

ONTARIO TOXICS REDUCTION ACT
DE BEERS CANADA INC. VICTOR MINE
2013 REPORT ON TOXIC SUBSTANCE ACCOUNTING SUMMARY

INTRODUCTION

In 2009, the Toxics Reduction Act (Act) and its associated regulation (O.Reg. 455/09) were promulgated as part of the Ministry of Environment's (MOE's) toxics reduction strategy, with the purposes of preventing pollution and protect human health and the environment by reducing the use and creation of toxic substances, and to inform Ontarians about toxic substances (TRA 2009, c. 19, s. 1.).

The Act is applicable to manufacturing facilities with North American Industry Classification System (NAICS) codes starting with "31", "32" or "33" and facilities with NAICS codes starting with "212". Regulated substances under the Act include all substances listed in Environment Canada's National Pollutant Release Inventory (NPRI) and O.Reg. 127/01. Forty-seven substances and substance groups were listed in Table A of O.Reg. 455/09 as Phase I priority substances, and reduction plans were prepared and submitted in December 2012. Phase II of the Act required accounting for all other NPRI substances and the TRPs were prepared in 2013.

For De Beers Victor Mine, nineteen substances were determined to be subject to the Toxics Reduction Act, and a total of six Toxic Reduction Plans have been prepared. They include dioxins and furans individual congeners, hexachlorobenzene (HCB), metals (arsenic, cadmium, chromium, cobalt, copper, lead, manganese, nickel, selenium, vanadium and zinc), phosphorous, carbon monoxide and particulate matter (TSP, PM₁₀, and PM_{2.5}).

The annual toxic substance accounting requirements were completed for the 2013 reporting year, and this annual toxic substance accounting summary has been prepared in accordance with the requirements of the Ontario Toxics Reduction Act and Ontario Regulation 455/09.

Further information on the Toxics Reduction Act is provided by the Ministry of the Environment on their website www.ene.gov.on.ca.

BASIC FACILITY INFORMATION

Company Name: DeBeers Canada Inc., Victor Mine
Contact Information: 119 Pine St. South, Suite 310, Timmins, ON. P4N 2K3

Highest Ranking Employee: James Kirby
Mine General Manager
416-645-3888 Ext. 2180
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Technical Contacts: Brian Steinback P. Eng.
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or Terry Ternes P. Geo.
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Parent Company: De Beers Canada Inc.
100% ownership

Address: Suite 900 – 250 Ferrand Dr.
Toronto, Ontario
M3C 3G8

Business Number: 103749735

The facility's NPRI ID: 10984
250 full time employees (equivalent).

Site Location (UTM Coordinates): Zone 17,304227 E and 5856029 N

The NAICS codes applicable to the facility are:

- 21 – Mining, quarrying, and oil and gas extraction
- 2123 – Non metallic mineral mining and quarrying
- 212392 – Diamond Mining

TOXIC SUBSTANCES

The site uses and emits thirteen Phase 1 MOE Toxic compounds and uses or emits six Phase 2 toxic compounds.

The nineteen MOE Toxic Compounds are listed below:

Chromium	NA - 04
Cobalt	NA - 05
Copper	NA - 06
Manganese	NA - 09
Nickel	NA - 11
Vanadium	7440-62-2
Zinc	NA - 14
Arsenic	NA - 02
Cadmium	NA - 03
Lead	NA - 08
Selenium	NA - 12
Dioxins and furans - total	NA - D/F
Hexachlorobenzene	118-74-1
NOx	11104-93-1
CO	630-08-0
TPM	N/A - M08
PM10	N/A - M09
PM2.5	N/A - M10
Phosphorus	NA-22

A total of six Toxic Reduction Plans have been prepared. They include dioxins and furans individual congeners, hexachlorobenzene (HCB), metals (arsenic, cadmium, chromium, cobalt, copper, lead, manganese, nickel, selenium, vanadium and zinc), phosphorous, carbon monoxide and particulate matter (TSP, PM₁₀, and PM_{2.5}).

TRACKING AND QUANTIFICATIONS

The method used to calculate the TRA quantifications was a combination of source testing results, published emission factors and mass balance.

