



Public Health Assessment for

**CROWN CLEANERS SITE
(a/k/a CROWN CLEANERS OF WATERTOWN INCORPORATED)
CARTHAGE, JEFFERSON COUNTY, NEW YORK
EPA FACILITY ID: NYD986965333
SEPTEMBER 29, 2003**

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE**

Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

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

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

Agency for Toxic Substances & Disease Registry Julie L. Gerberding, M.D., M.P.H., Administrator
Howard Frumkin, M.D., Dr.P.H., Director

Division of Health Assessment and Consultation..... William Cibulas, Jr., Ph.D., Director
Sharon Williams-Fleetwood, Ph.D., Deputy Director

Health Promotion and Community Involvement BranchSusan J. Robinson, M.S., Chief

Exposure Investigations and Consultation Branch.....Susan M. Moore, Ph.D., Chief

Federal Facilities Assessment Branch Sandra G. Isaacs, B.S., Chief

Superfund and Program Assessment BranchRichard E. Gillig, M.C.P., Chief

Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Additional copies of this report are available from:
National Technical Information Service, Springfield, Virginia
(703) 605-6000

You May Contact ATSDR TOLL FREE at
1-888-42ATSDR
or
Visit our Home Page at: <http://www.atsdr.cdc.gov>

PUBLIC HEALTH ASSESSMENT

CROWN CLEANERS SITE
(a/k/a CROWN CLEANERS OF WATERTOWN INCORPORATED)

CARTHAGE, JEFFERSON COUNTY, NEW YORK

EPA FACILITY ID: NYD986965333

Prepared by:

New York State Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

TABLE OF CONTENTS

SUMMARY	1
BACKGROUND AND STATEMENT OF ISSUES.....	4
A. Site Description and History	4
B. Site Visit.....	5
C. Demographics.....	5
DISCUSSION	6
A. Environmental Contamination	6
B. Exposure Pathways	7
C. Toxicological and Epidemiological Evaluation for Adult and Children=s Health Issues	8
D. ATSDR Child Health Considerations	10
E. Health Outcome Data	11
COMMUNITY HEALTH CONCERNS	12
CONCLUSIONS.....	12
RECOMMENDATIONS	13
PUBLIC HEALTH ACTION PLAN.....	14
REFERENCES	16
PREPARERS OF REPORT.....	17
CERTIFICATION	18
APPENDIX A--TABLES	19
APPENDIX B--FIGURE.....	21
APPENDIX C--NYS DOH PROCEDURE FOR EVALUATING POTENTIAL HEALTH RISKS FOR CONTAMINANTS OF CONCERN	23
APPENDIX D--INTERIM PUBLIC HEALTH HAZARD CATEGORIES	26
APPENDIX E--ATSDR GLOSSARY OF TERMS.....	28
APPENDIX F - SUMMARY OF PUBLIC COMMENTS AND RESPONSES	43

SUMMARY

Crown Cleaners was proposed for inclusion on the National Priorities List (NPL) in September 2001 and was added to the NPL in September 2002. The site is also a listed inactive hazardous waste site on the New York State Registry of Inactive Hazardous Waste Sites. A dry cleaning and laundry operation was located in a deteriorating old mill building on the northern bank of the Black River in the Village of Herrings, Jefferson County, from the early 1980's until 1991. Improper disposal of the dry cleaning solvent, tetrachloroethene, and spent filters from the dry cleaning operation contaminated soil and groundwater at the site. The Herrings public water supply well, just north of the facility, was found to be contaminated with tetrachloroethene in April, 1991. Treatment was installed on the public system in July 1991. Continuous pumping of the Village well, due in part to leaks in the distribution system, caused a cone of depression extensive enough to pull contaminated water from the site in an upgradient direction away from the Black River and into the municipal well.

One private well just outside the Village service area to the west was also found, in a 1991 sampling survey, to be contaminated with tetrachloroethene at levels exceeding those at the Village well. Subsequent sampling in 1997 found three new private wells with much lower levels of tetrachloroethene to the west of the Village. Individual household treatment systems have been provided for these four wells. Available information does not confirm that the Crown Cleaners site is the source of the private well contamination.

A state superfund Remedial Investigation began at Crown Cleaners in 1998. The NYS Department of Environmental Conservation (NYS DEC) removed some waste materials that year. In 2000 the US Environmental Protection Agency (US EPA) removed asbestos and other wastes. Site referral to the NPL in September 2001 allowed for US EPA investigation and identification of possible sources of contamination of the Village well and to the cluster of private wells to the west of the Village.

People were exposed in the past to contaminants in drinking water, both public and private. Exposures have been reduced by treatment installed at the impacted wells. Residents with contaminated water were exposed in several ways to the chemicals in their water including: ingestion - consuming the water by drinking it and cooking with it; inhalation - chemicals evaporating in the air may be breathed during bathing, showering, or using hot water in household chores; and by direct contact with the skin. Residents are concerned about possible health effects from these exposures. A fact sheet and water consumption advisory was distributed in 1991 and there have been two public meetings to discuss health concerns with the public, one in 1998 and one in 2000.

Because there is limited historical sampling data for the Village well, we do not know exactly how long consumers of the public water supply had been using contaminated drinking water. However, because the approximate time that the dry cleaner began operation is known, we know that the maximum period of time would not exceed 11 years. Since the source or sources of the tetrachloroethene in the private wells have not been determined, we do not know how long one

well was contaminated. Two other wells were drilled between 1991 and 1997 and an apartment house was unoccupied until 1997, allowing for an estimate of duration for potential exposure.

For an undetermined period of time, public and private water supply wells in the Village of Herrings have been contaminated with tetrachloroethene, which was detected above the New York State drinking water standard and public health assessment comparison values. Trichloroethene was also detected in one private well above its New York State drinking water standard and public health assessment comparison values. Scientific studies indicate that exposure to elevated levels of tetrachloroethene and/or trichloroethene for long periods of time can increase the risk of adverse health effects, including certain forms of cancer and effects on the liver, kidney and nervous system. The maximum amount of time people who used public water could have been exposed to tetrachloroethene originating from this facility is about 11 years. The average level detected in the Village well was 19 micrograms per liter (mcg/L). Based on the results of epidemiology studies and studies in animals, people drinking public water containing tetrachloroethene at an average level of 19 mcg/L for 11 years are estimated to have a low increased risk for cancer. The risks for noncancer health effects would be minimal.

Four private water supply wells contained tetrachloroethene contamination. An association between the contamination in any of the private wells and the Crown Cleaners site has not been made based on the available hydrogeological information. For three of these wells, the average levels of tetrachloroethene detected ranged from 2 to 12 mcg/L. The remaining well averaged 50 mcg/L. People drinking water from the private wells containing tetrachloroethene at the average level detected for five years (the maximum amount of time three of the wells have been used) or as much as 30 years are estimated to have a low increased risk for cancer. One well also contained trichloroethene that was detected on two occasions, at 0.5 mcg/L and 27 mcg/L. Exposure to the average level of trichloroethene (14 mcg/L) in this private well for 30 years is estimated to pose a low increased risk for cancer. The risks for noncancer health effects would be minimal for tetrachloroethene and low for trichloroethene.

The NYS DOH has not evaluated health outcome data specifically for the Village of Herrings. While residents may have been exposed to tetrachloroethene for up to 11 years, there is little information about level and duration of the past exposures. NYS DOH will consider evaluating health outcome data if additional information becomes available. The NYS DOH developed a registry of individuals in New York State who have been exposed to volatile organic compounds (VOCs) through contamination of drinking water or indoor air. Because residents of the Village of Herrings may have been exposed to tetrachloroethene in their drinking water for up to 11 years they will be considered for inclusion in the Registry.

The Village of Herrings falls within ZIP code 13619. Of the cancers investigated as part of the Cancer Surveillance Improvement Initiative, colorectal cancer in females was found at levels significantly higher than expected in this area of the State. Known risk factors for colorectal cancer include a family history of the disease, intestinal polyps and inflammatory bowel disease. Behavioral risk factors associated with colorectal cancer include sedentary lifestyle and high-fat, low-fiber diets. There is also some evidence of a weak association between environmental

exposures such as exposure to high levels of disinfection by-products in drinking water and an elevated risk of colorectal cancer. There is little evidence, however, of an association between environmental exposure to tetrachloroethene and colorectal cancer, although a weak association between tetrachloroethene and colorectal cancer has been observed in several occupational studies of workers in the dry-cleaning industry (ATSDR, 1997a).

The primary recommendation of this Public Health Assessment is to minimize exposure to contaminated groundwater in the community by providing alternative sources of potable water. Treatment systems with proper operation, maintenance and monitoring have been made available for all contaminated wells. Because of the measures already taken to reduce people=s exposure to VOC contamination in their drinking water, the Crown Cleaners site is currently no apparent public health hazard.

The public was invited to review the draft of this public health assessment during the public comment period which ran from June 30, 2003 to July 31, 2003. A summary of the comments received and the responses are found in Appendix F.

