

July 31, 2018  
File: 160950528

**Attention: Mr. Gioseph Anello, Manager,  
Waste Planning, and Technical Services**

The Regional Municipality of Durham  
605 Rossland Road East  
P.O. Box 623  
Whitby, ON L1N 6A3

Dear Mr. Anello,

**Reference: Durham York Energy Centre, Ambient Monitoring Program – Elevated Dioxins/Furans at Courtice WPCP on May 26, 2018**

The purpose of this letter is to provide notice and supplemental information to the Regions of Durham and York of an elevated measured ambient concentration of Dioxins and Furans (D/F) on May 26, 2018 at the Courtice WPCP Station. Formal notification of the Ontario Ministry of the Environment, Conservation and Parks (MECP) and Durham Medical Officer of Health is required.

Following the guidance of the Ambient Monitoring Plan (AMP), Stantec reviewed and confirmed the D/F filter results with the analytical laboratory (Maxxam) and conducted a review of the elevated D/F concentration. Additionally, Stantec requested Maxxam to re-analyze the May 26<sup>th</sup> samples from the Courtice WPCP, Rundle Road and Crago Road Stations. Furthermore, the potential impact on human health was evaluated by a Stantec Toxicologist.

The following summarizes our findings:

1. The May 26, 2018, D/F Toxic Equivalency Quotient (TEQ) concentration at the Courtice WPCP Station was determined to be 0.109 pg TEQ/m<sup>3</sup> which is 9% above the MECP Schedule 3 air quality Standard from Regulation 419/05 – Air Pollution – Local Air Quality (O. Reg. 419/05). D/F TEQ concentrations at the Crago Road and Rundle Road Stations (0.098 and 0.091 pg TEQ/m<sup>3</sup>, respectively) were also elevated relative to recent measurements. D/F TEQ values were below the MECP's Upper Risk Threshold (URT) of 1.0 pg TEQ/m<sup>3</sup>.
2. Stantec requested the May 26, 2018 samples at all three stations be re-analyzed by Maxxam to confirm the results. The re-run was found to be similar to the initial results. The average of the initial and re-analysis lab results for the Courtice WPCP was 0.106 which is also above the air quality Standard. Attachment A provides the laboratory results and Stantec's calculation of the TEQ values. The D/F TEQ results for May 26, 2018 at each station are summarized below.

July 31, 2018

Mr. Gioseph Anello, Manager, Waste Planning, and Technical Services

Page 2 of 5

Reference: Durham York Energy Centre, Ambient Monitoring Program – Elevated Dioxins/Furans at Courtice WPCP on May 26, 2018

**Table 1: Summary of Sampling of Dioxins and Furans on May 26, 2018**

	Concentration (pg TEQ/m <sup>3</sup> )		
	Courtice WPCP	Rundle Road	Crago Road
Initial Analysis	0.109	0.091	0.098
Second Analysis	0.103	0.095	0.101
Average	0.106	0.093	0.099
MECP Standard	0.1		
MECP URT	1		

3. A review of the DYEC Continuous Emissions Monitoring (CEMs) data for May 26<sup>th</sup> does not show an upset condition which could result in higher D/F emissions. Annual stack testing of the units was conducted on May 31 and June 1, 2018 – the dioxin and furans stack testing results for both boilers were less than 11 pg TEQ/Rm<sup>3</sup> which is well below the applicable emissions criteria.
4. The MCP Air Quality Health Index was moderate during the morning of May 26<sup>th</sup> at the Oshawa and Toronto East monitoring stations.
5. Attachment B includes a summary of the May 26<sup>th</sup> data at each station, based on the initial analysis. Plots of the D/F measurements since the beginning of 2018 are provided for all three stations. The plots show that typical background levels are around 0.02 pg TEQ/m<sup>3</sup> and the May 26<sup>th</sup> measurements are elevated relative to the rest of the 2018 measurements.
6. Attachment B also includes wind roses for May 26<sup>th</sup> at each station. The wind roses for each station show low winds (less than 5 km/h) on May 26<sup>th</sup>, with winds blowing mainly from westerly to southwesterly directions over the course of the day. Wind roses with hourly wind speed and direction labelled with the hour of the day are also provided in the summary. Time series plots of the wind direction measured at each station are also included. The wind direction for which the DYEC stack is upwind of the monitor is shown by a purple dashed line in both sets of plots. The hourly wind roses and time history plots show that over the course of the day, the DYEC was upwind of each of the three monitoring stations for varying periods of time. Thus, we can expect that all three monitors could have potentially been impacted by DYEC emissions but by varying amounts. At the Courtice WPCP Station, the DYEC stack was upwind for only short periods of time around 8 a.m. and around 10 p.m. to 11 p.m. The Courtice WPCP measurement, which had the highest measured D/F