Table 1 is a summary of reported TRA quantities for the 2013 operational year. When compared to the last reported values, the decrease in use and creation of metals, dioxins and furans and

HCB can be attributed to a combination of decrease in loading to the incinerator and updated source testing results. The change in reported values for carbon monoxide and nitrogen oxides created can be attributed to an increase in AN emulsified explosive use. And the increase in Particulate Matter (TSP, PM₁₀, and PM_{2.5}) created is due to an increase in road dust generated through vehicular travel along the unpaved hauling roads.

In the 2013 operational year, there were no out of the ordinary incidents or significant process changes at the facility.

COMPARISON OF TRACKING AND QUANTIFICATION

No changes were made in the quantification and tracking methodology from 2012 to 2013.

DESCRIPTION OF STEPS TAKEN TO ACHIEVE OBJECTIVE AND ASSESS EFFECTIVENESS

There was no technologically feasible reduction strategy objectives identified for the De Beers Canada Inc. and as such there was no economic feasibility study completed for the Phase I or Phase 2 substances.

There are no objectives to track or reduction targets to evaluate.

Table 2 provides a summary of the facility TRA changes and updates which took place in 2013.

Table 1: Comparison of Quantities Reported

Substance	CAS	Description of Processes that Use or Create Substance	Reporting under NPRI Part	NPRI Threshold	2013 Used (tonnes)	Used 2012 - Last Reported Value	% Change	2013 Created (tonnes)	Created 2012 - Last Reported Value	% Change	Contained In Product (tonnes)	Contained in Product 2012 - Last Reported Value	% Change	Reason for Changes
Chromium	NA - 04	Metals contained in Solid waste incinerated	Part 1	10 tonnes (MPO or Transferred to Tailings)	>0-1	>0-1	-73.30	0	0	NA	0	0	NA	Reduced loading to the incinerator
Cobalt	NA - 05	Metals contained in Solid waste incinerated	Part 1	10 tonnes (MPO or Transferred to Tailings)	0.0000	>0-1	-100.00	0	0	NA	0	0	NA	Reduced loading to the incinerator
Copper	NA - 06	Metals contained in Solid waste incinerated	Part 1	10 tonnes (MPO or Transferred to Tailings)	>0-1	>0-1	-17.40	0	0	NA	0	0	NA	Reduced loading to the incinerator
Manganese	NA - 09	Metals contained in Solid waste incinerated	Part 1	10 tonnes (MPO or Transferred to Tailings)	>0-1	>0-1	-93.60	0	0	NA	0	0	NA	update in source testing and reduced loading to the incinerator
Nickel	NA - 11	Metals contained in Solid waste incinerated	Part 1	10 tonnes (MPO or Transferred to Tailings)	>0-1	>0-1	-85.70	0	0	NA	0	0	NA	update in source testing and reduced loading to the incinerator
Phosphorus	NA-22	contained in Solid waste incinerated	Part 1	10 tonnes (MPO or Transferred to Tailings)	>0-1	>0-1	0.00	0	0	NA	0	0	NA	No significant change
Vanadium	7440-62-2	Metals contained in Solid waste incinerated	Part 1	10 tonnes (MPO or Transferred to Tailings)	0.00	0.00	NA	0	0	NA	0	0	NA	No significant change
Zinc	NA - 14	Metals contained in Solid waste incinerated	Part 1	10 tonnes (MPO or Transferred to Tailings)	>0-1	>0-1	9.00	0	0	NA	0	0	NA	No significant change
NOx	11104-93-1	Explosives use, Combustion	Part 4	20 tonnes (Release)	0	0	NA	>10-100	>10-100	63.00	0	0	NA	Increased explosives use
CO	630-08-0	Explosives use, Combustion	Part 4	20 tonnes (Release)	0	0	NA	>10-100	>10-100	50.40	0	0	NA	Increased explosives use
TPM	N/A - M08	Road dust	Part 4	20 tonnes (Release)	0	0	NA	>100-1000	>100-1000	23.40	0	0	NA	Increased vehicle kms travelled on hauling roads
PM10	N/A - M09	Road dust	Part 4	0.5 (Release)	0	0	NA	>100-1000	>100-1000	23.00	0	0	NA	Increased vehicle kms travelled on hauling roads
PM2.5	N/A - M10	Road dust	Part 4	0.3 (Release)	0	0	NA	>10-100	>10-100	13.52	0	0	NA	Increased vehicle kms travelled on hauling roads