BACKGROUND AND STATEMENT OF ISSUES

The New York State Department of Health, under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), produced this Public Health Assessment in response to a congressional mandate for a public health assessment for each site proposed for inclusion in the National Priorities List (NPL). The Crown Cleaners site was proposed to the NPL on September 13, 2001 and was added to the NPL in September 2002.

A. Site Description and History

The Crown Cleaners site is a 9.82 acre parcel on New York State Route 3 in the Village of Herrings, Town of Wilna, Jefferson County, listed on the NYS Registry of Inactive Hazardous Waste Sites. The site is bordered on the south by the Black River, on the east by a county-managed park, on the west by homes and the Village of Herrings, and on the north by the Village hall and the Village public water supply (Figure 1). The site includes a large and structurally deteriorating former paper mill, constructed in 1890 by the St. Regis Paper Company, and subsequently operated by Champion Paper. The mill was given to the Carthage Development Commission in the 1960's and became the home of a manufacturer of military clothing. The property was sold to Crown Cleaners of Watertown, Inc. in the late 70's. Crown Cleaners operated a laundry and dry cleaners in the western end of the building from the early 1980's to 1991. The Fort Drum Military Reservation was a major client. Crown Cleaners used about 55 gallons of tetrachloroethene (PCE) per year.

The Village water supply is a small municipal supply, serving about 50 homes and several businesses from a 150 foot deep rock well. It is located across NYS Rte 3 from the cleaners and about 300 feet away. In April of 1991, the New York State Department of Health (NYS DOH) required the first routine monitoring for volatile organic compounds (VOCs). Tetrachloroethene, a chlorinated solvent commonly used by dry cleaners, was detected at 17 micrograms per liter (mcg/L). Subsequent samples taken in May and June detected 19 mcg/L, 19 mcg/L, and 19.5 mcg/L of tetrachloroethene. Notification was made to consumers with an advisory stating that although the level of exposure to tetrachloroethene was relatively low, residents might want to take practical measures to reduce exposure. The NYS DOH requested that the New York State Department of Environmental Conservation (NYS DEC) provide bottled water for drinking, and subsequently, install a granular activated carbon (GAC) treatment system on the Village well. The GAC system was installed and operational in July 1991. A preliminary investigation performed on behalf of NYS DEC indicated poor disposal practices at Crown Cleaners, thereby causing a release of tetrachloroethene to the environment.

In June 1991, staff from the NYS DOH Watertown District Office contacted residents to the east and west of the Village who obtained their drinking water from private wells and sampled water from eight wells nearest to the ends of the Village system service area. One well about 2200 feet west of the site was contaminated at levels higher than those at the Village well. Because of the higher concentrations, its remote location, and intervening drainage features, another source is suspected but has not been identified. Subsequent sampling in that area in 1997 and 1998 found

three more wells with low levels of tetrachloroethene. Two of those wells were drilled since 1991 and one served a small apartment house not occupied previously. The NYS DEC has provided individual household GAC systems for those four wells.

A state superfund Remedial Investigation (RI) began at Crown Cleaners in 1998. NYS DEC contractors removed some waste materials in 1998; however, the site was referred to the US Environmental Protection Agency (US EPA) in June of 2000 for removal of asbestos from the building. Site referral to the National Priorities List (NPL) in September 2001 allowed for US EPA investigation and identification of possible sources of contamination to the Village well and to the cluster of private wells to the west of the Village.

B. Site Visits

NYS DOH staff from the Watertown District Office and the Central New York (CNY) Regional Office visited the site and the Village on numerous occasions since the discovery of tetrachloroethene in the Village well in 1991. A fact sheet and public notification was distributed in 1991; NYS DOH has participated in two public meetings, October 6, 1998 and November 29, 2000. The most recent site visit was in July 2000, when NYS DOH staff accompanied NYS DEC on a site tour intended to familiarize the US EPA project management and contractors with the site, its history, and environs. Over the past 10 years, staff have observed further deterioration of the mill building. The facility would present numerous physical hazards to trespassers; however, the US EPA has recently removed an unstable smokestack and repaired the chain link fence surrounding the property. Gregory Rys of the NYS DOH visited the site and sampled water from a private well of a nearby resident on July 23, 2003. At the time of the visit, the site perimeter fence appeared to be intact.

C. Demographics

The NYS DOH estimated, from the 2000 Census (US Bureau of the Census 2001) that 129 people live in the Village of Herrings, Jefferson County, NY. The age distribution of the village is somewhat younger than that of the New York State. There were 26 females of reproductive age (ages 15-44) in the village. The area within one mile of the site has a similar ethnic makeup compared to the rest of the county and state (excluding NYC) with the exception of Native Americans who make up a larger percentage of the population of the Village. Based on the 2000 Census (US Bureau of the Census 2002), the median household income is lower than the rest of the state but similar to the rest of Jefferson County. These comparisons are provided in the following table. In addition, there are no schools or nursing homes in the village.

2000 Census Demographics	New York State excluding NYC	Jefferson County	Area within 1 mile of Crown Cleaners
Age Distribution			
<6	8%	9%	11%
6-19	20%	21%	24%
20-64	58%	59%	61%
>64	14%	11%	5%
Race Distribution			
White	85%	88%	87%
Black	8%	6%	5%
Native American	<1%	<1%	5%
Asian	2%	1%	<1%
Pacific Islander	<1%	<1%	<1%
Other	2%	2%	2%
Multi-Racial	2%	2%	2%
Percent Minority*	18%	13%	14%
Ethnicity Distribution			
Percent Hispanic	6%	4%	2%
1999 Median Income	\$47,517	\$34,006	\$33,750
% Below Poverty Level	10%	13%	11%

* Minority includes Hispanics, African-Americans, Asian-Americans, Pacific Islanders and Native Americans.

DISCUSSION

A. Environmental Contamination

Preliminary investigations in 1991 and 1992 found disposal of waste water and sludges from the laundry and dry cleaning processes into concrete bunkers (pits) in the building. These bunkers appear to be constructed directly on the bedrock, increasing the potential for chemicals to enter cracks and fissures in the limestone bedrock. Spent filters from dry cleaning machines were dumped on the ground outside the rear doors of the buildings, thereby contaminating soil with tetrachloroethene and its breakdown products (trichloroethene and total 1,2-dichloroethene). Groundwater in on-site shallow monitoring wells contained tetrachloroethene as high as 6100 mcg/L.

Village of Herrings Well

Though the groundwater flow direction at the site is south-southwest (SSW) towards the Black River, pumping of the Village well may have caused a cone of depression which drew contaminated groundwater from the site north into the well. In 1991, the Village system had numerous leaks and the well was pumped fairly continuously. Once leaks were repaired and the

pumping schedule decreased, levels of tetrachloroethene in untreated water from the Village well dropped from a high of 61 mcg/L in December 1991 to non-detectable level (<0.5 mcg/L) in raw water by 1997. Trichloroethene (TCE) has not been detected in this well.

Since public notification occurred June 12th, 1991, and treatment was installed in July, the only available data from which to assess the significance of exposure to tetrachloroethene in Village water were those obtained from mid-April through June (four samples, averaging 19 mcg/L in concentration of tetrachloroethene).

Private Wells

Tetrachloroethene levels in raw water from only one of the private wells, the one discovered in 1991 (#1), have been consistently above the New York State Part 5 drinking water maximum contaminant level (MCL) of 5 mcg/L. Data for untreated water over the period from June 1991 through September 2001 show great variability and no trends (less than (<) 0.5 mcg/L to an (estimated) 240 mcg/L; averaging 50 mcg/L).

Previous to the installation of household treatment (June 1991-August 1997), concentrations varied from <0.5 mcg/L to 80 mcg/L, averaging 33 mcg/L. The consumption advisory distributed to consumers of the public water supply was shared with the resident in 1991, when tetrachloroethene contamination was first discovered. Trichloroethene (TCE) was detected twice in this well, in December 1992 at 27 mcg/L and in July 1997 at 0.5 mcg/L. The New York State Part 5 drinking water MCL for trichloroethene is 5 mcg/L. The federal MCLs for tetrachloroethene and trichloroethene are also 5 mcg/L.

From discovery to treatment (August 1997-December 1997) levels of tetrachloroethene varied in well #2 from 0.9 mcg/L initially to 7.2 mcg/L in December, averaging 3.3 mcg/L. From discovery to treatment (August 1997-November 1997) levels of tetrachloroethene in well #3 varied from 10 mcg/L initially, to 15 mcg/L in October, to 9.5 mcg/L in November, averaging 12 mcg/L. From discovery to treatment (July 1998-March 2000), levels of tetrachloroethene in well #4 varied from trace (0.7 mcg/L) initially to a high of 3.6 mcg/L in May 1999, averaging 2 mcg/L. The source of the tetrachloroethene in these private wells is under investigation. Available information does not indicate a hydraulic connection between wells at the Crown Cleaners site and the western wells. Contamination has not been detected in surrounding private wells and private wells on the east side of the Village. Trichloroethene has not been detected in any of the three other contaminated private wells.

