### **A. Environmental Contamination and Exposure Pathways**

#### Private Drinking Water Wells

In August 2006, 48 residential wells in the southern portion of the groundwater contaminant plume were sampled (Appendix B, Table 1). The predominant contaminant in this portion of the groundwater plume is 1,1,1-TCA, which was detected in 25 percent, or 12 of the 48 wells, at levels ranging from 0.11J mcg/L to 2.2 mcg/L (“J” is used to denote an estimated value). Seventeen percent, or eight of the 48 wells, contained TCE at levels ranging from 0.13J mcg/L to 4.7 mcg/L. The levels of 1,1,1-TCA and TCE detected were below public drinking water standards and public health comparison values (Appendix B, Table 4).

In August 2007, 195 additional residential wells were sampled (Appendix B, Table 1). 1,1,1-TCA was detected in 12 percent, or 23 of the 195 wells, ranging in concentration from 0.5J mcg/L to 3.3 mcg/L. TCE was detected in eight percent, or 16 of the 195 wells, at levels ranging from 0.53 mcg/L to 7.4 mcg/L. The detection of 7.4 mcg/L for TCE was the only sample above the drinking water standard and public health comparison value (Appendix B, Table 4). A treatment system was subsequently installed at this residence.

Based on the data collected during the remedial investigation, the nature and extent of the groundwater contamination from the site has been defined and there are no current completed exposure pathways to site-related contaminants in drinking water at levels above public drinking water standards or public health comparison values.

## Soil Vapor / Indoor Air

The EPA's general approach for evaluating soil vapor intrusion at the Hopewell Precision Area Groundwater Contamination site was to screen using the sub-slab vapor sample results and, where values exceed screening criteria, follow up with indoor air and sub-slab vapor sampling.

In February and March 2006, 73 sub-slab vapor samples were collected by EPA from buildings located over the southern portion of the groundwater plume (Appendix B, Table 2). TCE was detected in two samples, one each from two homes, one at a concentration of 1.5 micrograms per cubic meter ( $\text{mcg}/\text{m}^3$ ) and one at  $18 \text{ mcg}/\text{m}^3$ . EPA's sub-slab screening criterion for TCE was  $2.7 \text{ mcg}/\text{m}^3$ . 1,1,1-TCA was detected at 31 sampling locations, none of which exceeded the EPA screening criterion of  $820 \text{ mcg}/\text{m}^3$ . Tetrachloroethene (PCE) was detected in 22 samples; none of which exceeded its EPA screening criterion of  $100 \text{ mcg}/\text{m}^3$ . Methyl-tert-butyl ether (MTBE) was detected in four sub-slab samples; none exceeded the EPA screening criterion of  $3.7 \text{ mcg}/\text{m}^3$ .

In February and March 2007, 135 sub-slab vapor samples were collected by EPA from buildings overlying the groundwater plume (Appendix B, Table 2). TCE was detected in 27 samples; 1,1,1-TCA was detected in 78 samples; and, PCE was detected in 53 sub-slab vapor samples.

Later in March 2007, EPA collected concurrent indoor air, sub-slab vapor, and ambient outdoor air samples from 14 buildings where previous sampling results indicated an exceedance of the sub-slab screening criteria in the February/March 2007 sampling event or where no sub-slab sample had been taken previously (Appendix B, Table 3). In addition, sub-slab only samples were collected from four other buildings also not previously sampled (not shown on Table 3). TCE was detected in 13 of 18 sub-slab vapor samples (11 in the buildings previously sampled); and in seven indoor air samples. Five of these indoor air TCE levels exceeded indoor air background levels (DOH 2005) for TCE ( $<1 \text{ mcg}/\text{m}^3$ ) and one ( $20 \text{ mcg}/\text{m}^3$  in building 5) exceeded the DOH air guideline value and the health comparison value (Appendix B, Table 5).

1,1,1-TCA was detected in 11 sub-slab vapor samples (all in the buildings previously sampled). 1,1,1-TCA was detected in four indoor air samples; none exceeded indoor air background levels ( $3 \text{ mcg}/\text{m}^3$ ) or the health comparison value.

PCE was detected in five sub-slab vapor samples (all in the buildings previously sampled) and was detected in five indoor air samples. PCE in indoor air exceeded indoor air background levels in one sample ( $98 \text{ mcg}/\text{m}^3$  in Building #7), however, this concentration is below DOH's guideline value for PCE of  $100 \text{ mcg}/\text{m}^3$ . A sub-slab depressurization system was not installed at Building #7 because it was found to contain a maintenance area within the single family residence that used PCE, which subsequently impacted soil vapor beneath the property. Guidance was presented to the owner on how to reduce exposure to PCE in indoor air.

