Lane Regional Air Protection Agency
Standard Air Contaminant Discharge Permit

REVIEW REPORT

Junction City Clean Fuels **Permit No. 203147**
92757 Highway 99S
Junction City, Oregon 97448

Source Information:

Primary SIC	4922
Secondary SIC	4911
Primary NAICS	486210
Secondary NAICS	221117
Public Notice Category	III

Source Category (LRAPA title 37, Table 1)	B.48: Natural gas and oil production and processing and associated fuel burning equipment

Compliance and Emissions Monitoring Requirements:

Unassigned emissions	N
Emission credits	N
Compliance schedule	N
Source test [date(s)]	EU-1: 8760 hrs operation or 3 years

COMS	N
CEMS	N
CPMS	N
Ambient monitoring	N

Reporting Requirements

Annual report (due date)	2/15
Emission fee report (due date)	N
Semi-Annual Report (due date)	N
Greenhouse Gas Report (due date)	3/31

Quarterly report (due dates)	N
Monthly report (due dates)	N
Excess emissions report	Y
Other reports	N

Air Programs

NSPS (list subparts)	A, JJJJ
NESHAP (list subparts)	N
Compliance Assurance Monitoring (CAM)	N
Regional Haze (RH)	N
Synthetic Minor (SM)	N
SM-80	N
Part 68 Risk Management	N
Major FHAP source	N

Federal major source	N
TACT	N
Type A State New Source Review	N
Type B State New Source Review	N
Prevention of Significant Deterioration (PSD)	N
Nonattainment New Source Review (NNSR)	Y
Cleaner Air Oregon	N

Permittee Identification

1. The Junction City Clean Fuels facility ('JCCF' or 'the facility'), owns and operates a renewable natural gas and biogas electric power generation facility located at 92757 Highway 99, Junction City, Oregon.

2. The facility operates under the primary Standard Industrial Classification (SIC) code of 4922 – Natural Gas Transmission and the primary North American Industry Classification System (NAICS) code of 486210 - Pipeline Transportation of Natural Gas**.**

3. The facility operates under the secondary Standard Industrial Classification (SIC) code of 4911 – Electric Services and the secondary North American Industry Classification System (NAICS) code of 221117 – Biomass Electric Power Generation**.**

General Background

4. JCCF's primary operation consists of generating biogas derived from an anaerobic digester, then cleaning the biogas to produce pipeline quality gas which is injected into the natural gas pipeline. The secondary operation consists of biogas to produce electricity for the electrical power grid. The facility consists of a 1,550 ekW bio-fired generator, two (2) 7.0 MMBtu/hr natural gas-fired boilers, Type 1 and Type 2 feedstock handling systems with baghouse and carbon filter, solid/liquid mixing pump unit hoppers with carbon filter, a CO_2 stripper vessel – biogas upgrade vent, and paved roads. The facility also has the following categorically insignificant activities: an anaerobic digester, dewatering tank, diesel storage tank, four (4) condensate tanks, and two (2) 200 kW natural gas-fired emergency generators.

Reason for Permit Action and Fee Basis

5. The proposed permit is a renewal of an existing Standard Air Contaminant Discharge Permit (ACDP) that was issued on August 28, 2019 and was originally scheduled to expire on August 28, 2024. The renewed Standard ACDP will be valid for up to five (5) years.

Attainment Status

6. The facility is located in an attainment area for all criteria pollutants. The facility is located within 100 kilometers of three (3) Class I air quality protection areas: Diamond Peak Wilderness, Mount Washington Wilderness and Three Sisters Wilderness area.

Permitting History

7. LRAPA has reviewed and issued the following permitting actions to this facility since the last Standard ACDP renewal was issued on August 28, 2019:

Date(s) Approved/Valid	Permit Action Type	Description
08/28/2019 – 08/28/2024	Standard ACDP	Renewal
07/12/2021	Basic Tech. Mod.	Addendum No.1 to update the kilowatt rating of the stand-by generators, include previously omitted NSPS Subpart JJJJ language for EU-1, remove one waste biogas flare from EU-2, remove NSPS Subpart Dc references for EU-3, and remove EU-6, EU-9, EU-10, and the categorically insignificant diesel-fired fire pump engine.

Date(s) Approved/Valid	Permit Action Type	Description
01/08/2024	Simple Tech. Mod.	Addendum No. 2 to change the generators from “standby” to “emergency” and other associated changes.
09/22/25	Non-Tech. Mod.	Addendum No. 3 to change the name of the permittee.
Upon Issuance	Standard ACDP	Renewal

Emission Unit Descriptions

8. The emission units (EU) regulated by the permit are the following:

Emission Unit ID	Description	Pollution Control Device (PCD ID)	Installed / Last Modified
EU-1	Biogas-fired Generator, Combined Heat and Power manufactured by 2G/MWM in 2012, Rated at 1,550 ekW, (at 1800 rpm, 60Hz)	None	2013
EU-2	Enclosed waste flare	None	2018
EU-3	Two (2) boilers, natural gas-fired, 7.0 MMBtu/hr	None	2021
EU-4	Type 1 Feedstock Handling System	Baghouse, BH1	2021
EU-5	Type 2 Feedstock Handling System	Carbon Filter, Odor Control	2021
EU-7	Solid/Liquid Mixing Pump Unit Hoppers	Carbon Filter, Odor Control	2021
EU-8	CO_2 Stripper Vessel, biogas upgrade vent	None	2021
EU-Fugitive Emissions (FE)	Paved Road Dust	None	NA
EU-Categorically Insignificant Activities (CIA)	• Dewatering Tank Vent • Anaerobic digesters using green feedstock • Diesel Storage Tank • Four (4) Condensate Tanks • Two (2) Emergency Generators, natural gas-fired, 200 KW each	None	2021

Significant Emissions Units

9. Emission Unit EU-1
The facility has one (1) 2G/MWM biogas-fired internal combustion engine generator to produce electrical power that is not currently in use.

