

INCINERATION TODAY AND TOMORROW

**Impact on the Health of
Durham Region's (and our Neighbours') Children**

**Presented to:
REGIONAL COUNCIL OF DURHAM**

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- List of toxins expanded to include those listed in the Ontario Ministry of Environment Combustion and Air Pollution Requirements for Municipal Waste Incinerators as the byproducts of incomplete combustion in incinerators or as incinerator emissions.¹
- Section added *What We Are Already Breathing*, page 12.
- Section added: *A Look at Real Emissions*, page 13.
- Section added: *Comments on Emissions from Durham / York*, page 16.
- Section added: *Comments on Ministry of the Environment Guidelines*, page 18.
- Introductions and conclusions expanded to encompass new information added.
- Cross-referenced the sources of the emissions list so that when a chemical appears in more than one resource document, that fact is apparent in the footnotes. For example, mercury was listed as an emission of incineration in Province of Ontario, Ministry of the Environment (2004) **and** Swedish Environmental Protection Agency (2005) **and** Detroit, City of (2007). Prior to this edit, I only cited the first of the references that I found to list such toxin.

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¹ Province of Ontario, Ministry of the Environment (2004).

"Recurring themes and recommendations across all of the literature reviews that were scanned for this project included the need for precaution and the need to learn from past mistakes."

Kathleen Cooper

"We are conducting a vast toxicological experiment in which our children and our children's children are the experimental subjects."

Dr. Herbert Needleman, quoted by Kathleen Cooper

INTRODUCTION

One of the most pervasive local myths about incineration, which I debunked in my first report (*Debunking the Myths of Incineration*), is that incineration is safe. Here, I discredit this myth further by looking at the particular risks that incineration emissions pose to children.

As I discussed in *Debunking the Myths of Incineration*, the unborn child and breastfeeding infant are at the greatest risk of harm by incinerator emissions because they can take in 50 times more pollutants than adults, relative to their weight.² Infants and children are also at a higher risk because they are actively growing and developing, inside and out.³

The preparation of this report has been fairly straightforward. I started with two pieces of information. One piece is a list of chemicals and pollutants that are recognized or suspected as a result of research and scientific evidence to negatively affect child development. "Great care was taken to only include on the list those substances for which the literature reviews consistently and repeatedly report on the scientific evidence demonstrating associations, or suspected associations, with health effects in children."⁴ The second piece is a list of chemicals and pollutants that incinerators emit into the atmosphere. I cross-referenced these two lists. The result is an inventory of incinerator emissions that are damaging to the development of children.

Following this list that I developed through cross-referencing (see Diagram 1), I have included information that will help to put these findings in perspective – including comments on real emissions, the Ministry of the Environment and the risk assessment process.

² McKinnon-Rutherford, Kristin Duare (2007).

³ Cooper, Kathleen (2005).

⁴ Cooper, Kathleen (2005).

Diagram 1 – Report process

List of chemicals that are damaging to the development of children, from:

Cooper, Kathleen (2005).
Toxic Substances - Focus on Children - Developing a Canadian List of Substances of Concern to Children's Health

List of chemicals that are emitted by incinerators, from:

Global Alliance for Incinerator Alternatives (GAIA) (2003). *Waste Incineration: A Dying Technology.*

Cross referenced with

Swedish Environmental Protection Agency (2005). *A Strategy for Sustainable Waste Management: Sweden's Waste Plan.*

Detroit, City of (2007). *Future Solid Waste Plan, Task Force Report.*

Province of Ontario, Ministry of the Environment (2004). Guideline A – 7, *Combustion and Air Pollution Control Requirements for Municipal Waste Incinerators.*

List of chemicals emitted by incinerators that are damaging to children

FINDINGS

Following is the list of incinerator emissions that pose a risk to children. It is important to keep in mind that this list of chemicals and pollutants is a conservative one (meaning that there are likely many additional chemicals and pollutants that are emitted from incinerators and cause damage to children) because:

