



Stantec Consulting Ltd.

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September 12, 2016
File: 160950528

Attention: Ms. Amanda Graham, Air Quality Analyst

Ministry of the Environment and Climate Change
Technical Support Section
5775 Yonge Street, 8th Floor
North York, Ontario M2M 4J1

Dear Ms. Graham,

Reference: Durham York Energy Centre, MOECC Data Validation Review of Q1 2016 Quarterly Report (January 2016 to March 2016)

The Ministry of the Environment and Climate Change (MOECC) conducted a data validation review and issued a comment letter (dated August 19, 2016) for the Q1 2016 quarterly report (January 2016 to March 2016) for the Durham York Energy Centre project. This letter provides our responses to the MOECC's comments and is an addendum to the report.

1.0 CONTINUOUS PARAMETERS

MOECC Comment #1 (page 1 of 3): *In future quarterly and annual reports, consider providing a short analysis for days with elevated concentrations, describing local and regional conditions, plant operations, comparison with the Durham York Energy Center and the MOECC monitoring stations, and any other factors that may have contributed to any observed elevated concentrations.*

Stantec Response: Stantec has noted this comment and will incorporate comments for selected days with elevated concentrations into future quarterly and annual reports.

MOECC Comment #2 (page 2 of 3): *The ministry's Operations Manual for Air Quality Monitoring in Ontario (2008) states that 75% of the total number of possible samples is required to calculate a valid mean. Since Rundle Station yielded 55% valid data for PM_{2.5} during the month of January, the Q1 January mean for PM_{2.5} is not valid.*

Stantec Response: Upon review, Stantec concurs that the Rundle Road January 2016 PM_{2.5} mean is not valid. An updated 2016 Q1 report Table 4-2 is included in **Attachment A** to reflect this change.

MOECC Comment #3 (page 2 of 3): *Please provide the monthly calibration trends for the SO₂, NO_x and PM_{2.5} monitors, including the auto zero and auto span trends.*



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Reference: Durham York Energy Centre, MOECC Data Validation Review of Q1 2016 Quarterly Report (January 2016 to March 2016)

Stantec Response: Clarification was provided by the MOECC via e-mail on August 4, 2016 that supplying auto zero calibration trends (and not auto span calibration trends) for the SO₂ and NO_x monitors would be sufficient. The monthly calibration trends for the SO₂, NO_x and PM_{2.5} monitors and auto zero trends for the SO₂ and NO_x monitors for both stations are presented in

Attachment B.

MOECC Comment #4 (page 2 of 3): Please confirm the following statistics provided in Table 4-2, as they did not match with our calculated statistics.

- PM_{2.5} 24-Hour Maximum at Courtice and Rundle Stations
- NO₂ 24-Hour Minimum at Courtice and Rundle Station

Stantec Response: Stantec has reviewed this data and confirmed that the calculated maxima and minima are correct. If the MOECC were to provide their calculated values, Stantec would be able to compare statistics and identify the source of the discrepancy.

MOECC Comment #5 (page 2 of 3): As previously discussed, it is highly unusual in ambient monitoring to see precise linear PM_{2.5} measurements of the same recurring value for extended periods of time, as seen at Courtice station. The two longest strings of 0.2 µg/m³ are provided below. Please explain these occurrences.

Stantec Response:

January 10th at 9:00 to January 11th at 20:00

Review of the data at the Oshawa Air Quality Health Index (AQHI) monitoring station during this period showed measured PM_{2.5} concentrations that were relatively low - ranging between 0 and 3 µg/m³ and averaging 0.8 µg/m³. The PM_{2.5} concentrations at Rundle for the same time period varied between 1.0 and 13.5 µg/m³ with an average of 3.9 µg/m³.

Monthly calibration on the PM_{2.5} monitor was performed on this monitor on December 11, 2015 and January 29, 2016 and met all required calibration criteria. A Stantec technician was on site on January 12, 2016 and noted no issues (i.e., no status or error messages) with the PM_{2.5} monitor.

January 17th at 16:00 to January 20th at 7:00

During this period, the Oshawa AQHI monitoring station measured PM_{2.5} concentrations between 0 and 5 µg/m³, averaging 2.2 µg/m³ overall. No data was collected at the Rundle station as the monitor was removed for repairs during this period.

