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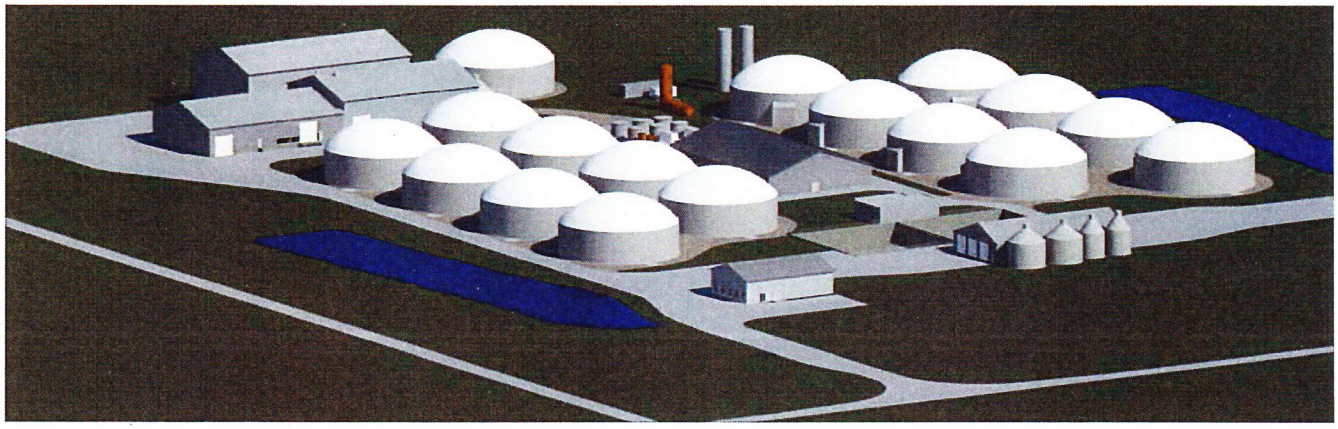
Presentation Made by BC ORGANICS LLC. To Planning Comission Town of Holland 10-23-18

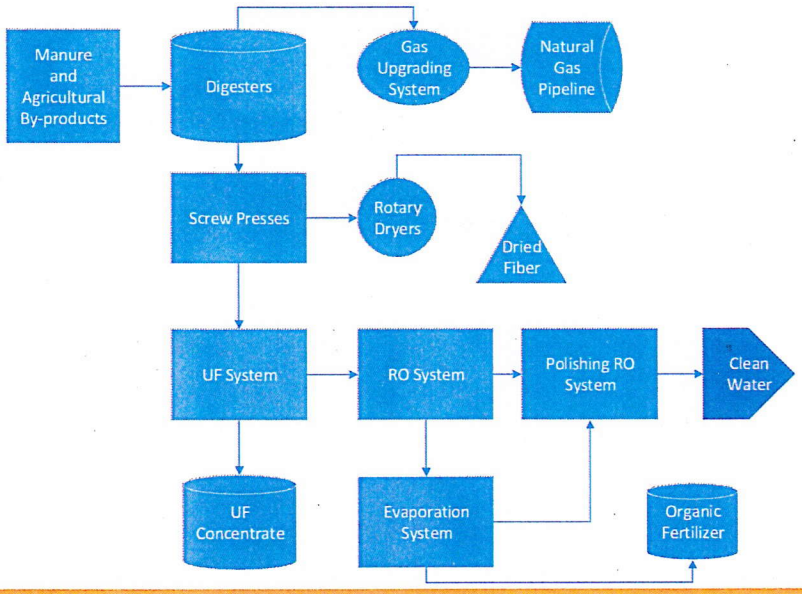


BC ORGANICS PROJECT

Project Goals

- Reduce or eliminate manure volume
  - Manure is 90-95% water
- Reduce manure hauling / trucks on the roads in spring and fall
- Reduce manure odor and pathogens
- Protect surface water from phosphorus runoff
- Protect groundwater from nitrate infiltration
- Improve sustainability of dairy farming

