Lake Erie Works
2019 Annual Toxics Reduction Report
(O. Reg. 455/09)

Issued July 31, 2020

Basic Facility Information

Section 1 – Facility Information	
Owner	Stelco Inc.
Facility name	Lake Erie Works
Address	2330 Regional #3 Road
City	Nanticoke
Province	Ontario
Postal Code	N0A 1L0
Spatial Coordinates	UTM Zone: 17 UTM Easting: 573853 UTM Northing: 4740111
Section 2 – Owner's Mailing Address	
Same as above (Y / N)	No
Address	386 Wilcox Street
City	Hamilton
Province	Ontario
Postal code	L8L 8K5
Section 3 – Owner's Primary Contact Person	
Name	Petar Kolundzija
Title	Environmental Manager
Phone	(519) 587 – 4541 ext. 2506
Fax	(519) 587 - 7706
Email address	Petar.Kolundzija@Stelco.com
Section 4 – Additional Facility Information	
NAICS Code	331110
NPRI ID	3855
# of Employees	1426
Licence # of Toxic Substance Reduction Planner	TSRP0050

Basic Facility Information (Cont.)

Lake Erie Works was commissioned in 1980 making it the most modern integrated steel mill in North America. The plant is located on 1660 hectares of land on the north shore of Lake Erie. Lake Erie Works is an integrated steel plant and produces approximately 2.5 million tonnes of steel per year. Process operations at the plant include Cokemaking, Ironmaking, Basic Oxygen Furnace Steelmaking, Continuous Casting, Hot Strip Rolling and Pickling. There are no finishing operations at the plant.

Raw materials (coal and iron ore) are brought to the area by self-unloading ships. Coal is heated in the Coke Ovens, where volatile components of coal are vapourized and the remaining carbon is transformed into coke. The coke is then used as a reductant in the Blast Furnace. The gas generated during coking fuels the coking battery and is used in the reheat furnaces in the Hot Strip Mill. The liquid components generated during coking are separated in an adjacent By-Products Plant and are sold.

Coke, iron ore pellets, and dolomite are conveyed to the Blast Furnace, which has a capacity to produce 7,000 tonne/day of molten pig iron. From the Blast Furnace, molten iron is carried to the steelmaking shop in specialized railway cars where it is charged into two Basic Oxygen Furnaces. After mixing the molten iron with scrap steel, fluxes and additives, oxygen is blown into the melt to remove carbon and impurities. The molten steel is treated to adjust its composition to meet the requirements of the final product then transferred to the Continuous Casting process.

The casting complex consists of two casting strands in which the molten steel is solidified into steel slabs. Most slabs cast at Lake Erie Works are rolled in the Hot Strip Mill for further processing, although some are sold as slabs.

The hot strip rolling facility reheats the slabs to the desired rolling temperature for converting them into strip. The slab is rolled to a finished thickness of 2-16 millimetres. The strip is then cooled and coiled for sale or further processing off-site. A portion of the hot-rolled strip is processed at the Lake Erie Works Pickle Lines where hydrochloric acid is used to remove iron oxide from the steel surface to produce Pickled & Oiled hot-rolled sheet.

The plant has extensive environmental control measures. Water is recycled extensively and treated before exiting the plant. Air cleaning equipment is used at the Coke Ovens, Blast Furnace and Basic Oxygen Furnaces to minimize emissions. In addition, a detailed landscaping plan was implemented during construction. This includes earthen berms up to 10 meters high surrounding the plant, water filled lagoons and extensive tree planting.

