

# FLIN FLON AREA QUARTERLY AIR QUALITY REPORT: OCTOBER, NOVEMBER AND DECEMBER 2009

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To inform interested parties about air quality in the Flin Flon area, Manitoba Conservation issues on a quarterly basis an overview summary of monitoring results in the community, measured both by the Department and Hudson Bay Mining and Smelting Co., Limited. Manitoba Conservation strives to make these quarterly reports available within two months from the end of each quarter.

## Report Contents:

- Overall [summary](#) of air quality monitoring results in the Flin Flon area.
- Chart depicting [air quality warnings](#) (summarized monthly) issued since the commencement of this program.
- Chart depicting values in [excess of the 1-hour MAL](#) (Maximum Acceptable Level) for SO<sub>2</sub> (summarized monthly) at each site.
- Chart depicting values in excess of the 1-hour and 24-hour MAL for SO<sub>2</sub> during [each month](#) in this quarter.
- [Table depicting statistics](#) on selected heavy metals and particulate matter over the last year, as well as the entire sampling period.
- Chart depicting daily levels of total [suspended particulate matter](#) at each site since 1996.
- Chart depicting average daily levels of fine particulate matter ([PM<sub>10</sub>](#) and [PM<sub>2.5</sub>](#)) in the Flin Flon area.

# SUMMARY OF AIR QUALITY WITHIN THE FLIN FLON AREA

## OCTOBER, NOVEMBER AND DECEMBER 2009

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### Monitoring Activity

The results from the continuous outdoor sulphur dioxide (SO<sub>2</sub>) monitoring and particulate matter (PM) sampling (including analysis for selected heavy metals) conducted by Manitoba Conservation and Hudson Bay Mining and Smelting Co., Limited (HBM&S) in the Flin Flon area form the basis of this report.

During the fourth quarter of 2009, ambient SO<sub>2</sub> concentrations showed improvement and were noticeably lower than in the previous quarter. A number of days with elevated levels of particulate matter were also recorded during this period mostly at the Creighton monitoring site - this is likely due to localized wind or vehicle entrained street dust and from wood smoke associated with local heating.

### Sulphur Dioxide

Selected statistics are shown in the attached graphs. An overview of air quality warnings issued to the Flin Flon area is also included.

During this quarter, exceedances of the 1-hour Maximum Acceptable Level for sulphur dioxide (Manitoba Ambient Air Quality Criteria is 0.34 parts per million) were not observed at any of the 5 sites in October or December but only during the month of November at the Aqua Centre air quality monitoring site (Nov 3<sup>rd</sup> one hour and Nov 30<sup>th</sup> for 2 hours). On these days, poor dispersion of the stack plume due to unfavourable meteorology caused stack gases to settle onto the community, instead of being dispersed aloft and away from the community.

The World Health Organization (WHO) daily maximum exposure guideline of 0.05 parts per million (ppm) was exceeded one day in October (Staffhouse site on the 9<sup>th</sup>) and at the Aqua Centre on November 30<sup>th</sup>.

### Particulate Matter (PM)/ Heavy Metals (HM)

Selected particulate matter and heavy metal data statistics/graphs are attached for 2009 and for the past sampling period.

Daily TSP levels (including the larger-sized or coarse dust particles) measured in the fourth quarter of 2009 were below the Manitoba Ambient Air Quality Criteria of 120 µg/m<sup>3</sup> (24-hour average) at all sites except for 1 day at the Provincial Bldg. site (November 12<sup>th</sup>) and three days at Creighton (October 14<sup>th</sup> and 20<sup>th</sup> and November 23<sup>rd</sup>). Coarse particulate matter usually arises from wind-swept ground dust or vehicle-entrained street materials.

