Manure Technologies Expert Panel Stakeholder Forum

December 2014

BION ENVIRONMENTAL TECHNOLOGIES INC.

Bion Philosophy & Project Approach

• Bion is a project developer with a 'utility service provider' type business plan, providing waste and energy services to large scale livestock operations. Bion's core competency is providing comprehensive solutions to land and air impacts from livestock manure.

• Bion's technology approach is to 'separate and aggregate' the manure stream in order to maximize the commercial value of captured by-products while reducing environmental impacts of waste stream components.

• Bion utilizes a series of interconnected unit processes that are integrated into a combination of patented/proprietary along with standard off the shelf components.

• Bion's technology platform is operated using onsite data collection and processing systems enabling constant as well as remote monitoring control in addition to data gathering sufficient to meet the standards of regulatory compliance and credit trading programs.

• Bion's overall system approach is driven by economics and requirements of the particular project; there is no single design or application.

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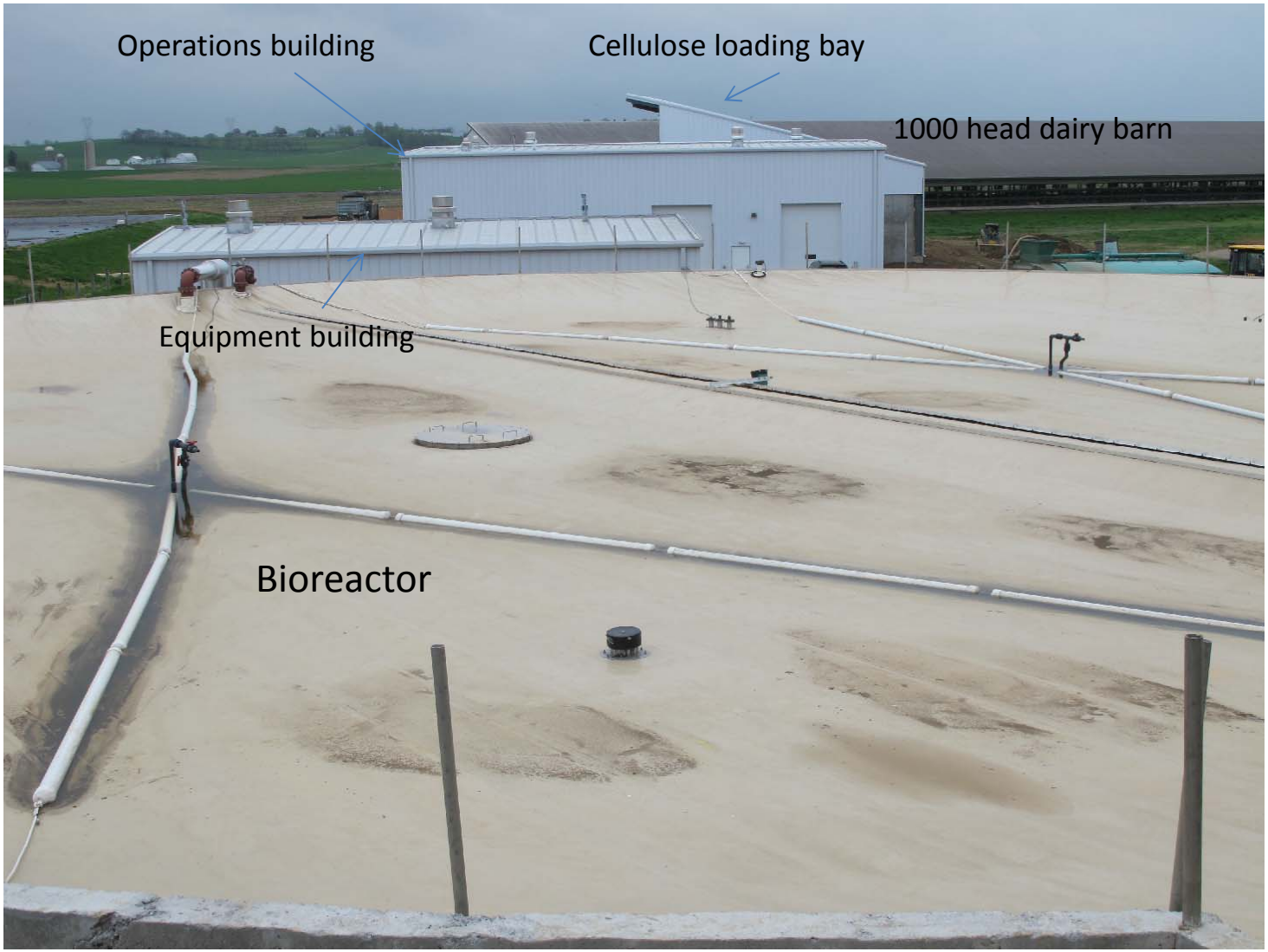
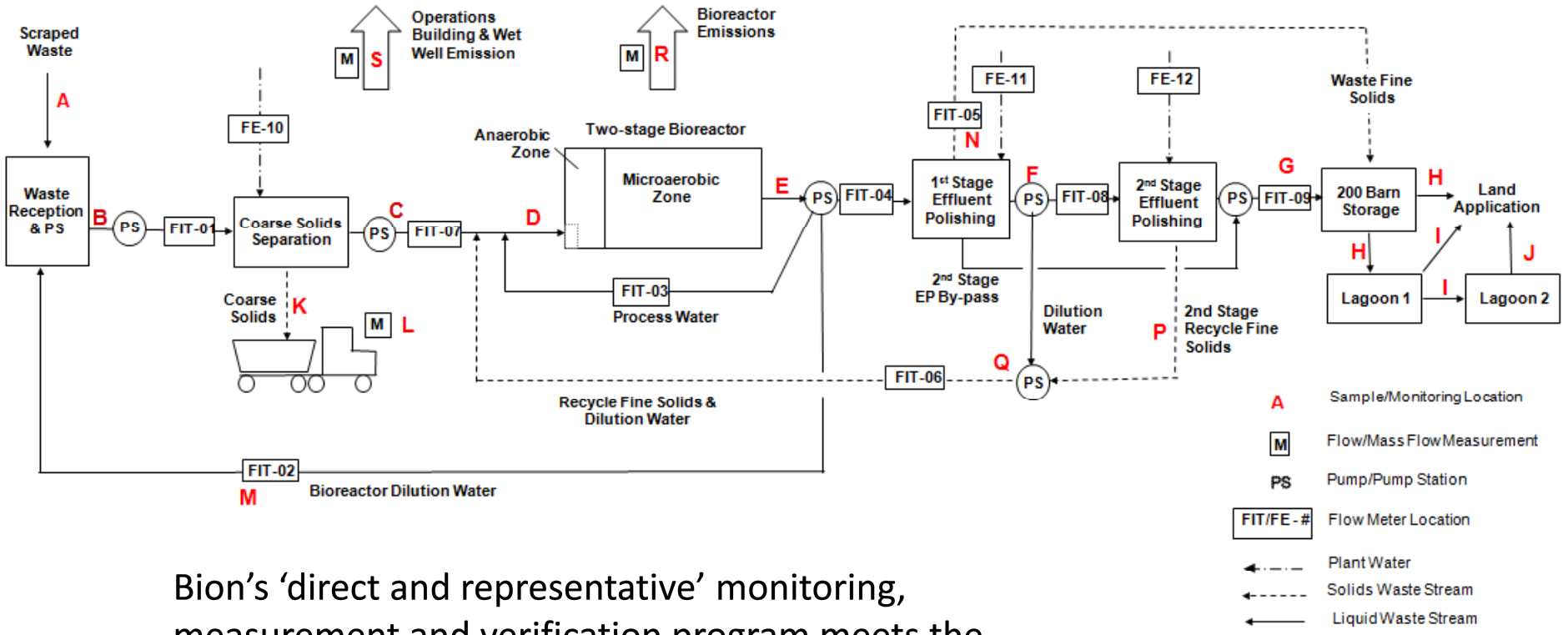
View of Bion Installation at the Kreider Dairy Farm



