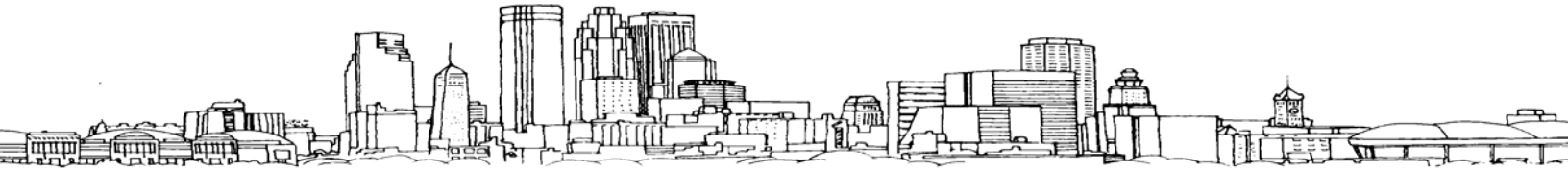
Minneapolis Air Quality Study



City of Minneapolis
Environmental Management and Safety

Summer 2007

Table of Contents
(click on links to visit individual chapters)

Abstract

Introduction

- **Table 1:** Chemicals Analyzed
- **Table 2:** Number of OVMs Deployed
- **Map 1:** Minneapolis Air Quality Study Map
- **Map 2:** 46th Street Transect

Data Results

- **Tables 3-32:** Data Tables
- **Table 34:** Weather Summary

Discussion of Results

- **Table 35:** Chemical with Associated Inhalation Health Benchmark

Benzene Discussion

- **Table 36:** Benzene Results at 46th Street Transect
- **Chart 1:** Benzene Results at 46th Street Transect
- **Chart 2:** Benzene Citywide Results

Tetrachloroethylene Discussion

- **Chart 3:** Tetrachloroehtylene Citywide Results

October 2005 Discussion

- **Chart 4:** Toluene Citywide Results
- **Chart 5:** Trichloroethylene Citywide Results
- **Chart 6:** Ethylbenzene Citywide Results
- **Chart 7:** Benzene- MPCA and City of Minneapolis

16th & Polk St NE Discussion

- **Table 37:** Trimethylbenzene Results
- **Chart 8:** 1 Ethyl-2-Methyl Benzene Citywide Results
- **Chart 9:** 1,2,4 Trimethylbenzene Citywide Results
- **Chart 10:** 1,3,5 Trimethylbenzene Citywide Results
- **Chart 11:** 1,2,3 Trimethylbenzene Citywide Results

Uptown Sampling

- **Map 3:** Uptown Map
- **Chart 12:** Uptown Benzene Results

Suggestions and Recommendations

Appendices

- **Appendix A:** Air Sampling Data-Tables 3-32
- **Appendix B:** An Air Pollution Primer
- **Appendix C:** Sampling Procedures

Sources

Acknowledgments

For questions about this report, contact

Jennifer Tschida
City of Minneapolis
Environmental Management and Safety
250 South 4th Street, Room 414
612.673.5874
Jennifer.tschida@ci.minneapolis.mn.us

Acknowledgements
We would like to thank the individuals who participated in this study. We acknowledge the contributions of the field team including Minneapolis Public Works and Environmental Management staff. We also acknowledge the help and support of the Minnesota Pollution Control Agency (MPCA) staff and University of Texas, School of Public Health.

The Study was funded by the City of Minneapolis Department of Regulatory Services.

ABSTRACT

The Minneapolis air quality study was a small study designed to look at air quality across the entire city in each season; May 2005, August 2005, October 2005 and January 2006. Volatile Organic Compounds were sampled due to their potential health impacts. 3M organic vapor monitors were chosen as the sampling device as they are cost effective, sample many of the chemicals the city was interested in studying and easy to deploy.

Chemicals were compared to their associated Inhalation Health Benchmark (IHB) where applicable. The study demonstrated that all but two of the chemicals sampled were well below the Inhalation benchmarks. The two chemicals that exceeded the Inhalation benchmarks at some of the sampling locations were Benzene and Tetrachloroethylene.

Benzene is emitted from many sources such as industry that produces plastics, rubber, dyes, detergents, drugs and pesticides, sources also include gasoline, mobile sources exhaust and cigarette smoke.

Tetrachloroethylene is emitted from dry cleaning of fabrics and metal degreasing.

In October many results were generally elevated for most of the chemicals throughout the City. Weather conditions likely played a role in the elevated results.

A few sampling locations also indicated elevated results for mobile source emissions. 34th and Cedar Ave South, 16XX Polk St NE and the Uptown Study locations.

Future studies could include sampling for formaldehyde or particulate matter, including more sampling sets within each season, sampling hot spots or sampling based on citizen complaints. This information can play a role in future city policy and planning.

<Back to Table of Contents>

INTRODUCTION

Hazardous Air Pollutants (HAPs) are chemicals that cause serious health and environmental effects including cancer. HAPs are a concern in urban areas because of the variety of pollutant sources such as mobile, point and area sources as well as the high density of people potentially affected. HAPs can also fall into an air pollution category called Volatile Organic Compounds (VOCs). *Volatile* chemicals produce *vapors* readily; at room temperature and normal atmospheric pressure, vapors escape easily from volatile liquid chemicals. Benzene is a HAP and a VOC because it is a chemical that easily volatilizes and also may cause cancer or other health problems. See Appendix B- An Air Pollution Primer for definitions.

MPCA Air Monitoring

The Minnesota Pollution Control Agency (MPCA) monitors air quality throughout the state. In Minneapolis alone the MPCA operates eight air monitoring systems that measure several different families of air pollutants. The MPCA air quality monitors are mounted on the rooftops of schools, fire stations and public buildings. The goal of the MPCA air monitoring is to:

- determine compliance with federal ambient air quality standards,
- determine if air pollution is increasing or decreasing over time,
- inform citizens about daily air quality conditions and
- develop environmental indicators.

Source: MPCA: Citizen's Guide to Monitoring of Outdoor Air, Air Quality/#1.08/February 2003

The monitors operated by MPCA are complex and expensive. They require secure mounting on rooftops and require electricity to operate. They require regular maintenance such as calibration, equipment to analyze the samples and trained staff to operate, interpret and report it all. As a result these monitors may cost upwards of $100,000 per monitor per year to operate. The MPCA's monitoring system is an excellent system that serves the goals of the MPCA and citizens well.

The Minneapolis Air Quality Study

The goal of the Minneapolis Air Quality study was to sample air quality at a neighborhood level or to collect data in areas where people breathe where they live, work and play. Minneapolis needed a different method of sampling as a system similar to the MPCA's system across an entire city would have been cost prohibitive.

Sampling Devices

The 3M™ Organic Vapor Monitor 3500 (OVM) is a charcoal based passive air sampler. The 3M OVM was chosen as they are simple to deploy, cost effective and capable of measuring many of the chemicals that Minneapolis was interested in studying. The OVMs are small, weigh only a few ounces and are designed with a clip to easily attach without causing damage to property. The OVMs are single use and do not require electricity or maintenance.

In a 1999 study the MPCA compared passive 3M ™ Organic Vapor Monitors with the U.S. Federal Reference Method which comprises active monitoring with stainless steel

canisters (the type of monitor the MPCA operates). This study found that the Organic Vapor Monitors compared well with the stainless steel canisters for many of the chemicals for which the City of Minneapolis was most interested. It is for these reasons that the 3M OVM was an appropriate sampling method for this small Minneapolis Air Study. Source: A Field Comparison of Volatile Organic Compound Measurements Using Passive Organic Vapor Monitors and Stainless Steel Canisters.

Prior to the study two hundred OVMs were purchased from the University of Texas School of Public Health, Division of Environmental and Occupational Health Sciences. The OVMs were stored in a secured refrigerator cooler operated by the Minneapolis Public Health Laboratory (AIHA Lab ID# 102313) until the sampling date.

The OVMs are capable of sampling many chemicals, however, the University of Texas School of Public Health's laboratory offered analysis of a suite of chemicals with the purchase of the OVMs. Most of the 31 chemicals analyzed by the University of Texas' laboratory were chemicals with which the city was interested in studying. Table 1 lists the chemicals sampled and analyzed in the Minneapolis Air Quality Study.

Table 1: Chemicals Analyzed Volatile Organic Compounds (VOCs) sampled	
1,3-Butadiene	Methylene chloride
MTBE	Chloroprene
Choroform	Carbon tetrachloride
Benzene	Trichloroethylene
Toluene	Tetrachloroethylene
Ethyl benzene	M&p-Xylenes
o-Xylene	Methyl ethyl ketone
Methylcyclopentane	Naphthalene
Styrene	α-Pinene
β-Pinene	d-Limonene
p-Dichlorobenzene	Isoprene
2,3-Dimethylpentane	1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene	1,2,3-Trimethylbenzene
1-Ethyl-2-methyl benzene	n-Hexane
n-Pentane	n-Nonane
n-Decane	

Sampling Periods

3M OVMs were deployed throughout the city during four sampling periods. The sampling periods were chosen to represent air quality in each season, therefore, one seventy-two hour sampling period occurred in May, August, October of 2005 and January 2006. Table 2 outlines the number of OVMs launched during each sampling period within each type of location.

Table 2- Number of OVMs Deployed*					
Mpls AQ Study	**May-05**	**Aug-05**	**Oct-05**	**Jan-06**	**Total**
• City grid overlay	**33**	**33**	**33**	**33**	**132**
• MPCA comparision	**6**	**6**	**6**	**6**	**24**
• Roadway Transect	**5**	**5**	**5**	**5**	**20**
• QA/QC	**5**	**5**	**5**	**5**	**20**
• Lost/Errored OVMs	**-2**	**0**	**0**	**-8**	**-10**
Total Mpls Study samples analyzed	**47**	**49**	**49**	**41**	**186**
Uptown Study					
• Uptown Samples	**0**	**6**	**6**	**6**	**18**
• Uptown error	**0**	**0**	**0**	**0**	**0**
Total Uptown Study samples analyzed	**0**	**6**	**6**	**6**	**18**
***Including number lost & errored OVMs and additional Uptown Study sampling**					

Sampling Locations

In order to evenly distribute sampling locations throughout the city, thirty-three sampling locations were established using a systematic grid (see Map 1). Sampling locations included residential homes, city parks and office buildings. Businesses and industry were not utilized as permission to access property may have been difficult to obtain and commercial properties were outside of the scope of our neighborhood study. Property owners and/or property managers were approached either by a personal visit or through the US Mail with a letter including a fact sheet and consent form. Each participant signed a consent form allowing city personnel to enter their property for the purpose of sampling. The consent also outlined the voluntary nature of participating (i.e. no monetary compensation was offered for participating).

35W Transect

We know that mobile sources have a large impact on local air quality. As a result, a small roadway transect was sampled in addition to the neighborhood overlay sampling. The transect study crossed 35W along 46th Street South. One OVM was placed in the freeway median between the north and south lanes on 35W. Four OVMs were placed on south side of 46th Street with two OVMs to the east and to the west of 35W spaced approximately 1 block apart. These OVMs were placed on City street signs approximately 7-10 feet from the ground to discourage theft and vandalism.

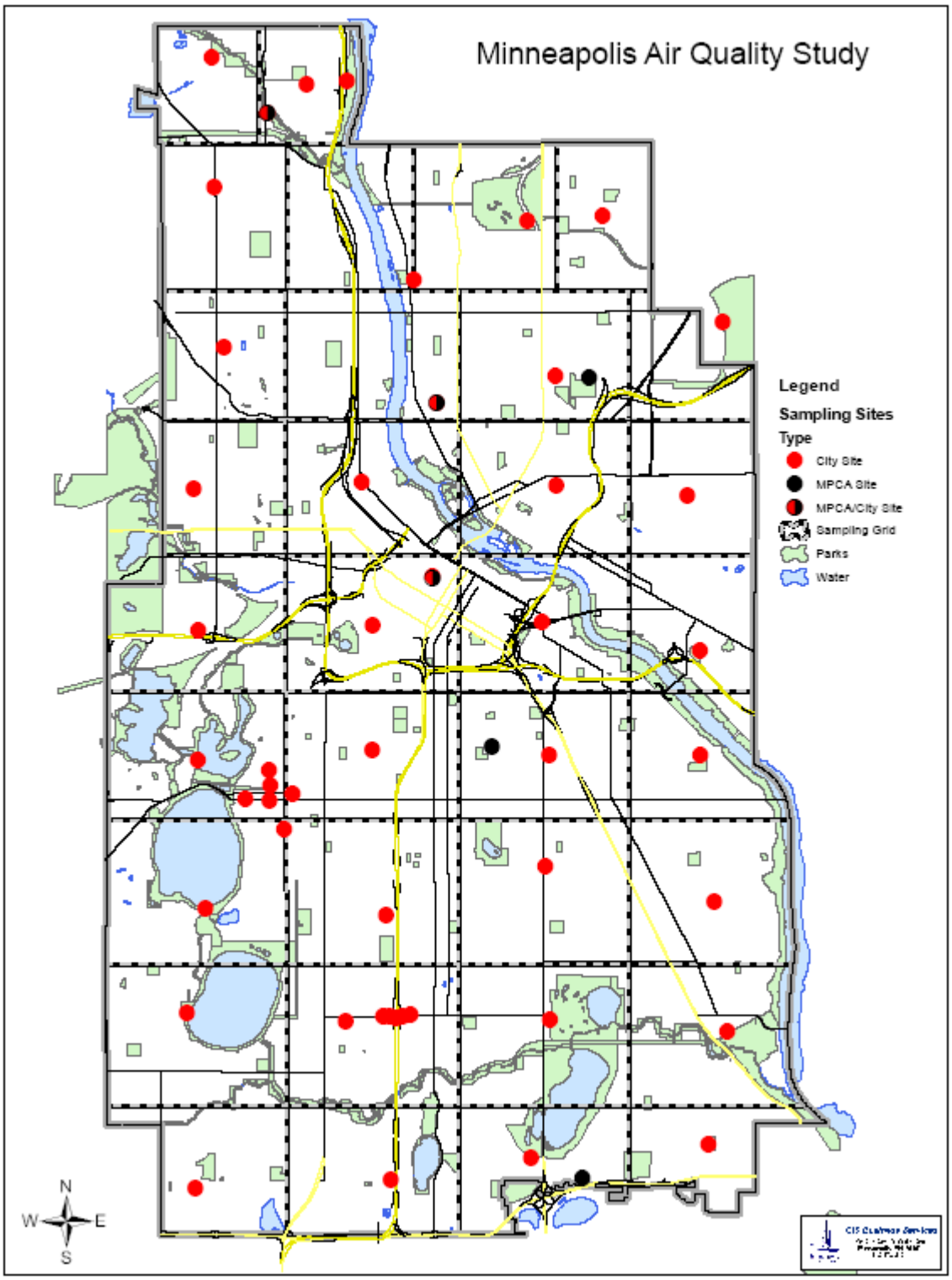
Uptown Neighborhood Sampling

In August 2005, six additional OVMs were placed in the Uptown Neighborhood. Uptown is a highly populated automobile dominated neighborhood. The City was interested in understanding how mobile sources play a role on air quality in his neighborhood. These six OVMs were spaced to collect mobile source data in Uptown. The OVMs were placed at:

- Emerson and Lagoon
- James and Lake
- Hennepin and Lake
- 32nd & Fremont
- Hennepin at the Library (at 29th St.)
- Hennepin at St. Sabrina's (at 28th St)

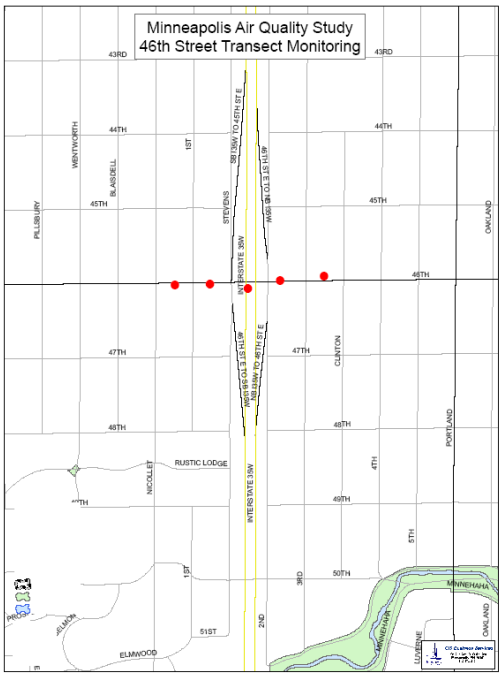
<Back to Table of Contents>

Map 1- Minneapolis Air Quality Study sampling points



[<Back to Table of Contents>]

Map 2- 46th Street Transect



Quality Control

Six samples were also placed adjacent to the MPCA ambient air monitors to compare the OVM results to that of the statewide ambient air monitoring system. These were located at fire stations, city owned office buildings and two nearby privately owned properties. It was difficult to gain access to the ambient air monitors located on top of the public schools (Putnam and Weenonah) and therefore OVM sampling was not conducted at those locations; instead the OVMs were placed at nearby residential properties.

The Minneapolis Air Quality Study sampling coincided with MPCA air monitoring. However, the MPCA monitors for 24 hours and the city's OVMs would collect samples for approximately 72 hours. Therefore, the OVMs were launched the day before MPCA's monitoring was to begin as to collect samples over the entire MPCA monitoring period.

Five OVMs were capped and placed next to field samples for quality control and quality assurance purposes. The control OVMs were deployed immediately next to five field OVMs sprinkled throughout the city in the overlay sampling. The control OVMs were capped immediately to prevent collection of chemicals.

<Back to Table of Contents>

3M™ Organic Vapor Monitor 3500

The OVM was then clipped in the prearranged location on the property, generally hanging from a plant hook or nail away from fresh paint, plastics, green vegetation or other sources that may bias the results high. The OVMs were placed in locations where they would be protected from direct sun, rain and snow such as under roof awnings, porches and the like. If no protection was offered at the sampling site an aluminum pie plate was wired above to protect the OVM.

An “Emissions log sheet” was left on the doorstep of each property to allow the tenants to note any unusual emission/odors occurred during the sampling period. Tenants were instructed to describe the emission/odor in detail, the distance to the emission source and the intensity of the emission. They were instructed to leave the completed form on their front porch so that they could be collected.

Hourly weather conditions were collected for the sampling period through weather underground (www.wunderground.com). Table 34 outlines the average daily weather conditions during the sampling periods.

The OVMs samples were chemically analyzed by the Division of Environmental and Occupational Health Sciences at the University of Texas School of Public Health.

<Back to Table of Contents>

DATA RESULTS

Results of City Data

Appendix A- Tables 3-32 include data by chemical name for all sampling locations and periods.

Understanding the data

The top left corner of the chart identifies the name of the chemical and the CAS#. CAS registry numbers are unique numerical identifiers for chemical compounds assigned by the Chemical Abstracts Service (CAS) as division of the American Chemical Society.

The Health Benchmark is found centered at the top of the page. The Health Benchmark is were derived by agencies such as the Minnesota Department of Health, the US Environmental Protection Agency and State of California to assess the potential health risks associated with exposure to ambient air pollutants (See Appendix A for more specific information).

ND- Non Detectable result indicates that the result was less than the detection limit for that pollutant by this analysis method.

Method Detection Limit (MDL)- This is the level at which the laboratory has 95% statistical accuracy.

The data results are expressed in micrograms per cubic meter (ug/m3).

Errors

In January eight OVMs were incorrectly deployed. The sampling results were eliminated from the study. The OVMs launched in error were located at:

- Grid 2 near 31st and Ulysses St NE
- Grid 6 near 23XX St. Anthony Blvd.
- Grid 7 near Talmage and 23rd AVE SE
- Grid 8 near Delaware and 27th AVE SE
- Grid 9 near 26th Street & 38th Ave South
- Grid 10 near 37th Street and 40th Ave South
- Grid 11 near 55th Street and 39th Ave South
- Grid 12 near Hiawatha and Nawadaha

These results are indicated by an NA on the data sheets.

Missing Samples

OVMs were missing in May upon retrieval; these results are indicated by an NA on the data sheets. The two missing samples were located at:

- Grid 33 at Harriet Lake
- Grid 41 at 46th Street at 1st Ave South

Table 34- Weather Summary							
Date	**Mean T**	**High T**	**Low T**	**Average Humidity**	**Precipitation**	**Wind Speed (MPH)**	**Direction**
3-May-05	42	54	29	39	0	7	NW
4-May-05	53	67	38	34	0	8	S
5-May-05	64	76	51	45	T	13	SSW
6-May-05	62	74	50	57	0	7	NNE
1-Aug-05	80	91	68	64	0	6	SSE
2-Aug-05	85	96	73	59	0	10	SSE
3-Aug-05	82	91	72	66	0	8	SSW
4-Aug-05	73	81	65	68	0.02 in	12	NW
24-Oct-05	39	45	32	70	0	7	N
25-Oct-05	41	51	31	71	0	2	WNW
26-Oct-05	44	52	36	68	0	5	ESE
27-Oct-05	43	54	32	73	0	3	SE
10-Jan-05	24	32	16	76	0	9	SSE
11-Jan-05	30	37	23	74	0	7	SSE
12-Jan-05	36	44	27	77	T	9	NW
13-Jan-05	26	32	20	72	T	14	NW

<Back to Table of Contents>

DISCUSSION OF RESULTS

The results of the Air Quality Study indicate that overall the air quality in Minneapolis is good. However, at times some chemicals may exceed the Inhalation benchmarks.

Of the 31 chemicals sampled, 15 have inhalation benchmarks (IHB) associated with them. IHBs are levels at which a chemical is considered reasonably safe in the ambient air (discussed in detail in Appendix B). Our sampling indicates that only 2 of the 15 chemicals with an Inhalation benchmark exceeded the value at some of the locations during some of the sampling periods. The remaining 13 chemicals which did not exceed the IHB. Table 35 below indicates whether or not the chemical has an associated IHB.

The two chemicals that exceeded the Inhalation Benchmark were benzene and tetrachloroethylene.

Several sampling locations exceeded the lower Inhalation Benchmark for benzene throughout the study. In May and August four sampling locations exceeded the lower Inhalation Benchmark of 1.3 ug/m3. In October, 35 locations exceeded, however, October seems to be an anomaly as many of the 31 chemicals sampled were generally elevated during this sampling period. Slow wind conditions likely played a role in the higher sampling results.

In May, Tetrachloroethylene exceeded the Inhalation Benchmark at three locations. One sampling location exceeded the HRV for three of the sampling periods. The location which exceeded the Inhalation benchmark during three sampling periods is located at a heavily traveled intersection with several area sources such as small business' and gas stations in the immediate vicinity.

There were a few locations that generally had elevated results. These locations were in high traffic areas such as the 46th Street Transect and 34th & Cedar Ave S. Overall, the residential sampling sites had lower chemical results than heavily traveled intersections. However, the 16XX Polk St NE sampling site, which is situated on a residential property and is adjacent to a parcel of land that is zoned light industrial was elevated for some chemicals in May.

<Back to Table of Contents>

Table 35

Chemical to associated Inhalation Benchmark (IHB)		
Cancer IHB	**Non-Cancer IHB**	**No IHB**
p-Dichlorobenzene (106-46-7)	*Styrene (100-42-5)*	1,3,5 TMB (108-67-8)
Toluene (79-01-6)	M P Xylenes (108-38-3)	n-Pentane (109-66-0)
Tetrachloroethylene (127-18-4)	*Chloroform (67-66-3)*	n-Hexane (110-54-3)
MTBE (1634-04-4)	Methyl Ethyl Ketone (78-93-3)	n-Nonane (111-84-2)
Carbon Tetrachloride (56-53-5)	O Xylenes (95476)	N-Decane (124-18-5)
Benzene (71-43-2)	Ethylbenzene (100-41-4)	1,2,3 TMB (526-73-8)
Methylene Chloride (75-09-2)		2,3 Dimethylpentane (565593)
Trichloroethylene (79-01-6)		Ethylmethylbenzene (611-14-3)
*__bolded__ chemicals indicate sampling resulted in a HRV exceedance at one or more locations. **_Italicized_ chemicals indicate that many of the results were below the method detection level (MDL).		*d-Limonene (5989-27-5)*
		Isoprene (78795)
		a-Pinene (127-91-3)
		b-Pinene (127-91-3)
		Napthalene (91-20-3)
		1,2,4 TMB (95-63-6)
		1,3 Butadiene (106-99-0)
		Chloroprene (126-99-8)

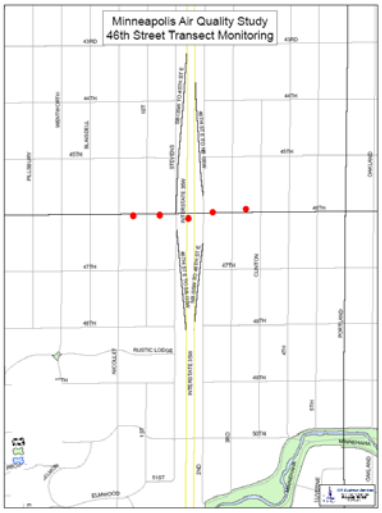
<Back to Table of Contents>

BENZENE DISCUSSION

> *"Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.*
>
> *Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke."*
>
> **ToxFAQs for Benzene,** Agency for Toxic Substances and Disease Registry, Division of Toxicology, http://www.atsdr.cdc.gov/tfacts3.html

Benzene is the only chemical with a range for the inhalation health benchmark (IHB were previously discussed). The lower end of the range is 1.3 ug/m3 and the upper is 4.5 ug/m3. Several sampling results exceeded the lower range of the Inhalation benchmark for Benzene in May, August and January; the October sampling results for Benzene will be discussed later in the report. Four sampling locations exceeded the Inhalation benchmark during every sampling period; they are located at 35W, 46th/1st Street South, 46th/ Nicollet Street South, and 34th/Cedar Ave South. No sampling locations exceeded the upper end of the Benzene HRV range at any time.