- 1) It is estimated that 88 to 90% of components making up incinerator emissions are unknown.⁵
- 2) There is little to no data available regarding the effects of the combining of these chemicals, which happens in the process of incineration.⁶ Even the authors of your Generic Human Health and Ecological Risk Assessment admit to this dearth of data.⁷
- 3) Some chemicals have a number of different names and I don't know all of these alternative names. Subsequently, just because I couldn't find some of the chemicals on both of lists doesn't mean that there aren't more matches. I just did not have the time to search for the alternative names for some the 140+ chemicals on the incineration emissions⁸ list that I have not already matched to the health list.⁹
- 4) The author of the list of chemicals harmful to children points out that just because a chemical is not listed as a suspected or recognized threat to child development does not mean that it is not a threat – but rather that more research is required.¹⁰
- 5) These lists do not even begin to address the ill effects of incinerator emissions on teenagers, adults and older adults or the already ill or vulnerable.

⁵ British Society for Ecological Medicine (2005).

⁶ British Society for Ecological Medicine (2005); David Suzuki Foundation et al (undated; data sources cited 1994 to 2006); Friends of the Earth Scotland (2002); Swedish Environmental Protection Agency (2005); UNEP's Information Unit for Conventions (2005); Carter-Whitney, Maureen (2007); Cooper, Kathleen (2005).

⁷ Whitford, Jacques (2007).

⁸ Global Alliance for Incinerator Alternatives / Global Anti-Incinerator Alliance (GAIA) (2003).

⁹ Cooper, Kathleen (2005).

¹⁰ Cooper, Kathleen (2005).

Table 1 – List of chemicals emitted by incinerators that are damaging to children

Chemical or Pollutant¹¹	Suspected Toxin(s)¹²	Recognized Toxin(s)¹³
1. 1,2,4-trichlorobenzene	Developmental toxin Endocrine toxin Neurotoxin Respiratory toxin	
2. 1,2,4-trimethylbenzene	Respiratory toxin Neurotoxin	
3. 2,4,6-trichlorophenol	Carcinogen toxin Respiratory toxin	Thyroid hormone interference
4. 2,4-dichlorophenol	Immunotoxin Endocrine	Thyroid hormone interference
5. 2-chlorophenol	Neurotoxin	
6. 2-methyl-2-propanol, also known as Tert- Butyl Alcohol	Neurotoxin Developmental toxin	
7. 4-chlorophenol	Neurotoxin Developmental toxin Respiratory toxin Reproductive toxin	
8. Acetone	Neurotoxin Respiratory toxin	
9. Acetonitrile	Neurotoxin Developmental toxin Respiratory toxin Reproductive toxin	
10. Benzene ¹⁴	Neurotoxin Endocrine toxin Respiratory toxin Immunotoxin	Reproductive toxin
11. Benzo(a)pyrene ¹⁵	Endocrine toxin Respiratory toxin Immunotoxin Developmental Toxin Carcinogen	

¹¹ Global Alliance for Incinerator Alternatives / Global Anti-Incinerator Alliance (GAIA) (2003) UNLESS OTHERWISE NOTED.

¹² Cooper, Kathleen (2005).

¹³ Cooper, Kathleen (2005).

¹⁴ On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

¹⁵ Province of Ontario, Ministry of the Environment (2004).

Chemical or Pollutant¹¹	Suspected Toxin(s)¹²	Recognized Toxin(s)¹³
12. Benzonitrile	Neurotoxin	
13. Benzyl alcohol	Neurotoxin	
14. Biphenyl ¹⁶	Carcinogen	Developmental toxin
15. Butyl acetate	Respiratory toxin Neurotoxin	
16. Cadmium ¹⁷	Carcinogen Respiratory toxin Endocrine toxin Immunotoxin Neurotoxin	Developmental toxin Reproductive toxin
17. Caffeine	Neurotoxin Respiratory toxin	
18. Carbon Dioxide ^{18 19}	Developmental toxin Neurotoxin Reproductive Toxin	Developmental toxin
19. Chlorobenzene	Developmental toxin Neurotoxin Respiratory toxin	
20. Chloroform ²⁰	Carcinogen Endocrine toxin Developmental toxin Respiratory Toxin Reproductive Toxin Neurotoxin	
21. Chromium ^{21 22}	Carcinogen Immunotoxin Respiratory toxin Reproductive toxin	
22. Cyclohexane	Neurotoxin	
23. Dichloromethane	Carcinogen toxin Neurotoxin	

¹⁶ Province of Ontario, Ministry of the Environment (2004).