10. Emission Unit EU-2
The facility uses an enclosed flare to combust excess gas.

11. Emission Unit EU-3
The facility operates two (2) boilers each with a heat input rating of 7.0 MMBtu per hour. These boilers operate on natural gas.

12. Emission Unit EU-4 and EU-5
The facility operates a Type 1 Feedstock Handling System and a Type 2 Feedstock Handling System, in EU-4 and EU-5, respectively. EU-4 is controlled by a baghouse (BH1) and EU-5 is controlled by a carbon filter for odor control.

13. Emission Unit EU-7
The facility operates Solid/Liquid Mixing Pump Unit Hoppers in EU-7. EU-7 is controlled by a carbon filter for odor control.

14. Emission Unit EU-8
The facility operates a biogas upgrade vent in EU-8 named as a CO_2 Stripper Vessel. EU-8 is uncontrolled.

15. Emission Unit EU-FE
Emissions Unit EU-Fugitive Emissions (FE) is for particulate emissions from vehicle traffic on paved roads within the facility.

16. Emission Unit EU-CIA
Emissions Unit EU-Categorically Insignificant Activities (CIA) includes devices and activities that are defined as CIA in LRAPA's Title 12 - Definitions.

Nuisance, Deposition and Other Emission Limitations

17. Under LRAPA 49-010(1), the permittee must not cause or allow air contaminants from any source subject to regulation by LRAPA to cause a nuisance. Compliance is demonstrated through documentation of all complaints received by the facility from the general public and following procedures to notify LRAPA of receipt of these complaints.

18. Under LRAPA 32-055, the permittee must not cause or permit the emission of particulate matter which is larger than 250 microns in size at sufficient duration or quantity as to create an observable deposition upon the real property of another person. Compliance is demonstrated through documentation of all complaints received by the facility from the general public and following procedures to notify LRAPA of receipt of these complaints.

19. Under LRAPA 32-090(1), the permittee must not discharge from any source whatsoever such quantities of air contaminants which cause injury or damage to any persons, the public, business or property; such determination is to be made by LRAPA. Compliance is demonstrated through documentation of all complaints received by the facility from the general public and following procedures to notify LRAPA of receipt of these complaints.

General Emission Limits and Standards

20. The facility is subject to the visible emissions limitations under LRAPA 32-010(3). For sources, other than wood-fired boilers, no person may emit or allow to be emitted any visible emissions that equal or exceed an average of 20 percent opacity for a period or periods aggregating more than three (3) minutes in any one (1) hour. Compliance will be demonstrated through a monthly visible emissions survey, annual inspection requirements for baghouses, and implementation of an Operation & Maintenance Plan for pollution control devices.

21. The facility is subject to the visible emission limitation under LRAPA 32-015(1)&(2)(b)(B). For fuel burning equipment installed, constructed or modified on or after June 1, 1970 but prior to April 16,

2015 for which there are not represented compliance test results prior to April 16, 2015, the particulate matter emission limit is 0.14 grains per dry standard cubic foot. Compliance will be demonstrated through a monthly visible emissions survey, annual inspection requirements for baghouses, and implementation of an Operation & Maintenance Plan for pollution control devices.

22. The facility is subject to the visible emission limitation under LRAPA 32-030(2). For fuel burning equipment installed, constructed or modified on or after April 16, 2015 for which there are not represented compliance test results prior to April 16, 2015, the particulate matter emission limit is 0.10 grains per dry standard cubic foot. Compliance will be demonstrated through a monthly visible emissions survey, annual inspection requirements for baghouses, and implementation of an Operation & Maintenance Plan for pollution control devices.

23. Under LRAPA 32-007(1), the facility is required to prepare an Operation and Maintenance Plan (O&M Plan) for the particulate matter control devices that exhaust to the atmosphere. If the O&M Plan is updated, the facility must submit the updated copy to LRAPA for review. If LRAPA determines the plan is deficient, LRAPA may require the facility to amend the plan. In addition, at least annually, the permittee is required to inspect each baghouse exhausting to the atmosphere and maintain a log of the inspection and any actions taken.

24. Under LRAPA 32-007(1), the facility is required to prepare an Operation and Maintenance Plan (O&M Plan) for the carbon filter that controls VOC and federal HAP emissions. If the O&M Plan is updated, the facility must submit the updated copy to LRAPA for review. If LRAPA determines the plan is deficient, LRAPA may require the facility to amend the plan.