35W -46th Street South Roadway Transect Map



46th Streets/ 35W roadway transect

The 35W-46th Street roadway transect OVMs were located on sign posts 7-10 feet off the ground in an effort to prevent vandalism and tampering (Map 3 above). The sampling points were on the south side of 46th Street approximately located between:

- Nicollet and 1st Avenue= Nicollet
- 1st and Stevens Avenue= 1st
- 2nd and 3rd Avenue= 2nd
- 3rd and Clinton Avenue= 3rd
- 35W freeway median= 35W

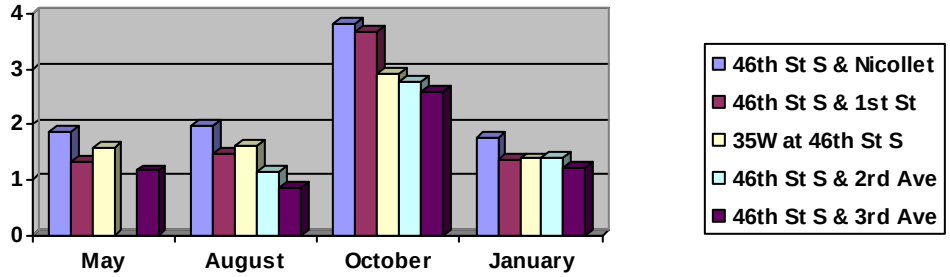
Mobile sources including diesel buses/trucks, automobiles, lawnmowers, idling and accelerating traffic at stop lights and bus stops are all emission sources in this area. There are also a few area sources in the immediate vicinity include: three licensed gasoline filling stations (two of which are located very near the sampling location) and three licensed repair garages (one of them being an autobody shop). There are no point sources in the immediate area.

The sampling results indicate that the 35W and two sampling sites to the west of 35W exceeded the Inhalation benchmark during all of the sampling periods. The benzene results of the roadway transect can be found in the Table 36 below; note that the bolded results indicate the lower Inhalation benchmark was exceeded.

Table 36-

Location	May	August	October	January
46th St S & Nicollet	**1.88**	**1.97**	**3.81**	**1.77**
46th St S & 1st St	**1.33**	**1.47**	**3.68**	**1.36**
35W at 46th St S	**1.59**	**1.63**	**2.91**	**1.39**
46th St S & 2rd Ave	NA	1.15	**2.76**	**1.40**
46th St S & 3rd Ave	1.17	0.86	**2.59**	1.23

Chart 1- Benzene results at the 35W-46th Street Roadway transect



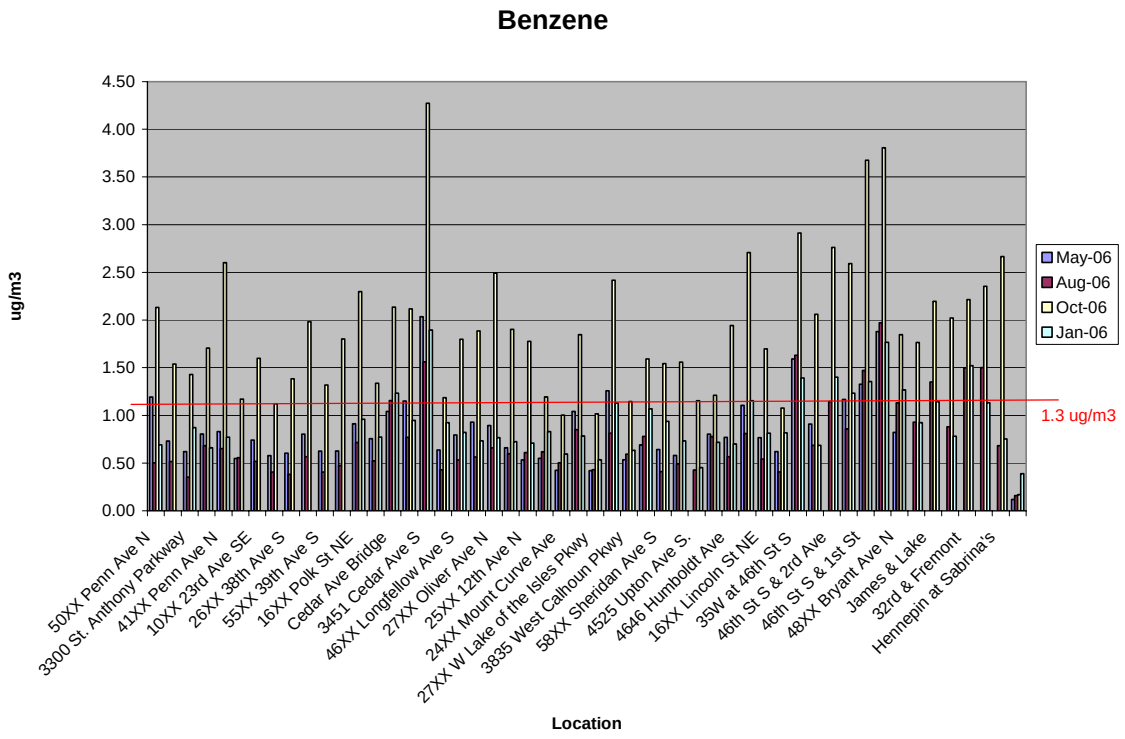
34th Street and Cedar Ave South

The lower range of the Benzene Inhalation benchmark was also exceeded during all four sampling periods at 34th Street and Cedar Ave. The results were: 2.03, 1.56, 4.27, and 1.90 for May, August, October and January.

This intersection generally has heavy bus and truck traffic including two bus stops on Cedar Ave near the sampling location. There are no area sources/licensed businesses in the immediate area that would knowingly emit benzene. There are no point sources in the immediate location of the sampling point.

Note that the OVM was placed under an awning near the bus stop in order to protect it from the rain, snow and direct sunlight. Bus riders sometimes smoke cigarettes beneath the awning in an effort to escape the elements while waiting for the bus. Cigarette smoke is also a source of benzene and therefore, it is likely that cigarette smoke contributed to the benzene results. However, it is impossible to determine what percentage of benzene resulted from cigarette smoke verses mobile sources.

Chart 2- Benzene results



In summary, the lower range of the Benzene Inhalation benchmark was exceeded at several locations in the city. At no time was the upper end of the range exceeded during the sampling. The locations that had multiple exceedances were generally located along busy intersections indicating that mobile sources likely contributed to the result. Gasoline also is a benzene source and therefore emissions from gasoline service stations likely contribute, there were two gasoline service stations adjacent to the 46th Street 35W roadway transect sampling. Cigarette smoke is also a known source of benzene and may have contributed to the exceedance at one location.

<Back to Table of Contents>

TETRACHLOROETHYLENE DISCUSSION

> *"Tetrachloroethylene is a manufactured chemical that is widely used for dry cleaning of fabrics and for metal-degreasing. It is also used to make other chemicals and is used in some consumer products.*
>
> *Other names for tetrachloroethylene include perchloroethylene, PCE, and tetrachloroethene. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor."*

ToxFAQs tm for Tetrachlorethylene (PERC), Agency for Toxic Substances and Disease Registry, Division of Toxicology, http://www.atsdr.cdc.gov/tfacts18.html

In May, Tetrachloroethylene exceeded the Inhalation benchmark at three locations:

- Carl W. Kroening Interpretive Center (I-94 at 49th Street Exit)- 1.72 mg/m3
- 31st & Ulysses St NE- 2.48 ug/m3
- 46th Street and Nicollet Ave- 6.83 ug/m3

Carl W. Kroening Interpretive Center
This sampling site is located in north Minneapolis along interstate I-94 at the 49th Street exit. The sampling site was located directly below the Minneapolis Parks and Recreation sign at the Carl W. Kroening Interpretive Center. There are no known sources of Tetrachloroethylene in the immediate vicinity as there are no area or point sources near the sampling site. It is unclear why this sampling site exceeded the Inhalation benchmark in May and further sampling would be needed to get a better understanding.

31st & Ulysses St NE
In May the 31XX Ulysses St NE sampling location exceeded the Inhalation benchmark of 1.7 ug/m3 with a result of 2.48 ug/m3. The Ulysses sampling site is a residential property set in the center of city block surrounded by residential homes. There is a licensed repair garage and a drycleaner within four blocks.

46th Street S & Nicollet

As previously discussed this location exceeded the Benzene Inhalation benchmark for all sampling periods. It also exceeded the Tetrachloroethylene Inhalation benchmark in three of the four sampling periods including: May-6.83 ug/m3, August- 4.08 ug/m3 and October- 2.36 ug/m3. This is the only sampling location in the study that exceeded Tetrachloroethylene on more than one occasion.

As discussed previously, this sampling site is at the center of a commercial setting with gasoline service stations, repair garages, and drycleaners within blocks.

In summary, Tetrachloroethylene is frequently used in the drycleaning process so it is likely that it may be detected in commercial locations. Tetrachloroethylene exceeded the Inhalation benchmark at a few sampling locations in the city. It is unclear why the chemical was detected above the Inhalation benchmark at two of the non-commercial sites.

46th Street South and Nicollet Ave looking east

OVM placement on sign post

<Back to Table of Contents>

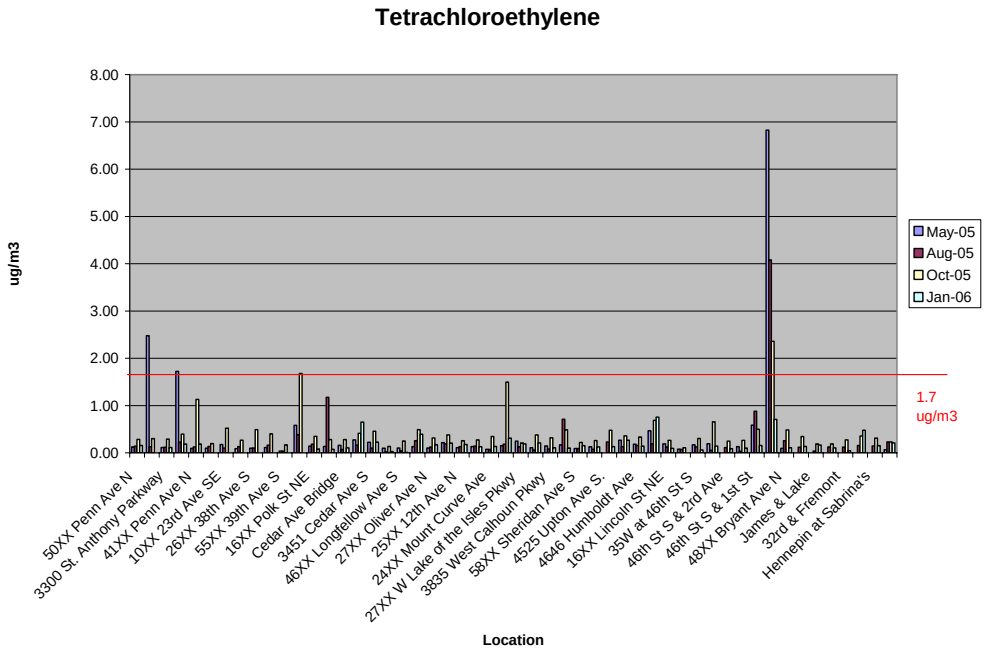


Chart 3- Tetrachloroethylene

[<Back to Table of Contents>]

OCTOBER 2005 DISCUSSION

In general many of the results throughout the city were much higher in October than the other three sampling periods. The weather conditions during this period likely played a role in the elevated results. The average wind speed in October was roughly half that of the other sampling periods. In May the average four day wind speed was ~8.75 miles per hour; in August 9.0 mph, in October 4.25 mph, and in January 9.75 mph. A slower average wind speed would have kept the air pollutants in the area longer allowing the chemicals to be absorbed into the carbon filter in higher concentrations.

The chemicals that resulted in high October readings include: Benzene, 1 3 5 Trimethylbenzene, 1 2 4 Trimethylbenzene, 1 2 3 Trimethylbenzene, Decane, Pentane, Styrene, P-Chlorobenzene, O-Xylene, MP-Xylene, Ethylbenzene, Toluene, and Trichloroethylene

October results are demonstrated by the yellow bar in Charts 4, 5, and 6.

Chart 4- Toluene Results

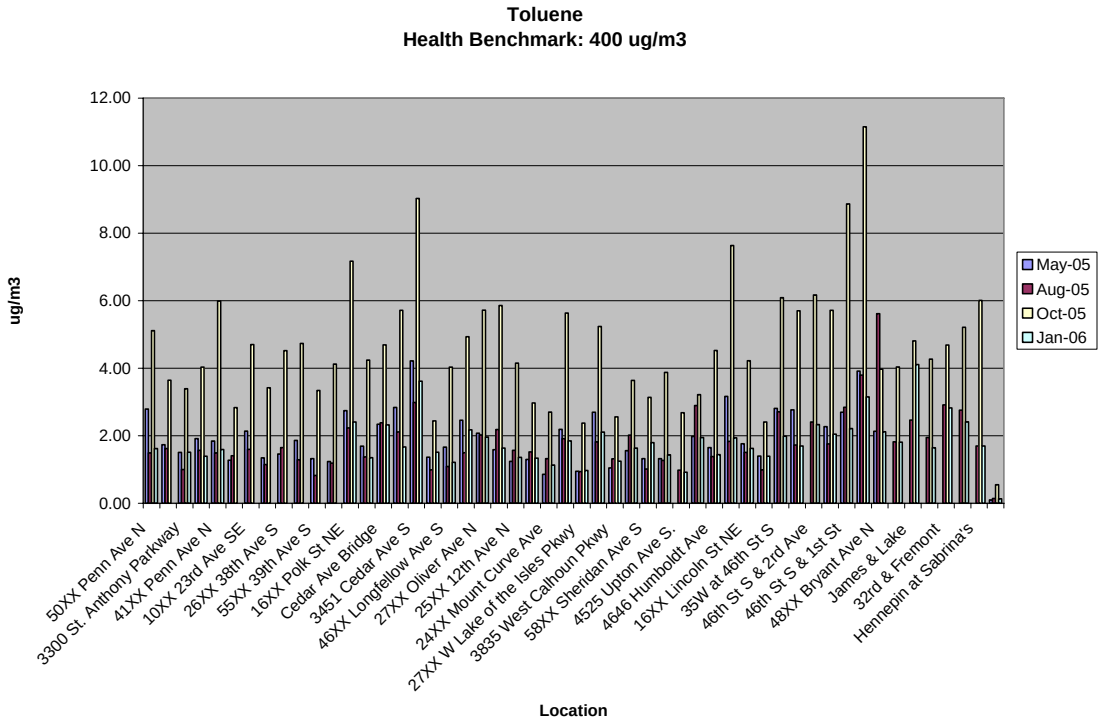


Chart 5- Trichloroethylene Results

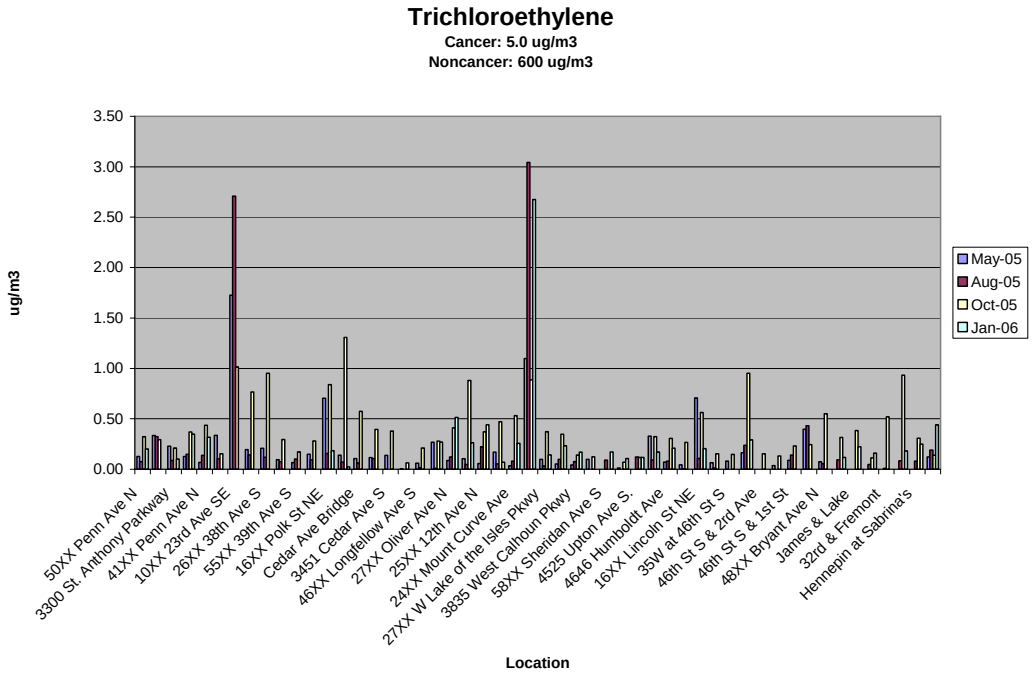
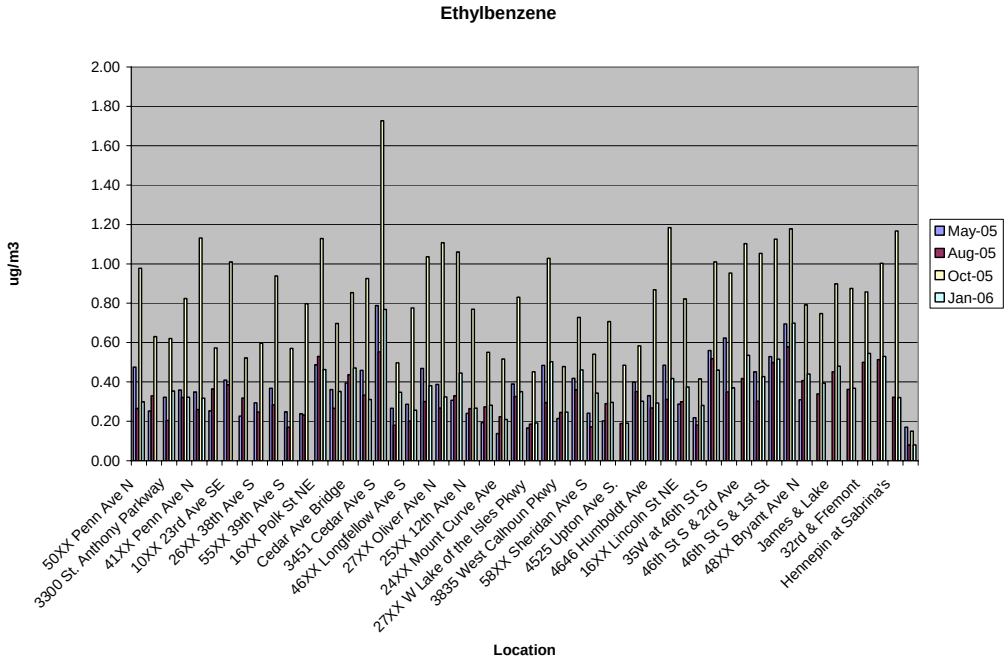
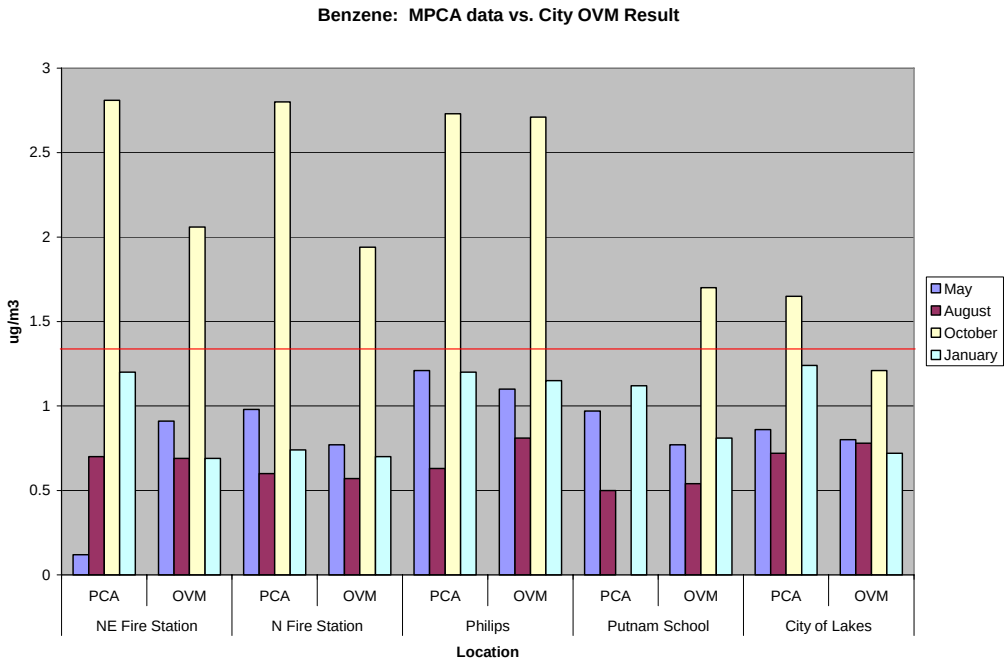


Chart 6- Ethylbenzene Results



The Minnesota Pollution Control Agency's ambient air monitors were consistent with the Minneapolis' October findings as found in Chart 7 below.

Chart 7- Benzene: MPCA and City



[<Back to Table of Contents>]

16th & POLK ST NE DISCUSSION

This sampling site is residential property adjacent to a parcel which is zoned as I1/Light Industrial District(`99). The neighboring property is used as a storage parking lot for construction equipment including diesel trucks. The diesel trucks park just over the property line within approximately 25 feet of the home. The trucks idle for long periods of time (up to hours) to warm the engines and pressurize the brakes, especially on cold days. Neighbors have complained in the past that the diesel emissions drift over the property line causing noxious odors and city inspectors have verified the complaints..

16th & Polk St NE

looking over the fence-16th & Polk

The Emissions Log Form was completed by the property owner in May describing the emissions detected in the immediate area during the sampling period. The resident described the emission on May 4, 2005, as an idling diesel engine and rated the intensity of the odor from the emission as a 5 (on a scale of 1-5). Specifically, the odor was described as a diesel exhaust. The resident included a brief description of the emission as follows:

> *"Equipment on a trailer was started and ran for an undetermined amount of time- the smell called my attention to it while it and out of the house on errands. Smoke was headed directly toward monitoring badge."*

The US Department of Labor- Occupational Safety and Health Administration (US OSHA) identifies the Trimethlybenzene compounds as commonly associated with exhaust emitted by diesel engines.

Source: http://www.osha.gov/SLTC/dieselexhaust/chemical.html

<Back to Table of Contents>

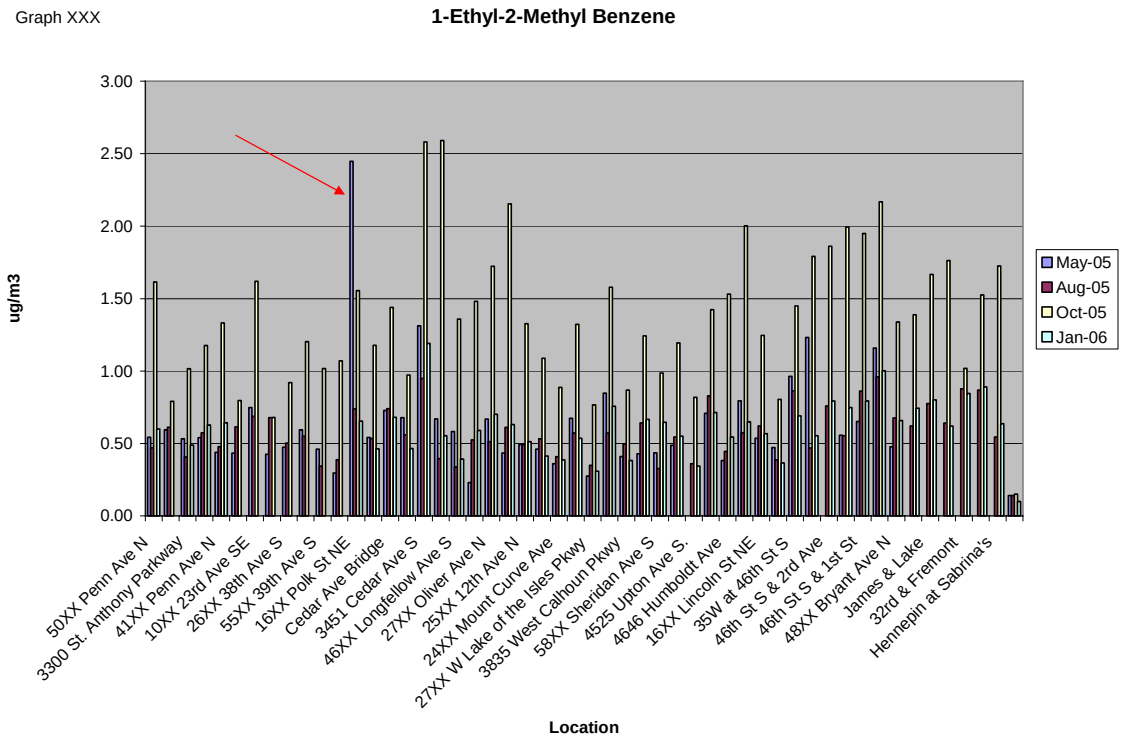
Table 37 lists the result for the Polk address for each of the sampling periods.

