**The Durham/York Incinerator: Health Risks and Concerns for Durham Residents**

Prepared by Wendy Bracken

## Air Quality Impacts

### 1. The Courtice air shed is already overburdened with respiratory irritants:

- Courtice has the highest annual nitrogen dioxide ($NO_2$) levels when compared against Hamilton, Toronto, Windsor, Oakville and Sarnia. (Figure 7-10, Human Health and Ecological Risk Assessment(HHERA);
- Courtice has elevated levels of PM2.5; the current ambient level (28. 6 $\mu g/m^3$) is marginally below the Canada Wide Standard (CWS) of 30 $\mu g/m^3$ for PM2.5 (Section 3.2.4.3, Air Quality Assessment Technical Study Report (AQATSR));
- Ozone levels at the Courtice 01 site already exceed applicable ministry limits. (Section 3.2.4.4, Air Quality Assessment Technical Study Report, Amended December 4, 2009);
- Site Selection Report showed the Courtice sites had far greater industrial burden than the York site that was considered. (Appendix A, Step 7:Site Selection Report)

### 2. The Durham/York incinerator will be a major industrial polluter .

- **The incinerator will emit <u>hundreds of tonnes of respiratory irritants annually</u>** which include nitrogen dioxide ($NO_2$), sulphur dioxide ($SO_2$), carbon monoxide (CO), particulate matter (PM), fine particulate matter ($PM_{2.5}$), ammonia($NH_3$), hydrogen chloride (HCl), hydrogen fluoride (HF) and others (Table 4-5, Air Quality Assessment Technical Study Report (AQATSR), December 4, 2009);

- **The incinerator will emit <u>tonnes of heavy metals over its operating life which will accumulate and persist in our environment and our population</u>;** these heavy metals include lead, mercury, cadmium, chromium, nickel and others. (Table 4-5, Air Quality Assessment Technical Study Report (AQATSR), December 4, 2009); the risk assessment predicted very significant heavy metal (mercury, cadmium, lead, tin, thallium) loading to surface water, sediments and fish (Tables 6-2, 6-3, 6-9 of the Human Health and Ecological Risk Assessment (HHERA));

- **The incinerator will emit very significant amounts of organic compounds/toxins**:
    - **61.2 tonnes of Volatile Organic Compounds (VOCs) per year** are reported for the facility emissions in the EA (Table 4-5, Air Quality Assessment Technical Study Report (AQATSR), December 4, 2009);
    - **significant amounts of NEW dioxins and furans created in the incinerator will be emitted** despite the fact that there is no safe level of exposure and that

Canada is signatory to the Stockholm Convention which calls for their virtual elimination;

- The incinerator will also emit a long list of polycyclic aromatic hydrocarbons(PAHs);

- **The incinerator will emit 138,000 tonnes of Greenhouse Gas emissions per year** which will contribute to global warming - that is almost a 1:1 ratio – i.e. for every tonne of waste incinerated, one tonne of greenhouse gases is emitted (as $CO_2$ equivalents)

3. **Potential risks to human health were identified in the EA documents.**

Potential risks to human health are identified in the EA for:

- PM2.5 for the Process Upset Project Case for 140,000 tpy (Table 7-21, *Human Health and Ecological Risk Assessment Technical Study Report* (HHERA), December 10, 2009) when World Health Organization (WHO) benchmarks are used to characterize risk;

- $NO_2$ in the Baseline Traffic Case (Table 7-11, HHERA) when World Health Organization benchmarks are used to characterize risk

- Respiratory Irritants for the 140,000 tpy case for Chemical Mixtures(Table 7-24, HHERA);

- Dioxins/Furans, PCBs, VOCs, arsenic for infants and toddlers in the Baseline Multi-pathway Assessment (Table 7-14, HHERA).

4. **There was controversy, dispute and concern on how risk was characterized for key pollutants $PM_{2.5}$ and $NO_2$. This concern remains unresolved**.

- The project team used ambient air quality criteria (CWS) to characterize risk for PM2.5 instead of appropriate and up-to-date toxicity reference values (TRVs); this was severely criticized by expert reviewers and the public, as its use as a TRV is not reflective of current science; expert reviewers provided alternative, more current standards (Comment 53, Attachment 14, Clarington report PSD-071-09); the CWS used to characterize risk for PM2.5 is also inappropriate since the CWS is a 98th percentile standard, however the study data used in the risk calculation was 90th percentile data; the CR values would therefore be understated;

- The project team used old ambient air quality criteria (AAQC) to characterize risk for NO2 instead

of appropriate toxicity reference values (TRVs) (Section 7.6 of AQATSR);the use of AAQC in place of TRVs was criticized by Clarington expert reviewers (Comment 50, Attachment 14, Clarington Report PSD-071-09) and by Ministry reviewers (appendix P, HHERA);

- Dr. Kyle used one medical reviewer, Dr. Lesbia Smith to review health documents and the draft EA; Dr. Kyle made no comment regarding the Courtice air shed burden in his June 2009 COW report at the time of the go ahead vote to submit the EA to the Ministry;

5. **After reviewing the EA health documents, Health Canada identified numerous areas of concern and advised that the EA discuss additional mitigation for a number of pollutants**.