July 31, 2018

Mr. Giuseppe Anello, Manager, Waste Planning, and Technical Services

Page 3 of 5

**Reference:** Durham York Energy Centre, Ambient Monitoring Program – Elevated Dioxins/Furans at Courtice WPCP on May 26, 2018

concentration, was also the station for which winds were blowing from the DYEC to the station for the least amount of time.

7. Based on the relative similarity of the D/F measurements at each station, and that the Courtice WPCP Station was the primarily upwind station over the majority of the day, the most likely source for the elevated D/F concentrations measured at each station was a regional source rather than the DYEC.
8. The MECP develops Ambient Air Quality Criteria (AAQC) and air quality Standards based on available toxicological information for individual chemicals. In general, the MECP uses an approach that is based on identifying the highest reported exposure level that does not result in an observable adverse health effect (referred to as the *No Observable Adverse Effect Level* or NOAEL), or the lowest reported exposure associated with an observable adverse health effect (referred to as the *Lowest Observable Adverse Effect Level* or LOAEL). For each chemical, the MECP sets the AAQC or Standard at a concentration that is typically more than 100 times lower than the NOAEL or LOAEL selected for use in the derivation. This approach is used to account for uncertainties that may exist in the toxicological information used in the derivation of the Standard.

Using this approach, the MECP developed a 24-hour AAQC and Standard for D/F of 0.1 pg TEQ/m<sup>3</sup> (where TEQ = Toxic Equivalency Quotient that represents the total concentration of D/F expressed relative to the toxicity of 2,3,7,8-TCDD). The 24-hour value was derived from toxicological studies that noted developmental effects associated with exposures to D/F (MECP 2009)<sup>1</sup>. The MECP considers the 24-hour D/F concentration in air to represent an essentially negligible health risk (MECP, 2009). This means that measured 24-hour average D/F concentrations that are at or below the AAQC/Standard would represent a negligible human health risk for people in the local community.

On May 26, 2018, a D/F TEQ concentration of 0.109 pg TEQ/m<sup>3</sup> was measured at the Courtice WPCP station. Although the D/F TEQ measurement on May 26, 2018 exceeded the MECP 24-hour AAQC, the exceedance was marginal (9% higher than the AAQC). In interpreting the human health risks that may be associated with this exceedance it is important to understand the pattern and frequency of these exceedances. Exposures that exceed a defined exposure limit on an intermittent basis (exceedances are separated by weeks or months) do not represent as much of a human health risk as exceedances that occur on a more frequent basis (occur on multiple consecutive sampling events). Therefore, to properly evaluate the potential health risks that may be associated with the

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<sup>1</sup> MECP EBR website accessed Aug 21, 2017: <http://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTA3MDk2&statusId=MTY5OTQz>

July 31, 2018

Mr. Gioseph Anello, Manager, Waste Planning, and Technical Services

Page 4 of 5

**Reference:** Durham York Energy Centre, Ambient Monitoring Program – Elevated Dioxins/Furans at Courtice WPCP on May 26, 2018

occasional exceedances of the 24-hour D/F exposure limit, it is important to also consider the frequency of these occurrences. The D/F TEQ concentrations at the Courtice WPCP station have consistently been around 0.02 pg TEQ/m<sup>3</sup> for the past several years and in the subsequent sample collected June 19, 2018. In addition, the D/F TEQ concentrations at the Rundle Road and Crago Road stations were 0.091 pg TEQ/m<sup>3</sup> and 0.098 pg TEQ/m<sup>3</sup>, respectively.