Table 37

Chemical	May-05	Aug-05	Oct-05	Jan-06
1,3,5 TMB	0.83	0.22	0.36	0.19
1,2,4 TMB	2.25	0.52	1.45	0.44
1,2,3 TMB	0.84	0.16	0.35	ND
EMB	2.45	0.74	1.55	0.65

While there are no Inhalation benchmarks with which to compare these results, the elevated sampling result at this location in May should be noted. Charts 8-11 below depict the results for all of the sampling locations and periods. The red arrow indicates the Polk St NE result in May. From these graphs it is easy to see that the Polk St NE sampling site had significantly elevated results for four chemicals in May. A secondary matter which is addressed in the October discussion, shows that overall October had generally elevated results for many of the chemicals sampled.

Chart 8- 1 Ethyl-2-Methyl Benzene Results



[<Back to Table of Contents>]

Chart 9- 1,2,4 Trimethylbenzene Results

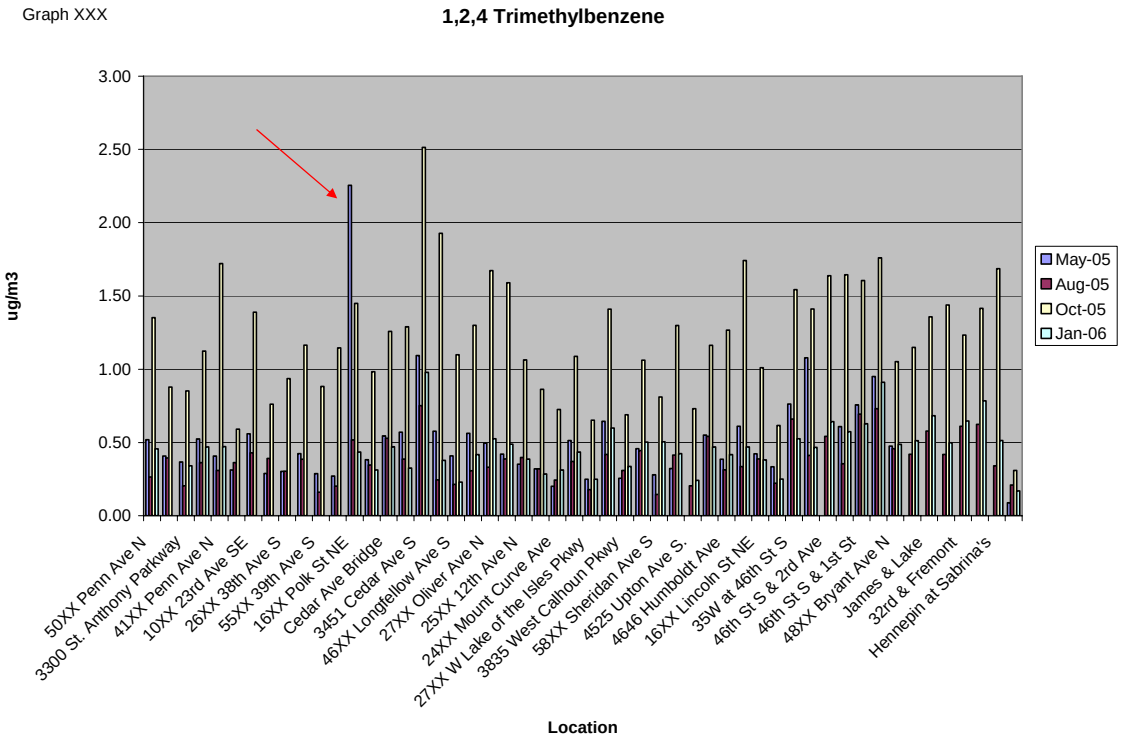


Chart 10- 1,3,5 Trimethylbenzene Results

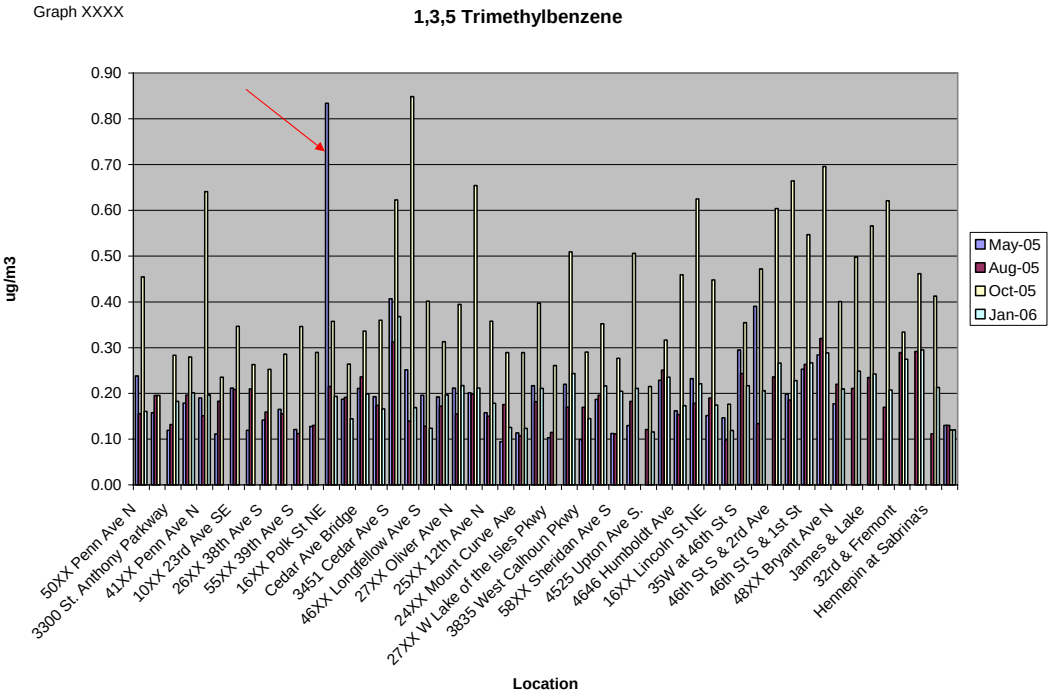
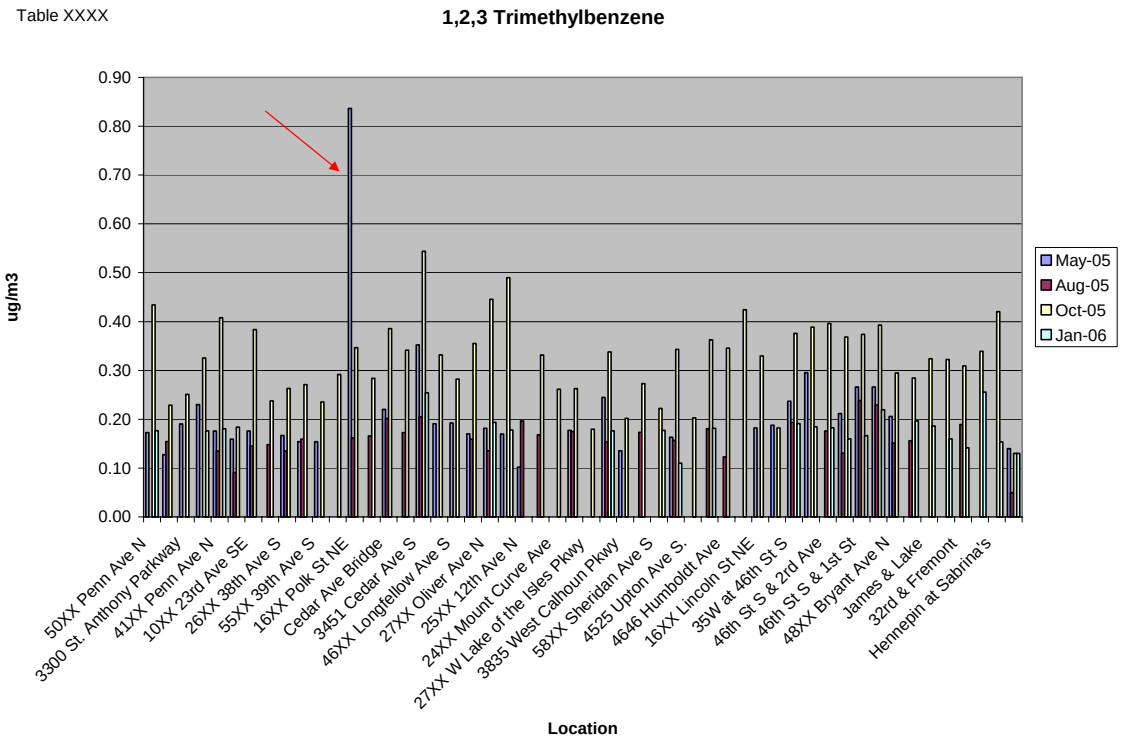


Chart 11- 1,2,3 Trimethylbenzene Results

Table XXXX



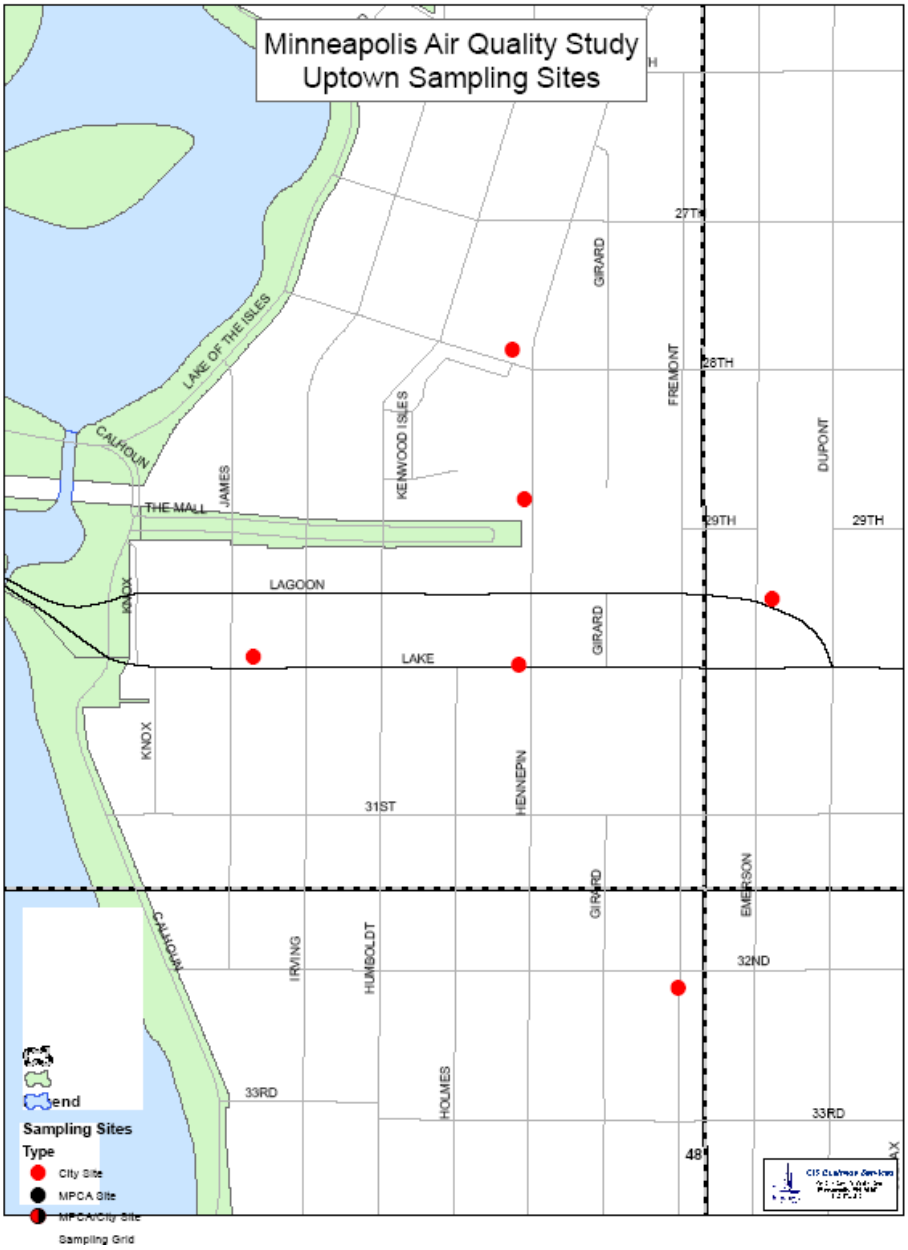
[<Back to Table of Contents>]

UPTOWN SAMPLING DISCUSSION

As mentioned previously, the Uptown sampling was added after the beginning of the study (see Map 3) and therefore, there are no sampling results for the May sampling period.

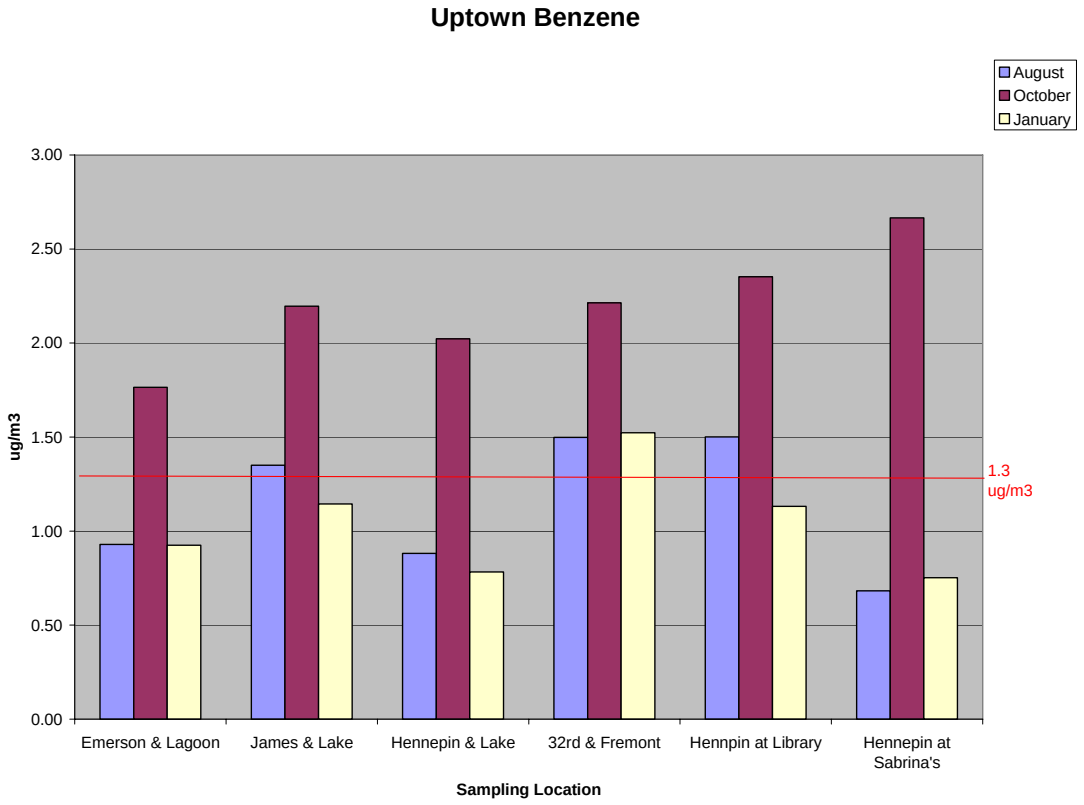
Of the three sampling periods in Uptown, Benzene was the only chemical that exceeded the Inhalation Benchmark. October appeared to be generally higher results than the other sampling periods. This is consistent with the results of the overall study.

Map 3- Uptown Map



[<Back to Table of Contents>]

Chart 12- Benzene results in Uptown sampling



SUGGESTIONS AND RECOMMENDATIONS

The following are suggestions and recommendations for future consideration.

Ordinance & Licensing Regulations

Create and amend current air quality ordinances to reduce volatile organic compounds, specifically benzene.

Utilize tools such as business licenses and building permits to target emissions reductions among industry type and work practices. Strategies may include pollution prevention techniques, adding or upgrading pollution controls equipment, and modifying work practices (for example, restricting idling of construction vehicles at job sites).

- Through ordinance, prevent specific work practices (for example, sand blasting) on air quality alert days.
- Implement annual inspections of city facilities/business that have MPCA air quality permits to ensure that they operating properly and more closely review MPCA permit applications for all facilities within Minneapolis.
- Implement random inspections for ensure Stage One Vapor Recovery Systems are installed and being used.
- Consider target areas within city and metro area for stricter state air quality regulation (lower emission standards).

Data Analysis

Continue to analyze the current data and include a more thorough review of air emissions sources near sampling sites such as bus stops, truck routes, gasoline stations, congested intersections and area sources to better determine their effect on the sampling results.

Share the data with the University of Minnesota for further analysis.

Within City Departments

Continue working with City's Sustainability Office to implement strategies to improve air quality and meet indicator goals, including an increased emphasis on ozone.

Work with Minneapolis Development Review to:

- Encourage green building techniques
- Consider air quality impacts during plan development review
- Develop stricter standards for permits that impact air quality
- Provide information on workplace practices to reduce adverse impact on air quality on job sites (idling, sandblasting, excavation dust).

Communicate the air quality data to all City Departments, including Public Works, Zoning/Planning, Department, Regulatory Services, and CPED. Offer assistance to develop comprehensive air quality strategies and policies.

- Develop city-wide strategies for reducing traffic congestion at intersections.
- Minimize air toxics exposure to sensitive populations such as children and the elderly. For example, work with Zoning/Planning to locate day care centers, schools, and senior centers away from known emission sources.
- Work with Public Works to plan commuter bike routes off of main roadways to reduce exposure e.g. to auto exhaust and increase roadway safety.

Partnerships
Continue to maintain/improve partnerships with sister agencies to share air quality information, resources and ideas such as:

- Increase the City's commitment to Clean Air Minnesota (CAM) to reduce volatile organic compounds and Oxides of Nitrogen throughout Minneapolis and the state. Accomplish this task by increasing staff time devoted to CAM and allocate funding for projects that directly reduce VOCs in Minneapolis.

- Partner with Minnesota Pollution Control Agency to discuss air quality strategies. Specifically, concentrate on areas with which the City can focus resources to realize emissions reductions and improve air quality in Minneapolis. Air Quality partnerships are necessary to minimize redundant efforts between sister agencies and to ensure resources are used efficiently.

  Other agencies with which we should communicate air quality strategies:
  Minnesota Department of Health
  University of Minnesota- School of Public Health
  Hennepin County
  MN DOT
  America Lung Association
  Metropolitan Council
  Other Metropolitan Cities

Future Sampling
Below are additional options for future air sampling. Submit request for equipment, training, and analysis as part of 2009 budget process.

- Citizen complaint response- sample locations that have a history of air quality complaints in the city.

- Conduct more intensive location sampling of air emissions sources such as industry type or heavily traveled intersections. Identify what pollutants need to measure and purchase appropriate equipment.

- Conduct multi-seasonality sampling to gain a more accurate picture of air quality within the seasons.

- Conduct sampling for other pollutants of concern such as particles or formaldehyde or others as they become a concern.

<Back to Table of Contents>

Appendix A

Data Tables 3-32

Benzene
71-43-2

Health Benchmark
Cancer: 1.3-4.5 ug/m3
Non Cancer: 30ug/m3

Table 3

Location	Grid	May-06	Aug-06	Oct-06	Jan-06
50XX Penn Ave N	1	1.19	0.50	2.13	0.69
31XX Ulysses St NE	2	0.73	0.52	1.54	NA
3300 St. Anthony Parkway	3	0.62	0.35	1.43	0.87
4900 Mississippi Court	4	0.80	0.68	1.71	0.66
41XX Penn Ave N	5	0.83	0.65	2.60	0.77
2317 St. Anthony Parkway	6	0.55	0.56	1.17	NA
10XX 23rd Ave SE	7	0.74	0.52	1.60	NA
1XX SE Arthur Avenue	8	0.58	0.41	1.12	NA
26XX 38th Ave S	9	0.60	0.38	1.38	NA
37XX 40th Ave S	10	0.80	0.57	1.98	NA
55XX 39th Ave S	11	0.63	0.41	1.32	NA
41XX Nawadaha Blvd	12	0.63	0.47	1.80	NA
16XX Polk St NE	13	0.91	0.72	2.30	0.96
8XX 5th Ave SE	14	0.76	0.52	1.34	0.77
Cedar Ave Bridge	15	1.04	1.16	2.14	1.23
26XX Longfellow Ave S	16	1.15	0.77	2.12	0.95
3451 Cedar Ave S	17	2.03	1.56	4.27	1.90
5601 Nokomis Lane	18	0.64	0.43	1.19	0.92
46XX Longfellow Ave S	19	0.80	0.53	1.80	0.82
27XX Randolph St.	20	0.93	0.56	1.89	0.73
27XX Oliver Ave N	21	0.89	0.66	2.49	0.77
1001 Washington Ave N	22	0.66	0.60	1.90	0.73
25XX 12th Ave N	23	0.53	0.61	1.78	0.71
Loring Greenway	24	0.55	0.62	1.19	0.83
24XX Mount Curve Ave	25	0.42	0.50	1.00	0.60
26XX Blaisdell Ave S	26	1.04	0.85	1.85	0.78
27XX W Lake of the Isles Pkwy	27	0.42	0.43	1.02	0.54
35XX 1st Ave S	28	1.26	0.81	2.42	1.13
3835 West Calhoun Pkwy	29	0.54	0.59	1.15	0.63
58th & Blaisdell Ave S	30	0.69	0.78	1.59	1.07
58XX Sheridan Ave S	31	0.64	0.41	1.54	0.94
46XX Grand Ave S	32	0.58	0.49	1.56	0.73
4525 Upton Ave S.	33	NA	0.43	1.15	0.45
309 2nd Ave S	34	0.80	0.78	1.21	0.72
4646 Humboldt Ave	35	0.77	0.57	1.94	0.70
12XX 26th St E	36	1.10	0.81	2.71	1.15
16XX Lincoln St NE	37	0.77	0.54	1.70	0.81
57XX Standish Ave	38	0.62	0.41	1.08	0.82
35W at 46th St S	42	1.59	1.63	2.91	1.39
143 13th Ave NE	43	0.91	0.69	2.06	0.69
46th St S & 2rd Ave	45	NA	1.15	2.76	1.40
46th St S & 3rd Ave	46	1.17	0.86	2.59	1.23
46th St S & 1st St	47	1.33	1.47	3.68	1.36
46th St S & Nicollet	48	1.88	1.97	3.81	1.77
48XX Bryant Ave N	49	0.82	1.13	1.85	1.27
Emerson & Lagoon	50	NA	0.93	1.76	0.92
James & Lake	51	NA	1.35	2.20	1.14
Hennepin & Lake	52	NA	0.88	2.02	0.78
32rd & Fremont	53	NA	1.50	2.21	1.52
Hennpin at Library	54	NA	1.50	2.35	1.13
Hennepin at Sabrina's	55	NA	0.68	2.67	0.75
Method Detection Limit	MDL	0.12	0.16	0.17	0.39

Results are in micrograms/cubic meter (ug/m3),
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Tetrachloroethylene
CAS# 127-18-4

