Summary of Ontario reportable substances (O-REG 455/09) - 2018

Facility Operator
IMPERIAL OIL
Imperial Oil Sarnia Refinery
602 South Christina Street, P.O. Box 3004
SARNIA, ON, N7T 7M5

Facility Owner
Imperial Oil Limited
505 Quarry Park Blvd. SE,
P.O. Box 2480, Station M
Calgary, Alberta T2C 5N1

Additional Facility Information
NPRI ID: 3704/11174 MOE ID 5132
Number of employees: 330
NAICS 2 Code: 31-33 - Manufacturing
NAICS 4 Code: 3241 - Petroleum & Coal Products Mfg.
NAICS 6 Code: 324110 - Petroleum Refineries
UTM NAD 83: 17N 385773.59 4756731.82

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Provincial regulations set out requirements for business owners to inform Ontarians about the use, creation and emissions of reportable substances in their communities. Under the Toxics Reduction Act (TRA), companies are required to post information quantifying these substances each year.

Substances are identified as "toxic" substances for the purposes of the Act if the substance is listed in the National Pollutant Release Inventory (NPRI). The NPRI is a federal database of emissions (to air, land and water) and waste transfers (on-site and offsite) and is available to the public on Environment Canada site (www.ec.gc.ca/inrp-npri). More information on the TRA is available at the Ontario Ministry of the Environment site (www.ene.gov.on.ca/environment/en/legislation/toxics_reduction_act/index.htm)

Petroleum refineries process crude oil to manufacture finished products that are used and valued by our society such as gasoline and heating oil. Crude oil may contain varying quantities of the substances covered under the Act. Through the tightly controlled multi-step refinery operation, a variety of substances are used, created and destroyed within contained piping and vessels. Finished products are highly regulated for both content (sulphur levels, for example) and use (pollution controls and higher mileage vehicles).

The notice below summarizes tracking and quantification of facility-wide quantities:

- **Used**: Amount of substance that enters the process. Includes amounts already present in raw materials or through addition of products required for processing.
- **Created**: Amount of substance produced during the processing stage.
- **Contained in product**: Amount of substance remaining after process is complete.
- **Emissions**: These are releases of substance from the facility to air, surface water or land; and, waste transfers (on-site and offsite).

Starting with the 2011 reporting year, companies are required to report the year-over-year change in these reportable substances. The tables below report the amount of change between the previous year and the reporting year by comparing the difference of the ranges by order of magnitude. Facilities are also required to report the change in percentage. The percentage of change is calculated from the mid-point of the previous year's range to the mid-point of the reporting year's range, and is reported in the table below as thousand percent. For example, a range change from >1-10 to >1,000-10,000 is equal to three orders of magnitude change, which is equal to 100 thousand percent change. When comparing zero to an amount, the percentage of change is reported as not applicable (n/a). Positive/negative changes for the reporting year indicate an increase/decrease from the previous year

A summary of reasons behind the change for each reportable substance is provided. The changes fall into the following categories:

- **No change**
- **New substance to report**: This substance was not reportable in previous year.
- **System variability**: There are many combined factors that result in system variability. Substances will vary depending on the feedstocks/raw crudes processed. Variability in operation can also affect the results. Analytical results have uncertainty, which can be increased when measuring low/trace levels. As a result, a change in substance range within a given amount may be attributed to system variability, even if the percentage of change is significantly different. This includes changes due to consumer demand fluctuations, shut-down and maintenance activities.
- **Change in production levels**: Change resulted from a sustained increase or decrease in production at the facility.
- **Improvement of data quality**: Change resulted from continuous improvement of the quality of the data used to calculate the amount of substance.

Reporting of substance quantities in ranges is allowed under the regulation to ensure that confidential information is not disclosed. Emissions data is annually reported to NPRI in absolute terms and is not considered confidential information.

