



Solution Name:	First Wave
Information by: (14.a)	Livestock Water Recycling
Date:	Aug 2025

COMPANY INFORMATION

Company:	Livestock Water Recycling		
Phone:	Toll Free 1 855-LWR-4972	Web Site:	https://www.livestockwaterrecycling.com/
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State:	Alberta, Canada	Zip Code:	T2C 4S9

TECHNICAL CONTACT (14.a)

DEMONSTRATION SITE CONTACT (15.a)

Name:	Karleigh Lewis	Site Name:	Western Valley Farms
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		Zip Code:	98944

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?

First Wave

Please provide a brief (1-2 sentence) description and a full description of this technology.

Attach pages or separate document if necessary.

Summary: (1.a) Livestock Water Recycling (LWR) offers a patented, sensor-driven manure treatment platform that transforms livestock waste into clean water, renewable energy, and high-value fertilizer products. This modular system helps farms reduce their carbon footprint, improve herd health, and produce low-carbon milk and protein.

Full description: (1.b)

The LWR First Wave™ system is a data-driven, patented nutrient recovery and water recycling platform designed to help food producers and wastewater generators achieve environmental and economic sustainability. As the first commercialized product from Livestock Water Recycling (LWR), First Wave is a fully automated, plug-and-play solution that transforms liquid waste—such as manure, digestate, or food processing effluent—into three valuable outputs: clean, reusable water; concentrated plant-available nutrients; and stackable solid fertilizer.

Equipped with real-time sensors and remote monitoring capabilities, First Wave enables operators to make precision decisions about nutrient management, water reuse, and operational efficiency. The system separates waste streams into nutrient-rich liquid and solid fractions, significantly reducing storage and hauling costs while creating opportunities for circular resource reuse. The clean water produced can be reused on-farm for irrigation, flushing, or washing, helping farms reduce their freshwater intake and become more water-resilient.

First Wave is engineered for durability and high performance, capable of handling variable influent conditions while delivering consistent, measurable results. Its modular design allows for scalable deployment across livestock farms, anaerobic digestion facilities, and industrial wastewater sites. When integrated with biogas systems, the First Wave system enhances renewable natural gas (RNG) production potential by diverting solids with high volatile content into digesters and generating carbon credits through methane emission avoidance.

LWR's modular, skid-mounted systems are proudly manufactured in North America at our head office facility, where the engineers on our team who designed the systems are there to QC them before they go to the farms! For more than a decade, LWR has been delivering proven nutrient recovery and water reuse solutions to livestock producers worldwide. Many of our systems have been operating successfully for over 10 years, consistently providing reliable performance, low maintenance requirements, and measurable environmental benefits. This long-term operational history demonstrates not only the durability of our equipment, but also our unmatched expertise in designing, commissioning, and supporting manure treatment systems that stand the test of time.

All First Wave systems are equipped with LWR's analytics platform, ManuRewards, which digitizes manure or digestate data to support on-farm decision making. A three-month analytics subscription is included with every installation through the myPLANT mobile app, giving operators immediate access to system insights, performance metrics, and digital recordkeeping for compliance and reporting.

Validated by third-party lifecycle analyses and verified by Verra under its VCS program, First Wave is a proven tool for achieving carbon footprint reductions and participating in voluntary and inset carbon credit markets. By capturing, concentrating, and repurposing nutrients and water from waste, First Wave enables producers to increase profitability while advancing climate-smart agriculture and resource stewardship goals.

Please explain how this technology will improve water quality and/or air quality by one or more of the following: (2.a)

- i. Reducing the nutrient content, organic strength, and/or pathogen levels of manure and agricultural waste.
- ii. Reducing odors and gaseous emissions
- iii. Facilitating desirable waste handling and storage
- iv. Producing value added byproducts that facilitate manure and waste utilization.

