CITY OF MINNEAPOLIS
EMERGENCY PREPAREDNESS & REGULATORY SERVICES

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To: Minneapolis City Council Health Energy and Environment Committee
From: Daniel Huff, Regulatory Services
Date: October 1, 2009
cc: Henry Reimer, Burt Osborne
Re: **GreenPrint sustainability target update: Air Quality**

Current Target

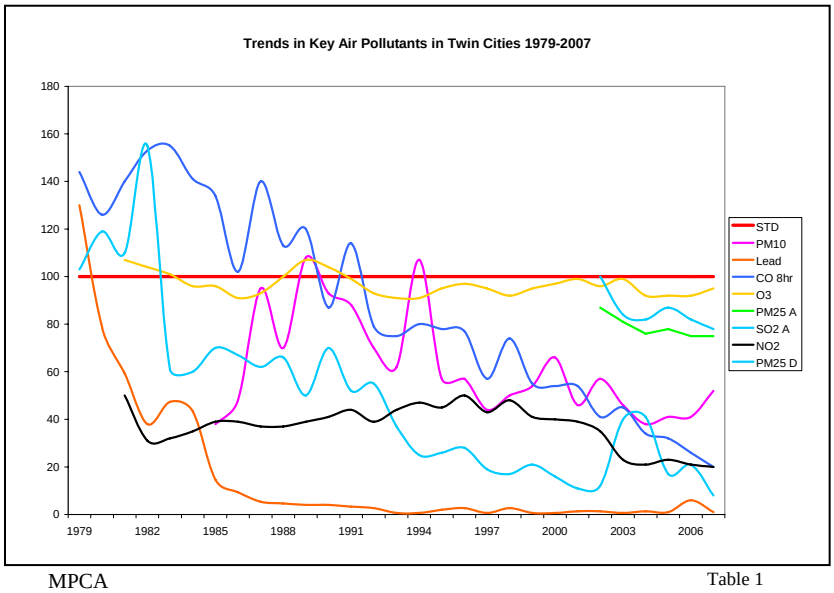
- **Reduce moderately unhealthy days in Minneapolis to fewer than 35 per year by 2015, with more reductions after that.**
- **Reduce all monitored air toxins to levels within state health guidelines by 2015.**

Proposed Target

- **Reduce criteria air pollution levels in the Minneapolis area to health-based levels recommended by the Environmental Protection Agency Clean Air Scientific Advisory Committee.**
- **Reduce all monitored air toxins to levels within state health guidelines by 2015.**

Background

The US Environmental Protection Agency (EPA), with the assistance of the Clean Air Scientific Advisory Committee among others, sets national standards for ambient air quality that are deemed protective of human health. As part of the US Clean Air Act, the EPA requires communities to meet standards for seven (7) main or criteria air pollutants. These criteria pollutants are ground-level Ozone, Carbon Monoxide, Sulfur Dioxide, Nitrogen Oxides, Lead, PM-10 (particulate matter smaller than 10 microns), and PM-2.5 (particulate matter smaller than 2.5 microns). Because our region enjoys relatively clean air, only two of these pollutants, Ozone and PM-2.5, are near the healthy-air standard (high levels) in Minneapolis, (Table 1). The EPA relies primarily upon the states to regulate air quality. In our state, the Minnesota Pollution Control Agency (MPCA) is responsible for monitoring air quality and enforcing air quality rules.