The monthly calibrations on December 11, 2015 and January 29, 2016 met all calibration criteria. No issues (i.e., no status or error messages) with the PM_{2.5} monitor were noted by the Stantec technician on the January 21, 2016 site visit.



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For both occurrences, relatively low concentrations were measured at the other stations, recent calibrations confirmed the monitor's performance, and no instrument error/ status messages occurred during the periods. During recent discussions between Valley Environmental/Stantec and the MOECC technical specialist on the PM_{2.5} monitors, the MOECC representative suggested that during periods of low ambient concentrations, a slight instrument nephelometer negative zero drift may be responsible for the extended periods of recurring values. Stantec sees no justification to invalidate these readings as the measured values were likely due to low ambient PM_{2.5} in the area coupled with normal levels of instrument zero drift.

2.0 NON-CONTINUOUS PARAMETERS

MOECC Comment #1 (page 2 of 3): *To confirm sample flow measurements for PAHs, dioxins and furans, please provide the daily temperature and pressure recordings for non-continuous sampling events in the field sample log sheets. Please also note that a number of the samples for PAHs, dioxins and furans had samples flows slightly above the recommended range of 7.2 to 8.8 cfm.*

Stantec Response: The TSP, PAH, dioxins and furans field sample log sheets were updated to include the daily average temperature and pressure for each of the sampling days and were e-mailed to the MOECC on September 12, 2016. Barometric pressure is only measured at the Courtice Water Pollution Control Plant (WPCP) station and this data was used for sample flow calculations at all three stations. Since meteorological data is not measured at the Fenceline station, temperature data from the Courtice WPCP station are also used for sample flow calculations at the Fenceline station.

The PAH/dioxin and furan sampler flow rates were discussed and agreed upon with the MOECC during the development of the Ambient Monitoring Plan and again at the initiation of the ambient monitoring. The samplers for PAHs/dioxins and furans are to run at their maximum flow rate in order to increase Method Detection Limits (MDL) by collecting as large a volume of air as possible. Therefore, sampler flow rates for the PAHs/dioxins and furans sampling equipment may be above the range noted in the MOECC Guidance Manual.

MOECC Comment #2 (page 2 of 3): *The field sheets provided suggest that the "Elapsed Time Reading" is measured in minutes, whereas the values would suggest measurements in hours. Please clarify what unit of measurement was used.*

Stantec Response: The units used in the field sheets are hours. The field sheet template has been revised to reflect this change and moving forward the field sheets submitted to the MOECC will specify these units.

MOECC Comment #3 (page 2 of 3): *The field sheets provided for TSP/metals lists "Pigeon Racing Club" as a sample location. Please change this to Rundle station. These sheets should also specify the units for the section "Chart Recorder Reading for Mass Flow Samplers".*



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Reference: Durham York Energy Centre, MOECC Data Validation Review of Q1 2016 Quarterly Report (January 2016 to March 2016)

Stantec Response: The Rundle Road Station is located on the property of the Pigeon Racing Club and initially the station was referred to by this name. The TSP/metals and PAH, dioxins and furans field sheet templates have been updated to "Rundle Station" for clarity. While the units on the chart recorder are nominally cubic feet per minute (cfm), the sampler flow rate is not calculated / based on these data and therefore including units may potentially mislead a reader to believe that the data recorded are accurate representations of the sampler flow in cfm. To avoid confusion, units for the section "Chart Recorder Reading for Mass Flow Samplers" were not included in the revised field sheets.

MOECC Comment #4 (page 2 of 3): *Supporting documentation for the TSP/metals measurements indicate that all TSP samples at the Fence Line location and a number of samples at Courtice and Rundle stations experienced flows that were either below or above the recommended flow range of 40 cfm +/- 10% outlined in the Ministry's Operations Manual. Please explain these occurrences as they may have had an impact on the data validity.*

Stantec Response: As discussed with the MOECC at the initiation of the monitoring program and also discussed at a meeting with the MOECC on July 28, 2016, during Q1 Stantec was operating the TSP/metals hi-vol samplers following the U.S. Environmental Protection Agency (U.S. EPA) reference method for TSP Hi-vol sampling (IO-2.1) and reviewing the flow data following the requirements of Section 11.4.1 of IO-2.1.

