TECHNOLOGY PROVIDER
TECHNOLOGY INFORMATION REQUEST

Technology/Service:	Montrose Environmental - Anaerobic Digester Design Build and Operate		
Information by:	Bernard Sheff, P.E.	**Date:**	February 19, 2019

COMPANY INFORMATION

Company:	Montrose Environmental Group		
Phone:	949-988-3500	**Web Site:**	http://montrose-env.com/
Address:	1 Park Plaza, Suite 1000	**City:**	Irvine
State:	California	**Zip Code:**	92614

TECHNICAL CONTACT

Name:	Bernard (Bernie) Sheff
Phone:	(517) 719-2212
Email:	bsheff@es-online.com
Address:	1 Park Plaza, Suite 1000
City:	Irvine
State:	California
Zip Code:	92614

DEMONSTRATION SITE CONTACT

Site Name:	Provided upon request
Contact:	
Title:	
Phone:	
Email:	
Address:	
City:	
State:	
Zip Code:	

INITIAL TECHNOLOGY OVERVIEW

This information is to guide in the development of a more specific and detailed Technology Information Request.
Please answer the following questions for each Technology or Service Provided.

What is the name of the technology or service you provide?

The Montrose Environmental Group team represents over 75 combined years of experience in the design, operation, and optimization of anaerobic digestion systems. This broad base of experience includes high-solids, total mixed, plug and mixed plug flow, up-flow blanket and municipal digestion systems.

Describe how this technology is used in a larger Nutrient Management System. *Please be as detailed as possible.*

Montrose Environmental works with dairies to design and build anaerobic digester systems that treat the full manure stream with or without added organic substrates (e.g., food waste). The manure stream, including parlor and flush water is processed to maximize production of high-quality renewable biogas which can be used to produce electricity, CNG vehicle fuel, or pipeline quality biomethane gas. In addition, the digester provides excess heat for farm use, livestock bedding and recovered crop nutrients from the non-volatile portion of manure or food waste. The digester system reduces odors and greenhouse gas emissions while returning water and natural nutrients for irrigation and crop needs.

How many systems do you have installed on dairy farms or other livestock operations?

SYSTEMS	NUMBER OF SITES	SIZE OF INSTALLATIONS
Dairy	5	1,000 to 11,000 cows
Pork	1	360,000+
Poultry		

What's the smallest and largest farm using your system?

1,000 cows to 11,000 cows

Does this technology have a 12-month record of reliable performance on at least three dairy farms?

Yes

Do you have a preferred region or area for the location of projects?

National

Input and output of your unit/system – do you have a mass balance analysis?
If a mass balance is available, please include below or attach as a separate document.

A mass balance is prepared for each project.

Input material description and characteristics:
For example: raw manure, digestate, screened digestate, suitable non-farm feedstocks, other.

The input to digester systems is the full manure stream including flush water. Food waste and other organics are often added feedstocks to boost biogas outputs.

Does the technology treat the full manure stream for a farm or a fraction of the stream?

The digester system is designed to treat the full manure stream including flush water from the milking parlor.

Do you consider this a mature system or ongoing farm development?

Mature technology with proven results.

Any weather constraints? **Yes** ☐ **No** ☑ *If so, please describe.*

Any bedding constraints? **Yes** ☐ **No** ☑ *If so, please describe.*

Sand bedding may have adverse impacts on anaerobic digestion systems. Sand separation technologies is recommended.

Output material description and characteristics:
Please include the % of the total stream for each material, i.e. 10% fiber and 90% screened liquid by weight.

Typical dairy farm output streams are approximately 4 - 8% total solids and 92% - 96% nutrient liquids for land application or nutrient recovery, depending on the manure management technology used.

Do the Outputs of the process have a resale market identified? **Yes** ☑ **No** ☐
If so, under what brand name or who is the contract with?

Markets are available to sell electricity, renewable natural gas and compressed natural gas and environmental attributes, such as, carbon credits, RINs and RECs. The digestate solids and liquids can be sold as compost or land applied as fertilizer on farm fields.

Is this process scalable and to what extent (top and bottom limits)? **Yes** ☑ **No** ☐ *If so, please describe.*

The system can be designed for any herd size.

Do you have a known scaling factor? **Yes** ☑ **No** ☐ *If so, please describe.*

Montrose Environmental designs systems that are scalable for any size dairy.

Does this technology require any air input? **Yes** ☐ **No** ☑

What is the preferred air connection? *For example: psi, fitting size, air quality.*
If not distributed by the system, please list each connected device.

Does this technology require any water input? **Yes** ☐ **No** ☑ *If so, please describe.*

What is the preferred water connection? *For example: psi, fitting size, water quality, gpm.*
If not distributed by the system, please list each connected device.

Does this technology require any electrical input? **Yes** ☑ **No** ☐ *If so, please describe.*

Standard commercial electricity supply for motors, pumps, mixers, and process control

What is the preferred electrical connection? *For example: phase #, voltage, full load amps.*
If not distributed by the system, please list each connected device.

480 volt three-phase

Does this technology require any mechanical input? **Yes** ☐ **No** ☑ *If so, please describe.*

What is the preferred mechanical connection? *For example: horsepower, connection, rpms.*
If not distributed by the system, please list each connected device.

.

Does this system require any special plumbing? **Yes** ☐ **No** ☑ *If so, please describe what is required.*

Does this system require any special foundations or pads? **Yes** ☑ **No** ☐ *If so, please describe.*

The digester system may require a specialized foundation for unstable ground conditions.