List of Toxic Substances at the Facility

Substance	Chemical Abstracts Service Number
Acenaphthylene	208-96-8
Arsenic	**
Benzene	71-43-2
Benzo(a)anthracene	56-55-3
Benzo(a)phenanthrene	218-01-9
Benzo(a)pyrene	50-32-8
Benzo(b)fluoranthene	205-99-2
Benzo(g,h,i)perylene	191-24-2
Benzo(j)fluoranthene	205-82-3
Benzo(k)fluoranthene	207-08-9
Butane	**
Butene	25167-67-3
Cadmium	**
Calcium Fluoride	7789-75-5
Carbon Monoxide	630-08-0
Chromium	**
Cobalt	**
Copper	**
Dibenzo(a,h)anthracene	53-70-3
Dibenzo(a,i)pyrene	189-55-9
Ethylene	74-85-1
Fluoranthene	206-44-0
Hydrogen Sulphide	7783-06-4
Indeno(1,2,3-c,d)pyrene	193-39-5
Lead	**
Manganese	**
Mercury	**
Methanol	67-56-1
n-Hexane	110-54-3
Nitrogen Oxides (as NO2)	11104-93-1
Particulate Matter	**
Perylene	198-55-0
Phenanthrene	85-01-8
PM10	**
PM2.5	**
Propane	74-98-6
Propylene	115-07-1
Pyrene	129-00-0
Selenium	**
Sulphur Dioxide	7446-09-5
Toluene	108-88-3
Total Reduced Sulphur	**
Vanadium	**
Volatile Organic Compounds	**

** No single CAS number applies to this substance

Summary: Tracking and Quantification

Substances	Usage	Creation	Destruction	Releases to Water
	tonnes	tonnes	tonnes	tonnes
Acenaphthylene	0	> 100 to 1,000	0	0
Arsenic	> 10 to 100	0	0	0
Benzene	0	> 1000 to 10,000	0	0.001
Benzo(a)anthracene	0	> 100 to 1,000	0	0.0007
Benzo(a)phenanthrene	0	> 100 to 1,000	0	0.001
Benzo(a)pyrene	0	> 100 to 1,000	0	0.0006
Benzo(b)fluoranthene	0	> 100 to 1,000	0	0.0006
Benzo(g,h,i)perylene	0	> 1 to 10	0	0.00002
Benzo(j)fluoranthene	0	> 10 to 100	0	0.00004
Benzo(k)fluoranthene	0	> 100 to 1,000	0	0.0004
Butane	> 100 to 1,000	> 0 to 1	> 100 to 1,000	0
Butene	0	> 1 to 10	0	0
Cadmium	> 1 to 10	0	0	0.026
Calcium Fluoride	> 100 to 1,000	> 10 to 100	> 100 to 1,000	58.6
Carbon Monoxide	0	> 1,000,000	> 1,000,000	0
Chlorine	> 100 to 1,000	0	> 100 to 1,000	0.758
Chromium	> 100 to 1,000	0	0	0.027
Cobalt	> 10 to 100	0	0	0
Copper	> 1,000 to 10,000	0	0	0.067
Dibenzo(a,h)anthracene	0	> 100 to 1,000	0	0.0007
Dibenzo(a,i)pyrene	0	> 100 to 1,000	0	0.0006
Ethylene	0	> 1 to 10	0	0
Fluoranthene	0	> 100 to 1,000	0	0.001
Hydrochloric Acid	> 10,000 to 100,000	0	< -100 to -1,000	0
Hydrogen Sulphide	0	> 10 to 100	> 1 to 10	0
Indeno(1,2,3-c,d)pyrene	0	> 10 to 100	0	0.0002
Lead	> 10 to 100	0	0	0.040
Manganese	> 10,000 to 100,000	0	0	0
Mercury	> 0 to 1	0	0	0
Methanol	0	> 1 to 10	0	0
n-Hexane	> 100 to 1,000	0	> 100 to 1,000	0
Nickel	> 100 to 1,000	0	0	0
NOx (as NO2)	0	> 1,000 to 10,000	0	0
Particulate Matter	0	> 1,000 to 10,000	> 1,000 to 10,000	0
Perylene	0	> 10 to 100	0	0.0002
Phenanthrene	0	> 100 to 1,000	0	0.002
PM10	0	> 1,000 to 10,000	> 1,000 to 10,000	0
PM2.5	0	> 1,000 to 10,000	> 1,000 to 10,000	0
Propane	> 100 to 1,000	> 0 to 1	> 100 to 1,000	0
Propylene	0	> 1 to 10	0	0
Pyrene	0	> 100 to 1,000	0	0.001
Selenium	> 10 to 100	0	0	0
Sulphur Dioxide	0	> 1,000 to 10,000	0	0
Toluene	0	> 100 to 1,000	0	0
Total Reduced Sulphur	0	> 10 to 100	> 1 to 10	0
Vanadium	> 10 to 100	0	0	0
VOCs	> 1,000 to 10,000	>10,000 to 100,000	>10,000 to 100,000	0

Summary: Tracking and Quantification (Cont.)