Health Benchmark
Cancer: 1.7 ug/m3
Non Cancer: 35 ug/m3

Table 4

Location	Grid	May-05	Aug-05	Oct-05
50XX Penn Ave N	1	0.12	0.14	0.28
31XX Ulysses St NE	2	**2.48**	0.13	0.30
3300 St. Anthony Parkway	3	0.11	0.12	0.29
4900 Mississippi Court	4	**1.72**	0.23	0.40
41XX Penn Ave N	5	0.10	0.13	1.13
2317 St. Anthony Parkway	6	0.10	0.14	0.20
10XX 23rd Ave SE	7	0.18	0.10	0.52
1XX SE Arthur Avenue	8	0.09	0.13	0.27
26XX 38th Ave S	9	0.10	0.10	0.49
37XX 40th Ave S	10	0.11	0.16	0.40
55XX 39th Ave S	11	0.04	0.04	0.17
41XX Nawadaha Blvd	12	0.58	0.39	1.68
16XX Polk St NE	13	0.15	0.18	0.35
8XX 5th Ave SE	14	0.13	1.18	0.28
Cedar Ave Bridge	15	0.16	0.07	0.28
26XX Longfellow Ave S	16	0.28	0.16	0.41
3451 Cedar Ave S	17	0.22	0.10	0.46
5601 Nokomis Lane	18	0.10	0.02	0.14
46XX Longfellow Ave S	19	0.10	0.05	0.25
27XX Randolph St.	20	0.13	0.26	0.49
27XX Oliver Ave N	21	0.10	0.12	0.32
1001 Washington Ave N	22	0.22	0.19	0.38
25XX 12th Ave N	23	0.11	0.13	0.26
Loring Greenway	24	0.13	0.14	0.28
24XX Mount Curve Ave	25	0.08	0.07	0.34
26XX Blaisdell Ave S	26	0.15	0.18	1.50
27XX W Lake of the Isles Pkwy	27	0.25	0.13	0.21
35XX 1st Ave S	28	0.11	0.06	0.38
3835 West Calhoun Pkwy	29	0.15	0.08	0.32
58th & Blaisdell Ave S	30	0.17	0.71	0.49
58XX Sheridan Ave S	31	0.09	0.09	0.22
46XX Grand Ave S	32	0.13	0.08	0.26
4525 Upton Ave S.	33	NA	0.23	0.48
309 2nd Ave S	34	0.27	0.13	0.36
4646 Humboldt Ave	35	0.18	0.16	0.33
12XX 26th St E	36	0.47	0.19	0.69
16XX Lincoln St NE	37	0.19	0.13	0.26
57XX Standish Ave	38	0.08	0.07	0.11
35W at 46th St S	42	0.17	0.13	0.30
143 13th Ave NE	43	0.19	0.05	0.66
46th St S & 2rd Ave	45	NA	0.11	0.25
46th St S & 3rd Ave	46	0.13	0.04	0.27
46th St S & 1st St	47	0.59	0.88	0.50
46th St S & Nicollet	48	**6.83**	**4.08**	**2.36**
48XX Bryant Ave N	49	0.09	0.26	0.49
Emerson & Lagoon	50	NA	0.12	0.34
James & Lake	51	NA	0.04	0.19
Hennepin & Lake	52	NA	0.12	0.19
32rd & Fremont	53	NA	0.12	0.28
Hennpin at Library	54	NA	0.16	0.36
Hennepin at Sabrina's	55	NA	0.15	0.31
Method Detection Limit	**MDL**	**0.07**	**0.23**	**0.23**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Napthalene
CAS# 91-20-3

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 5

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	ND	ND	ND	ND
31XX Ulysses St NE	2	ND	ND	ND	NA
3300 St. Anthony Parkway	3	ND	ND	ND	ND
4900 Mississippi Court	4	ND	ND	ND	ND
41XX Penn Ave N	5	ND	ND	ND	ND
2317 St. Anthony Parkway	6	ND	ND	ND	NA
10XX 23rd Ave SE	7	ND	ND	ND	NA
1XX SE Arthur Avenue	8	ND	ND	ND	NA
26XX 38th Ave S	9	ND	ND	ND	NA
37XX 40th Ave S	10	ND	ND	ND	NA
55XX 39th Ave S	11	ND	ND	ND	NA
41XX Nawadaha Blvd	12	ND	ND	ND	NA
16XX Polk St NE	13	ND	ND	ND	ND
8XX 5th Ave SE	14	ND	ND	ND	ND
Cedar Ave Bridge	15	ND	ND	ND	ND
26XX Longfellow Ave S	16	ND	ND	0.16	ND
3451 Cedar Ave S	17	ND	ND	ND	ND
5601 Nokomis Lane	18	ND	ND	ND	ND
46XX Longfellow Ave S	19	ND	ND	ND	ND
27XX Randolph St.	20	ND	ND	ND	ND
27XX Oliver Ave N	21	ND	ND	ND	ND
1001 Washington Ave N	22	ND	ND	ND	ND
25XX 12th Ave N	23	0.16	ND	ND	ND
Loring Greenway	24	ND	ND	ND	ND
24XX Mount Curve Ave	25	ND	ND	ND	ND
26XX Blaisdell Ave S	26	ND	ND	ND	ND
27XX W Lake of the Isles Pkwy	27	ND	ND	ND	ND
35XX 1st Ave S	28	ND	ND	ND	ND
3835 West Calhoun Pkwy	29	ND	ND	ND	ND
58th & Blaisdell Ave S	30	ND	ND	ND	ND
58XX Sheridan Ave S	31	ND	ND	ND	ND
46XX Grand Ave S	32	ND	ND	ND	ND
4525 Upton Ave S.	33	NA	ND	ND	ND
309 2nd Ave S	34	ND	ND	ND	ND
4646 Humboldt Ave	35	ND	ND	ND	ND
12XX 26th St E	36	ND	ND	ND	ND
16XX Lincoln St NE	37	ND	ND	ND	ND
57XX Standish Ave	38	ND	ND	ND	ND
35W at 46th St S	42	ND	ND	ND	ND
143 13th Ave NE	43	ND	ND	ND	ND
46th St S & 2rd Ave	45	NA	ND	ND	ND
46th St S & 3rd Ave	46	ND	ND	ND	ND
46th St S & 1st St	47	ND	ND	ND	ND
46th St S & Nicollet	48	ND	ND	ND	ND
48XX Bryant Ave N	49	ND	ND	ND	ND
Emerson & Lagoon	50	NA	ND	ND	ND
James & Lake	51	NA	ND	ND	ND
Hennepin & Lake	52	NA	ND	ND	ND
32rd & Fremont	53	NA	ND	0.15	ND
Hennpin at Library	54	NA	ND	ND	ND
Hennepin at Sabrina's	55	NA	ND	ND	ND
Method Detection Limit	**MDL**	**0.14**	**0.25**	**0.11**	**0.13**

Results are in micrograms/cubic meter (ug/m3),
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

p-Dichlorobenzene
CAS# 106-46-7

Health Benchmark
Cancer: 0.91 ug/m3
Non Cancer: 800 ug/m3

Table 6

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.14	0.04	0.35	ND
31XX Ulysses St NE	2	ND	0.09	ND	NA
3300 St. Anthony Parkway	3	0.07	0.02	0.10	0.25
4900 Mississippi Court	4	0.06	0.02	0.15	ND
41XX Penn Ave N	5	0.11	0.05	0.42	ND
2317 St. Anthony Parkway	6	0.04	0.04	0.09	NA
10XX 23rd Ave SE	7	0.04	0.05	0.19	NA
1XX SE Arthur Avenue	8	0.13	0.03	0.18	NA
26XX 38th Ave S	9	ND	0.08	0.21	NA
37XX 40th Ave S	10	0.07	0.06	0.20	NA
55XX 39th Ave S	11	0.02	ND	0.15	NA
41XX Nawadaha Blvd	12	0.04	0.05	0.15	NA
16XX Polk St NE	13	ND	0.16	0.12	0.28
8XX 5th Ave SE	14	ND	0.04	0.15	0.24
Cedar Ave Bridge	15	0.06	0.07	0.17	0.25
26XX Longfellow Ave S	16	0.14	0.15	0.42	0.28
3451 Cedar Ave S	17	0.14	0.12	0.33	0.26
5601 Nokomis Lane	18	ND	0.02	0.07	0.23
46XX Longfellow Ave S	19	ND	0.01	0.19	0.21
27XX Randolph St.	20	0.11	0.05	0.15	ND
27XX Oliver Ave N	21	0.13	0.07	0.56	0.01
1001 Washington Ave N	22	0.07	0.06	0.28	ND
25XX 12th Ave N	23	0.09	0.03	0.41	ND
Loring Greenway	24	0.13	0.13	0.21	0.23
24XX Mount Curve Ave	25	0.08	ND	0.15	ND
26XX Blaisdell Ave S	26	0.07	0.13	0.28	ND
27XX W Lake of the Isles Pkwy	27	ND	0.03	0.09	ND
35XX 1st Ave S	28	0.14	0.05	0.67	ND
3835 West Calhoun Pkwy	29	ND	ND	0.09	ND
58th & Blaisdell Ave S	30	0.07	0.06	0.12	0.26
58XX Sheridan Ave S	31	ND	0.01	0.14	ND
46XX Grand Ave S	32	0.04	0.05	0.35	ND
4525 Upton Ave S.	33	NA	0.02	0.12	ND
309 2nd Ave S	34	0.15	0.02	0.19	ND
4646 Humboldt Ave	35	0.09	0.04	0.41	ND
12XX 26th St E	36	0.20	0.07	0.36	0.25
16XX Lincoln St NE	37	0.09	ND	0.19	0.23
57XX Standish Ave	38	0.11	0.02	0.13	0.24
35W at 46th St S	42	0.06	0.02	0.31	0.22
143 13th Ave NE	43	0.30	0.25	0.53	0.06
46th St S & 2rd Ave	45	NA	0.06	0.48	0.30
46th St S & 3rd Ave	46	0.10	0.05	0.42	0.26
46th St S & 1st St	47	0.05	0.10	0.20	0.24
46th St S & Nicollet	48	0.08	0.00	0.21	0.22
48XX Bryant Ave N	49	0.06	0.03	0.20	0.28
Emerson & Lagoon	50	NA	0.03	0.17	ND
James & Lake	51	NA	0.04	0.15	ND
Hennepin & Lake	52	NA	ND	0.17	ND
32rd & Fremont	53	NA	ND	0.18	0.27
Hennpin at Library	54	NA	0.03	0.17	ND
Hennepin at Sabrina's	55	NA	0.07	0.29	0.15
Method Detection Limit	**MDL**	**0.28**	**0.17**	**0.29**	**0.59**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

1,2,3 Trimethylbenzene
CAS# 526-73-8

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 7

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.17	ND	0.43	0.18
31XX Ulysses St NE	2	0.13	0.15	0.23	NA
3300 St. Anthony Parkway	3	0.19	ND	0.25	ND
4900 Mississippi Court	4	0.23	ND	0.33	0.18
41XX Penn Ave N	5	0.18	0.13	0.41	0.18
2317 St. Anthony Parkway	6	0.16	0.09	0.18	NA
10XX 23rd Ave SE	7	0.18	0.15	0.38	NA
1XX SE Arthur Avenue	8	ND	0.15	0.24	NA
26XX 38th Ave S	9	0.17	0.14	0.26	NA
37XX 40th Ave S	10	0.15	0.16	0.27	NA
55XX 39th Ave S	11	0.15	ND	0.24	NA
41XX Nawadaha Blvd	12	ND	ND	0.29	NA
16XX Polk St NE	13	0.84	0.16	0.35	ND
8XX 5th Ave SE	14	ND	0.17	0.28	ND
Cedar Ave Bridge	15	0.22	0.20	0.39	ND
26XX Longfellow Ave S	16	ND	0.17	0.34	ND
3451 Cedar Ave S	17	0.35	0.20	0.54	0.25
5601 Nokomis Lane	18	0.19	ND	0.33	ND
46XX Longfellow Ave S	19	0.19	ND	0.28	ND
27XX Randolph St.	20	0.17	0.16	0.36	ND
27XX Oliver Ave N	21	0.18	0.14	0.45	0.19
1001 Washington Ave N	22	0.17	ND	0.49	0.18
25XX 12th Ave N	23	0.10	0.20	ND	ND
Loring Greenway	24	ND	0.17	0.33	ND
24XX Mount Curve Ave	25	ND	ND	0.26	ND
26XX Blaisdell Ave S	26	0.18	0.17	0.26	ND
27XX W Lake of the Isles Pkwy	27	ND	ND	0.18	ND
35XX 1st Ave S	28	0.24	0.15	0.34	0.18
3835 West Calhoun Pkwy	29	0.14	ND	0.20	ND
58th & Blaisdell Ave S	30	ND	0.17	0.27	ND
58XX Sheridan Ave S	31	ND	ND	0.22	0.18
46XX Grand Ave S	32	0.16	0.16	0.34	0.11
4525 Upton Ave S.	33	NA	ND	0.20	ND
309 2nd Ave S	34	ND	0.18	0.36	0.18
4646 Humboldt Ave	35	ND	0.12	0.35	ND
12XX 26th St E	36	ND	ND	0.42	ND
16XX Lincoln St NE	37	0.18	ND	0.33	ND
57XX Standish Ave	38	0.19	ND	0.18	ND
35W at 46th St S	42	0.24	0.19	0.38	0.19
143 13th Ave NE	43	0.30	ND	0.39	0.18
46th St S & 2rd Ave	45	NA	0.18	0.40	0.18
46th St S & 3rd Ave	46	0.21	0.13	0.37	0.16
46th St S & 1st St	47	0.27	0.24	0.37	0.17
46th St S & Nicollet	48	0.27	0.23	0.39	0.22
48XX Bryant Ave N	49	0.21	0.15	0.29	ND
Emerson & Lagoon	50	NA	0.16	0.28	0.20
James & Lake	51	NA	ND	0.32	0.19
Hennepin & Lake	52	NA	ND	0.32	0.16
32rd & Fremont	53	NA	0.19	0.31	0.14
Hennpin at Library	54	NA	ND	0.34	0.26
Hennepin at Sabrina's	55	NA	ND	0.42	0.15
Method Detection Limit	**MDL**	**0.14**	**0.05**	**0.13**	**0.13**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

d-Limonene
CAS# 5989-27-5

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 8

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	ND	0.09	0.36	ND
31XX Ulysses St NE	2	ND	0.07	0.06	NA
3300 St. Anthony Parkway	3	ND	ND	0.14	0.23
4900 Mississippi Court	4	ND	ND	0.14	ND
41XX Penn Ave N	5	ND	ND	0.24	ND
2317 St. Anthony Parkway	6	ND	0.11	ND	NA
10XX 23rd Ave SE	7	ND	0.10	0.11	NA
1XX SE Arthur Avenue	8	ND	0.06	0.16	NA
26XX 38th Ave S	9	0.00	0.08	0.13	NA
37XX 40th Ave S	10	0.08	0.56	0.15	NA
55XX 39th Ave S	11	0.01	ND	0.05	NA
41XX Nawadaha Blvd	12	ND	ND	0.11	NA
16XX Polk St NE	13	0.01	0.41	0.11	0.34
8XX 5th Ave SE	14	0.01	0.04	0.29	0.19
Cedar Ave Bridge	15	ND	ND	0.28	0.23
26XX Longfellow Ave S	16	ND	0.06	0.74	0.43
3451 Cedar Ave S	17	ND	0.20	0.29	0.44
5601 Nokomis Lane	18	0.06	0.26	0.23	0.38
46XX Longfellow Ave S	19	0.03	ND	0.02	0.18
27XX Randolph St.	20	0.06	ND	0.46	ND
27XX Oliver Ave N	21	0.03	ND	0.22	0.12
1001 Washington Ave N	22	0.39	0.13	0.59	0.15
25XX 12th Ave N	23	ND	ND	0.10	ND
Loring Greenway	24	ND	ND	0.32	0.34
24XX Mount Curve Ave	25	0.23	ND	0.07	ND
26XX Blaisdell Ave S	26	ND	0.38	0.10	0.00
27XX W Lake of the Isles Pkwy	27	ND	ND	ND	ND
35XX 1st Ave S	28	0.10	0.31	0.23	0.28
3835 West Calhoun Pkwy	29	ND	ND	0.06	0.01
58th & Blaisdell Ave S	30	ND	0.02	0.08	0.43
58XX Sheridan Ave S	31	ND	ND	0.11	ND
46XX Grand Ave S	32	0.06	0.15	0.27	ND
4525 Upton Ave S.	33	NA	ND	ND	ND
309 2nd Ave S	34	0.16	ND	0.31	ND
4646 Humboldt Ave	35	ND	0.03	0.33	ND
12XX 26th St E	36	0.08	ND	0.54	0.21
16XX Lincoln St NE	37	ND	ND	0.22	0.27
57XX Standish Ave	38	0.21	0.01	0.11	0.24
35W at 46th St S	42	0.00	0.03	0.26	0.20
143 13th Ave NE	43	0.34	ND	0.33	0.41
46th St S & 2rd Ave	45	NA	ND	0.13	0.25
46th St S & 3rd Ave	46	ND	ND	0.24	0.29
46th St S & 1st St	47	ND	ND	0.20	0.43
46th St S & Nicollet	48	ND	ND	0.09	0.21
48XX Bryant Ave N	49	ND	ND	0.10	0.28
Emerson & Lagoon	50	NA	0.11	0.08	ND
James & Lake	51	NA	ND	0.04	ND
Hennepin & Lake	52	NA	0.07	0.01	0.35
32rd & Fremont	53	NA	ND	0.03	0.21
Hennpin at Library	54	NA	ND	0.09	0.25
Hennepin at Sabrina's	55	NA	ND	0.30	ND
Method Detection Limit	**MDL**	**0.65**	**0.72**	**0.88**	**1.03**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

1,2,4 Trimethylbenzene
CAS# 95-63-6

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 9

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.52	0.26	1.35	0.46
31XX Ulysses St NE	2	0.41	0.40	0.88	NA
3300 St. Anthony Parkway	3	0.37	0.21	0.85	0.34
4900 Mississippi Court	4	0.52	0.36	1.12	0.47
41XX Penn Ave N	5	0.41	0.31	1.72	0.47
2317 St. Anthony Parkway	6	0.31	0.36	0.59	NA
10XX 23rd Ave SE	7	0.56	0.43	1.39	NA
1XX SE Arthur Avenue	8	0.29	0.39	0.76	NA
26XX 38th Ave S	9	0.30	0.30	0.94	NA
37XX 40th Ave S	10	0.42	0.39	1.17	NA
55XX 39th Ave S	11	0.29	0.16	0.88	NA
41XX Nawadaha Blvd	12	0.27	0.20	1.15	NA
16XX Polk St NE	13	2.25	0.52	1.45	0.44
8XX 5th Ave SE	14	0.38	0.35	0.98	0.31
Cedar Ave Bridge	15	0.54	0.53	1.26	0.47
26XX Longfellow Ave S	16	0.57	0.39	1.29	0.33
3451 Cedar Ave S	17	1.09	0.75	2.51	0.98
5601 Nokomis Lane	18	0.58	0.25	1.93	0.38
46XX Longfellow Ave S	19	0.41	0.21	1.10	0.23
27XX Randolph St.	20	0.56	0.31	1.30	0.42
27XX Oliver Ave N	21	0.50	0.33	1.67	0.53
1001 Washington Ave N	22	0.42	0.39	1.59	0.49
25XX 12th Ave N	23	0.35	0.40	1.06	0.39
Loring Greenway	24	0.32	0.32	0.86	0.28
24XX Mount Curve Ave	25	0.20	0.24	0.73	0.31
26XX Blaisdell Ave S	26	0.51	0.37	1.09	0.44
27XX W Lake of the Isles Pkwy	27	0.25	0.18	0.65	0.25
35XX 1st Ave S	28	0.64	0.42	1.41	0.60
3835 West Calhoun Pkwy	29	0.26	0.31	0.69	0.34
58th & Blaisdell Ave S	30	0.46	0.44	1.06	0.50
58XX Sheridan Ave S	31	0.28	0.15	0.81	0.51
46XX Grand Ave S	32	0.32	0.41	1.30	0.42
4525 Upton Ave S.	33	NA	0.21	0.73	0.24
309 2nd Ave S	34	0.55	0.54	1.16	0.47
4646 Humboldt Ave	35	0.38	0.31	1.27	0.42
12XX 26th St E	36	0.61	0.34	1.74	0.47
16XX Lincoln St NE	37	0.42	0.39	1.01	0.38
57XX Standish Ave	38	0.34	0.22	0.62	0.25
35W at 46th St S	42	0.76	0.66	1.54	0.53
143 13th Ave NE	43	1.08	0.41	1.41	0.47
46th St S & 2rd Ave	45	NA	0.54	1.64	0.64
46th St S & 3rd Ave	46	0.61	0.36	1.65	0.57
46th St S & 1st St	47	0.76	0.69	1.61	0.63
46th St S & Nicollet	48	0.95	0.73	1.76	0.91
48XX Bryant Ave N	49	0.47	0.46	1.05	0.49
Emerson & Lagoon	50	NA	0.42	1.15	0.51
James & Lake	51	NA	0.58	1.36	0.68
Hennepin & Lake	52	NA	0.42	1.44	0.50
32rd & Fremont	53	NA	0.61	1.23	0.65
Hennpin at Library	54	NA	0.62	1.42	0.78
Hennepin at Sabrina's	55	NA	0.34	1.69	0.51
Method Detection Limit	**MDL**	**0.09**	**0.21**	**0.31**	**0.17**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

b-Pinene
CAS# 127-91-3

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 10

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	ND	ND	0.31	ND
31XX Ulysses St NE	2	ND	ND	ND	NA
3300 St. Anthony Parkway	3	ND	ND	ND	ND
4900 Mississippi Court	4	ND	ND	ND	ND
41XX Penn Ave N	5	ND	ND	ND	ND
2317 St. Anthony Parkway	6	ND	ND	ND	NA
10XX 23rd Ave SE	7	ND	ND	ND	NA
1XX SE Arthur Avenue	8	ND	ND	ND	NA
26XX 38th Ave S	9	ND	ND	ND	NA
37XX 40th Ave S	10	ND	ND	ND	NA
55XX 39th Ave S	11	ND	ND	ND	NA
41XX Nawadaha Blvd	12	ND	ND	ND	NA
16XX Polk St NE	13	ND	ND	ND	ND
8XX 5th Ave SE	14	ND	ND	ND	ND
Cedar Ave Bridge	15	ND	ND	ND	ND
26XX Longfellow Ave S	16	ND	ND	ND	ND
3451 Cedar Ave S	17	ND	ND	ND	ND
5601 Nokomis Lane	18	ND	ND	ND	ND
46XX Longfellow Ave S	19	ND	ND	ND	ND
27XX Randolph St.	20	ND	ND	ND	ND
27XX Oliver Ave N	21	ND	ND	ND	ND
1001 Washington Ave N	22	ND	ND	ND	ND
25XX 12th Ave N	23	ND	ND	ND	ND
Loring Greenway	24	ND	ND	ND	ND
24XX Mount Curve Ave	25	ND	ND	ND	ND
26XX Blaisdell Ave S	26	ND	ND	ND	ND
27XX W Lake of the Isles Pkwy	27	ND	ND	ND	ND
35XX 1st Ave S	28	ND	ND	ND	ND
3835 West Calhoun Pkwy	29	ND	ND	ND	ND
58th & Blaisdell Ave S	30	ND	ND	ND	ND
58XX Sheridan Ave S	31	ND	ND	ND	ND
46XX Grand Ave S	32	ND	ND	ND	ND
4525 Upton Ave S.	33	NA	ND	ND	ND
309 2nd Ave S	34	ND	ND	ND	ND
4646 Humboldt Ave	35	ND	ND	ND	ND
12XX 26th St E	36	ND	ND	ND	ND
16XX Lincoln St NE	37	ND	ND	ND	ND
57XX Standish Ave	38	ND	ND	ND	ND
35W at 46th St S	42	ND	ND	ND	ND
143 13th Ave NE	43	ND	ND	ND	ND
46th St S & 2rd Ave	45	NA	ND	ND	ND
46th St S & 3rd Ave	46	ND	ND	ND	ND
46th St S & 1st St	47	ND	ND	ND	ND
46th St S & Nicollet	48	ND	ND	ND	ND
48XX Bryant Ave N	49	ND	ND	ND	ND
Emerson & Lagoon	50	NA	ND	ND	ND
James & Lake	51	NA	ND	ND	ND
Hennepin & Lake	52	NA	ND	ND	ND
32rd & Fremont	53	NA	ND	ND	ND
Hennpin at Library	54	NA	ND	ND	ND
Hennepin at Sabrina's	55	NA	ND	ND	ND
Method Detection Limit	**MDL**	**0.18**	**0.17**	**0.16**	**0.15**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

