

# FLIN FLON AREA QUARTERLY AIR QUALITY REPORT: JANUARY, FEBRUARY AND MARCH 2008

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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 levels in the community measured both by itself and Hudson Bay Mining and Smelting Co., Limited. Manitoba Conservation strives to make these quarterly reports available within two months of quarter-end.

## Report Contents:

- Overall [summary](#) of air quality in the Flin Flon area.
- Chart depicting [air quality warnings](#) by month issued since commencement of this program.
- Chart depicting values in [excess of the 1-hr MAL](#) (Maximum Acceptable Level) for SO<sub>2</sub> by month at each site.
- Chart depicting values in excess of the 1-hr and 24-hr 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

## JANUARY, FEBRUARY AND MARCH 2008

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### Monitoring Activity

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

Air quality during the first quarter of 2008 for sulphur dioxide was mostly unchanged from the latter half of 2007. Several days of elevated particulate matter (fine "dust") levels were recorded both at the Provincial and Creighton sites.

### Sulphur Dioxide

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

During this quarter, exceedances of the Manitoba provincial 1-hr Maximum Acceptable Level (MAL) for sulphur dioxide of 0.34 parts per million (ppm) were only observed in the "uptown" area of Flin Flon, as recorded at the Provincial Building and HBM&S StaffHouse monitoring locations. In January, 12 hours were determined to be above the 1-hr MAL, with two-thirds of these elevated levels recorded at the Provincial Bldg site during the time period from the 17<sup>th</sup> to the 29<sup>th</sup>. In February, 6 hours were recorded to be above the 1-hr MAL, all at the Provincial Bldg site (the 9<sup>th</sup>, 10<sup>th</sup>, 23<sup>rd</sup> and 25<sup>th</sup>). During March, only 3 hours were elevated and again mostly at the Provincial Bldg. site.

All hours with elevated readings appear to arise from fugitive gas releases associated with the tapping of matte from the reverboratory furnace or from the copper converter operations. These are gases that are released into the air nearer to ground level (and not exhausted through the tall stack) and, therefore, are not subject to as much dispersion and dilution.

The World Health Organization (WHO) daily maximum exposure guideline of 0.05 ppm was exceeded each month for a number of days especially during January.

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

TSP (Total Suspended Particulate) levels along with selected heavy metal concentrations and PM<sub>10</sub> and PM<sub>2.5</sub> (fine particulate ≤ 10 microns and ≤ 2.5 microns, respectively) statistics for all sites have been tabulated over the following time frames: for the 12 month period ending March 2008, and for the entire sampling period of up to 19 years.

Daily TSP levels (including the larger-sized or coarse dust particles) measured in the first quarter of 2008 were below the Manitoba provincial air quality objective of 120 µg/m<sup>3</sup> at all sites. The highest levels measured during this period were: the Provincial Bldg. site - 80 µg/m<sup>3</sup> on Feb 9<sup>th</sup> and at Creighton - 101 µg/m<sup>3</sup> on Mar 27<sup>th</sup>. Coarse particulate matter arises mostly from wind-swept ground dust or vehicle-entrained street material; such disturbances are minimized during periods with snow cover.

Fine particulate (PM<sub>10</sub>) levels were continuously measured 24/7 at the Provincial and Creighton monitoring sites. Elevated levels of PM<sub>10</sub> above the Manitoba criteria of 50 µg/m<sup>3</sup> / day were only recorded on 3 days at the Provincial Bldg site (March 27<sup>th</sup>, 28<sup>th</sup> and 31<sup>st</sup> - cause is likely street dust entrained by vehicular traffic).