Substances	Releases to Air	Disposal (on-site)	Recycling	Contained in Product
	tonnes	tonnes	Tonnes	tonnes
Acenaphthylene	0.099	0	0	> 100 to 1,000
Arsenic	0.016	1.333	6.6	> 10 to 100
Benzene	17.9	0	0	> 1,000 to 10,000
Benzo(a)anthracene	0.030	0	0	> 100 to 1,000
Benzo(a)phenanthrene	0.061	0	0	> 100 to 1,000
Benzo(a)pyrene	0.03	0	0	> 100 to 1,000
Benzo(b)fluoranthene	0.025	0	0	> 100 to 1,000
Benzo(g,h,i)perylene	0.007	0	0	> 1 to 10
Benzo(j)fluoranthene	0.007	0	0	> 10 to 100
Benzo(k)fluoranthene	0.016	0	0	> 100 to 1,000
Butane	0.51	0	0	0
Butene	0.83	0	0	0
Cadmium	0.004	0.798	0.3	> 0 to 1
Calcium Fluoride	0.162	0	0	0
Carbon Monoxide	3642	0	0	0
Chlorine	0	0	0	0
Chromium	0.025	36.7	319.0	> 100 to 1,000
Cobalt	0.003	0.596	4.3	> 10 to 100
Copper	0.01	4.34	14.7	> 1,000 to 10,000
Dibenzo(a,h)anthracene	0.028	0	0	> 100 to 1,000
Dibenzo(a,i)pyrene	0.025	0	0	> 100 to 1,000
Ethylene	4.56	0	0	0
Fluoranthene	0.070	0	0	> 100 to 1,000
Hydrochloric Acid	0.173	0	21653	0
Hydrogen Sulphide	53.0	0	0	0
Indeno(1,2,3-c,d)pyrene	0.010	0	0	> 10 to 100
Lead	0.034	0	18.7	> 1 to 10
Manganese	2.55	589	6728	> 10,000 to 100,000
Mercury	0.013	0.021	0.030	> 0 to 1
Methanol	1.92	0	0	0
n-Hexane	3.17	0	0	0
Nickel	0.005	3.5	11.7	> 100 to 1,000
NOx (as NO2)	1624	0	0	0
Particulate Matter	2628	0	0	0
Perylene	0.007	0	0	> 10 to 100
Phenanthrene	0.1	0	0	> 100 to 1,000
PM10	1141	0	0	0
PM2.5	490	0	0	0
Propane	0.39	0	0	0
Propylene	0.91	0	0	0
Pyrene	0.052	0	0	> 100 to 1,000
Selenium	0.0007	0.35	6.02	> 1 to 10
Sulphur Dioxide	3255	0	0	0
Toluene	3.50	0	0	> 100 to 1,000
Total Reduced Sulphur	53.0	0	0	0
Vanadium	0.04	11.63	174.4	> 1 to 10
VOCs	184	0	0	0

Comparison of Tracking and Quantification (2019) to Previous Reporting Periods (2018)