Health Canada (September 25, 2009) advised that the EA discuss additional mitigation for :

- $PM_{2.5}$ ;
- $NO_x$ ;
- Cadmium;
- All respiratory irritants to the extent feasible;

The Project Team responded that additional mitigation was not required.

Health Canada, also noted in the September 25 submission that the EA indicates that airborne levels of $SO_2$, HF, PM2.5, PM, cadmium, bromodichloromethane, chloroform, and xylenes are predicted to increase considerably in the case of process upsets for **both** the 140,000 tpy and 400,000 tpy scenarios, and advised that the EA discuss measures to minimize the air quality impacts of process upsets to the extent feasible.

**6. The proposed monitoring for the facility is inadequate. Most of the pollutants of greatest concern will likely only be monitored one day a year in an annual stack test. Their emissions for the other 364 days a year will be uncertain.**

- Continuous monitoring will only be for NOx, $SO_2$, HCl, HF, $NH_3$ , CO
  (Section 1.3.1.5, Emission Summary and Dispersion Modelling Report, C of A application, March 2011)

- Once a year (?) stack tests for $PM_{2.5}$ (?), mercury (?), cadmium (?), VOCs (?), etc.

**7. It remains unclear whether and how Council Commitments/Resolutions will be met.**

Durham Regional Council made a commitment that the proposed incinerator will be a most modern state-of-the-art facility.

- The Project Team provided no comparable quantitative emissions data from “modern” incinerators at the time the emissions criteria was set to enable the public and the decision

makers to ascertain if the emissions criteria proposed by the Project Team were adequate and reflected "state-of-the-art" expectations;

- Brampton emissions data provides no proof that the new Covanta facility will be an improvement over the Brampton incinerator; in fact, some information provided by the Regions' consultants appears to show the contrary – in a memo to Dr. Kyle dated November 4, 2008 , consultant Dr. C. Ollson supplied the annual emissions data for the 20 year old Algonquin incinerator located in Brampton; in the memo, Dr. Ollson states that the Durham/York incinerator will have reduced emissions, yet the following table comparing the Algonquin emissions submitted by Dr. Ollson to the Facility Emissions for the proposed Durham/York incinerator given in Table 4-5 of the AQATSR of the EA appear to show that, for a number of key pollutants, the emissions would be substantially worse for the Durham/York incinerator; it must also be noted that the Algonquin emissions for PM2.5, Nitrogen Oxides, Sulphur Oxides, Cadmium, Mercury, Dioxins/Furans were evaluated for a worst case Algonquin scenario where the facility would be operating right at the A-7 guideline limit for these pollutants, yet still Algonquin annual emissions are less than the Covanta facility;

**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

- **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)

8. **Emissions and operating scenarios in the Certificates of Approval Application appear to deviate significantly from what was considered in the Environmental Assessment** .

- EA - normal operation scenario at full capacity was 100% MCR. (4.2.1, AQATSR, Dec. 2009)

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- CofA application - normal operation scenario shown at 110% MCR. (Executive Summary, Emission Summary and Dispersion Modelling Report (ESDM), CofA Application, March 2011)

The Executive Summary, Emission Summary and Dispersion Modelling Report, CofA Application, March 2011) states that:

A POI concentration for each significant contaminant emitted from the Facility was estimated in accordance s.26 of O. Reg. 419/05 with results, results presented Emission Summary Tables (Tables i and ii). Table i reflects normal operating conditions (e.g., Scenario A) while Table ii presents maximum number of sources operating concurrently (e.g., Scenario H). The POI is an estimated maximum value reflective of meteorological conditions

Exhibit 2 from the ESDM Report:

**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 |

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 |

**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$^3$**.

## 9. Operating requirements are not necessarily regulatory enforcement limits.

See the excerpt from page 7 of the November 23rd, 2010 HDR memorandum to Mirka Januszkiewicz of Durham and Laura McDowell of York:

**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.

**Some of the Supporting EA Tables and Documentation Referenced Above**:

**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

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[f] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 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[a] | - | 0.0027 | 0.0027 | 0.027 | 0.027 | - | - | - | - | - |
| Carbon Monoxide (CO)[c] | - | - | - | - | - | - | - | - | - | - |
| Hydrogen Chloride (HCl)[a] | - | 0.023 | 0.023 | 0.23 | 0.23 | - | - | - | - | - |
| Hydrogen Fluoride (HF)[ac] | - | - | - | - | - | - | - | - | - | - |
| Nitrogen Dioxide ($NO_2$) | 0.29 | 0.030 | 0.32 | 0.049 | 0.34 | - | - | - | - | - |
| Particulate Matter - $PM_{10}$[ae] | - | 0.011 | 0.011 | 0.11 | 0.11 | - | 0.011 | 0.011 | 0.11 | 0.11 |
| Particulate Matter - $PM_{2.5}$[e] | 0.68 | 0.018 | 0.70 | 0.18 | 0.86 | 0.82 | 0.021 | 0.84 | 0.21 | 1.0 |
| Particulate Matter - Total[e] | 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 |

**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 |

An HQ value of 0.2 was used as a benchmark for all COPC, except methylmercury, evaluated in the multi-pathway assessment. This ensures that an adequate proportion of the tolerable daily intake is reserved for other potential sources of exposure with the exception of regional air emissions sources – this exposure pathway is assessed in the inhalation assessment.

**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.

**Note : Cells which were bolded on the original documents have been circled.**

**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 |

- the Regions' consultants attributed these exceedances of HQs to the use of MDLs (method detection limits) and conservative assumptions which led to the overestimation of risk, and they also state in many places that "these findings would be expected across Ontario and are not unique to this project"; Questions: Where is the data to support these statements? Were MDLs used for all dioxin/furan concentrations? Tables 5-1 to 5-63 in the Baseline Report (Jacques Whitford, 2009a) appear to show that actual dioxin/furan measured concentrations were used. Does the MOE agree with the Regions' consultants' assessment? Concerns were put forward to the MOE, but citizens have received no response from the MOE regarding this concern. Are there indeed already problems with baseline concentrations for these chemicals? To add the emissions of an incinerator when the Baseline Case indicates exceedances for infants and toddlers would be unacceptable.

## Heavy Metals

It has been established in the EA document and by reviewers that:

- Table 4-5, on page 63 of the Air Quality Assessment Technical Study Report (AQATSR), gives Facility Emissions for the 140,000 tpy scenario and shows that the incinerator will be a major polluter of cadmium, lead, mercury. It shows how the incinerator emissions will contribute significantly to the Regional Industrial Total (under normal operation, cadmium emissions will be 17% of Regional Industrial total, lead – 7%, mercury – 15%);
- Because there is no commitment to pre-sort the incoming waste, the waste stream will vary. The possibility exists for batteries, paints, mercury fluorescents (CFLs), electronics and other sources of heavy metals and toxins to be present in significant and varying quantities, which result in variable (and therefore unpredictable) emissions.
- Tables 6-2 and 6-3, on pages 81 and 83 of the HHERA, predict significant heavy metal loading to surface waters and sediments resulting from the facility emissions, e.g. under normal facility operation, the % loading predicted to surface waters for cadmium is 9.3%, for lead is 3.1% and for thallium is 17%. The % loading to sediments, under normal operation, is predicted to be 54% for mercury and that escalates to 78% under process upset conditions.
- Table 6-9 of the HHERA predicts significant loading to fish for heavy metals. Under normal operation, the cadmium % loading is 52%, the lead % loading is 4.6%, the nickel and silver loading is 4% and the tin loading is 108%. These values significantly increase under process upset.
- The proponents neglected to measure mercury (as methyl mercury) in the fish samples they collected and they did not report predicted fish concentrations for inorganic mercury, and thus did not report mercury loading to fish.
- The fish stock, waters and sediments of Lake Ontario, and other Great Lakes and their tributaries are already over burdened with mercury and other heavy metals and pollutants and advisories exist regarding fish consumption.
- In the September 25 submission from Health Canada (M. Lalani) to the MOE (G. Battarino), Health Canada advised that the AQATSR discuss mitigation measures to reduce project-related emissions of cadmium, noting the results of the AQATSR and that cadmium meets the criteria of a Schedule 1 toxic substance under CEPA. The proponents did not act upon this advice from Health Canada.
- In a letter from Health Canada (A. Denning, M. Lalani) to the MOE (S. Desautels) dated June 7, 2010, Health Canada advised that cadmium be included in the ambient air monitoring program for the project.
- The Facility Emissions reported in the EA (table 4-5, AQATSR) for the proposed new Durham/York incinerator are substantially worse (greater) than the emissions reported for the 20 year-old Brampton Algonquin incinerator for mercury. The Algonquin (Brampton) annual emissions when operating at 133,333 tpy and right at the existing A-7 limit for the entire year would be 11 kg. The proposed 140,000 tpy Durham incinerator would emit 18.7 kg (C. Ollson/Jacques Whitford memo to Dr. R. Kyle, 2008 November).