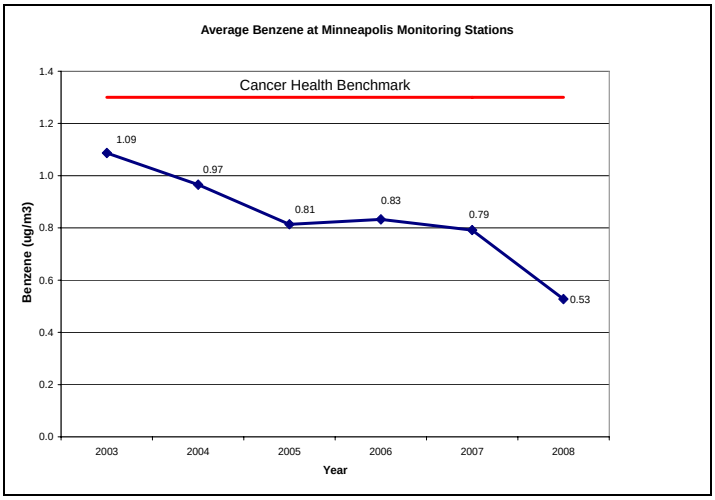


MPCA Table 1

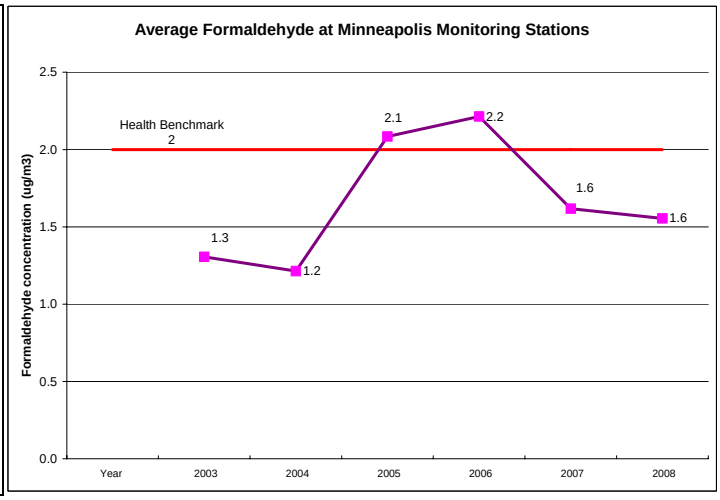
The EPA, the MPCA and the Minnesota Department of Health also set health benchmarks on non-criteria pollutants known as air toxics or hazardous air pollutants (HAPs). Two problematic air toxics in Minneapolis are Benzene and Formaldehyde (Tables 2 & 3). As the current GreenPrint target for air toxics is based upon health benchmarks we are not proposing any changes to this target.

The MPCA has established a state-wide air quality monitoring system to monitor both criteria pollutants and air toxics. Ambient air quality monitoring stations are distributed

throughout the state. The metro area has the largest number of monitoring stations with five stations within Minneapolis. Stations monitor different pollutants. None of the stations located within Minneapolis monitor Ozone. Therefore, Ozone readings must be taken from other stations within the metro area.



MPCA Table 2



MPCA Table 3

Because of the complexity of air quality monitoring, regulation and standards, the Air Quality Index was created as a user-friendly way for the public to track air quality. Using monitoring data for some of the criteria pollutants, the Air Quality Index gives each day one of four air quality grades, Good, Moderate, Unhealthy for sensitive groups, and Unhealthy. Good and Moderate grades mean the ambient air quality is below national air quality standards for the measured criteria pollutants. Unhealthy for sensitive groups and Unhealthy grades means one or more of these criteria pollutants have exceeded the level of the national air quality standards. Within Minneapolis, PM-2.5 and Ozone are the only criteria pollutants to be near the air quality standards over the past fifteen years. These continue to be problematic, and dependent upon weather and pollution emissions, occasionally push our Air Quality Index grade into the upper regions of Moderate and into the Unhealthy Categories.

Why the change?

While the Air Quality Index is user-friendly, it is not necessarily the best representation of what is protective of human health. A high Moderate score may be unhealthy for some individuals. To ensure Minneapolis' GreenPrint Target was protective of health, it was based upon limiting the number of Moderate days, relabeling those days Moderately Unhealthy. However, just as a high Moderate score may be unhealthy, a low Moderate score may be quite safe. The range within moderate becomes too large to say what is or is not protective of human health.

The Air Quality Index is based upon national air quality standards set by the EPA. The Clean Air Scientific Advisory Committee (CASAC), an independent advisory board representing leading national scientists and public health officials, advises the EPA on setting these standards. However, the EPA does not always adopt the recommendations of its scientific advisors. This happened most recently in 2006 and 2008 when the EPA did not fully adopt the recommendations for new Ozone and PM-2.5 standards provided by CASAC.

