HEALTH CONSULTATION

Norris Elementary School Indoor Air Assessment

Grand Traverse Overall Supply Company
CERCLIS No. MID017418559
Greilickville, Leelanau County, Michigan

November 8, 2005

Prepared by:
Michigan Department of Community Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material. In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members.

The Public Comment Period is an opportunity for the general public to comment on Agency findings or proposed activities for this written consultation. The purposes of the comment period are to 1) provide the public, particularly the community associated with a site, the opportunity to comment on the public health finds, 2) evaluate whether the community health concerns have been adequately addressed, and 3) provide ATSDR with additional information. There will be a time period for written comments, which will run until September 23, 2005. Please address correspondence to the health assessor for this site:

Linda D. Dykema, Manager
Toxicology and Response Section
Michigan Department of Community Health
Division of Environmental and Occupational Epidemiology
P.O. Box 30195
Lansing, Michigan 48909

The conclusions and recommendations presented in this health consultation are the result of site-specific analyses and are not to be cited or quoted for other evaluations or health consultations.

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

HEALTH CONSULTATION

Norris Elementary School Indoor Air Assessment

Grand Traverse Overall Supply Company
CERCLIS No. MID017418559
Greilickville, Leelanau County, Michigan

Prepared by:
Michigan Department of Community Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Table of Contents

Acronyms and Abbreviations ii
Summary 1
Background and Statement of Issues 1
Discussion 2
    Environmental Contamination and Other Hazards 2
    Human Exposure Pathways 5
    Toxicological Evaluation 6
    Child Health Issues 7
Conclusions 7
Recommendations 7
    Public Health Action Plan 8
References 9
Authors, Technical Advisors 12

List of Figures

Figure 1. Norris Elementary School Site Location 10

Figure 2. Norris Elementary School Site Map 11

List of Tables

Table 1. Indoor Air Sampling Results for the Norris Elementary School 4

Table 2. Sub-Slab Sampling Results for the Norris Elementary School 5

Table 3 Human Exposure Pathways for the Norris Elementary School 5

List of Appendices

Appendix A. Decision Matrix for Norris Elementary School Air Sampling 13

Acronyms and Abbreviations

AIAC	acceptable indoor air concentration
ATSDR	Agency for Toxic Substances and Disease Registry
BEA	Baseline Environmental Assessment
DCE	dichloroethylene
EMEG	environmental media evaluation guides
EPA	U.S. Environmental Protection Agency
GTOS	Grand Traverse Overall Supply Company
MCL	maximum contaminant level
MDCH	Michigan Department of Community Health
MDEQ	Michigan Department of Environmental Quality
MDPH	Michigan Department of Public Health
ppbv	part per billion by volume
PCE	perchloroethylene (also known as tetrachloroethylene)
TAGA	Trace Atmospheric Gas Analyzer
TCE	trichloroethylene
VAS	vertical aquifer sampling
VOC	volatile organic chemical

Summary

Volatile organic chemical (VOC) contaminants detected in the indoor air of the Norris Elementary School currently pose ***no apparent public health hazard*** to visitors, school staff, or children who attend the school. Levels of perchloroethylene (PCE) and trichloroethylene (TCE) detected in the indoor air inside the school were far below health-based screening values. Somewhat higher concentrations of PCE and TCE detected in soil gas under the foundation of the school do not appear to be entering the school building.

The source of the VOC contaminants under the Norris Elementary School is the Grand Traverse Overall Supply (GTOS) site, which is located immediately to the northwest of the school building. PCE and its breakdown products have been found at high concentrations in soil and groundwater at the GTOS site. Contaminated groundwater is moving southeast from the GTOS site and under a portion of the school building. Additional indoor air monitoring at the school is recommended until the source of VOC contaminants on the GTOS site is fully investigated and measures to intercept the contamination before it reaches the school are implemented.

A public comment period was held from August 18, 2005 through September 19, 2005 to receive feedback on this document. No comments were received.

Background and Statement of Issues

Norris Elementary School is located at 10781 East Cherry Bend Road, Greilickville, Michigan about 1.5 miles north of the city limits of Traverse City (Figure 1). The school is located immediately east of the site of the former Grand Traverse Overall Supply Company (GTOS) (Figure 2).

GTOS was a commercial laundry located at 10725 East Cherry Bend Road. The company began operations in 1953, using a dry well to collect wastewater until 1955. GTOS constructed an unlined seepage lagoon in 1955, adding two others in 1961 and 1968. Dry cleaning operations began in 1968 and continued until 1987. Process wastewaters from dry cleaning operations were disposed of in the lagoons and also in the dry well until 1977, when GTOS began to divert all wastewater discharge to the sanitary sewer (Conestoga-Rovers 1996; MDEQ 2004).

