

FLIN FLON AREA QUARTERLY AIR QUALITY REPORT: OCTOBER, NOVEMBER AND DECEMBER 2008

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 SO₂ by month at each site.
- Chart depicting values in excess of the 1-hr and 24-hr MAL for SO₂ 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 ([PM₁₀](#) and [PM_{2.5}](#)) in the Flin Flon area.

SUMMARY OF AIR QUALITY WITHIN THE FLIN FLON AREA

OCTOBER, NOVEMBER AND DECEMBER 2008

Monitoring Activity

Continuous outdoor sulphur dioxide (SO₂) 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.

During the last quarter of 2008, sulphur dioxide continued to show improvement developed over the past quarters. Several days of elevated particulate matter (very fine "dust") levels were recorded at the Creighton site due to the presence of smoke from local wood-burning for heating purposes.

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 observed only at the Provincial Building monitoring site (the "uptown" area of Flin Flon). In October and November, 1 hour each month was measured to be above the 1-hr MAL (October 26th and November 4th). During December, 4 hours were recorded to be above the 1-hr MAL (one each on the 2nd and 14th and two hours in the mid-day of the 3rd).

All hours with elevated readings appear to have arisen from fugitive gas releases associated with the tapping of matte from the reverberatory furnace (this is as reported by HBM&S). 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 several days during this quarter in October and December, mostly at the Provincial Bldg monitoring site.

Particulate Matter (PM)/ Heavy Metals (HM)

TSP (Total Suspended Particulate) levels along with selected heavy metal concentrations and PM₁₀ and PM_{2.5} (fine particulate ≤ 10 microns and ≤ 2.5 microns, respectively) statistics for all sites have been tabulated over the following time frames: for 2008, and for the entire sampling period of up to 20 years.

Daily TSP levels (including the larger-sized or coarse dust particles) measured in the fourth quarter of 2008 were below the Manitoba provincial air quality objective of 120 µg/m³ at all sites except for one day at the Provincial Building site (Nov 23rd, 124 µg/m³). The highest level measured at Creighton was 50 µg/m³ on Oct 31st. Coarse particulate matter usually arises from wind-swept ground dust or vehicle-entrained street material.

Fine particulate (PM₁₀) levels were continuously measured 24/7 at the Provincial and Creighton monitoring sites. Elevated levels of PM₁₀ above the Manitoba criteria of 50 µg/m³ / day were recorded on 2 days each at the Provincial Bldg site and at the Creighton site – cause is likely wind-swept dust and smoke in air from wood burning.

Continuous (24/7) monitoring of very fine particulate matter (PM_{2.5}) was also conducted at the Provincial and Creighton monitoring sites. PM_{2.5} is the fraction of the total dust in air most closely associated with human health impacts. During this quarter, PM_{2.5} levels were above the daily Canada-wide Standard of 30 µg/m³ for 4 days at the Creighton site during December – these levels were associated with smoke in air from wood-burning.

Concentrations of selected heavy metals were within the Manitoba provincial air quality guidelines at all sites except for 2 days where lead levels were elevated (Dec 2nd & 29th) and 4 days when arsenic levels were elevated (Nov 23rd, Dec 2nd, 3rd and 29th), all at the Provincial Building monitoring site.

