# Summary of Ontario reportable substances (O-REG 455/09) - 2017

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

**Facility Owner**
Imperial Oil Limited
505 Quarry Park Blvd. S.E. ,
P.O. Box 2480, Station "M"
Calgary, Alberta T2P 3M9

**Additional Facility Information**
NPRI ID: 1464 MOE ID: 6840
Number of employees: 263
UTM NAD 83: 17N 385773.59 4756731.82

NAICS 2 Code: 31-33 - Manufacturing
NAICS 4 Code: 3251 - Basic Chemical Mfg.
NAICS 6 Code: 325110 - Petrochemical Mfg.

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)

The Sarnia chemical plant produces a wide range of petrochemicals using refinery and external feedstocks. These products are then used to manufacture a number of widely used consumer products, such as plastics, in North America and around the world.

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 showing the range and percentage difference. 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 reason - no range 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 processed. Variability in operation can also affect the results. Analytical results have uncertainty, which can be increased when measuring low/trace levels.

- **Change in production levels**: Change resulted from an overall increase or decrease in production at the facility. This includes changes due to shut-down and maintenance activities.

- **Improvement of data quality**: Change resulted from continuous improvement of the quality of the data used to calculate the amount of substance.

Public Contact:
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| | | | Report of Tracking and Quantification of Facility-Wide Quantities | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Substances (Reported in kilograms) | Chemical Abstract Service CAS Registry Number | USED | | | CREATED | | | CONTAINED IN PRODUCT | | | Reason for Change |
| | | | 2017 (kilograms) | DELTA vs. 2016 (kilograms) | % CHANGE | 2017 (kilograms) | DELTA vs. 2016 (kilograms) | % CHANGE | 2017 (kilograms) | DELTA vs. 2016 (kilograms) | % CHANGE | |
| Metals | Cadmium | ** | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| | Lead | ** | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| | Mercury | ** | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| | Selenium | ** | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| Polyaromatic Hydrocarbons (PAH) | 7H-Dibenzo(c,g)carbazole | 194-59-2 | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| | Acenaphthene | 83-32-9 | >10,000 to 100,000 | >10,000 to 100,000 | 74% | >10,000 to 100,000 | >10,000 to 100,000 | -68% | >10,000 to 100,000 | >10,000 to 100,000 | -19% | system variability |
| | Acenaphthylene | 208-96-8 | >100 to 1000 | >10 to 100 | 45% | >10,000 to 100,000 | >10,000 to 100,000 | -38% | >10,000 to 100,000 | >10,000 to 100,000 | -37% | system variability |
| | Benzo(a)anthracene | 56-55-3 | 0 | 0 | n/a | >1000 to 10,000 | >100 to 1000 | 91% | 0 | 0 | n/a | system variability |
| | Benzo(a)phenanthrene, aka chrysene | 218-01-9 | 0 | 0 | n/a | >1000 to 10,000 | >100 to 1000 | 101% | 0 | 0 | n/a | system variability |
| | Benzo(a)pyrene | 50-32-8 | 0 | 0 | n/a | >1000 to 10,000 | >100 to 1000 | 140% | 0 | 0 | n/a | system variability |
| | Benzo(b/j)fluoranthene | 205-99-2 / 205-82-3 | 0 | 0 | n/a | >1000 to 10,000 | >100 to 1000 | 121% | 0 | 0 | n/a | system variability |
| | Benzo(e)pyrene | 192-97-2 | 0 | 0 | n/a | >100 to 1000 | >100 to 1000 | 195% | 0 | 0 | n/a | system variability |
| | Benzo(g,h,i)perylene | 191-24-2 | 0 | 0 | n/a | >100 to 1000 | >10 to 100 | 214% | 0 | 0 | n/a | system variability |
| | Benzo(k)fluoranthene | 207-08-9 | 0 | 0 | n/a | >100 to 1000 | >100 to 1000 | 157% | 0 | 0 | n/a | system variability |
| | Dibenzo(a,j)acridine | 224-42-0 | 0 | 0 | n/a | >0 to 1 | >0 to 1 | -10% | 0 | 0 | n/a | system variability |
| | Dibenzo(a,i)pyrene | 189-55-9 | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| | Fluoranthene | 206-44-0 | 0 | 0 | n/a | >1000 to 10,000 | >1000 to 10,000 | -47% | 0 | >1000 to 10,000 | -100% | system variability |
| | Fluorene | 86-73-7 | >10,000 to 100,000 | >10,000 to 100,000 | 66% | >10,000 to 100,000 | >10,000 to 100,000 | -31% | >10,000 to 100,000 | >10,000 to 100,000 | -26% | system variability |
| | Indeno(1,2,3-c,d)pyrene | 193-39-5 | 0 | 0 | n/a | >100 to 1000 | >100 to 1000 | 181% | 0 | 0 | n/a | system variability |
| | Perylene | 198-55-0 | 0 | 0 | n/a | >100 to 1000 | >10 to 100 | 141% | 0 | 0 | n/a | system variability |
| | Phenanthrene | 85-01-8 | >10,000 to 100,000 | >10,000 to 100,000 | 75% | 0 | >1 to 10 | -100% | >10,000 to 100,000 | >10,000 to 100,000 | -58% | system variability |
| | Pyrene | 129-00-0 | >1000 to 10,000 | >1000 to 10,000 | n/a | >10,000 to 100,000 | >1000 to 10,000 | -28% | >1000 to 10,000 | >1000 to 10,000 | -63% | 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 | | | |
| | | | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | |
| Metals | Nickel | ** | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| Metals | Vanadium | 7440-62-2 | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| Metals | Zinc | ** | >100 to 1000 | >100 to 1000 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| PAH | Naphthalene | 91-20-3 | >1000 to 10,000 | >100 to 1000 | 30% | >1000 to 10,000 | >100 to 1000 | 28% | >1000 to 10,000 | >100 to 1000 | 34% | system variability |
| Hydrocarbons | 1, 2, 4-Trimethylbenzene * | 95-63-6 | >1000 to 10,000 | >1000 to 10,000 | 6860% | >100 to 1000 | >1000 to 10,000 | -94% | >1000 to 10,000 | >1000 to 10,000 | -17% | system variability |
| Hydrocarbons | 1, 3-Butadiene * | 106-99-0 | >1000 to 10,000 | >100 to 1000 | -14% | >10,000 to 100,000 | >1000 to 10,000 | 32% | >10,000 to 100,000 | >1000 to 10,000 | 19% | system variability |
| Hydrocarbons | Benzene * | 71-43-2 | >10,000 to 100,000 | >10,000 to 100,000 | -19% | >10,000 to 100,000 | >1000 to 10,000 | 80% | >100,000 to 1,000,000 | >100 to 1000 | 0% | system variability |
| Hydrocarbons | Biphenyl | 92-52-4 | >1000 to 10,000 | >10 to 100 | 4% | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Butane * | ** | >10,000 to 100,000 | >1000 to 10,000 | -2% | >100 to 1000 | >10 to 100 | -8% | >10,000 to 100,000 | >1000 to 10,000 | 4% | system variability |
| Hydrocarbons | Butene * | 25167-67-3 | >10,000 to 100,000 | >10,000 to 100,000 | 51% | >1000 to 10,000 | >10,000 to 100,000 | -86% | >10,000 to 100,000 | >10,000 to 100,000 | 16% | system variability |
| Hydrocarbons | Cycloheptane * | ** | >1000 to 10,000 | >1000 to 10,000 | 90% | >1000 to 10,000 | >100 to 1000 | -9% | >1000 to 10,000 | >100 to 1000 | -13% | system variability |
| Hydrocarbons | Cyclohexane | 110-82-7 | >1000 to 10,000 | >100 to 1000 | -26% | >100 to 1000 | >1 to 10 | -1% | >1000 to 10,000 | >100 to 1000 | -30% | system variability |
| Hydrocarbons | Cyclooctane * | ** | >1000 to 10,000 | >1000 to 10,000 | 148% | >1000 to 10,000 | >100 to 1000 | 36% | >1000 to 10,000 | >100 to 1000 | 11% | system variability |
| Hydrocarbons | Decane * | ** | >10,000 to 100,000 | >1000 to 10,000 | 28% | >1000 to 10,000 | >1000 to 10,000 | -30% | >10,000 to 100,000 | >100 to 1000 | -3% | system variability |
| Hydrocarbons | Ethylbenzene | 100-41-4 | >1000 to 10,000 | >1000 to 10,000 | -34% | >100 to 1000 | >100 to 1000 | 30% | >1000 to 10,000 | >100 to 1000 | -7% | system variability |
| Hydrocarbons | Ethylene * | 74-85-1 | >10,000 to 100,000 | >10,000 to 100,000 | 36% | >100,000 to 1,000,000 | >1000 to 10,000 | -3% | >1000 to 10,000 | >100 to 1000 | -16% | system variability |
| Hydrocarbons | Heptane * | ** | >10,000 to 100,000 | >10,000 to 100,000 | 231% | >1000 to 10,000 | >100 to 1000 | 39% | >10,000 to 100,000 | >100 to 1000 | 1% | system variability |
| Hydrocarbons | Hexane * | ** | >100,000 to 1,000,000 | >10,000 to 100,000 | -23% | >1000 to 10,000 | >100 to 1000 | 12% | >100,000 to 1,000,000 | >10,000 to 100,000 | -18% | system variability |
| Hydrocarbons | Hexene * | 25264-93-1 | >1000 to 10,000 | >1000 to 10,000 | -17% | >10,000 to 100,000 | >1000 to 10,000 | 21% | >10,000 to 100,000 | >1000 to 10,000 | 15% | system variability |
| Hydrocarbons | Isoprene | 78-79-5 | 0 | >10 to 100 | -100% | >1000 to 10,000 | >100 to 1000 | 66% | >1000 to 10,000 | >100 to 1000 | 63% | system variability |
| Hydrocarbons | n-Hexane * | 110-54-3 | >10,000 to 100,000 | >1000 to 10,000 | 13% | >1000 to 10,000 | >100 to 1000 | 9% | >10,000 to 100,000 | >1000 to 10,000 | -12% | system variability |
| Hydrocarbons | Nonane * | ** | >1000 to 10,000 | >1000 to 10,000 | -13% | >10,000 to 100,000 | >100 to 1000 | -4% | >10,000 to 100,000 | >1000 to 10,000 | -13% | system variability |
| Hydrocarbons | Octane * | ** | >1000 to 10,000 | >1000 to 10,000 | 229% | >1000 to 10,000 | >100 to 1000 | -9% | >1000 to 10,000 | >1000 to 10,000 | -30% | system variability |
| Hydrocarbons | Pentane * | ** | >10,000 to 100,000 | >10,000 to 100,000 | -16% | >10 to 100 | >10 to 100 | -84% | >10,000 to 100,000 | >1000 to 10,000 | -8% | system variability |
| Hydrocarbons | Pentene * | ** | >1000 to 10,000 | >100 to 1000 | 6% | >10,000 to 100,000 | >1000 to 10,000 | 62% | >10,000 to 100,000 | >1000 to 10,000 | 43% | system variability |
| Hydrocarbons | Propane * | 74-98-6 | >100,000 to 1,000,000 | >10,000 to 100,000 | -8% | >10 to 100 | >1000 to 10,000 | -99% | >1000 to 10,000 | >100 to 1000 | 10% | system variability |
| Hydrocarbons | Propylene * | 115-07-1 | >10,000 to 100,000 | >1000 to 10,000 | -3% | >0 to 1 | >0 to 1 | -100% | >100 to 1000 | >1 to 10 | -2% | system variability |
| Hydrocarbons | Toluene * | 108-88-3 | >10,000 to 100,000 | >1000 to 10,000 | 13% | >1000 to 10,000 | >10 to 100 | -1% | >10,000 to 100,000 | >1000 to 10,000 | 17% | system variability |
| Hydrocarbons | Xylene * | 1330-20-7 | >10,000 to 100,000 | >10,000 to 100,000 | 185% | >1000 to 10,000 | >1000 to 10,000 | -29% | >10,000 to 100,000 | >100 to 1000 | -4% | system variability |