B. Exposure Pathways

People were exposed in the past to contaminants in drinking water supplies, both public and private. Treatment systems installed on the contaminated wells have reduced exposure. Homeowners with contaminated water were exposed in several ways to the chemicals in their water. These include: ingestion - consuming the water by drinking it and cooking with it; inhalation - chemicals evaporating into the air may be breathed in during bathing, showering, or using water in household chores; and, by direct contact with the skin.

Because we have limited historical sampling data for the Village well, we do not know for exactly how long consumers of the public water supply had been using contaminated drinking water. However, because the approximate time that the dry cleaner began operation is known (early 1980's), we estimate the maximum time period to be eleven years..

Since the source of the tetrachloroethene contamination in the private wells has not been determined, we do not know how long well #1 was contaminated. Wells # 2 and 3 were drilled between 1991 and 1997 and the apartment house (#4) was unoccupied until 1997, allowing for an estimate of duration for potential exposure.

C. Toxicological and Epidemiological Evaluation for Adult and Children=s Health Issues

To evaluate the potential health risks from contaminants associated with the human exposure pathways identified for the Crown Cleaners site, the NYS DOH assessed the risks for cancer and noncancer health effects. The health effects are related primarily to contaminant concentration, exposure pathway, exposure frequency and exposure duration. Chronic exposure to chemicals in drinking water is possible by ingestion, and also by dermal contact and inhalation from water uses such as showering, bathing and cooking. Accordingly, the NYS DOH doubled the concentrations of the volatile organic chemicals detected in drinking water to account for possible additional exposures via the inhalation and dermal routes. Although exposure varies depending on an individual's lifestyle, each of these exposure routes can contribute to the overall daily intake of contaminants and, thus, may increase the risk for chronic health effects. For additional information on how the NYS DOH determined and qualified health risks applicable to this health consultation, refer to Appendix C.

For an undetermined period of time, public and private water supply wells in the Village of Herrings have been contaminated with tetrachloroethene, which was detected above the New York State drinking water standard and public health assessment comparison values (see Table 1). Trichloroethene was also detected in one private well above its New York State drinking water standard and public health assessment comparison values (see Table 1, Appendix A). These contaminants are therefore selected for further evaluation.

Studies of workers exposed to tetrachloroethene and/or trichloroethene and lower amounts of other chemicals show an association between exposure to high levels of these chemicals and increased risks of certain forms of cancer, including kidney, cervical, esophageal, bladder, liver and non-Hodgkin's lymphoma (ATSDR 1997a, b). These associations are unlikely to be due to chance; however, the role of other factors in causing these cancers, including exposures to other potential cancer-causing chemicals, is not fully known. Thus, these data suggest, but do not prove, that tetrachloroethene and trichloroethene cause cancer in humans. Other studies show that people living in communities with drinking water supplies contaminated by mixtures of chemicals including tetrachloroethene and trichloroethene have higher risks of certain types of cancer (e.g., non-Hodgkin's lymphoma) than do people living in communities with uncontaminated drinking water. These studies are weaker than those of workers largely because we do not know for certain whether the people who got cancer actually drank the contaminated water for long periods of time before they got cancer. Tetrachloroethene and trichloroethene cause cancer in laboratory animals exposed to high levels over their lifetimes (ATSDR 1997a,

b). Chemicals that cause cancer in laboratory animals may also cause cancer in humans who are exposed to lower levels over long periods of time.

Exposure to high levels of tetrachloroethene and trichloroethene is also known to produce a variety of humans noncarcinogenic health effects, primarily on the liver, kidney and nervous system (ATSDR 1997a,b). In humans, the potential health effects for tetrachloroethene exposure include changes in electrical measurements of nervous system activity, mild and reversible effects on nervous system performance, and central nervous system symptoms such as dizziness (Stewart, et al., 1970; Hake et al., 1977; Altmann et al., 1990, 1992, 1995; Cavalleri, 1994).

Four samples taken in 1991 from the Village of Herrings public water supply well contained 17 mcg/L, 19 mcg/L, 19 mcg/L and 19.5 mcg/L tetrachloroethene. The average level of tetrachloroethene for these samples is 19 mcg/L. The Crown Cleaners facility began operating in the early 1980's, and the contamination was discovered and mitigated in 1991. Therefore, the maximum amount of time people who used public water could have been exposed to tetrachloroethene originating from this facility is about 11 years. Based on the results of epidemiology studies and studies in animals, people drinking public water containing tetrachloroethene at an average level of 19 mcg/L for 11 years are estimated to have a low increased risk for cancer. The actual increase in cancer risk for tetrachloroethene in drinking water is difficult to estimate because we do not know how long or to what levels people were exposed prior to the time the contamination was discovered. The risks for noncancer health effects would be minimal.

Four private water supply wells contained tetrachloroethene contamination. An association between the contamination in any of the private wells and the Crown Cleaners site has not been made based on the available hydrogeological information. For three of these wells, the levels of tetrachloroethene detected ranged from 0.7 to 15 mcg/L, and the average levels for these wells ranged from 2 to 12 mcg/L. Based on how long the wells have been used, the maximum amount of time people are likely to have been exposed to tetrachloroethene in their drinking water is about five years. The cancer and noncancer health effects for tetrachloroethene have been discussed previously and the risks are described in the following table.

The remaining private well had sampling results that were markedly different from the others. The tetrachloroethene levels in this well ranged from non-detect to 240 mcg/L, and averaged 50 mcg/L (18 total samples). Trichloroethene was also detected in this well on two occasions, at 0.5 mcg/L and 27 mcg/L. There is no obvious trend over time for this contamination. Since we do not know the source of the contamination, how long the contamination has been present, or how long the wells have been used, we assumed that exposures to contaminants in this well could have occurred for up to 30 years, which is the United States Environmental Protection Agency's recommended 95th percentile value for residence time (i.e., the amount of time people live in one residence) (US EPA 1999). The cancer and noncancer health effects for tetrachloroethene and trichloroethene have been discussed previously. Exposure to the average levels of tetrachloroethene and trichloroethene (50 mcg/L and 14 mcg/L, respectively) in this private well for 30 years is estimated to pose a low increased risk for cancer. The risks for noncancer health effects would be minimal for tetrachloroethene and low for trichloroethene.

Our evaluation of health risks for drinking water containing tetrachloroethene is summarized in the following table:

	Average Tetrachloroethene Concentration (mcg/L)	Descriptor for Estimated Increased Cancer Risk***	Descriptor for Estimated Increased Noncancer Risk
Public Well	19	low	minimal
Private Wells	2 to 12*	low	minimal
	50**	low	minimal

*Levels are the range of average results from private wells 2, 3 and 4.

**Level is the average of 18 samples from private well 1.

***Exposure durations of 30 years are assumed for the public wells. Evaluation of the private wells assumed exposure durations of five years for wells 2, 3 and 4, and 30 years for well 1. 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.

D. ATSDR Child Health Considerations

The ATSDR Child Health Initiative emphasizes the on-going examination of relevant child health issues in all of the Agency's activities, including evaluating child-focused concerns through its mandated public health assessment activities. The ATSDR and New York State Department of Health consider children when we evaluate exposure pathways and potential health effects from environmental contaminants. We recognize that children are of special concern because of their greater potential for exposure from play and other behavior patterns. Children sometimes differ from adults in their susceptibility to hazardous chemicals, but whether there is a difference depends on the chemical. Children may be more or less susceptible than adults to health effects, and the relationship may change with developmental age.

The possibility that children or the developing fetus may have increased sensitivity to tetrachloroethene (the primary contaminant at the Crown Cleaners site) was taken into account when evaluating the potential health risks associated with the groundwater contamination. Human studies suggest that exposure to mixtures of chlorinated solvents (including tetrachloroethene) in drinking water during pregnancy may increase the risk of birth defects (e.g., neural tube defects, oral cleft defects, and congenital heart defects) and/or childhood leukemia (ATSDR, 1997a). In each of these studies, however, there are uncertainties about how much contaminated water the women drank during pregnancy and about how much tetrachloroethene was in the water the women drank during pregnancy. Moreover, the role of other factors in causing these effects is not fully known. The most important of the factors was the potential exposure during pregnancy to other chemicals in drinking water. These studies suggest, but do not prove, that the developing fetus may have increased sensitivity to the effects of tetrachloroethene.

When pregnant animals are exposed by ingestion or inhalation to large amounts of tetrachloroethene (i.e., amounts that caused adverse health effects in the adult animal), adverse effects on the normal development of the offspring are observed. In addition, a study in young mice suggests effects on the central nervous system after transient exposure to tetrachloroethene by ingestion 10 to 16 days after birth (Fredriksson et al., 1993). The estimated levels of exposure to tetrachloroethene in public drinking water impacted by the Crown Cleaners site are more than 4600 times lower than the levels of exposure in the animal studies in which adverse health effects were observed.