In 1978, complaints of odors and unusual tastes in the water supply for the Norris Elementary School prompted testing of well samples. These tests showed elevated levels of perchloroethylene (PCE), trichloroethylene (TCE), and 1,2-dichloroethylene (1,2 DCE). The school's drinking water well was replaced with a new well drilled to a greater depth. The source of the groundwater contamination was traced to the GTOS site. In response, GTOS removed the dry well, excavated contaminated soil, and filled the former lagoons with clean soil and gravel, completing this work in 1979 (MDEQ 2004).

The Michigan Department of Natural Resources, now the Michigan Department of Environmental Quality (MDEQ), conducted hydrogeological investigations of the GTOS site in 1979 and 1980. The geology of the area consists of about 500 to 600 feet of glacial drift atop shale bedrock. There are two aquifers of interest. The upper aquifer is unconfined, beginning at

about 10 feet below the ground surface and is found in 50 to 60 feet of sand. Below the sand is a layer of clay and clayey sand that separates the upper and lower aquifers (MDPH 1994). The hydrogeological studies indicated that the impacted groundwater in the upper aquifer had migrated east-southeast toward M-22 and the West Arm of Grand Traverse Bay (Figure 2), that natural cleanup was occurring, and that investigation of the lower semi-confined aquifer was not warranted (MDEQ 2004).

In 1983, the GTOS site was placed on the National Priorities List. A contractor for the U.S. Environmental Protection Agency (EPA) began a Remedial Investigation/Feasibility Study of the site in 1988. The final report was issued in 1991 and the EPA issued a Record of Decision in 1992 indicating no further action for the site was necessary (MDPH 1994).

A Baseline Environment Assessment (BEA) was conducted in 1995 prior to the lease of the GTOS property to a new operator. High concentrations PCE were found in all 10 soil samples collected from under the GTOS building. PCE, TCE and cis-1,2-DCE were detected at high concentrations in water samples collected from sumps within the building that were formerly used to contain dry-cleaning solvents. PCE was also detected in a sample from the on-site drinking water well, although below the EPA's maximum contaminant level (MCL) for drinking water.

In 2002, a contractor for the MDEQ conduced vertical aquifer sampling (VAS). This technique is used to take samples from various depths of a groundwater aquifer to get an accurate profile of the contaminant distribution. Soil gas sampling was also conducted to determine if contaminants in the groundwater were moving through the soil as gases. In 2003, soil samples were collected and additional monitoring wells were installed to identify the source, location, and movement of the contaminant plume (Earth Tech 2003). As part of these investigations, the MDEQ also took samples from the well that provides drinking water to the Norris Elementary School.

The data gathered from the 2002 and 2003 investigations indicated that a plume of contaminants originating from the GTOS site was migrating southeastward toward the west arm of the Grand Traverse Bay (Earth Tech 2003). Soil gas samples taken from the Harbor West Condominium Association property (Figure 2) indicated that gases were detectable in the soil on and around the property. Since the Norris Elementary School is situated between the GTOS site and the condominiums, there were concerns that VOC contaminants in the groundwater migrating under the building could be entering the indoor air at the school. These concerns prompted the EPA to initiate sampling of the soil gas under the school building and of the air inside the building to which school children and staff could be exposed (EPA 2004). This public health consultation addresses the results of these sampling efforts and the potential risk to people using the school building.

Discussion

Environmental Contamination and Other Hazards

The contaminants of concern at the Norris Elementary School are volatile organic chemicals (VOCs) and include perchloroethylene, a chemical used in the dry cleaning operations at the former GTOS facility. When perchloroethylene, also known as tetrachloroethylene, PCE, or

PERC, is released into the environment it breaks down or "degrades" to other chemicals. The breakdown chemicals include TCE, DCE, and vinyl chloride. Dichloroethylene can be found in three different chemical forms: 1,1-DCE, cis-1,2-DCE, and trans-1,2-DCE. All air, soil, or water samples taken as part of the investigations of the GTOS site and surrounding properties were analyzed for these contaminants.

Drinking Water

In 2003, the MDEQ took samples from the well that supplies the drinking water to the Norris Elementary School. The current well was installed in 1979 to replace the well that had been contaminated by VOCs migrating from the GTOS site. No VOCs were detected in the samples taken in 2003 from this deeper well (Earth Tech 2003). To ensure the safety of the school's drinking water supply, the school has recently been connected to the municipal drinking water system (personal communication with James G. Feil, Superintendent, Traverse City Area Public Schools, August 9, 2005.)

Indoor Air

Two sets of health-based air screening values were used to assess the level of VOCs found in air samples taken from the Norris Elementary School. The screening values and a decision tree that were used in evaluating the results of the air sampling at the school are provided in Appendix A.

The first and most protective screening values used in this evaluation are the draft acceptable indoor air concentrations (AIAC) developed by the MDEQ, Remediation and Redevelopment Division. The draft AIACs are protective for people who will occupy a building 24 hours per day, 350 days per year, for 30 years. These screening values are very protective for this site since school employees and children will not be present in the building for this much time. No adverse health effects are expected to occur if the levels of chemicals in the air samples from the Norris Elementary School do not exceed these screening values.