| | | | Report of Tracking and Quantification of Facility-Wide Quantities | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Substances (Reported in tonnes) | Chemical Abstract Service CAS Registry Number | Used | | | Created | | | Contained in Product | | | Reason for Change |
| | | | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | |
| Other | Ammonia | ** | 0 | 0 | n/a | >100 to 1000 | >1 to 10 | 5% | >100 to 1000 | >1 to 10 | 5% | no reasons - quantities approximately the sa |
| | 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 | >100 to 1000 | >10 to 100 | 9% | 0 | 0 | n/a | no reasons - quantities approximately the sa |
| | Cresol | 1319-77-3 | 0 | 0 | n/a | >100 to 1000 | >10 to 100 | -17% | >0 to 1 | >10 to 100 | -100% | system variability |
| | Ethylene Glycol | 107-21-1 | >10 to 100 | >0 to 1 | 1% | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| | Formaldehyde * | 50-00-0 | 0 | 0 | n/a | >0 to 1 | >0 to 1 | 140% | 0 | 0 | n/a | system variability |
| | H2S | 7783-06-4 | >10,000 to 100,000 | >1000 to 10,000 | 21% | >1000 to 10,000 | >1000 to 10,000 | -68% | >10,000 to 100,000 | >1000 to 10,000 | -12% | system variability |
| | Hydrogen cyanide | 74-90-8 | 0 | 0 | n/a | >0 to 1 | >0 to 1 | -36% | >0 to 1 | >0 to 1 | -36% | system variability |
| | Methanol * | 67-56-1 | >10 to 100 | >1 to 10 | -9% | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the sa |
| | Isopropyl alcohol | 67-63-0 | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| | Molybdenum Trioxide | 1313-27-5 | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| | Nitrate Ion | ** | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| | Nox | 11104-93-1 | 0 | 0 | n/a | >100 to 1000 | >10 to 100 | -10% | 0 | 0 | n/a | system variability |
| | Particulates | ** | 0 | 0 | n/a | >10 to 100 | >1 to 10 | 11% | 0 | 0 | n/a | system variability |
| | Phenol (and its salts) | 108-95-2 | >100 to 1000 | >10 to 100 | 24% | 0 | 0 | n/a | 0 | >0 to 1 | -100% | system variability |
| | PM10 | ** | 0 | 0 | n/a | >10 to 100 | >1 to 10 | 10% | 0 | 0 | n/a | system variability |
| | PM2.5 | ** | 0 | 0 | n/a | >10 to 100 | >1 to 10 | 11% | 0 | 0 | n/a | system variability |
| | Sulphur Dioxide | 7446-09-5 | 0 | 0 | n/a | >100 to 1000 | >100 to 1000 | 856% | 0 | 0 | n/a | system variability |
| | Sulphuric acid | 7664-93-9 | >0 to 1 | >0 to 1 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| | Tetrahydrofuran * | 109-99-9 | >10 to 100 | >10 to 100 | -23% | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| | Total Reduced Sulphur | ** | >10,000 to 100,000 | >1000 to 10,000 | -10% | >1000 to 10,000 | >1000 to 10,000 | -67% | >10,000 to 100,000 | >1000 to 10,000 | -12% | system variability |
| | Volatile Organic Compounds | ** | >1,000,000 | >10,000 to 100,000 | 6% | >100,000 to 1,000,000 | >10,000 to 100,000 | -12% | >100,000 to 1,000,000 | >10,000 to 100,000 | -2% | 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 / OffsiteDisposal | | | Transfer for Treatment and Recycling | | | Reason for Change |