1-Ethyl-2-methyl benzene
CAS# 611-14-3

Health Benchmark
Cancer: NA
Non Cancer:NA

Table 11

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.54	0.47	1.61	0.60
31XX Ulysses St NE	2	0.59	0.61	0.79	NA
3300 St. Anthony Parkway	3	0.53	0.41	1.02	0.49
4900 Mississippi Court	4	0.54	0.57	1.18	0.63
41XX Penn Ave N	5	0.44	0.48	1.33	0.64
2317 St. Anthony Parkway	6	0.43	0.61	0.80	NA
10XX 23rd Ave SE	7	0.75	0.69	1.62	NA
1XX SE Arthur Avenue	8	0.43	0.68	0.68	NA
26XX 38th Ave S	9	0.48	0.50	0.92	NA
37XX 40th Ave S	10	0.59	0.55	1.20	NA
55XX 39th Ave S	11	0.46	0.34	1.02	NA
41XX Nawadaha Blvd	12	0.30	0.39	1.07	NA
16XX Polk St NE	13	2.45	0.74	1.55	0.65
8XX 5th Ave SE	14	0.54	0.53	1.18	0.46
Cedar Ave Bridge	15	0.73	0.74	1.44	0.68
26XX Longfellow Ave S	16	0.68	0.56	0.97	0.47
3451 Cedar Ave S	17	1.31	0.95	2.58	1.19
5601 Nokomis Lane	18	0.67	0.40	2.59	0.55
46XX Longfellow Ave S	19	0.58	0.34	1.36	0.39
27XX Randolph St.	20	0.23	0.52	1.48	0.59
27XX Oliver Ave N	21	0.67	0.51	1.72	0.70
1001 Washington Ave N	22	0.43	0.61	2.15	0.63
25XX 12th Ave N	23	0.49	0.49	1.33	0.51
Loring Greenway	24	0.46	0.53	1.09	0.41
24XX Mount Curve Ave	25	0.36	0.41	0.89	0.39
26XX Blaisdell Ave S	26	0.67	0.57	1.32	0.54
27XX W Lake of the Isles Pkwy	27	0.28	0.35	0.77	0.31
35XX 1st Ave S	28	0.85	0.57	1.58	0.76
3835 West Calhoun Pkwy	29	0.41	0.50	0.87	0.38
58th & Blaisdell Ave S	30	0.43	0.64	1.24	0.67
58XX Sheridan Ave S	31	0.44	0.33	0.99	0.65
46XX Grand Ave S	32	0.49	0.54	1.19	0.55
4525 Upton Ave S.	33	NA	0.36	0.82	0.34
309 2nd Ave S	34	0.71	0.83	1.42	0.71
4646 Humboldt Ave	35	0.38	0.45	1.53	0.54
12XX 26th St E	36	0.79	0.57	2.00	0.65
16XX Lincoln St NE	37	0.54	0.62	1.25	0.57
57XX Standish Ave	38	0.47	0.39	0.80	0.37
35W at 46th St S	42	0.96	0.86	1.45	0.69
143 13th Ave NE	43	1.23	0.47	1.79	0.55
46th St S & 2rd Ave	45	NA	0.76	1.86	0.79
46th St S & 3rd Ave	46	0.56	0.55	1.99	0.75
46th St S & 1st St	47	0.65	0.86	1.95	0.79
46th St S & Nicollet	48	1.16	0.96	2.17	1.00
48XX Bryant Ave N	49	0.48	0.68	1.34	0.66
Emerson & Lagoon	50	NA	0.62	1.39	0.74
James & Lake	51	NA	0.78	1.67	0.80
Hennepin & Lake	52	NA	0.64	1.76	0.62
32rd & Fremont	53	NA	0.88	1.02	0.84
Hennpin at Library	54	NA	0.87	1.53	0.89
Hennepin at Sabrina's	55	NA	0.54	1.73	0.64
Method Detection Limit	**MDL**	**0.14**	**0.14**	**0.15**	**0.10**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

1,3,5 Trimethylbenzene
CAS# 108-67-8

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 12

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.24	0.16	0.45	0.16
31XX Ulysses St NE	2	0.16	0.20	0.20	NA
3300 St. Anthony Parkway	3	0.12	0.13	0.28	0.18
4900 Mississippi Court	4	0.18	0.20	0.28	0.20
41XX Penn Ave N	5	0.19	0.15	0.64	0.20
2317 St. Anthony Parkway	6	0.11	0.18	0.24	NA
10XX 23rd Ave SE	7	0.21	0.21	0.35	NA
1XX SE Arthur Avenue	8	0.12	0.21	0.26	NA
26XX 38th Ave S	9	0.14	0.16	0.25	NA
37XX 40th Ave S	10	0.17	0.16	0.29	NA
55XX 39th Ave S	11	0.12	0.11	0.35	NA
41XX Nawadaha Blvd	12	0.13	0.13	0.29	NA
16XX Polk St NE	13	0.83	0.22	0.36	0.19
8XX 5th Ave SE	14	0.19	0.19	0.26	0.14
Cedar Ave Bridge	15	0.21	0.24	0.34	0.20
26XX Longfellow Ave S	16	0.19	0.17	0.36	0.17
3451 Cedar Ave S	17	0.41	0.31	0.62	0.37
5601 Nokomis Lane	18	0.25	0.14	0.85	0.17
46XX Longfellow Ave S	19	0.20	0.13	0.40	0.12
27XX Randolph St.	20	0.19	0.17	0.31	0.20
27XX Oliver Ave N	21	0.21	0.15	0.39	0.22
1001 Washington Ave N	22	0.20	0.20	0.65	0.21
25XX 12th Ave N	23	0.16	0.15	0.36	0.18
Loring Greenway	24	0.09	0.18	0.29	0.13
24XX Mount Curve Ave	25	0.11	0.11	0.29	0.12
26XX Blaisdell Ave S	26	0.22	0.18	0.40	0.21
27XX W Lake of the Isles Pkwy	27	0.10	0.11	0.26	ND
35XX 1st Ave S	28	0.22	0.17	0.51	0.24
3835 West Calhoun Pkwy	29	0.10	0.17	0.29	0.14
58th & Blaisdell Ave S	30	0.19	0.20	0.35	0.22
58XX Sheridan Ave S	31	0.11	0.11	0.28	0.20
46XX Grand Ave S	32	0.13	0.18	0.51	0.21
4525 Upton Ave S.	33	NA	0.12	0.22	0.12
309 2nd Ave S	34	0.23	0.25	0.32	0.24
4646 Humboldt Ave	35	0.16	0.15	0.46	0.17
12XX 26th St E	36	0.23	0.18	0.63	0.22
16XX Lincoln St NE	37	0.15	0.19	0.45	0.17
57XX Standish Ave	38	0.15	0.10	0.18	0.12
35W at 46th St S	42	0.29	0.24	0.35	0.22
143 13th Ave NE	43	0.39	0.13	0.47	0.21
46th St S & 2rd Ave	45	NA	0.24	0.60	0.27
46th St S & 3rd Ave	46	0.20	0.19	0.66	0.23
46th St S & 1st St	47	0.25	0.26	0.55	0.27
46th St S & Nicollet	48	0.28	0.32	0.70	0.29
48XX Bryant Ave N	49	0.18	0.22	0.40	0.21
Emerson & Lagoon	50	NA	0.21	0.50	0.25
James & Lake	51	NA	0.23	0.57	0.24
Hennepin & Lake	52	NA	0.17	0.62	0.21
32rd & Fremont	53	NA	0.29	0.33	0.27
Hennpin at Library	54	NA	0.29	0.46	0.29
Hennepin at Sabrina's	55	NA	0.11	0.41	0.21
Method Detection Limit	**MDL**	**0.13**	**0.13**	**0.12**	**0.12**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

n- Decane
CAS# 124-18-5

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 13

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.35	0.26	0.71	ND
31XX Ulysses St NE	2	0.32	0.41	0.37	NA
3300 St. Anthony Parkway	3	0.20	0.16	0.38	0.36
4900 Mississippi Court	4	0.27	0.17	0.58	ND
41XX Penn Ave N	5	0.29	0.29	0.65	ND
2317 St. Anthony Parkway	6	ND	0.22	0.37	NA
10XX 23rd Ave SE	7	0.33	0.34	0.57	NA
1XX SE Arthur Avenue	8	ND	0.26	0.48	NA
26XX 38th Ave S	9	0.26	0.32	0.62	NA
37XX 40th Ave S	10	0.38	0.57	0.61	NA
55XX 39th Ave S	11	0.28	0.32	0.59	NA
41XX Nawadaha Blvd	12	0.25	0.14	0.95	NA
16XX Polk St NE	13	0.40	0.60	0.75	0.03
8XX 5th Ave SE	14	0.22	0.28	0.78	0.22
Cedar Ave Bridge	15	0.29	0.50	0.90	0.10
26XX Longfellow Ave S	16	0.39	0.26	0.60	0.36
3451 Cedar Ave S	17	0.38	0.43	1.37	0.32
5601 Nokomis Lane	18	0.30	0.31	0.30	0.15
46XX Longfellow Ave S	19	0.28	0.15	1.05	0.18
27XX Randolph St.	20	0.32	0.39	2.28	0.35
27XX Oliver Ave N	21	0.38	0.29	1.32	0.08
1001 Washington Ave N	22	0.54	ND	0.89	0.40
25XX 12th Ave N	23	0.38	0.89	0.43	0.09
Loring Greenway	24	0.21	0.37	0.91	0.32
24XX Mount Curve Ave	25	0.22	0.16	0.85	0.34
26XX Blaisdell Ave S	26	0.23	0.27	0.93	0.26
27XX W Lake of the Isles Pkwy	27	0.32	0.21	0.17	0.23
35XX 1st Ave S	28	ND	0.34	0.50	0.42
3835 West Calhoun Pkwy	29	0.21	0.25	0.32	0.28
58th & Blaisdell Ave S	30	0.24	0.17	0.36	0.36
58XX Sheridan Ave S	31	ND	0.17	0.28	ND
46XX Grand Ave S	32	0.20	1.27	2.96	0.22
4525 Upton Ave S.	33	NA	0.20	0.36	0.21
309 2nd Ave S	34	0.50	0.99	0.44	0.11
4646 Humboldt Ave	35	0.34	0.32	0.63	0.23
12XX 26th St E	36	0.31	0.21	0.66	0.06
16XX Lincoln St NE	37	0.24	0.27	0.38	0.16
57XX Standish Ave	38	0.29	0.32	0.40	0.14
35W at 46th St S	42	0.39	0.26	0.51	0.23
143 13th Ave NE	43	0.53	ND	0.57	1.33
46th St S & 2rd Ave	45	NA	0.19	0.45	0.12
46th St S & 3rd Ave	46	0.30	0.16	0.82	0.17
46th St S & 1st St	47	0.36	0.28	0.67	0.23
46th St S & Nicollet	48	0.34	0.30	0.76	ND
48XX Bryant Ave N	49	0.22	0.25	0.31	0.18
Emerson & Lagoon	50	NA	0.36	0.38	0.21
James & Lake	51	NA	0.29	0.48	0.31
Hennepin & Lake	52	NA	0.34	0.56	0.26
32rd & Fremont	53	NA	0.31	0.79	0.25
Hennpin at Library	54	NA	0.20	0.48	0.69
Hennepin at Sabrina's	55	NA	0.28	0.51	ND
Method Detection Limit	**MDL**	**0.52**	**0.66**	**0.74**	**1.61**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

a-Pinene

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 14

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.18	0.14	0.85	0.10
31XX Ulysses St NE	2	ND	0.18	0.18	NA
3300 St. Anthony Parkway	3	0.04	ND	0.22	ND
4900 Mississippi Court	4	0.12	0.09	0.53	0.12
41XX Penn Ave N	5	0.09	0.14	0.47	0.16
2317 St. Anthony Parkway	6	0.12	0.92	0.28	NA
10XX 23rd Ave SE	7	0.21	0.16	0.44	NA
1XX SE Arthur Avenue	8	0.10	0.09	0.22	NA
26XX 38th Ave S	9	0.05	0.32	0.25	NA
37XX 40th Ave S	10	0.16	0.63	0.31	NA
55XX 39th Ave S	11	ND	ND	0.20	NA
41XX Nawadaha Blvd	12	ND	0.21	0.31	NA
16XX Polk St NE	13	0.13	0.68	0.30	ND
8XX 5th Ave SE	14	0.12	0.17	0.29	ND
Cedar Ave Bridge	15	ND	ND	0.25	ND
26XX Longfellow Ave S	16	0.18	0.26	0.55	0.10
3451 Cedar Ave S	17	ND	0.20	0.22	ND
5601 Nokomis Lane	18	ND	0.25	0.10	ND
46XX Longfellow Ave S	19	ND	ND	0.19	ND
27XX Randolph St.	20	0.11	0.13	0.38	0.15
27XX Oliver Ave N	21	0.24	0.08	0.31	0.35
1001 Washington Ave N	22	ND	0.03	0.56	ND
25XX 12th Ave N	23	ND	0.46	0.25	ND
Loring Greenway	24	ND	0.04	0.34	ND
24XX Mount Curve Ave	25	0.23	0.10	0.31	ND
26XX Blaisdell Ave S	26	ND	ND	0.13	0.98
27XX W Lake of the Isles Pkwy	27	ND	0.01	0.14	ND
35XX 1st Ave S	28	0.13	0.22	0.25	0.36
3835 West Calhoun Pkwy	29	ND	0.17	0.55	0.14
58th & Blaisdell Ave S	30	ND	0.13	0.18	ND
58XX Sheridan Ave S	31	ND	ND	0.13	0.15
46XX Grand Ave S	32	0.07	0.22	0.30	0.10
4525 Upton Ave S.	33	NA	0.48	0.19	ND
309 2nd Ave S	34	0.16	ND	0.22	ND
4646 Humboldt Ave	35	0.11	0.22	0.60	0.27
12XX 26th St E	36	0.17	0.06	0.30	ND
16XX Lincoln St NE	37	ND	0.01	0.28	ND
57XX Standish Ave	38	0.14	0.36	0.13	ND
35W at 46th St S	42	0.04	0.03	0.21	ND
143 13th Ave NE	43	ND	0.01	0.31	0.48
46th St S & 2rd Ave	45	NA	0.09	0.27	ND
46th St S & 3rd Ave	46	ND	0.04	0.19	0.07
46th St S & 1st St	47	ND	0.03	0.18	0.10
46th St S & Nicollet	48	ND	ND	0.19	ND
48XX Bryant Ave N	49	ND	ND	0.15	ND
Emerson & Lagoon	50	NA	0.11	0.11	ND
James & Lake	51	NA	ND	0.12	ND
Hennepin & Lake	52	NA	ND	0.11	0.29
32rd & Fremont	53	NA	ND	0.14	ND
Hennpin at Library	54	NA	ND	0.16	0.24
Hennepin at Sabrina's	55	NA	0.01	0.63	0.09
Method Detection Limit	**MDL**	**0.72**	**0.71**	**0.39**	**0.21**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Styrene
CAS# 100-42-5

Health Benchmark
Cancer: NA
Non Cancer: 100 ug/m3

Table 15

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	ND	ND	0.23	ND
31XX Ulysses St NE	2	ND	ND	ND	NA
3300 St. Anthony Parkway	3	ND	0.16	ND	0.07
4900 Mississippi Court	4	ND	ND	0.19	ND
41XX Penn Ave N	5	ND	ND	0.25	ND
2317 St. Anthony Parkway	6	ND	ND	ND	NA
10XX 23rd Ave SE	7	ND	0.30	0.21	NA
1XX SE Arthur Avenue	8	ND	ND	0.28	NA
26XX 38th Ave S	9	ND	ND	ND	NA
37XX 40th Ave S	10	ND	ND	ND	NA
55XX 39th Ave S	11	ND	ND	ND	NA
41XX Nawadaha Blvd	12	ND	ND	ND	NA
16XX Polk St NE	13	ND	ND	0.25	ND
8XX 5th Ave SE	14	ND	ND	0.49	ND
Cedar Ave Bridge	15	ND	ND	0.23	ND
26XX Longfellow Ave S	16	ND	ND	0.38	ND
3451 Cedar Ave S	17	ND	ND	0.31	ND
5601 Nokomis Lane	18	ND	ND	ND	ND
46XX Longfellow Ave S	19	ND	ND	ND	ND
27XX Randolph St.	20	ND	ND	0.48	ND
27XX Oliver Ave N	21	ND	ND	0.23	ND
1001 Washington Ave N	22	ND	ND	0.25	ND
25XX 12th Ave N	23	ND	ND	ND	ND
Loring Greenway	24	ND	ND	ND	ND
24XX Mount Curve Ave	25	ND	ND	ND	ND
26XX Blaisdell Ave S	26	ND	ND	ND	ND
27XX W Lake of the Isles Pkwy	27	ND	ND	ND	ND
35XX 1st Ave S	28	ND	ND	0.17	ND
3835 West Calhoun Pkwy	29	ND	ND	0.10	ND
58th & Blaisdell Ave S	30	ND	ND	ND	ND
58XX Sheridan Ave S	31	ND	ND	ND	ND
46XX Grand Ave S	32	ND	ND	0.14	ND
4525 Upton Ave S.	33	NA	ND	0.10	ND
309 2nd Ave S	34	ND	ND	0.13	ND
4646 Humboldt Ave	35	ND	ND	0.18	ND
12XX 26th St E	36	ND	ND	0.17	ND
16XX Lincoln St NE	37	0.13	0.18	0.17	ND
57XX Standish Ave	38	ND	ND	0.10	ND
35W at 46th St S	42	ND	ND	0.15	ND
143 13th Ave NE	43	ND	ND	0.23	ND
46th St S & 2rd Ave	45	NA	ND	0.20	ND
46th St S & 3rd Ave	46	ND	ND	0.17	ND
46th St S & 1st St	47	ND	ND	0.20	ND
46th St S & Nicollet	48	ND	ND	0.30	ND
48XX Bryant Ave N	49	ND	ND	0.10	ND
Emerson & Lagoon	50	NA	ND	0.10	ND
James & Lake	51	NA	ND	0.13	ND
Hennepin & Lake	52	NA	ND	0.11	ND
32rd & Fremont	53	NA	ND	ND	ND
Hennpin at Library	54	NA	ND	ND	ND
Hennepin at Sabrina's	55	NA	ND	0.19	ND
Method Detection Limit	**MDL**	**0.17**	**0.16**	**0.15**	**0.25**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

O Xylene
CAS# 95476

Health Benchmark
Cancer: NA
Non Cancer: 100 ug/m3

Table 16

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.54	0.31	1.20	0.38
31XX Ulysses St NE	2	0.31	0.37	0.75	NA
3300 St. Anthony Parkway	3	0.33	0.18	0.71	0.38
4900 Mississippi Court	4	0.38	0.32	0.99	0.38
41XX Penn Ave N	5	0.34	0.25	1.33	0.41
2317 St. Anthony Parkway	6	0.24	0.38	0.64	NA
10XX 23rd Ave SE	7	0.42	0.31	1.05	NA
1XX SE Arthur Avenue	8	0.24	0.31	0.61	NA
26XX 38th Ave S	9	0.28	0.29	0.73	NA
37XX 40th Ave S	10	0.37	0.28	1.05	NA
55XX 39th Ave S	11	0.25	0.21	0.71	NA
41XX Nawadaha Blvd	12	0.26	0.25	0.94	NA
16XX Polk St NE	13	0.53	0.49	1.27	0.45
8XX 5th Ave SE	14	0.38	0.33	0.79	0.37
Cedar Ave Bridge	15	0.52	0.51	1.04	0.50
26XX Longfellow Ave S	16	0.54	0.37	1.11	0.37
3451 Cedar Ave S	17	0.97	0.67	2.07	0.93
5601 Nokomis Lane	18	0.27	0.24	0.61	0.38
46XX Longfellow Ave S	19	0.33	0.21	0.89	0.32
27XX Randolph St.	20	0.47	0.35	1.17	0.44
27XX Oliver Ave N	21	0.46	0.30	1.34	0.45
1001 Washington Ave N	22	0.36	0.35	1.14	0.47
25XX 12th Ave N	23	0.26	0.28	0.99	0.32
Loring Greenway	24	0.25	0.27	0.68	0.27
24XX Mount Curve Ave	25	0.21	0.21	0.60	0.29
26XX Blaisdell Ave S	26	0.45	0.39	0.95	0.43
27XX W Lake of the Isles Pkwy	27	0.20	0.15	0.48	0.24
35XX 1st Ave S	28	0.60	0.32	1.23	0.57
3835 West Calhoun Pkwy	29	0.21	0.30	0.55	0.30
58th & Blaisdell Ave S	30	0.39	0.44	0.89	0.47
58XX Sheridan Ave S	31	0.27	0.20	0.66	0.47
46XX Grand Ave S	32	0.25	0.38	0.91	0.37
4525 Upton Ave S.	33	NA	0.17	0.57	0.22
309 2nd Ave S	34	0.42	0.36	0.66	0.39
4646 Humboldt Ave	35	0.32	0.31	1.06	0.37
12XX 26th St E	36	0.55	0.36	1.44	0.47
16XX Lincoln St NE	37	0.33	0.26	0.95	0.37
57XX Standish Ave	38	0.26	0.18	0.57	0.29
35W at 46th St S	42	0.71	0.64	1.22	0.50
143 13th Ave NE	43	0.72	0.34	1.15	0.43
46th St S & 2rd Ave	45	NA	0.55	1.41	0.60
46th St S & 3rd Ave	46	0.51	0.42	1.29	0.53
46th St S & 1st St	47	0.63	0.66	1.33	0.62
46th St S & Nicollet	48	0.84	0.79	1.39	0.92
48XX Bryant Ave N	49	0.42	0.50	0.92	0.50
Emerson & Lagoon	50	NA	0.47	0.88	0.46
James & Lake	51	NA	0.58	1.08	0.58
Hennepin & Lake	52	NA	0.44	1.06	0.44
32rd & Fremont	53	NA	0.63	1.03	0.63
Hennpin at Library	54	NA	0.67	1.17	0.63
Hennepin at Sabrina's	55	NA	0.35	1.48	0.43
Method Detection Limit	**MDL**	**0.22**	**0.06**	**0.18**	**0.04**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