Based on these results, the exceedance noted on May 26, 2018 would appear to represent an isolated event and as such, would be considered to represent a negligible human health risk.

9. The MECP's Upper Risk Threshold (URT) for D/F TEQ is 1.0 pg TEQ/m<sup>3</sup>. The URTs are not air quality Standards; rather, URTs represent management limits that are not directly tied to human health effects. An exceedance of an URT is not an indication of potential human health effects. Rather, an exceedance of an URT is an indication that timely action is required to lower the concentrations, and thereby reduce potential human health risks (MECP, 2017)<sup>2</sup>. Although URTs are not directly linked to the occurrence of human health effects, human health risks associated with prolonged exposures to chemicals in air at concentrations that exceed their respective URTs would not be considered negligible by the MECP.

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<sup>2</sup> MECP, February 2017: Guideline for the Implementation of Air Standards in Ontario (GIASO) (Guideline A-12) (Version 3).

July 31, 2018

Mr. Gioseph Anello, Manager, Waste Planning, and Technical Services

Page 5 of 5

Reference: Durham York Energy Centre, Ambient Monitoring Program – Elevated Dioxins/Furans at Courtice WPCP on May 26, 2018

## CONCLUSION

Based on Stantec's review, the DYEC is unlikely to have substantially contributed to the elevated D/F concentration at the Courtice WPCP Station measured on May 26, 2018. Furthermore, the measured D/F concentration is not expected to have resulted in an adverse effect on human health or the environment.

If you have comments or questions, please contact the undersigned.

Regards,

**Stantec Consulting Ltd.**

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Attachments: Attachment A D/F Data Tables  
Attachment B Analysis

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Seth Dittman, The Regional Municipality of York  
Celeste Dugas, District Manager, York-Durham District Office, MOEC  
Dr. Robert Kyle, Commissioner & Medical Officer of Health, Region of Durham  
Kimberly Ireland, Stantec Consulting Ltd.

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Design with community in mind

