Emergency Planning and Community Right-To-Know Act
Toxics Release Inventory (TRI) EPCRA 313

Inspection Report

Facility Name: American GreenFuels LLC
Facility Address: 30 Waterfront Street, East Haven, CT 06512

Date of Inspection: August 24, 2021

Inspectors:

Chris Rascher
Office of Environmental Stewardship
Waste & Chemical Compliance Section
U.S. Environmental Protection Agency, Region 1

Cheryl Keenan
Eastern Research Group, Inc.

Inspection Report Prepared by: Cheryl Keenan **Date:** 08/24/2021
Reviewed by: Chris Rascher, EPA **Date:** 9/15/2021
Approved by: Mary Jane O'Donnell **Date:** 9/16/2021

TRI Inspection Report

Facility Name: American GreenFuels LLC
Facility Address: 30 Waterfront Street, East Haven, CT 06512

Facility Telephone Number: (203) 672-9028
Facility TRI ID Number: 0651WGRNLF1WATE

Inspectors: Chris Rascher, Cheryl Keenan
Inspection Date: August 24, 2021
Arrival time: Approximately 9:00 AM
Type of Inspection: EPCRA 313
Current Owner: American GreenFuels LLC
Current Operator: American GreenFuels LLC
Parent Company: Kolmar Americas Inc

Notice of Inspection prepared by: Chris Rascher
Entry/ Opening Conference
Credentials Displayed? Yes
Purpose of Inspection Explained? Yes
Notice of Inspection presented and signed by facility contact? Yes
Attempt to deny entry? No
Facility Representatives Present:
Mikulas Gasparik, Plant Manager
Walter Dorman, Manager, Health, Safety & Environment
Elias Petersen, Attorney, Kolmar
Glenn Korner, Plant Engineer
Paul Simonetta, Consultant, Triton Environmental, Inc.

Primary NAICS Code: 325199 All Other Basic Organic Chemical Manufacturing
Number of Full Time Employees: 51 for 2020
Annual Sales: $20 - $25 million for 2020
Type of Heat: Gas

American GreenFuels, East Haven, was targeted for a Toxics Release Inventory (TRI) inspection because they reported recycling more than 90 million pounds of methanol on site in 2019 and 2020. The quantity of TRI waste recycled was the highest reported of any facility in Region 1.

This facility has reported methanol to TRI since they began operations in 2013 and it is the only chemical they report. The facility is a wholly-owned subsidiary of Kolmar Americas Inc., which is part of Kolmar, a firm based in Switzerland. The facility currently has 51 employees across three shifts and production operates continuously, 24/7.

Facility Description

This facility produces biodiesel fuel by processing refined vegetable oils, recycled cooking oils, rendered animal fats, and other feedstocks. Biodiesel is produced by chemically reacting fatty acid lipids with an alcohol. The facility primarily uses recycled cooking oils and rendered animal fats as their feedstocks and methanol as the alcohol in an esterification reaction.

Feedstock is transferred from terminal storage tanks to a centrifuge to remove impurities and is then directed to the facility's storage tanks. The feedstock is directed to the feedstock dryer to further remove residual moisture. The dry feedstock is mixed with methanol (i.e., as a reactant) and sulfuric acid (i.e., as a catalyst). The mixed material flows into the Acid-catalyzed Esterification (AE) reactor. The AE reactor consists of three chambers. In the first two chambers, the mixture of material continues to react with agitation. In the third chamber, the mixed stream is neutralized with sodium hydroxide. The whole stream goes through the AE dryer to remove excess methanol and residual moisture generated during the AE reaction.

In the Transesterification (TE) Reactor #1, the treated feedstock is mixed with methanol and sodium methylate (SMO) in a continuously stirred tank reactor (CSTR). The product of the TE Reactor #1 then flows to Decanter #1 where glycerin is allowed to drop out of the methyl ester (main components of biodiesel) and oil phase. The methyl ester and oil phase then flows to the TE Reactor #2 where it is heated and mixed with additional methanol and sodium methylate.

