

FLIN FLON AREA QUARTERLY AIR QUALITY REPORT: JULY, AUGUST AND SEPTEMBER 2009

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 SO₂ (summarized monthly) at each site.
- Chart depicting values in excess of the 1-hour and 24-hour 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

JULY, AUGUST AND SEPTEMBER 2009

Monitoring Activity

The results from the continuous outdoor sulphur dioxide (SO₂) 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 third quarter of 2009, ambient SO₂ concentrations were somewhat higher than the previous quarter. A number of days with elevated levels of particulate matter were also recorded during this period at the Creighton monitoring site - this is likely due to windswept and vehicular entrained dust from nearby roadway re-construction.

Sulphur Dioxide

Selected statistics are shown in the attached graphs. An overview of air quality warnings issued to the Flin Flon area was 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 observed primarily in the months of July and August. In July, 10 hours were observed to be elevated; in August, 20 hours were elevated whereas in September only 3 hours above the criteria were recorded. Two days (July 2nd and August 29th) accounted for over half of the high hours when, at times, multiple monitoring sites were concurrently impacted. On these days, poor dispersion of the stack plume due to unfavourable meteorology allowed stack gases to settle onto the community, instead of being dispersed aloft and away from the community. The remaining elevated hours, spread over various days and monitoring sites in the quarter, were due to either recurring impacts from the stack plume, fugitive releases from roaster matte tapping/handling or from sources that could not be specifically identified.

The World Health Organization (WHO) daily maximum exposure guideline of 0.05 parts per million (ppm) was exceeded for several days during this quarter, again primarily in July and August.

Particulate Matter (PM)/ Heavy Metals (HM)

TSP (Total Suspended Particulates), selected heavy metals, PM₁₀ and PM_{2.5} (fine particulate ≤ 10 microns and ≤ 2.5 microns, respectively) concentrations recorded from all sites have been tabulated over the following time frames: for the most recent 12 months to the end of September 09, and for the entire sampling period of over 20 years.

Daily TSP levels (including the larger-sized or coarse dust particles) measured in the third quarter of 2009 were below the Manitoba Ambient Air Quality Criteria of 120 µg/m³ (24-hour average) at all sites except for 1 day at the Provincial Bldg. site (September 25th). Coarse particulate matter usually arises from wind-swept ground dust or vehicle-entrained street materials.

Fine particulate (PM₁₀) levels were continuously measured at the Provincial Building and Creighton monitoring sites. Elevated levels of PM₁₀ above the Manitoba criteria of 50 µg/m³ (daily average) were recorded for 1 day (Sept 25th) at the Provincial Bldg. site and 12 days at the Creighton monitoring site. Most of these high levels arose from local conditions (at Creighton, local roadway re-construction and a temporary gravel surface allowed for entrainment of dust by vehicles or wind).

Continuous (24/7) monitoring of very fine particulate matter (PM_{2.5}) was also conducted at the Provincial Building and Creighton monitoring sites. PM_{2.5} is the fraction of the total dust in the ambient air most closely associated with human health impacts. During this quarter, only one PM_{2.5} daily level (Creighton, August 7th) was above the 24-hour Canada-Wide Standard of 30 µg/m³.

The concentrations of selected heavy metals were within the Manitoba Ambient Air Quality Criteria at all monitoring sites except for a number of days when at times both lead and arsenic in air levels were elevated at the Provincial Bldg. site (July 21st; August 4th arsenic only; and September 25th when arsenic levels were also elevated at the Ruth Betts School). The cause of these elevated levels is likely due to wind-swept dust containing metals or releases near ground level directly from the smelter complex.