MP Xylene
CAS# 108-38-3

Health Benchmark
Cancer: NA
Non Cancer: 100 ug/m3

Table 17

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	1.45	0.84	3.26	1.05
31XX Ulysses St NE	2	0.93	1.01	2.10	NA
3300 St. Anthony Parkway	3	1.05	0.62	2.01	1.09
4900 Mississippi Court	4	1.10	0.98	2.83	1.11
41XX Penn Ave N	5	1.07	0.76	3.77	1.11
2317 St. Anthony Parkway	6	0.75	1.12	1.79	NA
10XX 23rd Ave SE	7	1.34	1.18	3.22	NA
1XX SE Arthur Avenue	8	0.76	1.05	1.80	NA
26XX 38th Ave S	9	0.90	0.81	2.06	NA
37XX 40th Ave S	10	1.16	0.92	3.12	NA
55XX 39th Ave S	11	0.74	0.49	1.97	NA
41XX Nawadaha Blvd	12	0.71	0.68	2.83	NA
16XX Polk St NE	13	1.62	1.62	3.60	1.39
8XX 5th Ave SE	14	1.15	0.82	2.32	1.11
Cedar Ave Bridge	15	1.33	1.32	2.89	1.50
26XX Longfellow Ave S	16	1.61	0.98	3.19	1.00
3451 Cedar Ave S	17	2.65	1.74	5.82	2.55
5601 Nokomis Lane	18	0.84	0.54	1.66	1.08
46XX Longfellow Ave S	19	0.98	0.56	2.55	0.79
27XX Randolph St.	20	1.49	0.92	3.42	1.29
27XX Oliver Ave N	21	1.29	0.90	3.81	1.21
1001 Washington Ave N	22	1.01	0.99	3.47	1.67
25XX 12th Ave N	23	0.72	0.82	2.65	0.98
Loring Greenway	24	0.71	0.83	1.91	0.83
24XX Mount Curve Ave	25	0.53	0.67	1.71	0.75
26XX Blaisdell Ave S	26	1.28	1.06	2.74	1.26
27XX W Lake of the Isles Pkwy	27	0.51	0.47	1.50	0.64
35XX 1st Ave S	28	1.63	1.00	3.40	1.67
3835 West Calhoun Pkwy	29	0.64	0.74	1.57	0.86
58th & Blaisdell Ave S	30	1.31	1.18	2.59	1.48
58XX Sheridan Ave S	31	0.76	0.46	1.86	1.27
46XX Grand Ave S	32	0.72	0.96	2.51	1.06
4525 Upton Ave S.	33	NA	0.48	1.62	0.66
309 2nd Ave S	34	1.22	1.06	1.98	1.09
4646 Humboldt Ave	35	0.99	0.81	2.92	1.06
12XX 26th St E	36	1.59	0.92	4.03	1.32
16XX Lincoln St NE	37	1.12	0.90	2.71	1.05
57XX Standish Ave	38	0.69	0.54	1.43	0.78
35W at 46th St S	42	1.82	1.64	3.50	1.35
143 13th Ave NE	43	2.05	1.04	3.28	1.30
46th St S & 2rd Ave	45	NA	1.37	3.79	1.67
46th St S & 3rd Ave	46	1.44	1.02	3.61	1.54
46th St S & 1st St	47	1.75	1.63	3.76	1.66
46th St S & Nicollet	48	2.36	1.90	4.06	2.37
48XX Bryant Ave N	49	1.10	1.28	2.65	1.34
Emerson & Lagoon	50	NA	1.06	2.55	1.26
James & Lake	51	NA	1.49	3.03	1.65
Hennepin & Lake	52	NA	1.11	3.00	1.30
32rd & Fremont	53	NA	1.63	2.94	1.73
Hennpin at Library	54	NA	1.70	3.34	1.73
Hennepin at Sabrina's	55	NA	0.94	4.16	1.16
Method Detection Limit	**MDL**	**0.60**	**0.16**	**0.28**	**0.15**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

n-Nonane
CAS# 111-84-2

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 18

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.33	0.18	0.54	0.23
31XX Ulysses St NE	2	0.24	0.15	0.39	NA
3300 St. Anthony Parkway	3	0.16	0.07	0.36	0.23
4900 Mississippi Court	4	0.23	0.11	0.47	0.25
41XX Penn Ave N	5	0.16	0.22	0.54	0.33
2317 St. Anthony Parkway	6	0.12	0.12	0.43	NA
10XX 23rd Ave SE	7	0.19	0.20	0.41	NA
1XX SE Arthur Avenue	8	ND	0.19	0.30	NA
26XX 38th Ave S	9	0.21	0.20	0.43	NA
37XX 40th Ave S	10	0.24	0.30	0.46	NA
55XX 39th Ave S	11	0.26	0.20	0.32	NA
41XX Nawadaha Blvd	12	ND	0.10	0.59	NA
16XX Polk St NE	13	0.30	0.30	0.57	0.30
8XX 5th Ave SE	14	0.16	0.18	0.39	0.19
Cedar Ave Bridge	15	0.14	0.30	0.41	0.26
26XX Longfellow Ave S	16	0.28	0.21	0.53	0.21
3451 Cedar Ave S	17	0.29	0.24	0.71	0.34
5601 Nokomis Lane	18	0.16	0.14	0.39	ND
46XX Longfellow Ave S	19	0.16	0.09	0.37	ND
27XX Randolph St.	20	0.25	0.28	1.09	ND
27XX Oliver Ave N	21	0.20	0.15	0.47	0.24
1001 Washington Ave N	22	0.27	0.20	0.60	0.30
25XX 12th Ave N	23	0.19	0.23	0.51	0.24
Loring Greenway	24	0.14	0.28	0.34	0.20
24XX Mount Curve Ave	25	ND	0.20	0.35	0.24
26XX Blaisdell Ave S	26	ND	0.19	0.41	0.21
27XX W Lake of the Isles Pkwy	27	ND	0.19	0.33	0.16
35XX 1st Ave S	28	0.29	0.20	0.48	0.32
3835 West Calhoun Pkwy	29	0.14	0.09	0.43	0.19
58th & Blaisdell Ave S	30	0.15	0.15	0.52	0.19
58XX Sheridan Ave S	31	0.13	0.10	0.32	0.29
46XX Grand Ave S	32	ND	0.77	1.12	0.19
4525 Upton Ave S.	33	NA	0.11	0.35	ND
309 2nd Ave S	34	0.25	0.49	0.52	0.29
4646 Humboldt Ave	35	0.18	0.22	0.47	0.26
12XX 26th St E	36	0.27	0.15	0.66	0.22
16XX Lincoln St NE	37	0.19	0.11	0.37	0.19
57XX Standish Ave	38	0.12	0.17	0.34	0.20
35W at 46th St S	42	0.19	0.19	0.49	0.26
143 13th Ave NE	43	0.36	0.16	0.53	0.33
46th St S & 2rd Ave	45	NA	0.20	0.59	0.24
46th St S & 3rd Ave	46	0.18	0.13	0.49	0.24
46th St S & 1st St	47	0.20	0.21	0.57	0.25
46th St S & Nicollet	48	0.26	0.14	0.55	0.27
48XX Bryant Ave N	49	0.16	0.27	0.39	0.21
Emerson & Lagoon	50	NA	0.17	0.39	0.28
James & Lake	51	NA	0.13	0.48	0.29
Hennepin & Lake	52	NA	0.18	0.54	0.28
32rd & Fremont	53	NA	0.22	0.42	0.26
Hennpin at Library	54	NA	0.16	0.57	0.38
Hennepin at Sabrina's	55	NA	0.16	0.47	0.30
Method Detection Limit	**MDL**	**0.12**	**0.23**	**0.16**	**0.16**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Ethylbenzene
CAS# 100-41-4

Health Benchmark
Cancer: NA
Non Cancer: 1000 ug/m3

Table 19

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.48	0.27	0.98	0.30
31XX Ulysses St NE	2	0.25	0.33	0.63	NA
3300 St. Anthony Parkway	3	0.32	0.20	0.62	0.35
4900 Mississippi Court	4	0.36	0.32	0.82	0.32
41XX Penn Ave N	5	0.35	0.26	1.13	0.32
2317 St. Anthony Parkway	6	0.25	0.36	0.57	NA
10XX 23rd Ave SE	7	0.41	0.39	1.01	NA
1XX SE Arthur Avenue	8	0.23	0.32	0.52	NA
26XX 38th Ave S	9	0.29	0.25	0.60	NA
37XX 40th Ave S	10	0.37	0.28	0.94	NA
55XX 39th Ave S	11	0.25	0.17	0.57	NA
41XX Nawadaha Blvd	12	0.24	0.23	0.80	NA
16XX Polk St NE	13	0.49	0.53	1.13	0.46
8XX 5th Ave SE	14	0.36	0.27	0.70	0.35
Cedar Ave Bridge	15	0.39	0.44	0.85	0.47
26XX Longfellow Ave S	16	0.46	0.33	0.93	0.31
3451 Cedar Ave S	17	0.79	0.55	1.73	0.77
5601 Nokomis Lane	18	0.27	0.18	0.50	0.35
46XX Longfellow Ave S	19	0.29	0.20	0.78	0.26
27XX Randolph St.	20	0.47	0.30	1.04	0.38
27XX Oliver Ave N	21	0.39	0.27	1.11	0.32
1001 Washington Ave N	22	0.31	0.33	1.06	0.45
25XX 12th Ave N	23	0.24	0.26	0.77	0.27
Loring Greenway	24	0.19	0.27	0.55	0.28
24XX Mount Curve Ave	25	0.14	0.22	0.52	0.21
26XX Blaisdell Ave S	26	0.39	0.33	0.83	0.35
27XX W Lake of the Isles Pkwy	27	0.17	0.19	0.45	0.19
35XX 1st Ave S	28	0.48	0.30	1.03	0.50
3835 West Calhoun Pkwy	29	0.21	0.25	0.48	0.25
58th & Blaisdell Ave S	30	0.42	0.36	0.73	0.46
58XX Sheridan Ave S	31	0.24	0.17	0.54	0.34
46XX Grand Ave S	32	0.20	0.29	0.71	0.30
4525 Upton Ave S.	33	NA	0.19	0.48	0.19
309 2nd Ave S	34	0.40	0.35	0.58	0.30
4646 Humboldt Ave	35	0.33	0.27	0.87	0.29
12XX 26th St E	36	0.48	0.31	1.18	0.42
16XX Lincoln St NE	37	0.29	0.30	0.82	0.37
57XX Standish Ave	38	0.22	0.18	0.42	0.28
35W at 46th St S	42	0.56	0.52	1.01	0.46
143 13th Ave NE	43	0.62	0.35	0.95	0.37
46th St S & 2rd Ave	45	NA	0.42	1.10	0.53
46th St S & 3rd Ave	46	0.45	0.30	1.05	0.43
46th St S & 1st St	47	0.53	0.50	1.13	0.52
46th St S & Nicollet	48	0.69	0.58	1.18	0.70
48XX Bryant Ave N	49	0.31	0.41	0.79	0.44
Emerson & Lagoon	50	NA	0.34	0.75	0.39
James & Lake	51	NA	0.45	0.90	0.48
Hennepin & Lake	52	NA	0.36	0.87	0.37
32rd & Fremont	53	NA	0.50	0.86	0.55
Hennpin at Library	54	NA	0.51	1.00	0.53
Hennepin at Sabrina's	55	NA	0.32	1.17	0.32
Method Detection Limit	**MDL**	**0.17**	**0.08**	**0.15**	**0.08**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Toluene
CAS# 108-88-3

Health Benchmark
Cancer: NA
Non Cancer: 400 ug/m3

Table 20

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	2.79	1.49	5.11	1.62
31XX Ulysses St NE	2	1.73	1.62	3.64	NA
3300 St. Anthony Parkway	3	1.50	1.00	3.39	1.51
4900 Mississippi Court	4	1.91	1.57	4.03	1.39
41XX Penn Ave N	5	1.84	1.49	5.99	1.59
2317 St. Anthony Parkway	6	1.27	1.41	2.83	NA
10XX 23rd Ave SE	7	2.13	1.60	4.70	NA
1XX SE Arthur Avenue	8	1.34	1.15	3.42	NA
26XX 38th Ave S	9	1.46	1.65	4.52	NA
37XX 40th Ave S	10	1.86	1.29	4.73	NA
55XX 39th Ave S	11	1.32	0.82	3.34	NA
41XX Nawadaha Blvd	12	1.23	1.19	4.12	NA
16XX Polk St NE	13	2.74	2.23	7.17	2.40
8XX 5th Ave SE	14	1.69	1.38	4.24	1.35
Cedar Ave Bridge	15	2.34	2.38	4.69	2.32
26XX Longfellow Ave S	16	2.84	2.11	5.71	1.67
3451 Cedar Ave S	17	4.21	2.98	9.03	3.61
5601 Nokomis Lane	18	1.36	0.99	2.44	1.51
46XX Longfellow Ave S	19	1.66	1.09	4.03	1.21
27XX Randolph St.	20	2.46	1.50	4.93	2.17
27XX Oliver Ave N	21	2.07	2.03	5.72	1.96
1001 Washington Ave N	22	1.58	2.18	5.85	1.63
25XX 12th Ave N	23	1.24	1.57	4.15	1.36
Loring Greenway	24	1.30	1.52	2.97	1.34
24XX Mount Curve Ave	25	0.86	1.32	2.70	1.13
26XX Blaisdell Ave S	26	2.19	1.91	5.63	1.85
27XX W Lake of the Isles Pkwy	27	0.95	0.94	2.37	0.97
35XX 1st Ave S	28	2.70	1.82	5.23	2.11
3835 West Calhoun Pkwy	29	1.04	1.32	2.56	1.25
58th & Blaisdell Ave S	30	1.56	2.02	3.64	1.63
58XX Sheridan Ave S	31	1.32	1.01	3.14	1.80
46XX Grand Ave S	32	1.32	1.27	3.88	1.43
4525 Upton Ave S.	33	NA	0.98	2.68	0.92
309 2nd Ave S	34	1.98	2.90	3.22	1.95
4646 Humboldt Ave	35	1.65	1.38	4.53	1.44
12XX 26th St E	36	3.16	1.83	7.63	1.94
16XX Lincoln St NE	37	1.76	1.50	4.22	1.63
57XX Standish Ave	38	1.40	0.99	2.40	1.39
35W at 46th St S	42	2.81	2.71	6.09	1.98
143 13th Ave NE	43	2.77	1.72	5.70	1.70
46th St S & 2rd Ave	45	NA	2.40	6.17	2.33
46th St S & 3rd Ave	46	2.27	1.75	5.71	2.05
46th St S & 1st St	47	2.70	2.84	8.87	2.21
46th St S & Nicollet	48	3.91	3.80	11.15	3.15
48XX Bryant Ave N	49	2.13	5.61	3.97	2.12
Emerson & Lagoon	50	NA	1.82	4.03	1.81
James & Lake	51	NA	2.46	4.80	4.10
Hennepin & Lake	52	NA	1.95	4.27	1.64
32rd & Fremont	53	NA	2.91	4.69	2.82
Hennpin at Library	54	NA	2.75	5.21	2.41
Hennepin at Sabrina's	55	NA	1.70	6.00	1.70
Method Detection Limit	**MDL**	**0.10**	**0.14**	**0.55**	**0.13**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Trichlorethylene
CAS# 79-01-6

Health Benchmark
Cancer: 5.0 ug/m3
Non Cancer: 600 ug/m3

Table 21

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.13	0.07	0.32	0.20
31XX Ulysses St NE	2	0.33	0.32	0.29	NA
3300 St. Anthony Parkway	3	0.23	0.09	0.21	0.10
4900 Mississippi Court	4	0.13	0.15	0.37	0.35
41XX Penn Ave N	5	0.07	0.14	0.44	0.32
2317 St. Anthony Parkway	6	0.34	0.11	0.15	NA
10XX 23rd Ave SE	7	1.73	2.71	1.02	NA
1XX SE Arthur Avenue	8	0.19	0.14	0.77	NA
26XX 38th Ave S	9	0.21	0.12	0.95	NA
37XX 40th Ave S	10	0.10	0.07	0.29	NA
55XX 39th Ave S	11	0.07	0.10	0.17	NA
41XX Nawadaha Blvd	12	0.15	0.09	0.28	NA
16XX Polk St NE	13	0.70	0.16	0.84	0.18
8XX 5th Ave SE	14	0.14	0.07	1.31	0.02
Cedar Ave Bridge	15	0.11	0.06	0.57	ND
26XX Longfellow Ave S	16	0.12	0.11	0.39	ND
3451 Cedar Ave S	17	0.14	ND	0.38	ND
5601 Nokomis Lane	18	0.00	ND	0.06	ND
46XX Longfellow Ave S	19	0.06	0.01	0.21	ND
27XX Randolph St.	20	0.27	0.01	0.28	0.27
27XX Oliver Ave N	21	0.09	0.12	0.41	0.51
1001 Washington Ave N	22	0.10	0.05	0.88	0.26
25XX 12th Ave N	23	0.06	0.22	0.37	0.44
Loring Greenway	24	0.17	0.05	0.47	0.07
24XX Mount Curve Ave	25	0.03	0.08	0.53	0.26
26XX Blaisdell Ave S	26	1.10	3.04	0.89	2.67
27XX W Lake of the Isles Pkwy	27	0.10	0.03	0.37	0.14
35XX 1st Ave S	28	0.05	0.10	0.35	0.23
3835 West Calhoun Pkwy	29	0.04	0.07	0.14	0.17
58th & Blaisdell Ave S	30	0.10	ND	0.12	ND
58XX Sheridan Ave S	31	0.00	0.09	ND	0.17
46XX Grand Ave S	32	0.01	ND	0.07	0.11
4525 Upton Ave S.	33	NA	0.12	0.12	0.12
309 2nd Ave S	34	0.33	0.09	0.32	0.17
4646 Humboldt Ave	35	0.07	0.08	0.31	0.21
12XX 26th St E	36	0.04	0.00	0.27	ND
16XX Lincoln St NE	37	0.71	0.11	0.56	0.20
57XX Standish Ave	38	0.06	0.01	0.15	ND
35W at 46th St S	42	0.08	ND	0.15	ND
143 13th Ave NE	43	0.16	0.24	0.95	0.29
46th St S & 2rd Ave	45	NA	ND	0.15	ND
46th St S & 3rd Ave	46	0.04	ND	0.13	ND
46th St S & 1st St	47	0.09	0.14	0.23	ND
46th St S & Nicollet	48	0.40	0.43	0.24	ND
48XX Bryant Ave N	49	0.07	0.06	0.55	ND
Emerson & Lagoon	50	NA	0.09	0.31	0.12
James & Lake	51	NA	ND	0.38	0.22
Hennepin & Lake	52	NA	0.05	0.11	0.16
32rd & Fremont	53	NA	0.01	0.52	ND
Hennpin at Library	54	NA	0.08	0.93	0.18
Hennepin at Sabrina's	55	NA	0.08	0.31	0.25
Method Detection Limit	**MDL**	**0.12**	**0.19**	**0.14**	**0.44**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Carbon Tetrachloride
CAS# 56-23-5

Health Benchmark
Cancer: 0.7
Non Cancer: NA

Table 22

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.60	0.53	0.50	0.42
31XX Ulysses St NE	2	0.46	0.54	0.40	NA
3300 St. Anthony Parkway	3	0.46	0.39	0.46	0.49
4900 Mississippi Court	4	0.52	0.52	0.48	0.49
41XX Penn Ave N	5	0.45	0.51	0.48	0.48
2317 St. Anthony Parkway	6	0.51	0.52	0.46	NA
10XX 23rd Ave SE	7	0.52	0.47	0.42	NA
1XX SE Arthur Avenue	8	0.49	0.47	0.48	NA
26XX 38th Ave S	9	0.48	0.47	0.44	NA
37XX 40th Ave S	10	0.43	0.56	0.49	NA
55XX 39th Ave S	11	0.46	0.49	0.37	NA
41XX Nawadaha Blvd	12	0.48	0.51	0.49	NA
16XX Polk St NE	13	0.49	0.65	0.52	0.44
8XX 5th Ave SE	14	0.47	0.50	0.42	0.41
Cedar Ave Bridge	15	0.48	0.54	0.52	0.49
26XX Longfellow Ave S	16	0.51	0.51	0.43	0.42
3451 Cedar Ave S	17	0.53	0.47	0.49	0.47
5601 Nokomis Lane	18	0.43	0.48	0.39	0.48
46XX Longfellow Ave S	19	0.50	0.52	0.41	0.47
27XX Randolph St.	20	0.48	0.48	0.47	0.48
27XX Oliver Ave N	21	0.46	0.48	0.45	0.50
1001 Washington Ave N	22	0.55	0.57	0.45	0.53
25XX 12th Ave N	23	0.45	0.59	0.48	0.48
Loring Greenway	24	0.50	0.51	0.49	0.46
24XX Mount Curve Ave	25	0.49	0.48	0.47	0.47
26XX Blaisdell Ave S	26	0.53	0.55	0.48	0.45
27XX W Lake of the Isles Pkwy	27	0.51	0.50	0.42	0.48
35XX 1st Ave S	28	0.46	0.49	0.45	0.50
3835 West Calhoun Pkwy	29	0.48	0.51	0.42	0.50
58th & Blaisdell Ave S	30	0.56	0.52	0.42	0.50
58XX Sheridan Ave S	31	0.49	0.48	0.38	0.48
46XX Grand Ave S	32	0.47	0.52	0.45	0.47
4525 Upton Ave S.	33	NA	0.53	0.44	0.42
309 2nd Ave S	34	0.58	0.62	0.42	0.45
4646 Humboldt Ave	35	0.53	0.57	0.41	0.46
12XX 26th St E	36	0.47	0.47	0.39	0.42
16XX Lincoln St NE	37	0.54	0.51	0.43	0.46
57XX Standish Ave	38	0.52	0.49	0.43	0.44
35W at 46th St S	42	0.56	0.56	0.46	0.49
143 13th Ave NE	43	0.49	0.48	0.43	0.47
46th St S & 2rd Ave	45	NA	0.53	0.40	0.42
46th St S & 3rd Ave	46	0.54	0.48	0.41	0.39
46th St S & 1st St	47	0.48	0.56	0.43	0.48
46th St S & Nicollet	48	0.46	0.48	0.41	0.42
48XX Bryant Ave N	49	0.47	0.53	0.42	0.45
Emerson & Lagoon	50	NA	0.54	0.37	0.45
James & Lake	51	NA	0.48	0.40	0.50
Hennepin & Lake	52	NA	0.57	0.39	0.38
32rd & Fremont	53	NA	0.48	0.42	0.50
Hennpin at Library	54	NA	0.48	0.39	0.49
Hennepin at Sabrina's	55	NA	0.57	0.47	0.48
Method Detection Limit	**MDL**	**0.11**	**0.11**	**0.11**	**0.11**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

2,3 Dimethylpentane
CAS# 565593

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 23

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	ND	ND	ND	ND
31XX Ulysses St NE	2	ND	1.08	ND	NA
3300 St. Anthony Parkway	3	ND	ND	ND	ND
4900 Mississippi Court	4	ND	ND	ND	ND
41XX Penn Ave N	5	ND	ND	ND	ND
2317 St. Anthony Parkway	6	ND	0.69	0.88	NA
10XX 23rd Ave SE	7	ND	0.51	ND	NA
1XX SE Arthur Avenue	8	ND	ND	ND	NA
26XX 38th Ave S	9	ND	ND	ND	NA
37XX 40th Ave S	10	ND	ND	ND	NA
55XX 39th Ave S	11	ND	ND	ND	NA
41XX Nawadaha Blvd	12	ND	ND	ND	NA
16XX Polk St NE	13	ND	ND	1.19	ND
8XX 5th Ave SE	14	ND	ND	ND	ND
Cedar Ave Bridge	15	ND	ND	1.21	ND
26XX Longfellow Ave S	16	ND	ND	1.07	ND
3451 Cedar Ave S	17	ND	1.48	1.98	ND
5601 Nokomis Lane	18	ND	ND	0.49	ND
46XX Longfellow Ave S	19	ND	ND	ND	ND
27XX Randolph St.	20	ND	ND	1.75	ND
27XX Oliver Ave N	21	ND	ND	ND	ND
1001 Washington Ave N	22	ND	1.36	1.34	ND
25XX 12th Ave N	23	ND	ND	1.13	ND
Loring Greenway	24	ND	ND	ND	ND
24XX Mount Curve Ave	25	ND	ND	ND	ND
26XX Blaisdell Ave S	26	ND	ND	ND	ND
27XX W Lake of the Isles Pkwy	27	ND	ND	ND	ND
35XX 1st Ave S	28	ND	ND	1.36	ND
3835 West Calhoun Pkwy	29	ND	ND	ND	ND
58th & Blaisdell Ave S	30	ND	0.83	ND	ND
58XX Sheridan Ave S	31	ND	ND	0.76	ND
46XX Grand Ave S	32	ND	0.90	ND	ND
4525 Upton Ave S.	33	NA	ND	ND	ND
309 2nd Ave S	34	ND	ND	0.86	ND
4646 Humboldt Ave	35	ND	ND	1.44	ND
12XX 26th St E	36	ND	ND	1.65	ND
16XX Lincoln St NE	37	ND	ND	1.01	ND
57XX Standish Ave	38	ND	ND	ND	ND
35W at 46th St S	42	ND	ND	1.62	ND
143 13th Ave NE	43	ND	ND	2.00	ND
46th St S & 2rd Ave	45	NA	1.18	1.39	ND
46th St S & 3rd Ave	46	ND	ND	1.42	ND
46th St S & 1st St	47	ND	ND	1.71	ND
46th St S & Nicollet	48	ND	ND	2.10	ND
48XX Bryant Ave N	49	ND	ND	1.27	ND
Emerson & Lagoon	50	NA	ND	1.19	ND
James & Lake	51	NA	ND	1.12	ND
Hennepin & Lake	52	NA	ND	0.66	ND
32rd & Fremont	53	NA	0.97	ND	ND
Hennpin at Library	54	NA	ND	ND	ND
Hennepin at Sabrina's	55	NA	ND	ND	ND
Method Detection Limit	**MDL**	**0.17**	**0.15**	**0.15**	**0.88**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Chloroform
CAS# 67-66-3

Health Benchmark
Cancer: NA
Non Cancer: 300 ug/m3

Table 24

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	ND	ND	ND	ND
31XX Ulysses St NE	2	ND	ND	ND	NA
3300 St. Anthony Parkway	3	ND	ND	ND	ND
4900 Mississippi Court	4	ND	ND	ND	ND
41XX Penn Ave N	5	ND	ND	ND	ND
2317 St. Anthony Parkway	6	ND	ND	ND	NA
10XX 23rd Ave SE	7	ND	ND	ND	NA
1XX SE Arthur Avenue	8	ND	ND	ND	NA
26XX 38th Ave S	9	ND	ND	ND	NA
37XX 40th Ave S	10	ND	ND	ND	NA
55XX 39th Ave S	11	ND	ND	ND	NA
41XX Nawadaha Blvd	12	ND	ND	ND	NA
16XX Polk St NE	13	ND	ND	ND	ND
8XX 5th Ave SE	14	ND	ND	ND	ND
Cedar Ave Bridge	15	ND	ND	ND	ND
26XX Longfellow Ave S	16	ND	ND	ND	ND
3451 Cedar Ave S	17	ND	ND	ND	ND
5601 Nokomis Lane	18	ND	ND	0.17	ND
46XX Longfellow Ave S	19	ND	ND	ND	ND
27XX Randolph St.	20	ND	ND	ND	ND
27XX Oliver Ave N	21	ND	ND	ND	ND
1001 Washington Ave N	22	ND	ND	ND	ND
25XX 12th Ave N	23	ND	ND	ND	ND
Loring Greenway	24	ND	ND	ND	ND
24XX Mount Curve Ave	25	ND	ND	ND	ND
26XX Blaisdell Ave S	26	ND	ND	ND	ND
27XX W Lake of the Isles Pkwy	27	ND	ND	ND	ND
35XX 1st Ave S	28	ND	ND	ND	ND
3835 West Calhoun Pkwy	29	ND	ND	ND	ND
58th & Blaisdell Ave S	30	ND	ND	ND	ND
58XX Sheridan Ave S	31	ND	ND	ND	ND
46XX Grand Ave S	32	ND	ND	ND	ND
4525 Upton Ave S.	33	NA	ND	ND	ND
309 2nd Ave S	34	ND	ND	ND	ND
4646 Humboldt Ave	35	ND	ND	ND	ND
12XX 26th St E	36	ND	ND	ND	ND
16XX Lincoln St NE	37	ND	ND	ND	ND
57XX Standish Ave	38	ND	ND	ND	ND
35W at 46th St S	42	ND	ND	ND	ND
143 13th Ave NE	43	ND	ND	ND	ND
46th St S & 2rd Ave	45	NA	ND	ND	ND
46th St S & 3rd Ave	46	ND	ND	ND	ND
46th St S & 1st St	47	ND	ND	ND	ND
46th St S & Nicollet	48	ND	ND	ND	ND
48XX Bryant Ave N	49	ND	ND	ND	ND
Emerson & Lagoon	50	NA	ND	ND	ND
James & Lake	51	NA	ND	ND	ND
Hennepin & Lake	52	NA	ND	ND	ND
32rd & Fremont	53	NA	ND	ND	ND
Hennpin at Library	54	NA	ND	ND	ND
Hennepin at Sabrina's	55	NA	ND	ND	ND
Method Detection Limit	**MDL**	**0.16**	**0.17**	**0.16**	**0.16**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