At the Fenceline station only two samples were outside the recommended range as per the U.S. EPA protocols, with the first sample being -18% and second being 39% above 40 cfm. These were the first two samples collected after this station was installed (the Fenceline station was not installed for background sampling) and the discrepancies occurred due to issues initially adjusting the mass flow controller on the unit. All other samples collected in Q1 at this station were within $\pm 10\%$ of 40 cfm. The results of these samples were compared to those collected at the other stations on the same days and the results were relatively consistent; therefore, the samples were deemed valid.

Following IO-2.1, all samples at the Rundle and Courtice Stations in Q1 were within $\pm 10\%$ of 40 cfm (3% - 9% at Rundle and -9% to 8% at Courtice).

At the July 28th, 2016 meeting, Stantec and the MOECC agreed going forward to utilize a hi-vol sampling methodology for TSP/metals corresponding with MOECC rather than U.S. EPA protocols.



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(January 2016 to March 2016)**

Regards,

STANTEC CONSULTING LTD.

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Attachment: Attachment A – Updated Table 4-2
Attachment B – Calibrations Trends

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ATTACHMENT A

**2016 Q1 REPORT – UPDATED TABLE 4-2 SUMMARY OF AMBIENT CAC MONITORING
DATA – JANUARY TO MARCH 2016**

Table 4-2 Summary of Ambient CAC Monitoring Data – January to March 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Standards			Courtice WPCP Station (Predominately Upwind)		Rundle Road Station (Predominately Downwind)	
		ppb	µg/m³		Concentration (ppbv)	Concentration (µg/m³)	Concentration (ppbv)	Concentration (µg/m³)
SO ₂	1	250	690	Maximum	25.6	72.0	14.4	42.8
				Minimum	0.0	0.0	0.0	0.0
				Mean (January)	1.2	3.4	0.6	1.6
				Mean (February)	1.5	4.2	1.2	3.4
				Mean (March)	1.3	3.6	0.6	1.7
				Mean (Period)	1.3	3.7	0.8	2.2
				Standard Deviation	2.5	7.0	1.0	2.9
				# of Exceedances	0	0	0	0
	24	100	275	Maximum	13.0	36.5	3.2	8.9
				Minimum	0.0	0.0	0.0	0.0
				Mean (January)	1.2	3.3	0.6	1.6
				Mean (February)	1.5	4.3	1.2	3.4
				Mean (March)	1.3	3.6	0.6	1.7
				Mean (Period)	1.3	3.7	0.8	2.2
				Standard Deviation	1.6	4.6	0.8	2.3
				# of Exceedances	0	0	0	0
PM _{2.5}	24	N/A	28 ^A	Maximum	-	29.5	-	43.1
				Minimum	-	0.2	-	0.2
				Mean (January)	-	7.0	-	N/A ^B
				Mean (February)	-	7.9	-	11.5
				Mean (March)	-	8.5	-	8.4
				Mean (Period)	-	7.8	-	10.1
				Standard Deviation	-	6.2	-	7.5
				# of Exceedances	-	N/A	-	N/A

Table 4-2 Summary of Ambient CAC Monitoring Data – January to March 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Standards			Courtice WPCP Station (Predominately Upwind)		Rundle Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)	Concentration (ppbv)	Concentration (µg/m ³)
NO ₂	1	200 ^c	400 ^c	Maximum	62.4	125.9	36.2	70.8
				Minimum	0.0	0.0	0.0	0.0
				Mean (January)	8.0	16.5	8.4	17.2
				Mean (February)	7.1	14.5	6.6	13.6
				Mean (March)	8.2	16.7	6.8	13.8
				Mean (Period)	7.8	16.0	7.3	14.9
				Standard Deviation	7.2	14.9	5.3	10.9
				# of Exceedances	0	0	0	0
	24	100 ^c	200 ^c	Maximum	23.1	47.8	18.8	39.0
				Minimum	1.3	2.8	0.3	0.6
				Mean (January)	7.9	16.4	8.3	17.0
				Mean (February)	7.1	14.6	6.8	14.0
				Mean (March)	8.2	16.7	6.7	13.5
				Mean (Period)	7.8	16.0	7.3	14.8
				Standard Deviation	4.1	8.4	3.7	7.6
				# of Exceedances	0	0	0	0

