



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604**

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Green Era Campus, Chicago, Illinois

FROM: Tess Russell, Environmental Engineer
AECAB (MN/OH)

THRU: Brian Dickens, Section Supervisor
AECAB (MN/OH)

TO: File

BASIC INFORMATION

Facility Name: Green Era Renewable Energy & Urban Farming Campus

Facility Location: 650 West 83rd Street, Chicago, Illinois 60620

Date of Inspection: July 26, 2023

EPA Inspector(s):

1. Natalie Schulz, Environmental Engineer
2. Tess Russell, Environmental Engineer

Other Attendees:

1. Ned Mast, Green Arrow LLC, Principal Engineer
2. Clemens Halene, Green Arrow LLC, Principal Engineer

Contact Email Address: nmast@greenarrowllc.com

Purpose of Inspection: Anaerobic digester inspection

Facility Type: Anaerobic digester and biogas treatment system

Regulations Central to Inspection: Construction Permit

Arrival Time: 10:00 am

Departure Time: 12:50 pm

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Inspection Type:

- ☒ Unannounced Inspection
- ☐ Announced Inspection

OPENING CONFERENCE

- ☒ Presented Credentials
- ☒ Stated authority and purpose of inspection
- ☒ Provided Small Business Resource Information Sheet
- ☐ Small Business Resource Information Sheet not provided.
- ☒ Provided CBI warning to facility

The following information was obtained verbally from Green Era representatives unless otherwise noted.

Company Ownership:

Green Era has contracted with Green Arrow LLC to begin operations at the facility.

Process Description:

The facility does not process manure or biosolids. Incoming food wastes generally arrive via truck tankers. The food de-packaging and processing operation is housed entirely in an enclosed warehouse, and many of the storage/processing tanks are further located below the warehouse floor. The warehouse has negative pressure (up to about -0.1 in. H₂O), as required by the facility's odor plan, so that internal air is routed through a carbon bed scrubber before being emitted to atmosphere. The carbon bed system is equipped with ionizer bulbs.

Plastics, metals, and other contaminants are removed from the organic food wastes. After being processed, the organics are pumped to the outdoor biomass tank. The biomass tank, which holds organics before going to the digester, has a retention time of approximately 4-5 days. The digester has a retention time of approximately 30 days.

The digester is in the process of being brought into full operation; the digester is not yet operating at its design temperature. Biogas is currently being generated and flared as necessary. When the plant is soon fully operational, the biogas will be refined by a pressure swing adsorption (PSA) system, which absorbs carbon dioxide and hydrogen sulfide, and refines the gas into 97-98% biomethane for injection into pipelines. Waste tail gas from the PSA is routed to the tail gas tank and then to the thermal oxidizer; the thermal oxidizer is required to be in operation whenever there is flow to the thermal oxidizer. Prior to the biomethane being injected into the pipeline, the quality of the gas is checked and mercaptans are added. A flare is on-site for use if the quality of the gas is not sufficient for the PSA/pipeline; the flare is required to be in operation whenever there is flow to the flare. The permit requires that any emission unit not allow the discharge of more than 8 pounds per hour of organic material, unless the emissions are controlled by incineration; when the biogas is routed through either the PSA or the flare, or when

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tail gas is routed through the thermal oxidizer, the calculated emission limits are all below 8 pounds per hour of volatile organic material.

Sludge from the digester is pumped to a screw press and belt press, where polymer can be injected for thickening. Dehydrated cake is loaded into a roll off bin and can be sent to a landfill or used as compost.

Staff Interview:

The facility is in the process of starting its operations and not yet operating under normal conditions; the microbiology in the anaerobic digesters is in the start-up phase. Currently the digester is running at approximately 100°F but will get up to 130°F. Sludge has not yet been removed from the digester, so the dewatering process has not started. The PSA system is not online yet; biogas is currently only being routed to the flare (with a maximum capacity of 800 scfm) as needed. The permit requires the emission units in the permit not be operated until all associated air pollution control equipment has been constructed and is operational.

The facility can read and ensure the negative pressure of the warehouse by checking the online SCADA system. The facility monitors for hydrogen sulfide and ammonia on the back end of the carbon bed scrubber to indicate breakthrough. The ionizer bulbs have potential to decrease the frequency of replacing scrubber media up to every 6 years. Currently the facility has not seen any back-end readings but does expect a slight uptick when the dewatering process begins. According to the permit, H₂S and ammonia emissions are considered negligible and must be below 0.01 lb/hr and 0.04 ton/year from the carbon bed system. This carbon system is not for air pollution control but rather used for odors. The facility is required by an odor plan to use a nasal ranger to quantify smells around the facility.

Both the biomass tank and the anaerobic digester have fixed steel roofs. The biomass tank has one overpressure pressure release valve (PRV) and one under-pressure valve, neither of which is continuously monitored. The digester has two overpressure relief valves and two under-pressure relief valves, neither of which is continuously monitored. The head space of the biomass tank is connected to the digester via gas piping, so any biogas originating in the biomass tank would be controlled similarly to the digester biogas.

The facility has an inventory of spare parts. Two natural gas boilers (3 mmBTU each) supply heat to the digester; glycol is used in the boilers. The facility has plans to install a CO₂ recovery, ammonia recovery, and a second digester system in the future.

The permit contains various requirements, such as quantifying emissions, performing and recording periodic maintenance, etc., but due to the recent start-up of plant, the facility does not yet have extensive records and/or have not yet passed the deadline for conducting certain requirements.

The permit requires the facility to implement an odor control and monitoring plan that is designed to significantly reduce odors, including a description of potential fugitive odorant emission sources and the control measures for each type of odorant emission sources. This plan was requested by EPA.

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TOUR INFORMATION

EPA Tour of the Facility: Yes

Data Collected and Observations: Inspectors used two IRwin Methane Leak Detectors during the inspection. EPA detected elevated readings of approximately 45 parts per million (ppm) on the taller of the two PRVs on the digester, approximately 150 ppm on the shorter of the two PRVs on the digester, and approximately 4 ppm on the observation window of the biomass tank.

Photos and/or Videos: were not taken during the inspection.

Field Measurements: were taken during this inspection.

CLOSING CONFERENCE

☒ Provided U.S. EPA point of contact to the facility

Requested documents:

- Odor control plan

Concerns: Inspectors discussed the biogas leaks detected at the anaerobic digester.

DIGITAL SIGNATURES

Report Author: Russell, Tess Digitally signed by
Russell, Tess
Date: 2023.08.17
17:19:49 -05'00'

Section Supervisor: Brian Dickens Digitally signed by Brian
Dickens
Date: 2023.08.18
08:27:18 -05'00'