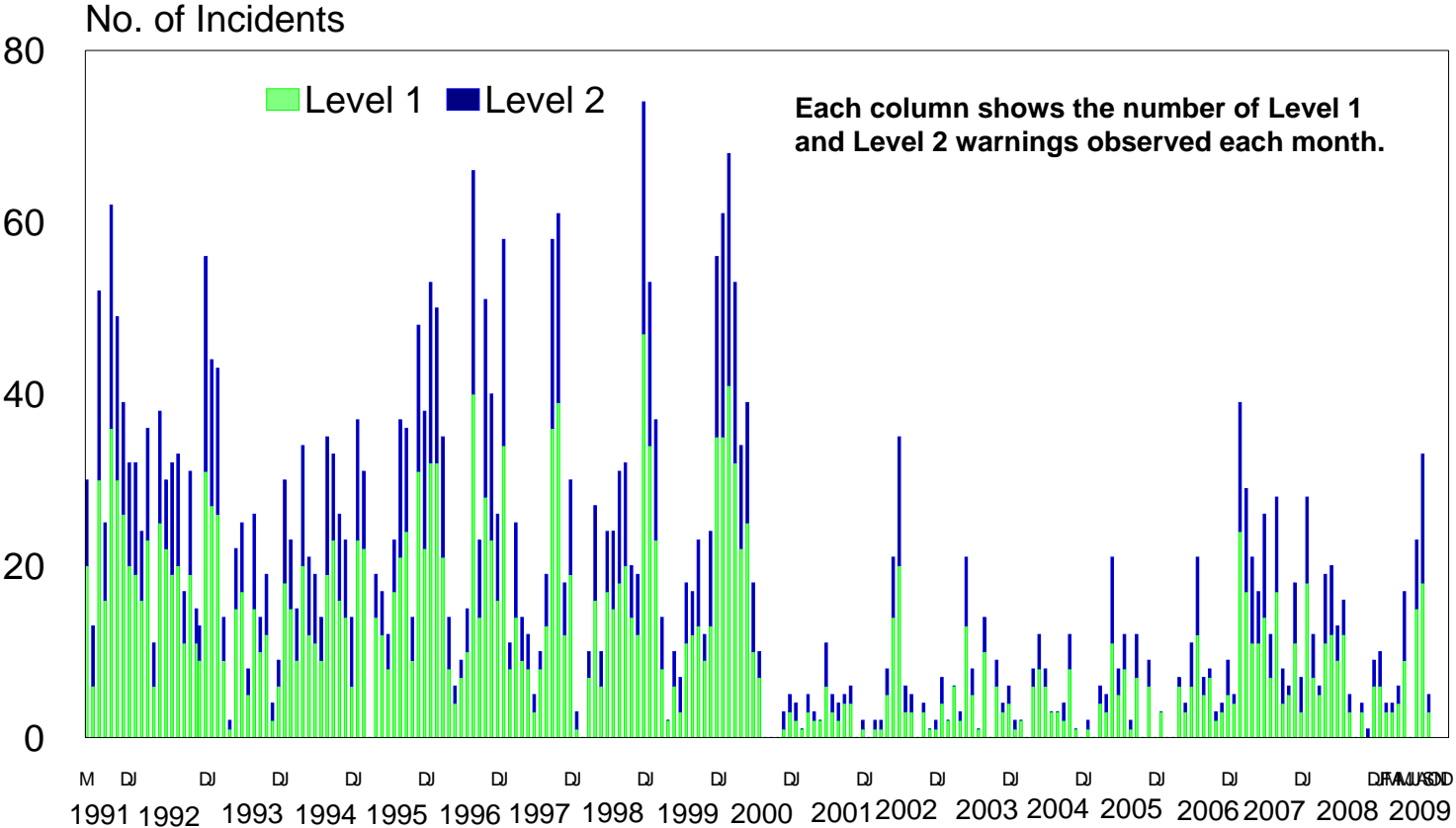
Additional Information

Details on the hourly and daily ambient 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 160-123 Main Street, Winnipeg, MB, and at the Flin Flon Public Library; File 1095.30. Hourly averages of SO₂ from all 5 sites over the last 24-hours can be viewed at www.flinflonairquality.com.

