NPRI Data Search

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Data as of 15 December 2001

Ontario Power Generation Inc - Nanticoke Generating Station
NPRI ID - 1861
P.O. Box 2000
Nanticoke, ON
N8A 1L0
Internet: power.opg.com

Click here for more facility information.
Click here to see several years of data.

2000 Facility Substance Summary

Click on a CAS Number or Substance Name for Substance-Specific Release Details

CAS Nr.	Substance Name	On-Site Releases	Transfers for Disposal	Transfers for Recycling	Units
	Sort	Details	Details	Details	
194-59-2	7H-Dibenzo(c,g)carbazole*	11.00	0.00	5.00	kg
NA - 16	Ammonia (Total)	2.19	0.00	0.00	tonnes
NA - 02	Arsenic (and its compounds)*	15.98	0.00	6.31	tonnes
56-55-3	Benzo(a)anthracene*	1.00	0.00	0.00	kg
218-01-9	Benzo(a)phenanthrene*	0.00	0.00	0.00	kg
50-32-8	Benzo(a)pyrene*	0.00	0.00	0.00	kg
205-99-2	Benzo(b)fluoranthene*	1.00	0.00	0.00	kg
192-97-2	Benzo(e)pyrene*	2.00	0.00	1.00	kg
191-24-2	Benzo(g,h,i)perylene	2.00	0.00	1.00	kg
205-82-3	Benzo(j)fluoranthene*	0.00	0.00	0.00	kg
207-08-9	Benzo(k)fluoranthene*	0.00	0.00	0.00	kg
NA - 04	Chromium (and its compounds)*	100.23	0.00	39.69	tonnes
NA - 05	Cobalt (and its compounds)	32.77	0.00	13.08	tonnes
NA - 06	Copper (and its compounds)	87.65	0.00	31.35	tonnes
224-42-0	Dibenz(a,j)acridine*	11.00	0.00	5.00	kg
53-70-3	Dibenzo(a,h)anthracene*	0.00	0.00	0.00	kg
189-55-9	Dibenzo(a,i)pyrene*	0.00	0.00	0.00	kg
206-44-0	Fluoranthene*	3.00	0.00	0.00	kg
118-74-1	Hexachlorobenzene*	279.70	0.00	112.80	g
7647-01-0	Hydrochloric acid	6781.51	0.00	0.00	tonnes
7664-39-3	Hydrogen fluoride*	427.89	0.00	0.00	tonnes
193-39-5	Indeno(1,2,3-CD)pyrene*	1.00	0.00	0.00	kg
NA - 08	Lead (and its compounds)*	31.13	0.00	12.40	tonnes
NA - 09	Manganese (and its compounds)	127.24	0.00	50.97	tonnes
NA - 10	Mercury (and its compounds)*	428.00	0.00	80.00	kg
NA - 11	Nickel (and its compounds)*	56.80	0.00	22.55	tonnes
198-55-0	Perylene*	0.00	0.00	0.00	kg
85-01-8	Phenanthrene*	19.00	0.00	5.00	kg
NA - D/F	Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans*	3.23	0.00	1.30	g TEQ
129-00-0	Pyrene*	3.00	0.00	0.00	kg
NA - 12	Selenium (and its compounds)	15.95	0.00	4.06	tonnes
7664-93-9	Sulphuric acid	412.78	0.00	0.00	tonnes
NA - 14	Zinc (and its compounds)	68.66	0.00	25.03	tonnes

UP THE STACK: Coal-Fired Electricity's Toxic Impact

by Sarah Rang
Environmental Economics International

ACKNOWLEDGEMENTS

The OCAA would like to thank Angelo Castellan, Director, Environment Division of Ontario Power Generation and Mark Winfield, Acting Policy Director, Environmental Governance, Pembina Institute for their thoughtful comments on an earlier draft of this report. Commenters do not assume any responsibility for the final content or accuracy of this report.

The Ontario Clean Air Alliance gratefully acknowledges the generous financial support of the George Cedric Metcalf Charitable Foundation, the Helen McCrea Peacock Foundation (managed by the Toronto Community Foundation), Laidlaw Foundation, Joyce Foundation and the Toronto Atmospheric Fund, which made the research, writing and production of this report possible.

TORONTO Atmospheric Fund

ABOUT THE ONTARIO CLEAN AIR ALLIANCE

The Ontario Clean Air Alliance (OCAA) is a coalition of health, environmental and consumer organizations, faith communities, municipalities, utilities, unions and individuals working for cleaner air through strict emission limits and the phase-out of coal in the electricity sector. Our partner organizations represent over six million Ontarians.

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EXECUTIVE SUMMARY

Releases from Ontario Power Generation's coal-fired plants accounted for a large percentage of the total pollutant releases for Ontario and Canada reported to the National Pollutant Release Inventory in 1999 and 2000. Ontario Power Generation's (OPG's) coal-fired facilities are often in the top five in Ontario and Canada for releases of many chemicals.

Air releases from OPG's coal-burning facilities are greater than those from all sources in British Columbia combined. In fact, OPG's Nanticoke coal-fired power plant on Lake Erie is ranked #1 in Canada for releases to the air in 1999. The air releases from this single facility were larger than the air releases of a number of provinces, including Manitoba, Nova Scotia, Saskatchewan and New Brunswick.