Continuous (24/7) monitoring of very fine particulate matter (PM<sub>2.5</sub>) was also conducted at the Provincial and Creighton monitoring sites. PM<sub>2.5</sub> is the fraction of the total dust in air most closely associated with human health impacts. During this quarter, PM<sub>2.5</sub> levels were above the Canada-wide Standard of 30 µg/m<sup>3</sup> over 24 hours for 2 days at the Provincial site (Jan 18<sup>th</sup> and Feb 9<sup>th</sup> due to industrial smelter emissions) and 1 day at the Creighton site (Feb 23<sup>rd</sup> due to smoke from wood-burning).

Concentrations of selected heavy metals, such as lead and arsenic in air, were within the Manitoba provincial air quality guidelines at all sites, except at the Provincial Bldg. monitoring site where arsenic levels exceeded the criterion on four days (January 19<sup>th</sup>, 20<sup>th</sup>, 22<sup>nd</sup> and Feb 9<sup>th</sup>) and at the Ruth Betts School site where arsenic also exceeded the criteria on 2 days (January 22<sup>nd</sup> and Feb 9<sup>th</sup>).

### Additional Information

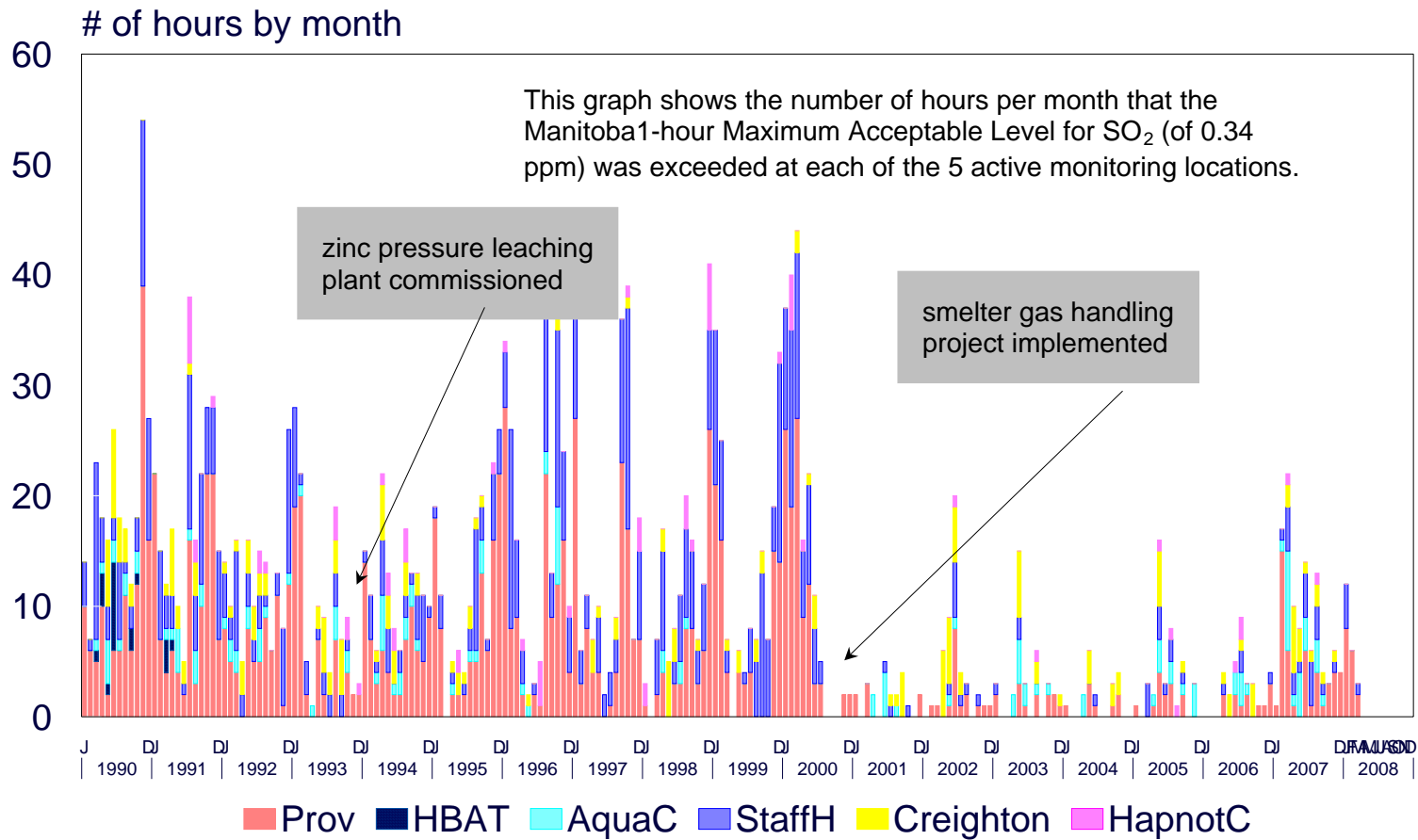
- Details on hourly and daily air concentrations of sulphur dioxide and an analysis of air quality warnings recorded compared with those issued, along with abatement actions taken by HBM&S, have been filed with the Manitoba Environment Act Public Registry at 160-123 Main Street, Winnipeg, MB, and at the Flin Flon Public Library; File 1095.30.