Additional Information

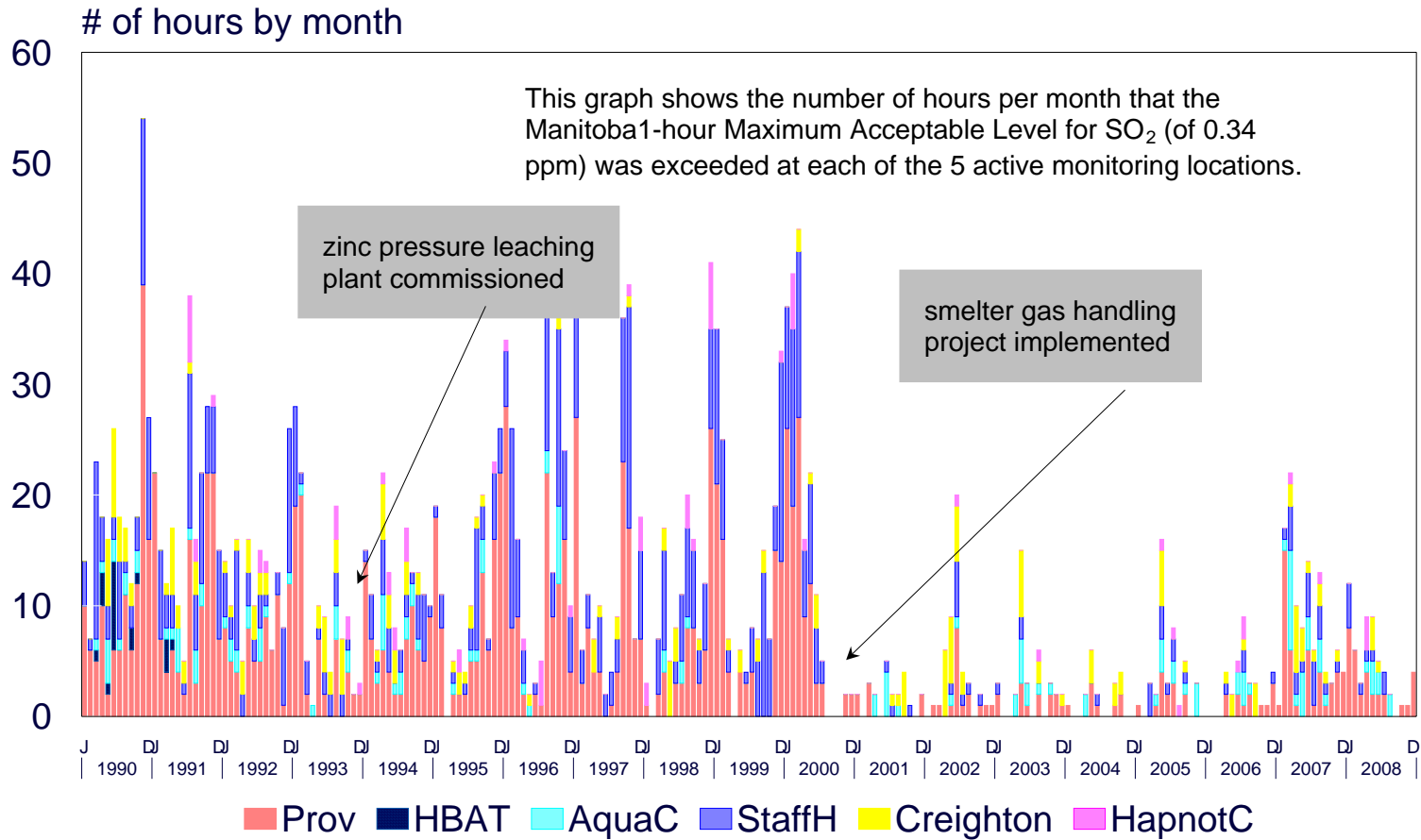
Emissions to the atmosphere for 2008 have been estimated for the HBM&S operation. Total sulphur dioxide emitted was 185 kilotonnes (regulated limit is 220); stack particulate matter emissions were estimated to be 1.0 kilotonnes (regulated limit is 2.5).