	Substances (Reported in kilograms)	Chemical Abstract Service CAS Registry Number	Report of Tracking and Quantification of Facility-Wide Quantities									Reason for Change
			USED			CREATED			CONTAINED IN PRODUCT			
			2018 (kilograms)	DELTA vs. 2017 (kilograms)	% CHANGE	2018 (kilograms)	DELTA vs. 2017 (kilograms)	% CHANGE	2018 (kilograms)	DELTA vs. 2017 (kilograms)	% CHANGE	
Metals	Cadmium	**	0	0	n/a	>100 to 1000	>100 to 1000	n/a	0	0	n/a	system variability
Metals	Lead	**	>100 to 1000	>1000 to 10,000	-94%	>100,000 to 1,000,000	>100,000 to 1,000,000	n/a	0	0	n/a	system variability
Metals	Mercury	**	>1 to 10	>10 to 100	-66%	0	0	n/a	>0 to 1	>100 to 1000	-100%	system variability
Metals	Selenium	**	0	0	n/a	0	0	n/a	>0 to 1	>0 to 1	70%	system variability
Polyaromatic Hydrocarbons (PAH)	7H-Dibenzo(c,g)carbazole	194-59-2	0	0	n/a	>0 to 1	>0 to 1	2%	0	0	n/a	no reasons - quantities approximately the same
Polyaromatic Hydrocarbons (PAH)	Acenaphthene	83-32-9	>100,000 to 1,000,000	>100,000 to 1,000,000	-46%	>100,000 to 1,000,000	>100,000 to 1,000,000	-21%	>100,000 to 1,000,000	>100,000 to 1,000,000	-26%	system variability
Polyaromatic Hydrocarbons (PAH)	Acenaphthylene	208-96-8	>10,000 to 100,000	>10,000 to 100,000	109%	>1000 to 10,000	>1000 to 10,000	n/a	>10 to 100	>1000 to 10,000	-99%	system variability
Polyaromatic Hydrocarbons (PAH)	Benzo(a)anthracene	56-55-3	>1000 to 10,000	>1000 to 10,000	n/a	>100,000 to 1,000,000	>10,000 to 100,000	-39%	>10,000 to 100,000	>10,000 to 100,000	71%	system variability
Polyaromatic Hydrocarbons (PAH)	Benzo(a)phenanthrene, aka chrysene	218-01-9	>1000 to 10,000	>1000 to 10,000	n/a	>100,000 to 1,000,000	>100,000 to 1,000,000	n/a	0	0	n/a	system variability
Polyaromatic Hydrocarbons (PAH)	Benzo(a)pyrene	50-32-8	0	0	n/a	>10,000 to 100,000	>1000 to 10,000	-9%	>10,000 to 100,000	>1000 to 10,000	18%	system variability
Polyaromatic Hydrocarbons (PAH)	Benzo(b/j)fluoranthene	205-99-2 / 205-82-3	0	0	n/a	>10,000 to 100,000	>1000 to 10,000	17%	>10,000 to 100,000	>10,000 to 100,000	88%	system variability
Polyaromatic Hydrocarbons (PAH)	Benzo(e)pyrene	192-97-2	>10,000 to 100,000	>10,000 to 100,000	n/a	>1000 to 10,000	>10,000 to 100,000	-77%	>10,000 to 100,000	>10,000 to 100,000	76%	system variability
Polyaromatic Hydrocarbons (PAH)	Benzo(g,h,i)perylene	191-24-2	0	0	n/a	>10,000 to 100,000	>10,000 to 100,000	-34%	>10,000 to 100,000	>10,000 to 100,000	-34%	system variability
Polyaromatic Hydrocarbons (PAH)	Benzo(k)fluoranthene	207-08-9	0	0	n/a	0	>1000 to 10,000	-100%	0	>1000 to 10,000	-100%	system variability
Polyaromatic Hydrocarbons (PAH)	Dibenzo(a,h)anthracene	53-70-3	0	0	n/a	0	0	n/a	0	0	n/a	no reasons - quantities approximately the same
Polyaromatic Hydrocarbons (PAH)	Dibenzo(a,j)acridine	224-42-0	>0 to 1	>1 to 10	-86%	>0 to 1	>0 to 1	2%	0	0	n/a	system variability
Polyaromatic Hydrocarbons (PAH)	Dibenzo(a,i)pyrene	189-55-9	>1 to 10	>1 to 10	-86%	>0 to 1	>0 to 1	2%	0	0	n/a	system variability
Polyaromatic Hydrocarbons (PAH)	Fluoranthene	206-44-0	>10,000 to 100,000	>10,000 to 100,000	-73%	>100,000 to 1,000,000	>10,000 to 100,000	-32%	>1000 to 10,000	>10,000 to 100,000	-73%	system variability
Polyaromatic Hydrocarbons (PAH)	Fluorene	86-73-7	>100,000 to 1,000,000	>100,000 to 1,000,000	-69%	>100,000 to 1,000,000	>10,000 to 100,000	5%	>100,000 to 1,000,000	>10,000 to 100,000	43%	system variability
Polyaromatic Hydrocarbons (PAH)	Indeno(1,2,3-c,d)pyrene	193-39-5	0	0	n/a	>1000 to 10,000	0	0%	>1000 to 10,000	>100 to 1000	-8%	system variability
Polyaromatic Hydrocarbons (PAH)	Perylene	198-55-0	0	0	n/a	>1000 to 10,000	>10,000 to 100,000	-65%	>10,000 to 100,000	>1000 to 10,000	6%	system variability
Polyaromatic Hydrocarbons (PAH)	Phenanthrene	85-01-8	>100,000 to 1,000,000	>100,000 to 1,000,000	-63%	>1,000,000	>100,000 to 1,000,000	-33%	>100,000 to 1,000,000	>100,000 to 1,000,000	-27%	system variability
Polyaromatic Hydrocarbons (PAH)	Pyrene	129-00-0	>10,000 to 100,000	>100,000 to 1,000,000	-75%	>100,000 to 1,000,000	>10,000 to 100,000	8%	>100,000 to 1,000,000	>10,000 to 100,000	11%	system variability