**ATTACHMENT A  
D/F DATA TABLES**

Dioxins and Furans		Crago			Crago (Duplicate)			Courlice			Courlice (Duplicate)			Rundle			Rundle (Duplicate)		
Location	dd/mm/yyyy	26/05/2018			26/05/2018			26/05/2018			26/05/2018			26/05/2018			26/05/2018		
Date	hh:mm	0:00			0:00			0:00			0:00			0:00			0:00		
Start Time	hours	24.08			24.08			23.67			23.67			23.19			23.19		
Sample Duration		AW			AW			AW			AW			AW			AW		
Technician		GNA486-01			GNA486-01			GNA487-01			GNA487-01			GNA488-01			GNA488-01		
Filter Number		GUN309			GUN309			GUN297			GUN297			GUN298			GUN298		
Maxxam ID		B8C6452			B8C6452			B8C6448			B8C6448			B8C6448			B8C6448		
Maxxam Job #		333.59			333.59			328.44			328.44			294.74			294.74		
Total Volumetric Flow	Am <sup>3</sup> /sample	333.59			333.59			328.44			328.44			294.74			294.74		
<b>Analytical Results</b>	<b>Units</b>	<b>Value</b>	<b>EDL</b>	<b>WHO<sub>2005</sub> TEF</b>	<b>Value</b>	<b>EDL</b>	<b>WHO<sub>2005</sub> TEF</b>	<b>Value</b>	<b>EDL</b>	<b>WHO<sub>2005</sub> TEF</b>	<b>Value</b>	<b>EDL</b>	<b>WHO<sub>2005</sub> TEF</b>	<b>Value</b>	<b>EDL</b>	<b>WHO<sub>2005</sub> TEF</b>	<b>Value</b>	<b>EDL</b>	<b>WHO<sub>2005</sub> TEF</b>
2,3,7,8-Tetra CDD *	pg	<3.4	3.4	1	<7.2	7.2	1	<3.3	3.3	1	<6.1	6.1	1	<3.6	3.6	1	<5.6	5.6	1
1,2,3,7,8-Penta CDD *	pg	<3.6	3.6	1	<6.7	6.7	1	<3.6	3.6	1	<7.0	7.0	1	<3.2	3.2	1	<8.6	8.6	1
1,2,3,4,7,8-Hexa CDD *	pg	<3.2	3.2	0.1	<7.9	7.9	0.1	<3.4	3.4	0.1	<7.5	7.5	0.1	<3.0	3.0	0.1	<6.8	6.8	0.1
1,2,3,6,7,8-Hexa CDD *	pg	4.3	3.3	0.1	<6.4	6.4	0.1	5.0	3.5	0.1	<6.1	6.1	0.1	<3.1	3.1	0.1	<5.5	5.5	0.1
1,2,3,7,8,9-Hexa CDD *	pg	6.8	3.1	0.1	<6.8	6.8	0.1	6.8	3.2	0.1	<6.5	6.5	0.1	4.3	2.9	0.1	<5.9	5.9	0.1
1,2,3,4,6,7,8-Hepta CDD *	pg	41.6	3.3	0.01	29.8	6.6	0.01	42.2	3.5	0.01	27.3	6.6	0.01	28.1	2.8	0.01	25.3	4.1	0.01