Fine particulate (PM<sub>10</sub>) levels were continuously measured at the Provincial Building and Creighton monitoring sites. Elevated levels of PM<sub>10</sub> above the Manitoba criteria of 50 µg/m<sup>3</sup> (daily average) were recorded for 1 day (November 12<sup>th</sup>) at the Provincial Bldg. site and 11 days at the Creighton monitoring site. Most of these high levels arose from local conditions (at Creighton, local street re-construction involving a temporary gravel surface allowing for entrainment of dust by vehicles or wind).

Continuous (24/7) monitoring of very fine particulate matter (PM<sub>2.5</sub>) was also conducted at the Provincial Building and Creighton monitoring sites. PM<sub>2.5</sub> is the fraction of the total dust in the outdoor air most closely associated with human health impacts. During this quarter, six daily averages of PM<sub>2.5</sub> at Creighton were above the 24-hour Canada-Wide Standard of 30 µg/m<sup>3</sup> (mostly during the latter half of December). These levels are believed to arise from wood smoke (and not industrial emissions) due to the very strong smell of smoke on the sampling filters.

The concentrations of selected heavy metals were within the Manitoba Ambient Air Quality Criteria at all monitoring sites except for three days when arsenic in air levels were elevated at the Provincial Bldg. site (October 8<sup>th</sup>, November 12<sup>th</sup> and December 31<sup>st</sup>). The cause of these elevated levels is likely due to wind-swept dust containing metals or ground level releases directly from the smelter complex.

### Additional Information

HBM&S has reported its emissions for 2009 to be: total sulphur dioxide emitted was 144 kilotonnes (regulated limit is 220); stack particulate matter emissions were 0.9 kilotonnes (regulated limit is 2.5). Both emission levels were also within the 2008 federal pollution prevention targets. A mercury release of 631 kilograms was reported; this is significantly reduced from previous years but still nearly twice the Canada-wide Standard target level for the base metal smelter sector.

Details on the hourly air concentrations of sulphur dioxide and air quality warnings issued to the Flin Flon area, along with abatement actions taken by HBM&S, have been filed with the Manitoba Environment Act Public Registry at the Flin Flon Public Library; File 1095.30. Hourly averages of SO<sub>2</sub> from all 5 sites over the last 24-hours can be viewed at [www.flinflonairquality.com](http://www.flinflonairquality.com).

