Ohio | Public Utilities Commission

Affidavit for Application for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility

Please be advised that all applicant's contact information, including address and telephone number, will be made public and is not subject to confidential treatment. Additionally, any information pertaining to trade secrets contained within the application will be made public unless filed under seal with a motion for protective order, pursuant to Rule 4901-1-24 of the Ohio Administrative Code.

Case Number: 14-2254-HT-REN

Facility Name: Zanesville Energy, LLC

Name of person making this affidavit: Bruce Bailey

State of Ohio
County of Muskingum

The undersigned, being duly sworn according to law, deposes and says that:

1. I am authorized to and do hereby make this affidavit on behalf of the Applicant,

2. All facts and statements made in the application for certification, including all attachments and supplemental information or filings, are true and complete to the best of my knowledge, information, and belief,

3. The facility has obtained or will obtain and will maintain all required local, state, and federal environmental permits,

4. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

B. Bailey VP
Signature of Affiant & Title

Sworn and subscribed before me this 15 day of December, 2014 Month/Year

Janalee A Stoll
Notary

My commission expires on October 8, 2018

Ohio | Public Utilities Commission

SB 310- Specific

Application for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility

Case No.: 14-2254-HT-REN

A. Name of Renewable Facility: Zanesville Energy, LLC
The name specified will appear on the facility's certificate of eligibility issued by the Public Utilities Commission of Ohio.

Facility Location
Street Address: 6400 Maysville Pike
City: Zanesville State: Ohio Zip Code: 43701 County: Muskingum

Facility Latitude and Longitude
Latitude: 39°51'31.94"N Longitude: 82° 6'47.41"W
There are internet mapping tools available to determine the latitude and longitude, if you do not have this information.

For facilities that have a total nameplate capacity of 1 MW or greater provide the U.S. Department of Energy, Energy Information Administration Form EIA-860 Plant Name and Plant Code.

EIA-860 Plant Name:

EIA Plant Code:

B. Legal Name of the Facility Owner: Zanesville Energy, LLC
Please note that the facility owner name listed will be the name that appears on the certificate. The address provided in this section is where the certificate will be sent.

If the facility has multiple owners, please provide the following information for each on additional sheets.

Legal Name of Facility Owner Representative (First Name, MI, Last Name): Scott Nally
Title: Senior Vice President of Environmental Operations
Organization: quasar energy group, LLC
Street Address: 5755 Granger Rd. Suite 320
City: Independence State: OH Zip Code: 44131
Country: Cuyahoga
Phone: (216) 986-9999 Fax: (216) 986-9999 Email Address: snally@quasareg.com
Web Site Address (if applicable): www.quasareg.com

C. List the name, address, telephone number and web site address under which the Applicant will do business in Ohio.
Legal Name of Facility Owner Representative (First Name, MI, Last Name): Zanesville Energy, LLC, Scott Nally
Title: Senior VP of Environmental Operations
Organization: quasar energy group
Street Address: 5755 Granger Rd. Suite 320
City: Independence State: Ohio Zip Code: 44131
Phone: (216) 986-9999 Fax: (216) 986-9999 Email Address: snally@quasareg.com
Web Site Address (if applicable): www.quasareg.com

D. Name of Generation Facility Operating Company: Zanesville Energy, LLC
Legal Name of Contact Person (First Name, MI, Last Name): Scott Nally
Title: Senior VP of Environmental Operations
Organization: quasar energy group
Street Address: 5755 Granger Rd. Suite 320
City: Independence State: Ohio Zip Code: 44131
Phone: (216) 986-9999 Fax: (216) 986-9999 Email Address: snally@quasareg.com
Web Site Address (if applicable): www.quasareg.com

E. Regulatory/Emergency contact
Legal Name of Contact Person (First Name, MI, Last Name): Bruce Bailey
Title: VP of Technical Affairs
Organization: quasar energy group, LLC
Street Address: 5755 Granger Rd. Suite 320
City: Independence State: Ohio Zip Code: 44131
Phone: (216) 538-1151 Fax: (216) 986-9999 Email Address: bbailey@quasareg.com
Web Site Address (if applicable): www.quasareg.com

F. Certification Criteria 1: Deliverability of the Generation into Ohio
Ohio Revised Code (ORC) Sec. 4928.64(B)(3)

Check which of the following applies to the facility's location:

_X_ The facility is located in Ohio.

__ The facility is located in a state geographically contiguous to Ohio (Indiana, Kentucky, Michigan, Pennsylvania, or West Virginia).

