Permit by Rule (PBR) Registration
Technical Review

Company:	South Fork Renewable Energy, LLC	**Registration No.:**	177908
Nearest City:	Dimmitt	**Project No.:**	381882
County:	Castro	**Project Type:**	Initial
Project Reviewer:	John Ma	**Regulated Entity No.:**	RN112066162
Unit Name:	South Fork Renewable Energy	**Customer Reference No.:**	CN606316099
PBR No(s).:	106.183, 106.261, 106.262, 106.263, 106.492, 106.511	**Project Received Date:**	October 17, 2024
Physical Location:	1604 County Road 624		

Project Overview / Process Description
South Fork Renewable Energy has submitted this project to authorize their new site in Castro County under 106.183, 106.261, 106.262, 106.263, 106.492, and 106.511.

The South Fork Renewable Energy Site is a biogas treatment site that will operate in Castro County. The treatment site will produce renewable natural gas (RNG) using biogas from cow manure. The facility will be constructed at the South Fork Dairy, an existing dairy concentrated animal feeding operation (CAFO) authorized under TPDES CAFO General Permit no. TXG921032.

The South Fork Renewable manure to RNG project will consist of an anaerobic digestion system comprised of four (4) anaerobic digester (ADs) tanks; a solid-liquid separation system for dewatering digestate exiting the ADs; one covered anaerobic lagoon for digesting flushed parlor water manure and polishing liquid digestate from AD tanks, incorporating a sealed cover to provide biogas storage; two natural-gas fired boilers to supply heat to the anaerobic digesters; a biogas treatment system to remove water, carbon dioxide (CO_2), and H_2S to meet pipeline quality specifications; a backup candlestick flare with natural gas pilot, and an emergency generator.

Manure from the nearby dairy farm is collected and moved into the reception pit. The manure is then pumped into the aerobic digesters. Ferric chloride can be injected into the incoming digester feed to control H_2S during system start-up and when downstream desulfurization systems are offline for maintenance. Once broken down in the digesters, the microorganisms produce biogas, which is comprised of approximately 60% methane and 40% carbon dioxide. Heating coils mounted to the inside walls of the tanks will provide heat to maintain an internal temperature of 100°F to provide an optimal environment for the microorganisms.

The heat provided to the heating coils will be supplied by two natural gas-fired 5MMBtu/hr boilers (BOILER1 and BOILER2). Each digestion tank will be covered with a double membrane that provides some volume for gas storage as it is being generated, and each membrane cover will have a pressure relief valve to prevent over-pressurization. Biogas will then exit the tanks and flow to a covered anaerobic lagoon for additional storage. A bypass line will allow biogas from the digesters to flow directly to the biogas upgrade system during start-up and when the lagoon requires maintenance.

After digesting, slurry contents from the digesters (digestate) will be pumped to a common digestate collection sump. Undigested solids will be separated from the liquid portion of the digestate, and the dewatered solids will be temporarily stored in the Screw Press Building before they are used as bedding for the cows. The liquid digestate will be sent to the Anaerobic Lagoon for further treatment.

The Anaerobic Lagoon will have approximately 43.6 million gallons of liquid storage capacity and can store up to 2 days' worth of biogas. The storage lagoon will be lined as well as covered with a membrane to store biogas generated within the lagoon and biogas that was generated in the digester tanks. After a retention time of approximately 57 days in the lagoon, the effluent will flow to an open lagoon where water is stored for future irrigation.

The anaerobic digesters, anaerobic storage lagoon, and associated gas and digestate transfer equipment and piping comprise the anaerobic digestion system. The system has an estimated biogas production flowrate of 1,060 scfm, 949 scfm from the digesters and an additional 111 scfm from the anaerobic lagoon with an average methane (CH_4) content of 58%. The anaerobic digestion system will reduce potential VOC emissions from manure generated by the dairy operations since the manure that is currently stored in an uncovered lagoon will now be stored in the enclosed digesters and covered lagoon, thereby decreasing the potential volatilization of compounds within the manure.

The anaerobic storage lagoon membrane is designed to hold a volume of up to 2 days' worth of biogas; however, in the event of an emergency, such as an equipment failure or shutdown of the gas upgrading system which lasts longer than 2 days, the biogas

will be sent to the backup Flare (FLARE1) for combustion. The gas will be treated to reduce the H_2S concentration prior to being combusted in the Flare. The flare pilot/auxiliary burner will be fueled by natural gas to ensure flame stability and ignition of the gas stream.