Based on the sampling conducted during the remedial investigation, the EPA installed sub-slab depressurization systems in three residential buildings that were determined to be impacted or have the potential to be impacted by vapor intrusion, buildings: 2, 8 and 9 (Appendix B, Table 3). Additionally, one homeowner (Building 11) was offered a system, but refused installation; one home (Building 5) was determined to have an indoor source contributing to elevated TCE levels in indoor air. The EPA did not offer a system to the responsible party (Building 12) since they were the source of the site-related contamination and are currently an active manufacturing facility. The EPA will continue to sample buildings within the site study area and maintain the sub-slab depressurization systems it has installed.

The soil vapor intrusion pathway evaluation is on-going and EPA will continue to institute a periodic soil vapor intrusion sampling plan that will ensure all homes in the affected area have been sampled at least once and that revisits occur to previously sampled homes to ensure that conditions have not changed

## **B. Public Health Implications - Adult and Children's Health Concerns**

To evaluate the potential health risks from contaminants of concern associated with the exposure pathways identified for the Hopewell Precision Area Contamination site, DOH assessed the risks for cancer and non-cancer health effects. The risks for health effects depend primarily on contaminant concentration, exposure route, exposure frequency and exposure duration. There are two primary potential routes of exposure for the Hopewell Precision Area Contamination site: 1) past ingestion, dermal contact, and inhalation of volatile organic contaminants in private water supply wells; and 2) past inhalation of volatile organic contaminants in indoor air via soil vapor intrusion. Based on the analytical data collected during the initial investigation through the site remedial investigation, the cancer risks associated with past exposure to site-related contaminants detected in private water supply wells and indoor air range from low to moderate, and the non-cancer health risks range from minimal to moderate (Appendix C). Levels of contaminants and exposures found by EPA during the phase of the investigation reported in this health consultation are less than or the same as those evaluated by the DOH in the 2007 PHA. A detailed evaluation of health risks is presented in the 2007 PHA (ATSDR 2007).

## **C. Health Outcome Data Evaluation – Health Statistics Review of Cancer and Birth Outcomes**

The health consultation that DOH and ATSDR released in December 2010 included a birth outcomes review and cancer review (DOH 2010). The birth outcomes review showed numbers of premature births and male births (sex ratio) in the Hopewell study area were similar to expected numbers. The low birth weight and growth restriction outcome categories, which largely overlap, all showed deficits (fewer than expected numbers); the small for gestational age category showed a statistically significant deficit. The number of birth defects in the study area was similar to the number expected. There was no evidence of elevations of major heart defects or cleft palate, which are birth defects found in excess in other studies of VOC exposures. The pattern of specific types

of birth defects did not appear to be unusual. The total number of cancers diagnosed among residents of the study area was similar to the number expected and no specific type of cancer showed a statistically significant excess or deficit. This review found no excesses of lymphoma or kidney cancer, two types of cancer associated with VOC exposure in other studies. Esophageal cancer, associated with VOC exposures in some studies, was elevated in the study area, but the elevation was not statistically significant.

Responses to public comments and additional information about the geographic distribution of cancer cases within the Hopewell study area, an issue brought up at the public meeting in the Fall of 2009 and in comments on the draft report, are included in an appendix to the final report. In response to public comments, DOH conducted additional analyses of cancer with respect to distance from both the Hopewell Precision site and the area of groundwater contamination. We compared the location of households where an individual was diagnosed with cancer to the location of households without a diagnosis of cancer. By comparing these locations, we could determine if there was an unusual spatial pattern of households with cancer diagnoses. No statistically significant difference was observed between households with a cancer diagnosis and households without a cancer diagnosis with respect to distance from either the Hopewell Precision site or the area of groundwater contamination. For more information on the study area, timeframe, and limitations of this type of review, see the full report and information sheet (DOH 2010).