__ The facility is located in the following state:

If the renewable energy resource generation facility is not located in Ohio, Indiana, Kentucky, Michigan, Pennsylvania, or West Virginia, you are required to submit a POWER FLOW study by one of the regional transmission organizations (RTO) operating in Ohio, either PJM or Midwest ISO, demonstrating that the power from the facility is physically deliverable into the state of Ohio. . This study must be appended to the application as an exhibit. THE FACILITY MUST BE INTERCONNECTED TO TRANSMISSION LINES. FOR ADDITIONAL INFORMATION ON DELIVERABILITY REQUIREMENTS, SEE THE COMMISSION'S MARCH 23, 2011 ORDER IN CASE NO. 09-0555-EL-REN.

G. Certification Criteria 2: Qualified Resource or Technology

You should provide information for only one generation facility in this application. If you are applying for more than one facility, you will need to complete a separate application for each facility.

The resource or technology for which you are applying for certification must be a renewable energy resource or technology included in Amended Substitute Senate Bill 310 (SB 310) that was not previously recognized as a renewable energy resource under previous statutes. If the resource or technology was a renewable resource or technology recognized by statute before the effective date of SB 310, the applicant must use the online Renewable Energy Resource Generating Facility Application for Certification at

http://www.puco.ohio.gov/puco/index.cfm/puco-forms/renewable-energy-resource-generating-facility-application-for-certification/

G.1 The Applicant is applying for certification in Ohio for a facility using the following SB 310 qualified resources or technologies (Sec. 4928.01 Ohio Revised Code):

G.2. For the resource or technology you identify in Sections G.1 above, please provide a detailed description of the system.

quasar constructed an ecoCITY system (900) anaerobic digestion facility that creates domestic green renewable energy in the form of CNG, electricity, and heat (thermal) from organic wastes. quasar technology solves the waste management issues facing famers, municipal waste water treatment plants, and food processing companies. The Process Flow Diagram (PFD) is figure 1. The continuous mix, high solids anaerobic digestion technology is proven reliable and advanced. This is one of the first city units constructed in the U.S. using quasar's advanced technology that supports hundreds of systems worldwide. The successful launch and demonstration of this system will assist with the creation of a new advanced energy industry based in Ohio.

This system generates domestic green renewable energy from biosolids, FOG (fats, oil and grease), and food waste that was previously unused or being hauled to landfills. Instead, the system will accept and process the material to generate sustainable renewable energy, reduce harmful greenhouse gas emissions, and produce valuable byproducts which include fertilizer and organic soil amendments. quasar's Zanesville facility accepts approximately 138 wet tons of biomass per day with a total solids content of approximately 14.4% from different sources. All waste material is delivered to the site by truck. Operating at this capacity, the plant can generate 1.0 MW per hour (based on measured energy recovery) (10,249 MWh per year with allowances or downtime) of electricity and converts 85% of the system to potential to useable energy (electricity and thermal combined) or the biogas can be cleaned and compressed with equipment we installed in 2011. This CNG equipment generates 3,000 gge (gallons gasoline equivalent) of CNG daily. Excess heat generated by the genset is 3.27 MMBTU/yr and is used for process and comfort heating.

Benefits of processing biomass using C900:

- Highly efficient system – the C900 is more than 85% efficient
- Takes waste products and generates renewable energy and beneficial products.
- Reduces volatile solids – reduction is between 40% and 60%
- Requires minimal real restate – overall footprint of no more than 3 acres
- Increased facility lifespan – systems are engineered to last 20 years
- Reduced odors – allowing us to be a "Good Neighbor" to the community
- Stabilizes biomass so it can be sold off-site as a product

quasar constructed a renewable energy system that produces (i) electricity, CNG, and/or thermal energy, (ii) carbon offsets, (iii) liquid fertilizer, and (iv) valuable soil amendments from the processing of biomass. The system was constructed in Zanesville, Ohio and consists of a quasar designed anaerobic digester, and exclusive gas cleaning and upgrade equipment.

The C900 system can be divided into the following areas:

1. Biomass Area – delivery and pre-processing
2. Receiving Tanks - hydrolysis and acidification
3. Main Digester Tank – mesophillic fermentation

4. Dual Purpose Tank
5. Effluent Processing – dewatering
6. Waste Gas Flare
7. CNG equipment
8. Genset – generators
9. System Operation – monitoring SCADA

Biomass Area – delivery and pre-processing: Trucks delivering high solids biomass unload directly into a 30 yard receiving hopper. Augers in the receiving hopper chop the material and mix it with dilution liquid before emptying the hopper contents to an open hopper, progressive cavity pump. Material is then pumped through a macerator to further reduce biomass particle size. Pumps then transfer the biomass to the receiving tank.