The LWR First Wave™ system significantly improves water and air quality through a comprehensive, technology-driven approach to waste treatment that addresses both environmental and operational challenges on farms and at food production sites:

i. Reducing the nutrient content, organic strength, and/or pathogen levels of manure and agricultural waste

First Wave separates manure, digestate, or other waste streams into clean water, concentrated liquid nutrients, and stackable solids. This advanced separation process removes a significant portion of total suspended solids (TSS), nitrogen, phosphorus, and biological oxygen demand (BOD) from the wastewater. This reduction in nutrient loading and organic strength helps prevent nutrient runoff into surface and groundwater bodies, which is a major cause of eutrophication, algal blooms, and water quality degradation. Additionally, by isolating pathogens with solids and reducing overall microbial activity, the system reduces the risk of pathogen leaching and contamination of nearby water sources.

ii. Reducing odors and gaseous emissions

By removing volatile solids and reducing anaerobic decomposition in manure storage, the system lowers the production of odorous compounds such as hydrogen sulfide and ammonia. This not only improves air quality for farm workers and surrounding communities but also contributes to a reduction in greenhouse gas emissions, including methane (CH₄) and nitrous oxide (N₂O). These benefits are further enhanced when the system is used in conjunction with anaerobic digesters, where solid fractions can be routed for controlled biogas production rather than decomposing uncontrolled in storage lagoons or fields.

iii. Facilitating desirable waste handling and storage

The First Wave system separates manure or waste streams into two concentrated outputs: a nutrient-rich liquid filtrate and nutrient-dense solids. By removing excess water and isolating nutrients into these manageable fractions, the system significantly reduces the total volume of material requiring storage or land application. The solid fraction is stackable and easier to store or transport, while the liquid fraction can be applied through precision methods such as fertigation, allowing for better control over timing and placement of nutrients. This targeted approach improves nutrient management planning, reduces the risk of runoff, and lowers handling and hauling costs.

iv. Producing value-added byproducts that facilitate manure and waste utilization

The First Wave system transforms raw manure or waste into two value-added byproducts: nutrient-rich liquid filtrate and nutrient-dense solids. These concentrated outputs offer flexible, agronomically beneficial options for nutrient utilization. The liquid filtrate contains readily available nitrogen and potassium, making it ideal for precision fertigation in crop production, while the solid fraction is rich in phosphorus and organic matter, suitable for land application, composting, or further processing (e.g., into biochar). By converting waste into targeted, crop-available nutrient products, the system reduces dependence on synthetic fertilizers, improves soil health, and creates new economic opportunities for farms through more efficient nutrient recycling.

In summary, the LWR First Wave system improves water and air quality by reducing nutrient pollution, limiting emissions and odors, streamlining manure handling, and creating value-added products that support sustainable agriculture and environmental stewardship.

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

No, the equipment is to be housed inside an insulated building regardless of location, making it suitable anywhere in the world.

Location of farm(s)?

We have installations in Canada, US, UK and Lebanon.

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

600-7200 cows

Input and output of this unit/system – do you have a mass balance analysis? (3.a)

If a mass balance is available, please include below or attach as a separate document.

See attached mass balance, Appendix A, for 1000 cows and 100,000gallons/day manure treatment.

Input material description and characteristics: (4.a)

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

Raw manure or digestate below 6% Total Solids, prescreened to remove fiber.

Please provide the expected performance of this technology related to the following: (5.a)

- i. Changes in form or handling characteristics**
- ii. Nutrient fate or end use projections**
- iii. Macro-nutrient reductions or transformations**
- iv. Pathogen reductions or elimination**
- v. Air emissions (including gaseous ammonia, hydrogen sulfide, and volatile organic compounds)**

Here is a detailed overview of the expected performance of the LWR First Wave™ system based on each of the specified criteria:

i. Changes in form or handling characteristics

The LWR First Wave system transforms raw liquid waste into two distinct and manageable outputs: a nutrient-rich liquid filtrate and nutrient-dense stackable solids. By removing excess water, the system significantly reduces the total volume of material requiring handling, storage, and land application—often by up to 50% or more. The solids are dewatered and stackable, allowing for easier transport and longer-term storage, while the liquid is clear, low in suspended solids, and suitable for precision application technologies like fertigation. This change in form dramatically improves the logistics of manure management, enabling greater flexibility and more strategic nutrient use.

ii. Nutrient fate or end use projections

Nutrients are separated into distinct streams based on their chemical form and mobility:

- The nutrient-rich liquid filtrate contains the majority of soluble nitrogen (primarily as ammonium) and potassium, making it ideal for targeted in-season crop application through fertigation or irrigation systems.
- The nutrient-dense solids retain the bulk of the phosphorus, along with organic-bound nitrogen and carbon, making them well-suited for soil amendment, composting, or biochar production.