Releases by industry for 268 chemicals were reported to the NPRI in 2000, including releases of many persistent toxic chemicals. However, NPRI reporting on releases of many of the key smog-producing chemicals, including nitrogen oxides, particulates and sulphur dioxide, and key greenhouse gases such as carbon dioxide and methane, is not currently required. This report summarizes the data reported by coal-burning OPG facilities to the NPRI in 1999 and 2000.

Based on NPRI reporting in 2000, in Ontario OPG coal fired facilities account for:

- 19% of Ontario's releases to the air
- 14% of Ontario's total releases to air, land and water
- 19% of Ontario's total dioxins and furans
- 14% of hexachlorobenzene releases
- 22% of mercury releases
- 68% of chromium releases
- 22% of nickel releases
- 28% of arsenic releases
- 92% of hydrogen chloride releases
- 87% of hydrogen fluoride releases
- 18% of sulphuric acid releases

In Ontario, in 2000 total releases from Nanticoke rank:

- # 3 for dioxin and furans
- # 6 for hexachlorobenzene
- # 2 for mercury
- # 1 for chromium
- # 3 for nickel
- # 4 for arsenic
- # 1 for hydrochloric acid
- # 1 for hydrogen fluoride
- # 4 for sulphuric acid

INTRODUCTION

Each year, Ontario Power Generation along with more than 2,000 other facilities must report its releases and transfers of 268 chemicals to the federal National Pollutant Release Inventory (NPRI). Each facility reports the amount of each chemical released to the air, land, water and injected underground at the facility site. The amount of each chemical that a facility transfers off-site for treatment, sewage, disposal, recycling or energy recovery is also reported.

Data from the NPRI is useful for identifying releases and transfers of chemicals from facilities. However, there are several limitations to NPRI data:

- it does not cover all chemicals known to be of environmental or health significance (including many of the smog and greenhouse gas chemicals)
- it does not cover all sources, only those meeting certain thresholds (generally facilities with at least 10 employees and 10 tonnes of chemicals released, manufactured or otherwise used)
- the data are self reported and a variety of different methods are used to estimate amounts.
- the data do not include emissions from mobile sources such as cars or trucks or from natural sources such as forest fires.

For more information on the NPRI, see Environment Canada's web site at **www.ec.gc.ca/pdb/**. For more information on a particular chemical, ranking or environmental and health rankings see **www.pollutionwatch.org** (maintained by the Canadian Environmental Law Association, Canadian Institute for Environmental Law and Policy, Environmental Defence Canada and Environmental Defense). Each of these websites provides a breakdown of chemical releases and transfers by facility.

There are some notable differences between the 1999 and the 2000 NPRI data. For the year 2000, several environmentally important chemicals, including dioxins and furans, have been added and reporting thresholds for some pollutants have been lowered.

For the purposes of this research, we have used the NPRI to answer the following questions:

1. What percentage are releases from OPG coal-burning facilities of national and provincial total releases ?

2. What percentage are releases from OPG coal-burning facilities of the national and provincial total releases of :

    2.1) Dioxins and furans
    2.2) Hexachlorobenzene
    2.3) Mercury
    2.4) Metals – chromium, nickel and arsenic and their compounds
    2.5) Acid gases – hydrochloric acid, hydrogen fluoride and sulphuric acid

RESULTS

1.0 Total Releases and Transfers – 2000

Approximately 2,000 facilities in Canada released more than 372,513 tonnes of chemicals in 2000. In addition to these releases at the facility site, 81,404 tonnes were shipped off-site for treatment or disposal. More than 1 million tonnes of chemicals were also shipped off-site for recycling and energy recovery.

Total releases are the sum of all chemicals emitted to air, land, water and underground injection at the facility site. Transfers are chemicals sent off-site as sewage or for treatment or disposal. (See the glossary on page 17 for a fuller explanation of these terms). Once a facility has met the threshold requiring it to report on an NPRI substance, any release or transfer of the pollutant must be reported.

Table 1: The Contribution of Ontario Power Generation Facilities to Releases and Transfers in Ontario and Canada (units are tonnes based on 2000 NPRI data from Environment Canada)

	Total On-Site Releases	Air Releases	Water Releases	Land Releases	Transfers	Recycling and Energy Recovery
Canada	372,512.9	128,674.6	45,242.7	34,842.0	81,403.8	1,131,830.7
Ontario	84,423.5	60,396.8	13,582.9	10,362.2	49,144.7	125,078.0
British Columbia	122,017.1	10,578.2				
New Brunswick	7,313.4	5,306.8				
OPG:						
• Nanticoke	8,161.3	7,640.2	11.1	509.9	0	205.5
• Lambton	2,774.9	2,423.9	8.7	342.4	0	77.3
• Lakeview	1,216.7	1,214.6	2.1	0	0	80.5
• Thunder Bay	16.6	9.6	0	7.0	0	7.8
• Atikokan	10.6	6.0	0	4.6	0	3.2
Total Coal OPG	12,180.1	11,294.3	21.9	863.9	0	374.3
Coal OPG as % of Ontario	14.4%	18.7%	0.2%	8.3%	0%	0%
Coal OPG as % of Canada	3.3%	8.8%	0%	2.5%	0%	0%

Note: Total releases are the sum of air, land, water and underground injection releases. The province of Ontario and OPG facilities do not report any chemicals injected underground. The total amount of chemicals injected underground in Canada is 163,589.3 tonnes in 2000. The totals of these release sub-components may not add to the total on-site release because releases less than one tonne may be reported as an aggregate amount.