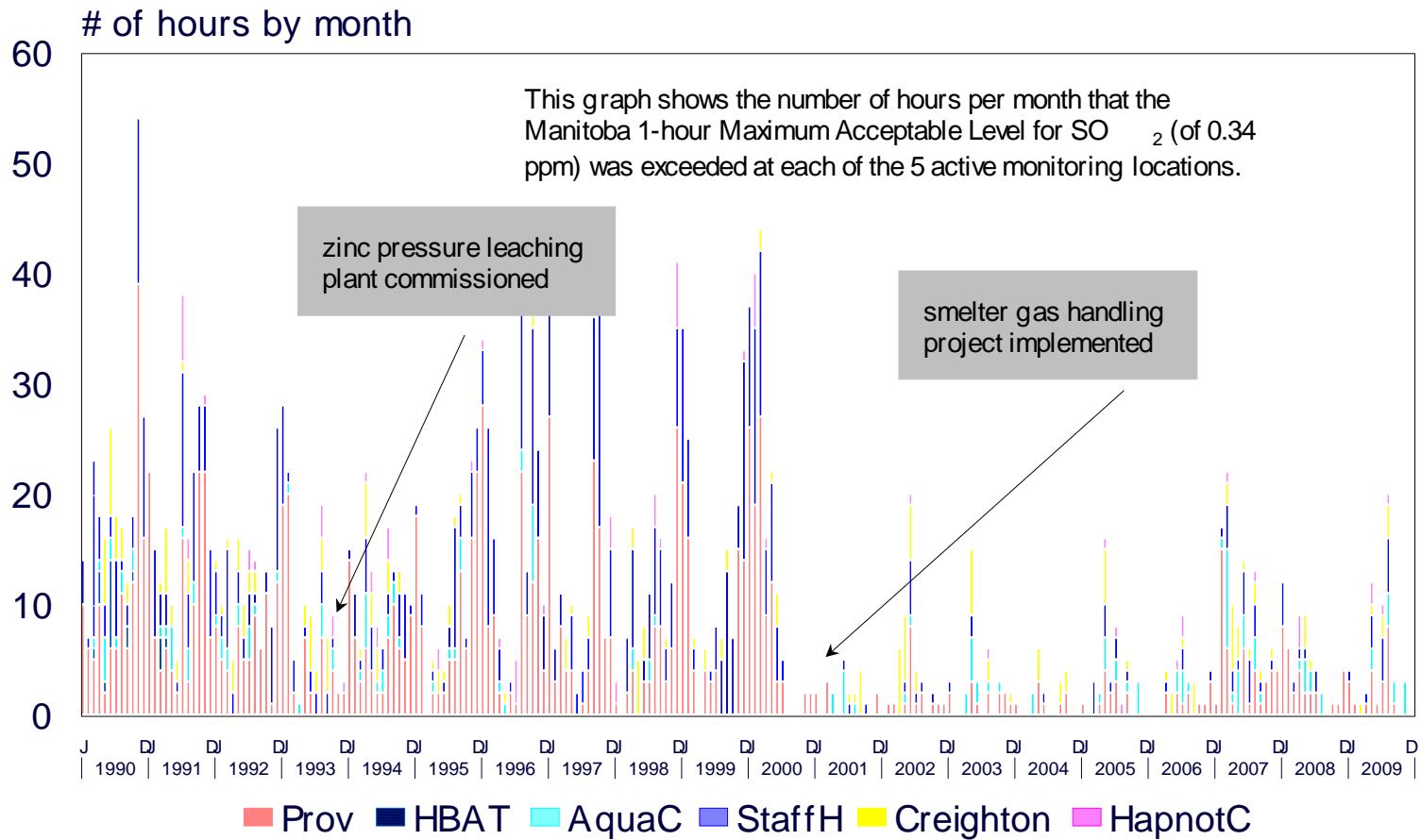
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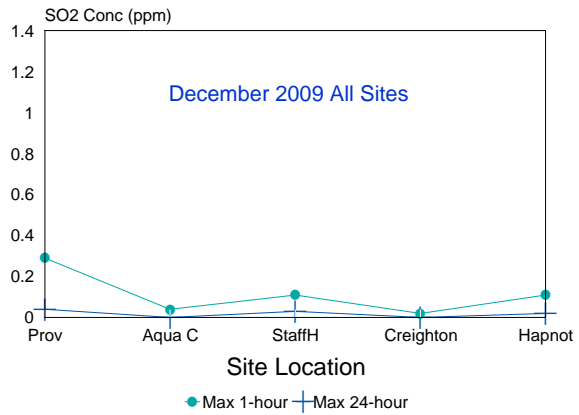
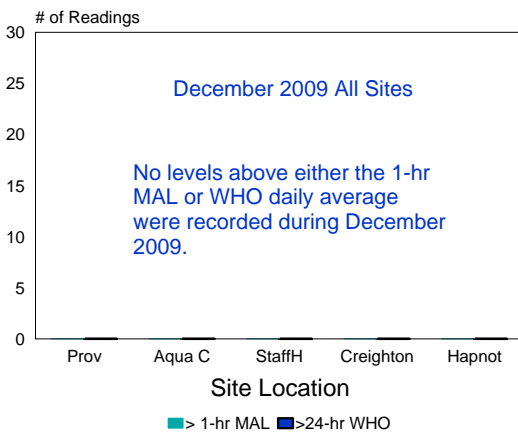