E. Health Outcome Data

NYS DOH has not evaluated health outcome data specifically for the Village of Herrings. While residents may have been exposed to tetrachloroethene for up to 11 years, there is little information about level and duration of the past exposures. NYSDOH will consider evaluating health outcome data if additional information becomes available. The NYSDOH maintains several health outcome databases, which could be used to generate site-specific data, if warranted. These databases include the cancer registry, the congenital malformations registry, vital records (birth and death certificates) and hospital discharge information.

The NYS DOH has also developed a registry of individuals in New York State who have been exposed to Volatile Organic Compounds (VOCs) through contamination of drinking water or indoor air. Because Residents of the Village of Herrings may have been exposed to tetrachloroethene in their drinking water for up to 11 years they will be considered for inclusion in the Registry. The VOC Registry is used to help evaluate exposures and health status for people whose drinking water was found to contain tetrachloroethene and other VOCs. Enrollment in the registry involves completing a survey about possible exposures to VOCs, the health status of each member of the household, and other factors related to health, such as smoking. Residents are then contacted approximately every two years to update address information and monitor changes in health status.

The registry allows long-term follow-up on the health status of persons with documented exposures to VOCs at selected sites in New York State. An exposure registry, such as this one, is a resource for research that may help us learn whether exposures to VOCs are related to health effects. People who are enrolled in the Registry will be kept informed of any research results that come from the Registry data. Data gathered for the registry will be kept confidential.

As part of the NYS DOH Cancer Surveillance Improvement Initiative, age-adjusted incidence rates for specific sites of cancer are being tabulated and mapped at the ZIP code level for the entire state for the years 1993-1997. Areas of the state having higher than expected rates of cancer are highlighted on the maps using statistical methods to evaluate the disease pattern. NYS DOH has evaluated four sites of cancer at the ZIP code level; breast, prostate, lung and colorectal. Additional follow-up for some geographic areas for these four types of cancer is being undertaken using a protocol developed for selecting and prioritizing follow-up areas. Additional information on this project can be found at the NYS DOH Cancer Surveillance Improvement Initiative web site at <http://www.health.state.ny.us/nysdoh/cancer/csii/nyscsii.htm> or by calling 1-800-458-1158.

The Village of Herrings falls within ZIP code 13619. Of the cancers investigated as part of the Cancer Surveillance Improvement Initiative, colorectal cancer in females was found at levels significantly higher than expected in this area of the State. Known risk factors for colorectal cancer include a family history of the disease, intestinal polyps and inflammatory bowel disease. Behavioral risk factors associated with colorectal cancer include sedentary lifestyle and high-fat, low-fiber diets. There is also some evidence of a weak association between environmental exposures such as exposure to high levels of disinfection by-products in drinking water and an elevated risk of colorectal cancer. There is little evidence, however, of an association between environmental exposure to tetrachloroethene and colorectal cancer, although a weak association between tetrachloroethene and colorectal cancer has been observed in several occupational studies of workers in the dry-cleaning industry (ATSDR, 1997a).

COMMUNITY HEALTH CONCERNS

Community health concerns were expressed at public meetings and in telephone calls to the NYS DOH. In addition, the public was invited to review the draft of this public health assessment during the public comment period which ran from June 30, 2003 to July 31, 2003. A summary of the comments received and the responses are found in Appendix F.

Concern: The primary concern expressed is about possible health effects the exposed individuals may have suffered. Part of this concern is the uncertainty about the length of time they may have been exposed and whether the levels of contaminants they were exposed to has varied (increased or decreased) during that time.

Answer: Potential health effects from past exposure to tetrachloroethene in drinking water are evaluated and discussed in the *Toxicological and Epidemiological Evaluation for Adult and Children's Health Issues* and the *ATSDR Child Health Considerations* sections. Contamination in the Village well, for which the source is fairly certain, can be estimated by the length of time Crown Cleaners was operating its dry cleaning facility, from the early 1980s to 1991. We do not know exactly when the Village well became contaminated as the program for monitoring small municipal systems for volatile organic compounds began in Herrings in 1991 and the compound was already present. The source of PCE in the private wells has not been confirmed and, therefore, duration and concentrations can be estimated but are uncertain.

CONCLUSIONS

Because of exposures to tetrachloroethene and trichloroethene in public and/or private drinking water wells near the Crown Cleaners site, public health actions were needed to interrupt or minimize these exposures. For an undetermined period of time, public and private water supply wells in the Village of Herrings were contaminated with tetrachloroethene, which was detected above the New York State drinking water standard and public health assessment comparison values. Trichloroethene was also detected in one private well above its New York State drinking water standard and public health assessment comparison values. Scientific studies indicate that exposure to elevated levels of tetrachloroethene and/or trichloroethene for long periods of time can increase the risk of adverse health effects, including certain forms of cancer and effects on

the liver, kidney and nervous system. The maximum amount of time people who used public water could have been exposed to tetrachloroethene originating from this facility is about 11 years. The average level detected in the Village well was 19 micrograms per liter (mcg/L). Based on the results of epidemiology studies and studies in animals, people drinking public water containing tetrachloroethene at an average level of 19 mcg/L for 11 years are estimated to have a low increased risk for cancer. The risks for noncancer health effects would be minimal.

Four private water supply wells contained tetrachloroethene contamination. An association between the contamination in any of the private wells and the Crown Cleaners site has not been made based on the available hydrogeological information. For three of these wells, the average levels of tetrachloroethene detected ranged from 2 to 12 mcg/L. The remaining well averaged 50 mcg/L. People drinking water from the private wells containing tetrachloroethene at the average level detected for five years (the maximum amount of time three of the wells have been used) or as much as 30 years are estimated to have a low increased risk for cancer. One well also contained trichloroethene that was detected on two occasions, at 0.5 mcg/L and 27 mcg/L. Exposure to the average level of trichloroethene (14 mcg/L) in this private well for 30 years is estimated to pose a low increased risk for cancer. The risks for noncancer health effects would be minimal for tetrachloroethene and low for trichloroethene.

The Crown Cleaners site is currently no apparent public health hazard because measures were taken to reduce people's exposure to VOC contamination in their drinking water to levels below those of public health concern.

The NYS DOH has not evaluated health outcome data specifically for the Village of Herrings. While residents may have been exposed to tetrachloroethene for up to 11 years, there is limited information about level and duration of the past exposures. NYSDOH will consider evaluating health outcome data if additional information becomes available. The NYS DOH developed a registry of individuals in New York State who have been exposed to volatile organic compounds (VOCs) through contamination of drinking water or indoor air. Because residents of the Village of Herrings may have been exposed to tetrachloroethene in their drinking water for up to 11 years they will be considered for inclusion in the Registry.

Of the cancers investigated as part of the Cancer Surveillance Improvement Initiative, only colorectal cancer in females was found at levels significantly higher than expected in the Village of Herrings ZIP code. Known risk factors for colorectal cancer include a family history of the disease, intestinal polyps and inflammatory bowel disease. Behavioral risk factors associated with colorectal cancer include sedentary lifestyle and high-fat, low-fiber diets.

RECOMMENDATIONS

Based on the potential for adverse health effects from exposure to contaminated groundwater, the primary recommendation of this Public Health Assessment is to provide alternative sources of potable water to the community. Treatment systems with proper operation, maintenance and monitoring have been made available for all contaminated wells.

Other recommendations:

1. Continue to provide information, such as sampling and source investigation results, to the public as soon as the data become available.
2. Continue investigations to locate the source or sources of the tetrachloroethene in the private wells to reduce further contaminant contribution to the groundwater and perhaps obtain clues to exposure duration.
3. Continue the maintenance and monitoring of the granular-activated carbon treatment systems provided to the four contaminated private water supplies.
4. Monitor, as needed, the uncontaminated private wells closest to those wells that were contaminated on the west side of the Village.
5. Maintain site security to reduce unauthorized access and reduce potential exposures to physical hazards presented by a structurally unsound industrial facility.
6. Site should be considered for inclusion in the New York State VOC Registry.

PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan (PHAP) for the Crown Cleaners site contains a description of actions already taken or to be taken by the NYS DOH and ATSDR following completion of this public health assessment. The purpose of the PHAP is to ensure that this Public Health Assessment identifies public health hazards and provides a plan of action designed to mitigate and prevent adverse human health effects resulting from the past, present and/or future exposures to hazardous substances in contaminated groundwater in this area. Included is a commitment on the part of the NYS DOH to follow-up on this plan to ensure that it is implemented. The public health actions are as follows:

Actions already taken:

1. The NYS DEC provided bottled water, and subsequently, household granular activated-carbon filter systems to those families with private wells where contamination was detected. These systems are monitored twice a year.
2. The Village of Herrings operates a granular-activated carbon treatment system on the public water supply to minimize people=s exposure to volatile organic compounds in drinking water.
3. The US EPA repaired fencing to secure the site from unauthorized access.