Process Overview

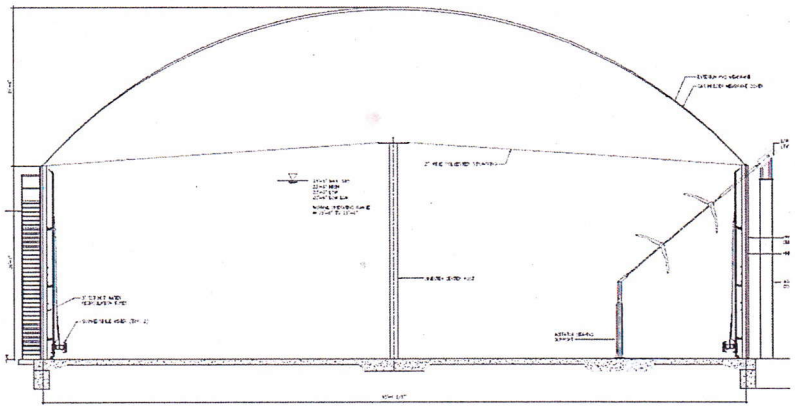


Process Description

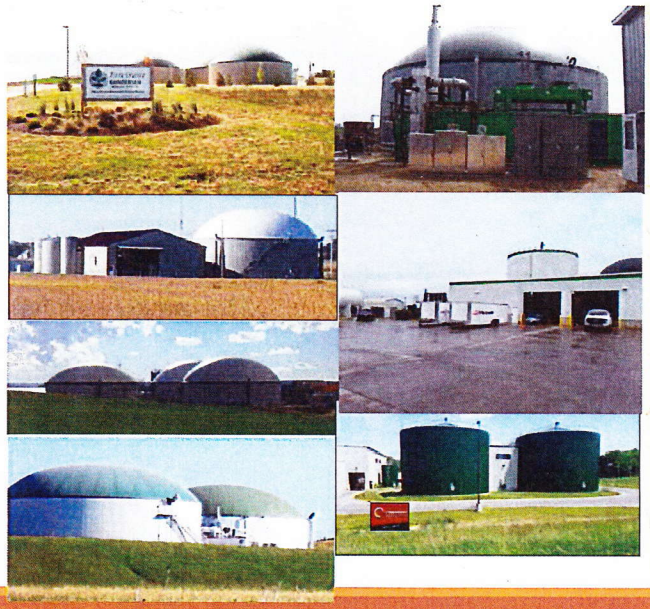
- Manure 93% of total gallons processed
  - 83% pumped
  - 17% trucked
- Agricultural By-products 7% of the total gallons processed
  - Cheese whey, yogurt, milk
  - Fruits and vegetables
  - Ethanol and biodiesel by-products
- Feed stock placed in storage tanks
- Pumped to (16) above ground bolted, stainless steel digester tanks
- Following digestion, liquids will be pumped to screw presses to separate coarse solids
- Solids will be dried from 70% to 50% moisture for use as bedding or transported to a horticultural wholesaler
- Liquids will be processed through reverse osmosis and evaporation systems creating 60-80% clean water
- Process operates 24/7/365

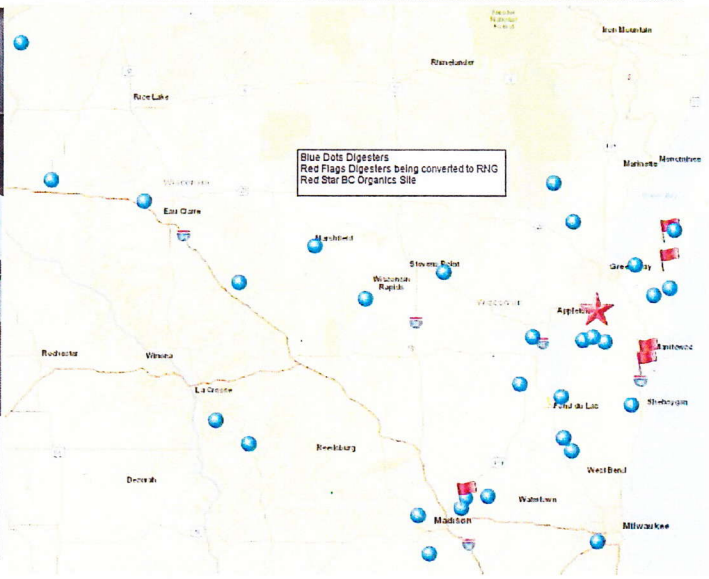
Anaerobic Digestion Process

- Insulated stainless steel tank with dual membrane cover system
- Tank is sealed to create anaerobic environment
- Heated to 95-105˚F
- Mixed
- Stays in digester for 20-25 days
- Creates biogas as bacteria breaks down volatile organics
- Biogas is 55-65% methane
- Reduces odor
- Reduces pathogens