The second set of screening values that were used to evaluate the air samples taken from the school are based on Environmental Media Evaluation Guides (EMEGs) developed by the U.S. Agency for Toxic Substances and Disease Registry (ATSDR). The EMEGs used at this site are concentrations of chemicals in air that humans may be exposed to for up to one year without an increased risk of adverse health effects. The EMEGs were used at this site as "Immediate Action Levels." If the air samples taken from inside the school building contained chemicals at concentrations greater than the EMEGs, EPA, MDCH, and ATSDR may have recommended that children and school staff be relocated as soon as possible (as per the decision tree in Appendix A).

There was the possibility that concentrations of chemicals in the indoor air samples taken from the school building would be greater than the screening values, but less than the Immediate Action Levels. Had this situation occurred, EPA, MDCH and ATSDR may have recommended further monitoring of the air in addition to installation of protective measures within one to three months (as per the decision tree in Appendix A).

On March 28 through 30, 2005, the EPA took samples of the air inside the Norris Elementary School building. EPA first conducted a screening level analysis of indoor air in the school

building using the Trace Atmospheric Gas Analyzer or TAGA unit, which was brought to the site in a mobile laboratory. Air samples were taken from various locations within the building, at all floor drains, and any wall openings and analyzed for VOC contaminants (Lockheed Martin 2005).

Twenty-four-hour samples were also collected in SUMMA® canisters at 10 locations inside the school building. In addition, four 24-hour samples were collected in the school's tunnel crawl space and three were collected outside on the school grounds (Lockheed Martin 2005). Table 1 presents the results of the indoor air screening and the 24-hour samples, and provides a comparison to the health-based screening values.

Table 1. Indoor Air Concentrations of VOCs at the Norris Elementary School (March 2005)

	AIAC	Immediate Action Level	Range of VOCs in Screening Samples	Range of VOCs in 24-Hour Samples
PCE	6.2	40	ND - 1.1	ND – 0.74
TCE	2.6	100	ND- 0.66	ND-0.30
1,1-DCE	0.12	20	ND	ND
1,2-DCE (cis)	9.1	200	ND	ND
1,2-DCE (trans)	18.4	200	ND	ND
Vinyl Chloride	2.2	30	ND	ND

Results are in parts per billion by volume (ppbv).
ND = not detected at or above the method detection limit.

None of the detected levels of VOCs exceeded health based screening levels. The highest concentrations of VOCs in the screening samples were found in a crawl space near room 19 and in the floor drain in the janitor's closet located off the cafeteria. The highest concentrations of VOCs detected in the 24-hour samples were found in the tunnels under the school building.

The levels of PCE and TCE found during the sampling did not exceed any health-based screening level. Levels detected in the schoolrooms where children and staff would be expected to spend most of their time were very low. The highest detection of PCE in a schoolroom was 0.36 ppbv and the highest detection of TCE was 0.23 ppbv. TCE was not detected in any ambient air samples and PCE was detected only in one location at a very low level of 0.18 ppbv. DCE and vinyl chloride were not found in any indoor or ambient air sample.

Soil Gas

Vapor or gas phase contaminants that occupy the small spaces between soil particles are called "soil gas." The EPA also analyzed samples of soil gas taken from under the foundation of the school building. These samples were taken to determine if concentrations of chemicals under the foundation of the building were high enough to impact the air inside the building. The screening values for the soil gas samples were developed by multiplying the AIACs by an attenuation factor of 10 (Appendix A). The attenuation factor accounts for the reduction in VOC levels that will occur as the vapors move through the barrier provided by the school building foundation and floors. An attenuation factor of 10 assumes that one tenth of the contaminants found under the school building will move into the indoor air. In actuality, far less of these contaminants appear to be moving through the foundation and entering the school building.

Table 2. Sub-Slab Concentrations of VOCs at the Norris Elementary School (March 2005)			
	Sub-Slab Screening Value	**Range of VOCs in Grab Samples**	**Range of VOCs in 24-Hour Samples**
PCE	62	ND - 400	ND - 400
TCE	26	ND - 160	ND - 190
1,1-DCE	1.2	ND	ND
1,2-DCE (cis)	91	ND - 5.3	ND - 5.6
1,2-DCE (trans)	184	ND - 1.7	ND - 1.6
VC	22	ND	ND

Results are in parts per billion by volume (ppbv).
ND = not detected at or above the method detection limit.

PCE and TCE exceeded their respective screening values in sub-slab soil gas samples collected from locations under the southwest corner of the school building. This information suggests that the plume of VOC contaminated ground water is located near or under this corner of the building. Levels of VOCs in sub-slab soil samples collected from under the northern and eastern areas of the building were non-detect or were well under the sub-slab screening values.