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Flin Flon Air Quality

Record of Warnings (1991 to 2009) - All Sites

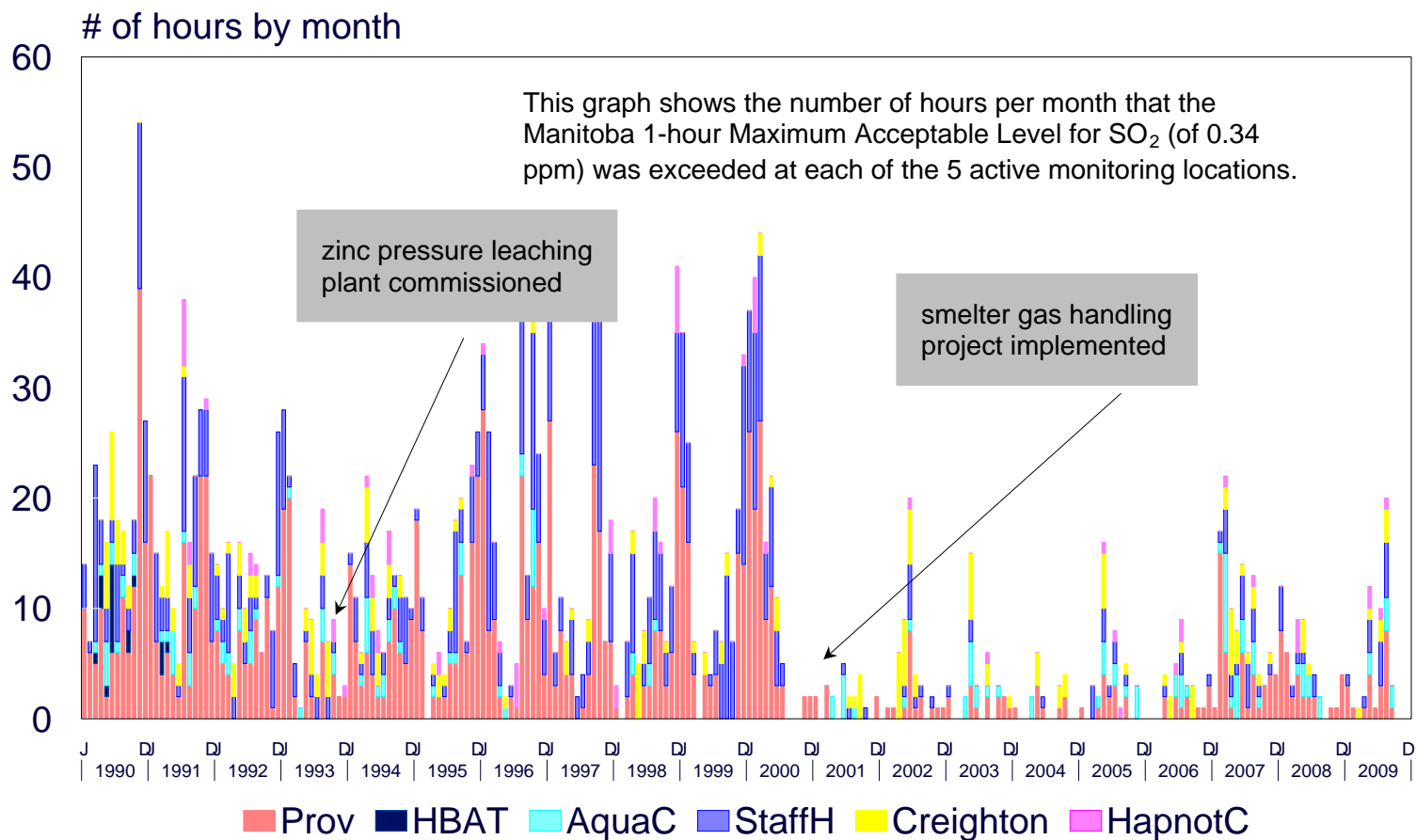


December 2009

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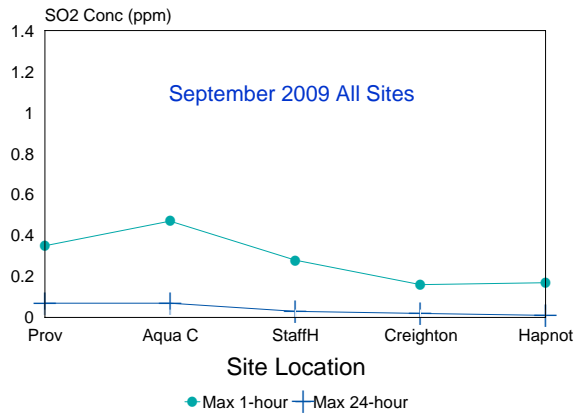