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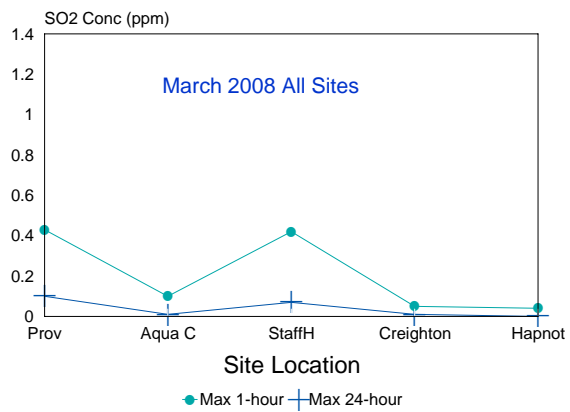
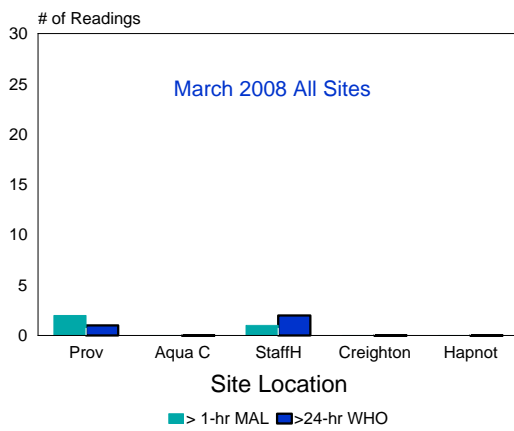
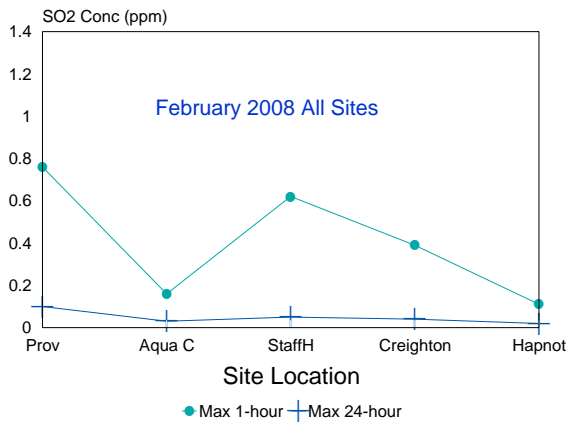
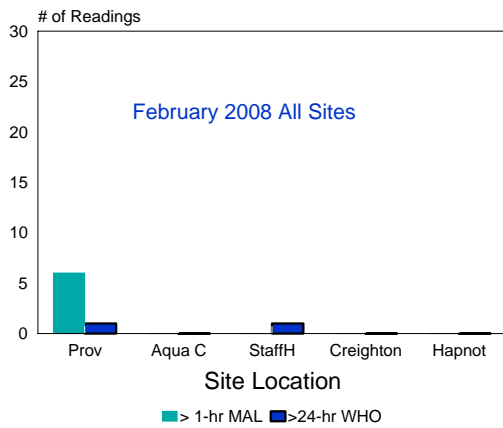
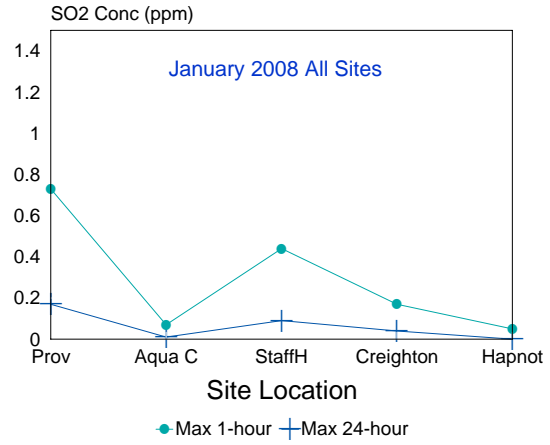
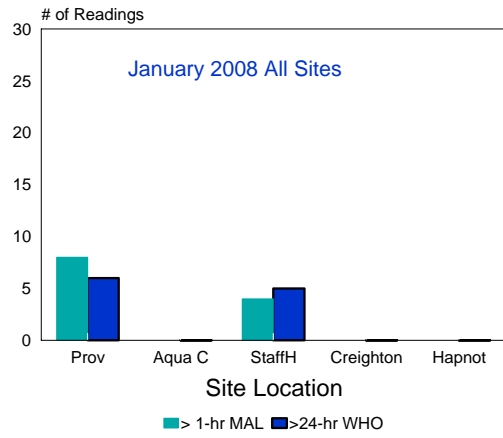
# Flin Flon Area Air Quality