Receiving Tank: Liquid, in the forms of dewatered filtrate, digestate, and water, or a combination of these is mixed with the solids to provide the proper consistency for pumping. Stones or other unwanted solid materials are removed from the biomass. The hopper is designed to completely empty in approximately 45 minutes.

Trucks delivering liquid biomass connect to a pump and empty directly to the receiving tank. The liquid biomass is pumped through a mechanism to filter out any unwanted solid material. A 6,000 gallon tanker truck can be unloaded in approximately 20 minutes. The receiving tanks provide a hydraulic storage buffer in front of the digester tank, providing up to 6 days of storage. Biomass is dosed from the biomass receiving tank to the digester tank.

The receiving tanks are 2 – 75,000 gallon insulated, bolted steel tanks. The tanks have an 18 foot diameter. A side-entry prop mixer prevents formation of layers of the material, ensuring a consistent mix for feeding. The tank has a gas tight steel roof.

Main digester tank: the main digester tank allows methanogenic bacteria to convert organic biomass into biogas. The digestate is heated to maintain approximately 100°F (mesophillic) in the tank using an external heat exchanger heated by the combined heat and power unit (CHP). Alternatively, a hot water boiler fueled by biogas can be used to provide heat. The main digester tank is a steel tank with a working volume of 750,000 gallons with a 60 foot diameter and is approximately 65 feet tall. Side-entry mixers prevent layer formation of the material, ensuring a consistent mix for feeding. The conditioned biomass from the receiving tank is fed into the tank at a turbulence zone created by the mixer to minimize the time required to obtain a complete mix.

The digester tank allows for increased retention time and gas storage. Total system retention time is approximately 30 to 40 days. Gas storage in the dual purpose tank is accomplished with a double membrane roof system. The inner membrane is supported by biogas pressure. The membrane inflates and deflates according to the amount of biogas in the system. When biogas is not present (during commissioning), the membrane is supported by a column and cable system to keep it from contacting the biomass. The cables also have a second function of supporting a net. The net provides surface area for colonization of natural aerobic bacteria to convert hydrogen

sulfide in the biogas to elemental sulfur and sulfates. This elemental sulfur then drops into the digester tank and is removed with the solids in the tank. A metered amount of air is added to the biogas with a blower to support biological desulfurization. The air level is maintained at 1% - 2% volume.

Safe pressure levels are maintained by an over/under pressure relief valve mounted to the tank. This prevents excess pressure or vacuum in the system.

Effluent processing – dewatering system: the suspended solids in the digested material are mechanically separated from the water using a dewatering belt press. The cake solids after this step are around 20% - 25% total dry solids and are utilized for beneficial use off-site as animal bedding, soil amendments, or compost.

The effluent from the dewatering equipment is put into the sewer system or field applied as a fertilizer. The certifiable fertilizer offsets much of the costs of traditional commercial fertilizers.

The biogas generated by quasar's C900 system is a water saturated stream composed primarily of methane (approximately 60%) and carbon dioxide (approximately 40%) and other trace impurities such as hydrogen sulfide and siloxane.

Flare: a flare system is provided to burn off an excess biogas that cannot be consumed in the CNG equipment or the CHP unit.

CNG equipment: Biogas cleaning and CO2 separation, compressor, and dispensing unit. This equipment can produce up to 3,000 gge/day.

Genset units: Two generator units use the biogas to produce electric power which is used on site and sold to the local public utility or into the grid through a Power Purchase Agreement; estimated power generation is up to 0.5MWh per hour (nameplate capacity). In the generation of electricity using an internal combustion engine, thermal energy is also created (water jacket in the engine and exhaust heat); this thermal energy is used on-site.

System operation: remote monitoring and controls: the "brain" of the system is a SCADA (Supervisory Control and Data Acquisition) that controls all the system functions. The SCADA system continuously monitors all process control parameters. Operators can remotely access the entire control system via the internet. The system can page service technicians in the case of critical system warning messages. Safety measures are put in place to meet federal, state, and local regulations.

G.3. Please include a detailed description of how the output of the facility is going to be measured and verified, including the configuration of the meter(s) and the meter type(s).

Endress (or equivalent) - To install: system – 10 - BAC meters or equivalent - **Thermal** for measuring the heat that is reused within the facility. Meters will be placed before and after reuse points to calculate recycled heat.

