



Greenfield Global TRA Annual Summary

Comparison 2015-2016

Facility Information

Company Name: Greenfield Global Inc.
Tiverton Plant

Facility Address: 99 Farrell Drive
4th Concession Rd.
Tiverton, Ontario
NOG 2T0

Contact Information: Dianne Schenk
EHS Manager
519-368-7723 ext 7928
dianne.schenk@greenfield.com

Certifying Official: Jim Murr (Public Contact)
Plant Manager
519-368-7723 ext 7931
jim.murr@greenfield.com

Parent Company: Greenfield Global Inc.
100% Ownership

UTM Coordinates: Zone 17
UTM Easting 454889; UTM Northing 4907493

Facility NPRI ID: 209

In 2016, Greenfield Global Tiverton Facility employed 40 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: Methanol, Sulphuric Acid, Ammonia, Carbon Monoxide, Ethanol, Ethyl Acetate, Isopropyl Alcohol, Nitrogen Oxides, PM 2.5, PM 10 and Sulphur Dioxide.

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 1: Toxic Reduction Act- Phase 1 & 2 - ACTIONS FOR 2016

	Phase 1		TOXIC SUBSTANCES - Phase 2					
	Methanol CAS#: 67-56-1	Sulphuric Acid CAS#: 7664-93-9	Ammonia CAS#: NA-16	PM10, PM2.5 CAS#: NA-M10, NA-M09	CO, Nox, SO2 CAS#: 630-08-0; 11104-93-1; 7446-09-5	Isopropyl Alcohol CAS#: 67-63-0	Ethyl Acetate CAS#: 141-78-6	Ethanol CAS#: 64-17-5
SOURCE	Utilized as a denaturant following Excise Canada requirements. Generated in fermentation process.	Purchased in bulk, received and stored on plant site in SS 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.	Products of NG and #2 oil combustion from boilers.	Raw material delivered by tank truck to storage and used as an ethanol denaturant following Excise Canada requirements.	Raw material delivered by tank truck to storage and used as an ethanol denaturant following Excise Canada requirements.	Generated in fermentation process.
1. Material or feedstock substitution	Customer-based required denaturant. Excise Canada regulated.	No direct substitution is being made at this time. New enzymes are being tested to reduce usage.	No direct substitution is being made at this time. New enzymes are being trialed.	Not applicable.	Not applicable.	Customer-based required denaturant. Excise Canada regulated.	Customer-based required denaturant. Excise Canada regulated.	not applicable, product that is produced.
2. Product design or reformulation	Involve and work with Excise Canada to develop a formulation that uses less methanol as a denaturant or eliminates it's use.	Ongoing trials of enzyme to reduce usage, success with AYF enzyme.	New enzymes are being trialed, success with AYF enzyme.	Not applicable.	Not applicable.	No change at this time	No change at this time	not applicable, product that is produced.
3. Equipment or process modification	Use of new enzymes in fermentation may have impact on methanol generation.	No longer used in distillation. Removed redundant acid lines and pumps in 2014.	New enzymes are being trialed.	Not applicable	Not applicable.	No change at this time.	No change at this time.	not applicable, product that is produced.
4. Spill and leak prevention	Shipping, Maintenance and operations are taught to detect, reports and repair leaks whenever possible. This early detection allows us to prevent emissions.	Maintenance and operations are taught to detect, reports and repair leaks whenever possible.	Maintenance and operations are taught to detect, reports and repair leaks whenever possible.	Continued PMs. These PM's help prevent leaks and spills by maintaining equipment before they lead to breakdowns and releases.	Continued PMs. These PM's help prevent leaks and spills by maintaining equipment before they lead to breakdowns and releases.	Shipping, Maintenance and operations are taught to detect, report and repair leaks whenever possible. This early detection allows us to prevent emissions.	Shipping, Maintenance and operations are taught to detect, report and repair leaks whenever possible. This early detection allows us to prevent emissions.	Maintenance and operations are taught to detect, report and repair leaks whenever possible. This early detection allows us to prevent emissions.
5. On-site reuse or recycling	not applicable.	not applicable. All sulphuric acid is consumed in process.	not applicable. All ammonia is consumed in process.	All materials captured via dust collectors are returned to the process.	Not applicable.	Not applicable	Not applicable	Any test samples taken are captured and re-introduced into the process.
6. Improved inventory management or purchasing techniques	Purchased as required.	Purchased as required.	Purchased as required.	Purchased as required.	Tight monitoring of CNG production and transport to minimize use of #2 oil contributing to higher Nox emissions.	Purchased as required.	Purchased as required.	not applicable, product that is produced.
7. Training or improved operating practices	Training ongoing. Shipping, Maintenance and operations are taught to detect, reports and repair leaks whenever possible.	Training ongoing. Maintenance and operations are taught to detect, reports and repair leaks whenever possible.	Purchase and installation of an automatic titrator for more consistent test results which will tighten operating parameters. Training ongoing. Maintenance and operations are taught to detect, reports and repair leaks whenever possible.	No change planned at this time.	Operating Engineers are trained to monitor for leaks and shut down and report any problems so repairs can be made.	Training ongoing. Maintenance and operations are taught to detect, reports and repair leaks whenever possible.	Training continues to improve. Maintenance and operations are taught to detect, reports and repair leaks whenever possible.	Training ongoing. Maintenance and operations are taught to detect, reports and repair leaks whenever possible.
Reduction Targets	10 % reduction	10% reduction	1% reduction	N/A	1% reduction in Nox 25% reduction in SO2	N/A	N/A	N/A
Timeline/Steps Taken	Implementation of Product Design or reformulation method of reduction reliant upon Excise Canada to change formulation and there has been no change made to date.	Target has been met but will continue with enzyme trials to further reductions..	Target has been met but will continue with enzyme trials to further reductions..	N/A	On schedule	N/A	N/A	N/A
Amendments to Plan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Additional Reduction Actions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Means of Reduction