¹⁷ Swedish Environmental Protection Agency (2005) and Province of Ontario, Ministry of the Environment (2004) and Detroit, City of (2007).

¹⁸ Province of Ontario, Ministry of the Environment (2004).

¹⁹ On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

²⁰ On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

²¹ Detroit, City of (2007).

²² On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

Chemical or Pollutant¹¹	Suspected Toxin(s)¹²	Recognized Toxin(s)¹³
	Endocrine toxin Respiratory toxin Reproductive toxin	
24. Dioxins ^{23 24}	Carcinogen toxin Developmental toxin Respiratory toxin Endocrine toxin Reproductive toxin	
25. Ethyl acetate	Neurotoxin Respiratory toxin	
26. Formaldehyde ^{25 26}	Carcinogen Respiratory toxin Neurotoxin Immunotoxin Reproductive toxin	
27. Furan ^{27 28}	Carcinogen Respiratory toxin	
28. Formic acid	Neurotoxin Respiratory toxin	
29. Heptane	Neurotoxin	
30. Hydrochloric acid, also known as Hydrogen Chloride ²⁹	Respiratory toxin	
31. Isopropyl benzene, also known as Cumene.	Neurotoxin	
32. Lead ^{30 31}	Neurotoxin Endocrine toxin Respiratory toxin Immunotoxin	Reproductive toxin

²³ Swedish Environmental Protection Agency (2005) and Province of Ontario, Ministry of the Environment (2004) and Detroit, City of (2007).

²⁴ On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

²⁵ Province of Ontario, Ministry of the Environment (2004).

²⁶ On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

²⁷ Province of Ontario, Ministry of the Environment (2004).

²⁸ On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

²⁹ Detroit, City of (2007) and Province of Ontario, Ministry of the Environment (2004) and Swedish Environmental Protection Agency (2005).

³⁰ Swedish Environmental Protection Agency (2005) and Province of Ontario, Ministry of the Environment (2004) and Detroit, City of (2007).

Chemical or Pollutant¹¹	Suspected Toxin(s)¹²	Recognized Toxin(s)¹³
33. Mercury ^{32 33}	Carcinogen Immunotoxin Neurotoxin Respiratory toxin Reproductive toxin	Developmental toxin
34. Methylcyclohexane	Neurotoxin	
35. Methyl Iodide	Carcinogen Neurotoxin Respiratory toxin	
36. Naphthalene ³⁴	Neurotoxin	
37. Nitrogen oxides ³⁵	Developmental toxin Neurotoxin Respiratory toxin Reproductive toxin	
38. Nonane	Neurotoxin	
39. Octane	Neurotoxin Respiratory toxin	
40. Octanoic acid	Neurotoxin	
41. Paraldehyde	Neurotoxin	
42. Particulate Matter (PM) ₁₀ ^{36 37}	Developmental toxin Respiratory toxin Reproductive toxin	
43. Particulate Matter (PM) _{2.5} ^{38 39}	Developmental toxin Respiratory toxin Reproductive toxin	
44. Pentachlorobenzene	Neurotoxin	

³¹ On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

³² Province of Ontario, Ministry of the Environment (2004) and Swedish Environmental Protection Agency (2005) and Detroit, City of (2007).

³³ On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

³⁴ Province of Ontario, Ministry of the Environment (2004).

³⁵ Swedish Environmental Protection Agency (2005) and Province of Ontario, Ministry of the Environment (2004) and Detroit, City of (2007).

³⁶ Province of Ontario, Ministry of the Environment (2004) and Detroit, City of (2007).

³⁷ Coarse, fine and ultrafine contain sulfates, nitrates, ammonium ion, elemental carbon, PAHs, other toxic organic carbon compounds and metals.