This separation allows producers to match nutrient forms to crop needs and timing, improving nutrient uptake efficiency and reducing losses to air or water.

iii. Macro-nutrient reductions or transformations

The system does not chemically transform nutrients but physically separates them into more manageable and crop-available forms.

- **Phosphorus reduction of up to 95%** from the liquid stream via flocculation and solid-liquid separation
- **Nitrogen redistribution**, with a significant portion of ammonium remaining in the liquid stream for crop-available fertilizer use
- **Volatile solids reduction**, which lowers the organic loading and reduces downstream nitrogen volatilization potential

These reductions are achieved by concentrating nutrients into the liquid and solid fertilizer outputs, minimizing nutrient discharge to the environment.

iv. Pathogen reductions or elimination

While First Wave is not a dedicated disinfection system, it contributes to pathogen reduction by separating pathogens that are typically bound to solids. The removal of over 99% of TSS also removes a significant portion of the pathogen load, as many pathogens like E. coli and Salmonella are associated with particulate matter. Additionally, solids can undergo further treatment (e.g., composting or biochar conversion) to achieve higher pathogen elimination levels before land application.

v. Air emissions (including gaseous ammonia, hydrogen sulfide, and volatile organic compounds)

The system reduces air emissions through immediate separation of solids and liquids after manure collection, limiting anaerobic breakdown that produces gaseous emissions. By rapidly removing volatile solids and ammonia from the storage environment, the system helps reduce:

- **Ammonia (NH₃)** emissions by decreasing the opportunity for volatilization
- **Hydrogen sulfide (H₂S)** through reduced anaerobic decomposition of sulfur compounds
- **Volatile organic compounds (VOCs)** associated with manure odor and degradation

Field experience has shown that treated manure products produce **significantly less odor** during storage and application, leading to improved air quality and neighbor relations.

Overall, these actions contribute to a noticeable reduction in odors and gaseous emissions, improving air quality for workers and surrounding communities while supporting carbon credit generation via methane avoidance pathways.

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

Yes, mature system.

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

Equipment is to be housed inside an insulated building.

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

Fiber and sand separation ahead of the PLANT system required.

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.

8% Stackable solids

92% Nutrient liquid

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?

Most farms sell part if not all their solids and liquid concentrate off farm to surrounding crop farms or nursery's. A farm in Wisconsin sells theirs under the brand name Bucky Organics.

Please provide any alternative uses for the byproducts produced by this technology. (11.a)

Concentrated solids from the LWR system can be used to boost volatile solids in an anaerobic digester or as feedstock for a biochar facility. Manure treated through the LWR process may qualify for carbon credit generation, creating opportunities in both voluntary and inset markets. The separated liquid stream can be land-applied through pivot or drip irrigation systems.

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

Equipment is skid mounted making it easy to scale if a farm expands and requires more manure treatment.

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.*

N/A

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

Water is needed for the polymer make down process.

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.*

Water supply shall be capable of providing 75 (Min) – 80 (Max) usgpm @ 60 (Min) – 87 (Max) PSIG. Connection size is 2".

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

System is run on electrical power.

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

3Phase power and 480V. Amps depend on system size – reach out to LWR for each systems details.

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.*

N/A

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.*

Building to house equipment requires cement pad with floor drains to place equipment on to.

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

The First Wave is the first step in the full PLANT system.

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

Building to house the equipment in.

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

Skid mounted.

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.*

The system is designed for permanent installation but since it is skid mounted could be transported.

**Does this technology negatively impact another critical area or have other regulated characteristics (i.e. emissions, sound, odor)?
If so, what are these impacts and what mitigation measures have been if required by state or local agencies?**

If so, please describe the recommended means of mitigating these impacts.

None.

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

LWR will provide an optional spare part list of the major component of the system for client to consider. The following items have spares that come with the system: electrical fuses, relays and spray bar nozzles. LWR offers an online platform for polymer, spare parts ordering and technician service visit bookings.