Typically Achievable Control Technology (TACT)

25. LRAPA 32-008(1) requires an existing unit a facility prior to January 1, 1994 to meet TACT if the emission unit meets the following criteria: The emission unit is not already subject to emission standards for the regulated pollutant under LRAPA title 30, title 32, title 33, title 38, title 39 or title 46 at the time TACT is required; the source is required to have a permit; the emission unit has emissions of criteria pollutants equal to or greater than five (5) tons per year of particulate or ten (10) tons per year of any gaseous pollutant; and LRAPA determines that air pollution control devices and emission reduction processes in use for the emissions do not represent TACT and that further emission control is necessary to address documented nuisance conditions, address an increase in emissions, ensure that the source is in compliance with other applicable requirements, or to protect public health or welfare or the environment.

    25.a. None of the emission units at the facility were in existence prior to January 1, 1994 and are therefore not required to meet TACT for existing sources.

26. LRAPA 32-008(2) requires new units installed or existing emission units modified on or after January 1, 1994, meet TACT if the emission unit meets the following criteria: The emission unit is not subject to Major NSR or Type A State NSR in LRAPA title 38, and applicable NSPS in LRAPA title 46, or any other standard applicable to only new or modified sources in LRAPA title 32, title 33, or title 39 for the regulated pollutant; the source is required to have a permit; if new, the emission unit has emissions of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant; if modified, the emission unit would have an increase in emissions of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant; and LRAPA determines that the proposed air pollution control devices and emission reduction processes do not represent TACT.

    26.a. The following emission units are not subject to TACT because they are subject to an applicable Standard of Performance for New Stationary Sources in title 46: EU-1.
    26.b. The following emission units are not subject to TACT because they do not have emissions of criteria pollutants equal to or greater than one (1) ton per year: EU-5 and EU-7.

26.c. The following emission units are subject to TACT because they have emissions of criteria pollutants equal to or greater than one (1) ton per year: EU-2, EU-3, EU-4, and EU-5. While a formal TACT analysis has not been conducted, TACT for these emission units would likely be the development and use of an O&M plan and documentation of inspections and maintenance on these emission units. Controls are not considered economically feasible for such small boilers.

New Source Performance Standards (NSPS)

27. Emission Unit EU-1 is subject to 40 CFR part 60 subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines because it is a digester gas-fire stationary engine greater than 500 HP located at an area source of HAP that was constructed on or after 6/12/2006.

28. The emergency generators in Emissions Unit EU-CIA are subject to 40 CFR part 60 subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines because they are emergency stationary engines less than or equal to 500 HP located at an area source of HAP that was constructed on or after 6/12/2006.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

29. There are no NESHAPs that apply to any of the existing Emissions Units at the facility.

Plant Site Emission Limits (PSELs)

30. Provided below is a summary of the baseline emissions rate, netting basis, plant site emission limit, and potential-to-emit:

Pollutant	Baseline Emission Rate (TPY)	Netting Basis		Plant Site Emission Limit (PSEL)		PTE (TPY)
		Previous (TPY)	Proposed (TPY)	Previous PSEL (TPY)	Proposed PSEL (TPY)	
PM	0	0	0	24	15	15
PM_{10}	0	0	0	14	5.2	5.2
$PM_{2.5}$	NA	0	0	9	2.9	2.9
CO	0	0	0	99	83	83
NO_x	0	0	0	39	37	37
SO_2	0	0	0	39	28	28
VOC	0	0	0	39	3.4	3.4
GHG (CO_2 eq)	0	0	0	74,000	70,280	70,280

31. The facility has no baseline emission rates for PM, PM_{10}, SO_2, NO_X, CO, and VOC because the facility was not in operation during the 1978 baseline year. A baseline emission rate is not established for $PM_{2.5}$ in accordance with LRAPA 42-0048(3). The facility has no baseline for GHGs because the facility had no GHG emissions during any consecutive 12 calendar month period during calendar years 2000 through 2010.

32. The netting basis for all pollutants is set at zero because the facility was constructed after the 1978 baseline year and the facility has not had any emission increases approved for any of the reasons listed under LRAPA 42-0046(3)(e).

33. The PSELs s were reset to the potential emission rate from the significant emissions units as required by subsection 42-0041(3). The previous PSELs were based on Generic PSELs that are no longer allowed by rule.

Significant Emission Rate (SER) Analysis

34. The PSEL increase over the netting basis is less than the Significant Emission Rate (SER) as defined in LRAPA title 12 for all pollutants as shown in the following table.

Pollutant	Proposed PSEL (TPY)	PSEL Increase Over Netting Basis (TPY)	PSEL Increase Due to Utilizing Existing Baseline Period Capacity (TPY)	PSEL Increase Due to Modification (TPY)	SER (TPY)
PM	15	15	NA	NA	25
PM_{10}	5.2	5.2	NA	NA	15
$PM_{2.5}$	2.9	2.9	NA	NA	10
CO	83	83	NA	NA	100
NO_x	37	37	NA	NA	40
SO_2	28	28	NA	NA	40
VOC	3.4	3.4	0	0	40
GHGs	70,280	70,280	NA	NA	75,000

New Source Review (NSR) and Prevention of Significant Deterioration (PSD)

35. This source is located in an area that is designated attainment or unclassified for all regulated pollutants. The proposed PSELs are less than the federal major source threshold for non-listed sources of 250 TPY per regulated pollutant and are not subject to Major NSR.