From Table 1, we can conclude that Ontario Power Generation five coal-burning plants are responsible for:

- 9% of Canada's releases to the air
- 19% of Ontario's releases to the air

- 3% of Canada's total releases to the air, land and water in 2000
- 14% of Ontario's total releases to the air, land and water in 2000

OPG's five coal plants emit more air pollutants than are released by all NPRI-reporting sources in the entire province of British Columbia (B.C. air releases were 10,578.2 tonnes). In fact, air releases from OPG's Nanticoke Station alone are larger than the air releases from many provinces including New Brunswick, Manitoba, Saskatchewan, and Nova Scotia. (New Brunswick air releases were 5,306.8 tonnes; Manitoba's air releases were 4,263.1 tonnes; Saskatchewan air releases were 3,010.3 tonnes; and Nova Scotia air releases were 4,391.1 tonnes).

Nanticoke alone is responsible for:

- 6% of Canada's releases to the air
- 13% of Ontario's releases to the air
- 2% of Canada's total releases to the air, land and water
- 10% of Ontario's total releases to the air, land and water

Of the 12,180 tonnes of pollutants reported released by OPG coal-burning facilities in 2000, 11,294 tonnes (92.7%) were releases to air.

2.0 Ranking of OPG Facilities Based on Total and Air Releases – 1999

Coal-fired OPG facilities are also in the lists of top polluting facilities for both Canada and Ontario in 1999. In fact, air releases from Nanticoke were the largest of any facility in Canada and Ontario in 1999. Table 2 uses 1999 data due to the difficulty in aggregating and ranking 2000 data by facility for multiple pollutants.

Of the top ten facilities on the NPRI list for total releases, OPG's Nanticoke plant ranks #6 and is the only facility where the vast majority of releases are to air (94% of total releases at Nanticoke are releases to air). Of the other top ten facilities, the Trans Canada Midstream and Westcoast Gas Services gas processing plants report that more than 99% of their total releases are in the form of underground injection (mainly hydrogen sulphide). Safety Kleen is a landfill/incinerator site where more than 99% of total releases are from chemicals sent to landfill (land releases). Secal is an electro-chemical plant where 99% of total releases are from land releases. Only the Agrium nitrogen fertilizer plant has significant air releases, with 64% of reported releases to air.

Table 2: Rankings of Ontario Power Generation's Top Polluting Coal Facilities Based on Total Releases and Air Releases in 1999 (based on 1999 NPRI data from Pollutionwatch.org)

	Total Releases – 1999		Air Releases – 1999	
OPG Coal-Fired Plant	**Canada**	**Ontario**	**Canada**	**Ontario**
Nanticoke	# 6	# 2	# 1	# 1
Lambton	# 22	# 10	# 14	# 8
Lakeview	# 30	# 12	# 15	# 9

2.1 Dioxins and Furans

What percentage are releases from OPG coal-burning facilities of the national and provincial total releases of dioxins and furans?

Dioxins and furans are a group of chemicals in which 17 members of the group are considered highly toxic. Polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) are persistent and bioaccumulative. In Canada, PCDD and PCDF are considered toxic (using the Canadian Environmental Protection Act (CEPA) definition) and scheduled by the Government of Canada for virtual elimination from the environment. One member of the dioxin family, 2,3,7,8-TCDD is considered the most toxic of all members and a carcinogen. Other members of the family may also be carcinogenic.

Dioxins and furans are also associated with endocrine disruption, immune system suppression and developmental toxicity, cardiovascular disease and diabetes. Some chemicals can interact with the endocrine system of many species and adversely affect growth, development or reproduction. In some parts of Canada, endocrine-disrupting chemicals such as PCBs, certain dioxins and pesticides have been shown to reduce thyroid and immune functioning and have feminized fish and wildlife.

Dioxins and furans are targeted for global reduction through the UN-ECE-Persistent Organic Protocol. Dioxins and furans are not produced deliberately, but generally are the products of incomplete combustion. Incinerators, steel mills and coal-burning utilities are some of the major sources of dioxin and furans.

Because dioxins and furans are often present as mixtures and group members have varying toxicity, they are reported to the NPRI using a "grams of toxicity equivalent" (TEQ) measure. The amount of each form of dioxin is multiplied by a toxicity factor to get a toxicity-weighted amount. These amounts are then added together to get a total amount for the mixture and it is this total amount that is reported to the NPRI.