The TE Reactor #2 is also a CSTR with multiple mixing zones. The product of the TE Reactor #2 then flows to the decanter mixing tank where water is added. The mixture is then directed to Decanter #2 to separate glycerin from biodiesel. The biodiesel product from Decanter #2 then flows to the triple water wash system.

The biodiesel flows into the two-stage biodryers to remove methanol and water. The low methanol biodiesel is held in a tank and chilled by a closed loop chiller. Once the desired filtration temperature is met, the chilled materials are pumped through a press filter precoated with a material that will target the undesired impurities, removing them from the fuel.

The filtered fuel is then directed to a product tank for quality testing and quarantine prior to shipping. Wet glycerin (containing glycerin, water, methanol, and other impurities) from the Decanters #1 and #2 and triple water wash system is collected in a surge tank. The wet glycerin is further processed to produce a low methanol glycerin with salts, water, and organics, which is sent to storage as a glycerin byproduct.

Methanol and water vapor generated from the five dryers (feedstock, AE, two biodiesel, and glycerin) are directed to the methanol distillation column. The methanol distillation is performed under a vacuum being supplied to the overheads via a vacuum pump. Additional heat is supplied by steam on a reboiler and a condenser using cooling water condenses the overhead. Product water from the distillation column is either reused in the process to facilitate glycerin separation in Decanter #2 or shipped off site for treatment. Methanol recovered from the distillation column is returned to the methanol storage tanks and reused in the process.

TRI Reporting

This facility has submitted a TRI Form R for methanol every year since they began operations in 2013. Methanol is the only chemical the facility reports to TRI. Methanol is processed as a reactant with fatty acid lipids to produce biodiesel fuel, as described above. Table 1 summarizes American GreenFuels' TRI reporting for the years of interest.

Table 1. American GreenFuels' TRI Reporting for Methanol[1]

Release or Waste Management Category (in lb)	2017	2018	2019	2020
Fugitive Air Emissions	12,115	10,021	3,738	5,154
Stack Air Emissions	984	114	141	117
Onsite Land Disposal	NA	NA	NA	NA
Discharges to Streams or Water Bodies	NA	NA	NA	NA
Transferred to POTW[2]	54,874	155,269	136,556	1,761
Releases, Offsite	11,045	162,115	144,062	13,198
Energy Recovery, Onsite	NA	NA	NA	NA
Energy Recovery, Offsite	NA	NA	10,752	110,856
Recycled, Onsite	71,182,210	91,230,454	107,282,398	91,520,397
Recycled, Offsite	NA	NA	7,576	56,638
Treated, Onsite	NA	NA	NA	NA
Treated, Offsite	7,886	110	41,923	37,168
Production Ratio	1.33	1.64	1.11	0.8

1. Data presented are as of August 10, 2021, when the facility submitted revisions for all years shown here
2. Includes quantities transferred for treatment and for disposal or other releases

Documentation and Facility Review

On June 23, 2021, EPA Region 1 sent an information request letter to the facility for information on the facility's Toxic Release Inventory (TRI) chemicals, data, and associated calculations. EPA received the requested information on August 11, 2021. Photographs provided by the facility as part of this response are attached to this report. Based on the information provided, the inspection team concluded that no chemicals other than methanol were manufactured, processed, or otherwise used in quantities exceeding a TRI threshold.

The inspection team reviewed the facility's SDSs, production and process information, and release and waste management calculations for methanol, and discussed these data with the facility during the onsite visit, as described below.

Recycling

Since the facility began production in 2013, they have been using an onsite recycling system for methanol. In this recycling operation, glycerin, oil, and unconsumed methanol are collected in a tank, the material is pumped into a flash dryer where the methanol is vaporized, and the vapors and water are sent into the distillation system. This system consists of two packed columns designed to collect 99.7% methanol at the top, and 99.8% water at the bottom. The methanol that is recovered at the top of the distillation system is recycled back into the process.