| | | 2017 (kilograms) | DELTA vs. 2016 (kilograms) | % CHANGE | 2017 (kilograms) | DELTA vs. 2016 (kilograms) | % CHANGE | 2017 (kilograms) | DELTA vs. 2016 (kilograms) | % CHANGE | 2017 (kilograms) | DELTA vs. 2016 (kilograms) | % CHANGE | 2017 (kilograms) | DELTA vs. 2016 (kilograms) | % CHANGE | |
| Metals | Cadmium | 3 | 0 | -3% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | -8% | system variability |
| | Lead | 9 | 0 | -3% | 0 | 0 | n/a | 0 | 0 | n/a | 2 | 2 | 12276% | 5 | 0 | -8% | system variability |
| | Mercury | 0 | 0 | -3% | 0 | 0 | n/a | 0 | 0 | n/a | 1 | 1 | 56291% | 0 | 0 | n/a | system variability |
| | Selenium | 2 | 0 | -3% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | -100% | 0 | 0 | -8% | system variability |
| Polyaromatic Hydrocarbons (PAH) | 7H-Dibenzo(c,g)carbazole | 0 | 0 | -15% | 0 | 0 | n/a | 0 | 0 | n/a | 1 | -1 | -53% | 7 | 0 | -1% | system variability |
| | Acenaphthene | 1 | 1 | 380% | 0 | 0 | n/a | 0 | 0 | n/a | 705 | -398 | -36% | 7391 | 1863 | 34% | system variability |
| | Acenaphthylene | 3 | 3 | 964% | 0 | 0 | n/a | 0 | 0 | n/a | 2319 | -2715 | -54% | 24306 | -929 | -4% | system variability |
| | Benzo(a)anthracene | 0 | 0 | 345% | 0 | 0 | n/a | 0 | 0 | n/a | 156 | 0 | 0% | 1637 | 856 | 110% | system variability |
| | Benzo(a)phenanthrene, aka chrysene | 0 | 0 | 1921% | 0 | 0 | n/a | 0 | 0 | n/a | 111 | 6 | 5% | 1166 | 637 | 120% | system variability |
| | Benzo(a)pyrene | 0 | 0 | 1659% | 0 | 0 | n/a | 0 | 0 | n/a | 90 | 18 | 26% | 947 | 587 | 163% | system variability |
| | Benzo(b/j)fluoranthene | 0 | 0 | 452% | 0 | 0 | n/a | 0 | 0 | n/a | 114 | 15 | 16% | 1191 | 698 | 142% | system variability |
| | Benzo(e)pyrene | 67 | 67 | 1184750% | 0 | 0 | n/a | 0 | 0 | n/a | 46 | 12 | 37% | 481 | 313 | 186% | system variability |
| | Benzo(g,h,i)perylene | 0 | 0 | -100% | 0 | 0 | n/a | 0 | 0 | n/a | 12 | 5 | 64% | 124 | 88 | 244% | system variability |
| | Benzo(k)fluoranthene | 0 | 0 | -37% | 0 | 0 | n/a | 0 | 0 | n/a | 16 | 4 | 34% | 164 | 105 | 181% | system variability |
| | Dibenzo(a,i)pyrene | 0 | 0 | -15% | 0 | 0 | n/a | 0 | 0 | n/a | 1 | -1 | -53% | 7 | 0 | -1% | system variability |
| | Dibenzo(a,j)acridine | 0 | 0 | -15% | 0 | 0 | n/a | 0 | 0 | n/a | 1 | -1 | -53% | 7 | 0 | -1% | system variability |
| | Fluoranthene | 0 | 0 | -100% | 0 | 0 | n/a | 0 | 0 | n/a | 440 | -15 | -3% | 4613 | 2330 | 102% | system variability |
| | Fluorene | 3 | 2 | 631% | 0 | 0 | n/a | 0 | 0 | n/a | 1657 | -741 | -31% | 17362 | 5345 | 44% | system variability |
| | Indeno(1,2,3-c,d)pyrene | 0 | 0 | -50% | 0 | 0 | n/a | 0 | 0 | n/a | 19 | 6 | 47% | 203 | 137 | 208% | system variability |
| | Perylene | 0 | 0 | -100% | 0 | 0 | n/a | 0 | 0 | n/a | 10 | 2 | 26% | 105 | 65 | 164% | system variability |
| | Phenanthrene | 4 | 4 | 728% | 0 | 0 | n/a | 0 | 0 | n/a | 2982 | -734 | -20% | 31251 | 12625 | 68% | system variability |
| | Pyrene | 1 | 1 | 1111% | 0 | 0 | n/a | 0 | 0 | n/a | 975 | -140 | -13% | 10219 | 4631 | 83% | system variability |