Table 4-2 Summary of Ambient CAC Monitoring Data – January to March 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Standards			Courtice WPCP Station (Predominately Upwind)		Rundle Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)	Concentration (ppbv)	Concentration (µg/m ³)
NO ^D	1	NA	NA	Maximum	58.5	79.9	30.7	43.1
				Minimum	0.0	0.0	0.0	0.0
				Mean (January)	2.2	2.9	2.3	3.1
				Mean (February)	1.5	2.0	2.0	2.7
				Mean (March)	2.4	3.2	2.5	3.3
				Mean (Period)	2.1	2.8	2.3	3.1
				Standard Deviation	4.9	6.6	2.2	2.9
				# of Exceedances	N/A	N/A	N/A	N/A
	24	NA	NA	Maximum	21.9	29.7	6.7	9.0
				Minimum	0.1	0.1	1.1	1.5
				Mean (January)	2.1	2.9	2.3	3.1
				Mean (February)	1.5	2.1	2.1	2.8
				Mean (March)	2.4	3.2	2.5	3.3
				Mean (Period)	2.1	2.8	2.3	3.1
				Standard Deviation	2.6	3.5	0.9	1.2
				# of Exceedances	N/A	N/A	N/A	N/A

Table 4-2 Summary of Ambient CAC Monitoring Data – January to March 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Standards			Courtice WPCP Station (Predominately Upwind)		Rundle Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)	Concentration (ppbv)	Concentration (µg/m ³)
NO _x	1	200 ^C	400 ^C	Maximum	85.3	178.9	57.1	123.0
				Minimum	0.0	0.0	0.0	0.0
				Mean (January)	10.1	20.9	9.5	19.5
				Mean (February)	8.1	16.7	7.4	15.2
				Mean (March)	10.5	21.4	7.9	16.0
				Mean (Period)	9.7	19.9	8.3	16.9
				Standard Deviation	11.0	22.8	6.6	13.6
				# of Exceedances	0	0	0	0
	24	100 ^C	200 ^C	Maximum	44.7	92.7	24.4	50.5
				Minimum	2.0	4.2	0.2	0.5
				Mean (January)	10.0	20.6	9.4	19.3
				Mean (February)	8.2	17.0	7.6	15.6
				Mean (March)	10.5	21.4	7.7	15.6
				Mean (Period)	9.7	19.9	8.2	16.9
				Standard Deviation	6.3	13.1	4.5	9.1
				# of Exceedances	0	0	0	0

Note:

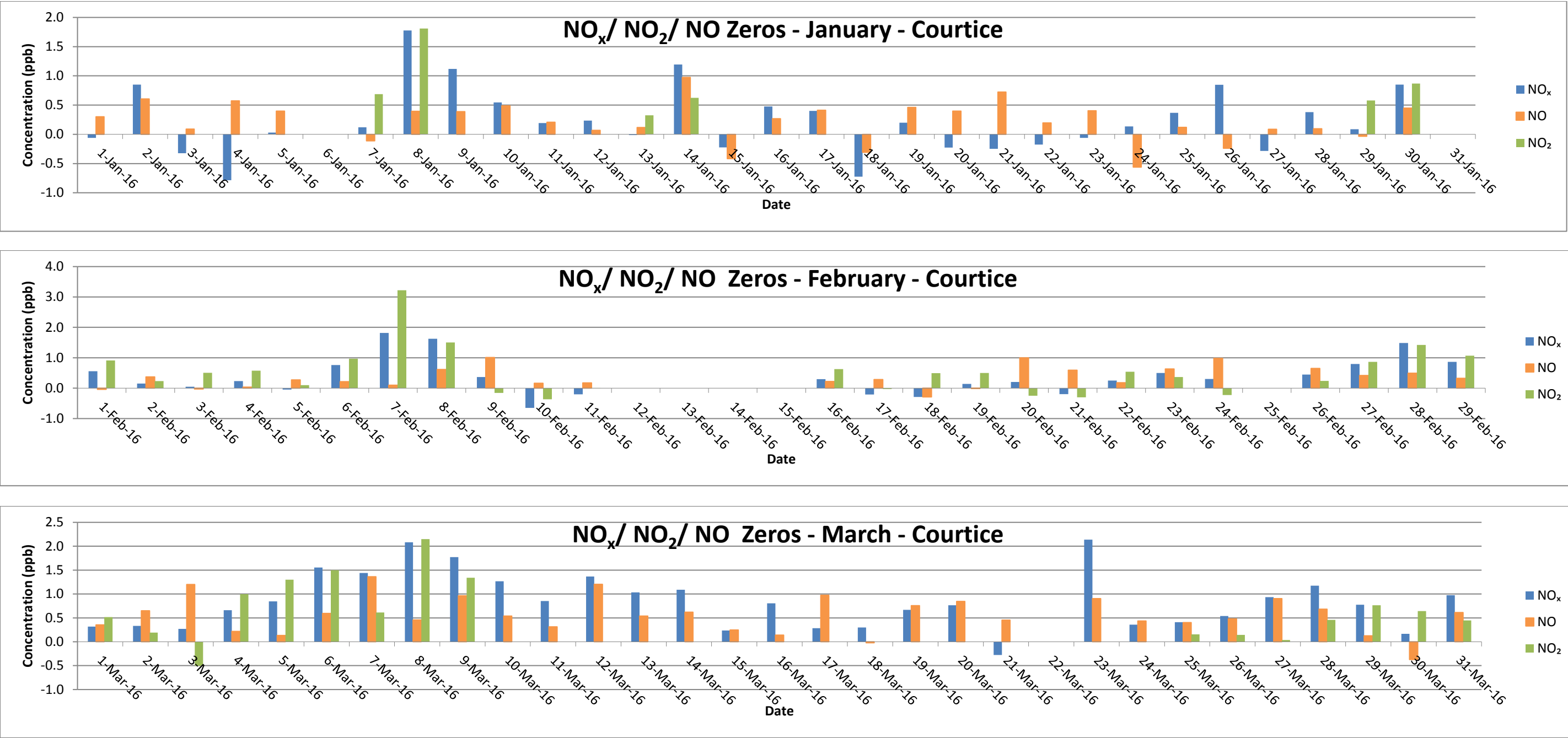
- A. Canadian Ambient Air Quality Standard for Respirable Particulate Matter. The Respirable Particulate Matter Objective is referenced to the 98th percentile over 3 consecutive years.
- B. A minimum 75% rate of recovery is required to calculate a valid mean as stated in the MOECC document Operations Manual for Air Quality Monitoring in Ontario (2008). The recovery rate was less than 75%, and accordingly the mean is not valid for this month.
- C. As per current version (April 2012) of O. Reg. 419/05 Summary of Standards and Guidelines, the Standard for NO_x is compared to a monitored NO_x concentration, although the O. Reg. 419 Schedule 3 Standard for NO_x is based on health effects of NO₂.
- D. NO has no regulatory criteria.