The reporting of dioxin and furans also differs from other NPRI reporting. Only certain types of industries are required to report dioxins and furans, and some of these industries report regardless of their number of employees or amount of dioxins and furans released. Industries that are required to report dioxins and furans to the NPRI (regardless of the number of employee hours) are non-hazardous solid waste incineration of more than 100 tonnes per year; biomedical/hospital waste incineration of more than 100 tonnes per year; hazardous-waste incineration; sewage-sludge incineration; and wood preservation using pentachlorophenol.

In addition to these industries, the following sectors must also report dioxins and furans if they meet the employee threshold: base-metal smelting, smelting of secondary lead and secondary aluminum; manufacturing of iron using a sintering process; using an electric arc in steel manufacturing or foundries; producing magnesium; manufacturing of Portland cement; production of chlorinated organic solvents or monomers; combustion of fossil fuel in a boiler unit for the purpose of production of electricity with a generating capacity of 25 megawatts or greater of electricity; combustion of hog fuel; and combustion of fuel in kraft liquid boilers used in pulp and paper sector. Therefore facilities that are reporting dioxins and furans are a subset of all facilities required to report to the NPRI.

Table 3: Contribution of Dioxins and Furans from Ontario Power Generation Facilities in 2000 (units are grams of Toxicity Equivalent [TEQ] as reported to NPRI 2000 – considered polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans)

	Dioxins and Furans – Grams TEQ						
		On-Site Releases	Air Releases	Water Releases	Land Releases	Transfers	Recycling
Canada		210.23	103.89	1.17	86.59	166.18	2.90
Ontario		33.08	27.75	0.26	5.07	77.39	2.90
Ontario Power Generation [1]	**Ontario Ranking***						
• Nanticoke	# 3	3.23	0.01	0	3.22	0	1.30
• Lambton	# 6	1.93	0.21	0	1.72	0	0.27
• Lakeview		0.01	0.01	0	0	0	0.70
• Thunder Bay	# 11	0.71	0.62	0	0.08	0	0.09
• Atikokan	# 17	0.41	0.36	0	0.05	0	0.04
Total Coal OPG		6.29	1.21	0	5.07	0	2.40
Coal OPG as % of Canada		3.0%	1.2%	0%	5.9%	0%	82.8%
Coal OPG as % of Ontario		19.0%	4.4%	0%	100%	0%	82.8%

*based on total releases

Ontario Power Generation's coal-burning facilities are responsible for a large percentage of the total dioxins and furans released in Ontario in 2000. Its coal power plants contributed 19% of Ontario's total releases of dioxin and furans and 4% of the air releases of dioxin and furans. The coal power plants also are responsible for 100% of dioxin and furans releases to land in Ontario. The large amounts of dioxin being shipped off-site for recycling at OPG plants is unusual — very few other facilities in Ontario report recycling of dioxin and furans.

Nanticoke ranks #3 in Ontario for total releases of dioxin and furans in 2000. Most of the dioxins and furans from Nanticoke are released to land rather than air (3.22 g TEQ to land of the total 3.23 g TEQ). Nanticoke releases rank behind Stelco Inc.'s Hilton Works with 6.25 g TEQ dioxin and furans and Canadian Waste Services Inc.'s SWARU Incinerator with 5.49 g TEQ dioxins and furans, both in Hamilton.

In Canada, of OPG's coal plants, Nanticoke ranks #17 for total releases of dioxin and furans in 2000, followed by #25 for Lambton, #46 for Thunder Bay, and #57 for Atikokan.

2.2 Hexachlorobenzene

What percentage are releases from OPG coal-burning facilities of the national and provincial total releases of hexachlorobenzene?

Hexachlorobenzene (HCB) is a CEPA toxic chemical that the government of Canada targets for virtual elimination. HCB persists in the environment and bioaccumulates. Because it is highly volatile, HCB can travel long distances in the air. HCB is persistent, so it breaks down very slowly in the environment. It does not dissolve very easily in water, so often sticks to soil or sediment. Because of its ability to bioaccumulate, high levels of HCB can often be found in fish, birds, caribou and

plants. It is one of the chemicals on the UN- ECE Persistent Organic Pollutants treaty (one of the "dirty dozen"). The International Agency for Research on Cancer considers HCB a possible human carcinogen.

HCB is formed as a byproduct when other chemicals such as pesticides are produced; in wood preserving plants; in chloralkali plants; in refineries; in coal-fired utilities; some metal manufacturing; and waste burning. HCB has not been used as a commercial product in Canada since 1972.

The reporting for HCB is similar to dioxin and furan reporting. Only specified industries are required to report and some of these industries report regardless of number of employees and amount of HCB produced. Releases and transfers of HCB are reported in grams.