Details on hourly and daily air concentrations of sulphur dioxide and air quality warnings issued to the community, 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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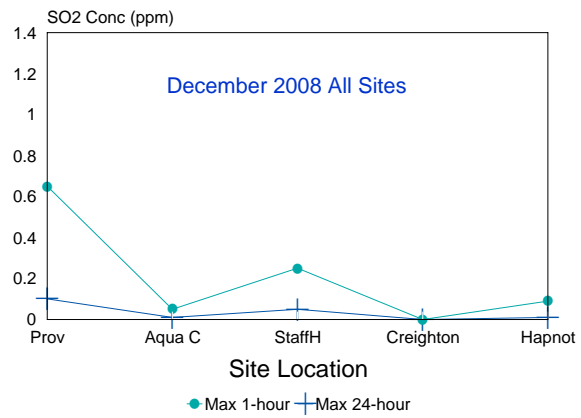
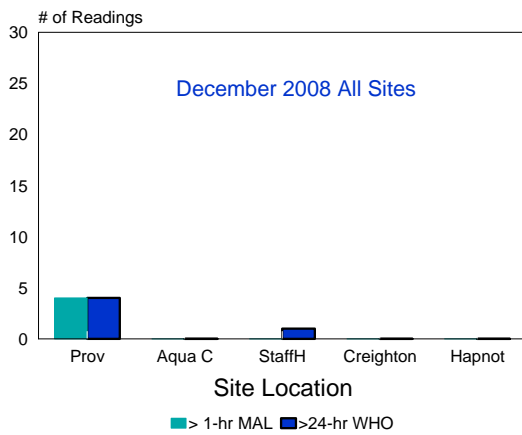
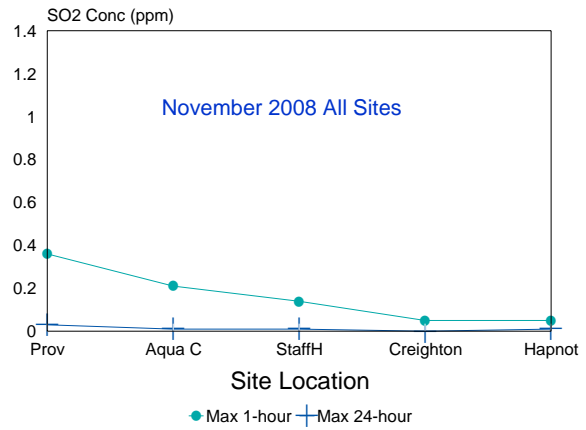
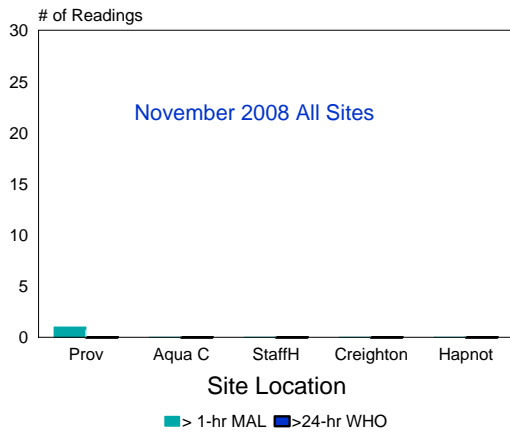
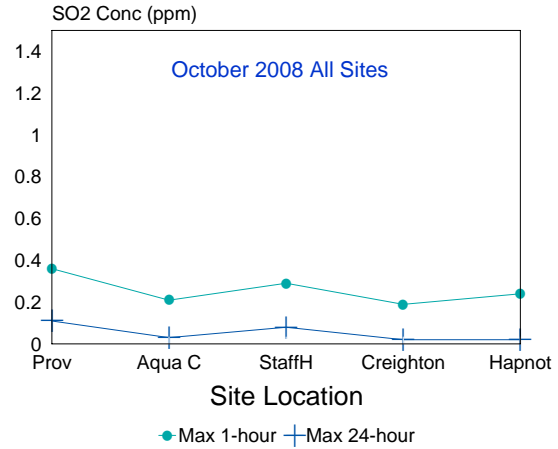
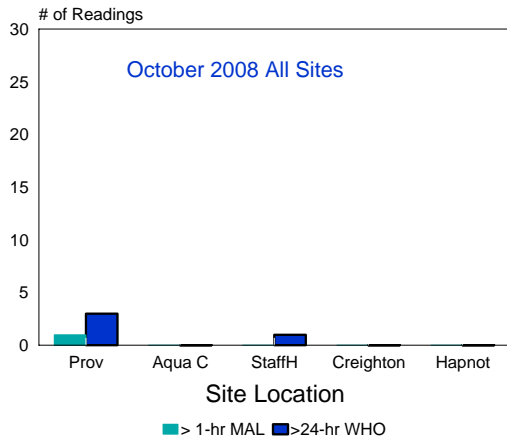
Flin Flon Area Air Quality

Exceedances of the 1-hr MAL for SO₂



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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. '08	Jan. '08- Dec. '08	Dec. '88 – Dec. '08	Jan. '08- Dec. '08	Dec. '88 – Dec. '08	Jan. '08- Dec. '08
PM	Prov.	0-468	3-178	35	28	181*	3 *
	R.B.	0-423	5-93	20	17	8 *	0 *
	C./S.P.	0-235	--	16	--	5 *	--
	Cr. Sch.	1-3601	5-120	23	20	24 *	0 *
Pb	Prov.	0.00-13.11	0.01-2.76	0.10	0.07	19 (5) *	3 (3) *
	R.B.	0.00-3.09	0.01-0.77	0.05	0.03	0 *	0 *
	C./S.P.	0.00-1.75	--	0.05	--	0 *	--
	Cr. Sch.	0.01-3.39	0.01-0.46	0.03	0.02	0 *	0 *
As	Prov.	0.000-1.380	0.002-0.869	0.018	0.021	112 **	8 **
	R.B.	0.000-0.524	0.000-0.524	0.006	0.004	4 **	2 **
	C./S.P.	0.000-0.282	--	0.003	--	0 **	--
	Cr. Sch.	0.000-4.548	0.000-0.089	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 (Man. Conservation) [to December 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 December 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 January 1, 2008 to December 31, 2008 inclusive for all sites (thus no data for Sewage Plant site - see note above.).