The facility reported recycling 107 million pounds and 91.5 million pounds of methanol onsite for 2019 and 2020, respectively. On their TRI forms submitted for methanol for 2018 and prior years, the facility originally reported "NA" for onsite methanol recycling each year except for a 7,550 pounds in 2015. As a result, the quantity of methanol recycled onsite, as originally reported, showed a dramatic increase from 2018 to 2019 (i.e., from zero to 107 million pounds). After EPA Region 1 submitted the TRI information request to the facility in advance of the August 24, 2021, inspection, the facility realized they had made an error in their TRI reporting of onsite recycling for years prior to 2019. The facility representatives explained that they had misinterpreted the quantity recycled as having been recovered and reused, therefore, did not include this quantity as recycled on their earlier TRI reports. After realizing their error, the facility submitted revised TRI forms for 2015 – 2020 to reflect the quantities of methanol recycled each year, as shown in Table 2.

Methanol recovered from the distillation system passes through a flow meter that captures the instantaneous volumetric flow rate which is recorded on a programmable logic controller at 10-minute intervals. The facility used the data from this meter to calculate the annual quantity of methanol recycled for 2017 (when the meter was installed) onward. Using the 2017 – 2020 metering data along with annual methanol purchasing data, the facility calculated that their recycling rate for methanol was 80%. Based on this empirical data, the facility used the 80% recycling rate along with their annual methanol purchasing records to calculate the quantity of methanol recycled annually for 2015 and 2016, prior to the installation of the flow meter.

Table 2. American GreenFuels' Revisions to Methanol Recycling Reported to TRI

Methanol Reported to TRI as Recycled (lb)[1]	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Recycled onsite (originally reported)	7,550	NA	NA	NA	107,845,005	91,520,397
Recycled onsite (per revised report)[2]	26,478,065	41,678,913	71,182,210	91,230,454	107,282,398	91,520,397
Difference between the original and revised forms	+26,470,515	+41,678,913	+71,182,210	+91,230,454	-562,207	0

[1]Revised TRI forms submitted August 10, 2021.

[2]Only quantities recycled onsite were revised; there were no revisions to quantities reported as recycled offsite.

Releases
Fugitive emissions estimates were based on the facility's LDAR monitoring which is conducted by a third party. Fugitive emissions from methanol unloading/delivery were not considered because methanol is delivered by barge to storage tanks that the facility rents from New Haven Terminal which is located on an adjacent site to American GreenFuels. Bulk methanol is pumped from the rented delivery tanks to American GreenFuels facility's storage tanks for use in the process. If New Haven Terminal is both the owner and the operator of the tanks on the adjacent site, New Haven Terminal is responsible for reporting any releases associated with the methanol delivery to TRI, provided they meet all TRI reporting criteria. If American GreenFuels is the operator of the rented tanks, American GreenFuels would need to include emissions associated with the tanks, including during methanol delivery, in their air emissions calculations.

Stack emissions were estimated based on stack testing of the Catalytic Thermal Oxidizer (CTO) conducted in 2018.

There is stormwater runoff from the facility to the adjacent harbor, although methanol was no detected. The facility should report zero for methanol in stormwater rather than "NA" since there is a possibility that there could be low quantities of methanol in the stormwater runoff.

POTW transfers
Transfers of methanol in wastewater dropped considerably in 2020 because the facility installed a steam stripper in the beginning of 2020. The addition of the steam stripper improved methanol recovery for use in the process.

Offsite Energy Recovery
Quantities of methanol sent offsite for energy recovery increased from 10,800 pounds sent to four different locations in 2019, to 111,000 pounds sent to 13 different locations in 2020. Prior to 2019, the facility reported no methanol sent offsite for energy recovery. The facility noted that this increase in quantities and the number of receiving facilities for offsite energy recovery was because they involved a third party to identify recipients interested in receiving the methanol waste for energy recovery. Several of the 2020 recipient facilities were farms in the area that accepted the methanol waste for their anerobic digesters.