Human Exposure Pathways

To determine whether nearby residents are, have been, or are likely to be exposed to contaminants associated with a property, ATSDR and MDCH evaluate the environmental and human components that lead to human exposure. An exposure pathway contains five major elements: 1) a source of contamination, 2) contaminant transport through an environmental medium, 3) a point of exposure, 4) a route of human exposure, and 5) a receptor population. An exposure pathway is considered a complete pathway if there is evidence that all five of these elements are, have been, or will be present at the property. Alternatively, an exposure pathway is considered complete if there is a high probability of exposure. It is considered a potential pathway if there is no evidence that at least one of the elements above are, have been, or will be present at the property, or that there is a lower probability of exposure. The table below lists the complete and potential pathways for human exposure to the chemicals of concern at the Norris Elementary School.

Table 2. Human Exposure Pathways at the Norris Elementary School							
Source	**Environmental Transport and Media**	**Chemicals of Interest**	**Exposure Point**	**Exposure Route**	**Exposed Population**	**Time Frame**	**Status**
GTOS	Groundwater	PCE, TCE, DCE and VC	Drinking Water	Ingestion, Inhalation, Dermal Contact	School Children and Staff, School Visitors	Past	Complete
						Present	Incomplete
						Future	Incomplete
GTOS	Volatilization of VOCs from groundwater into the school	PCE, TCE, DCE and VC	Indoor Air	Inhalation	School Children and Staff, School Visitors	Past	Complete
						Present	Complete
						Future	Potential

The drinking water well that served the school prior to 1979 was contaminated with VOCs emanating from the GTOS site. It is likely that children, staff and visitors were exposed to contaminants in the drinking water for some time before the well was replaced. However, no VOCs have been detected in the newer, deeper well sampled in 2003. Additionally, the school was recently connected to the municipal drinking water supply (personal communication with James G. Feil, Superintendent, Traverse City Area Public Schools, August 9, 2005.) Therefore the drinking water pathway of exposure is presently incomplete and will remain so in the foreseeable future.

VOCs were detected in low concentrations in the indoor air at the Norris Elementary School and in somewhat higher concentrations in soil gas samples taken from under the building. Therefore, the past and present indoor air inhalation pathways are complete. This pathway may continue to be complete in the future if no action is taken at this site.

Toxicological Evaluation

Exposure to high concentrations of PCE and its breakdown products in air (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, and unconsciousness (ATSDR 1990, 1994, 1996, 1997a, 1997b, 1999).

Animals that were exposed to far higher levels of these chemicals than most people are exposed to, showed noncancer effects such as nerve, liver and kidney damage. There is limited human evidence that suggests exposure to these chemicals may also cause these health effects in people. Most of this evidence comes from studies of people who are exposed to higher levels of these chemicals at their job.

Results from some studies suggest that women who work in dry cleaning industries, where exposures to PCE can be quite high, may have more menstrual problems and miscarriages than women who are not exposed. However, it is not known if PCE was responsible for these problems because other possible causes were not considered.

Some of these chemicals are known or suspected to cause cancer in people, including PCE, TCE, 1,1-DCE and vinyl chloride. The MDEQ draft acceptable indoor air concentrations that were used as screening values at the Norris Elementary School were developed to be protective of the cancer causing effects of these chemicals. None of the concentrations detected in the school exceeded these health-protective screening values.

In addition to its uses in dry cleaning, PCE is found in a variety of consumer products. These include printing ink, correction fluid, glues, sealants, lubricants, paint removers, rug and upholstery cleaners, and stain and rust removers. Both PCE and TCE are also used in industry as a solvent to degrease metal parts. When they are used in our homes, schools, and businesses, these products can release small amounts of chemicals into the air. Dry-cleaned clothes also release small amounts of PCE. Because these chemicals are so common, it is sometimes hard to determine if air concentrations result from the use of consumer products inside a building or from environmental contamination under a building.

Child Health Issues
Children may be at greater risk than adults from certain kinds of exposure to hazardous substances at sites of environmental contamination. They engage in activities such as playing outdoors and hand-to-mouth behaviors that increase their exposure to hazardous substances. They are shorter than adults, which means they breathe dust, soil, and vapors close to the ground. Their lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. The developing body systems of children can sustain permanent damage if toxic exposures are high enough during critical growth stages (ATSDR 1998).

The concentrations of VOCs in indoor air samples taken from the Norris Elementary School were compared to health-based screening values that were developed to be protective for both children and adults. None of the concentrations detected in the school exceeded the screening values.