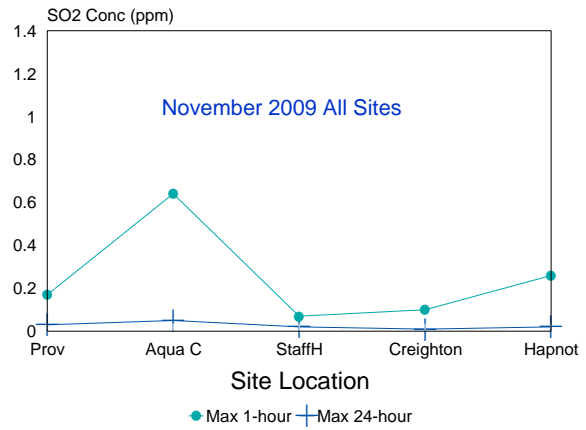
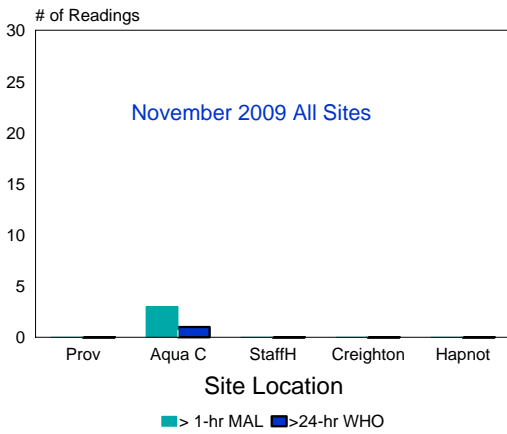
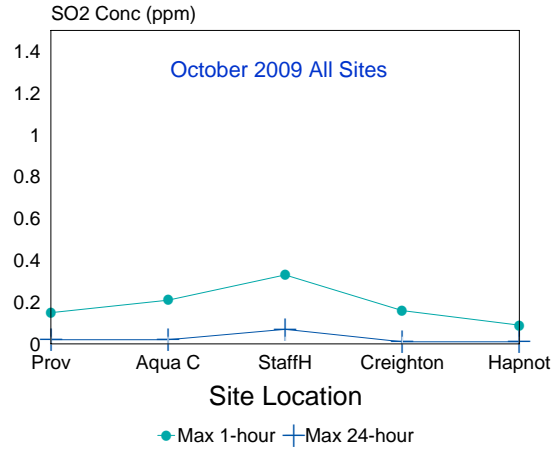
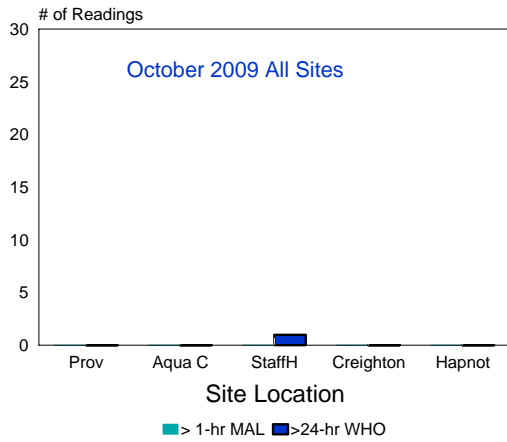
# Flin Flon Area Air Quality