G.4. Please attach digital photographs that depict an accurate characterization of the renewable generating facility. Please indicate the date(s) the photographs were taken.

Date photograph taken: 12/15/14

INSERT PHOTOGRAPH(S)

See attached
Figure 1: Process Flow Diagram
Figure 2: Heat Exchanger

H. Certification Criteria 3: Placed-in-Service Date (Sec. 4928.64. (A)(1) O.R.C.)

The Renewable Energy Facility:

__ has a placed-in-service date before January 1, 1998; (month/day/year):

_X_ has a placed-in-service date on or after January 1, 1998; (month/day/year): 11/15/2010

__ has been modified or retrofitted on or after January 1, 1998; (month/day/year):

Please provide a detailed description of the modifications or retrofits made to the facility that rendered it eligible for consideration as a qualified renewable energy resource. In your description, please include the date of initial operation and the date of modification or retrofit to use a qualified renewable resource. Please include this description as an exhibit attached to your application filing and identify the subject matter in the heading of the exhibit.

__ not yet online; projected in-service date (month/day/year):

H.1 Is the renewable energy facility owner a mercantile customer?

__ Yes

_X_ No

ORC Sec. 4928.01 (19) "Mercantile customer" means a commercial or industrial customer if the electricity consumed is for nonresidential use and the customer consumes more than seven hundred thousand kilowatt hours per year or is part of a national account involving multiple facilities in one or more states.

Has the mercantile customer facility owner committed to integrate the resource under the provisions of Rule 4901:1-39-08 O.A.C?

__ Yes

_X_ No

If yes, please attach a copy of your approved application as an exhibit to this filing.

I. Facility Information

I.a If applicable, the nameplate capacity of the entire facility
Genset: in kilowatts (kW): or in megawatts (MW): 1
CNG: 3,000 gge/day
Thermal: 3.27 MBTU/yr

To convert from kilowatts (kW) to megawatts (MW) divide by 1,000.

I.b If applicable, what is the expected net heat rate of the facility:
9,300.0000 BTU/kWh
Number of Generating Units: 1

I.1 If applicable, for each generating unit, provide the following information:

In-Service date of each unit	The nameplate capacity of each unit in megawatts (MW)	Projected Annual Gross Generation (MWh)	Expected Annual Capacity Factor %
11/15/10 Heat Exchanger	NA	3.27 MMBTU/yr	90.0

(To expand the number of rows if more units need to be reported, place your cursor in the bottom right cell and hit tab).

$$\text{Capacity Factor \%} = \frac{\text{Projected Annual Generation}}{\text{Nameplate Capacity} * 8760} * 100$$

J. Regional Transmission Organization Information

In which Regional Transmission Organization area is your facility located:

_X_ Within Geographic Area of PJM Interconnection, L.L.C.

__ Within Geographic Area of Midwest ISO

__ Other (specify):

K. Attribute Tracking System Information

Are you currently registered with an attribute tracking system: __ Yes _X_ No

In which attribute tracking system are you currently registered or in which do you intend to register ***(the tracking system you identify will be the system the PUCO contacts with your eligibility certification):***

_X_ GATS (Generation Attribute Tracking System)

__ M-RETS (Midwest Renewable Energy Tracking System)

__ Other (specify):

K.1 Enter the generation ID number the facility has been assigned by the tracking system:

(If the generation ID number has not yet been assigned, you will need to file this number in the PUCO Case Docket within 15 days of the facility receiving this number form the tracking system).

L. Other State Certification

Is the facility certified by another state as an eligible generating resource to meet the renewable portfolio standards of that state?

__ Yes

_X_ No

L.1 If yes, for each state, provide the following information:

Name of State	State Certification Agency	State Certification Number	Date Issued

(To expand the number of rows if more units need to be reported, place your cursor in the bottom right cell and hit tab).

M. Type of Generating Facility

Please check all of the following that apply to the facility:

__ Utility Generating Facility:

__ Investor Owned Utility

__ Rural Electric Cooperative

__ Municipal System

__ Electric Services Company (competitive retail electric service provider certified by the PUCO)

__ Distributed Generation with a net metering and interconnection agreement with a utility.
Identify the utility:

_X_ Distributed Generation with both on-site use and wholesale sales.
Identify the utility with which the facility is interconnected:

__ Distributed Generation, interconnected without net metering.
Identify the utility with which the facility is interconnected:

__ Other:

N. Meter Specifications

Metering Requirements

If the renewable energy resource electrical generating facility is 6 kW or below, the output may be measured with either an inverter meter or a utility grade meter.