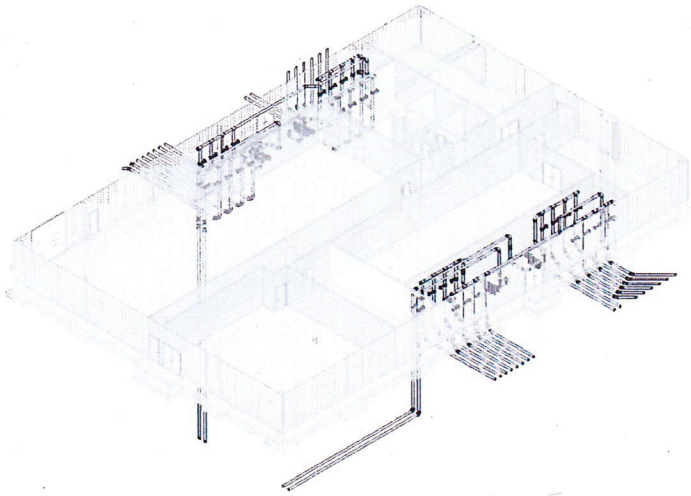
Digestion is a Proven Process





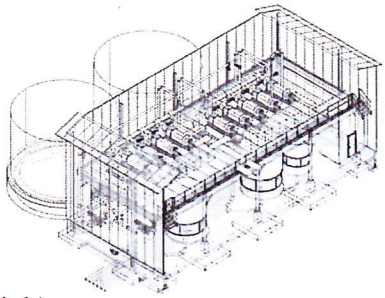
Process Building

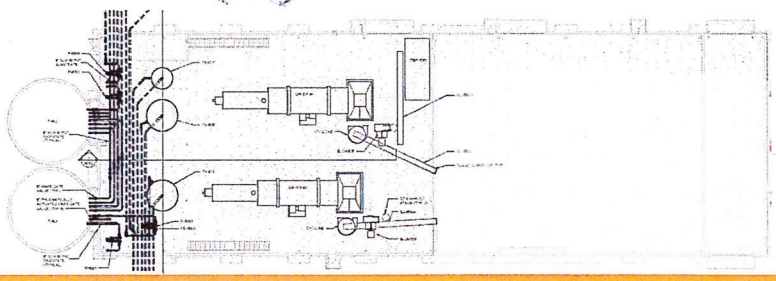
- All material in and out of digesters pass through the process building where flows are metered and recorded
- Hot water boilers and heat distribution system to maintain temperature of digesters
- Primary plant electrical and control room
- Compressed air system to provide air to pneumatic valves throughout plant
- Shop/parts storage area



Fiber Separation and Drying Building

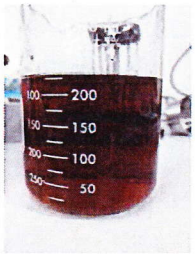
- Separates coarse fiber from liquids
- Fiber is ~5% of volume but contains ~30% of the phosphorus in the manure
- Dryer system to reduce moisture from 70% to 50% for improved bedding product and reduce transportation cost
- Indoor loading of fiber
- Liquids from separation system are further processed by UF/RO system