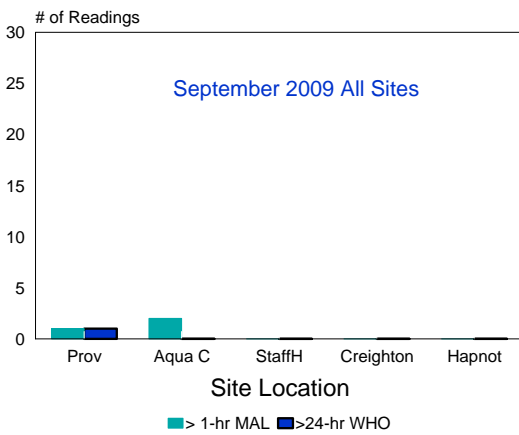
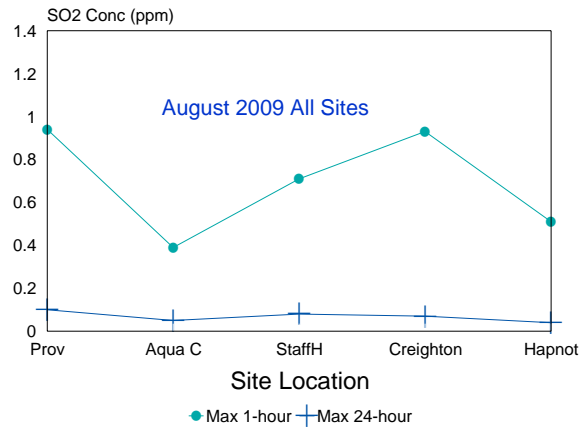
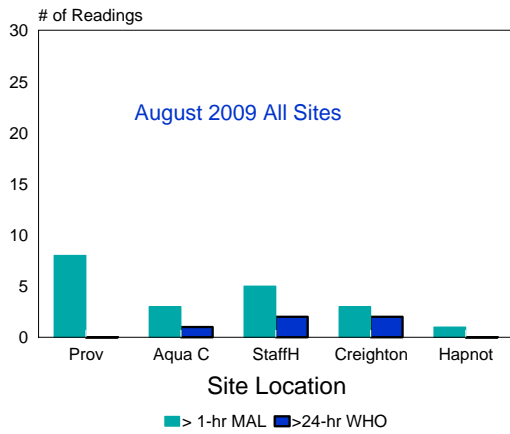
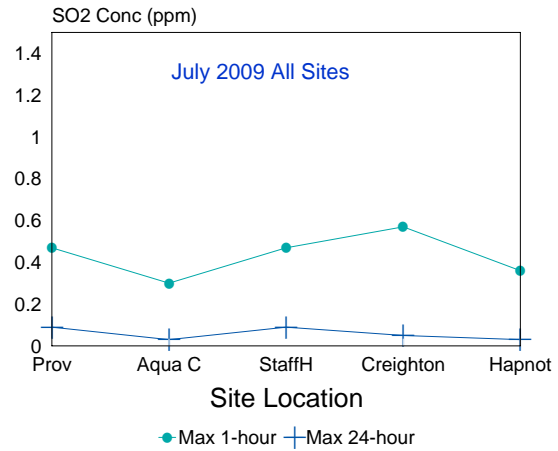
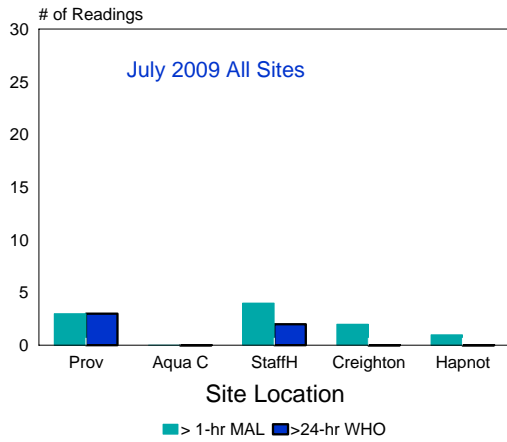
Flin Flon Area Air Quality