## **CONCLUSIONS**

DOH and ATSDR conclude that current ingestion of water from private water supply wells on the site or breathing indoor air within structures built on the site is not expected to harm people's health (Appendix D). Health risks associated with past exposure to site-related chemicals in drinking water are estimated to be minimal to moderate for both cancer and non-cancer effects. Furthermore, health risks for past exposure to site-related chemicals in indoor air as a result of soil vapor intrusion is estimated to be minimal or low for both cancer and non-cancer effects. Based on the additional information gathered during the remedial investigation, public health actions were needed at the Hopewell Precision Area Contamination site to reduce exposure to site-related VOCs, primarily TCE and 1,1,1-TCA. Exposure to TCE and 1,1,1-TCA was occurring via contaminated private well water and via soil vapor intrusion impacts to indoor air. Actions have been taken to reduce exposures to site-related contaminants (except for the individual that declined a system or had an indoor source), if new construction of buildings or installation of private wells occurs in areas overlying the contaminant plume, additional actions may be needed.

## **RECOMMENDATIONS**

1. Maintain installed treatment systems and monitor the quality of the treated water until contamination levels in groundwater are below DOH MCLs or until the planned public water supply system is installed and residences are connected to it.
2. Maintain and operate the soil vapor mitigation systems (sub-slab depressurization systems) until contaminated environmental media have been remediated and an evaluation has been performed to verify that the potential for exposure has been reduced or eliminated.
3. Continue EPA's periodic soil vapor intrusion sampling plan so that all homes in the study area will have been sampled at least once and that previously sampled homes will be revisited to determine if conditions have changed.

## **PUBLIC HEALTH ACTION PLAN**

The purpose of the Public Health Action Plan is to provide a plan of action designed to outline measures to be taken to mitigate exposure and reduce the potential for adverse human health effects resulting from the past, present, and/or future exposure to hazardous substances at or near the site. Included is a commitment on the part of ATSDR and/or DOH to follow up on this plan to ensure that it is implemented. The Public Health Action Plan for the Hopewell Precision Area Contamination site describes actions to be taken by ATSDR and/or DOH following completion of this health consultation. Please refer to the Background section of this health consultation for actions already taken at the site. The public recommended health actions to be implemented are as follows:

1. The EPA and DEC will continue to monitor and maintain the individual treatment systems installed on affected private wells until the planned public water supply system is installed and residences are connected to it.
2. The EPA will continue to monitor and maintain the sub-slab depressurization systems installed on affected homes.

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## **CERTIFICATION PAGE**

**APPENDIX A**  
**FIGURES**



FIGURE 1. SITE LOCATION MAP

Hopewell Precision Contamination Area Site  
Hopewell Junction, Dutchess County, New York





**APPENDIX B**  
**TABLES**



Table 1: Summary of EPA 2006/2007 Private Well Sampling Results for TCE and 1,1,1-TCA in 243 Homes in the Hopewell Precision Groundwater Contamination Area

*All values in micrograms per liter (mcg/L).*

Chemical	August 2006		August 2007	
	Detections	Concentration Range	Detections	Concentration Range
TCE	8/48	0.13J - 4.7	16/195	0.53 - 7.4
1,1,1-TCA	12/48	0.11J - 2.2	23/195	0.5J - 3.3

J - estimated value

Table 2: Summary of EPA 2006/2007 Sub-slab Soil Vapor Results for TCE and 1,1,1-TCA in Homes in the Hopewell Precision Groundwater Contamination Area

*All values in micrograms per cubic meter (mcg/m<sup>3</sup>).*

Chemical	Feb/March 2006 Sub-slab		Feb/Mar 1 <sup>st</sup> Round 2007 Sub-slab	
	Detections	Concentration Range*	Detections	Concentration Range*
TCE	2/73	1.5 - 18	27/135	1 - 280
1,1,1-TCA	31/73	0.88 - 270	78/135	0.76 - 120

\* levels shown are for detected concentrations only

Table 3: Summary of EPA March 2007 Soil Vapor Intrusion Investigation for TCE, 1,1,1-TCA, and PCE in Homes where Indoor Air was Sampled in the Hopewell Precision Groundwater Contamination area

All values in micrograms per cubic meter (mcg/m<sup>3</sup>).