Octa CDD *	pg	116	3.1	0.0003	118	7.1	0.0003	131	3.2	0.0003	104	7.2	0.0003	86.5	2.8	0.0003	93.3	9.8	0.0003
Total Tetra CDD *	pg	29.1	3.4		25.0	7.2		31.9	3.3		27.2	6.1		12.5	3.6		7.5	5.6	
Total Penta CDD *	pg	30.3	3.6		<14 (1)	14		21.5	3.6		<16 (1)	16		<9.0 (2)	9.0		<8.6 (1)	8.6	
Total Hexa CDD *	pg	57.6	3.2		37.1	7.0		60.9	3.4		24.1	6.7		34.4	3.0		27.1	6.0	
Total Hepta CDD *	pg	87.9	3.3		69.6	6.6		90.6	3.5		43.6	6.6		59.4	2.8		50.6	4.1	
2,3,7,8-Tetra CDF **	pg	<61 (1)	61	0.1	55.8 (2)	6.8	0.1	64.9	3.3	0.1	59.6	7.1	0.1	41.6	3.6	0.1	41.1	6.8	0.1
1,2,3,7,8-Penta CDF **	pg	15.0	3.2	0.03	10.1	6.8	0.03	15.9	3.3	0.03	13.6	6.9	0.03	12.1	3.5	0.03	<12	12	0.03
2,3,4,7,8-Penta CDF **	pg	34.6	3.2	0.3	23.3	6.9	0.3	31.4	3.2	0.3	26.9	6.9	0.3	26.7	3.5	0.3	22	12	0.3
1,2,3,4,7,8-Hexa CDF **	pg	54.1 (2)	3.1	0.1	55.1 (3)	6.6	0.1	60.1 (1)	2.9	0.1	55.1 (2)	6.7	0.1	40.7 (1)	3.0	0.1	36.1 (2)	7.6	0.1
1,2,3,6,7,8-Hexa CDF **	pg	27.3	3.2	0.1	23.8	5.6	0.1	27.2	2.9	0.1	26.1	5.7	0.1	21.1	3.1	0.1	18.3	6.5	0.1
2,3,4,6,7,8-Hexa CDF **	pg	29.5	3.4	0.1	28.4	7.0	0.1	31.1	3.1	0.1	<29 (1)	29	0.1	20.2	3.3	0.1	20.3	8.1	0.1
1,2,3,7,8,9-Hexa CDF **	pg	6.3	3.6	0.1	<8.3	8.3	0.1	5.2	3.4	0.1	<8.5	8.5	0.1	5.2	3.5	0.1	<9.6	9.6	0.1
1,2,3,4,6,7,8-Hepta CDF **	pg	141	2.6	0.01	94.2	5.2	0.01	160	2.7	0.01	111	5.8	0.01	97.1	3.2	0.01	67.4	6.7	0.01
1,2,3,4,7,8,9-Hepta CDF **	pg	31.0	3.1	0.01	24.9	8.3	0.01	29.0	3.2	0.01	31.0	9.3	0.01	23.6	3.8	0.01	24	11	0.01
Octa CDF **	pg	106	3.0	0.0003	89.3	8.4	0.0003	109	2.8	0.0003	108	6.0	0.0003	73.2	4.0	0.0003	70.6	7.2	0.0003
Total Tetra CDF **	pg	385	3.5		385	6.8		381	3.3		374	7.1		303	3.6		311	6.8	
Total Penta CDF **	pg	399	3.2		238	6.8		375	3.2		349	6.9		321	3.5		142	12	
Total Hexa CDF **	pg	317	3.3		293	6.7		315	3.1		235	6.9		262	3.2		214	7.8	
Total Hepta CDF **	pg	263	2.9		189	6.4		282	3.0		216	7.1		199	3.5		157	8.3	
Toxic Equivalency	pg																		