Federal Hazardous Air Pollutants/Toxic Air Contaminants

36. Potential annual federal hazardous air pollutant emissions (FHAP) are based on the potential to emit of the facility operating under permit limitations:

    36.a. Formaldehyde has the highest single FHAP emissions at approximately 3.0 tons per year.
    36.b. The potential total FHAP emissions are 3.2 tons per year.
    36.c. The detail sheets in this review report contain a table of FHAP emissions as well as toxic air contaminants (TAC) emissions.

37. A major source of FHAPs is defined as having potential FHAP emissions of at least 10 tons per year of any single HAP and 25 tons per year of the aggregate of all FHAPs. This facility does not have potential FHAP emissions exceeding these thresholds and is considered a minor or area source of FHAPs.

38. Under the Cleaner Air Oregon program, only existing sources that have been notified by LRAPA and new sources are required to perform risk assessments. This source has not been notified by LRAPA and, therefore, is not yet required to perform a risk assessment or report annual emissions of toxic air contaminants. LRAPA required reporting of approximately 600 toxic air contaminants in 2016 and regulates approximately 260 toxic air contaminants (TAC) that have Risk Based Concentrations established in rule. All FHAPs are on the list of approximately 600 TACs. The FHAPs and TACs listed

below are based upon safety data sheets and standard emission factors for the types of emission units at this facility. After the source is notified by LRAPA, they must update their inventory and perform a risk assessment to see if they must reduce risk from their TACs. Until then, this source will be required to report TAC emissions triennially.

Performance Testing

39. In accordance with NSPS Subpart JJJJ, performance testing must be conducted to demonstrate compliance with the NOx, CO, and VOC emission standards for the biogas generator in EU-1. The facility was required to conduct an initial performance test within one (1) year of engine startup, which was completed on November 18, 2014. Subsequent performance testing is required every 8,760 hours of operation or three (3) years, whichever is earlier.

40. The facility conducted source testing on EU-1 in 2014, 2016, 2017 and 2018, and those results are summarized in the emission detail sheets as part of this review report. Currently EU-1 is not operated.

41. If the gas-fired emergency generators in the Categorically Insignificant Activity emission unit are non-certified or are not operated and maintained according to the manufacturer's written emission-related instructions, then an initial performance test is required per NSPS Subpart JJJJ.

Compliance History

42. There have been no enforcement actions issued to the facility and no inspections that determined the facility was in non-compliance.

Monitoring and Recordkeeping Requirements

43. The facility is required to keep and maintain all records of the following information for a period of at least five (5) years and have available within 24 hours of a request from LRAPA:

Emission Source	Recordkeeping	Minimum Recording Frequency
Biogas Generator (EU-1)	Biogas burned in the engine generator (MMBtu)	Monthly
	Hours of Operation for the engine generator (hrs)	Monthly
	Maintenance performed in accordance with the Subpart JJJJ NSPS	Upon occurrence
	Results of biogas fuel analysis for heat content and/or composition	Upon occurrence
	Source test records in accordance with Condition 14.c	Upon occurrence
Waste Biogas Flare, Enclosed (EU-2)	Biogas burned by the excess biogas flare (MMBtu)	Monthly
Boilers (EU-3)	Natural gas burned in the boilers (cubic feet)	Monthly
Emergency Generators (Categorically Insignificant Activity)	Maintenance conducted	As performed
	Maintenance Plan	Maintain current (non-certified engines only)
	Hours of operation (hours)	Upon occurrence

Emission Source	Recordkeeping	Minimum Recording Frequency
Baghouse (EU-4)	Pressure drop readings (inches of water)	Monthly
	Inspections	Monthly
Carbon Filter Odor Control (EU-5 and EU-7)	Updated and Reviewed O&M Plan	Annually
Upgrade Vent (EU-8)	Hours of operation	Monthly
Type 1 Feedstock, Type 2 Feedstock and Digestate Removal (Fugitive Emissions)	Number of loads received/outgoing	Annually
All Emission Units	Odor complaints received by the permittee	Upon occurrence
	EPA Method 9 or Method 22 visible emission observations	As performed

Reporting Requirements

44. The facility must submit to LRAPA the following reports no later than the dates indicated in the table below:

Report	Reporting Period	Due Date
PSEL pollutant emissions, including supporting calculations. The summary must include emission calculations corresponding to each 12-month consecutive period in the previous calendar year.	Annual	February 15
A summary of maintenance and repairs performed on any pollution control devices at the facility.	Annual	February 15
Updated O&M Plan (if updated)	Annual	February 15
GHG Report	Annual	March 31
A summary of all complaints received by the permittee and their resolution	Annual	February 15
The excess emissions log, if any planned or unplanned excess emissions have occurred during the reporting period.	Annual	February 15

Public Notice

45. Pursuant to LRAPA 37-0066(4)(a)(A), issuance of renewed Standard Air Contaminant Discharge Permit requires public notice in accordance with LRAPA 31-0033(3)(c), which requires LRAPA to provide notice off the proposed permit action and a minimum of 35 days for interested persons to submit written comments.

The draft permit was on public notice from Monday October 13, 2025, to Tuesday November 18, 2025. No written comments were submitted during the 35-day comment period.