What equipment, time and resources are required for monitoring this technology and what equipment is included for monitoring this technology? (6.a)

The equipment is run by a PLC and is connected to the internet. There are various meters and sensors throughout the system that allow for remote access monitoring as well as daily data collection.

What equipment, time and resources are required to control this technology and what equipment is included for controlling this technology? (6.b)

The equipment is run by a PLC and is connected to the internet. There are various meters and sensors throughout the system that allow for remote access monitoring as well as daily data collection.

What is the usable life of the system?

20+ years is the lifespan of LWR's equipment.

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

\$20,000 stainless steel value.

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

Operators are farm staff who are trained by LWR's technicians during start up and commissioning of the equipment. No formal training or certificates are required to operate the system.

What level of maintenance is required for the system? (7.a)

Please indicate if rebuilds or major components must be replaced and what the frequency is for these components.

A maintenance schedule is provided in Appendix B. LWR also offers service packages that include but are not limited to over the phone service calls, remote access trouble shooting assistance and onsite technician optimization visits.

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.

Yes, a proprietary flocculant is used in the process, this is purchased directly from LWR. LWR works with the largest chemical manufacturer in the world and provides competitively priced products to their customers.

Which of these NRCS codes would this 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 checked="" 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 checked="" type="checkbox"/>

313	Waste Storage Facility	<input type="checkbox"/>
634	Waste Transfer	<input type="checkbox"/>
629	Waste Treatment	<input checked="" type="checkbox"/>
359	Waste Treatment Lagoon	<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>

Please provide an estimated installed capital cost for this technology and indicate the model, cow number or volume that this cost applies to. (8.a)

Please include all components and designate if provided by you or others.

LWR First Wave System	Herd Size	Approx. Monthly Payments
Sprout	100-200	\$3,567
First Wave ¹⁰	300-750	\$4,766
First Wave ⁴⁰	500-1,200	\$7,623
First Wave ⁸⁵	1,000-3,500	\$9,778
First Wave ¹⁸⁵	2,800 – 6,500	\$14,916

Monthly pricing based on 10-year lease with 8% interest.

All units include groControl and FAN Separators for dewatering of solids. Plant85 and 185 systems include polyFAST as well. Sprout, Plant10 and Plant40 includes manual polymer make down with the clients choice to add polyFAST for an additional cost

Please provide an estimated annual operation cost for this technology and indicate the model, cow number or volume that this cost applies to. (8.b)

Please include all costs and designate if provided by you or others.

~\$0.003/gallon for flocculant for the PLANT system. This is based on the influent Total Suspended Solids value of <3%.

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

LWR provides financing for the equipment, this is a 10-year lease to own at 8% interest.

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

See above.

What sort of warrantee or guarantee do you provide with this technology? (9.a)

Do you provide any performance guarantees or strictly defects in parts and materials?

LWR provides performance guarantees on the performance of the equipment based on influent parameters and treatability testing.

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

The LWR First Wave™ system is transformative because it is the only commercially available, fully automated, and sensor-driven platform that provides real-time nutrient recovery from manure and other high-strength waste streams. Unlike conventional technologies that focus solely on solids separation or lagoon treatment, First Wave delivers a complete and closed-loop solution that turns waste into value by recovering nutrient-rich liquid filtrate and nutrient-dense solids—all in one integrated process. Backed by more than a decade of proven field performance, with systems that have been operating successfully for over 10 years, First Wave combines innovation with a track record of reliability, low maintenance, and measurable environmental results.

What sets First Wave apart is its data-driven design, which uses advanced sensors, remote monitoring, and integrated digital tools to provide real-time visibility and control over nutrient flows and system performance. Through the myPLANT app and ManuRewards analytics platform, treatment data is digitized in real time, enabling precision decisions that improve environmental outcomes, enhance operational efficiency, and simplify regulatory compliance reporting. This level of automation, traceability, and nutrient specificity—paired with access to emerging nutrient and carbon credit markets—is unmatched in the manure treatment space and backed by more than a decade of continuous, real-world operation in demanding agricultural environments, supported by LWR’s proven expertise in designing, commissioning, and maintaining systems that deliver measurable climate impact.