All electrical generating facilities that are larger than 6 kW must measure the output of the facility with a utility grade meter. Electrical generating facilities that are larger than 6 kW and that are not measuring output with a utility grade meter will not be certified. OAC* 4901:1-40-04 *(D)(1)

Please only report on the meter or the meters used to measure the output from the facility which will be reported to the attribute tracking system.

N.a The meter(s) that are measuring output from the facility are:

____ Inverter Meter(s)

__X__ Utility Grade Meter(s) *(Must meet ANSI 12.1, or demonstrate an accuracy level of ± 2%)*

N.1 Please provide the following information for each meter used in your system.

N.2.a Manufacturer: Endress (or equivalent) **Thermal** for measuring the heat that is reused within the facility..
N.2.b Serial No. TBD
N.2.1.c Model System-10-BAC BTU meter
N.2.d Date of Last Certification: TBD

Attach a photograph of the meter(s) with date image taken. The meter reading(s) must be clearly visible in the photograph.

N.1.e See attached
Figure 1: Process Flow Diagram
Figure 2: Heat Exchanger

Date photograph taken: 12/15/14

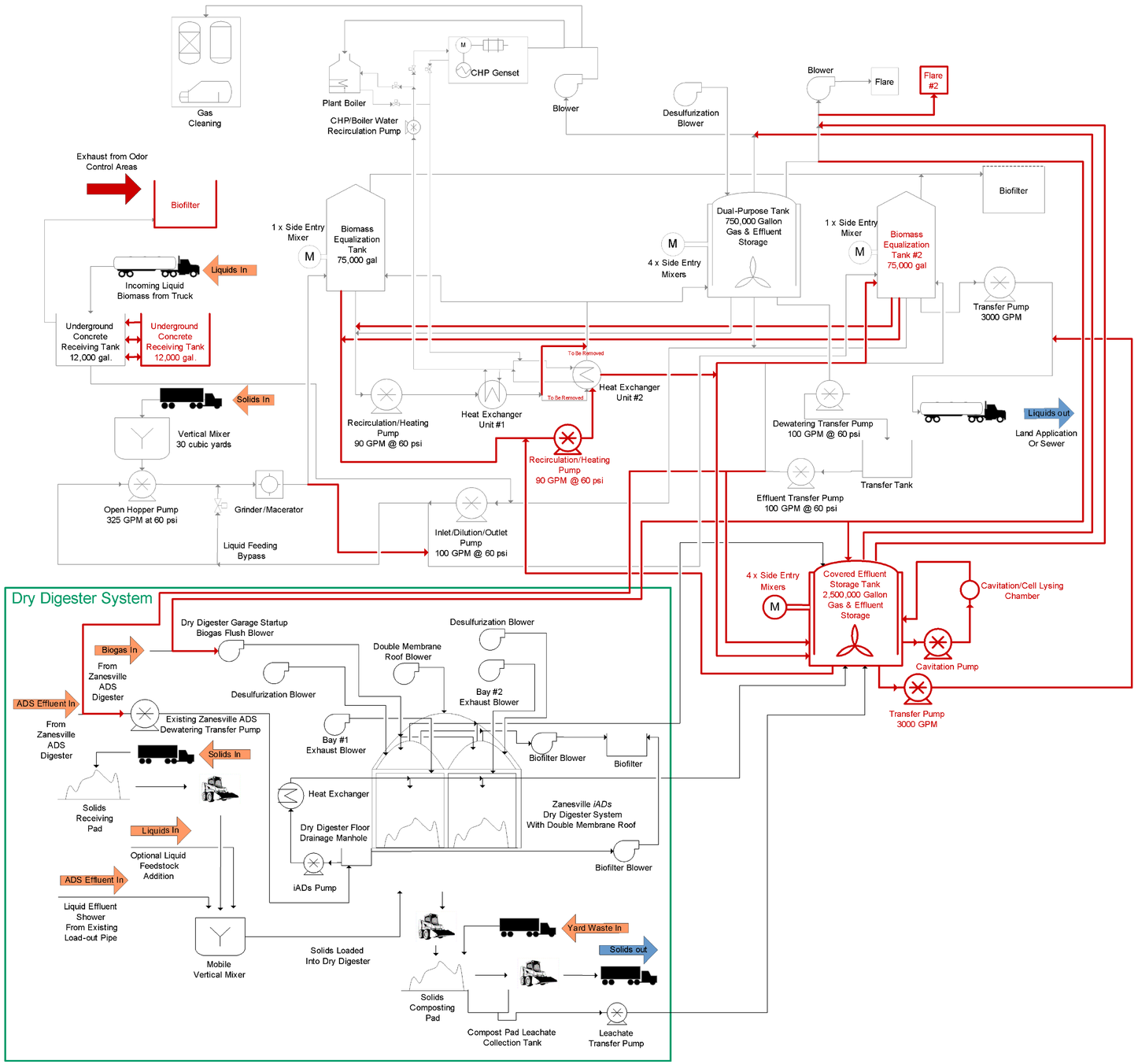
INSERT PHOTOGRAPH(S)