Recent studies show that air pollution has a direct impact upon our health, resulting in higher rates of cancer, cardiovascular disease, and pulmonary disease resulting in premature deaths. Recent studies have even linked poor air quality with lower IQ scores in children. This proposal for a revised GreenPrint Air Quality target is based upon what we believe the latest and best science says about what pollutant levels are actually protective of human health

Proposed Standard

- **Reduce criteria air pollution levels in the Minneapolis area to health-based standards recommended by the Environmental Protection Agency Clean Air Scientific Advisory Committee.**

This proposed standard no longer relies upon the Air Quality Index (Table 4), but rather the numerical values for Minneapolis's main pollutants of concern as proposed by the Clean Air Scientific Advisory Committee (CASAC) (Tables 5, 6 & 7). While CASAC proposes a range of levels, we have chosen the most protective value within this range. These recommended levels are:

Annual PM-2.5 of no more than 13 micrograms per cubic meter (Table 5)
Daily PM-2.5 of no more than 30 micrograms per cubic meter (Table 6)
Daily Ozone of no more than 0.060 parts per million (Table 7)

In order to track Ozone, data from metro area air quality monitoring stations located outside of Minneapolis will need to be used. There are two monitoring stations in Minneapolis that collect daily PM-2.5 levels, therefore Minneapolis-only data will be used to track PM-2.5. Because we are changing the target, not the monitoring, historical monitoring data are still relevant, allowing trend tracking with this new standard. See Appendix A and B for additional comparisons of data.

Twin Cities Region Air Quality Index, 2003-2008

Year	Good days	Moderately Unhealthy Days (Target 35)	Unhealthy for sensitive groups days	Unhealthy days
2003	161	191	13	0
2004	187	172	7	0
2005	166	191	5	3
2006	193	169	3	0
2007	179	177	9	0
2008	195	166	5	0

MPCA Table 4

Minneapolis annual weighted concentration averages Fine Particles based on continuous monitors, 2003-2008.

	Wenonah	Phillips	CASAC Recommendation
2003		12.3	< 13.01
2004		10.5	< 13.01
2005	9.3*	10.7	< 13.01
2006	9.5	11.6	< 13.01
2007	10.2	13.0	< 13.01
2008	10.5	9.7	< 13.01

*Data not available for all quarters
MPCA Table 5

Minneapolis Daily Average Fine Particle Concentration Counts, 2003-2008

Year	Total Below CASAC Standard	Total Above CASAC Recommendation (Target 0)
2003	305	11
2004	350	8
2005	353	8
2006	360	5
2007	355	8
2008	355	9

MPCA Table 6

Twin Cities' Daily Maximum 8-hour Ozone Concentration Counts, 2003-2008

Year	Total Below CASAC Standard	Total Above CASAC Recommendation (Target 0)
2003	121	60
2004	163	20
2005	136	47
2006	145	38
2007	150	33
2008	165	18

MPCA Table 7

Links to Additional Information

EPA Clean Air Scientific Advisory Committee (CASAC) Website**:**
http://yosemite.epa.gov/sab/sabpeople.nsf/WebCommittees/CASAC

State of Minnesota Legislative Requirement for MPCA to report PM-2.5 data referenced to CASAC standard (see lines 10.9-10.22):
https://www.revisor.leg.state.mn.us/bin/bldbill.php?bill=ccrhf2123B.html&session=ls86

Letter from CASAC to EPA Administrator regarding PM-2.5 standard
http://yosemite.epa.gov/sab/sabproduct.nsf/1C69E987731CB775852571FC00499A10/$File/casac-ltr-06-003.pdf

Letter from CASAC to EPA Administrator regarding Ozone standard April 1, 2008:
http://yosemite.epa.gov/sab/sabproduct.nsf/264cb1227d55e02c85257402007446a4/4AF876432433128885257425006 9E494/$File/EPA-CASAC-08-009-unsigned.pdf

City of Minneapolis Air Quality webpage:
http://www.ci.minneapolis.mn.us/airquality/

Minnesota Pollution Control Agency Air Quality webpage
http://www.pca.state.mn.us/air/index.html