Actions planned or ongoing:

1. The NYS DOH will coordinate with the US EPA, NYS DEC and other appropriate environmental and health agencies to continue to provide community health education activities, as needed, to people living in and near the affected area. Activities thus far have included public meetings and fact sheets. Site documents are available to the public at the Herrings Fire Barn and the NYS DEC Region 6 Office in Watertown.
2. The NYS DOH and NYS DEC will continue to work with the US EPA in their efforts to locate the source or sources of the contaminated groundwater.
3. The NYS DOH will ensure that private wells located downgradient of those found to be contaminated are monitored as needed .
4. The NYS DOH will provide follow-up to this PHAP, as needed, outlining the actions completed and those in progress. This report will be placed in repositories, as they are established, and provided to people who request it.
5. NYS DOH will consider this site for inclusion in the New York State VOC Registry.

ATSDR/NYS DOH will reevaluate and expand the PHAP when needed. New environmental, toxicological, or health outcome data, or the results of implementing the above proposed actions, may determine the need for additional actions at this site.

REFERENCES

- ATSDR (Agency for Toxic Substances and Disease Registry). 1997a. Toxicological Profile for Tetrachloroethylene. U.S. Department of Health and Human Services. Atlanta, Georgia: U.S. Public Health Service.
- ATSDR (Agency for Toxic Substances and Disease Registry). 1997b. Toxicological Profile for Trichloroethylene. U.S. Department of Health and Human Services. Atlanta, Georgia: U.S. Public Health Service.
- Altmann, L., A. Bottger and H. Weigand. 1990. Neurophysiological and psychophysical measurements reveal effects of acute low-level organic solvent exposure in humans. *Int. Arch. Occup. Environ. Health* 3: 493-499
- Altmann, L., H. Wiegand, A. Bottger, F. Elstermeier and G. Winneke. 1992. Neurobehavioral and neurophysiological outcomes of acute repeated perchloroethylene exposure. *Appl. Psych.* 41: 269-279.
- Altmann, L., H.-Florian Neuhann, U. Kramer, J. Witten and E. Jermann. 1995. Neurobehavioral and neurophysiological outcomes of chronic low-level tetrachloroethene exposure measured in neighborhoods of dry cleaning shops. *Environ. Res.* 69: 83-89.
- Cavalleri, A., F. Gobba, M. Paltrinieri, G. Fantuzzi, E. Righi and G. Aggazzotti. 1994. Perchloroethylene exposure can induce colour vision loss. *Neuroscience Lett.* 179: 162-166.
- Hake, C.L. and R.D. Stewart. 1977. Human exposure to tetrachloroethylene: Inhalation and skin contact. *Environ. Health Perspect.* 21: 231-239.
- New York State Department of Health 2000. New York State Cancer Surveillance Improvement Initiative. <http://www.health.state.ny.us/nysdoh/cancer/csii/nyscsii.htm>
- Stewart, R.D., E.D. Baretta, H.C. Dodd and T.R. Torkelson. 1970. Experimental human exposure to tetrachloroethylene. *Arch. Environ. Health.* 20: 224-229.
- US EPA (United States Environmental Protection Agency). 1999. Exposure Factors Handbook (EFH). Office of Research and Development. Washington, DC. EPA/600/C-99/001.
- US Bureau of the Census. 2001. 2000 Census of population and housing summary file 1(SF1). US Department of Commerce.
- US Bureau of the Census. 2002. 2000 Census of population and housing summary file 3 (SF3). US Department of Commerce.

PREPARERS OF REPORT

New York State Department of Health Authors

Henriette M.J. Hamel
Regional Toxics Coordinator
Central NY Regional Office

Sharlin Liu
Research Scientist
Bureau of Toxic Substance Assessment

Thomas Johnson
Research Scientist
Bureau of Toxic Substance Assessment

Steve Forand
Research Scientist
Bureau of Environmental and Occupational Epidemiology

Donald W.R. Miles
ATSDR Grant Coordinator
Bureau of Environmental Exposure Investigation

Agency for Toxic Substances and Disease Registry

ATSDR Regional Representative
Arthur Block
Senior Regional Representative
Region 2
Office of Regional Operations

ATSDR Technical Project Officer
Greg Ulirsch
Environmental Health Engineer
Superfund Site Assessment Branch
Division of Health Assessment and Consultation

CERTIFICATION

The Public Health Assessment for the Crown Cleaners site was prepared by the New York State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the Public Health Assessment was initiated.

Technical Project Officer, SPS, SSAB, DHAC

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

Chief, SPS, SSAB, DHAC, ATSDR

APPENDIX A

TABLE

Table 1
Water Quality Standards/Guidelines and /or Public Health Assessment Comparison Values
for Contaminants Found in Public and Private Wells Near the Crown Cleaner Site
[All values in micrograms per liter (mcg/L)]

Contaminant	Water Quality Standards/Guidelines			US EPA Drinking Water	Cancer	Comparison Values*		
	New York State		Drinking Water			Basis**	Noncancer	Basis**
	Ground Water	Surface Water						
tetrachloroethene tet	5	0.7 ^a	5	5	0.7	EPA RBC	10	EPA LTHA
trichloroethene tet	5	5	5	5 ^b	6.1	NYS CPF	2.1	EPA RBC

* 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 lifetime cancer risk of one-in-one million. The noncancer comparison value assumes a relative source contribution of 20%.

** EPA LTHA: U.S. Environmental Protection Agency Lifetime Health Advisory
U.S. Environmental Protection Agency Risk-Based Concentration Table

EPA RBC: U.S. Environmental Protection Agency Risk-Based Concentration Table
NYS CPF: New York State Cancer Potency Factor

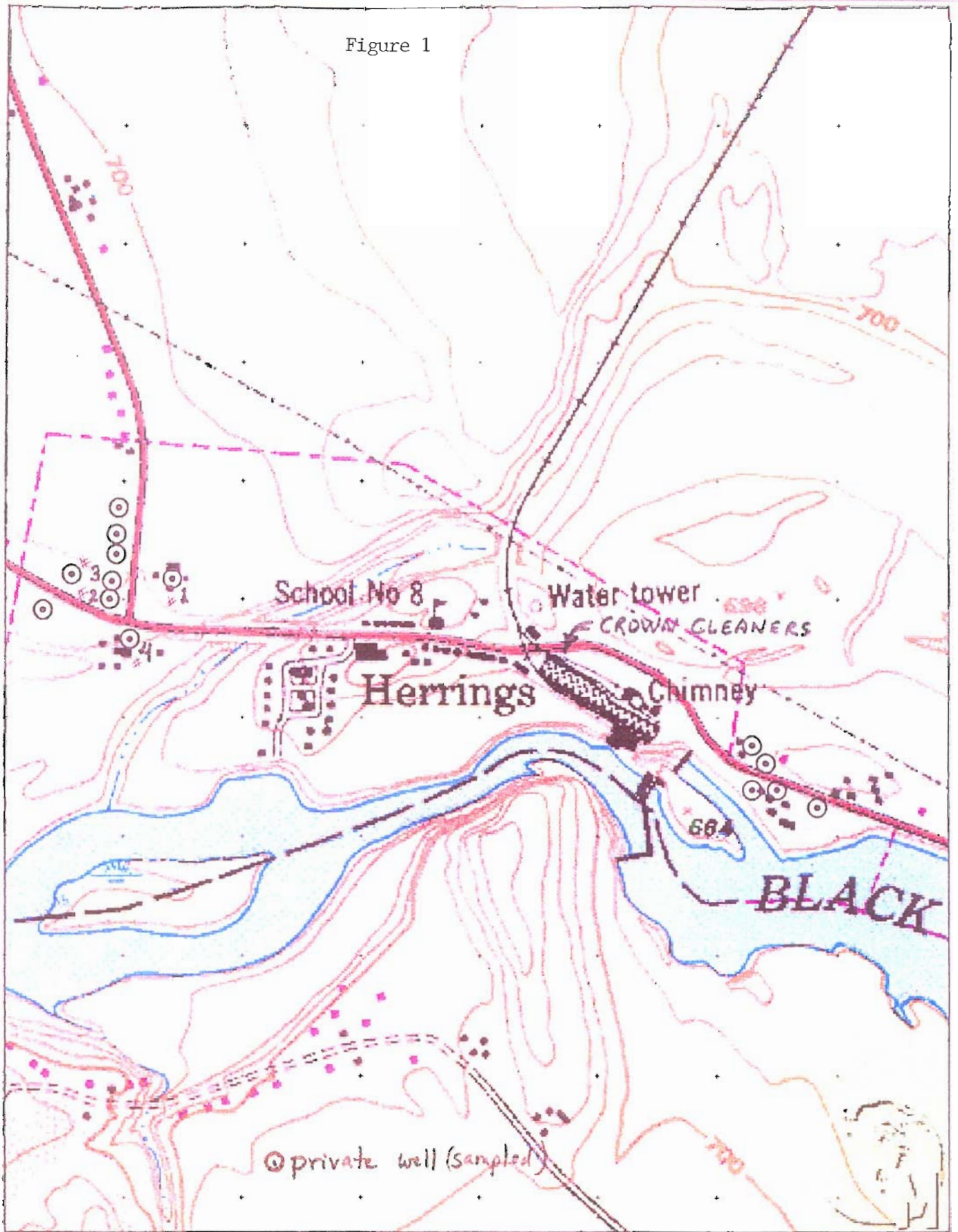
^a Guidance value

^b Under review

APPENDIX B

FIGURE

Figure 1



APPENDIX C

**NYS DOH PROCEDURE FOR EVALUATING POTENTIAL HEALTH RISKS
FOR CONTAMINANTS OF CONCERN**

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

To evaluate the potential health risks from contaminants of concern associated with the Crown Cleaners site, the New York State Department of Health assessed the risks for cancer and noncancer 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 US EPA or, in some cases, by the NYS DOH. The following qualitative ranking of cancer risk estimates, developed by the NYS 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:

<u>Risk Ratio</u>	<u>Excess Lifetime Cancer Risk</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 is acceptable. An increased lifetime cancer risk of one in one million or less is generally not considered a significant public health concern.