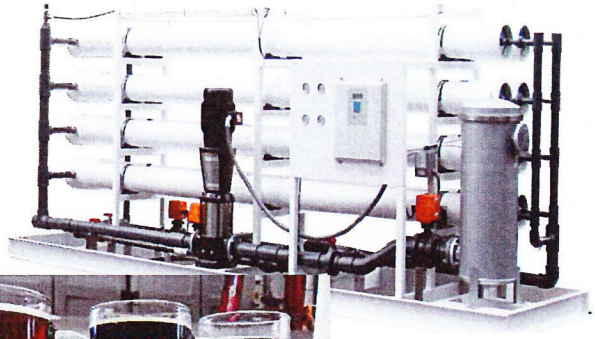
Water Treatment Building

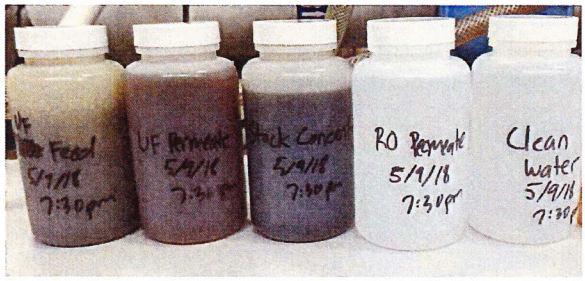
- Ultra-filtration (UF) technology separates suspended solids down to 0.02 micron
  - Removes >95% of total phosphorus
  - Removes >99.9% of suspended solids
  - Removes >99.9% of bacteria and pathogens
  - Removes 30-50% of total nitrogen (mainly the organic nitrogen)
- Liquids from the UF go to the Reverse Osmosis (RO) system



Water Treatment Building

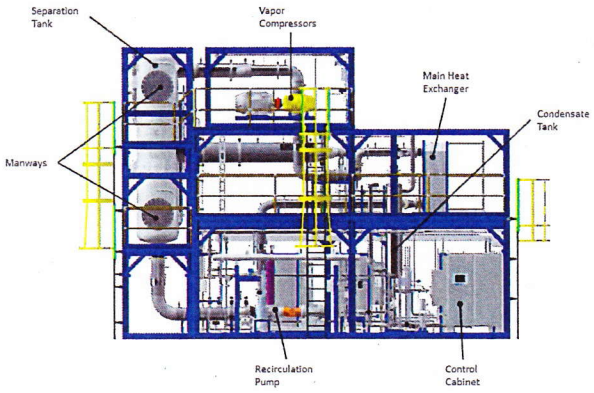
- Reverse Osmosis separates the dissolved solids from the water down to 0.001 micron
- ~70% of the water in manure is removed by the UF/RO system
- Nitrogen and Potassium are in RO Concentrate





Water Treatment Building

- Evaporation Process to Remove additional water from RO Concentrate
  - Removes 80-85% of water from RO Concentrate
- Water from evaporation system is processed through an RO system
- Following the evaporation process, 90-95% of the water is removed from the manure

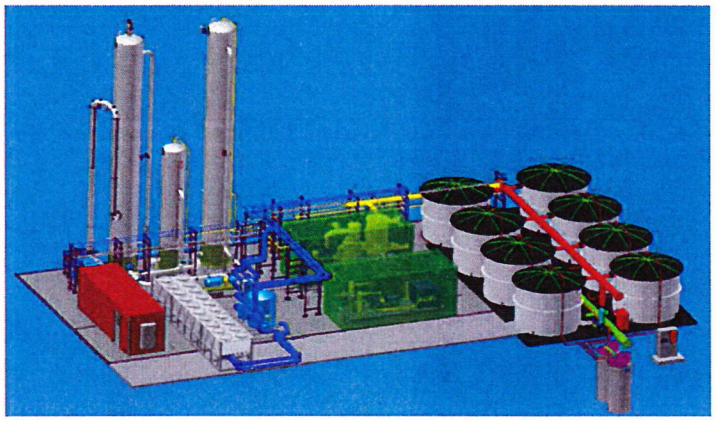


Water Treatment Systems

- Over 20 membrane separation systems installed utilizing manure
- Membrane separation technology began large scale commercialization in the 1950's
- Used today in many applications
  - Water desalinization
  - Medical
  - Water/Wastewater
  - Manufacturing
  - Food Processing
  - Dairy industry
    - Cheese plants
    - Milk plants
    - Yogurt plants

Biogas Upgrading

- Create Renewable Natural Gas (RNG) from biogas
  - Remove carbon dioxide, hydrogen sulfide, and moisture from the biogas
  - Same properties as Natural Gas (~98% methane)
- Growing market as diesel fuel replacement for large fleets
  - UPS, USPS, Coca-Cola, FedEx
  - Kwik Trip, Paper Transport, H.O Wolding
- Plant produces equivalent of 12,000 gallons of diesel fuel per day



