# Incinerator Emissions of High Concern

## RESPIRATORY IRRITANTS

**($NO_2$, $PM_{2.5}$, ammonia, carbon monoxide, $SO_2$, …)**

***have acute and chronic effects***

## HEAVY METALS

**(mercury, cadmium, lead, nickel, arsenic, …)**

## DIOXINS/FURANS & OTHER CARCINOGENS

***accumulate and persist in our bodies & environment***

## GREENHOUSE GASES

## UNKNOWN POLLUTANTS OF UNKNOWN TOXICITY

# Our Air is Already Burdened With Respiratory Irritants

- Particulate Matter PM2.5
- Nitrogen Oxides (Nox)
- Ozone

# *Health Effects of PM2.5*

## Cardiac

- Heart attacks
- Rhythm disturbances
- Congestive Heart Failure

## Respiratory

- Asthma
- Chronic Lung Disease

# PM2.5

**98th percentile, daily average values**

**Current Levels at Courtice : 28.6 µg/m$^3$**

**Canada Wide Standard Criteria: 30 µg/m$^3$**

From Table A2-5, Appendix A, Air Quality Assessment Technical Study Report

**Table 7-21 Concentration Ratio (CR) Values at 140,000 tpy for Criteria Air Contaminants at the Maximum Ground Level Concentration**

| COPC | Concentration Ratio (CR) Values – 140,000 tpy | | | | | Concentration Ratio (CR) Values – 140,000 tpy – WHO Benchmarks[4] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Baseline Case | Project Alone Case | Project Case | Process Upset Case | Process Upset Project Case | Baseline Case | Project Alone Case | Project Case | Process Upset Case | Process Upset Project Case |
| 24-Hour | | | | | | | | | | |
| Ammonia[3] | - | 0.0027 | 0.0027 | 0.027 | 0.027 | - | - | - | - | - |
| Carbon Monoxide (CO)[5] | - | - | - | - | - | - | - | - | - | - |
| Hydrogen Chloride (HCl)[3] | - | 0.023 | 0.023 | 0.23 | 0.23 | - | - | - | - | - |
| Hydrogen Fluoride (HF)[3c] | - | - | - | - | - | - | - | - | - | - |
| Nitrogen Dioxide ($NO_2$) | 0.29 | 0.030 | 0.32 | 0.049 | 0.34 | - | - | - | - | - |
| Particulate Matter - $PM_{10}$[3e] | - | 0.011 | 0.011 | 0.11 | 0.11 | - | 0.011 | 0.011 | 0.11 | 0.11 |
| Particulate Matter - $PM_{2.5}$[4] | 0.68 | 0.018 | 0.70 | 0.18 | 0.86 | 0.82 | 0.021 | 0.84 | 0.21 | 1.0 |
| Particulate Matter - Total[6] | 0.29 | 0.0044 | 0.30 | 0.044 | 0.34 | - | - | - | - | - |
| Sulfur Dioxide ($SO_2$) | 0.070 | 0.0064 | 0.077 | 0.10 | 0.17 | 0.15 | 0.014 | 0.17 | 0.22 | 0.38 |

# Comments from Health Canada EA Reviewer On PM2.5

"Given that airborne levels of PM2.5 are already elevated in the vicinity of the project and that this contaminant is considered to be a non-threshold contaminant (i.e. adverse health effects may be observed at any level of exposure),(CCME, 2000) HC suggests that the AQTSR discuss best available technologies and procedures that may be applied to mitigate PM2.5 emissions from the proposed facility."

Technical Reviewers Comment Summary Tracking Table, December 4, 2009

# Project Team Response

"...no additional mitigation measures are recommended or required."