MH/jm
11/19/2025

Emission Detail Sheets

Emissions Summary

Emission Unit	Description	PM	PM10	PM2.5	CO	NOx	SOx	VOC	GHG (CO2e)
		tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year
EU-FE	Paved Road - Vehicular	11.51	2.30	0.56	--	--	--	--	--
EU-1	Biogas Generator CHP	0.44	0.44	0.44	30.76	30.66	13.30	0.93	11732
EU-2	Flare - Enclosed	1.02	1.02	1.02	45.05	2.40	14.56	0.51	12839
	Boiler #1	0.11	0.11	0.11	3.59	2.13	0.03	0.23	5143
EU-3	Boiler #2	0.11	0.11	0.11	3.59	2.13	0.03	0.23	5143
EU-4	Type 1 Feedstock Handling System (Straw System Fugitives & Baghouse)	1.84	1.14	0.60	--	--	--	--	--
EU-5	Type 2 Feedstock Handling System (Odor Control - Manure Handling)	0.09	0.04	0.006	--	--	--	--	--
EU-7	Solid/Liquid Mixing Pump Unit Hoppers (Odor Control - Biomix)	--	--	--	--	--	--	0.187	3993
EU-8	CO2 Stripper Vessel, Gas Upgrade Vent	--	--	--	--	--	--	1.27	31429
	Total	15	5.2	2.9	83	37	28	3.4	70280
	SER	25	15	10	100	40	40	40	75000

EU-1 CHP Emissions

	197335701.6	cf/yr			66427080	dscf/yr	66.42708		
Generator Heat Input	111100	MMBtu/yr		Biogas flow rate	7583	dscf/hr			
Generator Emission Factors	Proposed	Units	Reference				Pollutant	Proposed	
PM	0.008	lb/MMbtu	Existing permit					TPY	
PM10	0.008	lb/MMbtu	Existing permit				PM	0.44	
PM2.5	0.008	lb/MMbtu	Existing permit				PM10	0.44	
CO	0.554	lb/MMbtu	Source test data (ave)				PM2.5	0.44	
NOx	0.552	lb/MMbtu	Source test data (ave)				CO	30.76	
SOx	0.2395	lb/MMbtu	Existing permit				NOx	30.66	
VOC	0.017	lb/MMbtu	Source test data (ave)				SOx	13.30	
CH4	3.20E-03	kg/MMbtu	EPA 40 CFR Part 98				VOC	0.93	
N2O	6.30E-04	kg/MMbtu	EPA 40 CFR Part 98				CH4	0.39	
CO2 Combustion	52.07	kg/MMbtu	EPA 40 CFR Part 98				N2O	0.08	
CO2 Biogenic	43.47	kg/MMbtu	EPA 40 CFR Part 98				CO2 Combustion	6377	
							CO2 Biogenic	5324	
Global Warming Potential							CO2e	11732	
CO2	1								
CH4	28								
N2O	265								

Source Test Results	Gas Flow (m3/hr)	Gas flow (cf/hr)	Heat Input (MMBtu/hr)	CO (lb/hr)	CO (lb/Mmbtu)	NOx (lb/hr)	NOx (lb/MMBtu)	VOC (lb/hr)	VOC (lb/MMBtu)
2014	563.0	19882	11.19	6.54	0.584	7.48	0.668	0.50	0.045
2016	631.8	22312	12.56	6.54	0.521	5.42	0.431	0.14	0.011
2017	570.8	20158	11.35	5.90	0.520	5.66	0.499	0.07	0.006
2018	*495.2*	*17489*	9.85	5.81	0.590	6.00	0.609	0.05	0.005
Average				6.20	0.554	6.14	0.552	0.19	0.017

EU-2 Enclosed Flare					
Higher Heating Values (HHV)					
Combined Biogas	563	btu/cf		185.61564	
Other biomass gases	655	btu/cf			
Methane	1010	btu/cf			
Flare Operating Hours	876	hours			
Flare Gas Flowrate	6000	m3/hr	211890	ft3/hr	
Flare heat input	139	MMbtu/hr			
	121578.2	121578.2442		185615640	
Pilot Light Operating Hours	8760	hours			
Pilot light heat input	0.05	MMbtu/hr	total	185615640	
Open Flares					
Higher Heating Values (HHV)					
Combined Biogas	563	btu/cf			
Cellulosic Biogas	549	btu/cf			
Methane	1010	btu/cf			
Flare Operating Hours	0	hours			
Flare Gas Flowrate	1000	m3/hr	35315	ft3/hr	
Flare heat input	23.13	MMbtu/hr			
Enclosed Flare Emission Factors					
PM	17	lb/10^6 dscf Methane	2.33	lb/hr Biogas	
PM10	17	lb/10^6 dscf Methane	2.33	lb/hr Biogas	
PM2.5	17	lb/10^6 dscf Methane	2.33	lb/hr Biogas	
CO	750	lb/10^6 dscf Methane	102.85	lb/hr Biogas	
NOx	40	lb/10^6 dscf Methane	5.49	lb/hr Biogas	
SOx	0.2395	lb/MMbtu			
VOC	5.5	lb/10^6 dscf NG	0.0084	lb/MMbtu Biogas	
CH4	3.20E-03	kg/MMbtu	7.05E-03	lb/MMbtu	
N2O	6.30E-04	kg/MMbtu	1.39E-03	lb/MMbtu	
CO2 Combustion	52.07	kg/MMbtu	114.79	lb/MMbtu	
CO2 Biogenic	43.47	kg/MMbtu	95.84	lb/MMbtu	
Pilot Light Emission Factors					
PM	7.6	lb/10^6 dscf NG	0.007525	lb/MMbtu	
PM10	7.6	lb/10^6 dscf NG	0.007525	lb/MMbtu	
PM2.5	7.6	lb/10^6 dscf NG	0.007525	lb/MMbtu	
CO	84	lb/10^6 dscf NG	0.083168	lb/MMbtu	
NOx	100	lb/10^6 dscf NG	0.09901	lb/MMbtu	
SOx	0.6	lb/10^6 dscf NG	0.000594	lb/MMbtu	
VOC	5.5	lb/10^6 dscf NG	0.005446	lb/MMbtu	
CH4	1.00E-03	kg/MMbtu	2.20E-03	lb/MMbtu	
N2O	1.00E-04	kg/MMbtu	2.20E-04	lb/MMbtu	
CO2 Combustion	53.06	kg/MMbtu	116.98	lb/MMbtu	
Global Warming Potential					
CO2	1				
CH4	28				
N2O	265				