## Exceedances of the 1-hr MAL for SO<sub>2</sub>



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# FLIN FLON SULPHUR DIOXIDE MONITORING



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# Flin Flon Heavy Metals and Particulate Summaries

## Total Suspended Particulates (TSP) Particulate Matter 100 µm and smaller in diameter

	Site/Time Period	Sample Range		Geometric Mean		# of Samples > MAL	
		Dec. '88 – Dec. '09	Jan. '09- Dec. '09	Dec. '88 – Dec. '09	Jan. '09- Dec. '09	Dec. '88 – Dec. '09	Jan. '09- Dec. '09
PM	Prov.	0-468	5-180	35	30	187*	7 *
	R.B.	0-423	1-103	19	13	8 *	0 *
	C./S.P.	0-235	--	16	--	5 *	--
	Cr. Sch.	1-3601	3-244	22	19	24 *	3 *
Pb	Prov.	0.00-13.11	0.01-4.18	0.10	0.09	23 (9) *	4 (4) *
	R.B.	0.00-3.09	0.01-0.75	0.05	0.02	0 *	0 *
	C./S.P.	0.00-1.75	--	0.05	--	0 *	--
	Cr. Sch.	0.01-3.39	0.01-0.34	0.02	0.02	0 *	0 *
As	Prov.	0.000-1.380	0.026-0.082	0.019	0.026	121 **	13 **
	R.B.	0.000-0.524	0.005-0.025	0.006	0.005	5 **	1 **
	C./S.P.	0.000-0.282	--	0.003	--	0 **	--
	Cr. Sch.	0.000-4.548	0.003-0.008	0.003	0.003	6 **	0 **

Concentration results are shown in units of micrograms of mass per cubic metre ( $\mu\text{g}/\text{m}^3$ ) of air per 24-hour averaging period.

Prov. = Provincial Building monitoring site (MB Conservation) [to December 31, 2009]

R.B. = Ruth Betts monitoring site (HBM&S)

C./S.P. = Centoba / Sewage Plant monitoring site (HBM&S)

Cr. Sch. = Creighton School monitoring site (HBM&S) [all HBM&S sites to December 31, 2009 for TSP and heavy metals except as follows - Sewage Plant to November 10, 2002 then Hi-Vol moved to Creighton School where sampling was daily from November 13 through December 12, 2002 and every second day from December 18, 2002]

Annual range January 1, 2009 to December 31, 2009 inclusive for all sites (thus no data for Sewage Plant site - see note above.).

## PM<sub>10</sub> (Inhalable Particulates) Particulate Matter 10 µm and smaller in diameter.

	Site/Time Period	Sample Range		Geometric Mean		# of Samples > MAL	
		Dec. '96 – Dec. '09	Jan. '09- Dec. '09	Dec. '96 – Dec. '09	Jan. '09- Dec. '09	Dec. '96 – Dec. '09	Jan. '09- Dec. '09
PM <sub>2.5</sub>	Prov.	0.00-56.93	0.29-29.26	3.81	3.44	15 ****	0 ****
PM <sub>10</sub>	Prov.	0.30-248.5	2.83-75.23	14.30	12.87	265 ***	9 ***
	R.B.	1-66	1-33	10	9	4 ***	0 ***
	S.P.	2-50	--	9	--	0 ***	--
	Cr. Sch.	3-93	--	15	--	1 ***	-- ***
D-PM <sub>10</sub>	Cr. Sch.	0-167.5	1.2-167.5	16.77	23.25	75 ***	28 ***
D-PM <sub>2.5</sub>	Cr. Sch.	0-80.1	0.5-60.6	8.85	11.34	97 ****	20 ****

Concentrations are shown in units of micrograms of mass per cubic metre ( $\mu\text{g}/\text{m}^3$ ) of air per 24-hour averaging period.

Prov. = Provincial Building real-time continuous PM<sub>10</sub> & PM<sub>2.5</sub> monitoring site (Man. Conservation)[to December 31, 2009]

R.B. = Ruth Betts monitoring site (HBM&S) [from June 8, 1996 to December 31, 2009 for PM<sub>10</sub>]

S.P. = Sewage Plant monitoring site (HBM&S) [from June 8, 1996 to December 7, 2002 for PM<sub>10</sub>]

Cr. Sch. = Creighton School monitoring site (HBM&S) [from December 15, 2002 to May 22, 2003 every second day for PM<sub>10</sub> and metals] On May 23, 2003 a R&P Dichotomous Partisol Sampler was installed at this site. It has provided daily 24-hr samples except for when there were instrument problems. The Partisol Sampler draws ambient air through a PM<sub>10</sub> size selective head and the sample is split internally to give a PM<sub>2.5</sub> (fine) [D-PM<sub>2.5</sub>] and PM<sub>2.5-10</sub> (coarse) [D-PM<sub>2.5-10</sub>] sample. D-PM<sub>10</sub> is the sum of D-PM<sub>2.5</sub> and D-PM<sub>2.5-10</sub>. Sample results to December 31, 2009. Annual range January 1, 2009 to December 31, 2009 inclusive for all sites.