For noncarcinogenic 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 US EPA, ATSDR and/or NYS DOH. The resulting ratio was then compared to the following qualitative scale of health risk:

Qualitative Descriptions for
Noncarcinogenic 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

Noncarcinogenic 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 which 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 subpopulations (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 noncancer 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 noncancer 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
INTERIM PUBLIC HEALTH HAZARD CATEGORIES

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>
<p>C. Indeterminate Public Health Hazard</p> <p>This category is used for sites in which <i>Acritical@</i> 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 <i>Acriticality@</i> 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.*

APPENDIX E
ATSDR Glossary of Terms

ATSDR Glossary of Terms

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency with headquarters in Atlanta, Georgia, and 10 regional offices in the United States. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances. ATSDR is not a regulatory agency, unlike the U.S. Environmental Protection Agency (EPA), which is the federal agency that develops and enforces environmental laws to protect the environment and human health. This glossary defines words used by ATSDR in communications with the public. It is not a complete dictionary of environmental health terms. If you have questions or comments, call ATSDR's toll-free telephone number, 1-888-42-ATSDR (1-888-422-8737).

General Terms

Absorption

The process of taking in. For a person or an animal, absorption is the process of a substance getting into the body through the eyes, skin, stomach, intestines, or lungs.

Acute

Occurring over a short time [compare with chronic].

Acute exposure

Contact with a substance that occurs once or for only a short time (up to 14 days) [compare with intermediate duration exposure and chronic exposure].

Additive effect

A biologic response to exposure to multiple substances that equals the sum of responses of all the individual substances added together [compare with antagonistic effect and synergistic effect].

Adverse health effect

A change in body function or cell structure that might lead to disease or health problems

Aerobic

Requiring oxygen [compare with anaerobic].

Ambient

Surrounding (for example, ambient air).

Anaerobic

Requiring the absence of oxygen [compare with aerobic].

Analyte

A substance measured in the laboratory. A chemical for which a sample (such as water, air, or blood) is tested in a laboratory. For example, if the analyte is mercury, the laboratory test will determine the amount of mercury in the sample.

Analytic epidemiologic study

A study that evaluates the association between exposure to hazardous substances and disease by testing scientific hypotheses.

Antagonistic effect

A biologic response to exposure to multiple substances that is less than would be expected if the known effects of the individual substances were added together [compare with additive effect and synergistic effect].

Background level

An average or expected amount of a substance or radioactive material in a specific environment, or typical amounts of substances that occur naturally in an environment.

Biodegradation

Decomposition or breakdown of a substance through the action of microorganisms (such as bacteria or fungi) or other natural physical processes (such as sunlight).

Biologic indicators of exposure study

A study that uses (a) biomedical testing or (b) the measurement of a substance [an analyte], its metabolite, or another marker of exposure in human body fluids or tissues to confirm human exposure to a hazardous substance [also see exposure investigation].

Biologic monitoring

Measuring hazardous substances in biologic materials (such as blood, hair, urine, or breath) to determine whether exposure has occurred. A blood test for lead is an example of biologic monitoring.

Biologic uptake

The transfer of substances from the environment to plants, animals, and humans.

Biomedical testing

Testing of persons to find out whether a change in a body function might have occurred because of exposure to a hazardous substance.

Biota

Plants and animals in an environment. Some of these plants and animals might be sources of food, clothing, or medicines for people.

Body burden

The total amount of a substance in the body. Some substances build up in the body because they are stored in fat or bone or because they leave the body very slowly.

CAP [see Community Assistance Panel.]

Cancer

Any one of a group of diseases that occur when cells in the body become abnormal and grow or multiply out of control.

Cancer risk

A theoretical risk for getting cancer if exposed to a substance every day for 70 years (a lifetime exposure). The true risk might be lower.

Carcinogen

A substance that causes cancer.

Case study

A medical or epidemiologic evaluation of one person or a small group of people to gather information about specific health conditions and past exposures.

Case-control study

A study that compares exposures of people who have a disease or condition (cases) with people who do not have the disease or condition (controls). Exposures that are more common among the cases may be considered as possible risk factors for the disease.

CAS registry number

A unique number assigned to a substance or mixture by the American Chemical Society Abstracts Service.

Central nervous system

The part of the nervous system that consists of the brain and the spinal cord.

CERCLA [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980]

Chronic

Occurring over a long time [compare with acute].

Chronic exposure

Contact with a substance that occurs over a long time (more than 1 year) [compare with acute exposure and intermediate duration exposure]

Cluster investigation

A review of an unusual number, real or perceived, of health events (for example, reports of cancer) grouped together in time and location. Cluster investigations are designed to confirm case reports; determine whether they represent an unusual disease occurrence; and, if possible, explore possible causes and contributing environmental factors.

Community Assistance Panel (CAP)

A group of people from a community and from health and environmental agencies who work with ATSDR to resolve issues and problems related to hazardous substances in the community. CAP members work with ATSDR to gather and review community health concerns, provide information on how people might have been or might now be exposed to hazardous substances, and inform ATSDR on ways to involve the community in its activities.

Comparison value (CV)

Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

Completed exposure pathway [see exposure pathway].

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)

CERCLA, also known as Superfund, is the federal law that concerns the removal or cleanup of hazardous substances in the environment and at hazardous waste sites. ATSDR, which was created by CERCLA, is responsible for assessing health issues and supporting public health activities related to hazardous waste sites or other environmental releases of hazardous substances. This law was later amended by the Superfund Amendments and Reauthorization Act (SARA).

Concentration

The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

Contaminant

A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.

Delayed health effect

A disease or an injury that happens as a result of exposures that might have occurred in the past.

Dermal

Referring to the skin. For example, dermal absorption means passing through the skin.

Dermal contact

Contact with (touching) the skin [see route of exposure].

Descriptive epidemiology

The study of the amount and distribution of a disease in a specified population by person, place, and time.

Detection limit

The lowest concentration of a chemical that can reliably be distinguished from a zero concentration.

Disease prevention

Measures used to prevent a disease or reduce its severity.

Disease registry

A system of ongoing registration of all cases of a particular disease or health condition in a defined population.

DOD

United States Department of Defense.

DOE

United States Department of Energy.

Dose (for chemicals that are not radioactive)

The amount of a substance to which a person is exposed over some time period. Dose is a measurement of exposure. Dose is often expressed as milligram (amount) per kilogram (a measure of body weight) per day (a measure of time) when people eat or drink

contaminated water, food, or soil. In general, the greater the dose, the greater the likelihood of an effect. An "exposure dose" is how much of a substance is encountered in the environment. An "absorbed dose" is the amount of a substance that actually got into the body through the eyes, skin, stomach, intestines, or lungs.

Dose (for radioactive chemicals)

The radiation dose is the amount of energy from radiation that is actually absorbed by the body. This is not the same as measurements of the amount of radiation in the environment.

Dose-response relationship

The relationship between the amount of exposure [dose] to a substance and the resulting changes in body function or health (response).

Environmental media

Soil, water, air, biota (plants and animals), or any other parts of the environment that can contain contaminants.

Environmental media and transport mechanism

Environmental media include water, air, soil, and biota (plants and animals). Transport mechanisms move contaminants from the source to points where human exposure can occur. The environmental media and transport mechanism is the second part of an exposure pathway.

EPA

United States Environmental Protection Agency.

Epidemiologic surveillance [see Public health surveillance].

Epidemiology

The study of the distribution and determinants of disease or health status in a population; the study of the occurrence and causes of health effects in humans.

Exposure

Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [acute exposure], of intermediate duration, or long-term [chronic exposure].

Exposure assessment

The process of finding out how people come into contact with a hazardous substance, how often and for how long they are in contact with the substance, and how much of the substance they are in contact with.

Exposure-dose reconstruction

A method of estimating the amount of people's past exposure to hazardous substances. Computer and approximation methods are used when past information is limited, not available, or missing.

Exposure investigation

The collection and analysis of site-specific information and biologic tests (when appropriate) to determine whether people have been exposed to hazardous substances.

Exposure pathway

The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An exposure pathway has five parts: a source of contamination (such as an abandoned business); an environmental media and transport mechanism (such as movement through groundwater); a point of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.