Additionally, First Wave is modular and scalable, making it adaptable for farms of various sizes and waste types, including direct integration with anaerobic digesters or industrial food processors. It also supports participation in carbon credit markets, a growing area not addressed by traditional waste treatment technologies. With third-party validation by Verra, the system enables farms to generate verified carbon credits through methane emission avoidance, creating an entirely new revenue stream.

In summary, First Wave improves upon existing technologies by combining precision separation and nutrient recovery reuse in a single, intelligent system—turning a regulatory and logistical challenge into a profitable, climate-smart solution, all supported by more than 10 years of proven operational success in the field.

Please provide the recommended record keeping procedures for end users of this technology. (10.a)

With an internet connection the system logs data every 5 min and stores this data. The sites and LWR have access to this historical data which includes run time, flow rates, inlet and outlet data such as TSS measurements.

NRCS considers it the responsibility of the technology provider to furnish information from a university or other independent research entity to document the effectiveness of the technology to achieve its intended purpose in order to be funded through its programs. This information must provide independent, verifiable data demonstrating results of the use of the facility, technology or process in other similar situations and locations and, if available, document the effectiveness of the technology under different climatic factors. Documentation from peer reviewed journals is preferable. Where use of a waste treatment facility or process to improve one resource concern negatively impacts another, impacts and mitigation measures, if required by state or local agencies, are to be documented.

Can you provide independent, verifiable data demonstrating results for the use of this technology in other similar situations and locations? Would you be willing to provide this data in order to qualify for NRCS funding? (12.a)

Yes, the First Wave system is verified and validated under the Verified Carbon Standard (VCS) Program with VERRA Registry.
<https://registry.verra.org/app/projectDetail/VCS/2535>

If information is provided related to the previous question, please provide the credentials of the individual collecting the data and analyzing the results along with disclosure of potential conflicts of interest. (13.a)

VCS Project Type - Livestock, enteric fermentation, and manure management
VCS Methodology - AMS-III.Y,VMR0003
VCS Project Validator - First Environment, Inc. (First Environment)

Newtrient has developed a third-party evaluation protocol that can be used in conjunction with a local university or state extension agency to evaluate technologies in a way that will meet the NRCS requirements. Please contact mstoerm@newtrient.com if you are interested in contracting for this service.

TECHNOLOGY REFERENCES

Please provide customers with whom we can discuss this technology and its performance. (15.a)

Include a company name, location, contact name and contact information.

Reference 1

Company Name:	Skyridge Farms
Company Location:	Washington
Contact Name:	Dan DeGroot
Contact Information:	dan@skyridgefarms.com

Reference 2

Company Name:	Western Valley Farms
Company Location:	Washington
Contact Name:	Steve Boon
Contact Information:	wvfsteve@gmail.com

Reference 3

Company Name:	Scenic View Dairy
Company Location:	Michigan
Contact Name:	Mike Geerlings
Contact Information:	mikeg@scenicviewdairy.com

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?

An important fact to highlight is that LWR’s technology is one of the few manure treatment systems that has achieved third-party verification and validation through VERRA, a leading global carbon standard. This recognition confirms that the LWR process can generate quantifiable and verifiable carbon credits by reducing methane emissions through the avoidance of anaerobic lagoon storage. This milestone enables livestock operations using LWR to participate in both voluntary and inset carbon markets, creating new revenue streams while supporting corporate sustainability goals. Additionally, the LWR system’s patented and sensor-driven design provides unmatched data transparency, allowing producers to track environmental performance in real time and demonstrate measurable climate impact.