During start-up, there may be a period during which the lagoon cover will be installed but gases from the lagoon will not yet be vented to the flare or gas upgrading system. In this scenario, the biogas generated will be vented to atmosphere through emergency vents installed on the covered lagoon. The stored biogas in the anaerobic lagoon will be sent to a biological desulfurization unit and lead- lag dry media reactors. The biological desulfurization system will use caustic scrubbing to remove approximately 99% of the H_2S in the biogas. The caustic liquid will be regenerated using bacteria to produce elemental sulfur. Biogas will then be sent to the dry media reactors for additional H_2S removal. During biological desulfurization system downtime or maintenance, the dry media reactors can be used as the primary control to reduce H_2S concentrations in the raw biogas.

After passing through the dry media reactor columns, the biogas will then be sent to the Biogas Upgrade System (BUS1) to remove residual compressor oil, non-methane organic compounds, and CO_2. The upgrading system tail gas stream will be directly vented to the atmosphere. The final gas product is compressed and monitored for quantity and quality before being injected into the pipeline. Out-of-spec gas will be returned to the anaerobic storage lagoon or combusted in the backup flare.

Permit by Rule Requirements - 30 TAC Chapter 106

General Requirements	
Registration Fee Reference No.:	**Application fee: 722842 / 582EA000626827**
Is this registration certified?	**No**
Is planned MSS included in the registration?	**Yes**
Are there affected NSR or Title V authorizations for the project?	**No**
If there are affected Title V authorizations, is monitoring being submitted as part of this registration?	**No**
Are there any upstream or downstream affects associated with this registration?	**No**
Are associated upstream/downstream emissions either included in the registration OR within current permitted limits with no changes to underlying air authorizations for the applicable units regarding BACT, health and environmental impacts, or other representations.	**NA**
Are emissions for each PBR authorized facility less than the § 106.4(a)(1) limits?	**Yes**
Are total emissions from all sitewide PBR authorized facilities less than the § 106.4(a)(4) limits, OR has the site been subject to public notice requirements? **Sitewide emissions meet 106.4 limits.**	**Yes**
Are there permit limits on using PBRs at the site?	**No**
Is the facility in compliance with all other applicable rules and regulations?	**Yes**
Does the registration include an appropriate PBR workbook, and has the workbook been verified?	**Yes**

Federal Applicability	
Does this project trigger a PSD or Nonattainment review?	**No**
Does the Major NSR applicability analysis include all associated upstream and/or downstream emissions?	**NA**
Are there any applicable standards under NSPS, NESHAP, or NESHAP for source categories (MACT)?	**NSPS JJJJ**

Permit by Rule Requirements - Compliance Demonstrations

PBR 106.183 Boilers, Heaters, And Other Combustion Devices

Boilers, heaters, drying or curing ovens, furnaces, or other combustion units, but not including stationary internal combustion engines or turbines are permitted by rule, provided that the following conditions are met.

(1) The only emissions will be products of combustion of the fuel.

(2) The maximum heat input will be 40 million British thermal unit (Btu) per hour with the fuel being:

(2)(A) sweet natural gas;

(3) Distillate fuel oil will not be fired as a back-up fuel.

(4) n/a; both boilers are rated at 5.0MMBtu/hr each.
(5) Records of hours of fuel oil firing and fuel oil purchases will be maintained on-site on a two-year rolling retention period and made available upon request to the commission or any local air pollution control agency having jurisdiction.

EPNs: BOILER1, BOILER2

PBR 106.261/262 Facilities (Emission Limitations / Emission and Distance Limitations)

- The emission point(s) associated with the facilities or changes to facilities are located **3000ft** from the nearest off-site receptor.
- The total new or increase emissions will comply with the applicable hourly and annual emission limits as represented in the table below.
- n/a; site will not store and handle chemicals under 106.262(a)(4).
- There are no changes to or addition of any pollution abatement equipment.
- Visible emissions to the atmosphere, from any point or fugitive source, do not exceed 5.0 percent opacity in any six-minute period.
- This registration does not authorize construction or changes to a facility authorized under another section of this chapter or under standard permit.