Appendix A

Detailed PM-2.5 data

Minneapolis Daily Average Fine Particle Concentration Counts, 2003-2008					
	Good	Low Moderate	High Moderate	Unhealthy for Sensitive Groups	Unhealthy
Concentration ($\mu g/m^3$)	0-15.4	15.5-30.4	30.5-35.4	35.5-55.4	55.5-140.4
2003	247	58	7	4	0
2004	293	57	5	3	0
2005	282	71	4	3	1
2006	299	61	4	1	0
2007	262	93	3	4	1
2008	291	64	5	4	0

Current Minneapolis GreenPrint Target based upon PM-2.5 data Minneapolis Daily Average Fine Particle Concentration Counts, 2003-2008				
Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy
2003	247	65	4	0
2004	293	62	3	0
2005	282	75	3	1
2006	299	65	1	0
2007	262	96	4	1
2008	291	69	4	0

Proposed Minneapolis GreenPrint Target for PM-2.5 Minneapolis Daily Average Fine Particle Concentration Counts, 2003-2008		
Year	Total Days Below CASAC Standard	Total Days Above CASAC Recommendation
2003	305	11
2004	350	8
2005	353	8
2006	360	5
2007	355	8
2008	355	9

Notes:

1. Not all years have complete daily data.

2. Data is based on continuous fine particulate monitors at Anderson Elementary and Wenonah School. Monitoring at Wenonah School began in April 2004.

3. Daily values are based on the midnight to midnight 24-hour concentration average. For days when both sites are operational, the site with the highest average will be used to represent the daily concentration.

4. CASAC recommended a range of 30-35 µg/m^3 for the daily fine particle standard. For ease of understanding, the data has been categorized into AQI categories, with the addition of a "high moderate" category to capture the CASAC recommendation.

5. Annually, Minneapolis experiences several days that exceed the level of the National Ambient Air Quality Standard (days categorized as orange and above). However, due to the form of the standard (98th percentile value averaged over three years), Minneapolis currently attains the NAAQS.

6. Data provided by Minnesota Pollution Control Agency

Appendix B

Detailed Ozone data

Twin Cities Daily Maximum 8-hour Ozone Concentration Counts, 2003-2008

	Good	High Moderate	Unhealthy for Sensitive Groups	Unhealthy
Concentration (ppb)	0-59	60-75	76-95	96-115
2003	121	51	9	0
2004	163	20	0	0
2005	136	39	8	0
2006	145	36	2	0
2007	150	28	5	0
2008	165	18	0	0

Current Minneapolis GreenPrint Target based upon Ozone

Twin Cities Daily Maximum 8-hour Ozone Concentration Counts, 2003-2008

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy
2003	121	51	9	0
2004	163	20	0	0
2005	136	39	8	0
2006	145	36	2	0
2007	150	28	5	0
2008	165	18	0	0

Proposed Minneapolis GreenPrint Target for Ozone

Twin Cities Daily Maximum 8-hour Ozone Concentration Counts, 2003-2008

Year	Total Days Below CASAC Standard	Total Days Above CASAC Recommendation
2003	121	60
2004	163	20
2005	136	47
2006	145	38
2007	150	33
2008	165	18

Notes:

1. Counts are based on the EPA defined Minnesota ozone season, which runs from April 1 - September 30 for a total of 183 days annually.

2. Due to the formation characteristics of ozone the MPCA does not monitor for ozone in Minneapolis. Downwind ozone monitors in Blaine, Cedar Creek, Hastings, Shakopee, Stanton, St. Michael, and Stillwater are used in this analysis as they have been sited to capture the maximum ambient concentration for the metro area.

3. Daily values are based on the maximum 8-hour average concentration at each site. The site with the highest 8-hour average is used to represent the day's concentration. Not all sites have concentration data for each day.

4. CASAC recommended a range of 60-70 ppb for the 8-hour ozone National Ambient Air Quality Standard. For ease of understanding, the data is organized into AQI categories, as defined by EPA. All values in EPA's "moderate" category exceed the low end of the CASAC recommended range.

5. Annually, the Twin Cities metropolitan area may experience several days that exceed the level of the National Ambient Air Quality Standard (days categorized as orange and above). However, due to the form of the standard (3-year average of the annual 4th-highest value), the Twin Cities metropolitan area currently attains the NAAQS.

6. Data provided by Minnesota Pollution Control Agency