Process Flow Diagram (existing Kreider installation)



Bion's 'direct and representative' monitoring, measurement and verification program meets the standards set out in the recent EPA Region 3 uncertainty in trading guidance

(http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/TradingTMs/Final_Uncertainty_TM_2-12-14.pdf)

Bion's Proprietary SCADA* System

* SCADA – supervisory control and automated data acquisition system

Environmental Benefits of Existing Bion Kreider System

- Nitrogen credits can be formed in three primary ways:
  - Ammonia conversion to N_2 gas released from the bioreactor
  - Combustion of separated cellulose
  - Enhanced nutrient uptake as per Kreider Farm NMP. Eliminate raw manure application, reduced need for commercial N, maximize organic N.
- Frequent manure collection, reduce ammonia
- Phosphorus credits available
- Ancillary benefits – pathogen and odor reductions, methane/GHG reductions, H_2S, VOC & NO_x emission reductions. Also PA DEP safety thresholds added (banking, etc).

Bion System TKN & Phosphorus Capture Efficiencies from 2012

Total Kjeldahl Nitrogen: January through June 2012, Bion's system at the Kreider Dairy Farm averaged a 77.1% nitrogen removal efficiency.

Phosphorus: January through June 2012, Bion's system at the Kreider Dairy Farm averaged a 85.9% phosphorus removal efficiency.

Bion System Unit Process TKN Capture Efficiencies

Evaluation Period Date Range	System TKN Removal Efficiencies								
	System Total TKN Removal Efficiency	Screw Press		Bioreactor		Decanter		Disc	
		Individual Removal Efficiency	System Contribution to Removal Efficiency	Individual Removal Efficiency	System Contribution to Removal Efficiency	Individual Removal Efficiency	System Contribution to Removal Efficiency	Individual Removal Efficiency	System Contribution to Removal Efficiency
1/16/2012 to 06/02/2012	**77.1%**	18.5%	**18.5%**	29.0%	**23.7%**	42.9%	**34.9%**	0.0%	**0.0%**