Table 4: Releases and Transfers of Hexachlorobenzene from Ontario Power Generation in 2000 (units are grams as reported to NPRI 2000)

		Hexachlorobenzene – Grams					
		On-Site Releases	Air Releases	Water Releases	Land Releases	Transfers to Disposal	Recycling
Canada		37,798.09	37,132.98	174.05	491.05	10,449.16	250.33
Ontario		4,869.76	4378.65	0.05	491.05	75.48	250.33
Ontario Power Generation [2]	**Ontario Ranking***						
• **Nanticoke**	# 6	279.70	0	0	279.70	0	112.80
• **Lambton**	# 7	209.86	2.11	0.05	207.70	0	32.74
• **Lakeview**	# 29	1.13	1.13	0	0	0	53.45
• **Thunder Bay**	# 13	125.82	123.90	0	1.92	0	2.14
• **Atikokan**	# 16	71.08	69.35	0	1.73	0	1.20
Total Coal OPG		687.59	196.49	0.05	491.05	0	202.33
Coal OPG as % of Canada		1.8%	0.5%	0.0%	100%	0%	80.8%
Coal OPG as % of Ontario		14.1%	4.5%	100%	100%	0%	80.8%

*based on total releases

Coal burning OPG facilities are responsible for almost 2% of Canada's total releases of HCB and 14% of Ontario's total releases of HCB. OPG coal-burning facilities are responsible for 4% of HCB releases to the air in Ontario.

Similar to the situation for dioxin and furans, OPG facilities report a large amount of HCB being recycled. In fact, coal-burning OPG facilities account for more than 80% of the total amount of HCB being recycled in both Canada and Ontario. Nanticoke reports almost half of this Ontario total. Not many other facilities in Canada report recycling of HCB, a persistent toxic substance.

2.3 Mercury

What percentage are releases from OPG coal-burning facilities of the national and provincial total releases of mercury and its compounds?

Mercury is a neurotoxin and a fetotoxin and can pose a threat to human health and wildlife. Mercury,

like many metals, can be present in different forms and can combine with other compounds. Most mercury released into the atmosphere is inorganic mercury. This inorganic mercury can be transformed by soil and water organisms into the more toxic form of methyl mercury. Methyl mercury can cross the placenta barrier and can affect fetal brain and nervous systems. As mercury bioaccumulates, fish at the top of the food chain can have levels of mercury millions of times higher than in the surrounding water. Mercury contamination is one of the leading causes of fish consumption advisories in the Great Lakes.

Exposure to higher concentrations of mercury has been associated with neurological and developmental damage, including the loss of sensory and cognitive ability, delayed motor and mental development, learning disabilities, tremours, behavioral changes, reproductive difficulties, birth defects and kidney disease.

Mercury is emitted from coal-burning utilities, smelters, incinerators and from products containing mercury. In 2000, recognizing the persistence and toxicity of mercury, the threshold for reporting of mercury and its compounds to the NPRI was lowered from 10,000 to 5 kilograms. This will result in a better picture of mercury emissions in Canada.

Coal-burning OPG facilities are a major source of mercury and its compounds in Ontario. The five coal burning plants contributed almost 22% of the mercury released in Ontario in 2000. In fact, more than one-third of Ontario's air releases of mercury come from OPG's coal-fired plants. Nanticoke is ranked the second largest releaser of mercury in Ontario in 2000. (Safety-Kleen Ltd. in Corunna, Ontario was ranked #1 due to mercury being landfilled at its facility site.)

Table 5: Contribution of Mercury and Its Compounds from Ontario Power Generation in 2000 (units are kilograms as reported to NPRI 2000)

	Mercury and Its Compounds – Kilograms						
		On-Site Releases	Air Releases	Water Releases	Land Releases	Transfers to Disposal	Recycling
Canada		9,067.95	5,981.75	231.46	2,801.14	21,045.64	30,370.17
Ontario		3,863.15	1,589.76	127.25	2,146.14	3,736.13	11,263.81
Ontario Power Generation	**Ontario Ranking***						
• Nanticoke	# 2	428.00	229.00	1.00	198.00	0	80.00
• Lambton	# 3	260.00	174.00	0	86.00	0	13.00
• Lakeview	# 10	55.00	55.00	0	0	0	20.00
• Thunder Bay	# 9	57.00	56.00	0	1.00	0	1.00
• Atikokan	# 13	36.00	35.00	0	1.00	0	1.00
Total Coal OPG		836.00	549.00	1.00	286.00	0	115.00
Coal OPG as % of Canada		9.2%	9.2%	0.4%	10.2%	0%	0.4%
Coal OPG as % of Ontario		21.6%	34.5%	0.8%	13.3%	0%	1.0%

Note: Total releases are the sum of air, land, water and underground injection releases. The province of Ontario and OPG facilities do not report any chemicals injected underground. The total amount of mercury injected underground in Canada is 25.7 kg in 2000. The totals of these release sub-components may not add to the total on-site release because releases less than one tonne may be reported as an aggregate amount.

*based on total releases

For releases in Canada for mercury in 2000, OPG's coal plants ranked as follows:

- #3 Nanticoke
- #8 Lambton
- #29 Thunder Bay
- #32 Lakeview
- #41 Atikokan

2.4 Metals: Chromium, Nickel, Arsenic, and Their Compounds

2.4.1 Chromium and Its Compounds

What percentage are releases from OPG coal-burning facilities of the national and provincial total releases of chromium and its compounds?

Some forms of chromium are more toxic than others. Hexavalent chromium (Cr VI) is the most toxic form and is considered a known human carcinogen. When inhaled at high concentrations, irritation of the nose, lungs, stomach and intestine may occur. When ingested, high concentrations of chromium can cause stomach upsets, ulcers, convulsions, kidney and liver damage and death. Studies on exposure of animals to lower levels of chromium indicate reproductive effects and fetal toxicity.