## 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 – Mar. '08	Apr. '07- Mar. '08	Dec. '88 – Mar. '08	Apr. '07- Mar. '08	Dec. '88 – Mar. '08	Apr. '07- Mar. '08
PM	Prov.	0-468	1-192	35	32	178*	4 *
	R.B.	0-423	2-93	20	19	8 *	0 *
	C./S.P.	0-235	--	16	--	5 *	--
	Cr. Sch.	1-3601	5-101	23	21	24 *	0 *
Pb	Prov.	0.00-13.11	0.02-2.71	0.10	0.07	16 (2) *	1 (1) *
	R.B.	0.00-3.09	0.01-0.88	0.05	0.03	0 *	0 *
	C./S.P.	0.00-1.75	--	0.05	--	0 *	--
	Cr. Sch.	0.01-3.39	0.01-0.25	0.03	0.02	0 *	0 *
As	Prov.	0.000-1.380	0.001-0.869	0.018	0.021	108 **	11 **
	R.B.	0.000-0.524	0.000-0.524	0.006	0.003	4 **	2 **
	C./S.P.	0.000-0.282	--	0.003	--	0 **	--
	Cr. Sch.	0.000-4.548	0.000-0.239	0.004	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 (Man. Conservation) [to March 31, 2008]

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 March 31, 2008 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 April 1, 2007 to March 31, 2008 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 – Mar. '08	Apr. '07- Mar. '08	Dec. '96 – Mar. '08	Apr. '07- Mar. '08	Dec. '96 – Mar. '08	Apr. '07- Mar. '08
PM <sub>2.5</sub>	Prov.	0.00-47.31	0.00-39.21	3.82	4.42	10 ****	3 ****
PM <sub>10</sub>	Prov.	0.30-248.5	2.18-76.80	14.42	14.08	243 ***	13 ***
	R.B.	1-66	1-47	10	9	3 ***	0 ***
	S.P.	2-50	--	9	--	0 ***	--
	Cr. Sch.	3-93	--	15	--	1 ***	-- ***
D-PM <sub>10</sub>	Cr. Sch.	0-152.1	0.4-64.7	15.76	17.04	40 ***	4 ***
D-PM <sub>2.5</sub>	Cr. Sch.	0-59.3	0-40.7	8.48	9.01	64 ****	4 ****