Conclusions

VOC contaminants detected in the indoor air of the Norris Elementary School currently pose ***no apparent public health hazard*** to visitors, school staff, or children who attend the school. Very low concentrations of PCE and TCE were detected in the indoor air inside the Norris Elementary School. Somewhat higher concentrations of PCE and TCE were detected in soil gas under the foundation of the school. While *cis*- and *trans*-1,2-DCE were found in the soil gas under the school building, these contaminants were not detected in the air inside the building. No level detected exceeded draft acceptable indoor air concentration for that contaminant, therefore there is no current risk for people using the school building.

The indoor door air inhalation pathway poses an ***indeterminate public health hazard*** in the future. The source of the VOC contaminated groundwater at the GTOS facility immediately up gradient from the school has not been fully defined or contained. The concentrations of VOCs in the groundwater plume emanating from the GTOS site could increase in the future, thus increasing the chance that higher concentrations of volatile contaminants could migrate from the groundwater, through the soil and the school foundation and enter the indoor air at the school.

The groundwater ingestion pathway poses ***no public health hazard***. The school has been connected to the municipal water supply and groundwater is no longer being used as a source of drinking water.

Recommendations

- VOC levels in the indoor air at the Norris Elementary School should be periodically monitored to ensure that staff and students are not exposed to unacceptable levels of contaminants.

- VOC contaminants in groundwater and soil gas that could enter the school building should be intercepted before reaching the school building.

- The nature and extent of the source of VOC contaminated groundwater emanating from the GTOS site should be fully defined.

Public Health Action Plan

- The EPA, as the lead agency for the GTOS site, should conduct periodic indoor air monitoring at the Norris Elementary School.
- MDCH and ATSDR will assist the EPA in interpreting indoor air monitoring results.
- The EPA should implement an engineering control to intercept VOCs before they reach the school building.
- The EPA, in cooperation with the MDEQ, should fully characterize the nature and extent of contamination at the GTOS site.
- MDCH will consider any information and data regarding the site that become available and will issue further health consultations as necessary.

References

Agency for Toxic Substances and Disease Registry. 1990. Toxicological Profile for 1,1-Dichloroethane. Atlanta: US Department of Health and Human Services: December 1990.

Agency for Toxic Substances and Disease Registry. 1994. Toxicological Profile for 1,1-Dichloroethene, Update. Atlanta: US Department of Health and Human Services: May 1994.

Agency for Toxic Substances and Disease Registry. 1996. Toxicological Profile for 1,2-Dichloroethene, Update. Atlanta: US Department of Health and Human Services: August 1996.

Agency for Toxic Substances and Disease Registry. 1997a. Toxicological Profile for Trichloroethylene, Update. Atlanta: US Department of Health and Human Services: September 1997.

Agency for Toxic Substances and Disease Registry. 1997b. Toxicological Profile for Vinyl Chloride, Update. Atlanta: US Department of Health and Human Services: September 1997.

Agency for Toxic Substances and Disease Registry. 1998. Division of Health Assessment and Consultation. Guidance on Including Child Health Issues in Division of Health Assessment and Consultation Documents. Atlanta: US Department of Health and Human Services: July 2, 1998.

Agency for Toxic Substances and Disease Registry. 1999. Toxicological Profile for 1,2-Dichloroethane, Update, Draft for Public Comment. Atlanta: US Department of Health and Human Services: August 1999.

Conestoga-Rovers & Associates. 1996. Baseline Environmental Assessment, Grand Traverse Overall Supply, Traverse City, Michigan. February 1996.

Earth Tech, Inc. 2003. Final Technical Memorandum TM-2, Grand Traverse Overall Supply Site, Site ID#450004. Grelickville, Michigan. July 2003.