	Substances (Reported in tonnes)		Chemical Abstract Service CAS Registry Number	Report of Tracking and Quantification of Facility-Wide Quantities									Reason for Change
				Used			Created			Contained in Product			
				2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	
Metals	Nickel		**	>100 to 1000	>100 to 1000	-39%	>100 to 1000	>100 to 1000	n/a	>10 to 100	>10 to 100	-59%	system variability
Metals	Vanadium		7440-62-2	>100 to 1000	>100 to 1000	-36%	0	0	n/a	>100 to 1000	>100 to 1000	-56%	system variability
Metals	Zinc		**	>1 to 10	>0 to 1	8%	0	>0 to 1	-100%	>1 to 10	>1 to 10	-53%	system variability
PAH	Anthracene		120-12-7	>10,000 to 100,000	>100,000 to 1,000,000	-1.	>100,000 to 1,000,000	>100,000 to 1,000,000	.	>10,000 to 100,000	>100,000 to 1,000,000	-1.	no reasons - quantities approximately the same
PAH	Naphthalene		91-20-3	>1000 to 10,000	>100 to 1000	-18%	>1000 to 10,000	>1 to 10	0%	>1000 to 10,000	>1000 to 10,000	-19%	system variability
Hydrocarbons	1, 2, 4-Trimethylbenzene	*	95-63-6	>10,000 to 100,000	>1000 to 10,000	-13%	>10,000 to 100,000	>1000 to 10,000	21%	>10,000 to 100,000	>10,000 to 100,000	-59%	system variability
Hydrocarbons	1, 3-Butadiene	*	106-99-0	>10,000 to 100,000	>1000 to 10,000	-37%	>1000 to 10,000	>100 to 1000	23%	>1000 to 10,000	#VALUE!	n/a	system variability
Hydrocarbons	Benzene	*	71-43-2	>10,000 to 100,000	>1000 to 10,000	-17%	>10,000 to 100,000	>1000 to 10,000	17%	>10,000 to 100,000	>1000 to 10,000	8%	system variability
Hydrocarbons	Biphenyl		92-52-4	>1000 to 10,000	>1000 to 10,000	-28%	>100 to 1000	>10 to 100	9%	>1000 to 10,000	>100 to 1000	-19%	system variability
Hydrocarbons	Butane	*	**	>100,000 to 1,000,000	>10,000 to 100,000	-16%	>100,000 to 1,000,000	>10,000 to 100,000	68%	>100,000 to 1,000,000	>10,000 to 100,000	30%	system variability
Hydrocarbons	Butene	*	25167-67-3	>10,000 to 100,000	>10,000 to 100,000	-16%	>100,000 to 1,000,000	>100,000 to 1,000,000	92%	>100,000 to 1,000,000	>10,000 to 100,000	55%	system variability
Hydrocarbons	Cycloheptane	*	**	>1000 to 10,000	>100 to 1000	25%	>100,000 to 1,000,000	>10,000 to 100,000	76%	>10,000 to 100,000	>1000 to 10,000	11%	system variability
Hydrocarbons	Cyclohexane		110-82-7	>10,000 to 100,000	>1000 to 10,000	-2%	>10,000 to 100,000	>1000 to 10,000	-9%	>1000 to 10,000	>10 to 100	0%	system variability
Hydrocarbons	Cyclohexene	t	**	>1000 to 10,000	>100 to 1000	-5%	>10,000 to 100,000	>1000 to 10,000	-10%	>10,000 to 100,000	>100 to 1000	-6%	system variability
Hydrocarbons	Cyclooctane	*	**	>1000 to 10,000	>1000 to 10,000	36%	>100,000 to 1,000,000	>10,000 to 100,000	89%	>10,000 to 100,000	>100 to 1000	-1%	system variability
Hydrocarbons	Decane	*	**	>10,000 to 100,000	>1000 to 10,000	-6%	>10,000 to 100,000	>10,000 to 100,000	103%	>10,000 to 100,000	>100 to 1000	0%	system variability
Hydrocarbons	Dicyclopentadiene		77-73-6	#N/A	#N/A	n/a	#N/A	#N/A	n/a	#N/A	#N/A	n/a	no reasons - quantities approximately the same
Hydrocarbons	Ethylbenzene		100-41-4	>10,000 to 100,000	>100 to 1000	5%	>10,000 to 100,000	>1000 to 10,000	14%	>10,000 to 100,000	>1000 to 10,000	16%	system variability
Hydrocarbons	Ethylene	*	74-85-1	>10 to 100	>1 to 10	-18%	>10,000 to 100,000	>1000 to 10,000	7%	>10,000 to 100,000	>1000 to 10,000	7%	system variability
Hydrocarbons	Heptane	*	**	>10,000 to 100,000	>1000 to 10,000	-10%	>10,000 to 100,000	>10,000 to 100,000	46%	>10,000 to 100,000	>1000 to 10,000	7%	system variability
Hydrocarbons	Hexane	*	**	>100,000 to 1,000,000	>1000 to 10,000	-1%	>100,000 to 1,000,000	>1000 to 10,000	-5%	>100,000 to 1,000,000	>10,000 to 100,000	4%	system variability
Hydrocarbons	Hexene	*	25264-93-1	>10,000 to 100,000	>1000 to 10,000	-13%	>10,000 to 100,000	>1000 to 10,000	-9%	>10,000 to 100,000	>1000 to 10,000	-9%	system variability
Hydrocarbons	Isoprene		78-79-5	>1000 to 10,000	>100 to 1000	-29%	>100 to 1000	>100 to 1000	31%	>100 to 1000	>100 to 1000	54%	system variability
Hydrocarbons	n-Hexane	*	110-54-3	>100,000 to 1,000,000	>10,000 to 100,000	-15%	>10 to 100	>10,000 to 100,000	-100%	>10,000 to 100,000	>100 to 1000	-1%	system variability
Hydrocarbons	Nonane	*	**	>10,000 to 100,000	>1000 to 10,000	-4%	>10,000 to 100,000	>10,000 to 100,000	79%	>10,000 to 100,000	>1000 to 10,000	3%	system variability
Hydrocarbons	Octane	*	**	>10,000 to 100,000	>100 to 1000	2%	>100,000 to 1,000,000	>10,000 to 100,000	47%	>10,000 to 100,000	>1000 to 10,000	2%	system variability
Hydrocarbons	Pentane	*	**	>100,000 to 1,000,000	>100,000 to 1,000,000	-24%	>100,000 to 1,000,000	>10,000 to 100,000	6%	>100,000 to 1,000,000	>10,000 to 100,000	2%	system variability
Hydrocarbons	Pentene	*	**	>10,000 to 100,000	>1000 to 10,000	-8%	>10,000 to 100,000	>100 to 1000	1%	>10,000 to 100,000	>100 to 1000	1%	system variability
Hydrocarbons	Propane	*	74-98-6	>10,000 to 100,000	>1000 to 10,000	-12%	>10,000 to 100,000	>1000 to 10,000	6%	>100,000 to 1,000,000	>10,000 to 100,000	11%	system variability
Hydrocarbons	Propylene	*	115-07-1	>100 to 1000	>10 to 100	-16%	>10,000 to 100,000	>10,000 to 100,000	44%	>10,000 to 100,000	>10,000 to 100,000	43%	system variability
Hydrocarbons	Trimethylbenzene	*	25551-13-7	>10,000 to 100,000	>1000 to 10,000	-28%	>10,000 to 100,000	>1000 to 10,000	3%	>10,000 to 100,000	>1000 to 10,000	-15%	no reasons - quantities approximately the same
Hydrocarbons	Toluene	*	108-88-3	>10,000 to 100,000	>1000 to 10,000	2%	>100,000 to 1,000,000	>10,000 to 100,000	38%	>100,000 to 1,000,000	>10,000 to 100,000	33%	system variability
Hydrocarbons	Xylene	*	1330-20-7	>10,000 to 100,000	>1000 to 10,000	8%	>100,000 to 1,000,000	>10,000 to 100,000	18%	>100,000 to 1,000,000	>10,000 to 100,000	25%	system variability