Technical Reviewers Comment Summary Tracking Table, December 4, 2009

# Health Effects of $NO_2$

Who is Vulnerable?
Children, Older Adults, Asthmatics, Diabetics

Premature Mortality
Heart disease
Lung Disease

# Nitrogen Dioxide (NO2)

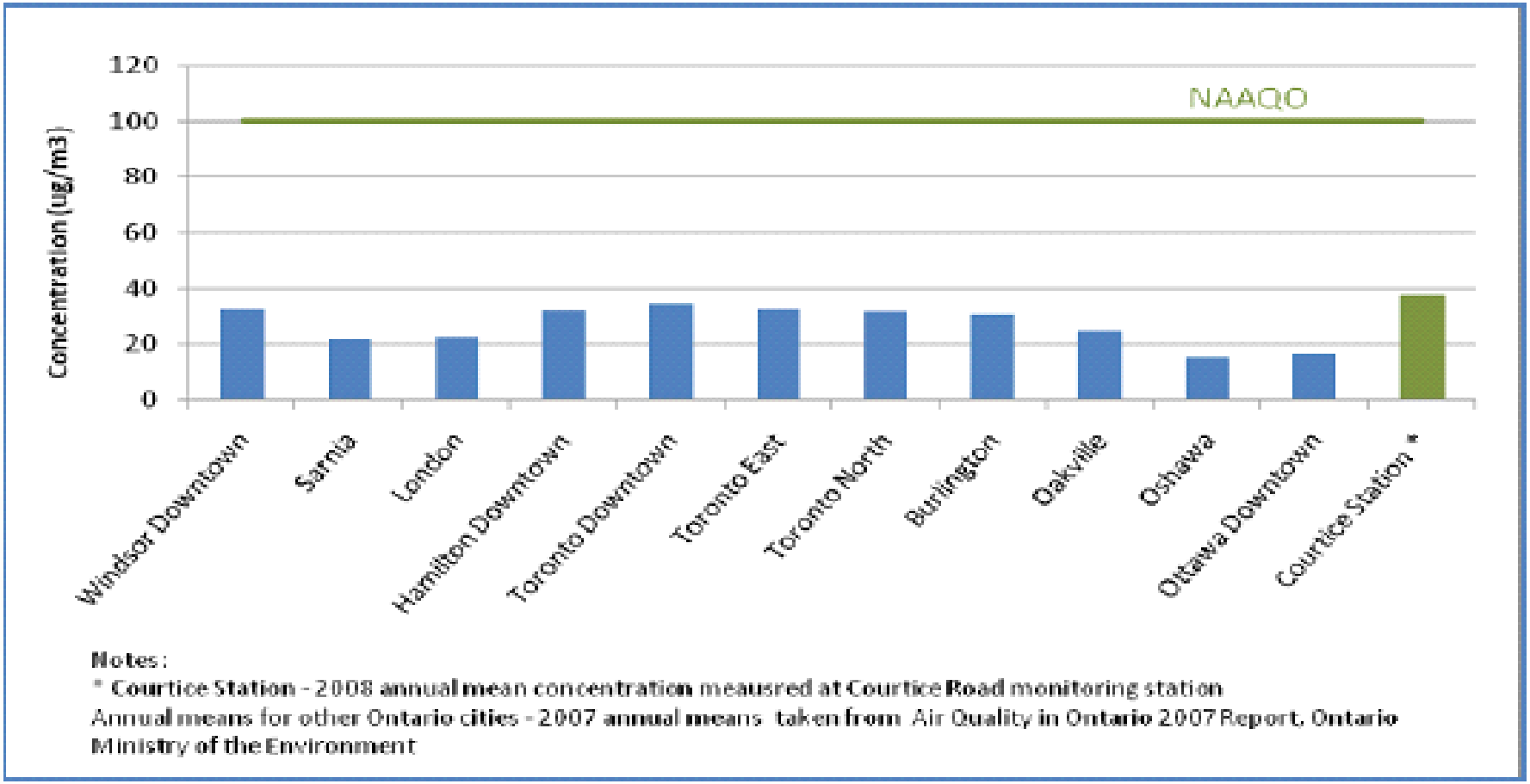


**Figure 1-1 Comparison of NO2 levels in Southwestern Ontario (Figure A-2-4 of Appendix A, Air Quality Assessment Technical Study Report - July 31st, 2009)**