The questions above have been adapted to attempt to glean as much information as possible in order to help Newtrient develop technology documentation that will meet the standards of what is required in a review package for technology to be approved under NRCS Practice Standard 629 (CPS 629 - Waste Treatment) **Note the definition of Waste Treatment is “The use of unique or innovative mechanical, chemical or biological technologies that change the characteristics of manure and agricultural waste”.**

NRCS documentation specifies that the review package shall contain the following 15 items (in black) and from these Newtrient has developed the questions in this document (in red):

1. A description of the technology. If lengthy, this may be placed in an appendix.
 - a. Please provide a brief (1-2 sentence) description of this technology.
 - b. Please provide a full description of this technology. (Attach pages if necessary)
2. An explanation of how this technology will accomplish one or more of the purposes of the standard.
 - a. Please explain how this technology will improve water quality and/or air quality by one or more of the following:
 - i. Reducing the nutrient content, organic strength, and/or pathogen levels of manure and agricultural waste.
 - ii. Reducing odors and gaseous emissions
 - iii. Facilitating desirable waste handling and storage
 - iv. Producing value added byproducts that facilitate manure and waste utilization.
3. The range of volumetric and mass flow rate capacities and hydraulic retention times of the waste streams including the influent, effluent, and recycle streams.
 - a. Please provide a detailed mass balance that demonstrates the range of volumetric and mass flow rate capacities and hydraulic retention times of the waste streams including the influent, effluent, and recycle streams for this technology by model number or as related to a specific flow or number of animals (i.e. 1,000 cows per day or 100,000 gallons per day).
4. The characteristics of the influent waste stream important to the waste treatment or process.
 - a. Are there any characteristics of the influent waste stream important to the proper operation of this technology?
5. Expected system performance related to changes in form, nutrient fate projections, macro-nutrient reductions, pathogen reductions and air emissions including gaseous ammonia, hydrogen sulfide, and volatile organic compounds.
 - a. Please provide the expected performance of this technology related to the following:
 - i. Changes in form or handling characteristics
 - ii. Nutrient fate or end use projections
 - iii. Macro-nutrient reductions or transformations
 - iv. Pathogen reductions or elimination
 - v. Air emissions (including gaseous ammonia, hydrogen sulfide, and volatile organic compounds)
6. Process monitoring and control system requirements.
 - a. What equipment, time and resources are required for monitoring this technology and what equipment is included for monitoring this technology?
 - b. What equipment, time and resources are required to control this technology and what equipment is included for controlling this technology?
7. A typical operation and maintenance plan that includes performance monitoring requirements and a replacement schedule for components that do not have a minimum life span of ten or more years.
 - a. Please provide a typical operation and maintenance plan that includes performance monitoring requirements and a replacement schedule for components that do not have a minimum life span of ten or more years.
8. Estimated installation and annual operation cost.
 - a. Please provide an estimated installed capital cost for this technology and indicate the model, cow number or volume that this cost applies to.
 - b. Please provide an estimated annual operation cost for this technology and indicate the model, cow number or volume that this cost applies to.
9. An example of a warranty on all construction or applied processes not covered by other NRCS Conservation Practice Standards.

- a. Please provide an example of a warranty on all construction or applied processes included with this technology.
- 10. Recommended record keeping procedures for end users.
 - a. Please provide the recommended record keeping procedures for end users of this technology.
- 11. Alternatives for the use of the byproducts produced by the system.
 - a. Please provide the alternative uses for the byproducts produced by this technology.

It is the responsibility of the technology provider to furnish information from a university or other independent research entity to document the effectiveness of the technology to achieve its intended purpose. Provide independent, verifiable data demonstrating results of the use of the facility or process in other similar situations and locations. If available document the effectiveness of the technology under different climatic factors. Documentation from peer reviewed journals is preferable. Where use of a waste treatment facility or process to improve one resource concern negatively impacts another, impacts and mitigation measures, if required by state or local agencies, are to be documented.

- 12. Independent, verifiable data demonstrating results for the use of the facility or process in other similar situations and locations.
 - a. Can you provide independent, verifiable data demonstrating results for the use of this technology in other similar situations and locations? Would you be willing to provide this data in order to qualify for NRCS funding?
- 13. The credentials of the individual collecting the data and analyzing the results along with disclosure of potential conflicts of interest.
 - a. If information is provided related to the previous question, please provide the credentials of the individual collecting the data and analyzing the results along with disclosure of potential conflicts of interest.
- 14. Contact information for the technology provider.
 - a. Please provide a technical contact and a business contact to answer questions regarding the information provided for this technology.
- 15. Contact information for individuals that have implemented this technology at the farm scale.
 - a. Please provide contact information for individuals that have implemented this technology at the farm scale.