Bion's Kreider Farms Project

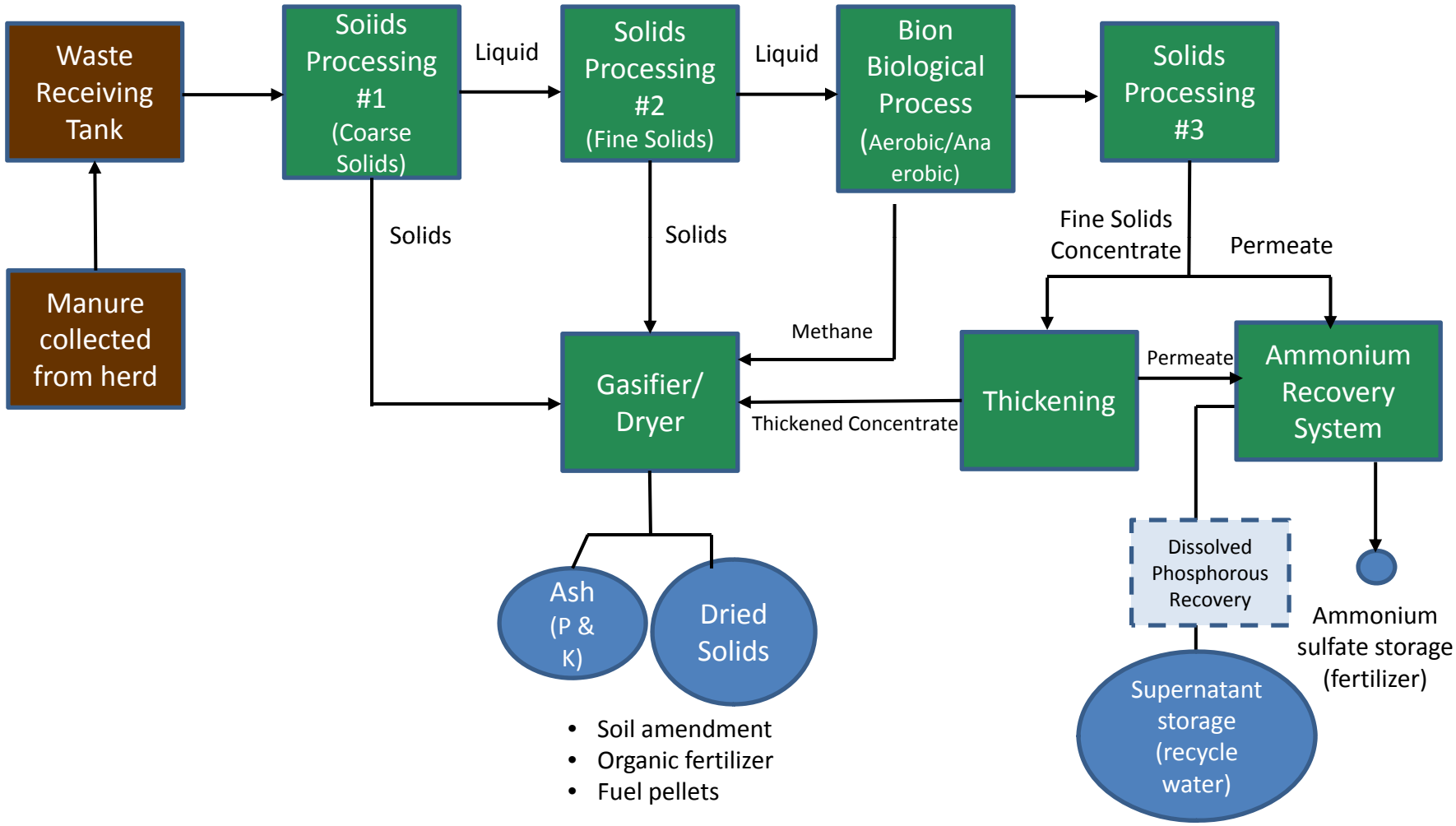
- Has been operating continuously for 2 ½ years
- USDA Rural Development found the technology *"to be functional, verifiable and sufficiently advanced to qualify for USDA programmatic funding"*
- Bion has been piloting enhancements and demonstration projects to improve overall economic and environmental efficiency.

Next Steps:
Bion Technology Enhancement Goals

- Reduce System Capital Cost by 50% or Greater.
- Increase System Efficiency:
  - Enhance N capture and re-use: trialing patent pending process to convert the ammonia to ammonium sulfate which can be used as a pathogen free commercial by-product (Bion currently releases this N as N2 gas).
  - Depending upon livestock species, can also capture N as a commercial products for organic fertilizer markets. Trials show up to 85% N capture & conversion to ammonium sulfate.
  - Water recycle and re-use advancements.
  - Drying and conversion efficiency advancements, enhance energy balance results.
  - Energy generation increases – enables additional incorporation where justified through a (currently tested) high rate AD system with enhanced methane generation and capture capability.

Anticipated Bion Process Flow Diagram

November 4, 2014



On-Going Activities

- Anaerobic digestion (AD) enhancement – lab scale piloting in process. Objective is 50% increase in gas production over standard wet waste manure AD systems.
- AD facility for onsite demonstration project testing at Kreider Farms under construction with projected January start-up.
- Recently filed patent applications on the above.

Bion Project Developer Role – Kreider Egg Layer Project

- Deploy drying, gasification, and pelletizing technologies to process 300 tpd of layer manure at 50% dry matter.
- Generate commercial ammonium sulfate product through ammonia recovery system.
- Generate pelletized 3-2-3 fertilizer product in excess of 90% dry matter.
- Thermal energy required is projected to be provided by manure coarse solids and methane provide by AD.