**Table 7-11 Maximum Concentration Ratio (CR) Values using Baseline Traffic Case Air Concentrations for CACs**

| COPC | Baseline Traffic Case Concentration Ratio (CR) Values | | | Baseline Traffic Case Concentration Ratio (CR) Values – WHO benchmarks[e] | | |
|---|---|---|---|---|---|---|
| | 1-hour | 24-hour | Annual | 1-hour | 24-hour | Annual |
| Ammonia[d] | - | - | - | - | - | - |
| Carbon Monoxide (CO)[bc] | 0.28 | - | - | - | - | - |
| Hydrogen Chloride (HCl)[d] | - | - | - | - | - | - |
| Hydrogen Fluoride (HF)[d] | - | - | - | - | - | |
| Nitrogen Dioxide ($NO_2$) | 0.39 | 0.53 | 0.77 | 0.78 | - | 1.2 |
| Particulate Matter - $PM_{10}$[ac] | - | 0.021 | - | - | 0.021 | 0.010 |
| Particulate Matter - $PM_{2.5}$[ac] | - | 0.70 | - | - | 0.84 | 0.99 |
| Particulate Matter – Total[a] | - | 0.31 | 0.36 | - | - | - |
| Sulfur Dioxide ($SO_2$) | 0.031 | 0.071 | 0.21 | - | 0.16 | - |

[a] 1-Hour TRV Not Available
[b] 24-Hour TRV Not Available
[c] Annual Average TRV Not Available
[d] Not Included in the Traffic Case Assessment
[e] '-' indicates WHO benchmark not available

# Health Canada Reviewer Comments on NO2

"Tables … of the Site Specific Human Health and Ecological Risk Assessment – Technical Study Report (HHERATSR) **identify considerable increases in NO2 levels as a result of the project**. … Further, the predicted project-related **NO2 levels at receptors** for **both** project scenarios (140,000 tpy and 400,000 tpy) **are predicted to increase approximately two times over baseline."**

# Health Canada Reviewer-Continued

**“Given that NO2 plays a role in the atmospheric reactions that produce ground-level ozone, which is known to be associated with respiratory and cardiovascular health effects, and that NO2 by itself is linked with respiratory health effects (EPA, 1995), HC advises that the AQTSR discuss mitigation measures that may be applied to minimize project-related emissions.”**

Technical Reviewers Comment Summary Table, December 4, 2009

# Project Team Response

**“… additional mitigation measures are not recommended or required.”**

# Ozone

- **Ozone in Courtice is already in exceedance of ambient air quality criteria**
- (Section 3.2.4.4, Air Quality Assessment, Dec.4,2009)

- Ozone was **not** assessed as a chemical of potential concern in the risk assessment (Section 4.3, Human Health and Ecological Risk Assessment, Dec.10, 2009)

**Table 7-24 Concentration Ratio (CR) Values at 140,000 tpy for Chemical Mixtures at the Maximum Ground Level Concentration**

| COPC | Concentration Ratio (CR) Values – 140,000 tpy | | | | |
|---|---|---|---|---|---|
| | Baseline Case | Project Alone | Project Case | Process Upset Case | Process Upset Project Case |
| **1-Hour** | | | | | |
| Eye Irritants | 0.0048 | 7.1E-04 | 0.0055 | 0.0071 | 0.012 |
| Nasal Irritants | 0.0079 | 8.3E-04 | 0.0087 | 0.0083 | 0.016 |
| Respiratory Irritants | 0.33 | 0.23 | 0.56 | 1.5 | 1.9 |
| Neurological Effects (Neurotoxicants) | 0.026 | 2.1E-04 | 0.026 | 0.0021 | 0.028 |
| **24-Hour** | | | | | |
| Eye Irritants | 0.0083 | 4.5E-05 | 0.0083 | 4.5E-04 | 0.0087 |
| Nasal Irritants | 0.0079 | 4.1E-05 | 0.0079 | 4.1E-04 | 0.0083 |
| Respiratory Irritants | 1.1 | 0.098 | 1.2 | 0.77 | 1.9 |
| Neurological Effects (Neurotoxicants) | 0.55 | 1.2E-04 | 0.55 | 0.0012 | 0.55 |
| **Annual** | | | | | |
| Nasal Irritants | 0.035 | 1.4E-05 | 0.035 | 3.5E-05 | 0.035 |
| Respiratory Irritants | 0.94 | 0.0082 | 0.95 | 0.011 | 0.95 |
| Neurological Effects (Neurotoxicants) | 0.050 | 2.3E-04 | 0.050 | 3.5E-04 | 0.050 |
| Reproductive/Developmental Effects | 0.0073 | 1.5E-04 | 0.0074 | 2.1E-04 | 0.0075 |

| Criteria Air Contaminants Emissions | Facility (140,000 tpy facility) |
|---|---|
| Sulphur Dioxide(SO2) | 44 tonnes per year |
| **Nitrogen Oxides** | **151 tonnes per year** |
| Carbon Monoxide | 56 tonnes per year |
| **Total Particulate** | **11 tonnes per year** |
| **Volatile Organic Compounds** | **61.2 tonnes per year** |