³⁸ Province of Ontario, Ministry of the Environment (2004) and Detroit, City of (2007).

³⁹ Coarse, fine and ultrafine contain sulfates, nitrates, ammonium ion, elemental carbon, PAHs, other toxic organic carbon compounds and metals.

Chemical or Pollutant¹¹	Suspected Toxin(s)¹²	Recognized Toxin(s)¹³
45. Pentane	Neurotoxin	
46. Phenanthrene	Respiratory toxin	
47. Phenol ⁴⁰	Neurotoxin Developmental toxin Respiratory toxin Reproductive toxin	Thyroid hormone interference
48. Tetrachloroethylene ⁴¹	Carcinogen Developmental Respiratory toxin Reproductive toxin Neurotoxin	
49. Toluene ⁴²	Respiratory toxin Reproductive toxin Neurotoxin Immunotoxin	Developmental toxin
50. Trichlorofluoromethane	Respiratory toxin Neurotoxin	
51. Trimethylbenzene	Neurotoxin	
52. Volatile organic compounds ⁴³	Developmental toxin Reproductive toxin Respiratory toxin	
53. Xylene ⁴⁴	Developmental toxin Immunotoxin Respiratory toxin Reproductive toxin	

⁴⁰ On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

⁴¹ Same as above.

⁴² On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

⁴³ Detroit, City of (2007).

⁴⁴ On CELA's (Canadian Environmental Law Association) Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered.

WHAT WE ARE ALREADY BREATHING

The following table compares some of the chemicals that we are already breathing in Clarington near the chosen incinerator site. These readings are compared with those from the East Gwillimbury site, which was not chosen.

It should be noted that this information comes from one of the Region's own assessment reports.⁴⁵

Also of interest to note is that every chemical on this comparison list is also in the list of toxins presenting a threat to children as presented in my report herein (pages 7 to 11) except sulphur dioxide (SO₂).

- CO = Carbon Monoxide
- NO_x = Nitrous Oxide
- PM, PM₁₀ and PM_{2.5} = Particulate matter
- VOC = Volatile Organic Compounds

Comparison of Industrial Emissions

(Tonnes/Year) Within 20 km of both sites

<i>Industrial Emissions</i>	CO	NOx	PM	PM10	PM2.5	SO2	VOC
Clarington Totals	4392.0	6089.0	700.0	571.0	274.0	8703.0	4525.0
E. Gwillimbury Totals	50.2	5.1	77.1	81.9	41.2	0.3	1137.3

Source: Annex A, Report on Air Quality impacts, Application of Short-List Evaluation Criteria from the Durham / York Residual Waste Study EA Assessment. (September 2007)

Thank you to Kerry Maydem for preparing this table, the information from which Wendy Bracken presented to Regional Council on Dec. 12th, 2007.

⁴⁵ *Source: Annex A, Report on Air Quality impacts, Application of Short-List Evaluation Criteria from the Durham / York Residual Waste Study EA Assessment. (September 2007)*

A LOOK AT **REAL** EMISSIONS

Now, let's take a look at emissions from the very real, and often revered [by our Durham politicians and bureaucrats], Swedish incinerators. These numbers are taken from Sweden's own government reports on waste management.⁴⁶

I simply took the annual totals (2004) for Sweden's 29 incinerators and divided by 29 to give you an example of what comes out of the stacks of one such facility in a year. When looking at these numbers, please keep in mind that they don't represent *all* emission contents – just the contents that Sweden measures.

Chemical / Pollutant measured⁴⁷	Annual emissions in Sweden for all 29 incinerators (2004)⁴⁸	Annual emissions in Sweden for 1 incinerator, averaged, based on 29 incinerators	Suspected or recognized toxins affecting children and child development⁴⁹	Included on CELA's Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered⁵⁰	Included on list of chemicals tested as part of the Durham York Waste Environmental Assessment?⁵¹
Particulates (tonnes/year)	24 tonnes	.82 tonnes	Developmental toxin Respiratory toxin Reproductive toxin	NO	YES
Hydrogen chloride (tonnes/year)	101 tonnes	3.5 tonnes	Respiratory toxin	NO	NO
Sulphur oxides (tonnes/year)	337 tonnes	11.5 tonnes		NO	Sulphur dioxide was measured.
Nitrogen oxides (tonnes/year)	1,707 tonnes	58 tonnes	Developmental toxin Neurotoxin Respiratory toxin	NO	YES

⁴⁶ Swedish Environmental Protection Agency (2005).