Exposure registry

A system of ongoing followup of people who have had documented environmental exposures.

Feasibility study

A study by EPA to determine the best way to clean up environmental contamination. A number of factors are considered, including health risk, costs, and what methods will work well.

Geographic information system (GIS)

A mapping system that uses computers to collect, store, manipulate, analyze, and display data. For example, GIS can show the concentration of a contaminant within a community in relation to points of reference such as streets and homes.

Grand rounds

Training sessions for physicians and other health care providers about health topics.

Groundwater

Water beneath the earth's surface in the spaces between soil particles and between rock surfaces [compare with surface water].

Half-life (t₂)

The time it takes for half the original amount of a substance to disappear. In the environment, the half-life is the time it takes for half the original amount of a substance to disappear when it is changed to another chemical by bacteria, fungi, sunlight, or other chemical processes. In the human body, the half-life is the time it takes for half the original amount of the substance to disappear, either by being changed to another substance or by leaving the body. In the case of radioactive material, the half life is the amount of time necessary for one half the initial number of radioactive atoms to change or transform into another atom (that is normally not radioactive). After two half lives, 25% of the original number of radioactive atoms remain.

Hazard

A source of potential harm from past, current, or future exposures.

Hazardous Substance Release and Health Effects Database (HazDat)

The scientific and administrative database system developed by ATSDR to manage data collection, retrieval, and analysis of site-specific information on hazardous substances, community health concerns, and public health activities.

Hazardous waste

Potentially harmful substances that have been released or discarded into the environment.

Health consultation

A review of available information or collection of new data to respond to a specific health question or request for information about a potential environmental hazard. Health consultations are focused on a specific exposure issue. Health consultations are therefore more limited than a public health assessment, which reviews the exposure potential of each pathway and chemical [compare with public health assessment].

Health education

Programs designed with a community to help it know about health risks and how to reduce these risks.

Health investigation

The collection and evaluation of information about the health of community residents. This information is used to describe or count the occurrence of a disease, symptom, or clinical measure and to evaluate the possible association between the occurrence and exposure to hazardous substances.

Health promotion

The process of enabling people to increase control over, and to improve, their health.

Health statistics review

The analysis of existing health information (i.e., from death certificates, birth defects registries, and cancer registries) to determine if there is excess disease in a specific population, geographic area, and time period. A health statistics review is a descriptive epidemiologic study.

Indeterminate public health hazard

The category used in ATSDR's public health assessment documents when a professional judgment about the level of health hazard cannot be made because information critical to such a decision is lacking.

Incidence

The number of new cases of disease in a defined population over a specific time period [contrast with prevalence].

Ingestion

The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see route of exposure].

Inhalation

The act of breathing. A hazardous substance can enter the body this way [see route of exposure].

Intermediate duration exposure

Contact with a substance that occurs for more than 14 days and less than a year [compare with acute exposure and chronic exposure].

In vitro

In an artificial environment outside a living organism or body. For example, some toxicity testing is done on cell cultures or slices of tissue grown in the laboratory, rather than on a living animal [compare with in vivo].

In vivo

Within a living organism or body. For example, some toxicity testing is done on whole animals, such as rats or mice [compare with in vitro].

Lowest-observed-adverse-effect level (LOAEL)

The lowest tested dose of a substance that has been reported to cause harmful (adverse) health effects in people or animals.

Medical monitoring

A set of medical tests and physical exams specifically designed to evaluate whether an individual's exposure could negatively affect that person's health.

Metabolism

The conversion or breakdown of a substance from one form to another by a living organism.

Metabolite

Any product of metabolism.

mg/kg

Milligram per kilogram.

mg/cm²

Milligram per square centimeter (of a surface).

mg/m³

Milligram per cubic meter; a measure of the concentration of a chemical in a known volume (a cubic meter) of air, soil, or water.

Migration

Moving from one location to another.

Minimal risk level (MRL)

An ATSDR estimate of daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of harmful (adverse), noncancerous effects. MRLs are calculated for a route of exposure (inhalation or oral) over a specified time period (acute, intermediate, or chronic). MRLs should not be used as predictors of harmful (adverse) health effects [see reference dose].

Morbidity

State of being ill or diseased. Morbidity is the occurrence of a disease or condition that alters health and quality of life.

Mortality

Death. Usually the cause (a specific disease, a condition, or an injury) is stated.

Mutagen

A substance that causes mutations (genetic damage).

Mutation

A change (damage) to the DNA, genes, or chromosomes of living organisms.

National Priorities List for Uncontrolled Hazardous Waste Sites (National Priorities List or NPL)

EPA's list of the most serious uncontrolled or abandoned hazardous waste sites in the United States. The NPL is updated on a regular basis.

National Toxicology Program (NTP)

Part of the Department of Health and Human Services. NTP develops and carries out tests to predict whether a chemical will cause harm to humans.

No apparent public health hazard

A category used in ATSDR's public health assessments for sites where human exposure to contaminated media might be occurring, might have occurred in the past, or might occur in the future, but where the exposure is not expected to cause any harmful health effects.

No-observed-adverse-effect level (NOAEL)

The highest tested dose of a substance that has been reported to have no harmful (adverse) health effects on people or animals.

No public health hazard

A category used in ATSDR's public health assessment documents for sites where people have never and will never come into contact with harmful amounts of site-related substances.

NPL [see National Priorities List for Uncontrolled Hazardous Waste Sites]

Physiologically based pharmacokinetic model (PBPK model)

A computer model that describes what happens to a chemical in the body. This model describes how the chemical gets into the body, where it goes in the body, how it is changed by the body, and how it leaves the body.

Pica

A craving to eat nonfood items, such as dirt, paint chips, and clay. Some children exhibit pica-related behavior.

Plume

A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the direction they move. For example, a plume can be a column of smoke from a chimney or a substance moving with groundwater.

Point of exposure

The place where someone can come into contact with a substance present in the environment [see exposure pathway].

Population

A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).

Potentially responsible party (PRP)

A company, government, or person legally responsible for cleaning up the pollution at a hazardous waste site under Superfund. There may be more than one PRP for a particular site.

ppb

Parts per billion.

ppm

Parts per million.

Prevalence

The number of existing disease cases in a defined population during a specific time period [contrast with incidence].

Prevalence survey

The measure of the current level of disease(s) or symptoms and exposures through a questionnaire that collects self-reported information from a defined population.

Prevention

Actions that reduce exposure or other risks, keep people from getting sick, or keep disease from getting worse.

Public availability session

An informal, drop-by meeting at which community members can meet one-on-one with ATSDR staff members to discuss health and site-related concerns.

Public comment period

An opportunity for the public to comment on agency findings or proposed activities contained in draft reports or documents. The public comment period is a limited time period during which comments will be accepted.

Public health action

A list of steps to protect public health.

Public health advisory

A statement made by ATSDR to EPA or a state regulatory agency that a release of hazardous substances poses an immediate threat to human health. The advisory includes recommended measures to reduce exposure and reduce the threat to human health.

Public health assessment (PHA)

An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be harmed from coming into contact with those substances. The PHA also lists actions that need to be taken to protect public health [compare with health consultation].

Public health hazard

A category used in ATSDR's public health assessments for sites that pose a public health hazard because of long-term exposures (greater than 1 year) to sufficiently high levels of hazardous substances or radionuclides that could result in harmful health effects.

Public health hazard categories

Public health hazard categories are statements about whether people could be harmed by conditions present at the site in the past, present, or future. One or more hazard categories might be appropriate for each site. The five public health hazard categories are no public health hazard, no apparent public health hazard, indeterminate public health hazard, public health hazard, and urgent public health hazard.

Public health statement

The first chapter of an ATSDR toxicological profile. The public health statement is a summary written in words that are easy to understand. The public health statement explains how people might be exposed to a specific substance and describes the known health effects of that substance.

Public health surveillance

The ongoing, systematic collection, analysis, and interpretation of health data. This activity also involves timely dissemination of the data and use for public health programs.

Public meeting

A public forum with community members for communication about a site.

Radioisotope

An unstable or radioactive isotope (form) of an element that can change into another element by giving off radiation.

Radionuclide

Any radioactive isotope (form) of any element.

RCRA [see Resource Conservation and Recovery Act (1976, 1984)]

Receptor population

People who could come into contact with hazardous substances [see exposure pathway].

Reference dose (RfD)

An EPA estimate, with uncertainty or safety factors built in, of the daily lifetime dose of a substance that is unlikely to cause harm in humans.

Registry

A systematic collection of information on persons exposed to a specific substance or having specific diseases [see exposure registry and disease registry].

Remedial investigation

The CERCLA process of determining the type and extent of hazardous material contamination at a site.

Resource Conservation and Recovery Act (1976, 1984) (RCRA)

This Act regulates management and disposal of hazardous wastes currently generated, treated, stored, disposed of, or distributed.

RFA

RCRA Facility Assessment. An assessment required by RCRA to identify potential and actual releases of hazardous chemicals.

RfD [see reference dose]

Risk

The probability that something will cause injury or harm.