Metals are reported to the NPRI as metal and its compounds. It is not possible in NPRI reporting to distinguish between the more toxic hexavalent chromium and the less toxic forms. This will be changed for 2002 reporting.

Table 6: Releases and Transfers of Chromium and Its Compounds from Ontario Power Generation in 2000 (units are tonnes as reported to NPRI 2000)

	Chromium and Its Compounds – Tonnes					
		On-Site Releases	Air Releases	Land Releases	Transfers to Disposal	Recycling
Canada		494.75			3,463.20	7,088.34
Ontario		247.04			2,473.14	6,373.42
Ontario Power Generation	**Ontario Ranking***					
• Nanticoke	# 1	100.23	1.69	98.46	0	39.69
• Lambton	# 2	66.64	0.17	66.46	0	10.48
• Lakeview		0.06	0.06	0	0	21.38
• Thunder Bay		NR	NR	NR	NR	NR
• Atikokan		NR	NR	NR	NR	NR
Total coal OPG		166.93	1.92	164.92	0	71.55
Coal OPG as % of Canada		33.7%			0%	1.0%
Coal OPG as % of Ontario		67.6%			0%	1.1%

NR= Chemical not reported

*based on total releases

Coal-burning OPG facilities are responsible for more than two–thirds of all the chromium released in Ontario. Most of the chromium and its compounds released from OPG facilities are sent to the land, rather than the air.

For releases in Canada for chromium and its compounds in 2000, OPG's coal plants ranked as follows:

- #1 Nanticoke
- #2 Lambton

2.4.2 Nickel and Its Compounds

What percentage are releases from OPG coal-burning facilities of the national and provincial total releases of nickel and its compounds?

Breathing high levels of nickel and its compounds may reduce lung function, cause bronchitis, lung cancer and nasal cancer. Ingestion of nickel and its compounds at high levels can lead to stomach problems and blood and kidney damage. High levels of nickel and its compounds may also cause liver, immune system and reproductive harm. Small amounts of nickel are essential for animal nutrition. Nickel may also cause allergic skin rashes. Nickel is considered a CEPA toxic and some forms of nickel are carcinogenic (Group 1).

Coal burning OPG plants are responsible for 13% of total releases of nickel and its compounds in Canada and 22% of Ontario's total nickel releases. Like chromium, most of the nickel released from OPG facilities is sent to the land at the site of the facility, rather than to the air.

Table 7: Releases and Transfers of Nickel and Its Compounds from Ontario Power Generation in 2000 (units are tonnes as reported to NPRI 2000)

	Nickel and Its Compounds – Tonnes						
		On-Site Releases	Air Releases	Water Releases	Land Releases	Transfers to Disposal	Recycling
Canada		778.59				1,067.76	4,803.95
Ontario		472.03				440.58	2,889.19
Ontario Power Generation	**Ontario Ranking***						
• Nanticoke	# 3	56.80	0.78	0.07	55.94	0	22.55
• Lambton	# 4	47.10	0.34	0.01	46.75	0	7.37
• Lakeview	# 45	0.04	0.04	0	0	0	13.36
• Thunder Bay		NR	NR	NR	NR	NR	NR
• Atikokan		NR	NR	NR	NR	NR	NR
Total Coal OPG		103.94	1.16	0.08	102.69	0	43.28
Coal OPG as % of Canada		13.3%				0%	0.9%
Coal OPG as % of Ontario		22.0%				0%	1.5%
NR= Chemical not reported							

*based on total releases

For releases in Canada for nickel and its compounds in 2000, OPG's coal plants ranked as follows:

- ➤ #4 Nanticoke
- ➤ #5 Lambton

2.4.3 Arsenic and Its Compounds

What percentage are releases from OPG coal-burning facilities of the national and provincial total releases of arsenic and its compounds?

Arsenic and its compounds is considered a carcinogen (Group 1) and a CEPA toxic. Only two of the OPG facilities report releases of arsenic and its compounds — Nanticoke and Lambton. Most of the arsenic and its compounds reported by these two facilities is sent to landfill at the site of the facility.

Table 8: Releases and Transfers of Arsenic and Its Compounds from Ontario Power Generation in 2000 (units are tonnes as reported to NPRI 2000)

	Arsenic and Its Compounds – Tonnes						
		On-Site Releases	Air Releases	Water Releases	Land Releases	Transfers to Disposal	Recycling
Canada		297.63				199.08	485.55
Ontario		122.21				94.27	39.45
Ontario Power Generation	**Ontario Ranking***						
• Nanticoke	# 4	15.98	0.27	0.05	15.66	0	6.31
• Lambton	# 3	17.91	0.04	0.01	17.87	0	2.82
Total Coal OPG		33.89	0.31	0.06	33.53	0	9.13
Coal OPG as % of Canada		11.3%				0%	1.9%
Coal OPG as % of Ontario		27.7%				0%	23.1%

*based on total releases

For releases in Canada for arsenic and its compounds in 2000, OPG's coal plants ranked as follows:

- ➤ #8 Nanticoke
- ➤ #7 Lambton

2.5 Acid Gases: Hydrochloric Acid, Hydrogen Fluoride and Sulphuric Acid

2.5.1 Acid Gases – Hydrochloric Acid

What percentage are releases from OPG coal-burning facilities of the national and provincial total releases of hydrochloric acid?