Notes:  
\* CDD = Chloro Dibenzo-p-Dioxin \*\* CDF = Chloro Dibenzo-p-Furan

Calculated Concentrations	Units	Crago		Crago (Duplicate)		Courlice		Courlice (Duplicate)		Rundle		Rundle (Duplicate)	
		7	8	7	8	7	8	7	8	7	8		
		26/05/2018	26/05/2018	26/05/2018	26/05/2018	26/05/2018	26/05/2018	26/05/2018	26/05/2018	26/05/2018	26/05/2018	26/05/2018	26/05/2018
2,3,7,8-Tetra CDD *	pg/m <sup>3</sup>	0.005	0.011	0.005	0.009	0.006	0.009	0.005	0.011	0.005	0.009	0.005	0.015
1,2,3,7,8-Penta CDD *	pg/m <sup>3</sup>	0.005	0.010	0.005	0.005	0.005	0.015	0.005	0.011	0.005	0.015	0.005	0.012
1,2,3,4,7,8-Hexa CDD *	pg/m <sup>3</sup>	0.005	0.012	0.005	0.005	0.005	0.012	0.005	0.011	0.005	0.012	0.005	0.009
1,2,3,6,7,8-Hexa CDD *	pg/m <sup>3</sup>	0.013	0.010	0.010	0.015	0.009	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2,3,7,8,9-Hexa CDD *	pg/m <sup>3</sup>	0.020	0.010	0.010	0.021	0.010	0.010	0.015	0.010	0.015	0.010	0.015	0.010
1,2,3,4,6,7,8-Hepta CDD *	pg/m <sup>3</sup>	0.125	0.089	0.089	0.128	0.083	0.086	0.083	0.083	0.083	0.083	0.083	0.086
Octa CDD *	pg/m <sup>3</sup>	0.348	0.354	0.354	0.399	0.317	0.317	0.293	0.317	0.293	0.317	0.293	0.317
Total Tetra CDD *	pg/m <sup>3</sup>	0.087	0.075	0.075	0.097	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083
Total Penta CDD *	pg/m <sup>3</sup>	0.091	0.021	0.021	0.065	0.024	0.024	0.015	0.024	0.015	0.024	0.015	0.024
Total Hexa CDD *	pg/m <sup>3</sup>	0.173	0.111	0.111	0.185	0.073	0.073	0.117	0.073	0.117	0.073	0.117	0.092
Total Hepta CDD *	pg/m <sup>3</sup>	0.263	0.209	0.209	0.276	0.194	0.194	0.172	0.194	0.172	0.194	0.172	0.172
2,3,7,8-Tetra CDF **	pg/m <sup>3</sup>	0.091	0.167	0.167	0.198	0.181	0.181	0.139	0.181	0.139	0.181	0.139	0.139
1,2,3,7,8-Penta CDF **	pg/m <sup>3</sup>	0.045	0.030	0.030	0.048	0.041	0.041	0.020	0.041	0.020	0.041	0.020	0.020
2,3,4,7,8-Penta CDF **	pg/m <sup>3</sup>	0.104	0.070	0.070	0.096	0.082	0.082	0.075	0.082	0.075	0.082	0.075	0.075
1,2,3,4,7,8-Hexa CDF **	pg/m <sup>3</sup>	0.162	0.165	0.165	0.183	0.168	0.168	0.138	0.168	0.138	0.168	0.138	0.122
1,2,3,6,7,8-Hexa CDF **	pg/m <sup>3</sup>	0.082	0.071	0.071	0.083	0.079	0.079	0.062	0.079	0.062	0.079	0.062	0.062
2,3,4,6,7,8-Hexa CDF **	pg/m <sup>3</sup>	0.088	0.085	0.085	0.095	0.044	0.044	0.069	0.044	0.069	0.044	0.069	0.069
1,2,3,7,8,9-Hexa CDF **	pg/m <sup>3</sup>	0.019	0.012	0.012	0.016	0.013	0.013	0.016	0.013	0.016	0.013	0.016	0.016
1,2,3,4,6,7,8-Hepta CDF **	pg/m <sup>3</sup>	0.423	0.282	0.282	0.487	0.338	0.338	0.229	0.338	0.229	0.338	0.229	0.229
1,2,3,4,7,8,9-Hepta CDF **	pg/m <sup>3</sup>	0.093	0.075	0.075	0.088	0.094	0.094	0.081	0.094	0.081	0.094	0.081	0.081
Octa CDF **	pg/m <sup>3</sup>	0.318	0.268	0.268	0.332	0.329	0.329	0.240	0.329	0.240	0.329	0.240	0.240
Total Tetra CDF **	pg/m <sup>3</sup>	1.154	1.154	1.154	1.160	1.139	1.139	1.055	1.139	1.055	1.139	1.055	1.055
Total Penta CDF **	pg/m <sup>3</sup>	1.196	0.713	0.713	1.142	1.063	1.063	0.482	1.063	0.482	1.063	0.482	0.482
Total Hexa CDF **	pg/m <sup>3</sup>	0.950	0.878	0.878	0.959	0.715	0.715	0.726	0.715	0.726	0.715	0.726	0.726
Total Hepta CDF **	pg/m <sup>3</sup>	0.788	0.567	0.567	0.859	0.658	0.658	0.533	0.658	0.533	0.658	0.533	0.533
Toxic Equivalency	pg/m <sup>3</sup>												
TOTAL TOXIC EQUIVALENCY	pg TEQ/m <sup>3</sup>	0.098	0.101	0.101	0.109	0.103	0.103	0.095	0.103	0.095	0.103	0.095	0.095

Notes:  
EDL = Estimated Detection Limit  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic

**ATTACHMENT B  
ANALYSIS**

Station	Dioxins and Furans Concentration on May 26, 2018 (pg <sub>TEQ</sub> /m <sup>3</sup> )	D/F Concentration through 2018	Wind Rose on May 26, 2018	Hourly Wind Rose on May 26, 2018	Wind Direction Time Series on May 26, 2018
Crago	0.098				
Rundle	0.091				
Courtice	0.109				