PM₁₀ (Inhalable Particulates) Particulate Matter 10 µm and smaller in diameter.

	Site/Time Period	Sample Range		Geometric Mean		# of Samples > MAL	
		Dec. '96 – Dec. '08	Jan. '08- Dec. '08	Dec. '96 – Dec. '08	Jan. '08- Dec. '08	Dec. '96 – Dec. '08	Jan. '08- Dec. '08
PM _{2.5}	Prov.	0.00-56.93	0.04-56.93	3.88	4.47	15 ****	7 ****
PM ₁₀	Prov.	0.30-248.5	2.84-80.58	14.43	13.51	256 ***	16 ***
	R.B.	1-66	3-59	10	11	4 ***	1 ***
	S.P.	2-50	--	9	--	0 ***	--
	Cr. Sch.	3-93	--	15	--	1 ***	-- ***
D-PM ₁₀	Cr. Sch.	0-152.1	1.3-84.2	15.87	16.68	47 ***	7 ***
D-PM _{2.5}	Cr. Sch.	0-80.1	0.5-80.1	8.48	9.36	77 ****	14 ****

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 PM₁₀ & PM_{2.5} monitoring site (Man. Conservation)[to December 31, 2008]

R.B. = Ruth Betts monitoring site (HBM&S) [from June 8, 1996 to December 31, 2008 for PM₁₀]

S.P. = Sewage Plant monitoring site (HBM&S) [from June 8, 1996 to December 7, 2002 for PM₁₀]

Cr. Sch. = Creighton School monitoring site (HBM&S) [from December 15, 2002 to May 22, 2003 every second day for PM₁₀ 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_{2.5} (fines) [D-PM_{2.5}] and PM_{2.5-10} (coarse) [D-PM_{2.5-10}] sample. D-PM₁₀ is the sum of D-PM_{2.5} and D-PM_{2.5-10}. Sample results to December 31, 2008. Annual range January 1, 2008 to December 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)

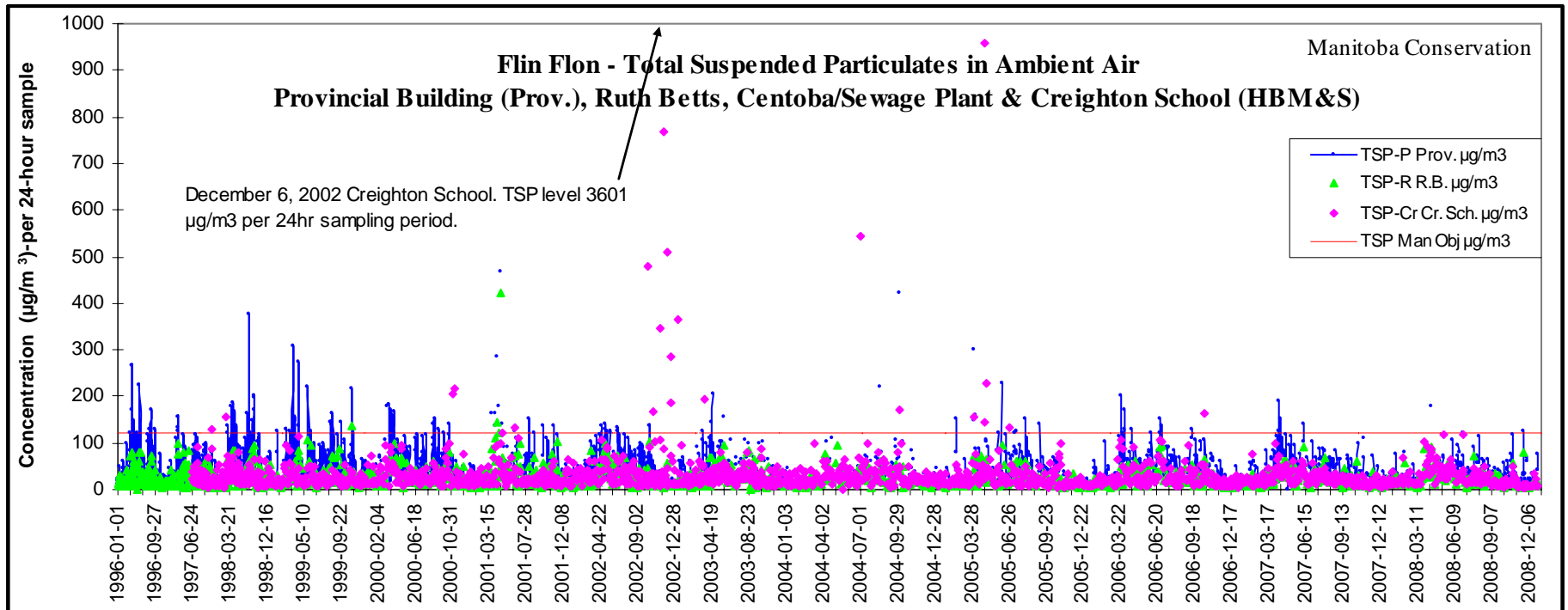
** In comparison to Guidelines (24 hours) [0.3 $\mu\text{g}/\text{m}^3$ for As]