Values from TABLE 4-5, *Air Quality Assessment Technical Study Report, December 4, 2009, Durham/York Waste EA*

Air Quality Issues (High Ozone,NO2 and PM2.5) Were NOT Emphasized or Highlighted by the Regions' Consultants to the Public nor to the Council at Meetings

Remarkably, Dr. Kyle's Report, 2009-COW-01, June 16, 2009, did not discuss present air quality measured at the site or discuss air quality concerns

# Heavy Metal Health Effects

## LEAD

- Probable human carcinogen
- Learning disabilities and central nervous system (CNS) disorders
- Reproductive problems in women

## MERCURY

- Central Nervous System disorders
- Reproductive toxin
- Endocrine disrupter

## CADMIUM

- Probable carcinogen-lung cancer

# INCINERATOR CONTRIBUTIONS TO REGIONAL INDUSTRIAL TOTALS

| | 140,000 tpy Facility- Normal Operation |
|---|---|
| Cadmium | 17% |
| Lead | 7% |
| Mercury | 15% |
| Benzo(ghi)perylene | 24% |
| Dioxins and Furans | 26% |
| Volatile Organic Compounds(VOC) | 3% |

# Dioxins/Furans and other Organic Carcinogens

- NO SAFE LEVEL OF EXPOSURE

- Cancer-causing
- Disrupts hormones/endocrine system
- Reproductive side effects-men and women
- Developmental problems

**Table 7-14 Maximum Hazard Quotient (HQ) Values Using Baseline Multi-Pathway Concentrations**

| COPC | Baseline Case Multi-Pathway Hazard Quotient (HQ) Values | | | | | | |
|---|---|---|---|---|---|---|---|
| | Resident - Infant | Resident - Toddler | Farmer - Infant | Farmer - Toddler | Daycare | Recreation User - Sport | Recreation User - Camping |
| PAHs | | | | | | | |
| Acenaphthene | 4.1E-06 | 1.3E-05 | 4.3E-06 | 3.8E-05 | 3.7E-06 | 1.6E-07 | 4.2E-07 |
| Anthracene | 9.5E-07 | 2.7E-06 | 1.1E-06 | 7.6E-06 | 7.6E-07 | 3.3E-08 | 8.6E-08 |
| Fluorene | 6.3E-06 | 2.0E-05 | 6.8E-06 | 5.8E-05 | 5.5E-06 | 2.4E-07 | 6.3E-07 |
| PCBs | | | | | | | |
| Aroclor 1254 (Total PCBs) | 11 | 0.49 | 118 | 4.2 | 0.011 | 4.7E-04 | 0.0012 |
| VOCs | | | | | | | |
| 1,1,1-Trichloroethane | 2.1E-08 | 4.7E-06 | 1.8E-07 | 6.4E-04 | 1.8E-08 | 7.6E-10 | 2.0E-09 |
| Bromoform | 4.7E-06 | 0.0023 | 6.6E-05 | 0.32 | 4.3E-06 | 1.8E-07 | 4.8E-07 |
| Carbon Tetrachloride | 1.6E-04 | 0.033 | 0.0025 | 4.6 | 8.1E-05 | 3.5E-06 | 9.2E-06 |
| Chloroform | 4.5E-06 | 0.0026 | 3.1E-05 | 0.32 | 4.2E-06 | 1.8E-07 | 4.8E-07 |
| Dichloromethane | 1.7E-05 | 0.0047 | 2.8E-05 | 0.65 | 1.7E-05 | 7.4E-07 | 1.9E-06 |
| Trichlorofluoromethane (FREON 11) | 3.7E-07 | 1.5E-04 | 5.9E-06 | 0.022 | 2.9E-07 | 1.3E-08 | 3.3E-08 |
| Chlorinated Monocyclic Aromatics | | | | | | | |
| 1,2,4,5-Tetrachlorobenzene | 0.0020 | 0.045 | 0.020 | 0.40 | 2.0E-04 | 8.8E-06 | 2.3E-05 |
| 1,2,4-Trichlorobenzene | 6.3E-04 | 0.057 | 0.21 | 20 | 2.6E-04 | 1.1E-05 | 3.0E-05 |
| 1,2-Dichlorobenzene | 3.9E-07 | 1.1E-04 | 3.0E-05 | 0.015 | 2.0E-07 | 8.6E-09 | 2.2E-08 |
| Hexachlorobenzene | 0.0025 | 0.019 | 0.026 | 0.17 | 8.6E-05 | 3.7E-06 | 9.8E-06 |
| Pentachlorobenzene | 9.3E-04 | 0.0094 | 0.0098 | 0.083 | 4.1E-05 | 1.8E-06 | 4.7E-06 |
| Pentachlorophenol | 8.9E-07 | 2.3E-06 | 8.9E-07 | 2.3E-06 | 8.5E-07 | 3.7E-08 | 9.7E-08 |
| Inorganics | | | | | | | |
| Antimony | 0.011 | 0.052 | 0.011 | 0.24 | 0.011 | 4.6E-04 | 0.0012 |
| Arsenic | 0.10 | 0.32 | 0.10 | 0.57 | 0.11 | 0.0048 | 0.013 |
| Barium | 0.0019 | 0.0079 | 0.0019 | 0.013 | 0.0019 | 8.2E-05 | 2.2E-04 |
| Beryllium | 0.0013 | 0.050 | 0.0013 | 0.42 | 0.0014 | 6.3E-05 | 1.6E-04 |
| Boron | 2.8E-04 | 0.022 | 2.8E-04 | 0.12 | 2.8E-04 | 1.2E-05 | 3.2E-05 |
| Cadmium | 0.0045 | 0.027 | 0.0045 | 0.10 | 0.0043 | 1.9E-04 | 4.9E-04 |
| Chromium (Total) | 5.7E-05 | 2.3E-04 | 5.7E-05 | 8.3E-04 | 6.1E-05 | 2.7E-06 | 7.0E-06 |
| Chromium VI | - | - | - | - | - | - | - |