Homes		Analyte		
		TCE	1,1,1-TCA	PCE
Building 1	Sub-slab	19	18	ND
	Indoor Air	ND	ND	ND
Building 2*	Sub-slab	6.4	42	6.3
	Indoor Air	2.3	ND	ND
Building 3	Sub-slab	33	21	ND
	Indoor Air	ND	ND	ND
Building 4	Sub-slab	0.24	3.2	8.3
	Indoor Air	ND	2.6	1.5
Building 5**	Sub-slab	1.4	31	ND
	Indoor Air	20	2.3	ND
Building 6	Sub-slab	ND	11	ND
	Indoor Air	ND	ND	1.6
Building 7***	Sub-slab	ND	5.9	560
	Indoor Air	1.5	1.5	98
Building 8*	Sub-slab	150	51	ND
	Indoor Air	0.89	ND	ND
Building 9*	Sub-slab	27	30	ND
	Indoor Air	1.0	0.86	1.1
Building 10	Sub-slab	ND	ND	1.5
	Indoor Air	ND	ND	5.9
Building 11+	Sub-slab	9.3	21	4.4
	Indoor Air	1.8	ND	ND
Building 12++	Sub-slab	12	ND	ND
	Indoor Air	3.5	ND	ND
Building 13	Sub-slab	4.9	51	ND
	Indoor Air	ND	ND	ND
Building 14	Sub-slab	2	ND	ND
	Indoor Air	ND	ND	ND

Shaded areas indicate data where actions were taken. See below for specific buildings and actions.

\* Buildings that received sub-slab depressurization systems.

\*\*Indoor source identified; no sub-slab depressurization system installed

\*\*\*PCE used on the property; no sub-slab depressurization system installed, but owner advised on ways to reduce exposures.

+Owner refused sub-slab depressurization system.

++ - Building was source of contamination and no sub-slab depressurization system offered.

ND - Not detected

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**Table 4: Water Quality Standards and Public Health Comparison Values  
Hopewell Precision Contamination Area**  
*All values in micrograms per liter (mcg/L)*

<b>Contaminant</b>	<b>Water Quality Standards</b>				<b>Comparison Values*</b>			
	<b>New York State</b>		<b>EPA</b>					
	<b>Ground Water</b>	<b>Surface Water</b>	<b>Drinking Water</b>	<b>Drinking Water</b>	<b>Cancer Basis**</b>	<b>Noncancer Basis**</b>		
1,1,1-trichloroethane	5	5	5	200	--	--	1960	EPA RfD
trichloroethene	5	5	5	5	6	NYS CPF	10	HealthCanada RfD

\* Comparison values determined for a 70-kilogram adult who drinks 2 liters of water per day. The cancer comparison value is the water concentration that provides an intake corresponding to an increased cancer risk of one-in-one-million after a lifetime (70 years) of exposure. Non-cancer comparison values assume a relative source contribution of 20% of the RfD from drinking water.

\*\* Health Canada RfD: Health Canada Reference Dose  
 NYS CPF: New York Cancer Potency Factor  
 EPA RfD: U.S. Environmental Protection Agency Reference Dose (Region 3)



**Table 5: Indoor Air Background Levels and Public Health Comparison Values  
Hopewell Precision Contamination Area**

*All values in micrograms per cubic meter (mcg/m<sup>3</sup>)*

<b>Contaminant</b>	<b>Indoor Air** Background Level</b>	<b>NYS Air Guidelines</b>	<b>Comparison Values*</b>			
			<b>Cancer</b>	<b>Basis***</b>	<b>Noncancer</b>	<b>Basis***</b>
1,1,1-trichloroethane	3	--	--	--	2200	EPA RfC
trichloroethene	<1	5	0.3 to 7.8	DOH UR	10	DOH RfC
tetrachloroethene	<10	100	1	DOH UR	100	DOH RfC

\* The cancer comparison values is the air concentration corresponding to an increased lifetime (70 years) cancer risk of one-in-one-million. The range of cancer comparison values is based on the range for several estimates of cancer potency for TCE derived by the New York State Department of Health (NYS DOH, 2006). Estimated health risks are based on the highest of these estimates of cancer potency for TCE.

\*\* From: <http://www.nyhealth.gov/environmental/indoors/air/contaminants/>

\*\*\* DOH UR: New York State Department of Health Unit Risk  
DOH RfC: New York State Department of Health Reference Concentration  
EPA RfC: U.S. Environmental Protection Agency Reference Concentration (Region 3)



## **APPENDIX C**

DOH Procedure for Evaluating Potential Health Risks  
for Contaminants of Concern

## Appendix C

### DOH PROCEDURE FOR EVALUATING POTENTIAL HEALTH RISKS FOR CONTAMINANTS OF CONCERN

To evaluate the potential health risks from contaminants of concern associated with the Hopewell Precision site, the DOH assessed the risks for cancer and non-cancer health effects.