MEK
CAS# 78-93-3

Health Benchmark
Cancer: NA
Non Cancer: 5000 ug/m3

Table 25

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	1.07	1.44	1.22	0.52
31XX Ulysses St NE	2	0.92	1.61	1.21	NA
3300 St. Anthony Parkway	3	0.86	1.17	1.25	1.03
4900 Mississippi Court	4	1.17	1.50	1.60	0.70
41XX Penn Ave N	5	0.97	1.23	1.30	0.45
2317 St. Anthony Parkway	6	1.14	1.65	1.25	NA
10XX 23rd Ave SE	7	1.73	2.20	2.42	NA
1XX SE Arthur Avenue	8	0.89	1.29	1.66	NA
26XX 38th Ave S	9	0.72	1.34	1.45	NA
37XX 40th Ave S	10	0.67	1.62	1.16	NA
55XX 39th Ave S	11	0.90	1.25	1.16	NA
41XX Nawadaha Blvd	12	0.73	1.29	1.17	NA
16XX Polk St NE	13	1.71	2.23	2.18	1.29
8XX 5th Ave SE	14	0.76	1.50	1.56	1.06
Cedar Ave Bridge	15	1.00	1.50	2.00	1.09
26XX Longfellow Ave S	16	1.04	1.56	2.36	0.86
3451 Cedar Ave S	17	0.92	1.25	1.57	0.77
5601 Nokomis Lane	18	1.31	2.20	0.91	0.79
46XX Longfellow Ave S	19	0.79	1.05	1.28	0.73
27XX Randolph St.	20	1.03	1.37	2.19	0.69
27XX Oliver Ave N	21	1.09	1.36	1.37	0.66
1001 Washington Ave N	22	1.08	4.28	2.66	0.83
25XX 12th Ave N	23	0.76	1.61	1.17	0.43
Loring Greenway	24	0.83	1.46	1.58	0.84
24XX Mount Curve Ave	25	0.76	1.34	1.17	0.44
26XX Blaisdell Ave S	26	0.81	1.38	2.42	0.52
27XX W Lake of the Isles Pkwy	27	0.67	1.20	1.09	0.47
35XX 1st Ave S	28	0.73	1.32	1.17	0.70
3835 West Calhoun Pkwy	29	0.78	1.36	1.13	0.65
58th & Blaisdell Ave S	30	1.01	1.42	1.34	1.45
58XX Sheridan Ave S	31	0.75	1.47	0.96	0.51
46XX Grand Ave S	32	0.81	1.22	1.28	0.54
4525 Upton Ave S.	33	NA	1.49	1.31	0.40
309 2nd Ave S	34	0.87	1.61	1.69	0.76
4646 Humboldt Ave	35	0.77	1.48	1.15	0.61
12XX 26th St E	36	1.08	1.27	1.50	0.79
16XX Lincoln St NE	37	1.24	1.48	1.31	0.99
57XX Standish Ave	38	0.92	1.24	1.14	0.77
35W at 46th St S	42	0.78	1.45	1.19	0.83
143 13th Ave NE	43	1.27	1.45	1.84	0.82
46th St S & 2rd Ave	45	NA	1.47	1.12	0.88
46th St S & 3rd Ave	46	0.99	1.29	1.17	0.71
46th St S & 1st St	47	0.91	1.49	1.41	0.82
46th St S & Nicollet	48	0.71	1.25	1.32	0.93
48XX Bryant Ave N	49	0.84	2.34	1.30	0.89
Emerson & Lagoon	50	NA	1.44	1.20	0.56
James & Lake	51	NA	1.37	1.20	0.64
Hennepin & Lake	52	NA	1.52	0.97	0.41
32rd & Fremont	53	NA	1.40	1.38	0.88
Hennpin at Library	54	NA	1.35	1.64	0.71
Hennepin at Sabrina's	55	NA	1.48	1.46	0.55
Method Detection Limit	**MDL**	**0.20**	**0.15**	**1.64**	**0.54**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Methylcyclopentane
CAS# 96-37-7

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 26

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.81	ND	ND	0.31
31XX Ulysses St NE	2	0.53	ND	ND	NA
3300 St. Anthony Parkway	3	0.45	0.25	0.87	0.37
4900 Mississippi Court	4	0.00	0.29	ND	0.44
41XX Penn Ave N	5	0.50	ND	ND	0.46
2317 St. Anthony Parkway	6	0.00	0.31	ND	NA
10XX 23rd Ave SE	7	0.44	ND	ND	NA
1XX SE Arthur Avenue	8	0.34	0.24	ND	NA
26XX 38th Ave S	9	0.35	ND	ND	NA
37XX 40th Ave S	10	0.54	ND	ND	NA
55XX 39th Ave S	11	0.35	ND	ND	NA
41XX Nawadaha Blvd	12	0.41	0.46	ND	NA
16XX Polk St NE	13	0.00	0.51	1.03	0.52
8XX 5th Ave SE	14	0.40	ND	ND	0.39
Cedar Ave Bridge	15	0.62	0.86	1.28	0.72
26XX Longfellow Ave S	16	0.76	0.60	1.06	0.39
3451 Cedar Ave S	17	1.08	0.84	ND	0.96
5601 Nokomis Lane	18	0.00	ND	0.63	0.45
46XX Longfellow Ave S	19	0.00	ND	ND	0.46
27XX Randolph St.	20	0.58	ND	1.07	0.48
27XX Oliver Ave N	21	0.51	0.43	ND	0.43
1001 Washington Ave N	22	0.43	0.40	ND	0.38
25XX 12th Ave N	23	0.35	ND	1.08	ND
Loring Greenway	24	0.00	0.40	ND	0.39
24XX Mount Curve Ave	25	0.00	0.30	ND	0.28
26XX Blaisdell Ave S	26	0.63	0.52	ND	0.48
27XX W Lake of the Isles Pkwy	27	0.26	ND	ND	0.18
35XX 1st Ave S	28	0.84	0.46	1.22	0.69
3835 West Calhoun Pkwy	29	0.26	ND	ND	0.37
58th & Blaisdell Ave S	30	0.33	0.47	ND	0.41
58XX Sheridan Ave S	31	0.00	ND	1.12	0.48
46XX Grand Ave S	32	0.39	0.42	ND	0.48
4525 Upton Ave S.	33	NA	ND	ND	0.26
309 2nd Ave S	34	0.40	0.45	ND	0.46
4646 Humboldt Ave	35	0.43	ND	0.73	0.50
12XX 26th St E	36	0.46	0.59	1.03	0.53
16XX Lincoln St NE	37	0.00	ND	ND	0.47
57XX Standish Ave	38	0.45	ND	ND	0.61
35W at 46th St S	42	0.75	0.79	1.52	0.67
143 13th Ave NE	43	0.58	0.35	1.32	0.54
46th St S & 2rd Ave	45	NA	0.82	1.00	0.62
46th St S & 3rd Ave	46	0.71	0.54	ND	0.49
46th St S & 1st St	47	0.76	1.08	3.72	0.67
46th St S & Nicollet	48	1.53	1.94	4.57	1.23
48XX Bryant Ave N	49	0.50	0.69	ND	0.47
Emerson & Lagoon	50	NA	ND	ND	0.55
James & Lake	51	NA	0.84	ND	0.75
Hennepin & Lake	52	NA	0.49	0.74	0.48
32rd & Fremont	53	NA	0.94	ND	0.69
Hennpin at Library	54	NA	0.77	ND	0.55
Hennepin at Sabrina's	55	NA	0.46	ND	0.53
Method Detection Limit	**MDL**	**0.16**	**0.15**	**0.15**	**0.15**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

n-Hexane
CAS# 110-54-3

Health Benchmark
Cancer: NA
Non Cancer: NA

Table 27

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	1.22	0.77	1.30	0.50
31XX Ulysses St NE	2	0.63	0.61	0.86	NA
3300 St. Anthony Parkway	3	0.51	0.59	0.92	0.71
4900 Mississippi Court	4	0.00	0.73	ND	0.73
41XX Penn Ave N	5	0.77	0.77	1.44	0.74
2317 St. Anthony Parkway	6	0.00	0.66	0.75	NA
10XX 23rd Ave SE	7	0.66	0.59	0.73	NA
1XX SE Arthur Avenue	8	0.00	0.43	ND	NA
26XX 38th Ave S	9	0.00	0.44	0.60	NA
37XX 40th Ave S	10	0.60	0.52	ND	NA
55XX 39th Ave S	11	0.00	0.34	0.63	NA
41XX Nawadaha Blvd	12	0.00	0.62	0.59	NA
16XX Polk St NE	13	0.71	1.15	1.48	1.05
8XX 5th Ave SE	14	0.00	0.74	1.54	0.67
Cedar Ave Bridge	15	0.67	1.12	1.34	0.89
26XX Longfellow Ave S	16	0.96	0.63	1.04	0.86
3451 Cedar Ave S	17	1.24	1.52	2.08	1.40
5601 Nokomis Lane	18	0.00	0.53	0.88	0.75
46XX Longfellow Ave S	19	0.64	0.49	0.91	0.84
27XX Randolph St.	20	0.00	ND	ND	0.93
27XX Oliver Ave N	21	0.65	0.84	1.31	0.74
1001 Washington Ave N	22	0.43	0.59	0.81	0.90
25XX 12th Ave N	23	0.00	0.45	0.91	0.52
Loring Greenway	24	0.00	0.66	ND	0.70
24XX Mount Curve Ave	25	0.00	0.39	ND	ND
26XX Blaisdell Ave S	26	0.65	0.93	0.92	ND
27XX W Lake of the Isles Pkwy	27	0.00	0.55	ND	ND
35XX 1st Ave S	28	0.73	0.75	1.17	0.87
3835 West Calhoun Pkwy	29	0.00	0.51	ND	ND
58th & Blaisdell Ave S	30	0.48	0.65	ND	0.75
58XX Sheridan Ave S	31	0.00	0.56	1.06	0.99
46XX Grand Ave S	32	0.44	0.86	0.76	0.89
4525 Upton Ave S.	33	NA	0.38	0.88	0.45
309 2nd Ave S	34	0.42	0.80	0.80	ND
4646 Humboldt Ave	35	0.71	0.62	1.28	ND
12XX 26th St E	36	0.91	0.79	1.46	ND
16XX Lincoln St NE	37	0.41	0.65	0.91	0.91
57XX Standish Ave	38	0.48	0.34	0.49	0.62
35W at 46th St S	42	1.01	1.21	1.51	0.90
143 13th Ave NE	43	0.70	0.58	1.12	ND
46th St S & 2rd Ave	45	NA	1.34	1.23	0.84
46th St S & 3rd Ave	46	0.00	0.83	1.32	0.94
46th St S & 1st St	47	1.00	1.64	4.92	0.98
46th St S & Nicollet	48	2.44	3.45	7.57	1.95
48XX Bryant Ave N	49	0.65	0.89	0.75	1.24
Emerson & Lagoon	50	NA	0.91	0.74	0.79
James & Lake	51	NA	1.34	0.79	0.91
Hennepin & Lake	52	NA	0.68	0.87	0.59
32rd & Fremont	53	NA	1.47	0.72	1.12
Hennpin at Library	54	NA	1.17	0.84	1.09
Hennepin at Sabrina's	55	NA	0.47	ND	ND
Method Detection Limit	**MDL**	**0.44**	**0.42**	**0.39**	**0.38**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

MTBE
CAS# 1634-04-4

Health Benchmark
Cancer: 38 ug/m3
Non Cancer: 3000 ug/m3

Table 28

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	ND	ND	ND	ND
31XX Ulysses St NE	2	ND	ND	ND	ND
3300 St. Anthony Parkway	3	ND	ND	ND	ND
4900 Mississippi Court	4	ND	ND	ND	ND
41XX Penn Ave N	5	ND	ND	ND	ND
2317 St. Anthony Parkway	6	ND	ND	ND	ND
10XX 23rd Ave SE	7	ND	ND	ND	ND
1XX SE Arthur Avenue	8	ND	ND	ND	ND
26XX 38th Ave S	9	ND	ND	ND	ND
37XX 40th Ave S	10	ND	ND	ND	ND
55XX 39th Ave S	11	ND	ND	ND	ND
41XX Nawadaha Blvd	12	ND	ND	ND	ND
16XX Polk St NE	13	ND	ND	ND	ND
8XX 5th Ave SE	14	ND	ND	ND	ND
Cedar Ave Bridge	15	ND	ND	ND	ND
26XX Longfellow Ave S	16	ND	ND	ND	ND
3451 Cedar Ave S	17	ND	ND	ND	ND
5601 Nokomis Lane	18	ND	ND	ND	ND
46XX Longfellow Ave S	19	ND	ND	ND	ND
27XX Randolph St.	20	ND	ND	ND	ND
27XX Oliver Ave N	21	ND	ND	ND	ND
1001 Washington Ave N	22	ND	ND	ND	ND
25XX 12th Ave N	23	ND	ND	ND	ND
Loring Greenway	24	ND	ND	ND	ND
24XX Mount Curve Ave	25	ND	ND	ND	ND
26XX Blaisdell Ave S	26	ND	ND	ND	ND
27XX W Lake of the Isles Pkwy	27	ND	ND	ND	ND
35XX 1st Ave S	28	ND	ND	ND	ND
3835 West Calhoun Pkwy	29	ND	ND	ND	ND
58th & Blaisdell Ave S	30	ND	ND	ND	ND
58XX Sheridan Ave S	31	ND	ND	ND	ND
46XX Grand Ave S	32	ND	ND	ND	ND
4525 Upton Ave S.	33	NA	ND	ND	ND
309 2nd Ave S	34	ND	ND	ND	ND
4646 Humboldt Ave	35	ND	ND	ND	ND
12XX 26th St E	36	ND	ND	ND	ND
16XX Lincoln St NE	37	ND	ND	ND	ND
57XX Standish Ave	38	ND	ND	ND	ND
35W at 46th St S	42	ND	ND	ND	ND
143 13th Ave NE	43	ND	ND	ND	ND
46th St S & 2rd Ave	45	NA	ND	ND	ND
46th St S & 3rd Ave	46	ND	ND	ND	ND
46th St S & 1st St	47	ND	ND	ND	ND
46th St S & Nicollet	48	ND	ND	ND	ND
48XX Bryant Ave N	49	ND	ND	ND	ND
Emerson & Lagoon	50	NA	ND	ND	ND
James & Lake	51	NA	ND	ND	ND
Hennepin & Lake	52	NA	ND	ND	ND
32rd & Fremont	53	NA	ND	ND	ND
Hennpin at Library	54	NA	ND	ND	ND
Hennepin at Sabrina's	55	NA	ND	ND	ND
Method Detection Limit	**MDL**	**2.05**	**1.91**	**1.73**	**1.69**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Methylene Chloride
CAS# 75-09-2

Health Benchmark
Cancer: 21 ug/m3
Non Cancer: 400 ug/m3

Table 29

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	0.21	0.04	0.34	0.15
31XX Ulysses St NE	2	0.28	0.00	0.33	NA
3300 St. Anthony Parkway	3	0.30	ND	0.87	0.66
4900 Mississippi Court	4	0.22	0.02	0.43	0.15
41XX Penn Ave N	5	0.29	ND	0.49	0.16
2317 St. Anthony Parkway	6	0.20	0.00	0.25	NA
10XX 23rd Ave SE	7	0.34	0.08	0.96	NA
1XX SE Arthur Avenue	8	0.20	0.02	0.35	NA
26XX 38th Ave S	9	0.18	0.03	0.78	NA
37XX 40th Ave S	10	0.23	0.11	ND	NA
55XX 39th Ave S	11	0.19	0.03	0.85	NA
41XX Nawadaha Blvd	12	0.15	0.01	0.37	NA
16XX Polk St NE	13	0.41	0.23	0.67	0.26
8XX 5th Ave SE	14	0.21	0.00	0.75	0.23
Cedar Ave Bridge	15	0.13	0.00	0.48	0.20
26XX Longfellow Ave S	16	0.20	0.08	ND	0.13
3451 Cedar Ave S	17	0.29	0.01	0.45	0.19
5601 Nokomis Lane	18	0.13	0.02	0.16	0.14
46XX Longfellow Ave S	19	0.16	ND	0.64	0.19
27XX Randolph St.	20	0.31	ND	0.72	0.30
27XX Oliver Ave N	21	0.12	ND	0.42	0.12
1001 Washington Ave N	22	0.15	0.08	0.70	0.21
25XX 12th Ave N	23	0.07	0.13	0.37	0.17
Loring Greenway	24	0.11	0.07	0.29	0.14
24XX Mount Curve Ave	25	0.10	ND	0.20	0.18
26XX Blaisdell Ave S	26	0.27	0.05	0.42	0.22
27XX W Lake of the Isles Pkwy	27	0.13	0.02	0.18	0.12
35XX 1st Ave S	28	0.20	0.00	0.13	0.20
3835 West Calhoun Pkwy	29	0.10	0.00	0.24	0.19
58th & Blaisdell Ave S	30	0.29	0.02	0.14	0.15
58XX Sheridan Ave S	31	0.17	ND	0.06	0.23
46XX Grand Ave S	32	0.56	ND	0.43	0.28
4525 Upton Ave S.	33	NA	0.10	0.10	0.08
309 2nd Ave S	34	0.25	0.08	0.26	0.12
4646 Humboldt Ave	35	0.16	0.02	0.34	0.14
12XX 26th St E	36	0.26	0.05	0.21	0.22
16XX Lincoln St NE	37	0.37	0.11	0.40	0.50
57XX Standish Ave	38	0.19	0.00	0.96	0.17
35W at 46th St S	42	0.25	ND	0.35	0.17
143 13th Ave NE	43	0.40	0.02	0.86	0.26
46th St S & 2rd Ave	45	NA	0.07	0.27	0.15
46th St S & 3rd Ave	46	0.26	0.01	0.43	0.12
46th St S & 1st St	47	0.19	0.03	0.32	0.16
46th St S & Nicollet	48	0.25	ND	0.26	0.13
48XX Bryant Ave N	49	0.28	0.05	0.70	0.16
Emerson & Lagoon	50	NA	ND	0.24	0.19
James & Lake	51	NA	ND	0.24	0.29
Hennepin & Lake	52	NA	0.12	0.22	0.23
32rd & Fremont	53	NA	0.03	0.29	0.20
Hennpin at Library	54	NA	0.01	0.37	0.18
Hennepin at Sabrina's	55	NA	ND	0.33	0.20
Method Detection Limit	**MDL**	**0.05**	**0.08**	**0.19**	**0.11**

Results are in micrograms/cubic meter (ug/m3).
ND= Non detectable result,
NA=Not available

City of Minneapolis
Env. Management and Safety
1/29/2007

Table 30

Isoprene
CAS# 78-79-5

Health Benchmark: NA

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	ND	ND	ND	ND
31XX Ulysses St NE	2	ND	ND	ND	NA
3300 St. Anthony Parkway	3	ND	ND	ND	ND
4900 Mississippi Court	4	ND	ND	ND	ND
41XX Penn Ave N	5	ND	ND	ND	ND
2317 St. Anthony Parkway	6	ND	ND	ND	NA
10XX 23rd Ave SE	7	ND	ND	ND	NA
1XX SE Arthur Avenue	8	ND	ND	ND	NA
26XX 38th Ave S	9	ND	ND	ND	NA
37XX 40th Ave S	10	ND	ND	ND	NA
55XX 39th Ave S	11	ND	ND	ND	NA
41XX Nawadaha Blvd	12	ND	ND	ND	NA
16XX Polk St NE	13	ND	ND	ND	ND
8XX 5th Ave SE	14	ND	ND	ND	ND
Cedar Ave Bridge	15	ND	ND	ND	ND
26XX Longfellow Ave S	16	ND	ND	ND	ND
3451 Cedar Ave S	17	ND	ND	ND	ND
5601 Nokomis Lane	18	ND	ND	ND	ND
46XX Longfellow Ave S	19	ND	ND	ND	ND
27XX Randolph St.	20	ND	ND	ND	ND
27XX Oliver Ave N	21	ND	ND	ND	ND
1001 Washington Ave N	22	ND	ND	ND	ND
25XX 12th Ave N	23	ND	ND	ND	ND
Loring Greenway	24	ND	ND	ND	ND
24XX Mount Curve Ave	25	ND	ND	ND	ND
26XX Blaisdell Ave S	26	ND	ND	ND	ND
27XX W Lake of the Isles Pkwy	27	ND	ND	ND	ND
35XX 1st Ave S	28	ND	ND	ND	ND
3835 West Calhoun Pkwy	29	ND	ND	ND	ND
58th & Blaisdell Ave S	30	ND	ND	ND	ND
58XX Sheridan Ave S	31	ND	ND	ND	ND
46XX Grand Ave S	32	ND	ND	ND	ND
4525 Upton Ave S.	33	NA	ND	ND	ND
309 2nd Ave S	34	ND	ND	ND	ND
4646 Humboldt Ave	35	ND	ND	ND	ND
12XX 26th St E	36	ND	ND	ND	ND
16XX Lincoln St NE	37	ND	ND	ND	ND
57XX Standish Ave	38	ND	ND	ND	ND
35W at 46th St S	42	ND	ND	ND	ND
143 13th Ave NE	43	ND	ND	ND	ND
46th St S & 2rd Ave	45	NA	ND	ND	ND
46th St S & 3rd Ave	46	ND	ND	ND	ND
46th St S & 1st St	47	ND	ND	ND	ND
46th St S & Nicollet	48	ND	ND	ND	ND
48XX Bryant Ave N	49	ND	ND	ND	ND
Emerson & Lagoon	50	NA	ND	ND	ND
James & Lake	51	NA	ND	ND	ND
Hennepin & Lake	52	NA	ND	ND	ND
32rd & Fremont	53	NA	ND	ND	ND
Hennpin at Library	54	NA	ND	ND	ND
Hennepin at Sabrina's	55	NA	ND	ND	ND
Method Detection Limit	**MDL**	**2.10**	**3.39**	**4.14**	**4.08**

Results are in Micrograms/cubic meter (ug/m3).
ND=Non Detectable result
NA=Not Available

Draft 10/19/2005

n-Pentane
CAS# 109-66-0

Health Benchmark
Cancer: NA
Noncancer: NA

Table 31

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	4.08	2.27	5.22	1.74
31XX Ulysses St NE	2	2.42	1.39	4.32	NA
3300 St. Anthony Parkway	3	0.88	1.45	3.98	1.21
4900 Mississippi Court	4	0.00	1.98	4.62	1.92
41XX Penn Ave N	5	1.18	2.84	6.28	1.86
2317 St. Anthony Parkway	6	0.00	1.52	5.91	NA
10XX 23rd Ave SE	7	0.00	1.62	3.09	NA
1XX SE Arthur Avenue	8	1.36	1.41	2.35	NA
26XX 38th Ave S	9	0.00	1.74	3.52	NA
37XX 40th Ave S	10	2.99	1.89	3.81	NA
55XX 39th Ave S	11	1.72	1.78	2.25	NA
41XX Nawadaha Blvd	12	1.93	2.73	4.63	NA
16XX Polk St NE	13	1.75	ND	5.56	1.84
8XX 5th Ave SE	14	0.00	2.08	2.63	1.40
Cedar Ave Bridge	15	3.15	5.23	4.98	2.55
26XX Longfellow Ave S	16	2.37	2.74	3.23	2.14
3451 Cedar Ave S	17	4.21	5.51	8.21	2.92
5601 Nokomis Lane	18	2.34	ND	3.42	1.71
46XX Longfellow Ave S	19	3.23	2.38	3.86	2.31
27XX Randolph St.	20	1.81	1.85	4.67	ND
27XX Oliver Ave N	21	3.33	3.59	6.16	2.13
1001 Washington Ave N	22	1.55	2.63	4.79	1.13
25XX 12th Ave N	23	0.00	2.86	3.49	2.01
Loring Greenway	24	0.00	2.40	2.68	1.85
24XX Mount Curve Ave	25	0.00	1.32	1.88	0.62
26XX Blaisdell Ave S	26	3.03	2.12	2.79	1.23
27XX W Lake of the Isles Pkwy	27	1.03	2.06	2.26	0.45
35XX 1st Ave S	28	3.00	2.46	5.22	2.76
3835 West Calhoun Pkwy	29	1.17	2.28	1.98	1.26
58th & Blaisdell Ave S	30	1.64	2.40	1.27	1.67
58XX Sheridan Ave S	31	0.00	ND	7.46	1.48
46XX Grand Ave S	32	1.45	2.43	3.52	1.52
4525 Upton Ave S.	33	NA	0.98	2.92	0.87
309 2nd Ave S	34	1.94	3.63	2.67	1.83
4646 Humboldt Ave	35	1.79	ND	5.69	2.08
12XX 26th St E	36	2.54	3.89	5.41	1.66
16XX Lincoln St NE	37	1.97	1.79	5.78	1.13
57XX Standish Ave	38	2.47	1.84	2.59	1.59
35W at 46th St S	42	3.88	5.78	9.58	2.46
143 13th Ave NE	43	2.66	2.00	5.24	1.38
46th St S & 2rd Ave	45	NA	3.21	6.28	2.14
46th St S & 3rd Ave	46	3.92	2.67	6.48	1.75
46th St S & 1st St	47	3.60	6.94	29.14	1.44
46th St S & Nicollet	48	12.52	15.38	29.17	6.43
48XX Bryant Ave N	49	2.10	3.51	3.09	2.35
Emerson & Lagoon	50	NA	2.00	3.32	ND
James & Lake	51	NA	5.98	4.55	3.07
Hennepin & Lake	52	NA	2.05	3.39	1.62
32rd & Fremont	53	NA	5.50	4.29	2.54
Hennpin at Library	54	NA	5.77	5.56	1.13
Hennepin at Sabrina's	55	NA	1.90	5.04	1.56
Method Detection Limit	**MDL**	**1.31**	**1.22**	**1.10**	**0.66**