Enclosed Flare Emissions

Pollutant	Enclosed Flare TPY
PM	1.02
PM10	1.02
PM2.5	1.02
CO	45.05
NOx	2.40
SOx	14.56
VOC	0.51
CH4	0.43
N2O	0.08
CO2 Combustion	6978
CO2 Biogenic	5826
CO2e	12839

Enclosed Flare Emission Factors		Ref.
PM	17	EPA AP42 2.4-5
PM10	17	EPA AP42 2.4-5
PM2.5	17	EPA AP42 2.4-5
CO	750	EPA AP42 2.4-5
NOx	40	EPA AP42 2.4-5
SOx	0.2395	Calculated based on 3-year average H2S concentration in ga
VOC	5.5	EPA AP42 1.4-2 converted to biogas by HHV
CH4	3.20E-03	EPA 40 CFR Part 98
N2O	6.30E-04	EPA 40 CFR Part 98
CO2 Combustion	52.07	EPA 40 CFR Part 98
CO2 Biogenic	43.47	EPA 40 CFR Part 98

EU-3 Boiler #1 & #2 Emissions						
Hours of operation	8760	hours	170760234	cf/year		
Input Capacity	10	MMBtu/hr				
NG HHV	1026	btu/cf				
	85.38011696					
Boiler Emission Factors	Value	Units	Value	Units	Ref.	
PM	2.5	lb/10^6 dscf	0.0024	lb/MMbtu	DEQ AQ-EF05	
PM10	2.5	lb/10^6 dscf	0.0024	lb/MMbtu	DEQ AQ-EF05	
PM2.5	2.5	lb/10^6 dscf	0.0024	lb/MMbtu	DEQ AQ-EF05	
CO	84	lb/10^6 dscf	0.0819	lb/MMbtu	DEQ AQ-EF05	
NOx	50	lb/10^6 dscf	0.0487	lb/MMbtu	DEQ AQ-EF05	
SOx	0.6	lb/10^6 dscf	0.0006	lb/MMbtu	Facility Data	
VOC	5.5	lb/10^6 dscf	0.0054	lb/MMbtu	DEQ AQ-EF05	
CH4	1.00E-03	kg/MMbtu	0.002	lb/MMbtu	EPA 40 CFR Part 98	
N2O	6.00E-04	kg/MMbtu	0.001	lb/MMbtu	EPA 40 CFR Part 98	
CO2 Combustion	53.06	kg/MMbtu	116.98	lb/MMbtu	EPA 40 CFR Part 98	
Global Warming Potential						
CO2	1					
CH4	25					
N2O	298					

Boiler Emissions			
Pollutant	Boiler #1	Boiler #2	Total
	TPY	TPY	TPY
PM	0.11	0.11	0.21
PM10	0.11	0.11	0.21
PM2.5	0.11	0.11	0.21
CO	3.59	3.59	7.17
NOx	2.13	2.13	4.27
SOx	0.03	0.03	0.05
VOC	0.23	0.23	0.47
CH4	0.10	0.10	0.19
N2O	0.06	0.06	0.12
CO2 Combustion	5124	5124	10247
CO2e	5143	5143	10287

EU-1 Type 1 Feedstocks (Straw Handling)

Fugitive Emissions			
Throughput	85000	ton/year	
Exposed sites	14		
Wind speed (U)	4.5	m/s	
	10.07	mph	
Straw moisture (M)	4	%	
PM30	k=	0.74	
PM10	k=	0.35	
PM2.5	k=	0.053	
PM30	EF=	0.002228	lb/ton
PM10	EF=	0.001054	lb/ton
PM2.5	EF=	0.00016	lb/ton
Fugitive Emissions (@ the 14 exposed sites)			
PM30	1.326	tons/year	
PM10	0.627	tons/year	
PM2.5	0.095	tons/year	

AP42 Section 13.2.4-4

The quantity of particulate emissions generated by either type of drop operation, per kilogram (kg) (ton) of material transferred, may be estimated, with a rating of A, using the following empirical expression:[11]

$$E = k(0.0016)\ \frac{\left(\frac{U}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}\ \text{(kg/megagram [Mg])}$$

$$E = k(0.0032)\ \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}\ \text{(pound [lb]/ton)}$$

where:

E = emission factor
k = particle size multiplier (dimensionless)
U = mean wind speed, meters per second (m/s) (miles per hour [mph])
M = material moisture content (%)

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 30 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.20	0.053[a]

[a] Multiplier for < 2.5 µm taken from Reference 14.