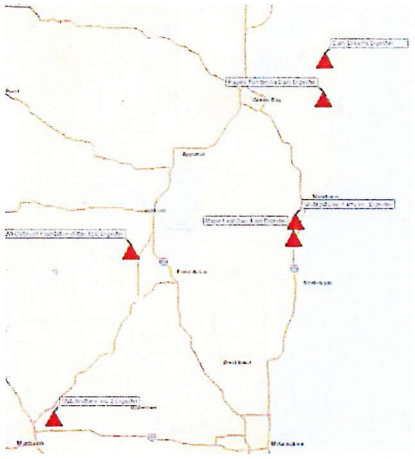
Biogas Upgrading

- Same process utilized to upgrade raw natural gas
  - Raw natural gas typically contains 70-75% methane
  - Industry has existed in the United States for over 150 years
- First farm scale biogas upgrading plants installed over 10 years ago
- RNG from dairy manure has the greatest demand

Biogas Upgrading

- 6 Renewable Natural Gas Project Currently Being Installing in WI

Pagel's Ponderosa Dairy	Dairy Dreams Dairy	Grotegut Dairy
Maple Leaf Dairy	Statz Bros. Dairy	Rosendale Dairy



Environmental Protections

- All truck unloading and loading done indoors
- Plant has extensive instrumentation and control to monitor conditions, take correct action, and alert operators
- Multiple levels of mechanical and automated redundancy integrated into design
- All process buildings have a curb around the perimeter
- Site is designed with secondary containment
- Extensive permitting and review process prior to construction
- Required monitoring, testing, and reporting during operations

Required Permits

- Wisconsin Pollutant Discharge Elimination System (WPDES) Permit
  - Reporting of daily volume of manure and agricultural by-products received by plant
  - Weekly testing of manure and agricultural by-products
  - Pre-approval of all agricultural by-products by DNR prior to use in the digester
  - Reporting of daily volumes sent back to farms or discharged
  - Weekly testing of products sent back to farms
  - Daily monitoring of discharge water quality prior to discharge
  - Weekly testing of discharge water quality by certified lab
  - Water Quality Trading Plan to offset phosphorus and total suspended solids loading to the stream
    - Monthly reporting of trading amounts and comparing results to plan
  - Approval of construction drawings prior to start of construction
  - Requires plant to have a DNR certified wastewater operator
  - Updates to existing CAFO permits for the transfer of manure to/from plant

Required Permits

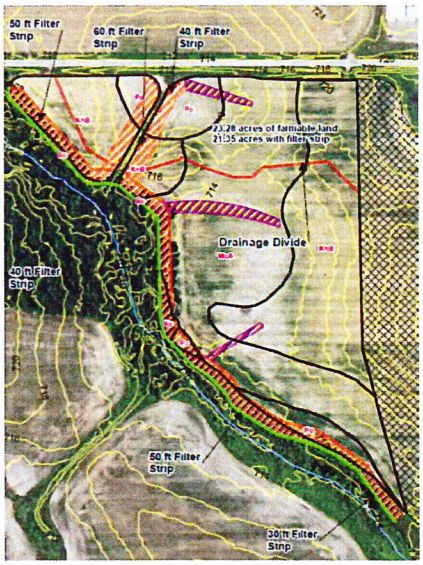
- WDNR Air Permit
  - Modeling of all emissions sources to quantify projected new emissions from plant prior to start of construction
  - Monthly monitoring and reporting of emissions
- WDNR Stormwater Permit
  - Ensures the site is designed to treat stormwater prior to flowing off site
- WDNR Erosion Control Permit
  - Ensures protections in place during construction to prevent soil loss
- WDNR Chapter 30 Permit
  - Ensures protections are in place with minimal disturbance when installing discharge pipe in stream bank
- WDNR Well Permit
  - Ensures the well is installed properly