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ATTACHMENT B

**MONTHLY CALIBRATION AND AUTO ZERO TRENDS FOR SO₂, NO_x AND PM_{2.5}
MONITORS - JANUARY TO MARCH 2016**

Daily NO_x/ NO₂/ NO Internal Zero Calibrations – Courtice WPCP Station

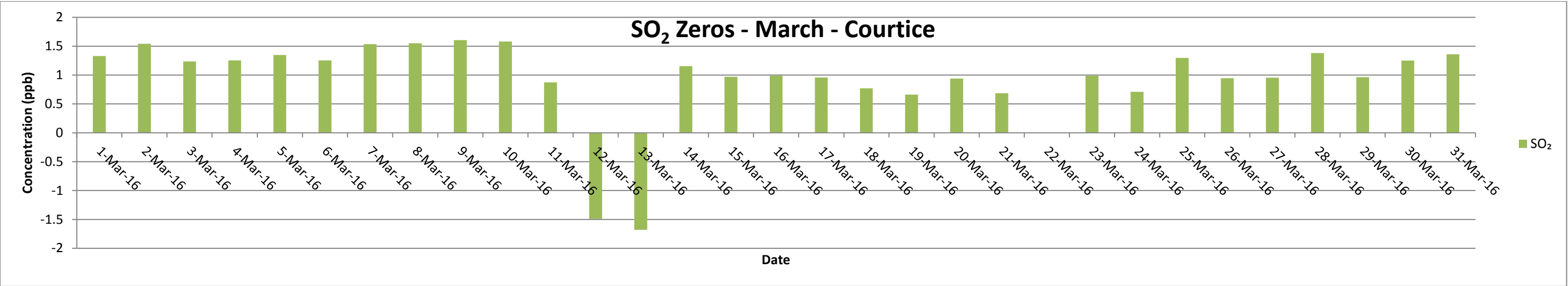
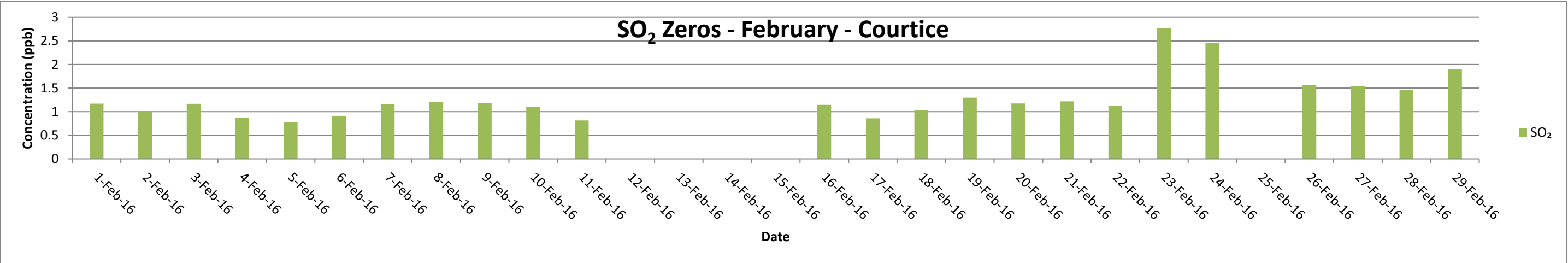
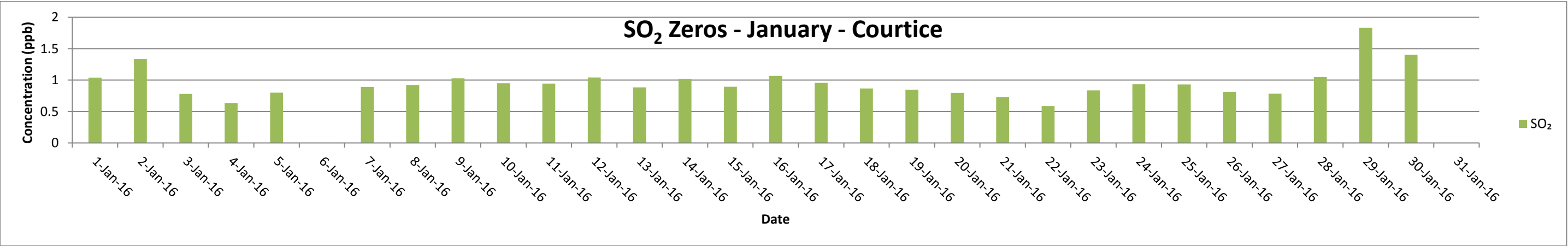


Note 1: Auto-calibrations occur every 25 hours

Note 2: Data logger compromised from February 12 to February 16, 2016 – no data available for this period.