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 – Sep. '09	Oct. '08- Sep. '09	Dec. '88 – Sep. '09	Oct. '08- Sep. '09	Dec. '88 – Sep. '09	Oct. '08- Sep. '09
PM	Prov.	0-468	7-180	35	32	187*	7 *
	R.B.	0-423	2-83	19	12	8 *	0 *
	C./S.P.	0-235	--	16	--	5 *	--
	Cr. Sch.	1-3601	3-90	22	16	24 *	0 *
Pb	Prov.	0.00-13.11	0.01-4.18	0.10	0.09	23 (9) *	6 (6) *
	R.B.	0.00-3.09	0.01-0.75	0.05	0.03	0 *	0 *
	C./S.P.	0.00-1.75	--	0.05	--	0 *	--
	Cr. Sch.	0.01-3.39	0.01-0.34	0.02	0.01	0 *	0 *
As	Prov.	0.000-1.380	0.003-1.041	0.019	0.026	121 **	14 **
	R.B.	0.000-0.524	0.000-0.375	0.006	0.005	5 **	1 **
	C./S.P.	0.000-0.282	--	0.003	--	0 **	--
	Cr. Sch.	0.000-4.548	0.000-0.145	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 September 30, 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 September 30, 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 October 1, 2008 to September 30, 2009 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 – Sep. '09	Oct. '08- Sep. '09	Dec. '96 – Sep. '09	Oct. '08- Sep. '09	Dec. '96 – Sep. '09	Oct. '08- Sep. '09
PM _{2.5}	Prov.	0.00-56.93	0.29-29.26	3.86	3.68	15 ****	0 ****
PM ₁₀	Prov.	0.30-248.5	2.84-75.23	14.35	12.66	264 ***	10 ***
	R.B.	1-66	1-40	10	9	4 ***	0 ***
	S.P.	2-50	--	9	--	0 ***	--
	Cr. Sch.	3-93	--	15	--	1 ***	-- ***
D-PM ₁₀	Cr. Sch.	0-167.5	1.2-167.5	16.65	20.15	64 ***	19 ***
D-PM _{2.5}	Cr. Sch.	0-80.1	0.5-60.6	8.80	8.66	91 ****	18 ****

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 September 30, 2009]

R.B. = Ruth Betts monitoring site (HBM&S) [from June 8, 1996 to September 30, 2009 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} (fine) [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 September 30, 2009. Annual range October 1, 2008 to September 30, 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)

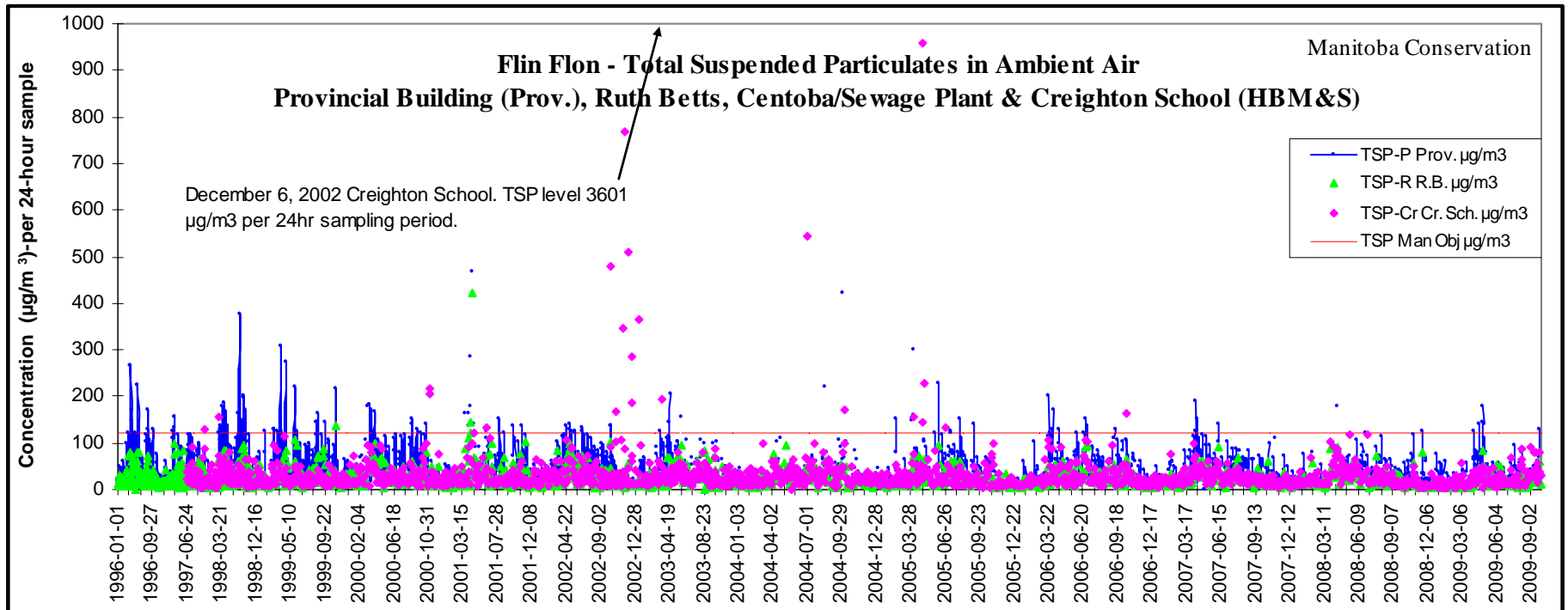
** In comparison to Guidelines (24 hours) [0.3 $\mu\text{g}/\text{m}^3$ for As]