Notes:
Abolded cell indicates exposures for that particular scenario and COPC exceeded the regulatory benchmark.
'-' - No baseline concentration was available for this COPC.

**Table 7-15 Maximum Hazard Quotient (HQ) Values for Dioxins/Furans and Lead Using Baseline Multi-Pathway Concentrations**

| COPC | Baseline Case Multi-Pathway Hazard Quotient (HQ) Values | | | | | | |
|---|---|---|---|---|---|---|---|
| | Resident - Infant | Resident - Toddler | Farmer - Infant | Farmer - Toddler | Day Care | Recreation User - Sport | Recreation User - Camping |
| 2,3,7,8-TCDD Equivalent | 3.8 | 0.17 | 20 | 0.72 | 0.0048 | 0.0017 | 0.0020 |
| Lead | 0.040 | 0.12 | 0.040 | 0.20 | 0.044 | 0.0082 | 0.011 |

Notes:
Abolded cell indicates exposures for that particular scenario and COPC exceeded the regulatory benchmark.

**Table 7-18 Maximum Hazard Quotient (HQ) Values for Chemical Mixtures using Baseline Multi-Pathway Concentrations**

| COPC | Baseline Case Multi-Pathway Hazard Quotient (HQ) Values | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Resident-Infant | Resident-Toddler | Farmer-Infant | Farmer-Toddler | Daycare | Recreation User - Sport | Recreation User - Camping | Additional Exposure due to Swimming | Additional Exposure due to Hunting/ Angling |
| Haematological Effects | 0.017 | 0.059 | 0.017 | 0.28 | 0.013 | 0.0011 | 0.0016 | 6.6E-04 | 0.18 |
| Kidney Effects | 0.0021 | 0.0094 | 0.0021 | 0.038 | 0.0017 | 1.4E-04 | 2.0E-04 | 0.0011 | 0.14 |
| Liver Effects | 11 | 0.47 | 117 | 4.8 | 0.0013 | 1.0E-04 | 1.5E-04 | 0.028 | 0.67 |
| Neurological Effects | 0.031 | 0.080 | 0.031 | 0.24 | 0.029 | 0.0084 | 0.0092 | 0.0022 | 0.19 |
| Reproductive/Developmental Effects | 0.97 | 0.15 | 12 | 0.73 | 0.034 | 0.010 | 0.011 | 0.0025 | 0.35 |

# Inadequate Monitoring

## The Truth about Continuous Monitoring

- Continuous monitoring will be done for only a handful of the hundreds of pollutants emitted (NOx, SO2,HCl,HF,NH3,CO)