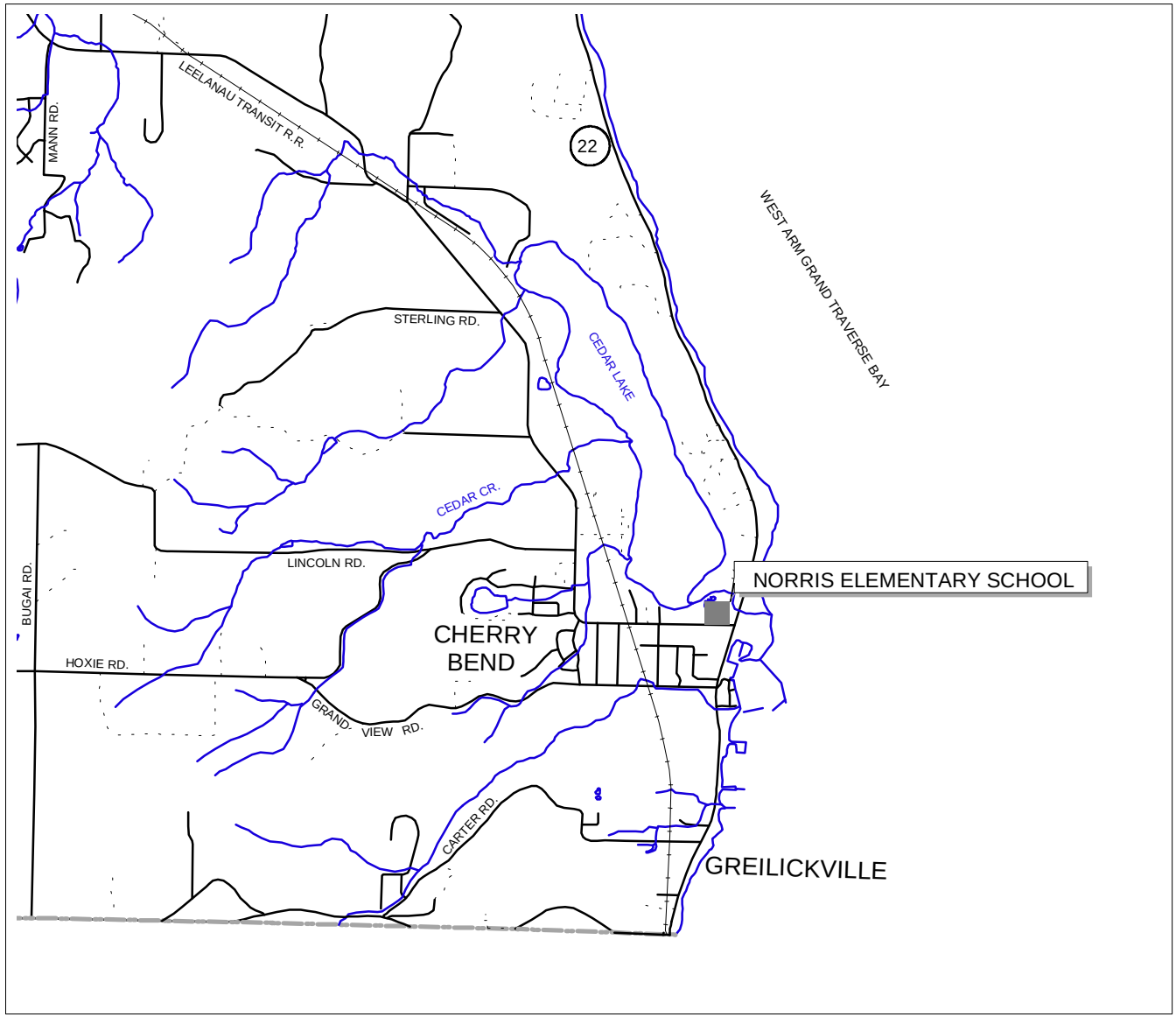
Lockheed Martin. 2005. Final Report. GTOS Soil Gas Intrusion Study Site, Greilickville, Michigan. July 2005.

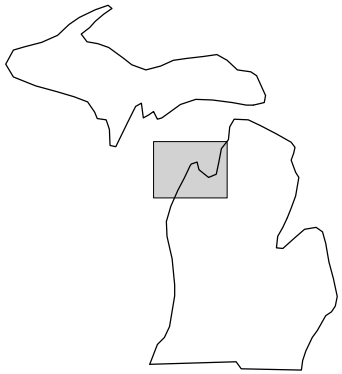
Michigan Department of Environmental Quality. 2004. First Five-Year Review Report for Grand Traverse Overall Supply, Greilickville, Leelanau County, Michigan. June 2004.

Michigan Department of Public Health. 1994. Grand Traverse Overall Supply Company, Greilickville, Leelanau County, Michigan. CERCLIS No. MID017418559. January 21, 1994.

U.S. Environmental Protection Agency. 2004. Letter to MDEQ, Remediation and Redevelopment Division from EPA Superfund Division. July 21, 2004.