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

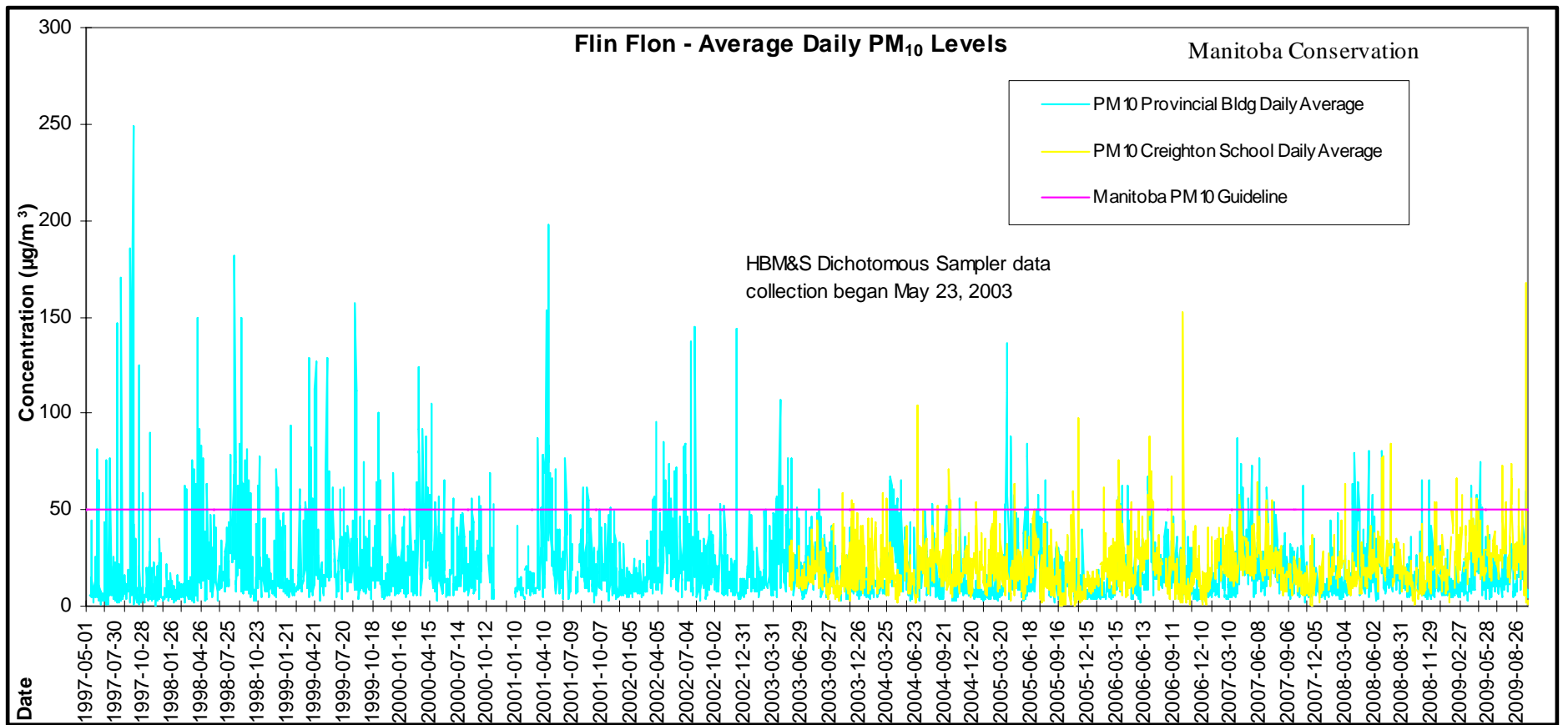
MAL - Maximum Acceptable Level