- Many of the most toxic pollutants (PM2.5?,heavy metals, organic toxins, etc.) will only be monitored **once a year**(?) during a pre-arranged stack test

- Variable wastestream = variable emissions

# Slippery Slope of Safety Evaluation

- Epidemiological Studies
- Risk Assessment
- Biomonitoring

# What Happened in Durham

- Durham's Medical Officer of Health,
Dr. Kyle,
has repeatedly used one medical doctor,
Dr.Lesbia Smith,
for reviews of health documents in this EA

# What Happened in Halton

- Dr. Pengelly concluded that the Halton 4a report (written by the same consultants used in this EA) failed to provide the evidence that modern incinerators are safe

- Halton's Medical Officer of Health, Dr. Nosal, advised to side with the “precautionary principle” and recommended the decision on the incinerator be shelved

# Dr. Smith's Epidemiological Review

- Like Pengelly, she concluded that there was **no proof that modern incineration is safe**

BUT

instead of applying the precautionary principle, she concluded there was **no proof that modern incineration is not safe**

and the consultants used **risk assessment to determine safety**

# But Risk Assessment cannot assess for some of the MAJOR concerns

1. chemical mixtures

2. synergistic effects (chemicals reacting)

3. toxic ultrafine particulates (nanoparticles)

4. hundreds of unnamed pollutants of unknown toxicity

5. pollutants known to be emitted by incinerators, but companies do not track them

# Concerns With How Consultants Assessed Risk for Key Pollutants

- Exposure estimates are compared against TOXICITY REFERENCE VALUES

- It is critical that the TRVs selected are appropriate and up to date with current science

- **For $NO^2$ and PM2.5 the consultants used air standards instead of appropriate TRVs**

# Clarington Reviewer Comments

**Clarington Report PSD-071-09, July 6, 2009, Attachment 14**

"**Air guidelines may not be based on health effects and thus concentration ratios obtained using these values would not be considered valid."** (Comment 50)

"**The values for particulate matter PM10 and PM2.5 do not reflect the current science on particulate matter.** The National Ambient Air Quality Objective for Particulate Matter has reference values for health based values of 15 $\mu g/m^3$ for 24-h PM2.5 and 25 $\mu g/m^3$ for PM10." (Comment 53)

# Using the Consultants Choice of Reference Values:

## NO Inhalation Risks Identified For 140,000 tpy Incinerator

# Using World Health Organization Benchmark Values:

# Potential Risk to Human Health Identified for PM2.5 and $NO^2$

## in Baseline Traffic and 140,000 tpy Cases

**Table 7-11 pg 173,Table 7-21 pg 205, Table 7-22 pg 207-208,Table 7-53 pg 267**
***Human Health and Ecological Risk Assessment Technical Study Report,***
**Dec 10, 2009**

**Annual Emissions Comparison from the Generic Human Health and Ecological Risk Assessment (HHERA) facility model**

Algonquin Incinerator (Brampton) vs Proposed Durham Incinerator

| Contaminants of Potential Concern | Units | 1 Algonquin Incinerator (Brampton) 133,000 TPY | 2 Durham Incinerator (Courtice) 140,000 TPY |
|---|---|---|---|
| Particulate Matter PM 2.5 | tonnes/year | 9 | 11 |
| Carbon Monoxide | tonnes/year | 12 | 56 |
| Nitrogen Oxides* | tonnes/year | 110 | 151 |
| Sulphur Oxides* | tonnes/year | 30 | 44 |
| Cadmium* | kg/year | 7.5 | 8.7 |
| Mercury* | kg/year | 11 | 18.7 |
| Dioxins & Furans*** | grams/year | 0.043 | 0.075 |

[1] **Algonquin Incinerator (Brampton):** Memo from Chris Ollson/David Payne (Jacques Whitford) to Dr. Robert Kyle, Durham Region Medical Officer of Health, dated Nov. 4, 2008

[2] **Durham Incinerator (Courtice):** Table 4-5, Air Quality Assessment Technical Study Report July 31, 2009

**Notes:**

1. Data for all the contaminants except the VOCs were obtained from annual stack testing of the Algonquin Power EFW plant in Ontario. Data presented here is the maximum annual rates of 2003-2005. *VOC emission rates were obtained from specialized stack testing of the same facility in December 1992 and March 1993.*