	Substances (Reported in tonnes)	Chemical Abstract Service CAS Registry Number	Report of Tracking and Quantification of Facility-Wide Quantities									Reason for Change
			Used			Created			Contained in Product			
			2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	
Other	Ammonia	**	>1 to 10	>1 to 10	139%	>100 to 1000	>10 to 100	14%	0	0	n/a	system variability
	Asbestos	1332-21-4	0	0	n/a	0	0	n/a	0	0	n/a	no reasons - quantities approximately the same
	Carbon Monoxide	630-08-0	0	0	n/a	>1000 to 10,000	>10 to 100	-2%	0	0	n/a	system variability
	Cresol	1319-77-3	0	0	n/a	>10 to 100	>1 to 10	12%	0	0	n/a	system variability
	Ethylene Glycol	107-21-1	0	0	n/a	0	0	n/a	0	0	n/a	no reasons - quantities approximately the same
	Formaldehyde *	50-00-0	0	0	n/a	>1 to 10	>0 to 1	0%	0	0	n/a	no reasons - quantities approximately the same
	H2S	7783-06-4	>10,000 to 100,000	>1000 to 10,000	7%	>10,000 to 100,000	>10,000 to 100,000	22%	>10,000 to 100,000	>1000 to 10,000	12%	system variability
	Hydrochloric Acid		#N/A	#N/A	n/a	#N/A	#N/A	n/a	#N/A	#N/A	n/a	new substance to report
	Hydrogen cyanide	74-90-8	0	0	n/a	>10 to 100	>1 to 10	5%	0	0	n/a	system variability
	Methanol *	67-56-1	>10 to 100	>10 to 100	95%	>1 to 10	>1 to 10	-21%	0	0	n/a	system variability
	Isopropyl alcohol	67-63-0	0	0	n/a	>0 to 1	>0 to 1	8955%	>0 to 1	>0 to 1	16101%	system variability
	Molybdenum Trioxide	1313-27-5	>1 to 10	>100 to 1000	-97%	>10 to 100	>10 to 100	n/a	0	0	n/a	system variability
	Nitrate Ion	**	0	0	n/a	>100 to 1000	>10 to 100	25%	0	0	n/a	system variability
	Nox	11104-93-1	0	0	n/a	>1000 to 10,000	>10 to 100	2%	0	0	n/a	system variability
	Particulates	**	0	0	n/a	>100 to 1000	>100 to 1000	18%	0	0	n/a	system variability
	Phenol (and its salts)	108-95-2	>0 to 1	>0 to 1	-18%	>10 to 100	>10 to 100	-49%	>1 to 10	>1 to 10	3605%	system variability
	PM10	**	0	0	n/a	>100 to 1000	>10 to 100	18%	0	0	n/a	system variability
	PM2.5	**	0	0	n/a	>100 to 1000	>10 to 100	18%	0	0	n/a	system variability
	Sulphur Dioxide	7446-09-5	0	0	n/a	>10,000 to 100,000	>1000 to 10,000	27%	0	0	n/a	system variability
	Sulphuric acid	7664-93-9	0	0	n/a	>100 to 1000	>10 to 100	21%	0	0	n/a	system variability
	Tetrahydrofuran *	109-99-9	0	0	n/a	0	0	n/a	0	0	n/a	no reasons - quantities approximately the same
	Total Reduced Sulphur	**	>10,000 to 100,000	>1000 to 10,000	7%	>10,000 to 100,000	>10,000 to 100,000	35%	>10,000 to 100,000	>1000 to 10,000	13%	system variability
	Volatile Organic Compounds	**	>1,000,000	>100,000 to 1,000,000	-14%	>1,000,000	>100,000 to 1,000,000	47%	>1,000,000	>100,000 to 1,000,000	12%	system variability

		Report of Tracking and Quantification of Facility-Wide Quantities															
	Substances (Reported in kilograms)	Releases To Air			Releases to Water			Releases to Land			Onsite / Offsite Disposal			Transfer for Treatment and Recycling			Reason for Change
		2018 (kilograms)	DELTA vs. 2017 (kilograms)	% CHANGE	2018 (kilograms)	DELTA vs. 2017 (kilograms)	% CHANGE	2018 (kilograms)	DELTA vs. 2017 (kilograms)	% CHANGE	2018 (kilograms)	DELTA vs. 2017 (kilograms)	% CHANGE	2018 (kilograms)	DELTA vs. 2017 (kilograms)	% CHANGE	
Metals	Cadmium	0	-10	-100%	0	0	-100%	0	0	-100%	0	-10	-98%	0	0	n/a	system variability
	Lead	0	-70	-100%	0	-10	-100%	1	-22	-94%	52	15	41%	57	57	n/a	system variability
	Mercury	0	-4	-100%	0	0	n/a	0	-6	-100%	0	-3	-100%	0	0	-100%	system variability
	Selenium	0	0	n/a	0	0	-100%	0	0	-100%	0	-11	-98%	35	35	n/a	system variability
Polyaromatic Hydrocarbons (PAH)	7H-Dibenzo(c,g)carbazole	0	0	2%	0	0	n/a	0	0	n/a	0	0	-100%	0	0	n/a	no reasons - quantities approximately the same
	Acenaphthene	0	-189	-100%	0	0	n/a	0	-86	-100%	4	-100	-96%	0	0	n/a	system variability
	Acenaphthylene	0	-528	-100%	0	0	n/a	0	-261	-100%	0	-266	-100%	0	-1	-100%	system variability
	Benzo(a)anthracene	0	-14	-100%	0	0	n/a	0	-13	-99%	4	4	835%	0	0	n/a	system variability
	Benzo(a)phenanthrene, aka chrysene	0	-12	-100%	0	0	n/a	0	-11	-100%	0	-1	-90%	0	0	n/a	system variability
	Benzo(a)pyrene	0	-8	-100%	0	0	n/a	0	-8	-100%	3	2	1118%	0	0	-100%	system variability
	Benzo(b/j)fluoranthene	0	-5	-100%	0	0	n/a	0	-5	-99%	0	0	-87%	0	0	n/a	system variability
	Benzo(e)pyrene	0	-5	-100%	0	0	n/a	0	-5	-100%	0	0	-99%	0	0	-100%	system variability
	Benzo(g,h,i)perylene	0	-3	-100%	0	0	n/a	0	-2	-100%	0	0	-100%	0	0	-100%	system variability
	Benzo(k)fluoranthene	0	-2	-100%	0	0	n/a	0	-1	-99%	17	17	10640%	0	0	n/a	system variability
	Dibenzo(a,h)anthracene	0	0	-100%	0	0	n/a	0	0	n/a	0	0	-100%	0	0	n/a	no reasons - quantities approximately the same
	Dibenzo(a,i)pyrene	0	0	105%	0	0	n/a	0	0	n/a	0	0	-100%	0	0	n/a	no reasons - quantities approximately the same
	Dibenzo(a,j)acridine	0	0	41%	0	0	n/a	0	0	n/a	0	0	-100%	0	0	n/a	no reasons - quantities approximately the same
	Fluoranthene	0	-61	-100%	0	0	n/a	1	-40	-98%	2	-19	-92%	0	0	n/a	system variability
	Fluorene	0	-273	-100%	0	0	n/a	0	-158	-100%	18	-97	-84%	0	0	-100%	system variability
	Indeno(1,2,3-c,d)pyrene	0	-2	-100%	0	0	n/a	0	-2	-93%	0	0	-98%	0	0	-100%	system variability
	Perylene	0	-2	-100%	0	0	n/a	0	-1	-91%	0	0	-99%	0	0	-100%	system variability
	Phenanthrene	0	-379	-100%	0	0	n/a	559	263	89%	19	-64	-77%	0	0	-100%	system variability
	Pyrene	0	-92	-100%	0	0	n/a	556	469	540%	19	13	247%	0	0	-100%	system variability