| | | Report of Tracking and Quantification of Facility-Wide Quantities | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Substances (Reported in tonnes) | Releases To Air | | | Releases to Water | | | Releases to Land | | | Onsite / OffsiteDisposal | | | Transfer for Treatment and Recycling | | | Reason for Change |
| | | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | 2017 (tonnes) | DELTA vs. 2016 (tonnes) | % CHANGE | |
| Metals | Nickel | 0 | 0 | -3% | 0 | 0 | n/a | 0 | 0 | n/a | 1 | -4 | -73% | 0 | 0 | -8% | system variability |
| Metals | Vanadium | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | -100% | 0 | 0 | -8% | system variability |
| Metals | Zinc | 0 | 0 | -3% | 0 | 0 | 0% | 0 | 0 | n/a | 0 | 0 | -100% | 0 | 0 | -8% | system variability |
| PAI | Naphthalene | 0 | 0 | 27% | 0 | 0 | n/a | 0 | 0 | n/a | 9 | -10 | -52% | 97 | 1 | 1% | system variability |
| Hydrocarbons | 1, 2, 4-Trimethylbenzene * | 4 | 0 | -2% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | 1, 3-Butadiene * | 0 | 0 | -44% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Benzene * | 4 | 0 | 8% | 0 | 0 | n/a | 0 | 0 | n/a | 1 | 1 | 1011667% | 0 | 0 | n/a | system variability |
| Hydrocarbons | Biphenyl | 0 | 0 | 18% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | -1 | -100% | 0 | 0 | n/a | system variability |
| Hydrocarbons | Butane * | 13 | 11 | 758% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Butene * | 3 | 2 | 118% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Cycloheptane * | 0 | 0 | 64% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Cyclohexane | 0 | -1 | -89% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Cyclooctane * | 0 | 0 | 106% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Decane * | 1 | 0 | 6% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Ethylbenzene | 1 | 0 | -3% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | 1010676% | 0 | 0 | n/a | system variability |
| Hydrocarbons | Ethylene * | 43 | -12 | -22% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Heptane * | 1 | -1 | -39% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Hexane * | 8 | 0 | -1% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Hexene * | 2 | 0 | -11% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Isoprene | 0 | 0 | 393% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | n-Hexane * | 0 | -7 | -100% | 0 | 0 | n/a | 0 | 0 | n/a | 1 | 1 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Nonane * | 3 | 0 | 12% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Octane * | 1 | 0 | 0% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Pentane * | 8 | -2 | -24% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Pentene * | 0 | 0 | 572% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Propane * | 41 | 12 | 41% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | -29% | 0 | 0 | n/a | system variability |
| Hydrocarbons | Propylene * | 20 | -2 | -9% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Hydrocarbons | Toluene * | 4 | -1 | -23% | 0 | 0 | n/a | 0 | 0 | n/a | 2 | 2 | 2174666% | 0 | 0 | n/a | system variability |
| Hydrocarbons | Xylene * | 3 | 0 | 1% | 0 | 0 | n/a | 0 | 0 | n/a | 1 | -1 | -53% | 10 | 0 | -1% | system variability |
| Other | Ammonia | 0 | 0 | -3% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Other | Asbestos | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 2 | 1 | 30% | 0 | 0 | n/a | system variability |
| Other | Carbon Monoxide | 473 | 38 | 9% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| Other | Cresol | 0 | 0 | -50% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| Other | Ethylene Glycol | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | -1 | -100% | 0 | 0 | n/a | system variability |
| Other | Formaldehyde * | 0 | 0 | -3% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Other | H2S | 1 | 0 | 4% | 0 | 0 | n/a | 0 | 0 | n/a | 4 | 4 | 6719% | 0 | 0 | n/a | system variability |
| Other | Hydrogen cyanide | 0 | 0 | -3% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| Other | Methanol * | 0 | 0 | -2% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Other | Isopropyl alcohol | 0 | - | n/a | 0 | - | n/a | 0 | - | n/a | 0 | - | n/a | 0 | - | n/a | no reasons - quantities approximately the same |
| Other | Molybdenum Trioxide | 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 | Nitrate Ion | 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 | Nox | 420 | -44 | -10% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| Other | Particulates | 20 | 2 | 11% | 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 | 0 | -3% | 0 | 0 | -1% | 0 | 0 | n/a | 0 | 0 | -100% | 0 | 0 | n/a | system variability |
| Other | PM10 | 13 | 1 | 10% | 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 | 10 | 1 | 11% | 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 | 112 | 100 | 856% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Other | Sulphuric acid | 2 | 0 | 25% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | no reasons - quantities approximately the same |
| Other | Tetrahydrofuran * | 5 | 2 | 100% | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | 0 | 0 | n/a | system variability |
| Other | Total Reduced Sulphur | 2 | 0 | 0% | 0 | 0 | n/a | 0 | 0 | n/a | 4 | 4 | 6719% | 0 | 0 | n/a | system variability |
| Other | Volatile Organic Compounds | 164 | 10 | 6% | 0 | 0 | n/a | 0 | 0 | n/a | 4 | 2 | 96% | 10 | 0 | -1% | system variability |