* MOE Guideline A-7 emission concentration limit

** Assumes that particulate matter above PM2.5 will be captured by the air pollution control equipment and the Guideline A-7 emission concentration limit is comprised of PM2.5 only

*** Maximum concentration measured at similar EFW|facility also considered in risk assessment

# *Shouldn't state-of-the-art mean reduced emissions???*

**Brampton Emission Rate of Nitrogen Oxides = 3.5 grams/second**

(operating year-round at A-7 Limit) (Table 1, Memo to Dr. Kyle from Dr. Ollson)

**Covanta Emission Rate of Nitrogen Oxides = 5 grams/second**

(Table 4-1, Air Quality Assessment Technical Study Report, December 2009, Durham/York Residual Waste EA); Note: Emission rate of 18.0 kg/h is reported for Nitrogen Oxides in that table and that converts to 5 grams/second)

**Table I: Emission Summary Table – Maximum Emissions under Scenario A (Two Units Operating at 110% MCR)**

| Contaminant | CAS No. | Maximum Facility Emission Rate [g/s] | Air Dispersion Model Used | Background Concentration [µg/m³] | Averaging Period [hours] | MOE POI Limit [µg/m³] | Limiting Effect | Regulation Schedule No. | Maximum POI Concentration [µg/m³] |
|---|---|---|---|---|---|---|---|---|---|
| Carbon Monoxide | 630-08-0 | 1.92E+00 | Calpuff | 1.26E+03 | ½ | 6000 | Health | Schedule 3 | 1.33E+01 |
| Sulphur Dioxide | 7446-09-5 | 1.49E+00 | Calpuff | 1.93E+01 | 24 | 275 | Health & Vegetation | Schedule 3 | 1.46E+00 |
| Sulphur Dioxide | 7446-09-5 | 1.49E+00 | Calpuff | 1.95E+01 | 1 | 690 | Health & Vegetation | Schedule 3 | 8.62E+00 |
| Total Particulate Matter | N/A | 9.55E-01 | Calpuff | 3.54E+01 | 24 | 120 | Visibility | Schedule 3 | 1.05E+00 |
| PM10 | N/A | 9.55E-01 | Calpuff | — | 24 | 50 | — | Ontario AAQC | 1.05E+00 |
| PM2.5 | N/A | 8.95E-01 | Calpuff | 2.04E+01 | 24 | 30 | — | Ontario AAQC | 9.87E-01 |
| Lead | 7439-92-1 | 2.13E-03 | Calpuff | 4.98E-03 | 24 | 0.5 | Health | Schedule 3 | 2.09E-03 |
| Lead | 7439-92-1 | 2.13E-03 | Calpuff | 1.92E-03 | 30-day | 0.2 | Health | Schedule 3 | 2.52E-04 |
| Cadmium | 7440-43-9 | 2.89E-04 | Calpuff | 6.04E-04 | 24 | 0.25 | Upper Risk Threshold | Schedule 6 | 2.84E-04 |
| Cadmium | 7440-43-9 | 2.89E-04 | Calpuff | 1.76E-03 | ½ | 0.75 | Upper Risk Threshold | Schedule 6 | 2.01E-03 |
| Mercury | 7439-97-6 | 6.39E-04 | Calpuff | — | 24 | 2 | Health | Schedule 3 | 6.26E-04 |
| Fluorides | 7664-39-3 | 3.84E-02 | Calpuff | — | 24 | 0.86 | Vegetation | Schedule 3 | 3.76E-02 |
| Fluorides | 7664-39-3 | 3.84E-02 | Calpuff | — | 30-day | 0.34 | Vegetation | Schedule 3 | 4.53E-03 |
| PCDD | N/A | 2.49E-09 | Calpuff | 2.37E-08 | 24 | 5.00E-06 | — | Guideline | 2.44E-09 |
| Hydrogen Chloride | 7647-01-0 | 3.84E-01 | Calpuff | — | 24 | 20 | Health | Schedule 3 | 3.76E-01 |
| Ammonia | 7664-41-7 | 4.22E-01 | Calpuff | — | 24 | 100 | Health | Schedule 3 | 4.13E-01 |
| Nitrogen Oxides | 10102-44-0 | 5.14E+00 | Calpuff | 5.82E+01 | 24 | 200 | Health | Schedule 3 | 5.04E+00 |
| Nitrogen Oxides | 10102-44-0 | 5.14E+00 | Calpuff | 6.46E+01 | 1 | 400 | Health | Schedule 3 | 2.97E+01 |
| Polychlorinated Biphenyls (PCB) | N/A | 3.08E-06 | Calpuff | 4.20E-05 | 24 | 0.15 | Health | Point-of-Impingement | 3.02E-06 |
| Aluminum | 7429-90-5 | 1.69E-03 | Calpuff | 2.10E-01 | 24 | 4.8 | — | JSL | 1.66E-03 |
| Antimony | 7440-36-0 | 1.17E-04 | Calpuff | 3.02E-03 | 24 | 25 | Health | Schedule 3 | 1.14E-04 |
| Arsenic | 7440-38-2 | 1.79E-05 | Calpuff | 1.81E-03 | 24 | 0.3 | Health | Guideline | 1.75E-05 |
| Arsenic | 7440-38-2 | 1.79E-05 | Calpuff | 5.29E-03 | ½ | 1 | Health | Guideline | 1.24E-04 |