Substance	CAS	Description of Processes that Use or Create Substance	Reporting under NPRI Part	NPRI Threshold	2013 Used (kg)	Used 2012 - Last Reported Value	% Change	2013 Created (kg)	Created 2012 - Last Reported Value	% Change	Contained In Product (kg)	Contained in Product 2012 - Last Reported Value	% Change	Reason for Changes
Arsenic	NA - 02	Metals contained in Solid waste incinerated	Part 1B	50 kg (MPO or contained in tailings)	>0-1	>0-1	-20.00	0.00	0.00	NA	0.00	0.00	NA	Reduced loading to the incinerator
Cadmium	NA - 03	Metals contained in Solid waste incinerated	Part 1B	5 kg (MPO or Transferred to Tailings)	>0-1	>0-1	-50.00	0.00	0.00	NA	0.00	0.00	NA	Reduced loading to the incinerator
Lead	NA - 08	Metals contained in Solid waste incinerated	Part 1B	50 kg (MPO or contained in tailings)	>0-1	>1-10	-59.83	0.00	0.00	NA	0.00	0.00	NA	update in source testing and reduced loading to the incinerator
Selenium	NA - 12	Metals contained in Solid waste incinerated	Part 1B	100 kg (MPO or contained in tailings)	>0-1	>0-1	-33.33	0.00	0.00	NA	0.00	0.00	NA	Reduced loading to the incinerator
Substance	CAS	Description of Processes that Use or Create Substance	Reporting under NPRI Part	NPRI Threshold	2013 Used (g)	Used 2012 - Last Reported Value	% Change	2013 Created (g)	Created 2012 - Last Reported Value	% Change	Contained In Product (g)	Contained in Product 2012 - Last Reported Value	% Change	Reason for Changes
1234678-HpCDD(Dioxin)	35822-46-9	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-34.84	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
1234678-HpCDF(Furan)	67562-39-4	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-37.89	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
1234789-HpCDF(Furan)	55673-89-7	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-38.15	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
123478-HxCDD(Dioxin)	39227-28-6	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-39	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
123478-HxCDF(Furan)	70648-26-9	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-45.04	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
123678-HxCDD(Dioxin)	57653-85-7	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-42	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
123678-HxCDF(Furan)	57117-44-9	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-45	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
123789-HxCDD(Dioxin)	19408-74-3	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-39.39	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
123789-HxCDF(Furan)	72918-21-9	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-44.83	0.00	0.00	NA	update to source testing and reduced loading to the incinerator

Substance	CAS	Description of Processes that Use or Create Substance	Reporting under NPRI Part	NPRI Threshold	2013 Used (g)	Used 2012 - Last Reported Value	% Change	2013 Created (g)	Created 2012 - Last Reported Value	% Change	Contained In Product (g)	Contained in Product 2012 - Last Reported Value	% Change	Reason for Changes
12378-PeCDD(Dioxin)	40321-76-4	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-49.69	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
12378-PeCDF(Furan)	57117-41-6	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-56.96	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
234678-HxCDF(Furan)	60851-34-5	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-41.18	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
23478-PeCDF(Furan)	57117-31-4	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-50.54	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
2378-TCDD(Dioxin)	1746-01-6	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-66.67	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
2378-TCDF(Furan)	51207-31-9	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>1-10	-80.22	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
Octa CDD (Dioxin)	3268-87-9	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-33.39	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
Octa CDF (Furan)	39001-02-0	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-36.51	0.00	0.00	NA	update to source testing and reduced loading to the incinerator
Hexachlorobenzene	118-74-1	Solid Waste Incineration	Part 3	Solid Waste Incineration	0	0	NA	>0-1	>0-1	-25	0.00	0.00	NA	Reduced loading to the incinerator