A number of different compounds are reported to the NPRI that have the potential to become acid gases in the atmosphere. These acid gases, including hydrogen chloride, sulphuric acid and nitric acid, can be damaging to our health and the environment. These gases can be irritating to lungs and respiratory systems and play a role in smog formation. These gases can also cause acid rain resulting to damage to lakes, rivers, forests and buildings.

Table 9: Releases and Transfers of Hydrochloric Acid from Ontario Power Generation in 2000 (units are tonnes as reported to NPRI 2000)

	Hydrochloric Acid – Tonnes						
		On-Site Releases	Air Releases	Water Releases	Land Releases	Transfers to Disposal	Recycling
Canada		16,214				4,406	1,365
Ontario		10,637				2,857	824
Ontario Power Generation	**Ontario Ranking***						
• Nanticoke	# 1	6,781	6,781	0	0	0	0
• Lambton	# 2	1,848	1,848	0	0	0	0
• Lakeview	# 3	1,098	1,098	0	0	0	0
• Thunder Bay, Atikokan		NR				NR	NR
Total Coal OPG		9,727	9,727	0	0		0
Coal OPG as % of Canada		60.0%				0%	0%
Coal OPG as % of Ontario		91.4%				0%	0%
NR= Chemical not reported							

*based on total releases

Only three OPG facilities report releases of hydrochloric acid, but these three facilities account for 60% of the total amount of reported hydrochloric acid releases in Canada and almost 92% of Ontario's total releases. All of the hydrogen chloride is released to the air from OPG facilities.

For releases in Canada for hydrochloric acid in 2000, OPG's coal plants ranked as follows:

- ➤ #1 Nanticoke
- ➤ #2 Lambton
- ➤ #4 Lakeview

2.5.2 Acid Gases – Hydrogen Fluoride

What percentage are releases from OPG coal-burning facilities of the national and provincial total releases of hydrogen fluoride?

Hydrogen fluoride is considered a toxic chemical under CEPA. Hydrogen fluoride is highly soluble in water and can damage aquatic and terrestrial plants and ecosystems. Industrial sources of hydrogen fluoride include aluminum smelters, brick plants, and utilities. Skeletal damage (fractures, weakness, crippling) to cattle and other wildlife has been observed around some of these facilities.

The coal-fired OPG plants are a major provincial source of hydrogen fluoride, contributing 87% of all releases of hydrogen fluoride in Ontario. Most hydrogen fluoride is released to the air from OPG facilities.

Table 10: Releases and Transfers of Hydrogen Fluoride from Ontario Power Generation in 2000 (units are tonnes as reported to NPRI 2000)

	Hydrogen Fluoride – Tonnes						
		On-Site Releases	Air Releases	Water Releases	Land Releases	Transfers to Disposal	Recycling
Canada		3,601				1	0
Ontario		683				1	0
Ontario Power Generation	**Ontario Ranking***						
• Nanticoke	# 1	428	428	0	0	0	0
• Lambton	# 2	135	135	0	0	0	0
• Lakeview	# 4	29	29	0	0	0	0
• Thunder Bay	# 8	2	2	0	0	0	0
• Atikokan	# 7	2	2	0	0	0	0
Total Coal OPG		596	596	0	0	0	0
Coal OPG as % of Canada		16%				0%	0%
Coal OPG as % of Ontario		87%				0%	0%

*based on total releases

For releases in Canada for hydrogen fluoride in 2000, OPG's coal plants ranked as follows:

- #2 Nanticoke
- #8 Lambton
- #20 Lakeview
- #28 Atikokan
- #29 Thunder Bay

2.5.3 Acid Gases – Sulphuric Acid

What percentage are releases from OPG coal-burning facilities of the national and provincial total releases of sulphuric acid?

Sulphuric acid can combine with other gases to cause acid rain, resulting in damage to forests, lakes and buildings. Sulphuric acid can also be irritating to human respiratory systems, leading to bronchitis, and emphysema. Exposure may also cause chronic runny nose, tearing of the eyes, nosebleeds and stomach upsets. Higher exposure can lead to fluid buildup (pulmonary edema).

Five coal-fired OPG plants released 946 tonnes of sulphuric acid in 2000, all of it to the air. The five coal plants accounted for 9% of Canada's releases and 18% of Ontario's releases of sulphuric acid. Most sulphuric acid is released to the air.