Do you consider this technology part of a larger system that you provide? **Yes** ☑ **No** ☐ *If so, please describe.*

The digester can be designed as a stand-alone system or incorporate solids separation, heat recovery, bedding recovery and nutrient extraction systems.

Does your system require any other components that you do not provide or are not included in your proposal? **Yes** ☐ **No** ☑
If so, please describe.

.

How is the system delivered to the site? *For example: skid mounted, assembled on site, constructed on site.*

Assembled on-site with additional site construction.

Is this system portable or configured in such a way that it could be easily transported for use in several locations?
Yes ☐ **No** ☑ *If so, please describe.*

Has your technology been accepted by the NRCS and is it included into a practice standard? Yes ☑ No ☐
If so, please describe if necessary.

Are there any unusable or hazardous byproducts of this process? Yes ☐ No ☑
If so, please describe the product and recommended means of disposal.

What spare parts and redundant components are included with the system?

Spare parts are commercially available.

How is the system controlled and what are the components and capabilities of the control system?

The system can be automated for 24/7 operation using on-line SCADA and PLC systems sourced locally or in the U.S.

What is the usable life of the system?

With proper O/M the system has a service life of 20+ years

What is the salvage value at the end of the usable life?

Main mechanical components have salvage value

What is the educational and technical level of competence for the operation of the system?

Local qualified labor can be trained to operate the system

What level of maintenance is required for the system?
Please indicate if rebuilds or major components must be replaced and what the frequency is for these components.

Component parts require maintenance and replacement per maintenance schedule. Daily walk through inspections and periodic response to system upsets are required

Are consumables used in the process? Yes ☐ No ☑
Please provide the nature and purchase relationship for these consumables. For example: proprietary, special contract, generally available.

Which of these NRCS codes would your technology be classified under? *Check all that apply. Add if necessary.*

CODE	NRCS DESCRIPTION	CHECK ALL THAT APPLY
472	Access Control	☐
560	Access Road	☐
309	Agrichemical Handling	☐
371	Air Filtration and Scrubbing	☐
591	Amendments for the Treatment of Agricultural Waste	☑
366	Anaerobic Digester	☑
672	Building Envelope Improvement	☐
372	Combustion System Improvement	☑
317	Composting Facility	☐
554	Drainage Water Management	☐
375	Dust Control from Animal Activity on Open Lot Surfaces	☐

373	Dust Control on Unpaved Roads and Surfaces	☐
374	Farmstead Energy Improvement	☑
512	Forage and Biomass Planting	☐
561	Heavy Use Area Protection	☐
516	Livestock Pipeline	☐
590	Nutrient Management	☑
521A	Pond Sealing or Lining, Flexible Membrane	☐
533	Pumping Plant	☐
588	Roof Runoff Structure	☐
367	Roofs and Covers	☑
318	Short-Term Storage of Animal Waste and By-Products	☐
570	Stormwater Runoff Control	☐
606	Subsurface Drain	☐
635	Vegetated Treatment Area	☐
601	Vegetative Barrier	☐
360	Waste Facility Closure	☐
632	Waste Separation Facility	☐
313	Waste Storage Facility	☐
634	Waste Transfer	☐
629	Waste Treatment	☑
359	Waste Treatment Lagoon	☐
		☐
		☐
		☐

Can you provide an estimate of the capital required for the installation of this technology?
Please include all components and designate if provided by you or others.

The capital requirements to install a digester will vary widely depending on digester design, size, and choice of equipment for utilization of the biogas and/or for separating out manure fiber. Typical capital cost of an on-farm anaerobic digester ranges from approximately $3 million to $5 million depending upon the size of the operation and technology used.

Can you provide an estimate of the operational costs required for this technology?
Please include all costs and designate if provided by you or others.

Annualized operations and maintenance cost of a dairy anaerobic digester and genset are estimated to be approximately 3 to 5 percent of the total capital cost of the system on a project by project basis.

Is there financing available for this system? **Yes** ☑ **No** ☐ *If so, what are the conditions for this financing?*

Montrose can help arrange project financing.

Is the system available for lease? **Yes** ☐ **No** ☑ *If so, please describe.*

What sort of warrantee or guarantee do you provide with this technology?
Do you provide any performance guarantees or strictly defects in parts and materials?

Standard warranty on every project and any equipment warranty passes along to the project owner.

Explain how this system is unique or transformative and how does it improve upon or go beyond other technologies that are currently available.

In addition to AD design/build, Montrose Environmental is a leader is Anaerobic Digester Performance Optimization. Montrose professionals evaluate existing operations and identify areas where process changes could be made to increase operational potential. The following services are available to new and existing dairy digester operations:

- Project feasibility and process design
- Engineering review and independent engineering services
- Operations and maintenance services
- Project management, including permitting

Would you be willing to provide a location for a site visit by Newtrient? **Yes** ☑ **No** ☐ *If so, please provide location.*

TECHNOLOGY REFERENCES

Please provide customers with whom we can discuss this technology and its performance.
Include a company name, location, contact name and contact information.

Reference 1

Company Name:	Provided upon request
Company Location:	
Contact Name:	
Contact Information:	

Reference 2

Company Name:	
Company Location:	
Contact Name:	
Contact Information:	

Reference 3

Company Name:	
Company Location:	
Contact Name:	
Contact Information:	

Reference 4

Company Name:	
Company Location:	

Contact Name:	
Contact Information:	

Are there any other facts about this technology that you feel should be included in this document?