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 March 31, 2008]

R.B. = Ruth Betts monitoring site (HBM&S) [from June 8, 1996 to March 31, 2008 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 PM10 size selective head and the sample is split internally to give a PM<sub>2.5</sub> (fines) [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 March 31, 2008. Annual range April 1, 2007 to March 31, 2008 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)

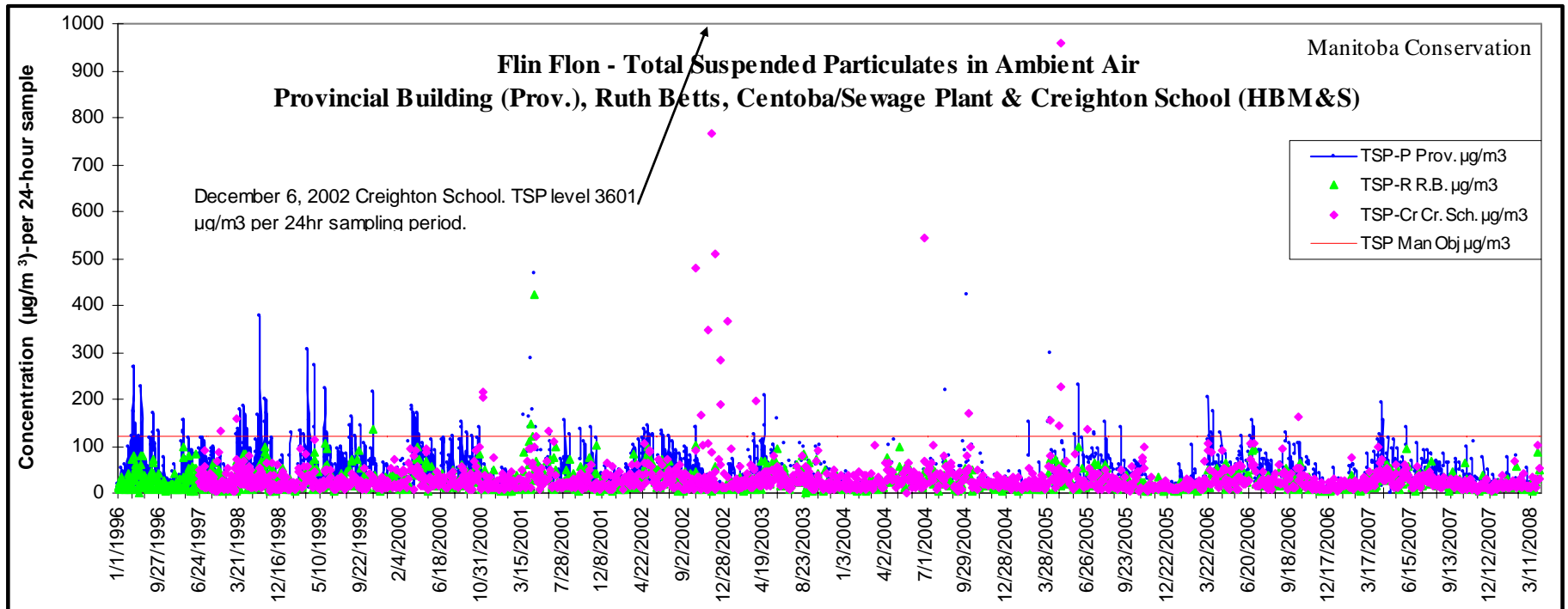
\*\* In comparison to Guidelines (24 hours) [0.3  $\mu\text{g}/\text{m}^3$  for As]