** No single CAS number applies to this substance

* also included in Volatile Organic Compounds

## Toxic Reduction Plan Stewardship - 2017 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 (2017) 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) enters the facility at concentrations in the chemcial plant feedstock that are below the measurement detection limit and is not created at the facility. No reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Lead | Lead enters the facility at concentrations in the chemcial plant feedstock that are below the measurement detection limit and is not created at the facility. No reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Mercury | Mercury enters the facility at concentrations in the chemcial plant feedstock that are below the measurement detection limit and is not created at the facility. No reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Selenium | Selenium enters the facility at concentrations in the chemcial plant feedstock that are below the measurement detection limit and is not created at the facility. No reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Nickel | Nickel enters the facility at concentrations in the chemcial plant feedstock that are below the measurement detection limit and is not created at the facility. No reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Vanadium | Vanadium enters the facility at concentrations in the chemcial plant feedstock that are below the measurement detection limit and is not created at the facility. No reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Zinc | Zinc enters the facility at concentrations in the chemcial plant feedstock that are below the measurement detection limit and is not created at the facility. No reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| Polyaromatic Hydrocarbons (PAH) | 7H-Dibenzo(c,g)carbazole | 7H-Dibenzo(c,g)carbazole is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Acenaphthene | Acenaphthene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Acenaphthylene | Acenaphthylene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Benzo(a)anthracene | Benzo(a)anthracene is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options 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 is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Benzo(a)pyrene | Benzo(a)pyrene is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options 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 is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Benzo(e)pyrene | Benzo(e)pyrene is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options 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 is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Benzo(k)fluoranthene | Benzo(k)fluoranthene is created at the facility in the conversion units through cracking processes. Sarnia chemical plant is targeting to reduce the amount of Benzo(k)fluoranthene byproduct leaving the site for treatment / recyling by approximately 33 kg. | Facility upgrades in the chemical plant are progressing but completion of the upgrades have been delayed beyond the original reduction plan timeline. Reductions will be achieved when the facility upgrades are complete. | No change | Reduction plan timeline will not be met | No additional actions | No amendments |
| | Dibenzo(a,h)anthracene | Dibenzo(a,h)anthracene is created at the facility in the conversion units through cracking processes. Sarnia chemical plant is targeting to reduce the amount of Dibenzo(a,h)anthracene byproduct leaving the site for treatment / recyling by approximately 15 kg. | Facility upgrades in the chemical plant are progressing but completion of the upgrades have been delayed beyond the original reduction plan timeline. Reductions will be achieved when the facility upgrades are complete. | No change | Reduction plan timeline will not be met | No additional actions | No amendments |
| | Dibenzo(a,i)pyrene | Benzo(a,i)pyrene is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Dibenzo(a,j)acridine | Benzo(a,i)pyrene is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Fluoranthene | Fluoranthene is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |

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|---|---|---|---|---|---|---|
| Fluorene | Fluorene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options 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 is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| Naphthalene | Naphthalene is a component of the chemical plant feedstocks. There is both creation and destruction of naphthalene occurring in the chemical plant conversion processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| Perylene | Perylene is created at the facility in the conversion units through cracking processes. Sarnia chemical plant is targeting to reduce the amount of Perylene byproduct leaving the site for treatment / recyling by approximately 20 kg. | Facility upgrades in the chemical plant are progressing but completion of the upgrades have been delayed beyond the original reduction plan timeline. Reductions will be achieved when the facility upgrades are complete. | No change | Reduction plan timeline will not be met | No additional actions | No amendments |
| Phenanthrene | Phenanthrene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| Pyrene | Pyrene is created at the facility in small concentrations in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |

## Toxic Reduction Plan Stewardship - 2017 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 (2017) 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) |
|---|---|---|---|---|---|---|---|
| Hydrocarbons | 1, 2, 4-Trimethylbenzene | 1,2,4-Trimethylbenzene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. Sarnia Chemcial plant is targeting to reduce the use of 1,2,4 Trimethylbenzene in unit feedstock by approximately 1.4 tonne. | Reduced the use of a 1,2,4 Trimethylbenzene containing feedstock to one chemical plant unit per the documented reduction plan. | No change | Reduction plan timeline met. | No additional actions | No amendments |
| | 1, 3-Butadiene | 1,3-Butadiene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. However, various projects at Sarnia Chemical Plant are expected to reduce the 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 | Benzene is integral to the chemical plant operation and is contained in desired chemical feedstock and/or products, therefore no options to reduce the use or creation of benzene were identified. However, various projects at Sarnia Chemical Plant are expected to reduce the 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 | Biphenyl enters the chemical plant in unit feedstock and is destroyed at the facility in the conversion unit through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Butane | Butane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Butene | Butene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Cycloheptane | Cycloheptane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Cyclohexane | Cyclohexane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Cyclohexene | Cyclohexene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Cyclooctane | Cyclooctane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Decane | Decane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Dicyclopentadiene | Dicyclopentadiene enters the chemical plant in desired feedstock. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Ethylbenzene | Ethylbenzene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Ethylene | Ethylene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. Sarnia Chemical plant is targeting to reduce the amount of ethylene released to the air in one of its operating units by approximately 2.8 tonnes. | Option #1: Facilities upgrades completed, procedure changes and operator training completed per documented reduction plan. Planned reduction was achieved.<br>Option #2: Procedure changes and operator training completed per documented reduction plan and planned reduction was achieved. | No change | Reduction plan timeline met. | No additional actions | No amendments |
| | Heptane | Heptane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Hexane | Hexane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Hexene | Hexene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Isoprene | Isoprene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | n-Hexane | n-Hexane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Nonane | Nonane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Octane | Octane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Pentane | Pentane enters the chemical plant in various feedstocks and is created & destroyed at the facility in the conversion units through cracking processes. Sarnia Chemical plant is targeting to reduce the amount of pentane used at one of its operating units by approximately 135 tonnes. Sarnia Chemical plant is targeting to reduce the amount of pentane released to the air in one of its operating units by approximately 0.7 tonnes. | Option #1: Facility upgrades in the chemical plant are progressing but completion of the upgrades have been delayed beyond the original reduction plan timeline. Reductions will be achieved when the facility upgrades are complete.<br>Option #2: Procedure changes and operator training completed per documented reduction plan and planned reduction was achieved. | No change | Reduction plan timeline will not be met. | No additional actions | No amendments |
| | Pentene | Pentene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Propane | Propane enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Propylene | Propylene enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |

## Toxic Reduction Plan Stewardship - 2017 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 (2017) 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) |
|---|---|---|---|---|---|---|---|
| Hydrocarbons | Toluene | Toluene is integral to the chemical plant operation and is contained in desired chemical feedstock and/or products, therefore no options to reduce the use or creation of toluene were identified. However, various projects at Sarnia Chemical Plant are expected to reduce the 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 | Xylene is integral to the chemical plant operation and is contained in desired chemical feedstock and/or products, therefore no options to reduce the use or creation of xylene were identified. However, various projects at Sarnia Chemical Plant are expected to reduce the fugitive emissions of xylene 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 |
| | Ammonia | Ammonia is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Asbestos | Asbestos (friable form only) currently exists at the facility as a result of historical use and no new asbestos (friable form only) enters the chemical plant. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Carbon Monoxide | Carbon Monoxide may be created as a byproduct of fuel combustion. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Cresol | Cresol is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Ethylene Glycol | Ethylene Glycol is used at the Sarnia Chemical plant in purchased additive. The additive is optimized for the facility's operating envelope and product market demand. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Formaldehyde | Formaldehyde may be created as a byproduct of fuel combustion and was not detected in measurable concentrations in any of the chemcial plant inputs or outputs. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | H2S | H2S enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Hydrogen cyanide | Hydrogen Cyanide is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Methanol | Methanol is used as an antifreeze for the chemical plant process equipment. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |

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|---|---|---|---|---|---|---|---|
| Other | Isopropyl alcohol | Isopropyl alcohol may be found in process chemical additives. It is not contained in any chemical plant feedstocks and is not created at the facility. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Molybdenum Trioxide | Molybdenum Trioxide may be found in catalyst. It is not contained in any chemical plant feedstocks and is not created at the facility. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Nitrate Ion | Nitrate Ion may be a byproduct of biological oxidation of ammonia containing streams at wastewater treatment plant. It is not contained in any chemical plant feedstocks and is not created at the facility. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Nox | Nox (mono-nitrogen oxides) are produced from the reaction of nitrogen and oxygen gases in the air during combustion at thigh temperatures. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Particulates | Particulates are fines that are not fully combused or recovered in the process. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Phenol (and its salts) | Phenol (and its salts) is contained in an additive that is used within the polyethylene plant and is transformed during processing. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | PM10 | PM10 are fines that are not fully combused or recovered in the process. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | PM2.5 | PM2.5 are fines that are not fully combused or recovered in the process. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Sulphur Dioxide | Sulphur Dioxide is created in the combustion of fuel containing sulphur. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Sulphuric acid | Sulphuric acid is used as an additive to the facility's clean water impounding basin and is transformed into a neutral salt. Sulphuric acid is also created as a byproduct from combustion of fuel containing traces of sulphur. Sarnia chemical plant is targeting to reduce the use of sulphuric acid by 1.0 tonnes. | Reduced the use of this toxin at the chemical plant, reduction was achieved per documented plan. | No change | Reduction plan timeline met. | No additional actions | No amendments |
| | Tetrahydrofuran | Tetrahydrofuran is used as a feedstock in the preparation of chemical plant catalyst and is detroyed through unit processing. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Total Reduced Sulphur | Totatl Reduced Sulphur enters the chemical plant in various feedstocks and is created at the facility in the conversion units through cracking processes. No feasible reduction options were identified. | No steps | No change | Not applicable - no timeline in plan | No additional actions | No amendments |
| | Volatile Organic Compounds | Not applicable - no plans required for VOC's as a group (O. Reg 455/09 S.11) | 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)

James  Ritchie

Report Submitted by

James  Ritchie

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 MOE TRA - Electronic Certification Statement

## Annual Report Certification Statement

As of 31/05/2018, I, James  Ritchie, 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) |
| 1332-21-4 | Asbestos (friable form only) |
| 71-43-2 | Benzene |
| 56-55-3 | Benzo(a)anthracene |
| 218-01-9 | Benzo(a)phenanthrene |
| 50-32-8 | Benzo(a)pyrene |
| 205-99-2 | Benzo(b)fluoranthene |
| 192-97-2 | Benzo(e)pyrene |
| 191-24-2 | Benzo(g,h,i)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 |
| 1319-77-3 | Cresol (all isomers, and their salts) |
| NA - 25 | Cycloheptane (all isomers) |
| 110-82-7 | Cyclohexane |
| NA - 27 | Cyclooctane (all isomers) |
| NA - 28 | Decane (all isomers) |
| 53-70-3 | Dibenzo(a,h)anthracene |
| 189-55-9 | Dibenzo(a,i)pyrene |
| 224-42-0 | Dibenzo(a,j)acridine |
| 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-c,d)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 |
| 115-07-1 | Propylene |
| 129-00-0 | Pyrene |
| NA - 12 | Selenium (and its compounds) |
| 7446-09-5 | Sulphur dioxide |
| 7664-93-9 | Sulphuric acid |
| 108-88-3 | Toluene |
| NA - M08 | Total Particulate Matter |
| NA - M14 | Total reduced sulphur (expressed as hydrogen sulphide) |
| 7440-62-2 | Vanadium (and its compounds) |

| | |
|---|---|
| 1330-20-7 | Xylene (all isomers) |
| NA - 14 | Zinc (and its compounds) |

## Exit Record Certification Statement

## TRA Exit Record Substances

| CAS RN | Substance Name |
|---|---|
| 77-73-6 | Dicyclopentadiene |
| 67-63-0 | Isopropyl alcohol |
| 120-12-7 | Anthracene |

Company Name

Imperial Oil

Highest Ranking Employee

James  Ritchie

Report Submitted by

James  Ritchie

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 |
|---|---|---|---|---|---|
| 2017 | 31/05/2018 | Sarnia Chemical Plant | Ontario | Sarnia | NPRI,ON MOE TRA,NERM |

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.