EPNs: FUG1, BUS1, FLARE1

PBR 106.263 Routine Maintenance, Startup, and Shutdown

(a) This section authorizes routine maintenance, start-up and shutdown of facilities, and specific temporary maintenance facilities except as specified in subsection (b) of this section.
(b) Activities listed under 106.263(b) will not be authorized with this project.
(c) The following activities and facilities are authorized under this section:
(c)(1) routine maintenance activities which are those that are planned and predictable and ensure the continuous normal operation of a facility or control device or return a facility or control device to normal operating conditions;
(c)(2) routine start-ups and shutdowns which are those that are planned and predictable; and
(c)(3) n/a; temporary maintenance facilities will not be used.
(d) Emissions from routine maintenance (excluding temporary maintenance facilities), start-up, and shutdown are:
(d)(1) limited to 24-hour emission totals which are less than the reportable quantities defined in §101.1(82) of this title (relating to Definitions) for individual occurrences;
(d)(2) required to be authorized under Chapter 116 of this title (relating to Control of Air Pollution by Permits for New Construction or Modification) or comply with §101.7 and §101.11 of this title (relating to Maintenance, Start-up and Shutdown Reporting, Recordkeeping, and Operational Requirements, and Demonstrations) if unable to comply with paragraph (1) of this subsection or subsection (f) of this section; and
(d)(3) required to comply with subsection (f) of this section.
(e) n/a; temporary maintenance facilities will not be used.
(f) All emissions covered by this section are limited to, collectively and cumulatively, less than any applicable emission limit under §106.4(a)(1) - (3) of this title (relating to Requirements for Permitting by Rule) in any rolling 12-month period.
(g) Facility owners or operators must retain records containing sufficient information to demonstrate compliance with this section and must include information listed in paragraphs (1) - (4) of this subsection. Documentation must be separate and distinct from records maintained for any other air authorization. Records must identify the following for all maintenance, start-up, or shutdown activities and temporary maintenance facilities:
(g)(1) the type and reason for the activity or facility construction;
(g)(2) the processes and equipment involved;
(g)(3) the date, time, and duration of the activity or facility operation; and
(g)(4) the air contaminants and amounts which are emitted because of the activity or facility operation

EPNs: LAGOON1

PBR 106.492 Flares

Smokeless gas flares which meet the following conditions of this section are permitted by rule:
(1) design requirements.
(1)(A) The flare will be equipped with a flare tip designed to provide good mixing with air, flame stability, and a tip velocity less

than 60 feet per second (ft/sec) for gases having a lower heating value less than 1,000 British thermal units per cubic foot (Btu/ft3) or a tip velocity less than 400 ft/sec for gases having a lower heating value greater than 1,000 Btu/ft3.

(1)(B) The flare will be equipped with a continuously burning pilot or other automatic ignition system that assures gas ignition and provides immediate notification of appropriate personnel when the ignition system ceases to function. A gas flare which emits no more than 4.0 pounds per hour (lb/hr) of reduced sulfur compounds, excluding sulfur oxides, is exempted from the immediate notification requirement, provided the emission point height meets the requirements of §106.352(4) of this title (relating to Oil and Gas Production Facilities).

(1)(C) Flare will combust waste gas containing hydrogen sulfide. Site is located at 1320ft from the nearest off-site receptor.

(1)(D) The heat release of a flare which emits sulfur dioxide (SO_2) will be greater than or equal to the following values:

For SO_2 $Q = 0.53 \times 10^5 \times SO_2$

Where Q = heat release, British thermal units per hour, based on lower heating value

SO_2 = SO_2 emission rate, lb/hr

(2) operational conditions.

(2)(A) The flare will burn a combustible mixture of gases containing only carbon, hydrogen, nitrogen, oxygen, sulfur, chlorine, or compounds derived from these elements. When the gas stream to be burned has a net or lower heating value of more than 200 Btu/ft3 prior to the addition of air, it may be considered combustible.

(2)(B) Form PI-7 CERT submitted via STEERS.

(2)(C) Under no circumstances will liquids be burned in the flare.

EPNs: FLARE1

PBR 106.511 Portable and Emergency Engines and Turbines

Internal combustion engine and gas turbine driven compressors, electric generator sets, and water pumps, used only for portable, emergency, and/or standby services are permitted by rule, provided that the maximum annual operating hours will not exceed 10% of the normal annual operating schedule of the primary equipment; and all electric motors. For purposes of this section, "standby" means to be used as a "substitute for" and not "in addition to" other equipment.

Notes: There will be a 369HP emergency generator on site. Generator will be authorized to operate 100hrs/year.