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

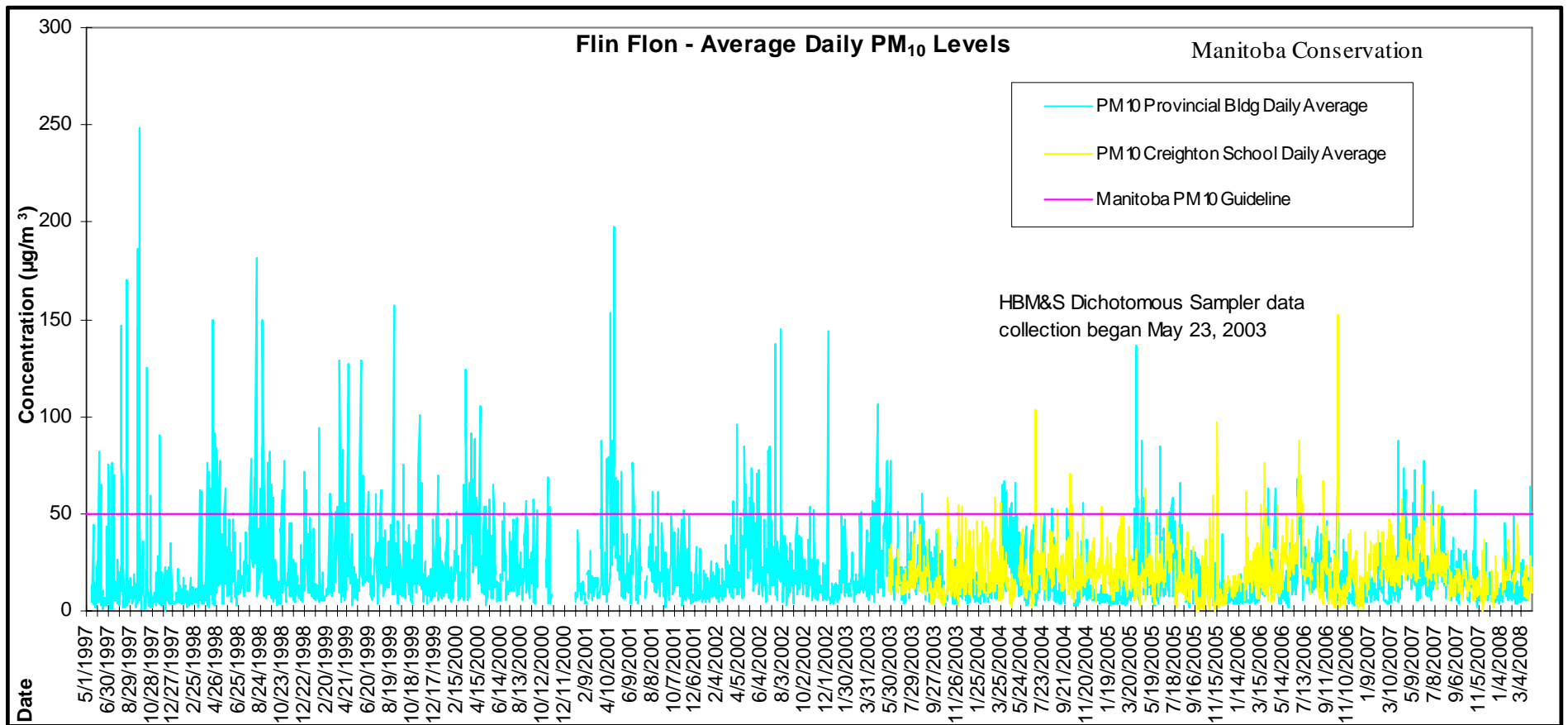
MAL - Maximum Acceptable Level

