

ONTARIO TOXIC REDUCTION ACT
BIOAMBER SARNIA INC.
2017 REPORT ON TOXIC SUBSTANCE ACCOUNTING SUMMARY

INTRODUCTION

In 2009, the Toxics Reduction Act (Act) and its associated regulation (O.Reg. 455/09) were promulgated as part of the Ministry of Environment and Climate Change's (MOECC's) toxics reduction strategy, applicable only to manufacturing facilities with North American Industry Classification System (NAICS) codes starting with "31", "32" or "33" and facilities with NAICS codes starting with "212". Regulated substances under the Act include all substances listed in Environment Canada's National Pollutant Release Inventory (NPRI) and O.Reg. 127/01. Forty-seven substances and substance groups were listed in Table A of O.Reg. 455/09 as Phase I priority substances. Phase II of the Act requires accounting for all other NPRI substances and TRPs submitted by December 31, 2013.

BioAmber Sarnia Inc. uses two (2) Phase 1 MOECC Toxic Compounds and two (2) Phase 2 MOECC Toxic Compounds requiring TRA planning and accounting. The TRA plans for all four (4) Toxic Compounds were prepared and submitted to MOECC in December 2016.

This 2017 annual toxic substance accounting summary has been prepared in accordance with the requirements of the Ontario TRA and O.Reg. 455/09.

TOXIC REDUCTION POLICY STATEMENT OF INTENT

BioAmber does not intend to reduce the use of ammonia or phosphorus in the production of Succinic acid as they are required to provide the biomass with essential nutrients of nitrogen and phosphorus. There are no technically viable options available.

BioAmber does not intend to reduce the use of hydrochloric acid (HCl) or sulphuric acid (H₂SO₄) in the production of Succinic acid as there are no technically viable options available.

However, BioAmber is committed to playing a leadership role in protecting the environment. Wherever feasible, BioAmber will strive forward to eliminate or reduce the use and discharge of TRA compounds in full compliance with all federal and provincial regulations. Our employees are encouraged to participate in all types of toxic substance reduction activities. Toxic substance reduction will be an ongoing effort at BioAmber, and we will continue to monitor advancements in succinic acid production to ensure that options that are both technologically and financially viable are implemented at our facility.

BASIC FACILITY INFORMATION

Company Name: BioAmber Sarnia Inc.

Contact Information:

Highest Ranking Employee: Trevor MacLeod
Plant Manager
(519) 344-0065
Trevor.Macleod@sarniaiv.bio-amber.com

Technical Contact: Sarah Macklin
HSE Manager
(519) 344-0065
Sarah.Macklin@bio-amber.com

Certified Planner: Beth Rhyno, P.Eng.
License Number TSRP0273
Senior Environmental Engineer
Wood
519- 650-7104
Beth.Rhyno@woodplc.com

Facility Address: 1265 Vidal Street
Sarnia, Ontario
N7T 7V8

Business Number: 813019858

NPRI ID: 29205

Location (of main gate) Zone – 17
383930 m E
4755300 m N

In 2017, BioAmber Inc. employed about 57 full time employees (equivalent).

The NAICS codes applicable to the facility are: 325199

32	– Manufacturing
3251	– Basic Chemical Manufacturing
325199	– Other Basic Organic Chemical Manufacturing

REDUCTION OBJECTIVES

All employees at BioAmber Sarnia Inc. will be involved in the reduction of toxic substance use, creation and releases.

No current options were identified that are technically feasible or economically feasible.

TOXIC SUBSTANCE

The site uses 2 Phase I MOECC Toxic Compounds and 2 Phase II MOECC Toxic Compounds for which TRA planning is required:

MOECC Phase I Toxic Compound	CAS Number
Hydrochloric Acid	7647-01-0
Sulphuric Acid	7664-93-9
MOECC Phase II Toxic Compound	CAS Number
Ammonia	7664-41-7
Phosphorus	NA - 22

TRACKING AND QUANTIFICATIONS

The method used to calculate the TRA quantifications was a mass balance approach based on purchase records, operational data, and source testing.

Table 1 is a summary of reported TRA quantities for the 2017 operational year.