revised December 10, 2009

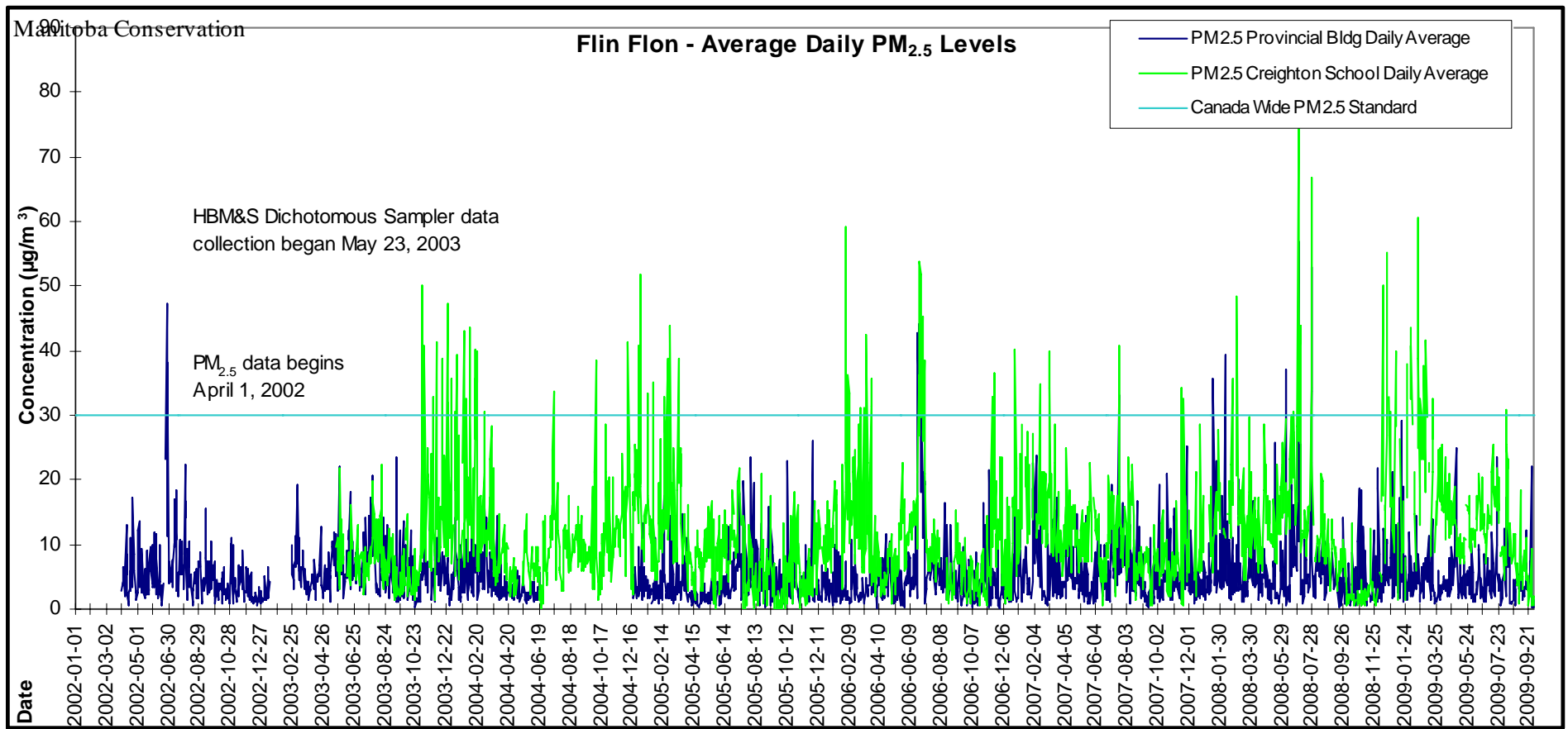
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