

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

Contact Information:

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Certifying Official:

Angelo Ligori (Public Contact)

Plant Manager

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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 1: Toxic Reduction Act- Reduction Potential - Phase 1 & 2 - SUMMARY FOR 2016

			TOXIC SUBSTANCES Banne, cyclobrane,												
	Acetaldehyde [MPO]	Ammonia [MPO]	Sulphuric Acid [MPO]	[MPO - component of	TOLH PM, PM10, PM2.5 (CAC)	CO, NOx [CACs]	Ethyl Acetate (speciate VOC)	Ethanol (speciate VOC)	Butanes, n-Hexane, Pentane, Propane [speciate VOCs]	Methanol [speciate VOC]					
SOURCE	Generated in process in low concentration at evaporation, fermentalion and dryers.	I. Pushases in both, received and slored on plant site in tank. Vented to atmosphere from tank. Vented to atmosphere from tank. Vented to atmosphere with track during transfers, Neutralised/converted upon initing in to process. Used for pH control. 2. Losses are many activated to product affects of NS.	And stored on plant site in Stand stored on plant site in Stanks. Consumed / neutralized upon mixing into process. Used for pH control	in gasoline which is used to denalure ethanol product as per Excise Canada.	Fugilities from grain receiving transfers, DSD product transfers, cooling tower liquid drift, diestel generators and from specific process [mainly 1.9 dryer stack] and baghouse stack emissions.	Products of No combusion, Malanity Turtine, Bollers, Dysers, Minimality, Building Space Heaters, diesel Fire Pump and operation of Tanker Trucks, Rail Engines, other Vehicle traffic	Raw maleral delivered by faith fruck to knowe and year as an strangle denemberal. Additional losses from transfers and storage and venting	Primary facility product Production based on consumer inmand. Mailly facility has been occur from process vents, storage lank vents and product transfero.	Products of Mill combustion. Generated in process and emitted Mills 3-3 Dayer Stack and boline and business shacks and boline and business shacks in gasoline which is used to denature ethanol product.	Generación in fermentation process and distillation process. Entitled from fermentation 5-6 vent stack jil not sent to Praxair j					
. Material or Terristock substitution	Not applicable. This is siny-product of our grocess.	No cress sussion is being made at this time. New entires were triated to potentially eliminate ammonia usage but were found ineffective.	No direct substitution is being made at this time. New engines are being used that are helping to reduce usage.	After emissions testing on our gasoline/fuet blending station concluded it was found that the natural gasoline used contains higher amounts of these substances. This feedstock is currently being reviewed at a corporate level.	Ned applicable.	News any Planable.	Customer based required idenaturant, Usage dependant on customer demand. Usage was us in 2015 because of customer demand.	not applicable	Products of combustion for gode amounts, no change planned at this lime.	not applicable.					
t. Product straign or reformulation	Feet applicable - this is a by product of our process.	it is our intention to aim for the lower limit of free available nitrogen to help reduce the ammonia use as a nutrient	As a result of allning for the lower nitrogen limit the sulphuric acid used to control the fit has reduced by \$4%	This is currently part of our denaturing process as per factor Canada. Use of Natural Casoline is under Investigation.	Not applicable.	Not applicable.	No change at this time	Plant codimization is engoing.	Stack condensing will minimize these emission. Project planned for 2018	(No changes at this time					
1. Equipment of prioress modification	Emissions and odeur testing were updated in 2015. Our to drye opdimized to Term was no extra diffrage to the control of the co	New Crigan was added for erruser dishatere ferchical uptime. This is sun-decreases plant upsets.	No larger used in fermental for process femonetal resolution and a collect and pumps. A new subject did tank and containment system is currently being installed. This will reduce the risk of spills	Investigation vapour recovery fixed stream vapour recovery already in use. Vepour balance between supply links fuck and gasoline storage tank during transfers.	Shutdown of one hammermill and efficient dryer operation to a reduction. A new dryer stack condenser tradallation is underway. This project should further reduce the TPAX vended at stack \$3.3.	The addition of a new COSEN tomplete. This increased to generation but will decrease evictifisity consumption for a greater benefit. Dyers were found to be producing a great deal of CO. Combustion expens were hought in to optimize the fuel congen ratio.	No change at this time.	in 2015 we added a new product file with another standard we stude. The med result was fower emissions reported in the 2015 emissions testing Emissions were down 60%. Because of the previous reduction temperature controls are now being added to the previous distillation scrubbers to opinine support recovery and reduce losses.	Stack condensing will minimize these emissions. Project planned for 2017.	in 2015 we added a new podout line with another thank was studen. The end result was lower emissions reported in the 2015 emissions stepted in the 2015 emissions stealing. Because of the previous resolution temperature contents are now being added to the previous distillation scrubbers to optimize vapour successively and resolute temperature vapour and resolute temperature vapour and resolute temperature vapour and resolute temperature vapour scrubbers to optimize vapour scrubbers and resolute temperature vapour scrubbers and resolute vapour scrubbers are vapour scrubbers and resolute vapour scrubbers are vapour scrubbers and vapour scrubbers and vapour scrubbers are vapour scrubbers and vapour scrubbers and vapour scrubbers are vapour scru					
. Soil and leat prevention	Diyer door inspections, leak checks and pressure readings help ininimize leakage	essure readings help are taught to detect, reports are		Maintenance, and operations are taught to detect, report and repair leaks whenever possible. This early detection allows us to prevent emissions.	help prevent leaks and spills by maintaining equipment before they lead to breakdowns and spills.	Cogen elficiency testing performed biannually to	Maintenance and operations are laught to detect, reports and repair tests wherever possible. This early detection allows us to greatest emissions.	Maintenance and operations are taught to detect, sports and repair leaks whenever socials. This early detection above us to prevent emission.	r:hecks and pressure readings help minimize leakage	Maintenance and operation are taught to detect, reports und repair feats wherever possible. This early detection allows us to present emissions.					
On vile reuse of recycling	net epp kable	consumed in process	not applicable, All sulphuric acid is consumed in process	Not applicable, All gasoline is utilized as ethanol denaturant.	All materials captured via dust collections are returned to the process.	Not applicable.	All material blanded to customer specifications.	Any test samples taken are captured and re-introduced into the process	Vegligible amounts, no change planned all this time	Introduction of new feed kource to Truly green (greenhouse) and recently increased production by Praxair will decrease these umissions.					
Impossed inventory management or urchasing techniques	not applicable	QA is developing a program to	No change planned at this time.	CAA drawled he a program to audit suppliers as part of our purchasing procedure Ready for implementation	Water segment product under segment in an attempt to improve our particulate matter processing in our waste water	No change planned at this time.	No change planned at this time.	Eduction have been installed in new tanks to promote blending instead of the use of air wands for mixing.	Negligible amounts, no change	not applicable.					
Training or Improved operating actices	Training continues to improve, Maintenance and operations are taught to detect, reports and repair leaks whenever possible,	The amount reconsistion or	Training continues to interose. Maintenance and operations are talled to detect, reports and repair leaks whenever gostilitie.	Training continues to improve Mahternace and constitution of the continues to improve and repair leaks whenever cost life.	Operations is tracking and soft mere down reliability and temperature.	Utility Engineers are trained to monitor for leaks and shut down and report any problems so repairs can be made.	Training continues to improve. Maintenance and operations are laught to detect, reports and repair leass whenever possible.	raining continues to improve the state of the state of th	(Vegligible amounts, no change planned at this time.	Fraining continues to experience of the second of the seco					
Reduction Targets	1 % reduction	1¼ reduction	10% reduction	67% reduction benzene 97% reduction toluene 99% reduction xylene 100% reduction ethylbenzene	1% reduction in TPM 0.5% reduction in PM2.5, PM10	N/A	N/A	N/A	N/A	N/A					
Timeline/Steps Taken	Com oil extraction in place Improved dryer optimization Reduction larget has been exceeded.	Improved dryer optimization Reduction target has been On Schedule On schedule On schedule On schedule, reduction target		Switch has been made to natural gaspline as a denatural for our product. finduction in Benzene, tollurae, xylene and ethylbenzene	On schedule Leas detection in place. Dryer stack condensing underway. Radiation targets have been	N/A N/A		N/A N/A		N/A					
Ameniments to Flun	N/A	N/A	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	N/A	N/A					