\* In comparison to the Manitoba Ambient Air Quality Objective (or Guideline) of 120  $\mu\text{g}/\text{m}^3$  for TSP and 5  $\mu\text{g}/\text{m}^3$  for Pb and as of July 1, 2005 2  $\mu\text{g}/\text{m}^3$  for Pb (number in bracket indicates the number above the new standard)

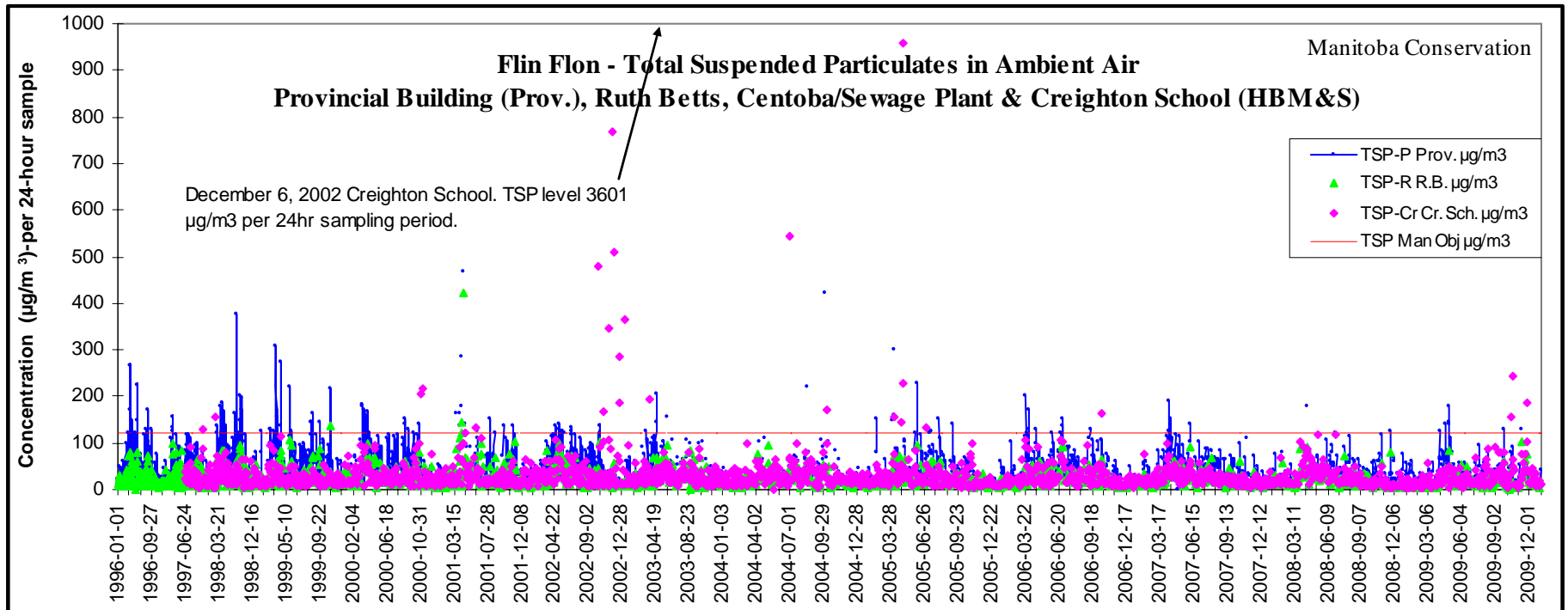
\*\* In comparison to Guidelines (24 hours) [0.3  $\mu\text{g}/\text{m}^3$  for As]

