



Technology/Service:	Bedding/Fiber Recovery System	Date:	July/7/2017
Information by:	Frank Engel		

COMPANY INFORMATION

Company:	Trident Processes LLC		
Phone:	1-800-799-3740	Web Site:	http://tridentprocesses.com/
Address:	446 Harrison Street #81D	City:	Sumas
State:	Washington, USA	Zip Code:	98295

TECHNICAL CONTACT

Name:	Kerry Doyle
Phone:	(604) 330-2500
Email:	Kerry.Doyle@tridentprocesses.com
Address:	2238 Queen St, Unit 101
City:	Abbotsford
State:	BC Canada
Zip Code:	V2T 0B7

DEMONSTRATION SITE CONTACT

Site Name:	Windy Ridge Dairy
Contact:	Jason Dykstra
Title:	Farm Manager
Phone:	(219) 394-2259
Email:	windyridge@midwaynet.net
Address:	1652 N 1100 W
City:	Fair Oaks
State:	IN
Zip Code:	47943

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?

Bedding/Fiber Recovery System

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

The Trident Bedding Recovery System extracts large organic fiber from manure (raw or anaerobically digested) for reuse as quality bedding material. Additional configurations and integration options are available: in front of an anaerobic digester to enhance digester performance or as a conditioning system for the Trident Nutrient Recovery System.

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

SYSTEMS	NUMBER OF SITES	SIZE OF INSTALLATIONS
Dairy	3	300-14,500
Pork		
Poultry		

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

North America

Location of farm(s)?

North America

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

400 cows – 14,500 cows

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.

Mass balance available

Input material description and characteristics:

For example: raw manure, digestate, screened digestate, suitable non-farm feedstocks, other.

Raw manure or digestate

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

Full stream depending on bedding material

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

Mature system with continuous improvement ongoing.

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

Must be protected from freezing and the elements

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

Sand removal would be designed into the process prior to screening if sand is used as a bedding. Sand removal equipment provided by others.

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.

Approx. 15-20% fiber, 80-85% liquid including small particles and dissolved solids.

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?

If not used on farm the recovered fiber can be marketed off farm, mostly regional markets (to other farms).

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

System is modular and fully scalable, linear based on manure volume.

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

Very linear scalability, typically a single module has capacity for about 1,500 cows.

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.

Oil free dry air, <20 scf per hour, 80 psi

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

For CIP, depending on solid concentration for conditioning

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.

Fresh water (doesn't need to be potable), 10 gpm @30 psi

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

See below

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

3 phase 460 volt not more than 250 amps on large systems, changes with scale.

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

11 hp combined for single-module system; agitator, pumps, conveyor extra

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

For a single-module system: 1 hp for Trident Rotary Screen + 10 hp for Trident Screw Press

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

The stream to be treated must be pumped into the system, the final effluent can gravity drain from the system to a tank or pit for pumping to final storage.

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

Loading requirements for construction of floors and mezzanines available as part of a formal proposal.

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

The Trident Bedding Recovery System is implemented as standalone system. However, the main components are also used for first-stage conditioning and fiber removal in the Trident Nutrient Recovery Process.

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.

Pre-installed equipment including platforms, stair case and conveyor module, assembled on site.

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.

Standard system is designed for non-mobile use. Small mobile unit is available upon request.

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 and redundant components are available. They are not included in the price of the system.

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

The system is automated, with Allen-Bradley components and proprietary program. Remote access and data collection interface are included. Standardized reporting is also included, customization is available, inclusion into other data collection systems to be provided by others. HMI included is on the unit, remote display and control is an available option.

What is the usable life of the system?

Usable life of the equipment is 15 years.

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

Salvage value is stainless scrap value (10,000 lbs for single-module system).

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

The system is designed for operation and maintenance by a high school graduate with moderate mechanical skills, outside assistance for troubleshooting electrical and computer related issues needs to be identified.

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.

The system is designed for 24/7 operation, and has also maintenance provisions in place. Normal maintenance is required depending on operation conditions, i.e. occasional screen cleaning, idler wheel replacement (estimated 1 hr/yr).

