



GREENFIELD
GLOBAL

Greenfield Global TRA Annual Summary

Comparison 2015 - 2016

Facility Information

Company Name: Greenfield Global Inc.
Chatham Plant

Facility Address: 275 Bloomfield Dr.
Chatham, Ontario
N7M 5J5

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Parent Company: Greenfield Global Inc.
100% Ownership

UTM Coordinates: Zone 17
UTM Easting 393453; UTM Northing 4693216

Facility NPRI ID: 5739

In 2016, GFSA Chatham Facility employed 70 full time employees

NAICS Codes: Two Digit NAICS – 31, 32
Four Digit NAICS - 3121, 3251

Six Digit NAICS - 312140, 325190

Reduction Objectives:

Greenfield Global (GG) operates an ethanol production facility. GG is committed to protect the environment through continual improvement of its manufacturing processes and the prevention of pollution. The objective of GG is to determine the technical and economic feasibility of various reduction options and identify if any are viable for implementation.

Toxic Substances:

The TRA requires the tracking of the following NPRI substances: Acetaldehyde, Cumene, Cyclohexane, Ethylbenzene, Methanol, Sulphuric Acid, Ammonia, Carbon Monoxide, Ethanol, Ethyl Acetate, Isopropyl Alcohol, Nitrogen Oxides, PM 2.5, PM 10, Toluene, Benzene and n-Hexane.

Tracking and Quantifications:

The method used to calculate the TRA quantifications was a mass balance approach.

Table 1 provides a summary of the facility TRA steps taken in 2016.

Table 2 provides a summary of the TRA quantities for the 2016 operational year compared to the last reported values.