Required Permits

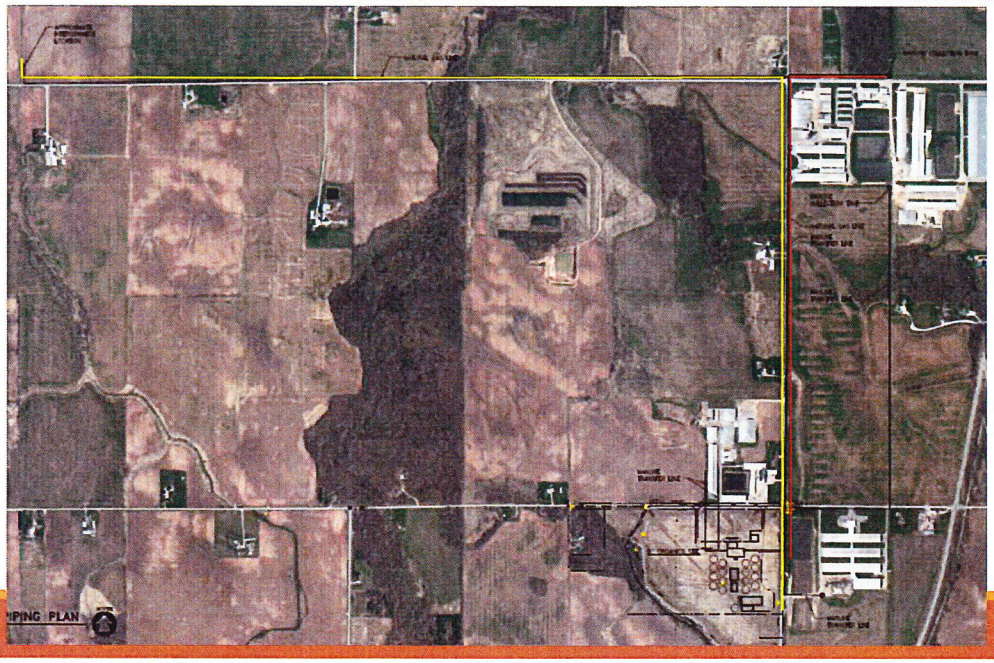
- Brown County Private Onsite Wastewater Treatment System (POWTS) Permit
  - Ensures wastewater from on-site restrooms is treated and stored as required
- Brown County Shoreland Permit
  - Ensures protections in place to prevent sediment loss to the stream
- Public Service Commission Pipeline Approval
  - Approval of the design and interconnection for the natural gas gathering line
- Wisconsin Department of Commerce Building Approval
  - Review of all buildings to ensure they meet codes and life safety requirements
- Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) Scale Permit
  - Ensures the truck scale is installed correctly and measures accurately
- Town of Holland Building Permit
  - Ensures project is built to code

Demonstration Plot

- Project would install demonstration plot of Best Management Practices for preventing soil loss
- Working with Brown County and Wiese Brothers Farm on plan for acres around the digester site
- Install buffer strips, grassed waterways, convert a portion to prairie, and utilize no-till and cover crops
- Demonstrate practices that can be utilized by project participants and area farmers to improve water quality in the Lower Fox River Watershed

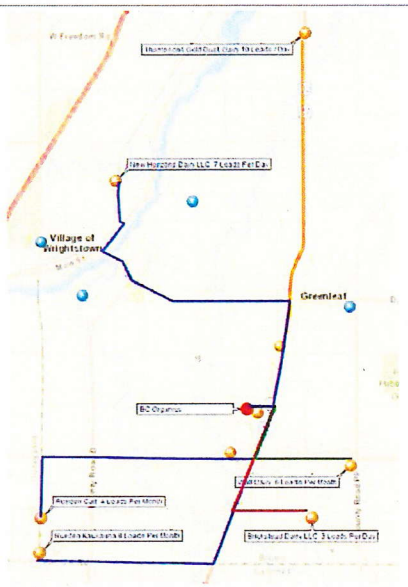


Pipeline Routing



Truck Routing

- 21 truckloads per day of manure to site
- 9 truckloads per day of agricultural by-products to site
- 4 truckloads per day of dried fiber
- 4 truckloads per day of organic fertilizer
- Truck traffic is spread over 365 days per year rather than 2-3 weeks in the spring and 2-3 weeks in the fall