Onsite Treatment
In the documents provided and as observed by the inspectors, methanol vapor is sent to the CTO for destruction. Additionally, methanol vapors from the centrifuges used to pre-wash feedstock are directed into the air collection header at the inlet of the CTO. The CTO has a process fan that blows the methanol vapors into the burner unit with a specialized catalyst that allows combustion at lower temperatures resulting in methanol destruction with limited emissions. The facility reported "NA" in Section 7A for Onsite Waste Treatment Methods and reported "NA" in Section 8.6 for Quantity Treated Onsite for all reporting years, although they installed the CTO in 2017. The facility will review their selection of "NA" in Sections 7A and 8.6 and revise their forms as needed.

Production Ratio

During the inspection, the facility stated that they calculated the methanol production ratio based on the quantity of biodiesel produced annually. Based on the biodiesel production data supplied by the facility, however, the production ratios reported to TRI for 2016, 2017 and 2018 differ from the ratio calculated using the production data provided, as shown in Table 3. The facility stated that they will review their reported production ratios and revise their forms if needed.

Table 3. American GreenFuels' Production and Production Ratios

Year	Biodiesel Produced (gal)	Ratio of Biodiesel Production to Prior Year Production	TRI Production Ratio Reported
2013	1,595,952		
2014	5,819,268	3.65	3.6
2015	7,419,241	1.27	1.25
2016	13,278,574	1.79	1.14
2017	15,749,018	1.19	1.33
2018	29,776,981	1.89	1.64
2019	33,088,974	1.11	1.11
2020	26,396,069	0.80	0.8

Process Hazard Analysis

American Greenfuels is covered under the Clean Air Act's General Duty Clause which is similar to the Process Safety Management (PSM) requirements but addition to the onsite consequences also includes offsite consequence analysis. American Greenfuels stated that they are subject to OSHA's Process Safety Management (PSM) Program based on methanol and sodium methylate above regulatory thresholds. EPA reviewed a copy of American Greenfuel's Process Hazard Analysis (PHA) and associated Emergency Action Plan (EAP).

Based on a quick review of the PHA and EAP, American Greenfuels utilized both the HazOp and What-If methodologies, and existing safeguards included but was not limited to a preventative maintenance program, regularly and frequent equipment inspections, foam fire suppression, secondary containment, Class 1 Div.2 electrical systems, LEL and IR sensors, operator training, instruments and controls, and more.

While the PHA appears thorough and detailed, it has not included a complete analysis of the potential releases that may occur on and off site. For example, a release of methanol or sodium methylate spill outside of the containment area, or (except for one instance) releases to the harbor have not been evaluated in American Greenfuels PHA.

Closeout

The inspection team identified the following areas of concern during the evaluation of the information provided by American Greenfuels and the site visit:

1. Based on EPA's inquiry, American Greenfuels revised the quantities of methanol recycled prior to the site visit.

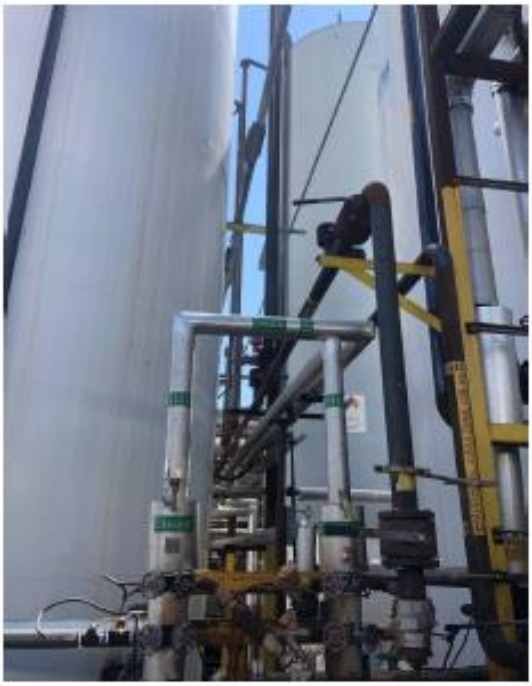
2. The facility uses a thermal oxidizer to treat methanol air emissions, however this treatment system was not reported in Section 7 of the facility's Methanol Form R Report. The facility **must** report the treatment system and treatment efficiency in Section 7 and Section 8.6 of their Form Rs.
3. The facility discharges Stormwater to New Haven Harbor. Prior to discharge this stormwater passes through an oil water separator. However, this discharge was not reported in Section 5.3 Discharges to Receiving Streams or Water Bodies. Additionally, this treatment system was not reported in Section 7 of the facility's Methanol Form R Report. The facility **must** report the release to water, the treatment system and treatment efficiency in Section 7 and Section 8.6 of their Form Rs. If there was no methanol detected in the release, the facility should report zero for the quantity released.
4. The facility **must** correct the production ratios reported for 2016, 2017 and 2018 and revise Section 8.9 Production Ration on their TRI submissions.
5. As discussed during the inspection, if American GreenFuels is the operator of the rented methanol tanks on the adjacent New Haven Terminal site, American GreenFuels would need to include emissions associated with the tanks, including during methanol delivery, in their air emissions calculations.
6. The facility has a detailed PHA that addresses many hazards.
7. While the PHA appears thorough and detailed, it has not included a complete analysis of the potential releases that may occur on and offsite. For example, a release of methanol or sodium methylate spill outside of the containment area, or (except for one instance) discharge to the harbor has not been evaluated in American Greenfuels PHA. EPA recommends that the PHA be revised to identify, evaluate and control potential releases that may occur on and offsite at the facility.

Photographs provided by the facility

Vapor Collection Line for the Acid Esterification Reactor

Vapor Collection Line for Decanter #1

Vapor Collection Line for Decanter #2



Vapor Collection Line for Tanks 901 (SMO), 902 (Methanol), 903 (Glycerin), 904 (Methanol), and Methanol Distillation Column

Methanol Vapor Condenser.

Methanol Condensate Pump.

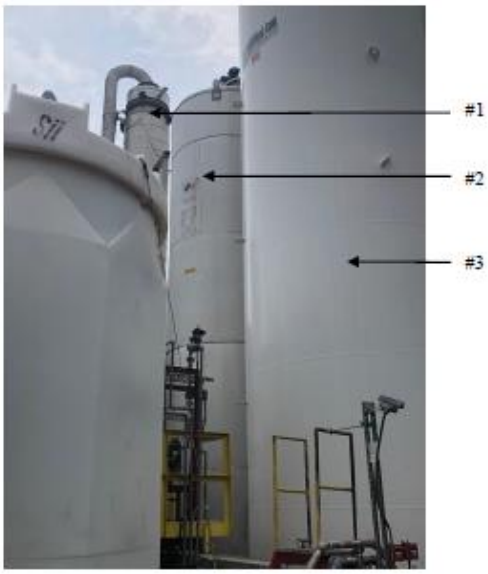
Glycerin Tricanter Vapor Stack.

Catalytic Thermal Oxidizer (CTO).

Vapor Knock Out Pot.

Fat Tricanter Vapor Stack.

1) Methanol Storage Tank T-902.
2) Methanol Storage Tank T-904.
3) Methanol Distillation Column
4) Sodium Methylate (SMO) Storage Tank T-901.
5) Wet Glycerin Storage Tank T-903.



1) Top of Methanol Distillation Column.
2) Wet Glycerin Storage Tank T-903.
3) Methanol Storage Tank T-902.

Acid Esterification Reactor.

Production Flash Dryers. From left to right: Acid Esterification Dryer; Feedstock Dryer; Biodiesel Dryer; Glycerin Dryer #1, and; Glycerin Dryer #2.

Transesterification Reactor #1.

Transesterification Reactor #2.

Decanter #1

Decanter #2

Fat Tricanter.

Glycerin Tricanter.