Compliance History and Site Review

In accordance with 30 TAC Chapter 60, a compliance history report was reviewed on:			**November 7, 2024**
Site rating / classification:	**N/A**	Site rating / classification:	**N/A**
Has any action occurred on the basis of the compliance history or rating?			**No**
Did the Regional Office provide site approval and confirm distances?			**NA**

106.261(a)(2) Emissions

Chemical	Criteria Pollutant Designation	CAS No. (optional input)	Emission Threshold (lb/hr)	Emission Threshold (tpy)	Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Meets Threshold?
Propane	VOC		6	10	9.64E-02	4.22E-01	Yes
Acetylene	VOC		6	10	5.16E-02	2.26E-01	Yes
Ethylene	VOC		6	10	2.33E-02	1.02E-01	Yes
Butane	VOC		6	10	6.43E-02	2.81E-01	Yes

106.261(a)(3) Emissions

Chemical	Criteria Pollutant Designation	L Value (mg/m^3)	CAS No. (optional input)	Emission Threshold (lb/hr)	Emission Threshold (tpy)	Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Meets Threshold ?
1,2,4-Trimethylbenzene	VOC		95636	1	4.38	2.24E-05	9.81E-05	Yes
1,3,5-Trimethylbenzene	VOC		108678	1	4.38	1.28E-05	5.61E-05	Yes
1-Methylnaphthalene	VOC		90120	1	4.38	3.14E-08	1.37E-07	Yes
2-Chlorophenol	VOC		95578	1	4.38	7.02E-06	3.08E-05	Yes
2-Methylnaphthalene	VOC		91576	1	4.38	2.24E-08	9.81E-08	Yes

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3,4-Methylphenol(o,p-cresol)	VOC		106445	1	4.38	6.00E-05	2.63E-04	Yes
Benzyl Alcohol	VOC		100516	1	4.38	5.07E-04	2.22E-03	Yes
bis(2-chloroisopropyl)ether	VOC		108601	1	4.38	2.80E-05	1.23E-04	Yes
bis(2-Ethylhexyl)phthalate	VOC		117817	1	4.38	2.19E-05	9.59E-05	Yes
Chlorobenzene	VOC		108907	1	4.38	8.65E-06	3.79E-05	Yes
Di-n-butylphthalate	VOC		84742	1	4.38	1.03E-05	4.50E-05	Yes
Fluoranthene	VOC		206440	1	4.38	4.38E-09	1.92E-08	Yes
n-Butylbenzene	VOC		104518	1	4.38	9.52E-06	4.17E-05	Yes
N-nitroso-di-n-propylamine	VOC		621647	1	4.38	4.80E-06	2.10E-05	Yes
n-Propylbenzene	VOC		103651	1	4.38	8.93E-06	3.91E-05	Yes
Phenanthrene	VOC		85018	1	4.38	1.11E-08	4.86E-08	Yes
p-Isopropyltoluene	VOC		99876	1	4.38	1.67E-04	7.33E-04	Yes
sec-Butylbenzene	VOC		135988	1	4.38	6.73E-06	2.95E-05	Yes
Hexane	VOC		110543	1	4.38	4.64E-03	2.03E-02	#REF!
tert-Butylbenzene	VOC		98066	1	4.38	7.15E-06	3.13E-05	Yes

106.262(a)(2) Distance

Distance to nearest off-plant receptor (feet):	3000
K value:	8

106.262(a)(2) Emissions – Table 262

Chemical	Criteria Pollutant Designation	CAS No. (optional input)	L Value (mg/m^3)	E, maximum Hourly Emission Threshold (lb/hr)	Actual Emission Threshold (tpy)	Actual Hourly Increases (lb/hr)	Actual Annual Increase (tpy)	Meets Threshold?
Acetaldehyde	VOC	75-07-0	9	1.13E+00	4.93E+00	2.16E-02	9.46E-02	Yes
Carbon Tetrachloride	VOC	71-43-2	12	1.50E+00	5.00E+00	1.02E-03	4.45E-03	Yes
Cumene	VOC	56-23-5	50	6.00E+00	5.00E+00	1.19E-05	5.22E-05	Yes
Hydrogen Sulfide	VOC	98-82-8	1.1	1.38E-01	6.02E-01	7.00E-02	2.90E-01	Yes
Perchloroethylene	Other	100-42-5	33.5	4.19E+00	5.00E+00	6.69E-02	2.93E-01	Yes
Styrene	VOC	127-18-4	21	2.63E+00	5.00E+00	1.39E-05	6.08E-05	Yes
Benzene	VOC	100-42-5	3	3.75E-01	1.64E+00	6.93E-06	3.04E-05	Yes
Pentane	VOC		350	6.00E+00	5.00E+00	3.21E-02	1.40E-01	Yes