\*\*\* Based on the Manitoba Guideline of 50  $\mu\text{g}/\text{m}^3$  \*\*\*\* Based on Canada-Wide Standard of 30  $\mu\text{g}/\text{m}^3$

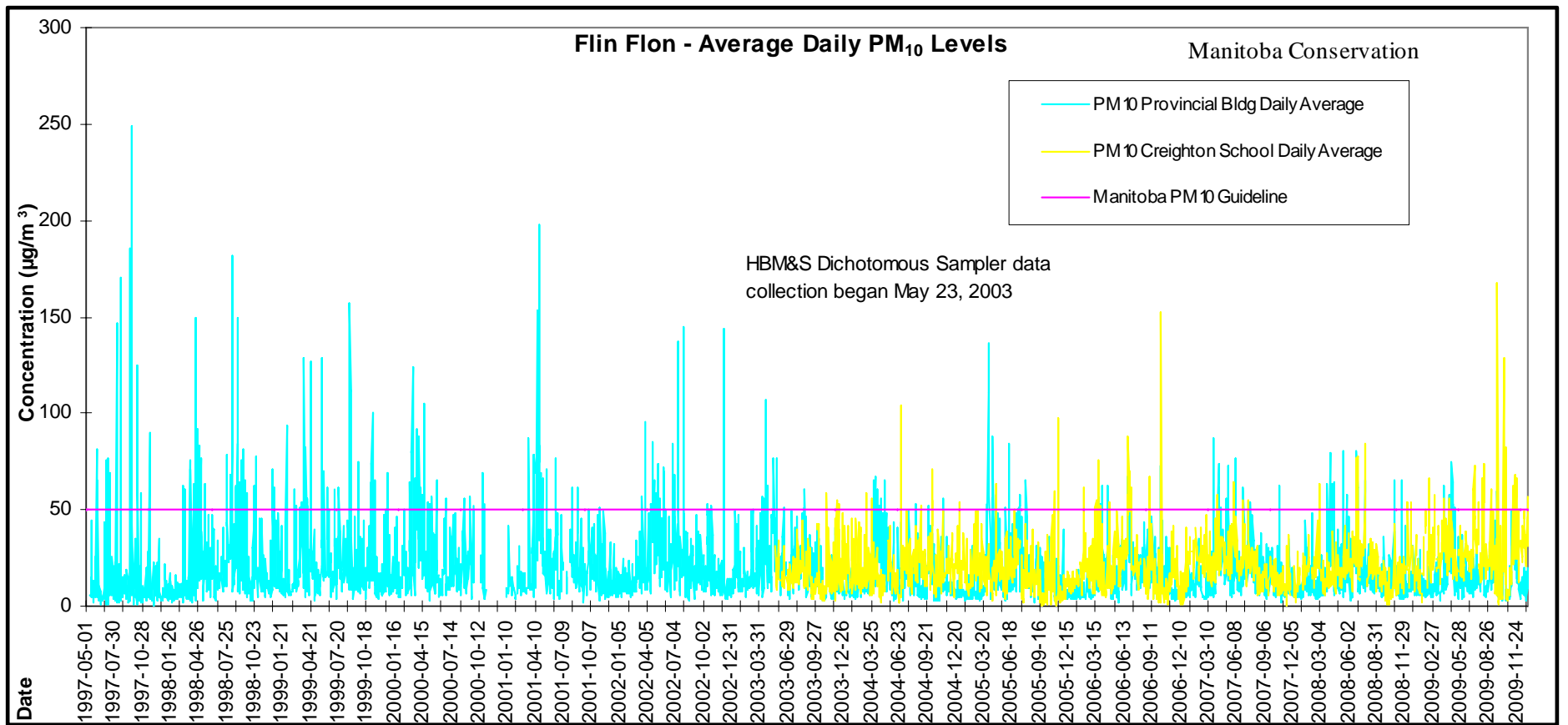