Table 2: Toxic Reduction Act- Phase 1 & 2 - 2016 Quantities

SOURCE	TOXIC SUBSTANCES - Phase 1 & 2																
	Acetaldehyde [MPO] CAS#: 75-07-0	Benzene CAS#: 71-43-2	Methanol CAS#: 67-56-1	Sulphuric Acid CAS#: 7664-93-9	Ammonia CAS#: NA-16	PM2.5 CAS#: NA-M10	PM10 CAS#: NA-M09	Total Particulate Matter CAS#: NA-M08	Nox CAS#: 11104-93-1	CO CAS#: 630-08-0	Cyclohexane CAS#: 110-82-7	Toluene CAS#: 108-88-3	Ethylbenzene CAS#: 100-41-4	Ethyl Acetate CAS#: 141-78-6	Xylene CAS#: 1330-20-7	n-Hexane CAS#: 110-54-3	Ethanol CAS#: 64-17-5
Generated in process in low concentration at evaporation, fermentation and dryers,	In gasoline which is used to denature ethanol product.	Utilized as a denaturant following Excise Canada requirements. Generated in fermentation process.	Purchased in bulk, received and stored on plant site in 55 tank. Consumed / neutralized upon mixing into process. Used for pH control.	1. Purchased in bulk, received and stored on plant site in tank. Vapour balance with truck during transfers. Neutralized/converted upon mixing in to process. Used for pH control.	Created at grain unloading and milling, the corn vents, grain transfers, cooling towers and boiler stack.	Created at grain unloading and milling, the corn vents, grain transfers, cooling towers and boiler stack.	Created at grain unloading and milling, the corn vents, grain transfers, cooling towers and boiler stack.	Products of NG combustion. Mainly: Turbine, Boilers, Dryers. Minimally: Building Space Heaters, diesel Fire Pump and operation of Tanker Trucks, Rail Engines, other Vehicle traffic	Products of NG combustion. Mainly: Turbine, Boilers, Dryers. Minimally: Building Space Heaters, diesel Fire Pump and operation of Tanker Trucks, Rail Engines, other Vehicle traffic	In gasoline which is used to denature ethanol product.	In gasoline which is used to denature ethanol product.	Corrosion inhibitor added to gasoline which is used to denature ethanol product.	Raw material delivered by tank truck to storage and used as an ethanol denaturant following Excise Canada requirements.	In gasoline which is used to denature ethanol product.	Products of NG combustion. Generated in process and emitted thru 5-13 Dryer Stack and boiler and turbine stacks. In gasoline which is used to denature ethanol product.	Generated in fermentation process, final production product.	
2016 Used (tonnes)	0	>1-10	>10-100	>1000	>100-1000	0	0	0	0	0	>10-100	>1-10	<1	>10-100	>10-100	>100-1000	0
2015 Used - Last reported value	0	>10-100	>1-10	>1000	>100-1000	0	0	0	0	0	>10-100	>1-10	<1	>10-100	>10-100	>1000	0
% Change	0	-10.25%	729.00%	-14.82%	1.30%	0	0	0	0	0	0.00%	-10.24%	>100%	53.7	15.18%	-10.26%	0
2016 Created (tonnes)	>1-10	0	>100-1000	0	>1-10	>1-10	>10-100	>100-1000	>100-1000	>100-1000	0	>0-1	0	0	0	>0-1	>100-1000
2015 Created - Last reported value	>1-10	0	>100-1000	0	>1-10	>1-10	>10-100	>100-1000	>100-1000	>100-1000	0	>0-1	0	0	0	>0-1	>100-1000
% Change	-12.76	0	16.00%	0	-12.75%	-12.76%	-14.30%	-10.26%	-12.76%	-12.76%	0.00%	-12.87%	0	0	0	-13.86%	0.00%
2016 Contained in Product (tonnes)	>1-10	>1-10	>100-1000	0	0	0	0	0	0	0	>10-100	>1-10	<1	0	>10-100	>100-1000	0.32%
2015 Contained in Product - Last Reported Value	>1-10	>1-10	>100-1000	0	0	0	0	0	0	0	>10-100	>1-10	<1	0	>10-100	>1000	0
% Change	0	-2.53%	17.50%	0	0	0	0	0	0	0	-10.25%	-10.26%	>100%	0	12.51%	-10.26%	0
2016 Released to Air (tonnes)	>1-10	<1	>1-10	0	>1-10	>1-10	>10-100	>100-1000	>100-1000	>100-1000	<1	>0-1	0	>1-10	>1-10	>1-10	>10-100
2015 Released to Air - Last Reported	>1-10	<1	>1-10	0	>1-10	>1-10	>10-100	>100-1000	>100-1000	>100-1000	<1	>0-1	0	>1-10	>0-1	>0-1	>100-1000
% Change	-12.76	-13%	-12.77%	0	-12.75%	-12.76%	-14.30%	-10.26%	-12.76%	-12.76%	-16.00%	-3%	0%	-45.17%	-12.78%	100.00%	-97.00%
Quantity Released to Surface Waters	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quantity Released to Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quantity Disposed of on-site to Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quantity Transferred off-site for Disposal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quantity Transferred off-site for Treatment prior to final disposal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quantity transferred off-site for Recycling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reason for Change	Emissions and odour testing were updated in 2015. Due to dryer optimization there was no acetaldehyde vented in our stack. Dryer door inspections, leak checks and pressure readings help minimize leakage.	This is currently part of our denaturing process as per Excise Canada.	Increase in production and use of corrosion inhibitor.	As a result of aiming for the lower nitrogen limit the sulphuric acid used to control the PH has reduced by 14%.	New Cogen was added to ensure consistent electrical uptime. This in turn decreases plant upsets. Reduction in creation in combustion.	Shutdown of one hammermill and efficient dryer operation has led to a reduction. A new dryer stack condenser installation is underway. This project should further reduce the TPM vented at stack S13.	Shutdown of one hammermill and efficient dryer operation has led to a reduction. A new dryer stack condenser installation is underway. This project should further reduce the TPM vented at stack S13.	Shutdown of one hammermill and efficient dryer operation has led to a reduction. A new dryer stack condenser installation is underway. This project should further reduce the TPM vented at stack S13.	The addition of a new COGEN complete. This will decrease electricity consumption for a greater benefit. Combustion experts were brought in to optimize the fuel oxygen ratio.	The addition of a new COGEN complete. Dryers were found to be producing a great deal of CO. Combustion experts were brought in to optimize the fuel oxygen ratio.	This is currently part of our denaturing process as per Excise Canada. Decreased fuel ethanol production.	This is currently part of our denaturing process as per Excise Canada. Decreased fuel ethanol production.	This is currently part of our denaturing process as per Excise Canada.	Customer-based required denaturant. Usage dependant on customer demand.	This is currently part of our denaturing process as per Excise Canada. Decreased fuel ethanol production.	Improved combustion efficiency. This is currently part of our denaturing process as per Excise Canada.	In 2015 we added a new product line with another ethanol wet scrubber. The end result was lower emissions reported in the 2015 emissions testing.