	Substances (Reported in tonnes)	Report of Tracking and Quantification of Facility-Wide Quantities															
		Releases To Air			Releases to Water			Releases to Land			Onsite / Offsite Disposal			Transfer for Treatment and Recycling			Reason for Change
		2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	2018 (tonnes)	DELTA vs. 2017 (tonnes)	% CHANGE	
Metals	Nickel	2	-58	-96%	0	-58	-100%	28	28	8063%	0	-2	-87%	246	246	2428468%	system variability
Metals	Vanadium	5	0	4%	0	0	-100%	0	0	-56%	0	-4	-99%	0	0	425%	system variability
Metals	Zinc	0	0	-33%	0	0	-100%	0	0	-100%	141	141	37150%	1	1	2840%	system variability
PAI	Naphthalene	2	-1	-23%	0	0	n/a	6	5	338%	19	18	1207%	0	0	n/a	system variability
Hydrocarbons	1, 2, 4-Trimethylbenzene *	3	3	n/a	0	0	n/a	0	0	n/a	0	-3	-100%	0	0	n/a	no reasons - quantities approximately the same
Hydrocarbons	1, 3-Butadiene *	1	1	75%	0	0	n/a	0	0	n/a	0	-1	-100%	0	0	n/a	no reasons - quantities approximately the same
Hydrocarbons	Benzene *	8	1	17%	0	0	n/a	1	1	675%	1	-6	-91%	0	0	n/a	system variability
Hydrocarbons	Biphenyl	0	0	-25%	0	0	n/a	0	0	-99%	26	26	12592%	0	0	n/a	system variability
Hydrocarbons	Butane *	77	77	n/a	0	0	n/a	0	0	n/a	0	-90	-100%	0	0	n/a	system variability
Hydrocarbons	Butene *	13	13	n/a	0	0	n/a	0	0	n/a	0	-16	-100%	0	0	n/a	system variability
Hydrocarbons	Cycloheptane *	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	no reasons - quantities approximately the same
Hydrocarbons	Cyclohexane	9	9	n/a	0	0	n/a	0	-13	-100%	17	7	69%	0	0	n/a	system variability
Hydrocarbons	Cyclooctane *	2	2	n/a	0	0	n/a	0	0	n/a	0	-1	-100%	0	0	n/a	no reasons - quantities approximately the same
Hydrocarbons	Decane *	1	1	n/a	0	0	n/a	0	0	n/a	0	-1	-100%	0	0	n/a	no reasons - quantities approximately the same
Hydrocarbons	Ethylbenzene	4	0	2%	0	0	n/a	0	0	-87%	64	61	1825%	0	0	n/a	system variability
Hydrocarbons	Ethylene *	3	3	n/a	0	0	n/a	0	0	n/a	0	-3	-100%	0	0	n/a	no reasons - quantities approximately the same
Hydrocarbons	Heptane *	5	5	n/a	0	0	n/a	0	0	n/a	0	-5	-100%	0	0	n/a	system variability
Hydrocarbons	Hexane *	15	15	n/a	0	0	n/a	0	0	n/a	0	-17	-100%	0	0	n/a	system variability
Hydrocarbons	Hexene *	1	1	n/a	0	0	n/a	0	0	n/a	0	-2	-100%	0	0	n/a	system variability
Hydrocarbons	Isoprene	0	0	n/a	0	0	n/a	0	0	n/a	0	0	-100%	0	0	n/a	no reasons - quantities approximately the same
Hydrocarbons	n-Hexane *	16	16	n/a	0	0	n/a	497	497	206470%	18	3	23%	0	0	n/a	system variability
Hydrocarbons	Nonane *	2	2	n/a	0	0	n/a	0	0	n/a	0	-2	-100%	0	0	n/a	system variability
Hydrocarbons	Octane *	4	4	n/a	0	0	n/a	0	0	-100%	5	-1	-15%	0	0	n/a	system variability
Hydrocarbons	Pentane *	59	59	n/a	0	0	n/a	0	0	n/a	0	-72	-100%	0	0	n/a	no reasons - quantities approximately the same
Hydrocarbons	Pentene *	3	3	n/a	0	0	n/a	0	0	n/a	0	-5	-100%	0	0	n/a	no reasons - quantities approximately the same
Hydrocarbons	Propane *	45	45	n/a	0	0	n/a	0	0	n/a	0	-47	-100%	0	0	n/a	system variability
Hydrocarbons	Propylene *	22	22	n/a	0	0	n/a	2	1	85%	0	-19	-98%	0	0	n/a	system variability
Hydrocarbons	Toluene *	17	-1	-5%	0	0	n/a	556	555	82492%	10	-7	-39%	0	0	n/a	system variability
Hydrocarbons	Xylene *	13	0	-3%	0	0	n/a	112	111	14045%	7	-6	-46%	0	0	n/a	system variability
Other	Ammonia	3	3	n/a	0	0	n/a	0	0	n/a	0	-3	-100%	0	0	n/a	system variability
Other	Asbestos	0	-19	-100%	0	0	n/a	0	-20	-100%	0	0	n/a	0	0	n/a	system variability
Other	Carbon Monoxide	1133	-35	-3%	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	system variability
Other	Cresol	1	1	n/a	0	0	n/a	0	-2	-100%	21	19	649%	0	0	n/a	system variability
Other	Ethylene Glycol	0	0	n/a	0	0	n/a	0	-5	-100%	0	0	839%	0	0	n/a	system variability
Other	Formaldehyde *	4	0	0%	0	0	n/a	0	0	n/a	0	-4	-100%	0	0	n/a	no reasons - quantities approximately the same
Other	H2S	12	12	n/a	0	0	n/a	56	53	2157%	1	-10	-92%	0	0	n/a	system variability
Other	Hydrogen cyanide	52	52	n/a	0	0	n/a	0	0	n/a	0	-50	-100%	0	0	n/a	no reasons - quantities approximately the same
Other	Methanol *	5	-1	-18%	0	0	n/a	0	0	n/a	0	-6	-100%	0	0	n/a	system variability
Other	Molybdenum Trioxide	0	0	n/a	0	0	n/a	28	28	n/a	0	0	-100%	4	-141	-97%	system variability
Other	Nitrate Ion	0	0	n/a	212	42	25%	0	0	n/a	0	0	n/a	0	0	n/a	system variability
Other	Nox	2424	42	2%	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	no reasons - quantities approximately the same
Other	Particulates	822	125	18%	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	no reasons - quantities approximately the same
Other	Phenol (and its salts)	0	-5	-97%	0	0	n/a	0	-5	-100%	24	24	22730%	0	0	n/a	system variability
Other	PM10	624	94	18%	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	no reasons - quantities approximately the same
Other	PM2.5	313	48	18%	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	no reasons - quantities approximately the same
Other	Sulphur Dioxide	11079	2348	27%	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	system variability
Other	Sulphuric acid	210	37	21%	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	system variability
Other	Tetrahydrofuran *	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	0	0	n/a	no reasons - quantities approximately the same
Other	Total Reduced Sulphur	18	2	13%	0	0	n/a	56	56	n/a	1	-2	-63%	0	0	n/a	system variability
Other	Volatile Organic Compounds	322	-14	-4%	0	0	-4%	1168	1168	n/a	41	38	1339%	0	0	n/a	system variability