When compared to the last reported values, there was a 30%, 40%, 29%, and 10% increase in the use of Ammonia, HCl, Phosphorus, and H₂SO₄ respectively. This is attributed to changes in production levels.

In the 2017 operational year, there were no out of the ordinary incidents or significant process changes at the facility.

COMPARISON OF TRACKING AND QUANTIFICATION

No changes were made in the quantification and tracking methodology for determining used, created, or contained TRA compounds in the product from 2016 to 2017.

DESCRIPTION OF STEPS TAKEN TO ACHIEVE OBJECTIVE AND ASSESS EFFECTIVENESS

There were no technologically feasible reduction strategy objectives identified for the BioAmber Sarnia Inc. facility and as such there was no economic feasibility study completed for the TRA compounds. There are no objectives to track or reduction targets to evaluate.

Table 2 provides a summary of the facility TRA changes and updates which took place in 2017.

Table 1: Comparison of Quantities Reported														
CAS	Substance	Description of Processes that Use or Create Substance	Reporting under NPRI Part	NPRI Threshold (tonnes)	2017 Used (tonnes)	Used 2016- Last Reported Value	%Change	2017 Created (tonnes)	Created 2016- Last Reported Value	%Change	2017 Contained in Product (tonnes)	Contained in Product 2016 - Last Reported Value	%Change	Reason for Changes
NA – 16	Ammonia (total)	The ammonia is used on-site as a feedstock needed for the growth of biomass and other biological processes.	Part 1A	10 (MPO)	> 100 - 1000	> 10 – 100	30.33%	0	0	N/A	0	0	N/A	Changes in production levels
7657-01-0	Hydrochloric Acid	The HCl is used on-site is used to remove impurities from their product.	Part 1A	10 (MPO)	> 100 - 1000	> 100 - 1000	40.02%	0	0	N/A	0	0	N/A	Changes in production levels
NA -22	Phosphorus (total)	The phosphorus is used on-site as a feedstock needed for the growth of biomass and other biological processes.	Part 1A	10 (MPO)	> 10 – 100	> 10 – 100	29.14%	0	0	N/A	0	0	N/A	Changes in production levels
7664-41-7	Sulphuric Acid	The H ₂ SO ₄ used on-site is to control contamination which could result in spoiled batches and the waste of other TRA substances.	Part 1A	10 (MPO)	> 10 – 100	> 10 – 100	9.78%	0	0	N/A	0	0	N/A	Changes in production levels

Note:
 MPO - Manufactured, Processed or Otherwise used
 N/A - not applicable
 Ranges >0- 1 unit (tonnes)
 >1 - 10
 >10- 100
 >100- 1000

Table 2: Changes in Quantifications, Quantities, and Plan Updates									
CAS	Substance	Quantification Method(s) Used	Change in Quantification Method Used	Rationale for Using Selected Method(s)	Incidents out of the Ordinary	Significant Process Change	Objectives, Descriptions, Targets	Actions	Amendments
NA – 16	Ammonia (total)	Purchase Records and Recorded Throughput	No change	Availability Purchase Records	None	None	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
7657-01-0	Hydrochloric Acid	Purchase Records and Recorded Throughput	No change	Availability Purchase Records	None	None	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
NA -22	Phosphorus (total)	Purchase Records and Recorded Throughput	No change	Availability Purchase Records	None	None	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None
7664-41-7	Sulphuric Acid	Purchase Records and Recorded Throughput	No change	Availability Purchase Records	None	None	No reduction options were identified to be both technically and economically feasible. Therefore, no options were chosen for implementation.	None	None

2017 TRA Annual Accounting Summary
BioAmber Sarnia Inc.
Sarnia, Ontario

CERTIFICATION OF HIGHEST RANKING EMPLOYEE

As of May 21, 2018, I, Trevor Macleod, certify that I have read the toxic substance reduction plan for the toxic substance referred to below and am familiar with its contents, and to my knowledge the plan is factually accurate and complies with the Toxics Reduction Act, 2009 and Ontario Regulation 455/09 (General) made under that Act.

Ammonia
Hydrochloric Acid
Phosphorus
Sulphuric Acid



Trevor MacLeod
Plant Manager
BioAmber Sarnia Inc.