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	<input type="checkbox"/>
560	Access Road	<input type="checkbox"/>
309	Agrichemical Handling	<input type="checkbox"/>
371	Air Filtration and Scrubbing	<input type="checkbox"/>
591	Amendments for the Treatment of Agricultural Waste	<input checked="" type="checkbox"/>
366	Anaerobic Digester	<input type="checkbox"/>
672	Building Envelope Improvement	<input type="checkbox"/>
372	Combustion System Improvement	<input type="checkbox"/>
317	Composting Facility	<input type="checkbox"/>
554	Drainage Water Management	<input type="checkbox"/>
375	Dust Control from Animal Activity on Open Lot Surfaces	<input type="checkbox"/>
373	Dust Control on Unpaved Roads and Surfaces	<input type="checkbox"/>
374	Farmstead Energy Improvement	<input type="checkbox"/>
512	Forage and Biomass Planting	<input type="checkbox"/>
561	Heavy Use Area Protection	<input type="checkbox"/>
516	Livestock Pipeline	<input type="checkbox"/>
590	Nutrient Management	<input type="checkbox"/>
521A	Pond Sealing or Lining, Flexible Membrane	<input type="checkbox"/>
533	Pumping Plant	<input type="checkbox"/>
588	Roof Runoff Structure	<input type="checkbox"/>
367	Roofs and Covers	<input type="checkbox"/>
318	Short-Term Storage of Animal Waste and By-Products	<input type="checkbox"/>
570	Stormwater Runoff Control	<input type="checkbox"/>
606	Subsurface Drain	<input type="checkbox"/>
635	Vegetated Treatment Area	<input type="checkbox"/>
601	Vegetative Barrier	<input type="checkbox"/>
360	Waste Facility Closure	<input type="checkbox"/>
632	Waste Separation Facility	<input type="checkbox"/>
313	Waste Storage Facility	<input type="checkbox"/>
634	Waste Transfer	<input type="checkbox"/>
629	Waste Treatment	<input type="checkbox"/>

359	Waste Treatment Lagoon	
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>

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.

Approx. \$800,000 including equipment and automation for 3,000 cows

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.

Approx. \$34,000 in electrical costs for entire system including pumps, agitator, conveyor etc. for 3,000 cows (based on \$0.10/kwh)

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

Financing may be provided for some projects depending on the contractual commitments and specific project requirements.

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

Leasing is available through Trident and third party lender.

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?

Performance guarantees as well as material and workmanship.

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

The Trident Bedding/Fiber Recovery System stands out in different aspects. It's designed for fully automated operation requiring very minimal operator attendance. The automation makes flexible adjustments to the system's key operating parameters allowing optimal performance and consistently high output, even under changing conditions. The system components are designed with durability and functionality in mind. Stainless steel construction ensures long life and purpose designed maintenance provisions help save time.

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

Windy Ridge Dairy, 1652 N 1100 W, Fair Oaks, IN

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:	Windy Ridge Dairy
Company Location:	Fair Oaks, IN
Contact Name:	Jason Dykstra
Contact Information:	(219) 394-2259

Reference 2

Company Name:	Gienger Farms
Company Location:	Tillamok, OR
Contact Name:	Jesse Gienger
Contact Information:	(503) 842-7994

Reference 3

Company Name:	Seabreeze Farms
Company Location:	Delta, BC
Contact Name:	Kevin Keulen
Contact Information:	Contact can be arranged via Trident (604) 330-2500

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?

Media links:

<https://youtu.be/pXSDGGxgjFE>

https://youtu.be/7YERsmWlt_0 (Maintenance procedure. Please do not share this video publicly, this is for internal demonstration only.)

https://www.dropbox.com/s/stxh09dl156sqo4/IMG_8463.JPG?dl=0

https://www.dropbox.com/s/hvn0ravlawovdb8/IMG_8457.JPG?dl=0

https://www.dropbox.com/s/8zm1y2a84ind250/IMG_8551.JPG?dl=0

https://www.dropbox.com/s/amuwvnrg6cyg3r3/IMG_8382-2.JPG?dl=0

As discussed over the phone, we do work with a calculator tool walk customers through some financial projections (Capex, Opex). I'm happy to arrange a screen share to walk you through.