⁴⁷ Swedish Environmental Protection Agency (2005).

⁴⁸ Swedish Environmental Protection Agency (2005).

⁴⁹ Cooper, Kathleen (2005).

⁵⁰ Cooper, Kathleen (2005).

⁵¹ Durham/York Residual Waste Study EA Assessment (September 2007).

Chemical / Pollutant measured⁴⁷	Annual emissions in Sweden for all 29 incinerators (2004)⁴⁸	Annual emissions in Sweden for 1 incinerator, averaged, based on 29 incinerators	Suspected or recognized toxins affecting children and child development⁴⁹	Included on CELA's Dirty Six Dozen list, Substances of concern to children associated with four or more of the health effects considered⁵⁰	Included on list of chemicals tested as part of the Durham York Waste Environmental Assessment?⁵¹
			Reproductive toxin		
Mercury (kg/year)	37 kg	1.3 kg	Carcinogen Immunotoxin Neurotoxin Respiratory toxin Reproductive toxin	YES	NO
Cadmium (kg/year)	5 kg	.17 kg	Carcinogen Respiratory toxin Endocrine toxin Immunotoxin Neurotoxin	YES	NO
Lead (kg/year)	54 kg	1.8 kg	Neurotoxin Endocrine toxin Respiratory toxin Immunotoxin Reproductive toxin	YES	NO
Dioxins (g/year)	0.7 g (See A note or two about dioxin emissions, following page)	.024 g (See A note or two about dioxin emissions, following page)	Carcinogen toxin Developmental toxin Respiratory toxin Endocrine toxin Reproductive toxin	YES	NO

A note or two about dioxin emissions:

Dioxins are toxic at a ratio of 1 to 1 trillion – that's 1 to 1,000,000,000,000.⁵² So whereas .024 *grams* (emissions of dioxin for a year) may seem small, we're really looking at a measurement of 240,000,000,000 *picograms* –the unit used to measure dioxin. This new number will give you a slightly different picture of the situation than .024 grams.

Consider this:

"By disrupting hormone receptor sites, dioxin can literally change the functioning and reproduction of our cells. There is no safe dose; our own bodies have no defence against it – it acts at a molecular level, exhibiting toxic effects at concentrations of one part per trillion [1,000,000,000,000] – a drop in 300 Olympic-sized swimming pools."⁵³

⁵² Thomas, Pat (2007) and Connett, Dr. Paul (1998).

⁵³ Toronto STAR (May 31, 2007).

COMMENTS ABOUT EMISSIONS FROM DURHAM / YORK

In answering this question about incinerator emissions, **Why can't you provide specific details outlining the emission quantities of the facility?**⁵⁴, the Regions answer:

*"...In order to provide specific emissions details, the type of thermal treatment technology that will be used for this facility, such as incineration, gasification or plasma needs to be chosen. This will take place during the Request for Proposal process, scheduled to be finalized early 2008. Once a technology and vendor is selected, the emissions data specific to this facility will be compiled."*⁵⁵

Compare the above statement with these below, also from the Regions' *Frequently Asked Questions* on their waste website:

*"Throughout its lifetime a thermal facility will release less greenhouse gas than the current waste management practices of trucking the waste to remote sites and landfilling it."*⁵⁶ ⁵⁷

*"The emissions you see coming out of the stacks of similar facilities are mostly water vapour."*⁵⁸ ⁵⁹

*"These facilities emit very small quantities of dioxins but these chemicals are also emitted by other sources as well. The annual quantity of dioxins emitted by thermally treating the residual waste from a typical household is equivalent to that same household burning approximately 15 logs in a woodstove or fireplace."*⁶⁰ ⁶¹

⁵⁴ Durham and York Regions (2007).