NORRIS ELEMENTARY SCHOOL
SITE LOCATION



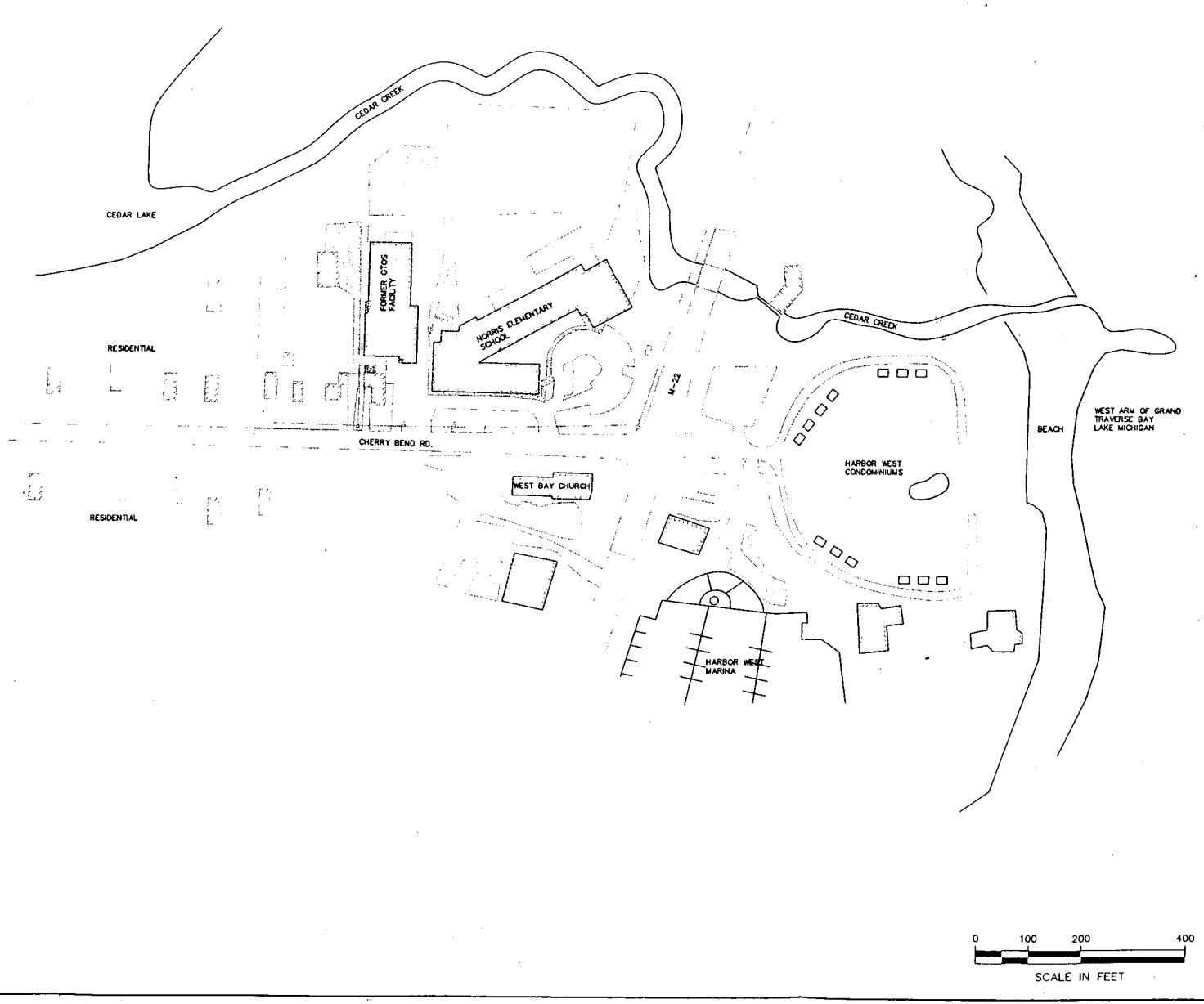


SITE LOCATION

N

Figure 1.

8/8/2005



EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

5555 Glenwood Hills Parkway, SE • P.O. Box 874 • Grand Rapids, MI 49588-0874 • (616) 942-9600

DRAWN BY: KOR	DATE: MARCH, 2003
CHECKED BY: CAB	EDITED BY: DCT031403
FILE NAME: 45915-BASE	

FIGURE 1

GRAND TRAVERSE OVERALL SUPPLY SITE MAP

MDEQ SUPERFUND
LANSING, MICHIGAN

PROJECT NUMBER 45915	SCALE: 1" = 200'

Authors, Technical Advisors

Michigan Department of Community Health
Division of Environmental and Occupational Health

Linda D. Dykema, Ph. D., Toxicologist
Brendan Boyle, M.P.A., Health Assessor

ATSDR Regional Representative

Mark Johnson
Regional Services, Region V
Office of the Assistant

ATSDR Technical Project Officer

Alan Yarbrough
Division of Health Assessment and Consultation
Superfund Site Assessment Branch