Results are in micrograms/cubic meter (ug/m3).
ND=Non Detectable Limit.
NA=Not Available

City of Minneapolis
Env. Management and Safety
1/29/2007

1,3 Butadiene

Health Benchmark
Cancer: 0.0036 ug/m3
Noncancer: 2.0 ug/m3

Table 32

Location	Grid	May-05	Aug-05	Oct-05	Jan-06
50XX Penn Ave N	1	ND	ND	ND	ND
31XX Ulysses St NE	2	ND	ND	ND	NA
3300 St. Anthony Parkway	3	ND	ND	ND	ND
4900 Mississippi Court	4	ND	ND	ND	ND
41XX Penn Ave N	5	ND	ND	ND	ND
2317 St. Anthony Parkway	6	ND	ND	ND	NA
10XX 23rd Ave SE	7	ND	ND	ND	NA
1XX SE Arthur Avenue	8	ND	ND	ND	NA
26XX 38th Ave S	9	ND	ND	ND	NA
37XX 40th Ave S	10	ND	ND	ND	NA
55XX 39th Ave S	11	ND	ND	ND	NA
41XX Nawadaha Blvd	12	ND	ND	ND	NA
16XX Polk St NE	13	ND	ND	ND	ND
8XX 5th Ave SE	14	ND	ND	ND	ND
Cedar Ave Bridge	15	ND	ND	ND	ND
26XX Longfellow Ave S	16	ND	ND	ND	ND
3451 Cedar Ave S	17	ND	ND	ND	ND
5601 Nokomis Lane	18	ND	ND	ND	ND
46XX Longfellow Ave S	19	ND	ND	ND	ND
27XX Randolph St.	20	ND	ND	ND	ND
27XX Oliver Ave N	21	ND	ND	ND	ND
1001 Washington Ave N	22	ND	ND	ND	ND
25XX 12th Ave N	23	ND	ND	ND	ND
Loring Greenway	24	ND	ND	ND	ND
24XX Mount Curve Ave	25	ND	ND	ND	ND
26XX Blaisdell Ave S	26	ND	ND	ND	ND
27XX W Lake of the Isles Pkwy	27	ND	ND	ND	ND
35XX 1st Ave S	28	ND	ND	ND	ND
3835 West Calhoun Pkwy	29	ND	ND	ND	ND
58th & Blaisdell Ave S	30	ND	ND	ND	ND
58XX Sheridan Ave S	31	ND	ND	ND	ND
46XX Grand Ave S	32	ND	ND	ND	ND
4525 Upton Ave S.	33	NA	ND	ND	ND
309 2nd Ave S	34	ND	ND	ND	ND
4646 Humboldt Ave	35	ND	ND	ND	ND
12XX 26th St E	36	ND	ND	ND	ND
16XX Lincoln St NE	37	ND	ND	ND	ND
57XX Standish Ave	38	ND	ND	ND	ND
35W at 46th St S	42	ND	ND	ND	ND
143 13th Ave NE	43	ND	ND	ND	ND
46th St S & 2rd Ave	45	NA	ND	ND	ND
46th St S & 3rd Ave	46	ND	ND	ND	ND
46th St S & 1st St	47	ND	ND	ND	ND
46th St S & Nicollet	48	ND	ND	ND	ND
48XX Bryant Ave N	49	ND	ND	ND	ND
Emerson & Lagoon	50	NA	ND	ND	ND
James & Lake	51	NA	ND	ND	ND
Hennepin & Lake	52	NA	ND	ND	ND
32rd & Fremont	53	NA	ND	ND	ND
Hennpin at Library	54	NA	ND	ND	ND
Hennepin at Sabrina's	55	NA	ND	ND	ND
Method Detection Limit	MDL	2.10	1.96	1.78	1.75

Results are in micrograms/cubic meter (ug/m3).
ND=Non Detectable Limit,
NA=Not Available

City of Minneapolis
Env. Management and Safety
1/29/2007

APPENDIX B:

AN AIR POLLUTION PRIMER

What are the Sources of Hazardous Air Pollutants?

Mobile Sources include construction vehicles, trucks, trains, airplanes, automobiles, lawnmowers and off road vehicles such as snowmobiles and ATVs.
Point Sources are industrial and manufacturing sources such as power plants, refineries, waste incinerators etc. By themselves these sources have a significant quantity of emissions individually.
Area Sources are sources that individually have smaller quantities of emissions but cumulatively are a significant piece of the air pollution puzzle. Dry cleaners, gasoline filling stations, woodstoves, painting/solvent use, autobody shops and bakeries are all area sources.

What are Health Risk Values?
Health Risk Values (HRVs) were derived by the Minnesota Department of Health to assess the potential health risks associated with exposure to ambient air pollutants. HRVs are defined in Minnesota State Rule 4717.8050 below:

> **Minnesota State Rule 4717.8050 Definitions. Subp. 19.** Health risk value or HRV. "Health risk value" or "HRV" means the concentration of a chemical or defined mixture of chemicals in ambient air, at or below which the chemical or defined mixture of chemicals is unlikely to cause an adverse health effect to the general public. The HRV is expressed in units of micrograms of the chemical or defined mixture of chemicals per cubic meter of air (µg/m3).

Cancer Inhalation Health Benchmark (IHB) A cancer IHB is a concentration in ambient air, at or below which a chemical or defined mixture of chemicals is unlikely to cause an adverse health effect to the general public when exposure occurs daily throughout a person's lifetime. Cancer IHBs are based on unit risk values and the judgment that 1 additional chance in 100,000 of getting cancer in a lifetime is acceptable. For implementation purposes, cancer IHBs are typically compared to an annual average concentration of a chemical or defined mixture of chemicals in air.

Noncancer Chronic Inhalation Health Benchmark (IHB)
A chronic noncancer IHB is a concentration in ambient air, at or below which a chemical or defined mixture of chemicals is unlikely to cause an adverse health effect to the general public when exposure occurs daily throughout a person's lifetime. Noncancer IHBs are used for effects other than cancer. For implementation purposes, chronic IHBs are typically compared to an annual average concentration of a chemical or defined mixture of chemicals in air.

Air Emission Operating Permits
The Minnesota Pollution Control Agency issues air emission operating permits to stationary sources that have the potential to emit air pollutants in quantities greater than regulated thresholds. Manufacturing plants, autobody shops and printing facilities are types of facilities that may require an air emission permit. Air emission operating permits place legal requirements on industry such as:

- stack/emission testing requirements including testing frequency and methods,

- monitoring and recordkeeping requirements,
- operation and maintenance requirements,
- employee training programs and
- air pollution limits

State and federal rules as well as policy decisions may be included in permits making them a legally binding agreement between the MPCA and the permit holder. Failure to comply with the permit requirements may result in enforcement that may include corrective actions and/or monetary penalties.

There are several categories of air emission operating permits. Generally speaking the greater the quantity of emissions released, the more stringent the permit requirements in the permit.

The United States Environmental Protection Agency (EPA) requires facilities that have the potential to emit pollutants in quantities greater than federal permit thresholds (100 tons per year) for each of the Criteria Pollutants to obtain an air emission operating permit. see the chart below.

The EPA authorizes the state of Minnesota to draft, issue and monitor the air emission permits on their behalf. However, the EPA plays an oversight role in the permit process by reviewing and approving the draft version of the permit prior to its issuance. Only after the EPA approves the permit can it become a legally binding document.

Citizens can also play a role in the permitting by submitting written comments on the draft version of the permit to the MPCA. The MPCA considers and replies to every citizen comment prior to issuance of the final permit.

State Air Emission Operating Permits
Facilities whose actual emissions are less than the federal emissions thresholds can obtain a state permit. There are several categories of state permits based upon the type of process and the amount of actual emissions emitted.

Registration permits B, C or D are issued to facilities that emit less than 50% of the federal thresholds. Registration permits have the fewer requirements than their federal counterpart.

General state permits are permits for those facilities where emissions fall in between the federal permits and the state registration permits.

Stationary Sources of Air Pollution In Minneapolis
As of December 20, 2005, the MPCA had 157 active air emission permit holders in Minneapolis broken down by permit type as follows:

- Federal- 16
- State General- 5
- Registration, Option B- 25
- Registration, Option C- 39

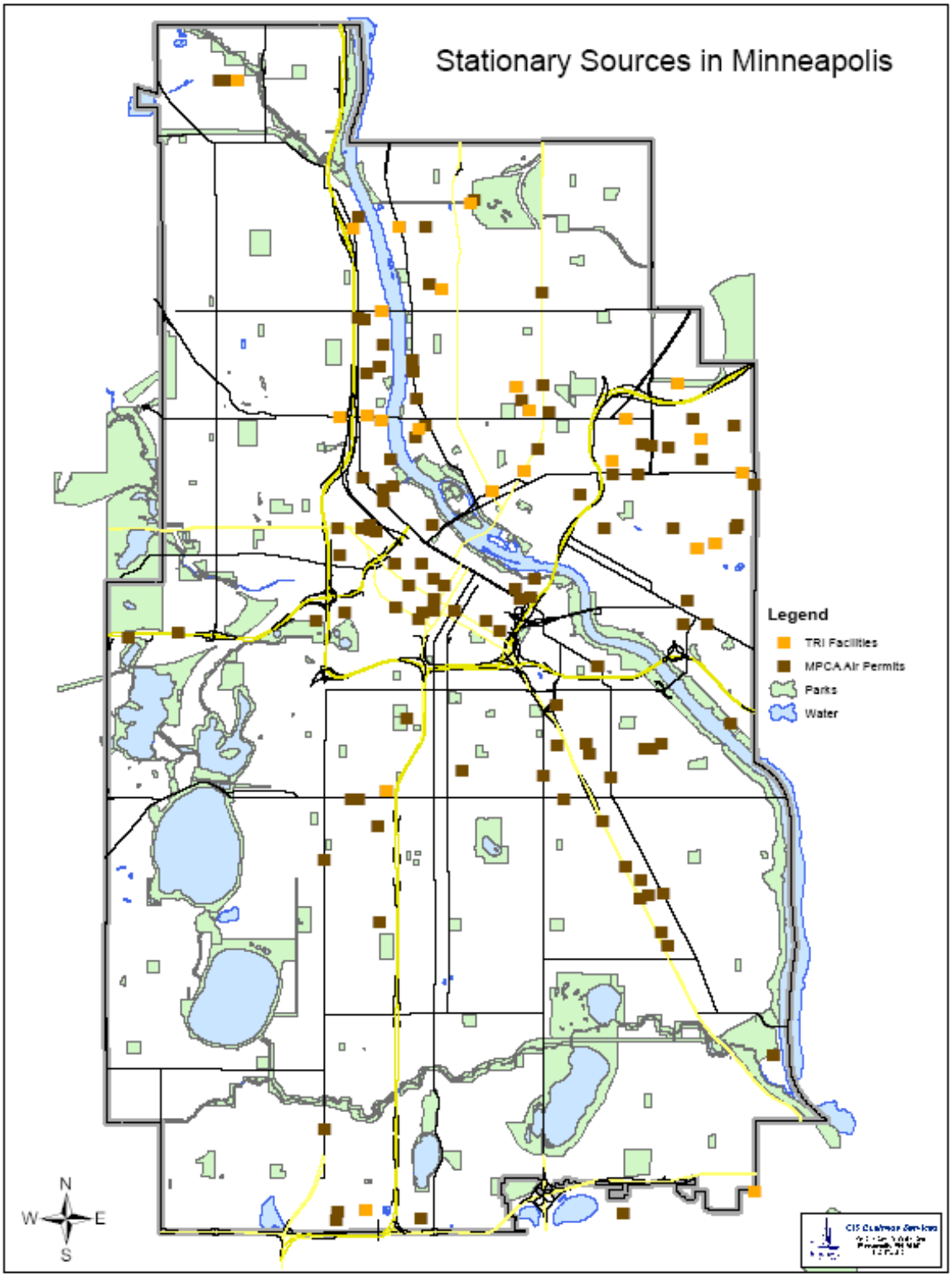
- Registration, Option D- 72

The chart below lists the air emission permits issued by the MPCA in Minneapolis by type of permit. Below are some examples of the types of facilities in Minneapolis who hold MPCA air emission operating permits:

Permit Thresholds

Pollutant	Total Facility PTE Thresholds (tons per year)	
	Federal	State
NOx	100	100
SO2	100	50
VOC	100	100
PM	100	100
PM10	100	25
CO	100	100
Pb	NA	0.5
1 HAP	10	10
> 1 HAP	25	25

Minnesota Pollution Control Agency
http://www.pca.state.mn.us/air/aboutpermits.html


Stationary Sources in Minneapolis
Legend
TRI Facilities
MPCA Air Permits
Parks
Water
N
W
E
S

Federal Permits

Plating companies, power plants, municipal garbage incinerator, airlines, manufacturing plants, asphalt plants

State Registration Permits

Option B
Hospitals, asphalt plants, newspaper, auto body shops, industrial launderers, printers, sign manufacturers, airlines

Option C
Institutions such as schools, businesses, hospitals, and municipal departments with boilers for heating purposes or back up diesel generators

Option D
Paint manufacturers, grain elevators, metal finishing, general manufacturing, drum refurbishing, plating companies, aggregate/ready mix

Area Sources of Air Pollution Identified by Minneapolis Business Licenses

The City of Minneapolis requires that specific types of business' to obtain a business license to operate in Minneapolis. The basic premise of the business license is to ensure that business operate within the ordinances of Minneapolis and rules/regulations of the state of Minnesota.

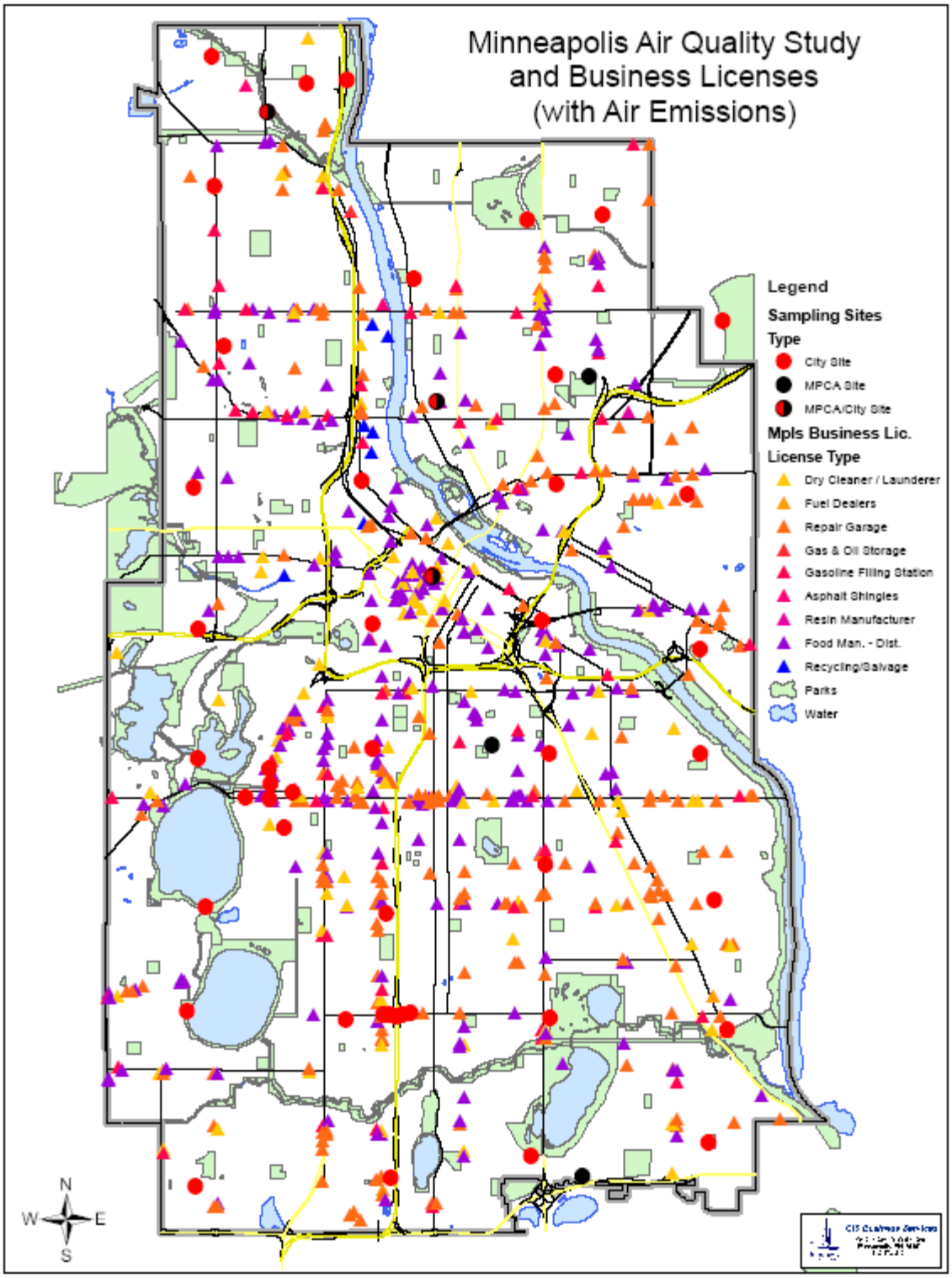
> "Our Mission- Working to ensure the safety, health, and livability of our community through regulation, enforcement, information, and education of applicable laws and regulations."

They types of business that are licensed fall under the following categories:

- Entertainment
- Construction
- Liquor
- Food
- Sales/Services
- Vehicles

Business licenses can be used as a resource to identify area sources of air pollution in a neighborhood. For example: autobody shops emit small amount of air pollutants that may impact a neighborhood intersection. This autobody shop in conjunction with all the others throughout state becomes a significant source of air pollution.

<Back to Table of Contents>



[<Back to Table of Contents>]

Appendix C

Sampling Procedures

Sampling Procedures
OVMs were kept sealed in their original individual packaging canisters and stored in coolers chilled with ice packs during transport to the sampling site. The packaging was opened at the sampling site allowing the carbon filter to begin collecting at that time.

To facilitate rapid OVM deployment and ensure consistent sampling start times throughout the city; six staff members were tasked with deployment of the OVMs. Each staff member was assigned between 9-11 OVMs to deploy with one control OVM for quality assurance and quality control. On the sampling morning, the assistants collected the require supplies and began deploying their first sample between 8:30-9:30 am. Assistants were able to complete deployment of all 8-11 OVMs within 1-3 hours.

Assistants were asked to refrain from practices that could interfere with the sampling such as idling automobile engines, cigarette smoking and use of sharpie pens or other markers during the deployment of the OVMs.

Field OVM Deployment Procedures
At the sampling site the OVM was removed from the original packaging, inspected for rips, tears and other abnormalities. Defected OVMs were not used for sampling. The OVM number was verified on the back of the OVM and recorded on the top of the original packaging canister with a ball point pen. The empty OVM canister was stored in the cooler.

The following information was recorded for each OVM on the "OVM Field Sampling Form"

- OVM number,
- grid number,
- location address,
- start date,
- start time and
- comments

The comments recorded included activities identified by assistants on site that could potentially bias the samples high such as asphalt paving, heavy chemical odors or defects of the OVM.

Quality Control OVM Deployment Procedures
During each of the sampling periods five OVMs were used as control (blank sample) to assure the quality of the 3M™ OVMs and laboratory methods. The control OVMs were initially handled in the same manner as the field OVMs however, the deployment procedures differ.

At the field sampling site the control OVM was removed from the original packaging, it was inspected for rips or tears. A coin was used to remove the orange plastic ring and then the white membrane; both the orange ring and white membrane were discarded. Next the clear plastic cap was immediately placed on the OVM covering the carbon filter. The plastic cap was snapped tight and twisted to ensure a good seal. The clear plastic

straw contained in the packaging canister was then pressed against the ports on the plastic cap to ensure a tight fit.

Once again the OVM number was verified on the back of the OVM and recorded on the top of the original packaging canister and the empty canister was again stored in the cooler. The OVM number, Grid number, Location address, Start Date, Start Time and any other comments were noted on the OVM field sampling form.

The control OVM was then clipped next to the field sampling OVM.

The field OVMs sampled for approximately 72 hours before collection. The control OVMs were placed at the sampling location for the same amount of times as the field sample.

OVM Collection Procedures
The procedure for collection of the OVMs was to first inspect the OVM for rips, tears and water damage and note any damage on the OVM field log. Next, the OVM badge number was compared to that on the field log sheet. Removal procedures are similar to the field blank (control) OVM. A coin was used to remove the orange plastic ring and then the white membrane; both the orange ring and white membrane were discarded. Next the clear plastic cap was immediately placed on the OVM covering the carbon filter. The plastic cap was snapped tight and twisted to ensure a good seal. The clear plastic straw contained in the packaging canister was then pressed against the ports on the plastic cap to ensure a tight fit. The OVM was replaced in the original packaging canister and placed in the chilled cooler.

The end date, end time and any comments were recorded on the OVM Field Log sheet. The “Emission Log Sheet” was also collected if left by the tenant was collected.

Packing and Shipment Procedures
The OVMs remained in the chilled coolers until returned to the project manager after collection was complete. The project manager immediately transferred the information from the individual field log sheets into an excel spreadsheet. The OVM canisters were counted, verified, and packaged in a chilled cooler. The OVMs and the log sheets were shipped overnight delivery to the University of Texas School of Public Health laboratory immediately following each sampling period.

Temperature Correction Factor
Air temperature will slightly influence the sampling rate of the OVM and therefore, the data needs to be corrected for the temperatures below 77 degrees F and pressure of 760 mm.

In February of 2006, Staff corrected the August 2005 and January 2006 data for temperature. The temperature correction did not result in any prior sampling that originally resulted below the inhalation benchmark to exceed, therefore the corrected values were not applied to the data.

Source: Section 2.0 Analysis Procedure of the 3M Technical Data Bulletin- Organic Vapor Monitor Sampling and Analysis Guide

<Back to Table of Contents>

SOURCES

MPCA: Citizen's Guide to Monitoring of Outdoor Air, Air Quality/#1.08/February 2003

Pratt G.C., Bock D., Stock T.H., Morandi M.T., Adgate J.L., Ramachandran G., Sexton K., (2005) A Field Comparison of Volatile Organic Compound Measurements Using Passive Organic Vapor Monitors and Stainless Steel Canister. , Environ. Sci. Technol. 39 (9), 3261 -3268.

3M™ Technical Data Bulletin Organic Vapor Monitor Sampling and Analysis Guide - 1028

Source 3M™ Technical Data Bulletin, Organic Vapor Monitor Sampling and Analysis Guide, 1028

Section 2.0 Analysis Procedure of the 3M Technical Data Bulletin- Organic Vapor Monitor Sampling and Analysis Guide.

Source: ToxFAQs for Benzene, Agency for Toxic Substances and Disease Registry, Division of Toxicology, http://www.atsdr.cdc.gov/tfacts3.html

US Department of Labor- Occupational Safety and Health Administration, http://www.osha.gov/SLTC/dieselexhaust/chemical.html

ToxFAQs tm for Tetrachlorethylene (PERC), Agency for Toxic Substances and Disease Registry, Division of Toxicology, http://www.atsdr.cdc.gov/tfacts18.html

<Back to Table of Contents>