⁵⁵ Durham and York Regions (2007).

⁵⁶ Durham and York Regions (2007).

⁵⁷ This comment embraces the myths that our choice is only one between landfill and incineration, and that landfill is worse than incineration. See my report, *Debunking the Myths of Incineration* for comments and evidence proving that these assumptions are not true.

⁵⁸ Durham and York Regions (Nov 10, 2007).

⁵⁹ This comment embraces an incineration myth as well. See my report, *Debunking the Myths of Incineration* for comments and evidence proving that these assumptions are not true.

⁶⁰ This comment embraces the myth that it is okay to add more dioxins to the atmosphere because other sources already do so. See my report, *Debunking the Myths of Incineration* for comments and evidence proving that these assumptions are not true.

Now, besides the questionable truth, flawed logic, omission and outright manipulation in these answers, we have to ask ... how come Durham and York Regions are contradicting themselves here? In effect, they are saying that they **can't** comment on specific emissions and then they turn around and do just that - commenting on VERY specific emissions (e.g., right down to a comparison to burning 15 logs in fireplaces, contrasting to landfill, and the specious at best 'water vapour' comment. I am reminded here of something a friend of mine said: "The best way to tell a lie is to include a little bit of the truth."⁶²

It is interesting the 'truths' that Durham and York Regions chose and do not chose to share with the public.

⁶² My friend Donna!

COMMENTS ON THE MINISTRY OF THE ENVIRONMENT

According to the Regions, “**Air emissions [from the incinerator] will meet ALL of the strict guidelines and standards set out by the Ontario Ministry of the Environment.”**⁶³

This comment presupposes that the Ministry of the Environment’s guidelines are indeed strict and will adequately protect the public.

So let’s munch on that a bit...

In its guidelines for the Combustion and Air Pollution Control Requirements for New Municipal Waste Incinerators, the Ministry of the Environment sets out eight (8) chemicals / pollutants that must be monitored and must meet emission levels set by the Ministry:⁶⁴

- Particulate matter
- Cadmium
- Lead
- Mercury
- Dioxins and furans
- Hydrochloric acid
- Sulphur dioxide
- Nitrogen oxides
- Organic matter⁶⁵

Missing just about everything

It is interesting to note that four of these – cadmium, lead, mercury and dioxins – are listed in the dirty six dozen by CELA.⁶⁶ And for dioxins there is no level is safe.⁶⁷ Yet, the Ministry endorses allowable limits of these emissions.

It is all the more alarming to note that the incineration emissions list prepared by the Global Alliance for Incinerator Alternatives / Global Anti-Incinerator Alliance includes about 180 chemicals and pollutants that are released from incinerators compared to the eight that the Ministry addresses in its “strict guidelines and standards.”⁶⁸

⁶³ Durham and York Regions (2007).

⁶⁴ Province of Ontario, Ministry of Health (2004).

⁶⁵ Province of Ontario, Ministry of Health (2004).

⁶⁶ Cooper, Kathleen (2005).

⁶⁷ Toronto STAR (May 31, 2007).

⁶⁸ Durham and York Regions (2007).

Add to this the fact that it is estimated that 88 to 90% of components making up incinerator emissions are unknown⁶⁹ and that there is little to no data available regarding the effects of the combining of these chemicals - which happens in the process of incineration⁷⁰ - and we have gone well past alarming to truly fearful.

How else is the Ministry of the Environment protecting us from incinerator emissions? Here are just a few examples, taken from the the "strict guidelines and standards:"⁷¹

- The "Ministry **encourages** [emphasis mine] the installation of continuous monitoring on all incinerators."⁷²
- The parameters set out for continuous monitoring of incinerator "**may be considered** [emphasis mine]."⁷³
- "Continuous monitoring **should** be located properly to measure the relevant parameters and **should** be equipped with recording devices for subsequent reference and analysis...and **should** correspond with the provisions for the Environment Canada document called...[emphasis mine]."⁷⁴
- After initial testing of emissions within six months of start-up, "source emissions tests to demonstrate performance shall be repeated at a frequency of at least **once a year** [emphasis mine]."⁷⁵

⁶⁹ British Society for Ecological Medicine (2005).