** No single CAS number applies to this substance

* also included in Volatile Organic Compounds

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	Substances	Plan Objectives and Targets	Summary of steps taken during the previous calendar year (2017) to implement the toxics reduction options identified in the plan and the reduction amount resulting from these steps	Comparison of steps taken during the previous calendar year (2016) to steps included in the plan	Indication of whether timeline(s) set out in plan will be met	Additional actions taken during the previous calendar year (2017) to achieve the plan's objectives and the reduction amount resulting from the additional actions	Amendments made to the plan during the previous calendar year (2017)
Metals	Cadmium	Cadmium (and its compounds) is naturally occurring in trace quantities in the crude oil required by the refinery to run its base business. Cadmium (and its compounds) is also found in trace quantities in the purchased feed. No reduction objectives have been identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Lead	Lead (and its compounds) is naturally occurring in trace quantities in the crude oil required by the refinery to run its base business. Lead (and its compounds) is also found in trace quantities in the purchased feed. No reduction objectives have been identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Mercury	Mercury (and its compounds) is naturally occurring in trace quantities in the crude oil required by the refinery to run its base business. Mercury (and its compounds) is also found in trace quantities in the purchased feed. No reduction objectives have been identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Selenium	Selenium (and its compounds) is naturally occurring in trace quantities in the crude oil required by the refinery to run its base business. Selenium (and its compounds) is also found in trace quantities in the purchased feed. No reduction objectives have been identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Nickel	Nickel (and its compounds) is naturally occurring in trace quantities in the crude oil required by the refinery to run its base business. Nickel (and its compounds) is also found in trace quantities in the purchased feed. No reduction objectives have been identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Vanadium	Vanadium (and its compounds) is naturally occurring in trace quantities in the crude oil required by the refinery to run its base business. Vanadium (and its compounds) is also found in trace quantities in the purchased feed. No reduction objectives have been identified	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Zinc	Zinc (and its compounds) is naturally occurring in trace quantities in the crude oil required by the refinery to run its base business. Zinc (and its compounds) is also found in trace quantities in the purchased feed. Additionally, the Zinc (and its compounds) used at BP&S is required to achieve finished product quality specifications. No reduction objectives have been identified	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	7H-Dibenzo(c,g)carbazole	7H-Dibenzo(c,g)carbazole enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of 7HDibenzo(c,g)carbazole were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Acenaphthene	Acenaphthene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Acenaphthene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Acenaphthylene	Acenaphthylene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Acenaphthylene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Benzo(a)anthracene	Benzo(a)anthracene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Benzo(a)anthracene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Benzo(a)phenanthrene, aka chrysene	Benzo(a)phenanthrene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Benzo(a)phenanthrene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Benzo(a)pyrene	Benzo(a)pyrene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Benzo(a)pyrene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Benzo(b/j)fluoranthene	Benzo(b/j)fluoranthene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Benzo(b/j)fluoranthene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Benzo(e)pyrene	Benzo(e)pyrene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Benzo(e)pyrene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Benzo(g,h,i)perylene	Benzo(g,h,i)perylene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Benzo(g,h,i)perylene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments

Polyaromatic Hydrocar	Benzo(k)fluoranthene	Benzo(k)fluoranthene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Benzo(k)fluoranthene were identified	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Dibenzo(a,i)pyrene	Dibenzo(a,i)pyrene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Dibenzo(a,i)pyrene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Dibenzo(a,j)acridine	Dibenzo(a,j)acridine enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Dibenzo(a,j)acridine were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Fluoranthene	Fluoranthene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Fluoranthene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Fluorene	Fluorene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Fluorene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Indeno(1,2,3-c,d)pyrene	Indeno(1,2,3-c,d)pyrene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Indeno(1,2,3-c,d)pyrene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Naphthalene	Naphthalene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Naphthalene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Perylene	Perylene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Perylene were identified	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Phenanthrene	Phenanthrene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Phenanthrene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Pyrene	Pyrene enters the facility in purchased feedstock, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of Pyrene were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments

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Substances	Plan Objectives and Targets	Summary of steps taken during the previous calendar year (2017) to implement the toxics reduction options identified in the plan and the reduction amount resulting from these steps	Comparison of steps taken during the previous calendar year (2016) to steps included in the plan	Indication of whether timeline(s) set out in plan will be met	Additional actions taken during the previous calendar year (2017) to achieve the plan's objectives and the reduction amount resulting from the additional actions	Amendments made to the plan during the previous calendar year (2017)
1, 2, 4-Trimethylbenzene	1, 2, 4-Trimethylbenzene enters the facility in purchased feedstock and additives, and is created as a byproduct from thermal cracking. No options to reduce the use or creation of 1, 2, 4-Trimethylbenzene were identified	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
1, 3-Butadiene	While Imperial Oil has not identified any feasible options to reduce the use or creation of 1, 3-Butadiene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of 1, 3-Butadiene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
Benzene	While Imperial Oil has not identified any feasible options to reduce the use or creation of benzene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of benzene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
Biphenyl	While Imperial Oil has not identified any feasible options to reduce the use or creation of Biphenyl at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Biphenyl in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
Butane	While Imperial Oil has not identified any options to reduce the use or creation of butane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of butane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments

Hydrocarbons	Butene	While Imperial Oil has not identified any options to reduce the use or creation of Butene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Butene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Cycloheptane	While Imperial Oil has not identified any options to reduce the use or creation of Cycloeheptane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Cycloeheptane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Cyclohexane	While Imperial Oil has not identified any options to reduce the use or creation of Cyclohexane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Cyclohexane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Cyclohexene	While Imperial Oil has not identified any options to reduce the use or creation of Cyclohexene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Cyclohexene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Cyclooctane	While Imperial Oil has not identified any options to reduce the use or creation of Cyclooctane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Cyclooctane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Decane	While Imperial Oil has not identified any options to reduce the use or creation of Decane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Decane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Dicyclopentadiene	Dicyclopentadiene was not detected at measurable concentrations in any of the Refinery inputs or outputs and is not created. As such, no technically and economically feasible options to reduce use and/or creation were identified	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Ethylbenzene	While Imperial Oil has not identified any feasible options to reduce the use or creation of Ethylbenzene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Ethylbenzene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Ethylene	While Imperial Oil has not identified any options to reduce the use or creation of Ethylene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Ethylene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Heptane	While Imperial Oil has not identified any options to reduce the use or creation of Heptane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Heptane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Hexane	While Imperial Oil has not identified any options to reduce the use or creation of Hexane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Hexane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments

Hydrocarbons	Hexene	While Imperial Oil has not identified any options to reduce the use or creation of Hexene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Hexene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Isoprene	While Imperial Oil has not identified any options to reduce the use or creation of Isoprene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Isoprene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	n-Hexane	While Imperial Oil has not identified any options to reduce the use or creation of N-Hexane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of N-Hexane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Nonane	While Imperial Oil has not identified any options to reduce the use or creation of Nonane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Nonane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Octane	While Imperial Oil has not identified any options to reduce the use or creation of Octane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Octane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Pentane	While Imperial Oil has not identified any options to reduce the use or creation of Pentane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Pentane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Pentene	While Imperial Oil has not identified any options to reduce the use or creation of Pentene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Pentene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Propane	While Imperial Oil has not identified any options to reduce the use or creation of Propane at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Propane in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Propylene	While Imperial Oil has not identified any options to reduce the use or creation of Propylene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Propylene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Toluene	While Imperial Oil does not intend to reduce the use or creation of Toluene at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Toluene in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Xylene	While Imperial Oil has not identified any feasible options to reduce the use or creation of Xylene (all isomers) at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Xylene (all isomers) in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments

Toxic Reduction Plan Stewardship - 2018 Reporting Year

	Substances	Plan Objectives and Targets	Summary of steps taken during the previous calendar year (2017) to implement the toxics reduction options identified in the plan and the reduction amount resulting from these steps	Comparison of steps taken during the previous calendar year (2016) to steps included in the plan	Indication of whether timeline(s) set out in plan will be met	Additional actions taken during the previous calendar year (2017) to achieve the plan's objectives and the reduction amount resulting from the additional actions	Amendments made to the plan during the previous calendar year (2017)
Other	Ammonia	While Imperial Oil has not identified any feasible options to reduce the use or creation of Ammonia (total) at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Ammonia (total) in the coming years. These projects include but are not limited to improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Asbestos	There are no new uses of Asbestos (friable form only) and the refinery does not create Asbestos (friable form only).	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Carbon Monoxide	Sarnia Refinery has not identified any technically and economically feasible options to reduce creation of Carbon Monoxide at this time	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Cresol	Cresol (all isomers, and their salts) primarily enters the Sarnia Refinery as a blend additive used in lube oil blending. Cresol (all isomers, and their salts) is not created at the Sarnia Refinery. Sarnia Refinery has reduced the use of Cresol (all isomers, and their salts) with the closure of the lube oil blending operations of the refinery	Reduced the use of the blend additive containing Cresol and reduction was achieved per documented plan.	No change	Reduction plan timeline met	No additional actions	No amendments
	Ethylene Glycol	Ethylene glycol primarily enters the Sarnia Refinery as a blend additive used in lube oil blending. Ethylene glycol is not created at the Sarnia Refinery. Sarnia Refinery has reduced the use of Ethylene glycol with the closure of the lube oil blending operations of the refinery	Reduced the use of the blend additive containing Ethylene glycol and reduction was achieved per documented plan.	No change	Reduction plan timeline met	No additional actions	No amendments
	Formaldehyde	Formaldehyde was not detected in any streams used at the facility, nor was it detected in any measureable amounts in any streams in the refinery.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	H2S	While Imperial Oil has not identified any feasible options to reduce the use or creation of HYDROGEN SULPHIDE at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of HYDROGEN SULPHIDE in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Hydrogen cyanide	While Imperial Oil has not identified any feasible options to reduce the use or creation of Hydrogen cyanide at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of Hydrogen cyanide in the coming years. These projects include but are not limited to improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Methanol	Methanol enters the facility as an additive and is destroyed in hydrocarbon processing. Methanol is also created as a by-product in the production of hydrogen which is necessary for many refinery processes. No options to reduce the use or creation of Methanol were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Isopropyl alcohol	Isopropyl Alcohol primarily enters the Sarnia Refinery as a component of a water treating chemical and is destroyed in the refinery processing. Sarnia Refinery has not identified any technically and economically feasible options to reduce cuse of Isopropyl Alcohol at this time	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Molybdenum Trioxide	While Imperial Oil has not identified any feasible options to reduce the use or creation of Molybdenum Trioxide at the Sarnia refinery, Molybdenum Trioxide is not released in products or to the environment from refinery operations. All Molybdenum Trioxide is contained in solid catalysts and recovered through recycling operations	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Nitrate Ion	Sarnia Refinery has not identified any technically and economically feasible options to reduce creation of NITRATE ION IN SOLUTION AT PH >=6.0 at this time	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Nox	Sarnia Refinery has not identified any technically and economically feasible options to reduce creation of Nitrogen oxides (expressed as NO2) at this time	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
	Particulates	Sarnia Refinery has not identified any technically and economically feasible options to reduce creation of TOTAL PARTICULATE MATTER at this time	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments

Phenol (and its salts)	Sarnia Refinery has already eliminated the primary use of Phenol (and its salts) and does not create any Phenol (and its salts).	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
PM10	Sarnia Refinery has not identified any technically and economically feasible options to reduce creation of PM10 - PARTICULATE MATTER	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
PM2.5	Sarnia Refinery has not identified any technically and economically feasible options to reduce creation of PM2.5 - PARTICULATE MATTER	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
Sulphur Dioxide	Sarnia Refinery has not identified any technically and economically feasible options to reduce creation of Sulphur Dioxide at this time	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
Sulphuric acid	Various projects at Sarnia refinery are expected to reduce fugitive emissions of Sulphuric acid in the coming years. These projects are being evaluated in support of environmental emissions objectives not directly related to Toxic Substance Reductions. Sarnia Refinery does not use Sulphuric acid and no economically feasible options to reduce Sulphuric acid creation were identified.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
Tetrahydrofuran	Tetrahydrofuran has not been detected in measurable concentrations in any of the refinery inputs or outputs and is not created.	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
Total Reduced Sulphur	While Imperial Oil has not identified any feasible options to reduce the use or creation of TOTAL REDUCED SULPHUR (EXPRESSED AS HYDROGEN SULPHIDE) at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of TOTAL REDUCED SULPHUR (EXPRESSED AS HYDROGEN SULPHIDE) in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	No steps	No change	Not applicable - no timeline in plan	No additional actions	No amendments
Volatile Organic Compounds	While Imperial Oil has not identified any feasible options to reduce the use or creation of TOTAL REDUCED SULPHUR (EXPRESSED AS HYDROGEN SULPHIDE) at the Sarnia refinery, various projects at Sarnia refinery are expected to reduce fugitive emissions of TOTAL REDUCED SULPHUR (EXPRESSED AS HYDROGEN SULPHIDE) in the coming years. These projects include but are not limited to tank upgrades and improvements to the fugitive emission monitoring program	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