**Exhibit 2: Durham York Energy Centre Emission Scenarios**

| Emission Scenario | Unit 1 | Unit 2 | Silo | Standby Diesel Generator | Comments |
|---|---|---|---|---|---|
| A | 110% MCR | 110% MCR | Not Filling | Off-line | Maximum Emissions at Reference Point 2' on Firing Diagram - Exhibit 3 |
| B | Off-line | 110% MCR | Not Filling | Off-line | Single Unit at Reference Point 2' on Firing Diagram - Exhibit 3 |
| C | Phase 2 – Start-up | Phase 2 – Start-up | Not Filling | Off-line | 60% MSW/40% NG Extreme Case |
| D | Phase 2 – Start-up | Off-line | Not Filling | Off-line | 60% MSW/40% NG Most Likely Start-up condition |
| E | Phase 1 – Start-up | Phase 1 – Start-up | Not Filling | Off-line | Natural Gas Firing only Extreme Case |
| F | Phase 1 – Start-up | Off-line | Not Filling | Off-line | Natural Gas Firing only Most likely Case |
| G | ID Fans on | ID Fans on | N/A | Off-line | Used for Odour modeling only |
| H | 110% MCR | 110% MCR | Filling | Testing | Maximum Emissions at Reference Point 2' on Firing Diagram - Exhibit 3 Extreme Case |

**Emissions Rate for PM2.5 in the EA (Normal Operation, 100%MCR) = 0.361 g/s**

(Table 4-1, Maximum Facility CAC Emissions during Normal Operation (Scenarios 1 and 2), AQATSR,Dec 4,2009)

**Emissions Rate for PM2.5 in the CofA Application (Normal Operation, 110%MCR) = 0.895 g/s**

(Table 1: Emissions Summary Table – Maximum Emissions under Scenario A(Two Units Operating at 110% MCR, ESDM, C of A application, March 2011)

**The above PM2.5 emissions reported in the C of A application are about 2.5 times greater than what was used in the EA risk assessment for PM2.5 emissions.**

This emission rate was calculated using a stack concentration for PM2.5 provided by Covanta of **21 mg/Rm$^3$** (Source Emissions Table, page 4, Appendix C, ESDM).

The operational requirement in Schedule 1 of the EA Conditions of Approval, for PM, is

**9 mg/Rm$^3$**.

## Emission Limits

Discussion

Based on discussions with the MOE to date, the EA conditions emission limits will be utilized as operating requirements, not regulatory enforcement limits. It is anticipated that the enforcement limits will align with the guarantees provided by Covanta in the project agreement. There are three emission limits which are currently not in line with the EA conditions and will be considered operating targets during the CofA discussions.

# *Summary*

- Air quality is already poor

- Incinerator adds very significant emissions of NO2, PM2.5,heavy metals,dioxins/furans,+++;

- Health Canada advised discussion of further mitigation but no action taken;

- Relying on risk assessment to determine safety is not appropriate for incineration;

- Evaluation against more health protective WHO standards results in identification of potential human risk

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# *Summary*

- Only a handful of pollutants will be monitored continuously; the remaining (some highly toxic) pollutants will only be monitored one day a yea
- Emissions comparisons are at odds with most modern, state-of-the-art  claim
- Grave concerns with C of A application and whether EA conditions operating requirements will be enforced