⁷⁰ British Society for Ecological Medicine (2005); David Suzuki Foundation et al (undated; data sources cited 1994 to 2006); Friends of the Earth Scotland (2002); Swedish Environmental Protection Agency (2005); UNEP's Information Unit for Conventions (2005); Carter-Whitney, Maureen (2007); Cooper, Kathleen (2005).

⁷¹ Durham and York Regions (2007).

⁷² Province of Ontario, Ministry of the Environment (2004).

⁷³ Province of Ontario, Ministry of the Environment (2004).

⁷⁴ Province of Ontario, Ministry of the Environment (2004).

⁷⁵ Province of Ontario, Ministry of the Environment (2004).

- If the design of an incineration may not allow consistent good combustion, the Ministry **may** require measuring emissions for the byproducts of incomplete combustion, “such as carbon monoxide, benzo(a)phenol, biphenyl, naphthalene, formaldehyde and odour [emphasis mine and the Ministry’s].”⁷⁶ Please note that except for odours, all of these emissions are in the list of toxins in my report (page 7 to 11) that are of harm to child development⁷⁷ and carbon monoxide is one of the ‘dirty six dozen’.⁷⁸
- If an incinerator achieves low dioxin and furan measures for five consecutive years, they ***no longer have to text for dioxins and furans annually*** [emphasis mine].⁷⁹
- In providing guidelines for gas residence time (vital to minimize dioxin formation) the Ministry states that one second is ***“generally considered adequate*** to provide high efficiency incineration [emphasis mine].”⁸⁰
- The Ministry states, “Air pollution control systems for incinerators shall be designed to operate on a continuous basis, as ***much as possible***, whenever there is waste burning in the incinerator [emphasis mine].”⁸¹
- **“Incinerator operators** shall analyze bottom and fly ashes sent to disposal for leachate toxicity and ultimate analysis during performance tests or at the direction of the Director of the ministry’s Environmental Assessment and Approvals Branch.”⁸²

⁷⁶ Province of Ontario, Ministry of the Environment (2004).

⁷⁷ Cooper, Kathleen (2005).

⁷⁸ Cooper, Kathleen (2005).

⁷⁹ Province of Ontario, Ministry of the Environment (2004).

⁸⁰ Province of Ontario, Ministry of the Environment (2004).

⁸¹ Province of Ontario, Ministry of the Environment (2004).

⁸² Province of Ontario, Ministry of the Environment (2004).

Too many 'shoulds' and 'mays'

Now, I don't know about you, but I think that there are WAY too many 'shoulds' and 'mays' in these "strict guidelines and standards" not to the hard line language of 'encouraging', 'generally adequate' and 'as much as possible.' There aren't an awful lot of what we would expect from "strict guidelines and standards" – the 'musts' and 'or elses'.

Ash issues

The last point in particular is a scary one ... that it is those who are operating the incinerator who will be testing the ash and who are responsible to ensure that the ash does not constitute a health or environmental threat. Yet how can we believe that the operators will take the dangers of ash seriously when they say:

"The largest portion of this will be a non-toxic bottom ash, which can be used as a landfill cover or, in some jurisdictions, as a construction aggregate."⁸³

The Regions make this statement despite solid evidence that bottom ash as well as fly ash also contains toxins – bottom ash is considered toxic residue in the European Union⁸⁴ - as well as significant levels of heavy metals and other chemical contaminants.⁸⁵ Would you like your street made out of such materials?

For more evidence

For more evidence and commentary proving that the Ministry of the Environment will not protect us, please see my first report, *Debunking the Myths of Incineration*.

⁸³ Durham and York Regions (2007).

⁸⁴ Thomas, Pat (2007).

⁸⁵ Global Alliance for Incinerator Alternatives / Global Anti Incinerator Alliance (2003).