Report Submission and Electronic Certification

NPRI - Electronic Statement of Certification

Specify the language of correspondence

English

Comments (optional)

I hereby certify that I have exercised due diligence to ensure that the submitted information is true and complete. The amounts and values for the facility(ies) identified below are accurate, based on reasonable estimates using available data. The data for the facility(ies) that I represent are hereby submitted to the programs identified below using the Single Window Reporting Application.
I also acknowledge that the data will be made public.
Note: Only the person identified as the Certifying Official or the authorized delegate should submit the report(s) identified below.

Company Name

Imperial Oil

Certifying Official (or authorized delegate)

Rohan Davis

Report Submitted by

Rohan Davis

I, the Certifying Official or authorized delegate, agree with the statements above and acknowledge that by pressing the "Submit Report(s)" button, I am electronically certifying and submitting the facility report(s) for the identified company to its affiliated programs.

ON MECP TRA - Electronic Certification Statement

Annual Report Certification Statement

As of 17/06/2019, I, Rohan Davis, certify that I have read the reports on the toxic substance reduction plans for the toxic substances referred to 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 that Act.

TRA Substance List*

CAS RN	Substance Name
95-63-6	1,2,4-Trimethylbenzene

106-99-0	1,3-Butadiene
194-59-2	7H-Dibenzo[c,g]carbazole
83-32-9	Acenaphthene
208-96-8	Acenaphthylene
NA - 16	Ammonia (total)
120-12-7	Anthracene
56-55-3	Benz[a]anthracene
71-43-2	Benzene
50-32-8	Benzo[a]pyrene
205-99-2	Benzo[b]fluoranthene
192-97-2	Benzo[e]pyrene
191-24-2	Benzo[ghi]perylene
205-82-3	Benzo[j]fluoranthene
207-08-9	Benzo[k]fluoranthene
92-52-4	Biphenyl
NA - 24	Butane (all isomers)
25167-67-3	Butene (all isomers)

NA - 03	Cadmium (and its compounds)
630-08-0	Carbon monoxide
218-01-9	Chrysene
1319-77-3	Cresol (all isomers, and their salts)
NA - 25	Cycloheptane (all isomers)
110-82-7	Cyclohexane
NA - 26	Cyclohexene (all isomers)
NA - 27	Cyclooctane (all isomers)
NA - 28	Decane (all isomers)
53-70-3	Dibenz[a,h]anthracene
224-42-0	Dibenz[a,j]acridine
189-55-9	Dibenzo[a,i]pyrene
100-41-4	Ethylbenzene
74-85-1	Ethylene
107-21-1	Ethylene glycol
206-44-0	Fluoranthene
86-73-7	Fluorene

50-00-0	Formaldehyde
NA - 31	Heptane (all isomers)
NA - 32	Hexane (all isomers excluding n-hexane)
25264-93-1	Hexene (all isomers)
74-90-8	Hydrogen cyanide
7783-06-4	Hydrogen sulphide
193-39-5	Indeno[1,2,3-cd]pyrene
78-79-5	Isoprene
NA - 08	Lead (and its compounds)
NA - 10	Mercury (and its compounds)
67-56-1	Methanol
1313-27-5	Molybdenum trioxide
91-20-3	Naphthalene
110-54-3	n-Hexane
NA - 11	Nickel (and its compounds)
NA - 17	Nitrate ion in solution at pH >= 6.0
11104-93-1	Nitrogen oxides (expressed as NO2)

NA - 33	Nonane (all isomers)
NA - 34	Octane (all isomers)
NA - 35	Pentane (all isomers)
NA - 36	Pentene (all isomers)
198-55-0	Perylene
85-01-8	Phenanthrene
108-95-2	Phenol (and its salts)
NA - M09	PM10 - Particulate Matter
NA - M10	PM2.5 - Particulate Matter
74-98-6	Propane
115-07-1	Propylene
129-00-0	Pyrene
NA - 12	Selenium (and its compounds)
7446-09-5	Sulphur dioxide
7664-93-9	Sulphuric acid
109-99-9	Tetrahydrofuran
108-88-3	Toluene

NA - M08	Total Particulate Matter
NA - M14	Total reduced sulphur (expressed as hydrogen sulphide)
25551-13-7	Trimethylbenzene (all isomers excluding 1,2,4-Trimethylbenzene)
1330-20-7	Xylene (all isomers)
NA - 14	Zinc (and its compounds)

*Due to reporting system limitations, for the 2018 annual report the TRA Substance List may included new Volatile Organic Compounds (VOCs) and/or Dioxins and Furans congeners reported to NPRI only.

Exit Record Certification Statement

TRA Exit Record Substances

CAS RN	Substance Name
1332-21-4	Asbestos (friable form only)
7440-62-2	Vanadium (and its compounds)
77-73-6	Dicyclopentadiene
67-63-0	Isopropyl alcohol

Company Name

Imperial Oil

Highest Ranking Employee

Rohan Davis

Report Submitted by

Rohan Davis

Website address

I, the highest ranking employee, agree with the certification statement(s) above and acknowledge that by checking the box I am electronically signing the statement(s). I also acknowledge that by pressing the 'Submit Report(s)' button I am submitting the facility record(s)/report(s) for the identified facility to the Director under the Toxics Reduction Act, 2009. I also acknowledge that the Toxics Reduction Act, 2009 and Ontario Regulation 455/09 provide the authority to the Director under the Act to make certain information as specified in subsection 27(5) of Ontario Regulation 455/09 available to the public.

Submitted Report

Period	Submission Date	Facility Name	Province	City	Programs
2018	17/06/2019	Sarnia Refinery Plant	Ontario	Sarnia	NPRI,ON MECP TRA,NERM,NFPRER

Note: If there is a change in the contact information for the facility, a change in the owner or operator of the facility, if operations at the facility are terminated, or if information submitted for any previous year was mistaken or inaccurate, please update this information through SWIM or by contacting the National Pollutant Release Inventory directly.