Table 2: Changes in Quantifications, Quantities and Plan Updates									
Substance	CAS	Quantification Method(s) Used	Change in Quantification Method Used	Rationale for Using Selected Method(s)	Incidents out of the Ordinary	Significant Process Change	Objectives, Descriptions, Targets	Actions	Amendments
Chromium	NA - 04	Mass Balance/Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Cobalt	NA - 05	Mass Balance/Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Copper	NA - 06	Mass Balance/Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Manganese	NA - 09	Mass Balance/Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Nickel	NA - 11	Mass Balance/Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Phosphorus	NA-22	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Vanadium	7440-62-2	Mass Balance/Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None

Substance	CAS	Quantification Method(s) Used	Change in Quantification Method Used	Rationale for Using Selected Method(s)	Incidents out of the Ordinary	Significant Process Change	Objectives, Descriptions, Targets	Actions	Amendments
Zinc	NA - 14	Mass Balance/Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
NOx	11104-93-1	Emission Factors	No change	No site specific monitoring data available	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
CO	630-08-0	Emission Factors	No change	No site specific monitoring data available	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
TPM	N/A - M08	Emission Factors	No change	No site specific monitoring data available	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
PM10	N/A - M09	Emission Factors	No change	No site specific monitoring data available	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
PM2.5	N/A - M10	Emission Factors	No change	No site specific monitoring data available	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Arsenic	NA - 02	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None

Substance	CAS	Quantification Method(s) Used	Change in Quantification Method Used	Rationale for Using Selected Method(s)	Incidents out of the Ordinary	Significant Process Change	Objectives, Descriptions, Targets	Actions	Amendments
Cadmium	NA - 03	Mass Balance/Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Lead	NA - 08	Mass Balance/Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Selenium	NA - 12	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
1234678- HpCDD(Dioxin)	35822-46-9	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
1234678- HpCDF(Furan)	67562-39-4	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
1234789- HpCDF(Furan)	55673-89-7	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
123478- HxCDD(Dioxin)	39227-28-6	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None

Substance	CAS	Quantification Method(s) Used	Change in Quantification Method Used	Rationale for Using Selected Method(s)	Incidents out of the Ordinary	Significant Process Change	Objectives, Descriptions, Targets	Actions	Amendments
123478-HxCDF(Furan)	70648-26-9	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
123678-HxCDD(Dioxin)	57653-85-7	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
123678-HxCDF(Furan)	57117-44-9	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
123789-HxCDD(Dioxin)	19408-74-3	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
123789-HxCDF(Furan)	72918-21-9	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
12378-PeCDD(Dioxin)	40321-76-4	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
12378-PeCDF(Furan)	57117-41-6	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None

Substance	CAS	Quantification Method(s) Used	Change in Quantification Method Used	Rationale for Using Selected Method(s)	Incidents out of the Ordinary	Significant Process Change	Objectives, Descriptions, Targets	Actions	Amendments
234678-HxCDF(Furan)	60851-34-5	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
23478-PeCDF(Furan)	57117-31-4	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
2378-TCDD(Dioxin)	1746-01-6	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
2378-TCDF(Furan)	51207-31-9	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Octa CDD (Dioxin)	3268-87-9	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Octa CDF (Furan)	39001-02-0	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
Hexachlorobenzene	118-74-1	Source Testing	No change	Most accurate method	No	No	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None

CERTIFICATIONS BY HIGHEST RANKING OFFICIAL

As of October 8, 2014, I James Kirby certify that I have read the reports on the toxic substance reduction plans for the toxic substances listed below and am familiar with their contents and to my knowledge the information contained in the reports is factually accurate and the reports comply with the Toxics Reduction Act, 2009 and Ontario Regulation 455/09 (General) made under the Act.

Chromium	NA - 04
Cobalt	NA - 05
Copper	NA - 06
Manganese	NA - 09
Nickel	NA - 11
Vanadium	7440-62-2
Zinc	NA - 14
Arsenic	NA - 02
Cadmium	NA - 03
Lead	NA - 08
Selenium	NA - 12
Dioxins and furans - total	NA - D/F
Hexachlorobenzene	118-74-1
NOx	11104-93-1
CO	630-08-0
TPM	N/A - M08
PM10	N/A - M09
PM2.5	N/A - M10
Phosphorus	NA-22



James Kirby
Mine Manager