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

	Phase 1			TOXIC SUBSTANCES - Phase 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	Nox CAS#: 11104-93-1	SO2 CAS#: 7446-09-5	CO CAS#: 630-08-0	Isopropyl Alcohol CAS#: 67-63-0	Ethyl Acetate CAS#: 141-78-6	Ethanol CAS#: 64-17-5
SOURCE	Utilized as a denaturant following Excise Canada requirements. Generated in fermentation process.	Purchased in bulk, received and stored on plant site in SS 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.	Products of NG and #2 oil combustion from boilers.	Products of NG and #2 oil combustion from boilers.	Products of NG and #2 oil combustion from boilers.	Raw material delivered by tank truck to storage and used as an ethanol denaturant following Excise Canada requirements.	Raw material delivered by tank truck to storage and used as an ethanol denaturant following Excise Canada requirements.	Generated in fermentation process, final production product.
2016 Used (tonnes)	>100-1000	>100-1000	>100-1000	0	0	0	0	0	>10-100	>10-100	0
2015 Used - Last reported value	>100-1000	>100-1000	>100-1000	0	0	0	0	0	>10-100	>10-100	0
% Change	-7.64%	11.94%	6.69%	0	0	0	0	0	27.75%	1.28%	0
2016 Created (tonnes)	>1-10	0	0	>0-1	>10-100	>1-10	>0-1	>10-100	0	0	>10-100
2015 Created - Last reported value	>1-10	0	0	>1-10	>10-100	>1-10	>0-1	>10-100	0	0	>10-100
% Change	0.00%	0	0	-4.81%	4.25%	0.28%	-24.95%	0.80%	0	0	1.67%
2016 Contained in Product (tonnes)	>100-1000	0	0	0	0	0	0	0	>10-100	0	0
2015 Contained in Product- Last Reported Value	>100-1000	0	0	0	0	0	0	0	>10-100	0	0
% Change	-7.64%	0	0	0	0	0	0	0	0	0	0
2016 Released to Air (tonnes)	0	0	0	>0-1	>10-100	>1-10	>0-1	>10-100	>0-1	>0-1	>10-100
2015 Released to Air - Last Reported	0	0	0	>0-1	>10-100	>1-10	>0-1	>10-100	>0-1	>0-1	>10-100
% Change	0	0	0	-4.81%	4.25%	0.28%	-24.95%	0.85%	0%	0.00%	0.00%
Quantity Released to Surface Waters	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
Quantity Disposed of on site to Land	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
Quantity Transferred off-site for Treatment prior to final disposal	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
Reason for Change	No significant change	Increase due to an enzyme trial that did not give the results anticipated.	Slight increase due to an enzyme trial that did not give the results anticipated.	Improved combustion efficiency	Increased production and operating days.	No significant change	Ability to operate on natural gas instead of #2 oil due to a milder winter.	No significant change	Increase in demand from our customers.	Increased production	Increased production.

Quantification