106.262(a)(2) Emissions – 1997 ACGIH Guide

Chemical	Criteria Pollutant Designation	CAS No. (optional input)	L Value (mg/m^3)	E, maximum Hourly Emission Threshold (lb/hr)	Actual Emission Threshold (tpy)	Actual Hourly Increases (lb/hr)	Actual Annual Increase (tpy)	Meets Threshold?
1,1,2,2-Tetrachloroethane	VOC	79-34-5	6.9	8.63E-01	3.78E+00	5.93E-06	2.60E-05	Yes
1,1,2-Trichloroethane	VOC	79-00-5	55	6.00E+00	5.00E+00	1.68E-04	7.36E-04	Yes
Aniline and homologues	VOC	62-53-3	7.6	9.50E-01	4.16E+00	6.25E-05	2.74E-04	Yes
Diethyl phthalate	VOC	84-66-2	5	6.25E-01	2.74E+00	2.66E-06	1.16E-05	Yes
Ethyl benzene	VOC	100-41-4	434	6.00E+00	5.00E+00	1.27E-04	5.57E-04	Yes
Xylene (o-,m-, p-	VOC	1330-20-	434	6.00E+00	5.00E+00	3.30E-05	1.45E-04	Yes

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Naphthalene	VOC	91-20-3	52	6.00E+00	5.00E+00	6.01E-06	2.63E-05	Yes
Nitrobenzene	VOC	98-95-3	5	6.25E-01	2.74E+00	5.60E-09	2.45E-08	Yes
Phenol	VOC	100-95-2	19	2.38E+00	5.00E+00	5.16E-05	2.26E-04	Yes
Pyridine	VOC	110-86-1	16	2.00E+00	5.00E+00	1.52E-08	6.65E-08	Yes
Toluene	VOC	108-88-3	188	6.00E+00	5.00E+00	1.00E-03	4.39E-03	Yes
Formaldehyde	VOC	50-00-0	0.37	4.63E-02	2.03E-01	3.41E-02	1.50E-01	Yes
Hexane (n-Hexane)	VOC	110-54-3	176	6.00E+00	5.00E+00	1.67E-02	7.28E-02	Yes

Total 106.261/262 Combined Emissions

	Total Hourly Emissions (lb/hr)	**Total Annual Emissions (tpy)**
Total VOC Emissions:	0.36	1.54
Total H_2S Emissions:	0.07	0.29

Emission Summary

EPN / Emission Source	**VOC**		**NOx**		**CO**		**PM_{10}**		**$PM_{2.5}$**		**SO_2**		**H_2S**	
	lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**
BOILER1 / Boiler No. 1	0.03	0.12	0.24	1.07	0.41	1.79	0.04	0.16	0.04	0.16	<0.01	0.01		
BOILER2 / Boiler No. 2	0.03	0.12	0.24	1.07	0.41	1.79	0.04	0.16	0.04	0.16	<0.01	0.01		
GEN1 / Emergency Generator (100hrs)	0.81	0.04	0.81	0.04	1.63	0.08	0.07	<0.01	0.07	<0.01	<0.01	<0.01		
BUS1 / Biogas Upgrade System	<0.01	0.01											0.01	0.03
FLARE1 / Biogas Flare	0.35	1.53	2.43	10.63	20.81	91.14	0.55	2.42	0.55	2.42	0.30	1.33	<0.01	0.01
LAGOON1 / Lagoon Venting	<0.01	<0.01											2.34	2.59
FUG1 / Fugitives	<0.01	<0.01											0.06	0.25
TOTAL EMISSIONS (TPY):		**1.81**		**12.81**		**94.81**		**2.75**		**2.75**		**2.75**		**2.88**

MAXIMUM OPERATING SCHEDULE:	**Hours/Day**	24	**Days/Week**	7	**Weeks/Year**	52	**Hours/Year**	8,760

November 7, 2024
Mr. John Ma Date
Permit Reviewer
Rule Registration Section

November 8, 2024
Michael Partee, Manager Date
Rule Registrations Section
Air Permits Division
Section Manager