Table 11: Releases and Transfers of Sulphuric Acid from Ontario Power Generation in 2000 (units are tonnes as reported to NPRI 2000)

		Sulphuric Acid – Tonnes					
		On-Site Releases	Air Releases	Water Releases	Land Releases	Transfers to Disposal	Recycling
Canada		10,479				9,459	41,181
Ontario		5,114				7,138	10,728
Ontario Power Generation	**Ontario Ranking***						
• Nanticoke	# 4	413	413	0	0	0	0
• Lambton	# 3	437	437	0	0	0	0
• Lakeview	# 5	86	86	0	0	0	0
• Thunder Bay	# 16	7	7	0	0	0	0
• Atikokan	# 21	3	3	0	0	0	0
Total Coal OPG		946	946	0	0	0	0
Coal OPG as % of Canada		9.0%				0%	0%
Coal OPG as % of Ontario		18.5%				0%	0%

*based on total releases

For releases in Canada for sulphuric acid in 2000, OPG's coal plants ranked as follows:

- #6 Lambton
- #8 Nanticoke
- #15 Lakeview

ENDNOTES

[1] Contribution of Dioxins and Furans from Ontario Power Generation Facilities in 2000

After reviewing a draft of this report, Ontario Power Generation has indicated that it made a reporting error in the dioxin and furan data for water and land releases and recycling for 2000. OPG states that it did not apply the Toxicity Equivalent Factor to water and land releases and recycling. OPG expects these water and land releases and recycling estimates to be significantly reduced. Until this data is revised and resubmitted to the NPRI office, the dioxin and furan data in this report remain OPG's submission for the year 2000.

[2] Releases and Transfers of Hexachlorobenzene from Ontario Power Generation in 2000

After reviewing a draft of this report, Ontario Power Generation has indicated that it made a reporting error in the HCB data. OPG states that it did not apply the reporting guidance for non-detection and therefore the calculated emissions for HCB were inflated. OPG expects that this change will result in reports of zero emissions of hexachlorobenzene for all plants except Lakeview and Lambton. Until this data is revised and resubmitted to the NPRI office, the HCB data in this report remain OPG's submission for the year 2000.

GLOSSARY

Explanations adapted from *A Citizen's Guide to the National Pollutant Release Inventory* (Canadian Institute for Environmental Law and Policy, May 2000) of the NPRI terms "releases," "transfers" and "recycling":

Once a facility has met the threshold requiring it to report on an NPRI substance, any release or transfer of the pollutant must be reported. If the total release is less than one tonne, the reporter has the option of reporting a total release or transfer, rather than reporting whether it is released to air, water, land, etc.

"Releases" refers to pollutants that are discharged directly at the facility into the environment (air, water, underground injection or land). **"Releases to Air"** are the total of releases from stacks, vents, etc., plus releases to the air as a result of storing or handling the material, plus fugitive releases through leaking pipes, evaporation from surface impoundments, etc., plus spills. **"Releases to Surface Water"** include releases to water through direct discharges, spills or leaks. They do not include discharges to a municipal sewage treatment system or other off-site waste-water treatment facilities. **"Releases to Land"** include on-site landfill, land treatment or farming (where the pollutants are incorporated into the soil), spills and leaks. **"Releases to Underground Injection"** are materials injected on-site into underground wells.

"Transfers" refer to the shipment of a pollutant from one facility to another facility, e.g., to a landfill, incinerator, sewage treatment plant, or **recycling** facility located somewhere else.

"Transfers for Disposal" refers to shipment of materials off-site for final disposal or storage and treatment prior to final disposal.

"Recycling" in the NPRI refers to all activities that keep a material from going to disposal. It includes energy recovery (including energy-from-waste incinerators), recovery of solvents, recovery of other organic substances, recovery of metals and metal compounds, recovery of other inorganic materials, recovery of acids or bases, recovery of catalysts, recovery of pollution abatement residues, and refining or re-use of used oil.

Ontario Clean Air Alliance's Conclusions & Recommendations

The NPRI data make it clear that Ontario Power Generation's coal plants are a leading source of air-pollutant emissions in Canada and Ontario. The range of pollutants released by these plants should prompt a high level of concern. OPG's coal plants are leading sources of everything from persistent bioaccumulative toxins and potentially cancerous metals to acid gases. Worse yet, the picture produced by the NPRI data is only partly complete as the NPRI system does not currently require reporting on major smog-causing emissions, such as releases of nitrogen oxides or sulphur dioxide, or on releases of greenhouse gases, such as carbon dioxide and methane.

However, the picture that the NPRI data does paint is sufficient to demonstrate the need to phase-out the use of coal for electricity generation in Ontario. Conserving energy and replacing coal-fired electricity with renewable power sources such as wind and water power would completely eliminate the slew of pollutants being released by coal plants. Converting coal plants to high-efficiency natural gas units would also significantly help reduce the toxic impact of OPG's coal plants:

- releases of mercury, arsenic and chromium would be completely eliminated.
- releases of dioxins and furans would be virtually eliminated.
- releases of sulphuric acid would be virtually eliminated.

The Ontario government, OPG's sole shareholder, should move quickly on the unanimous recommendation of the Ontario Legislature's Select Committee on Alternative Fuel Sources to phase-out the use of coal for electricity generation in Ontario.
Such a phase-out could be fully implemented at minimal cost by 2008. As a first step, the government should immediately ban non-emergency exports of coal-fired electricity during smog-alert periods in Ontario.

Jack Gibbons, Chair
Ontario Clean Air Alliance

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