Baghouse System			
PM	EF=	0.012	lb/ton straw processed
PM10	EF=	0.012	lb/ton straw processed
PM2.5	EF=	0.012	lb/ton straw processed
Point Emissions			
PM	0.510	tons/year	
PM10	0.510	tons/year	
PM2.5	0.510	tons/year	
EF	**Baghouse and Fugitives Combined**		
PM	EF=	0.014	
PM10	EF=	0.013	
PM2.5	EF=	0.012	
Emissions			
PM	1.84	tons/year	
PM10	1.14	tons/year	
PM2.5	0.60	tons/year	

Fugitive EFs are from EPA AP42 Sectuib 13.2.4-4
Baghouse EFs are from EPA AP42 Table 9.9.1-2 for a grain hammermill with baghouse
DEQ's AQEF-08: PM2.5 is 100% of PM10 for baghouse

EU-5 Type 2 Feedstocks (Manure Handling)

Throughput	36500	ton/year	
Exposed sites	14		
Wind speed (U)	22.4	m/s	
	50.00	mph	
Manure moisture (M)	10	%	
PM30	k=	0.74	
PM10	k=	0.35	
PM2.5	k=	0.053	
PM30	EF=	0.004964	lb/ton
PM10	EF=	0.002348	lb/ton
PM2.5	EF=	0.000356	lb/ton
Emissions			
PM30	0.091	tons/year	
PM10	0.043	tons/year	
PM2.5	0.006	tons/year	

AP42 Section 13.2.4-4

The quantity of particulate emissions generated by either type of drop operation, per kilogram (kg) (ton) of material transferred, may be estimated, with a rating of A, using the following empirical expression:[11]

$$E = k(0.0016)\ \frac{\left(\frac{U}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}\ \text{(kg/megagram [Mg])}$$

$$E = k(0.0032)\ \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}\ \text{(pound [lb]/ton)}$$

where:

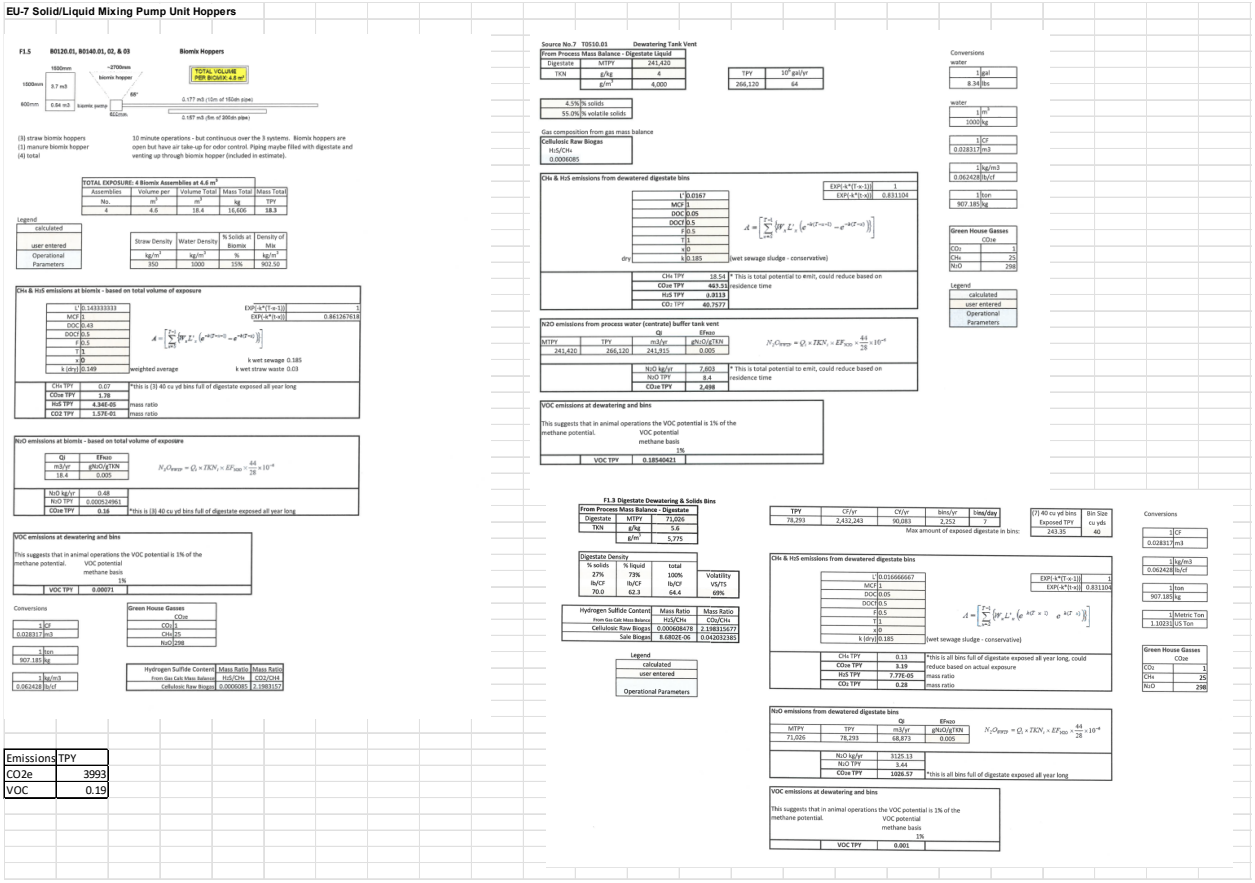
E = emission factor
k = particle size multiplier (dimensionless)
U = mean wind speed, meters per second (m/s) (miles per hour [mph])
M = material moisture content (%)