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

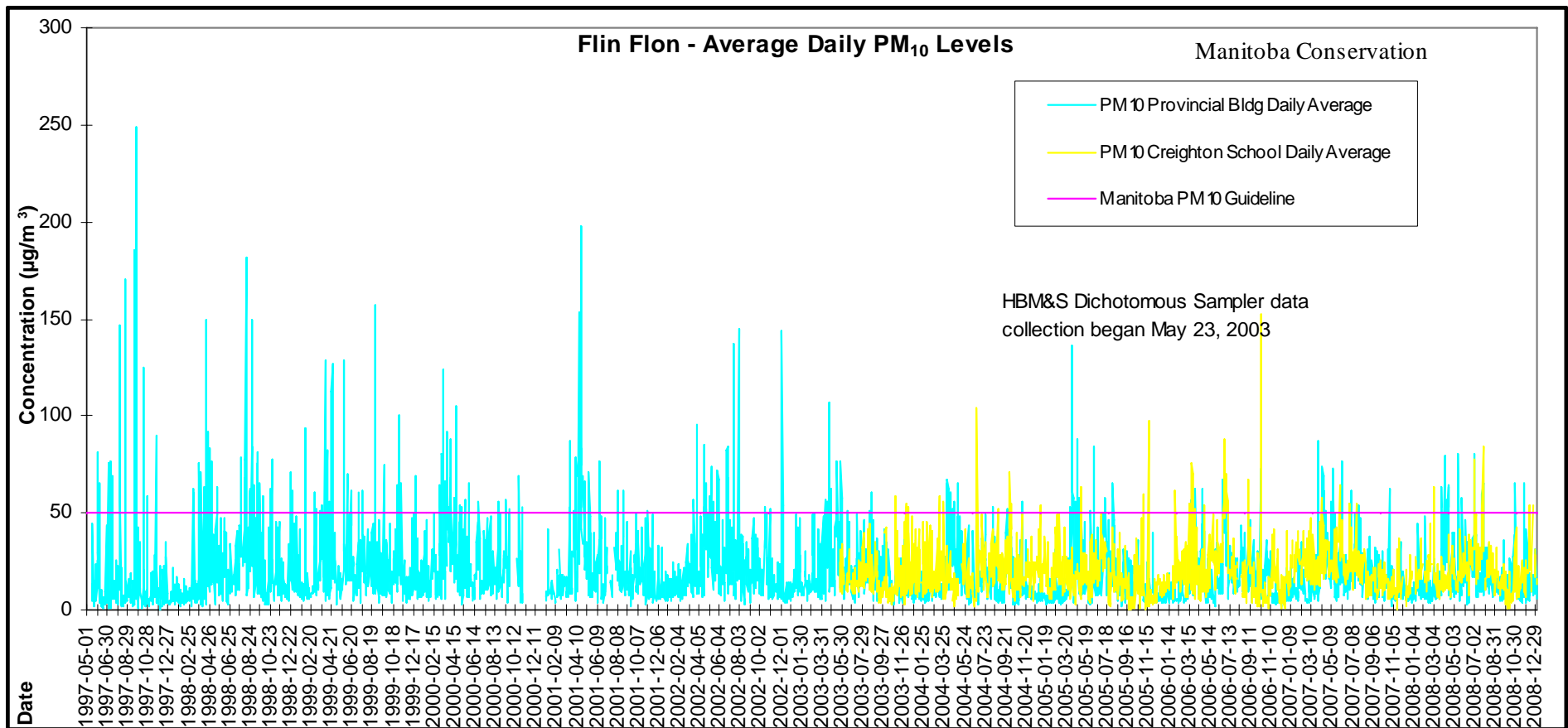
MAL - Maximum Acceptable Level