Increased cancer risks were estimated by using site-specific information on exposure levels for the contaminant of concern and interpreting them using cancer potency estimates derived for that contaminant by the EPA or, in some cases, by the DOH. The following qualitative ranking of cancer risk estimates, developed by the DOH, was then used to rank the risk from very low to very high. For example, if the qualitative descriptor was "low," then the excess lifetime cancer risk from that exposure is in the range of greater than one per million to less than one per ten thousand. Other qualitative descriptors are listed below:

#### Qualitative Descriptors for Excess Lifetime Cancer Risk

<u>Risk Ratio</u>	<u>Qualitative Descriptor</u>
equal to or less than one per million	very low
greater than one per million to less than one per ten thousand	low
one per ten thousand to less than one per thousand	moderate
one per thousand to less than one per ten	high
equal to or greater than one per ten	very high

An estimated increased excess lifetime cancer risk is not a specific estimate of expected cancers. Rather, it is a plausible upper-bound estimate of the probability that a person may develop cancer sometime in his or her lifetime following exposure to that contaminant.

There is insufficient knowledge of cancer mechanisms to decide if there exists a level of exposure to a cancer-causing agent below which there is no risk of getting cancer, namely, a threshold level. Therefore, every exposure, no matter how low, to a cancer-causing compound is assumed to be associated with some increased risk. As the dose of a carcinogen decreases, the chance of developing cancer decreases, but each exposure is accompanied by some increased risk.

There is general consensus among the scientific and regulatory communities on what level of estimated excess cancer risk may be judged acceptable. An increased lifetime cancer

risk of one in one million or less is generally considered negligible and not a public health concern. The level of risk is typically used as a "target level," "screening level," or "goal", which when exceeded does not necessarily imply that risk reduction measures should be pursued but will trigger more careful evaluation of the situation. Cancer risks greater than one in ten thousand ( $10^{-4}$ ), on the other hand, typically trigger actions to lower exposures. When cancer risk estimates are between one in one million ( $10^{-6}$ ) and one in ten thousand ( $10^{-4}$ ), a risk management decision must be made on a case-by case basis whether or not to pursue risk reduction measures. The one in one million ( $10^{-6}$ ) risk level is used as a starting point for analysis of remedial alternatives which reflects a preference for managing risks at the more protective end of the risk range, all other things being equal. The ultimate risk management decision should consider judgments on not only the strength of the scientific evidence regarding carcinogenicity, but also the actual potential for chronic or lifetime exposure, other sources and levels of everyday exposure, our ability to detect the chemical, the availability and costs of risk reduction options, the societal benefits of the regulated activity, compliance with existing regulations, and, in many cases, the risks, benefits and costs of alternatives.

For non-carcinogenic health risks, the contaminant intake was estimated using exposure assumptions for the site conditions. This dose was then compared to a risk reference dose (estimated daily intake of a chemical that is likely to be without an appreciable risk of health effects) developed by the EPA, ATSDR and/or DOH. The resulting ratio was then compared to the following qualitative scale of health risk:

Qualitative Descriptors for Non-carcinogenic Health Risks

<u>Ratio of Estimated Contaminant Intake to Risk Reference Dose</u>	<u>Qualitative Descriptor</u>
equal to or less than the risk reference dose	minimal
greater than one to five times the risk reference dose	low
greater than five to ten times the risk reference dose	moderate
greater than ten times the risk reference dose	high

Non-carcinogenic effects, unlike carcinogenic effects, are believed to have a threshold, that is, a dose below which adverse effects will not occur. As a result, the current practice is to identify, usually from animal toxicology experiments, a no-observed-effect-level (NOEL). This is the experimental exposure level in animals at which no adverse toxic effect is observed. The NOEL is then divided by an uncertainty factor to yield the risk reference dose. The uncertainty factor is a number that reflects the degree of uncertainty that exists when experimental animal data are extrapolated to the general human

population. The magnitude of the uncertainty factor takes into consideration various factors such as sensitive sub-populations (for example, children or the elderly), extrapolation from animals to humans and the incompleteness of available data. Thus, the risk reference dose is not expected to cause health effects because it is selected to be much lower than dosages that do not cause adverse health effects in laboratory animals.

The measure used to describe the potential for non-cancer health effects to occur in an individual is expressed as a ratio of estimated contaminant intake to the risk reference dose. A ratio equal to or less than one is generally not considered a significant public health concern. If exposure to the contaminant exceeds the risk reference dose, there may be concern for potential non-cancer health effects because the margin of protection is less than that afforded by the reference dose. As a rule, the greater the ratio of the estimated contaminant intake to the risk reference dose, the greater the level of concern. This level of concern depends upon an evaluation of a number of factors such as the actual potential for exposure, background exposure and the strength of the toxicologic data.