COMMENTS ON RISK EVALUATION

"There is an urgent need for more research and better monitoring, including biomonitoring, of chemical exposures, with a child health focus. The overwhelming lack of monitoring that occurs following what is widely considered to be the inexact 'science' of Risk Assessment, is a major omission. ***It is an understatement to say that Risk Assessment lacks accuracy.*** [Emphasis mine]

The corresponding lack of basic data collection is a serious gap in the knowledge-development chain. Problems exist not only with basic data collection, but also with the lack of methods to assess multiple exposures to substances with multiple effects."⁸⁶

"The level of scientific ignorance across this vast field, in the opinion of many health and environmental professionals and organizations, is frighteningly high. Yet, what is known about the toxic effects of a relatively small number of environmental contaminants and the constituents of consumer products is deeply troubling. While scientific inquiry continues, exposure also continues, and data collection about chemical exposure is inadequate."⁸⁷

"The Risk Assessment of toxic substances has too often involved a 'wait and see' approach in which exposure continues until enough evidence of harm exists before regulatory action is taken. The history of lead in gasoline is a case in point. After sixty years of exposure and nearly thirty years of research, amid repeated calls for the precautionary step of eliminating a developmental neurotoxin from the environment, regulatory action to eliminate lead from gasoline did not occur until compelling evidence existed that millions of children were affected."⁸⁸

⁸⁶ Cooper, Kathleen (2005).

⁸⁷ Same as above.

⁸⁸ Same as above.

(Lead is listed in the Swedish Environmental Protection Agency's 2005 Swedish Waste Plan as a major emission from the country's 29 incinerators. In 2004, incinerators in Sweden emitted 54 kg of lead. Lead is also listed in the city of Detroit's 2007 Future Solid Waste Plan as an incinerator emission: "The Detroit incinerator is permitted to release 3.6 million pounds of regulated toxins per year. More than 50,000 pounds of these legal pollutants are classified as hazardous, including lead, mercury, cadmium, chromium and hydrogen chloride."⁸⁹)

"It seems clear that an overall paradigm shift is necessary. There is an urgent need to consider the use and emissions of toxic substances much more broadly than simply as end-of-pipe environmental contaminants. Consideration of environmental and human health impacts is necessary across the entire lifecycle of substances, from their extraction from natural sources, their synthesis in the lab, and through all manner of manufacture, use, reuse, recycling and disposal. Risk Assessment involves a 'science-based' regulatory response at a narrow point in this cycle, and demands a high degree of scientific proof of harm at the same time as the information base upon which it relies is extremely limited."⁹⁰

For more critiques of risk assessment in general and the Generic Human Health and Ecological Risk Assessment Study prepared for Durham-York Residual Waste Study in particular see the section, *Assessing the Risk Assessment* in my report, *Debunking the Myths of Incineration*.

⁸⁹ Detroit, City of (2007).

⁹⁰ Cooper, Kathleen (2005).

CONCLUSIONS

The findings of this report speak for themselves. I was able to identify 53 chemicals and pollutants that are strongly suspected or have been confirmed as toxins affecting children and their development. Keeping in mind that this is a conservative list – refer to the explanation why on page 6 – it is well and beyond me why the ‘solution’ of incineration would ever be considered even in a perfect world free of pollution and illness, let alone in our already overburdened skies where rates of so many illnesses and disease are skyrocketing.

These findings are even more alarming when taken in context with real incinerator emissions and the limitations of the study approach taken by the Regions, Ministry of the Environment protections and the risk assessment process.

Why would we even take the chance when there are other options available to solve our ‘waste problem’, and those alternatives are superior to incineration in every way?⁹¹

For our future, and our children’s future, the costs of incineration are much too high.

“In court, a person is innocent until proven guilty. Chemicals suspected of bioaccumulating, persisting in the environment, and harming human beings and animals do not deserve that kind of protection.”

United Nations ⁹²

⁹¹ See my report, Debunking the Myths of Incineration for more details for citations and evidence to back up this statement.

⁹² United Nations Environment Program (UNEP) and UNEP’s Information Unit for Conventions (2005).

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PDF copies of all references are available upon request.