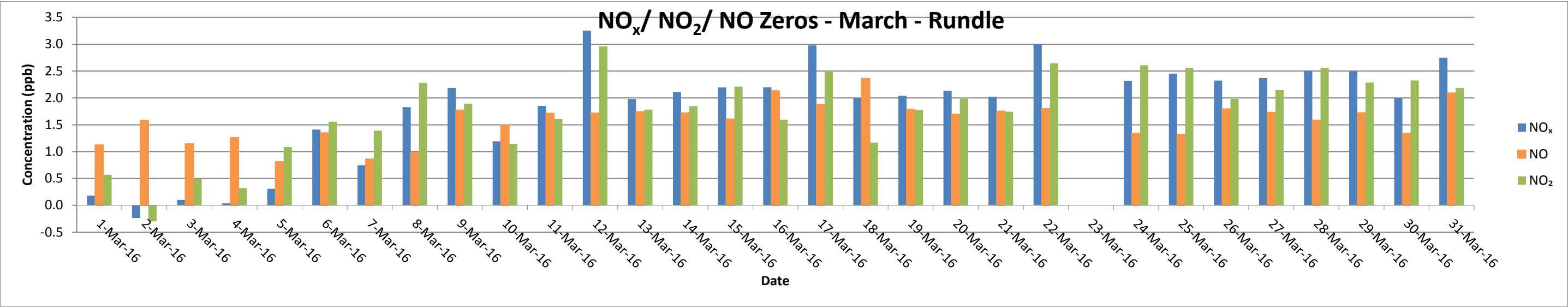
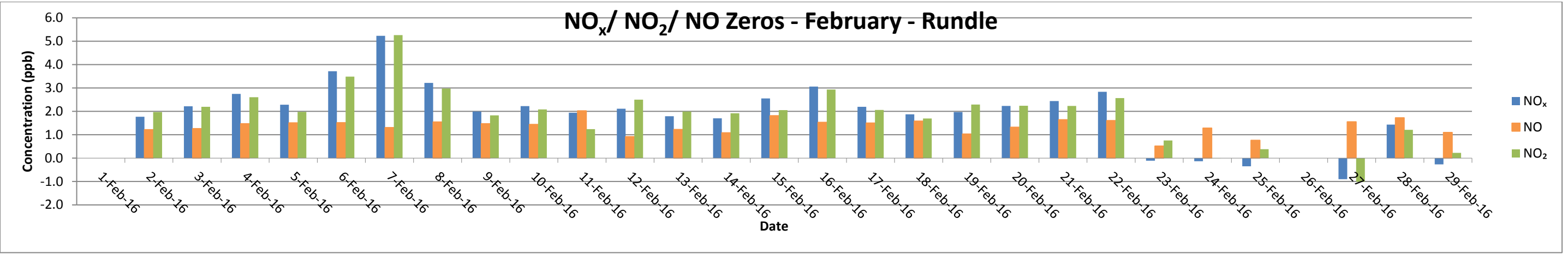
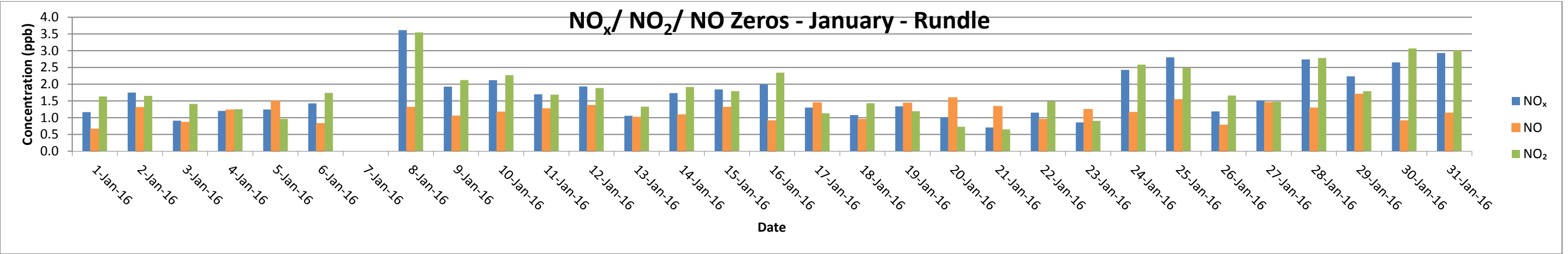
Note 3: NO₂ auto-zeros for the following periods were not available due to an analogue output issue: January 1- 5, January 9-12, January 15-28, March 10-24, 2016. During these periods hourly NO₂ was calculated from the NO_x/NO data or was replaced by data downloaded directly from the monitor.