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 30 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.20	0.053[a]

[a] Multiplier for < 2.5 µm taken from Reference 14.

EU-7 Solid/Liquid Mixing Pump Unit Hoppers



Emissions	TPY
CO2e	3993
VOC	0.19

EU-8 Gas Upgrade - Amine Scrubber Vent Emissions							
	% Emitted	EF lb/hr	lb/yr	TPY	TPY CO2e		
Vented CO2	100%	mb		30491	30491		
CH4 loss	0.1%	mb		33.51	938		
H2S	98%	mb		0.16			
VOC	95%	0.31	2548	1.27			
							lb/hr
							18689.96
VOC Emission Factor							
	Raw Gas	Raw Gas	VOC	VOC			81862.03
VOC	Flow Rate	Flow Rate	EF	EF			
mg/m3	mscfh	m3/hr	mg/hr	lb/hr			
30	163.5	4630	138,894	0.31			
Process Engineering MB							
biogas	production	m3/a	40,569,153				
methane	production	m3/a	21,242,157				
		%methane	52.36%				
specific weight	0oC	kg/m3	1.32				
specific weight	50oC	kg/m3	1.4342				

EU- FE Fugitive Emissions from Vehicle Travel																
PM30	k=	0.011	lb/VMT			Travel Distances (based on site drawings):										
PM10	k=	0.0022	lb/VMT			2400	ft -trucks									
PM2.5	k=	0.00054	lb/VMT			100	ft -bale handlers									
						750	ft - employee									
sL=		7.4	g/m^2													
P		140	rain days (at least 0.01" rainfall)													
N		365	days per year													
Assumptions Made by the Facility																
Vehicle Miles/Trips Travelled:					Total VMT/year				Vehicle Weights:							
0.45	VMT for straw truck and product trip				Employees	879	VMT/year		W=	25	tons, straw truck weight					
0.02	VMT for bale handler trips				Straw Trucks	2151	VMT/year		W=	25	tons, manure truck weight					
0.14	VMT for employee trips				Manure Trucks	993	VMT/year		W=	1.5	tons, employee vehicle weight					
6188	employee trips/yr				Bale Handlers	1972	VMT/year		W=	10	tons, bale handler weight					
4732	straw truck trips/yr				Product Trucks	9927	VMT/year		W=	25	tons, product truck weight					
104104	bale handler trips/yr	13071			Maintenance	500	VMT/year		W=	7.5	tons, maintenance					
2184	manure truck trips/yr															
21840	product truck trips/yr															
PM30 EF				PM10 EF				PM2.5 EF								
	Employees	0.0929	lb/VMT		Employees	0.0186	lb/VMT		Employees	0.0046	lb/VMT					
	Straw Trucks	1.6388	lb/VMT		Straw Trucks	0.3278	lb/VMT		Straw Trucks	0.0804	lb/VMT					
	Manure Trucks	1.6388	lb/VMT		Manure Trucks	0.3278	lb/VMT		Manure Trucks	0.0804	lb/VMT					
	Bale Handlers	0.6436	lb/VMT		Bale Handlers	0.1287	lb/VMT		Bale Handlers	0.0316	lb/VMT					
	Product Trucks	1.6388	lb/VMT		Product Trucks	0.3278	lb/VMT		Product Trucks	0.0804	lb/VMT					
	Maintenance	0.4799	lb/VMT		Maintenance	0.0960	lb/VMT		Maintenance	0.0236	lb/VMT					
PM30 Emissions				PM10 Emissions				PM2.5 Emissions								
	Employees	0.0408	ton/year		Employees	0.0082	ton/year		Employees	0.0020	ton/year					
	Straw Trucks	1.7624	ton/year		Straw Trucks	0.3525	ton/year		Straw Trucks	0.0865	ton/year					
	Manure Trucks	0.8134	ton/year		Manure Trucks	0.1627	ton/year		Manure Trucks	0.0399	ton/year					
	Bale Handlers	0.6345	ton/year		Bale Handlers	0.1269	ton/year		Bale Handlers	0.0311	ton/year					
	Product Trucks	8.1342	ton/year		Product Trucks	1.6268	ton/year		Product Trucks	0.3993	ton/year					
	Maintenance	0.1200	ton/year		Maintenance	0.0240	ton/year		Maintenance	0.0059	ton/year					
														VMT/Load		
	Total PM30	**11.5**	**ton/year**		**Total PM10**	**2.3**	**ton/year**		**Total PM2.5**	**0.6**	**ton/year**			**0.45**	Source Estimate	