Risk reduction

Actions that can decrease the likelihood that individuals, groups, or communities will experience disease or other health conditions.

Risk communication

The exchange of information to increase understanding of health risks.

Route of exposure

The way people come into contact with a hazardous substance. Three routes of exposure are breathing [inhalation], eating or drinking [ingestion], or contact with the skin [dermal contact].

Safety factor [see uncertainty factor]

SARA [see Superfund Amendments and Reauthorization Act]

Sample

A portion or piece of a whole. A selected subset of a population or subset of whatever is being studied. For example, in a study of people the sample is a number of people chosen from a larger population [see population]. An environmental sample (for example, a small amount of soil or water) might be collected to measure contamination in the environment at a specific location.

Sample size

The number of units chosen from a population or an environment.

Solvent

A liquid capable of dissolving or dispersing another substance (for example, acetone or mineral spirits).

Source of contamination

The place where a hazardous substance comes from, such as a landfill, waste pond, incinerator, storage tank, or drum. A source of contamination is the first part of an exposure pathway.

Special populations

People who might be more sensitive or susceptible to exposure to hazardous substances because of factors such as age, occupation, sex, or behaviors (for example, cigarette smoking). Children, pregnant women, and older people are often considered special populations.

Stakeholder

A person, group, or community who has an interest in activities at a hazardous waste site.

Statistics

A branch of mathematics that deals with collecting, reviewing, summarizing, and interpreting data or information. Statistics are used to determine whether differences between study groups are meaningful.

Substance

A chemical.

Substance-specific applied research

A program of research designed to fill important data needs for specific hazardous substances identified in ATSDR's toxicological profiles. Filling these data needs would allow more accurate assessment of human risks from specific substances contaminating the environment. This research might include human studies or laboratory experiments to determine health effects resulting from exposure to a given hazardous substance.

Superfund [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Superfund Amendments and Reauthorization Act (SARA)]

Superfund Amendments and Reauthorization Act (SARA)

In 1986, SARA amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from substance exposures at hazardous waste sites and to perform activities including health education, health studies, surveillance, health consultations, and toxicological profiles.

Surface water

Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs [compare with groundwater].

Surveillance [see public health surveillance]

Survey

A systematic collection of information or data. A survey can be conducted to collect information from a group of people or from the environment. Surveys of a group of people can be conducted by telephone, by mail, or in person. Some surveys are done by interviewing a group of people [see prevalence survey].

Synergistic effect

A biologic response to multiple substances where one substance worsens the effect of another substance. The combined effect of the substances acting together is greater than the sum of the effects of the substances acting by themselves [see additive effect and antagonistic effect].

Teratogen

A substance that causes defects in development between conception and birth. A teratogen is a substance that causes a structural or functional birth defect.

Toxic agent

Chemical or physical (for example, radiation, heat, cold, microwaves) agents that, under certain circumstances of exposure, can cause harmful effects to living organisms.

Toxicological profile

An ATSDR document that examines, summarizes, and interprets information about a hazardous substance to determine harmful levels of exposure and associated health effects. A toxicological profile also identifies significant gaps in knowledge on the substance and describes areas where further research is needed.

Toxicology

The study of the harmful effects of substances on humans or animals.

Tumor

An abnormal mass of tissue that results from excessive cell division that is uncontrolled and progressive. Tumors perform no useful body function. Tumors can be either benign (not cancer) or malignant (cancer).

Uncertainty factor

Mathematical adjustments for reasons of safety when knowledge is incomplete. For example, factors used in the calculation of doses that are not harmful (adverse) to people. These factors are applied to the lowest-observed-adverse-effect-level (LOAEL) or the no-observed-adverse-effect-level (NOAEL) to derive a minimal risk level (MRL). Uncertainty factors are used to account for variations in people's sensitivity, for differences between animals and humans, and for differences between a LOAEL and a NOAEL. Scientists use uncertainty factors when they have some, but not all, the information from animal or human studies to decide whether an exposure will cause harm to people [also sometimes called a safety factor].

Urgent public health hazard

A category used in ATSDR's public health assessments for sites where short-term exposures (less than 1 year) to hazardous substances or conditions could result in harmful health effects that require rapid intervention.

Volatile organic compounds (VOCs)

Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, toluene, methylene chloride, and methyl chloroform.

APPENDIX F.
SUMMARY OF PUBLIC COMMENTS AND RESPONSES

Summary of Public Comments and Responses Crown Cleaners Public Health Assessment

This summary was prepared to address comments and questions on the public comment draft of the Crown Cleaners Public Health Assessment. The public was invited to review the draft during the public comment period which ran from June 30, 2003 to July 31, 2003. We received two written sets of comments from residents and several phone-in comments. Similar comments may be consolidated or grouped together and some statements reworded to clarify the comment. If you have any questions about this summary, you may contact Henrietta Hamel of the New York State Department of Health (NYS DOH) at 1-315-426-7612 or by e-mail at hmh01@health.state.ny.us.

Comment #1 - What are the health risks associated with drinking contaminated groundwater from the Crown Cleaners Site?

Response #1- Public and private water supply wells in the Village of Herrings were contaminated with tetrachloroethene; one private well was contaminated with trichloroethene. Scientific studies indicate that exposure to tetrachloroethene and/or trichloroethene for long periods of time can increase the risk of adverse health effects, including certain forms of cancer and effects on the liver, kidney and nervous system. The maximum amount of time people who used public water could have been exposed to tetrachloroethene originating from this facility is about 11 years. The average level detected in the Village well was 19 micrograms per liter (mcg/L). Based on the results of epidemiology studies and studies in animals, people drinking public water containing tetrachloroethene at an average level of 19 mcg/L for 11 years are estimated to have a low increased risk for cancer. The risks for noncancer health effects would be minimal.

Four private water supply wells contained tetrachloroethene contamination. For three of these wells, the average levels of tetrachloroethene detected ranged from 2 to 12 mcg/L. The remaining well averaged 50 mcg/L. People drinking water from the private wells for five years (the maximum amount of time three of the wells have been used) are estimated to have a low increased risk for cancer. One well also contained trichloroethene that was detected on two occasions, at 0.5 mcg/L and 27 mcg/L. Exposure to the average level of trichloroethene (14 mcg/L) in this private well for 30 years is estimated to pose a low increased risk for cancer. The risks for noncancer health effects would be minimal for tetrachloroethene and low for trichloroethene.

Comment #2 - Was the site monitored for environmental hazards when the mill was operating and has the old St. Regis/Champion Paper Mill site been investigated as a potential source of this contamination?

Response #2 - We have no specific information about Federal or State agency monitoring of the St. Regis/ Champion operation. However, the most likely source of the tetrachloroethene contamination of the groundwater supplying the public water supply was the handling and disposal practices at Crown Cleaners. The dry cleaning process

uses large quantities of tetrachloroethene and evidence of improper tetrachloroethene disposal practices in fluids and used filters was observed during the first site visit.

Comment #3 - Were other potential sources of contamination, such as Fort Drum, old landfills and dumps investigated?

Response#3 -Yes, during the state=s remedial investigation, attempts were made to find reported old dumps in the Herrings area. No likely source areas were found. Because Crown Cleaners has not been definitely tied to the contamination in the private wells, the NYS DOH and the Agency for Toxic Substances and Disease Registry (ATSDR) recommend that additional investigations to locate the source of this contamination be undertaken.

Comment #4 - Will the site be completely cleaned up?

Response #4- All on-site materials that might contain contaminants have been removed. Not all contamination that has seeped into the ground will likely be removed, however, because removal of all contamination in crevices in bedrock may not be technically feasible. Large pockets of contamination, if found, may be removed or remediated.

Comment #5 Will the potential for public exposure and consequent health risks be eliminated; and, when?

Response #5 Although contamination remains in the groundwater, the risk of exposure has been reduced by source removal and treatment of public and private well water. The treatment systems on water supplies reduces or eliminates health risks presented by the contamination of the drinking water. Further, the NYS DOH will monitor, as needed, the water quality of private wells that are near those that were or are contaminated.

Comment #6 - The site is a potential physical hazard for trespassers due to the dilapidated condition of some of the structures. What is planned to reduce or eliminate these hazards?

Response #6- The United States Environmental Protection Agency (US EPA) repaired fencing to secure the site from unauthorized access and removed an unstable smokestack. While there remain a number of physical hazards on the site, security is provided to reduce unauthorized access and reduce potential exposures to these hazards.

Comment #7 - A resident requested that the text be changed to clearly state that Crown Cleaners has not been eliminated as a possible source for the contamination in private wells and that a recommendation be made to have US EPA=s plans for the site include making a final determination as to the source of this contamination.

Response #7 - The source of the tetrachloroethene in these private wells is under investigation. Available information does not indicate a hydraulic connection between wells at the Crown Cleaners site and these wells. No clear path for the contaminated groundwater caused by practices at Crown Cleaners to the private wells has been shown.

The NYS DOH and ATSDR recommend that the US EPA continue investigations to locate the source or sources of the tetrachloroethene in the private wells.