Substances	Usage	Creation	Releases to Water	Releases to Air	Disposal (on-site)	Recycling	Contained in Product
	Percent Change (%)						
Acenaphthylene	0.0	< -10 to -100	0.00	-0.95	0.0	0.0	< -10 to -100
Arsenic	> 10 to 100	0.0	0.00	-8.39	0.41	47.10	> 100 to 1,000
Benzene	0.0	< -10 to -100	-9.09	-19.57	0.0	0.0	< -10 to -100
Benzo(a)anthracene	0.0	< -10 to -100	2.60	-3.99	0.0	0.0	< -10 to -100
Benzo(a)phenanthrene	0.0	< -10 to -100	2.61	-10.39	0.0	0.0	< -10 to -100
Benzo(a)pyrene	0.0	< -10 to -100	2.54	-4.66	0.0	0.0	< -10 to -100
Benzo(b)fluoranthene	0.0	< -10 to -100	2.59	-0.07	0.0	0.0	< -10 to -100
Benzo(g,h,i)perylene	0.0	< -10 to -100	0.00	-23.57	0.0	0.0	< -10 to -100
Benzo(j)fluoranthene	0.0	< -10 to -100	2.61	-20.49	0.0	0.0	< -10 to -100
Benzo(k)fluoranthene	0.0	< -10 to -100	2.54	-0.03	0.0	0.0	< -10 to -100
Butane	< -10 to -100	< -1 to -10	0.00	-90.36	0.0	0.0	0.0
Butene	0.0	< -1 to -10	0.00	-25.50	0.0	0.0	0.0
Cadmium	< -1 to -10	0.0	11.25	-0.87	0.76	44.49	< -10 to -100
Calcium Fluoride	< -10 to -100	0.0	2.96	-52.90	0.0	0.0	0.0
Carbon Monoxide	0.0	0.0	0.00	-5.20	0.0	0.0	0.0
Chromium	< -10 to -100	0.0	-45.58	-3.50	1.08	19.90	< -1 to -10
Cobalt	> 10 to 100	0.0	0.00	-0.37	0.80	65.33	>100 to 1,000
Dibenzo(a,h)anthracene	0.0	< -10 to -100	2.56	-0.01	0.0	0.0	< -10 to -100
Dibenzo(a,i)pyrene	0.0	-< -10 to -100	2.59	0.00	0.0	0.0	< -10 to -100
Ethylene	0.0	< -1 to -10	0.00	-25.51	0.0	0.0	0.0
Fluoranthene	0.0	< -10 to -100	2.57	-7.64	0.0	0.0	< -10 to -100
Hydrogen Sulphide	0.0	< -1 to -10	0.00	-14.18	0.0	0.0	0.0
Indeno(1,2,3-c,d)pyrene	0.0	< -10 to -100	2.57	-2.96	0.0	0.0	< -10 to -100
Lead	< -1 to -10	0.0	-8.71	-2.85	0.0	263.85	< -10 to -100
Manganese	< -1 to -10	0.0	0.00	-4.02	0.93	20.46	> 0 to 1
Mercury	< -10 to -100	0.0	0.00	-25.48	1.03	165.46	< -10 to -100
Methanol	0.0	< -1 to -10	0.00	-25.51	0.0	0.0	0.0
n-Hexane	< -10 to -100	0.0	0.00	-18.98	0.0	0.0	0.0
NOx (as NO2)	0.0	< -10 to -100	0.00	-8.36	0.0	0.0	0.0

Particulate Matter	0.0	< 0 to -1	0.00	-14.52	0.0	0.0	0.0
Perylene	0.0	< -10 to -100	2.56	-0.04	0.0	0.0	< -10 to -100
Phenanthrene	0.0	< -10 to -100	2.57	-0.81	0.0	0.0	< -10 to -100
PM10	0.0	> 0 to 1	0.00	-16.04	0.0	0.0	0.0
PM2.5	0.0	< 0 to -1	0.00	-13.39	0.0	0.0	0.0
Propane	< -10 to -100	< -1 to -10	0.00	-90.39	0.0	0.0	0.0
Propylene	0.0	< -1 to -10	0.00	-25.52	0.0	0.0	0.0
Pyrene	0.0	< -10 to -100	2.62	-4.92	0.0	0.0	< -10 to -100
Selenium	> 10 to 100	0.0	0.00	-25.44	0.50	63.66	> 10 to 100
Sulphur Dioxide	0.0	< -1 to -10	0.00	-13.55	0.0	0.0	0.0
Toluene	0.0	< -10 to -100	0.00	-18.48	0.0	0.0	< -10 to -100
Total Reduced Sulphur	0.0	< -1 to -10	0.00	-14.18	0.0	0.0	0.0
Vanadium	> 10 to 100	0.0	0.00	-0.24	0.67	20.42	< -10 to -100
VOCs	< -10 to -100	< -1 to -10	0.00	-100.00	0.0	0.0	0.0

Negative values indicate a decrease in quantity in 2019 compared to 2018.