			Phase	1	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 CASN: 630-08-0	Сусіоһеявле CAS#: 110-82-7	Toluene CAS#: 108-88-3	Ethylbenzene CAS#: 100-41-4	Ethyl Acetate CASN: 141-78-6	Xylene CAS#: 1990-20-7	n-Hexane CAS#: 110-54-3	Ethanol CAS#: 64-17-5
SOURCE	Generated in process in low concentration at evaporation, fermentation and dryers,	at		plant site in SS tank	plant site in tank Vapour balance with truck during		the corn vents, grain transfers, cooling towers	and boller stack	Turbine, Bollers, Dryers Minimally: Bullding Space Heaters, diesel Fire Pump and operation of Tanker Trucks, Rail Engines,	Products of NG combustion. Mainly: Turbine, Bollers, 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,	to denature ethanol product		In gasoline which is used to denature ethanol product	Products of NG combustion. Generated in process and emitted thru S-13 Dryer Stack and boiler and furbine stacks. In gasoline which is used to denature ethanol product.	4
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	o	-10.25%	729,00%	-14,82%	1,30%	0	0	Ö	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	D	٥	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	o	>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	D	0	0	0	0
Quantity Transferred off-site for Disposal	a	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	door inspections, leak	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 fower 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.	dryer operation has led to a reduction A new dryer stack condenser installation is underway. This project should further reduce the	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 \$13.	should further reduce the	will decrease electricity consumption for a greater benefit Combustion experts were brought in to optimize	CO. Combustion experts	This is currently part of our denaturing process as per Excise Canada. Occreased fuel ethanol production.	our denaturing process as per Excise Canada.	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 ne product line with anot ethanol wet scrubber. The end result was low emissions reported in 2015 emissions testing