Appendix A

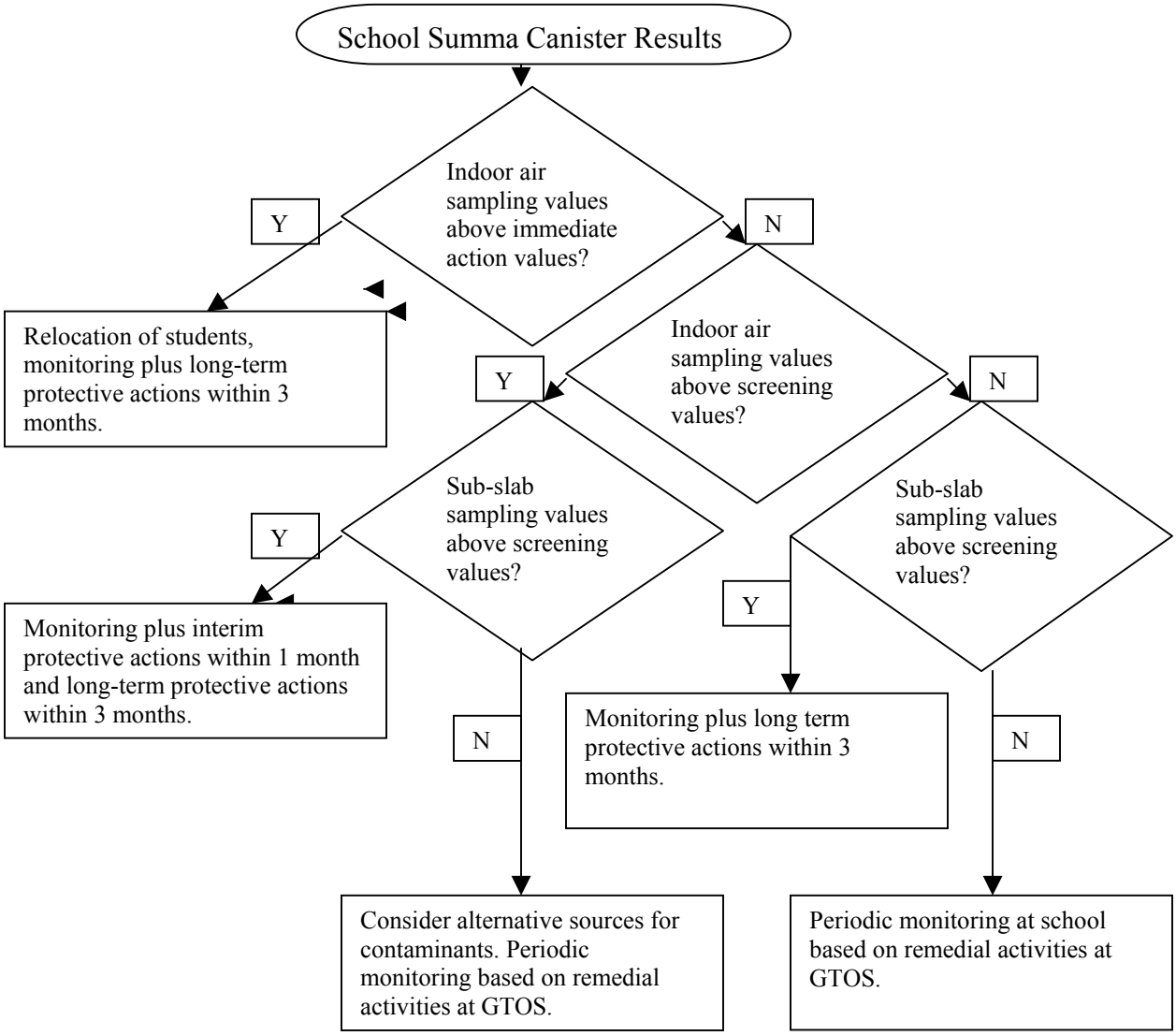
Grand Traverse Overall Supply
Greilickville, Leelanau County, Michigan
Decision Matrix for Norris Elementary School Air Sampling
ATSDR and MDCH Recommendations
3/24/05

Indoor Air Samples[a]		
	Screening Value (ppb)	Immediate Action Value (ppb)[b]
PCE	6.2	40[c]
TCE	2.6	100
1,1-DCE	0.12	20
1,2-DCE (cis)	9.1	200
1,2-DCE (trans)	18.4	200
VC	2.2	30

Sub-Slab Samples[d]	
	Screening Value (ppb)
PCE	62
TCE	26
1,1-DCE	1.2
1,2-DCE (cis)	91
1,2-DCE (trans)	184
VC	22

a) The immediate action values are based on ATSDR intermediate MRLs, while the screening values are based on MDEQ chronic risk guidelines.
b) Consideration will be made for immediate action decisions based on concentrations of mixtures when several of the chemicals of concern approach but do not exceed any individual immediate action value.
c) ATSDR has no intermediate MRL value for PCE; ATSDR's chronic MRL for PCE that is based on a non-cancer endpoint is used instead.
d) Sub-slab monitoring values are derived by incorporating a ten-fold factor to the indoor air screening values to reflect attenuation from sub-slab to indoor air (reference: EPA- OSWER, 2002: Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), Appendix F).

Grand Traverse Overall Supply
Greilickville, Leelanau County, Michigan
Decision Tree for Norris Elementary School Air Sampling
ATSDR and MDCH Recommendations
3/24/05



Certification

This **Grand Traverse Overall Supply Company – Norris Elementary School Indoor Air Assessment** Health Consultation was prepared by the Michigan Department of Community 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 health consultation was begun. Editorial review was completed by the cooperative agreement partner.

Technical Project Officer, Cooperative Agreement Team, SPAB, DHAC, ATSDR

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

for Team Leader, Cooperative Agreement Team, SPAB, DHAC, ATSDR