Comparison of Tracking and Quantification (2019) to Previous Reporting Periods (2018)

Substances	Usage	Creation	Releases to Water	Releases to Air	Disposal (on-site)	Recycling	Contained in Product
	Quantity Change (tonnes)						
Acenaphthylene	0	< -100 to -1,000	0	-0.001	0	0	< -100 to -1,000
Arsenic	> 10 to 100	0	0	-0.001	0.0055	2.1285	> 10 to 100
Benzene	0	< -1000 to -10,000	-0.0001	-4.3578	0	0	< -1000 to -10,000
Benzo(a)anthracene	0	< -100 to -1,000	0.00002	-0.001	0	0	< -100 to -1,000
Benzo(a)phenanthrene	0	< -100 to -1,000	0.00003	-0.007	0	0	< -100 to -1,000
Benzo(a)pyrene	0	< -100 to -1,000	0.00002	-0.0014	0	0	< -100 to -1,000
Benzo(b)fluoranthene	0	< -100 to -1,000	0.00002	-0.00002	0	0	< -100 to -1,000
Benzo(g,h,i)perylene	0	< -1 to -10	0	-0.0021	0	0	< -1 to -10
Benzo(j)fluoranthene	0	< -1 to -10	0	-0.0018	0	0	< -1 to -10
Benzo(k)fluoranthene	0	< -10 to -100	0.00001	0	0	0	< -10 to -100
Butane	< -100 to -1,000	< 0 to -1	0	-4.75	0	0	0
Butene	0	< 0 to -1	0	-0.283	0	0	0
Cadmium	< 0 to -1	0	0.00261	-0.00003	0.0060	0.0935	< 0 to -1
Calcium Fluoride	< -100 to -1,000	0	1.683	-0.182	0	0	0
Carbon Monoxide	0	< -10 to -100	0	-199.6	0	0	0
Chromium	< -100 to -1,000	0	-0.0227	-0.0009	0.392	0.05293	< -10 to -100
Cobalt	> 10 to 100	0	0	-0.00001	0.0047	1.6832	> 10 to 100
Dibenzo(a,h)anthracene	0	< -100 to -1000	0.00002	-0.000003	0	0	< -100 to -1000
Dibenzo(a,i)pyrene	0	< -100 to -1000	0.000016	0	0	0	< -100 to -1,000
Ethylene	0	< 0 to -1	0	-1.563	0	0	0
Fluoranthene	0	< -100 to -1000	0.000034	-0.0058	0	0	< -100 to -1,000
Hydrogen Sulphide	0	< -1 to -10	0	-8.76	0	0	0
Indeno(1,2,3-c,d)pyrene	0	< -10 to -100	0.000006	-0.0003	0	0	< -10 to -100
Lead	< -1 to -10	0	-0.00385	-0.0001	0	2.79	< 0 to -1
Manganese	< -1000 to -10,000	0	0	-0.107	5.443	757.8	> 100 to 1,000
Mercury	< 0 to -1	0	0	-0.0044	0.0002	-0.0004	< 0 to -1
Methanol	0	< 0 to -1	0	-0.6587	0	0	0
n-Hexane	< -10 to -100	0	0	-0.7432	0	0	0
NOx (as NO2)	0	< -100 to -1,000	0	-148.15	0	0	0
Particulate Matter	0	< -10 to -100	0	-446.18	0	0	0
Perylene	0	< -10 to -100	0.000004	-0.000002	0	0	< -10 to -100
Phenanthrene	0	< -100 to -1,000	0.000053	-0.0007	0	0	< -100 to -1,000