Daily SO₂ Internal Zero Calibrations – Courtice WPCP Station



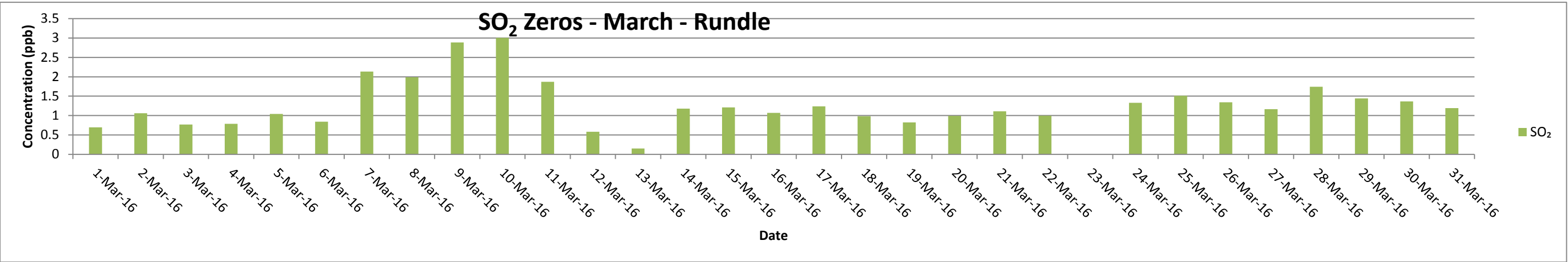
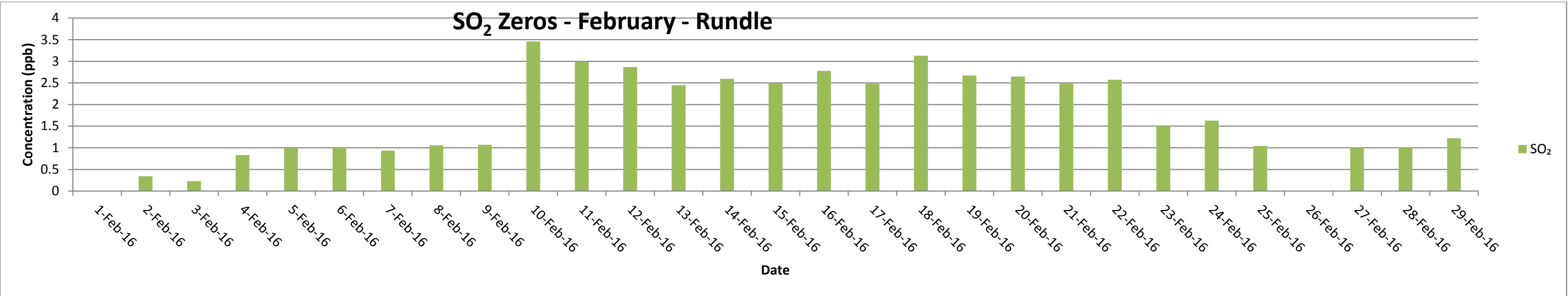
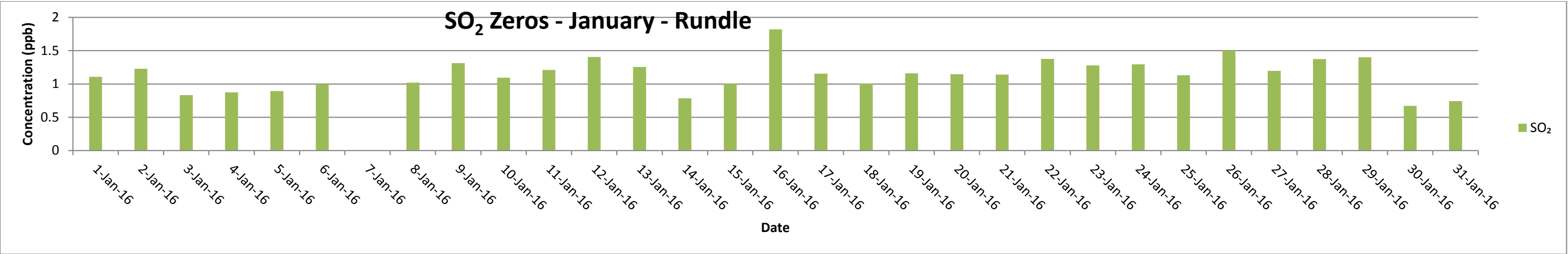
Note 1: Auto-calibrations occur every 25 hours
Note 2: Data logger compromised from February 12 to February 16, 2016 – no data available for this period.

Daily NO_x/ NO₂/ NO Internal Zero Calibrations – Rundle Road Station



Note: Auto-calibrations occur every 25 hours

Daily SO₂ Internal Zero Calibrations – Rundle Road Station



Note: Auto-calibrations occur every 25 hours