*revised May 30, 2008*

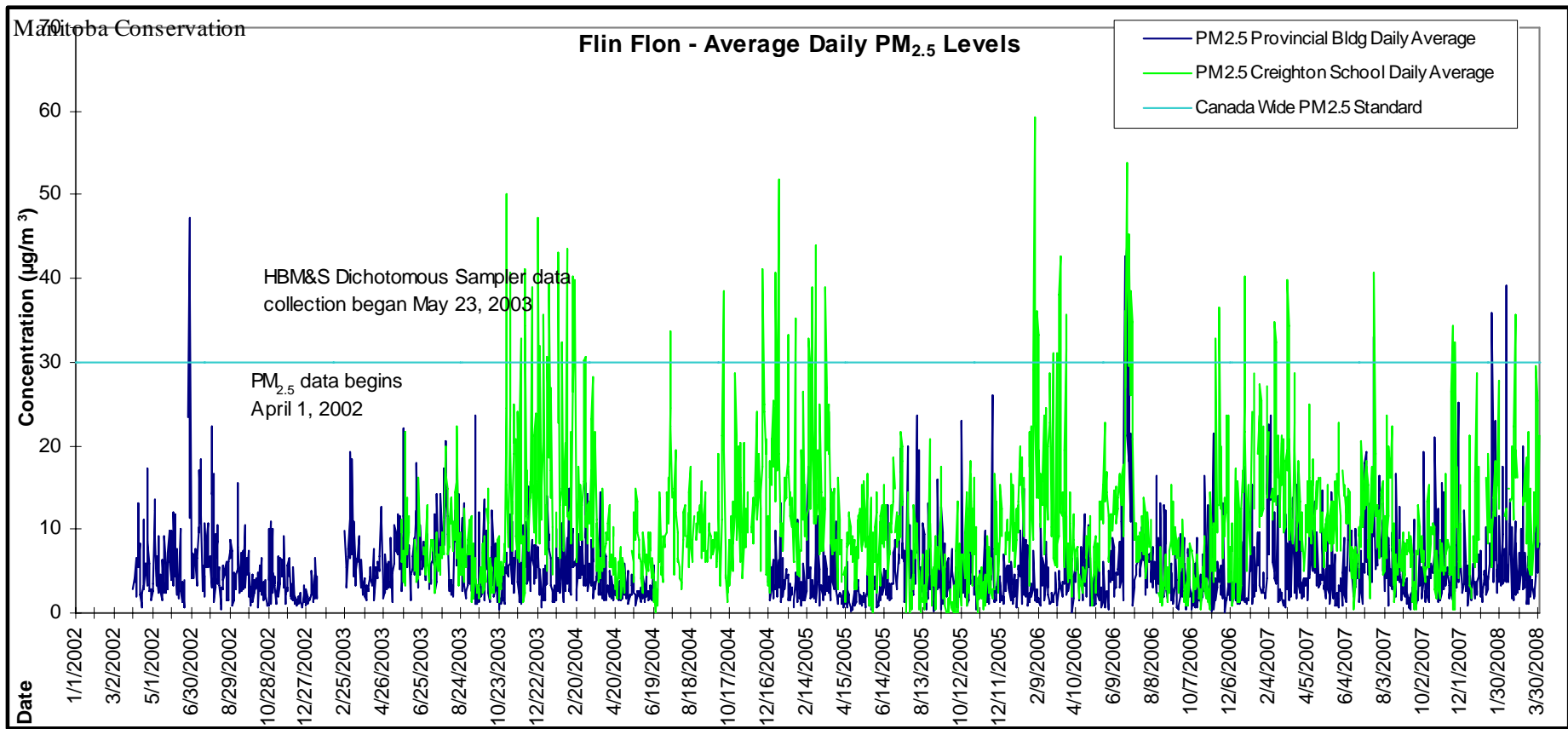
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