PM10	0	> 10 to 100	0	-218.10	0	0	0
PM2.5	0	< -1 to -10	0	-75.76	0	0	0
Propane	< -10 to -100	< 0 to -1	0	-3.62	0	0	0
Propylene	0	< 0 to -1	0	-0.3126	0	0	0
Pyrene	0	< -100 to -1,000	0.000029	-0.0027	0	0	< -100 to -1,000
Selenium	> 1 to 10	0	0	-0.0002	0.0017	2.3422	> 1 to 10
Sulphur Dioxide	0	< -100 to -1,000	0	-510.26	0	0	0
Toluene	0	< -100 to -1,000	0	-0.7933	0	0	< -100 to -1,000
Total Reduced Sulphur	0	< -10 to -100	0	-8.76	0	0	0
Vanadium	> 10 to 100	0	0	-0.0001	0.0779	29.5763	< 0 to -1
VOCs	< -100 to -1,000	< -1,000 to -10,000	0	-184.26	0	0	0

Negative values indicate a decrease in quantity in 2019 compared to 2018.

The following substances are primarily associated with cokemaking operations: acenaphthylene, benzene, benzo(a)anthracene, benzo(a)phenanthrene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(j)fluoranthene, benzo(g,h,i)perylene, butene, dibenzo(a,h)anthracene, dibenzo(a,i)pyrene, indeno(1,2,3-c,d)pyrene, fluoranthene, ethylene, methanol, perylene, phenanthrene, propylene, pyrene, toluene, total reduced sulphur, hydrogen sulphide, sulphur dioxide and volatile organic compounds.
As a result of decreased coke production in 2019 compared to 2018, the “creation”, “contained in product”, and “releases to air” quantities related to the abovementioned substances also decreased in 2019 compared to 2018. The “releases to water” nominally increased, decreased or otherwise remained unchanged on the basis combined effluent sampling results for benzene and PAHs.

The following substances are primarily related to ironmaking and steelmaking operations: arsenic, cadmium, chromium, cobalt, lead, manganese, vanadium, selenium, mercury, calcium fluoride, n-hexane, carbon monoxide, butane and propane.
Usage quantities of most of the noted substances were lower in 2019 due to decreased steel production compared to 2018. However, usage quantities also depend on customers’ steel specifications which dictate quantities in which some substances are used. Some variability is observed in quantities reported under “releases to air”, “releases to water” as well as “contained in product”. Due to the batch process (rather than continuous process) nature of ironmaking and steelmaking operations, some of the samples collected and used to determine compositions may not be representative of “releases to air”, “releases to water” and “contained in product” throughout the entire calendar year. Substance quantities are also impacted by the disposal and recycling of secondary materials which vary from one year to another (example: the timing in which some secondary materials are sent to landfill or recycled back into commerce as a useful raw material for other applications).

The following substances are impacted by all operations at Lake Erie Works: nitrogen oxides, chlorine, particulate matter, PM2.5 and PM10.
The nitrogen oxides quantities associated with “creation” and “releases to air” were lower in 2019 compared to 2018 as a result of decreased production of steel. The “creation” and “releases to air” for particulate matter, PM2.5 and PM10 vary from one year to another because they are highly impacted by both production and weather conditions (primarily wind and precipitation).

Reduction Objectives

Please refer to the Reduction Summary Plans for the reduction objective for each substance:
https://www.stelco.com/community/environment/compliance-reports

Steps Taken to Achieve Objectives and Assess Effectiveness

The substances reported by Lake Erie Works are either required for its products and processes, are generated as unavoidable by-products, or are incidental trace elements in raw materials. Where feasible, these substances are managed by recycling and maintaining inventories that are as low as possible.

For further details please refer to the following:
https://www.stelco.com/community/environment/compliance-reports

Certification

As of *July 31, 2020*, I *Sujit Sanyal*, certify that I have read the records created for the purposes of section 11.2 of Ontario Regulation 455/09 (General) made under the Toxics Reductions Act, (2009) in respect of the use and creation of the toxic substances referred to above and am familiar with their contents and to my knowledge they are factually accurate.

Sujit Sanyal
Chief Operating Officer
Stelco Inc.