MAL - Maximum Acceptable Level

*revised March 9, 2010*

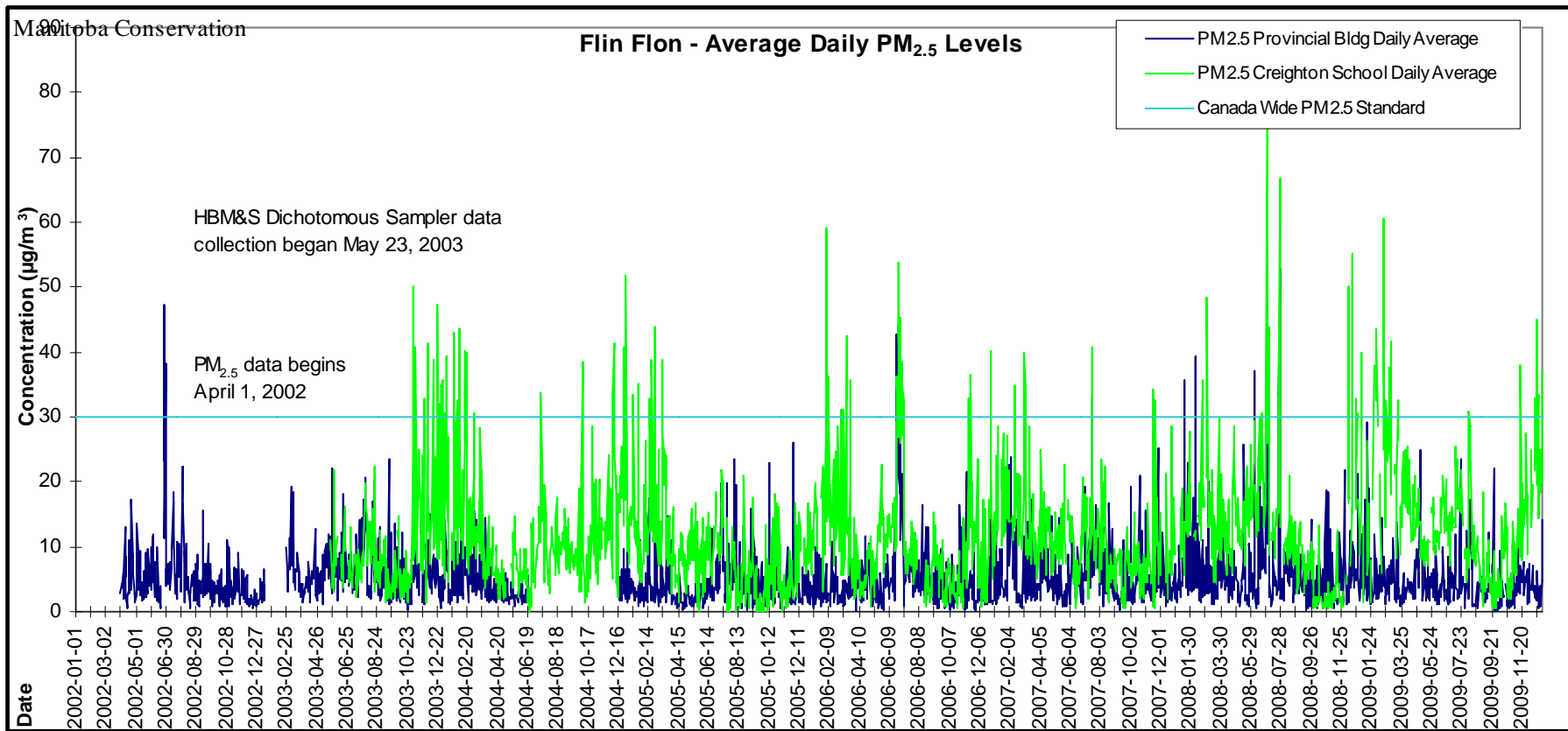
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