The Public Utilities Commission of Ohio reserves the right to verify the accuracy of the data reported to the tracking system and to the PUCO.

quasar
energy group

Figure 1

Process Flow Diagram



Integrated Anaerobic Digester System

quasar energy group
7624 Riverview Road
PO Box 31023
Cleveland OH 44141
Phone: 216.986.9999

Stamp:

Not to Scale

EPA SUBMITTAL

Rev.	ECN Number	Date
2		
1		
0	EPA SUMITTAL	10/10/11

Drawing Name:
0054-01G-0100

Process Flow Diagram

Project Name and Address:
0054-ZAN-OH-11
Zanesville Integrated
Anaerobic Digestion
Merchant Facility

6400 Maysville Pike
Zanesville, Ohio 43701

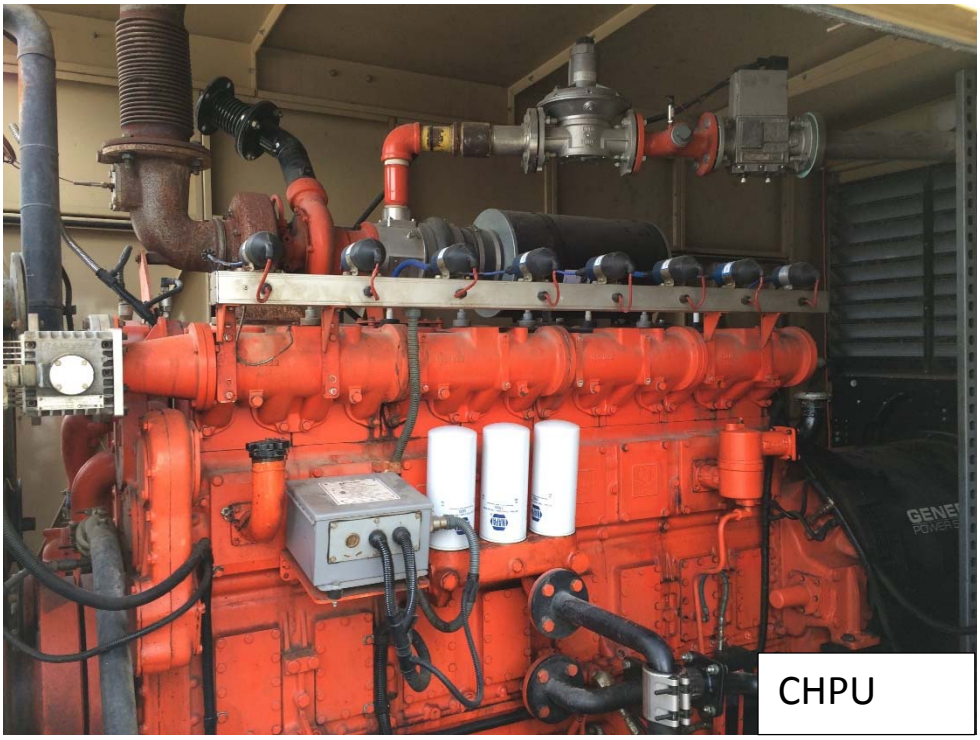
Area: 01
Author: BR
Calculated: ___
Checked: CH
Sheet Number: G-4

P:\ACAD10\CommonSpace\Projects\0014-ZAN-OH-07-F825 IADs Zanesville\Zanesville F825 iADs\PID DWG\0054-01G-0100-Process Flow Diagram3.dwg
7/2/2012 10:14 AM

quasar
energy group

Figure 2

Heat Exchanger



CHPU

Meter

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

12/19/2014 7:02:11 AM

in

Case No(s). 14-2254-HT-REN

Summary: Reply electronically filed by Mr. Bruce Bailey on behalf of Zanesville Energy, LLC