## **APPENDIX D**

### Conclusion Categories and Hazard Statements

## Conclusion Categories and Hazard Statements

ATSDR has five distinct descriptive conclusion categories that convey the overall public health conclusion about a site or release, or some specific pathway by which the public may encounter site-related contamination. These defined categories help ensure a consistent approach in drawing conclusions across sites and assist the public health agencies in determining the type of follow-up actions that might be warranted. The conclusions are based on the information available to the author(s) at the time they are written.

### **1. Short-term Exposure, Acute Hazard “ATSDR concludes that...could harm people’s health.”**

This category is used for sites where short-term exposures (e.g. < 1 yr.) to hazardous substances or conditions could result in adverse health effects that require rapid public health intervention.

### **2. Long-term Exposure, Chronic Hazard “ATSDR concludes that...could harm people’s health.”**

This category is used for sites that pose a public health hazard due to the existence of long-term exposures (e.g. > 1 yr.) to hazardous substance or conditions that could result in adverse health effects.

### **3. Lack of Data or Information “ATSDR cannot currently conclude whether...could harm people’s health.”**

This category is used for sites in which data are insufficient with regard to extent of exposure and/or toxicologic properties at estimated exposure levels to support a public health decision.

### **4. Exposure, No Harm Expected “ATSDR concludes that ... is not expected to harm people’s health.”**

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.

### **5. No Exposure, No Harm Expected “ATSDR concludes that ...will not harm people’s health.”**

This category is used for sites that, because of the absence of exposure, are not expected to cause any adverse health effects.

## **APPENDIX E**

### Comment Form

**New York State Department of Health  
Draft Health Consultation - Comment Form  
Hopewell Precision Area Contamination**

Thank you for reviewing the draft health consultation. The public comment period gives you a chance to let us know if you have questions or additional information related to the site that should be included in this report. This reply form is broken into three sections - optional information (to update our mailing list), general comments (how helpful is the information to you) and specific comments (specific to the main sections in the report). Please write any questions or comments in the appropriate spaces below.

**Please return your completed form by October 14, 2011.** Additional information and documents about this site can be found at the New York State Department of Health (NYSDOH) website at: <http://www.health.ny.gov/environmental/investigations/hopewell/>

**Optional Information**

First Name \_\_\_\_\_ Last Name \_\_\_\_\_

Address \_\_\_\_\_

Contact number (with best time to reach you) \_\_\_\_\_

E-mail Address \_\_\_\_\_

**General Comments**

1. Was the information in this health consultation clear and understandable?

(Rate on a scale of 1 to 5, please circle your choice)

Not clear and understandable      1 ..... 2 ..... 3 ..... 4 ..... 5      Very clear and understandable

2. Does the document take into account all relevant site information?

(Check one)     Yes     No     Not sure

If no, please tell us what's missing \_\_\_\_\_

3. Does the document identify and respond to community concerns, including your own concerns?

(Check one)     Yes     No     Not sure

If no, please tell us what concerns are missing \_\_\_\_\_

4. After reading this document, do you have a better understanding of how the site might affect your or your community's health? (Rate on a scale of 1 to 5, please circle your choice)

Do not have a better understanding.....1 ..... 2 ..... 3 ..... 4 ..... 5 .....Have a much better understanding

### Specific Comments

Note: Please refer to page numbers in the report when writing your comments

SUMMARY Section: \_\_\_\_\_  
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BACKGROUND AND STATEMENT OF ISSUES Section: \_\_\_\_\_  
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DISCUSSION Section: \_\_\_\_\_  
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CONCLUSIONS Section: \_\_\_\_\_

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RECOMMENDATIONS Section: \_\_\_\_\_

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PUBLIC HEALTH ACTION PLAN Section: \_\_\_\_\_

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OTHER: \_\_\_\_\_

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Please return your completed comment form to:

New York State Department of Health  
Bureau of Environmental Exposure Investigation  
Flanigan Square, 547 River Street, Room 300  
Troy, NY 12180-2216

OR

Fax#: (518) 402-7859

For questions and concerns, please call the NYSDOH at (518) 402-7880 or [email@atsdr@health.state.ny.us](mailto:email@atsdr@health.state.ny.us)