Environmental Benefits

- Reduced Manure Volume
  - Less volume per acre spread on fields, less likely to run off or infiltrate the soil
  - More flexibility in application times, not just in spring and fall
  - Reduce phosphorus loading on cropland in Lower Fox River Watershed by exporting phosphorus
  - Reduced manure trucks in spring and fall by over 50%
  - Less soil compaction from manure applications
  - Reduced tillage since not incorporating manure
  - Increased use of cover crops
- Odor Reduction
- Pathogen Reduction
- Reduced groundwater usage by utilizing the RO water
- Reduced Greenhouse Gas Emissions from Lagoons

Additional Benefits

- Increased manure storage capacity in the area
  - Avoid manure lagoons overfilling due to extreme weather events
- Utilize local/regional construction contractors and equipment suppliers
  - Positive impact on local stores and restaurants
- 8-10 Full-time jobs created to operate and maintain the plant
- Improve sustainability of dairy farming in community
  - Reduce operating costs
  - Reduce risks
  - Improve neighbor relations
  - Improve yields

Project Goals

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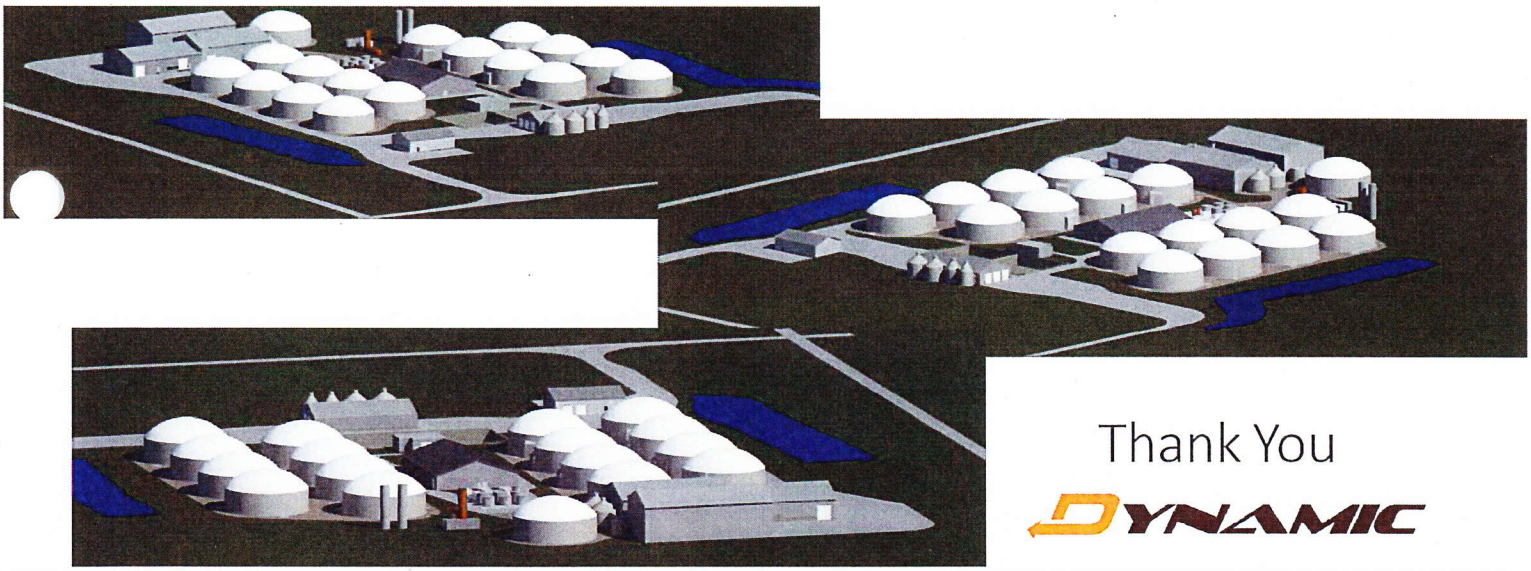
- ✓Reduce manure hauling / trucks on the roads in spring and fall
- ✓Reduce manure odor and pathogens
- ✓Protect surface water from phosphorus runoff
- ✓Protect groundwater from nitrate infiltration
- ✓Improve sustainability of dairy farming

BC Organics Project



Thank You

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