revised February 25, 2009

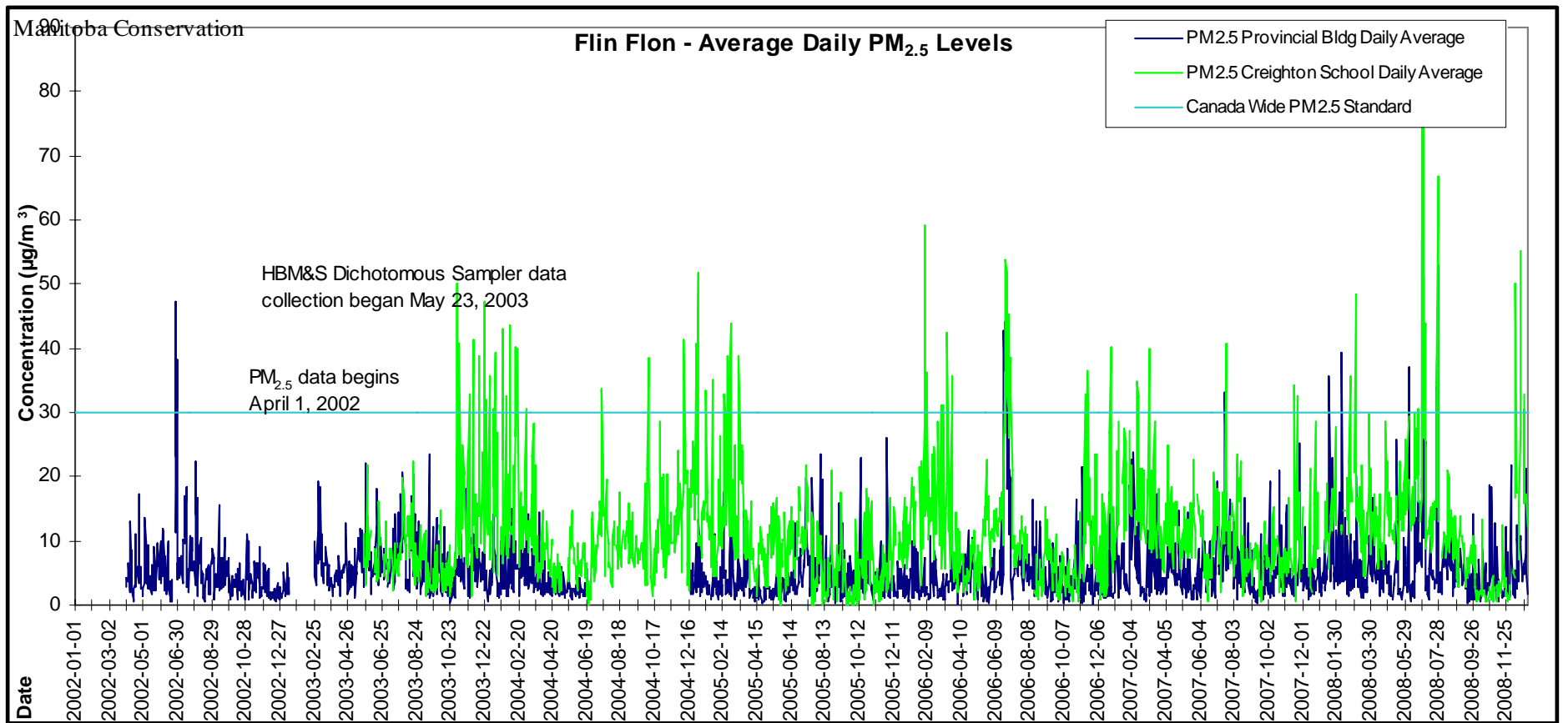
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