Aggregating and Trading Anaerobic Digester Carbon Credits

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Who we are.

- Second largest hog producer in the US. Approximately 225,000 sows.
- Operations in Missouri, North Carolina, Texas, and Kansas
- Vertically integrated producer. Own farms and processing plants.
- First swine producer to join the Chicago Climate Exchange
Joining the Chicago Climate Exchange

- 2003 PSF Joined Chicago Climate exchange
- $10k commitment to reduce CO2 equivalent emissions each year.
- Reduction of 1% first year with additional 1% each year following.
Establishing our baseline

Collected company wide fuel usages.

Did not count carbon sequestration via land application of manure to our credit.
Calculating credits from biogas

- Measured tons of methane burned (produced in digesters) x 18.25 (CO2 equivalent factor).
Where we get our credits.

- Two Large Covered Anaerobic Digesters Treating Swine Manure (10,000 Sows & 108,000 Finishers)
About $10k in revenue first and second year. Low revenue due to operational issues with metering and digesters as well as carbon ton about $1/ton.

Expect about $40k this year because of price increase to around $1.60 and better operation of digesters.
S-5 10,000 Sow Site

Evaporation cell

IRP

Aeration Digester

Flush

Pull Plug

IRP

Flush
WF-1 108,000 Finishing Site

- 26 Barns
- Irrigation cell
- Sludge cell
- Aeration cell
- Digester
- Land application
S-5 Digester Cover
WF-1 Digester Cover
WF-1 Biogas Buildings
S-5
Boiler

America’s Premium Pork®
S-5 Biogas Blower
WF-1 Biogas Blowers
Compare Projected & Actual Anaerobic Effluent BOD$_5$

- Influent, Projected 6,385 mg/l
- Influent Actual 6,216 mg/l
- Effluent, Projected 958 mg/l
- Effluent Actual 422 mg/l
- % Reduction, Projected 85%
- % Reduction, Actual 93.4%
Lessons learned

- Projected biogas volumes are highly variable due to water usage, number of animals, diet, operator expertise.

- Don’t let carbon credit financials drive the project.

- Commitment to doing the right thing and hoping the price goes up.
Where we are going with technology and carbon credits

- Committed to value added technology. Creating product with renewable fuels if possible.
1999 State Consent Decree

- Company agrees to invest $25 mm over five yrs. to develop Next Generation environmental systems
- Implementation of an “Expert Panel”

2001 EPA/CLEAN Consent Decree

- Company agrees to reduce nitrogen content of effluent by 50% on larger farms
- Air monitoring for emissions
- Payment of $350,000 civil penalty
“Next Generation Technology”

- Odor Control Projects
- Barn and Lagoon Air Monitoring
- Nite/ Denite (AND) System at 70,000 head Farm
- Water Reuse project at Homan Farm
- Crystal Peak Fertilizer with Anaerobic digesters
Crystal Peak
Fertilizer Process
Granulated Fertilizer Pellets From Hog Manure

Sample of fertilizer from the CPF pilot project at the Homan Farm
America's Premium Pork®

14 SETS OF BARNs
Bypassing lagoons entirely, effluent flows from the barns and through the Internal Recirculation Process where it is concentrated from 25 percent solids to 8 percent solids and moves to the digester.

STORAGE POND
The liquid is stored in the storage pond.

FREEZE-THE-AW SEPARATION
During the winter liquids are processed through freeze/thaw. Water with a high nutrient content freezes more slowly. This allows for separation of nutrients through the natural climate cycle. This concentrated brine is passed on to the brine pond.

TREATED WATER STORAGE POND
Clean water stored for irrigation or further treatment to be fed back to the animals.

BRINE POND
The concentrated brine created from the freeze/thaw process is stored in a caustic pond before being transferred to the mixer.

DIGESTER
Volatile organic material is removed from the slurry-like substance and converted to methane gas, which is used in the drying process.

SETTLING BASIN
Nitrogen and Sulfur compounds are scrubbed from the exhaust air and returned to the input stream to be added to the fertilizer.

14 SETS OF IRP
Bypassing lagoons entirely, effluent flows from the barns and through the Internal Recirculation Process where it is concentrated from 25 percent solids to 8 percent solids and moves to the digester.

EXHAUST AIR

WET SCRUBBER

CENTRIFUGE
The centrifuge further reduces moisture content, concentrating the material to 25-30 percent solids. A material that once was liquid is now the consistency of potting soil.

Mixer
Solids are blended with brine and recycled solids.

SCREEN
The pellets are screened into two size classes. Large pellets for turf application and the fines are suitable for greens.

CHARRING DRUM
The pelleted product is charred. Charring removes odor and any remaining pathogens.

DRYER
The concentrated material is dried to create rich, high quality fertilizer pellets which will be trucked off the farm.

DUST

BAG HOUSE AND CYCLONE
Dust expelled from the dryer is returned to the mixer where it is added to the fertilizer product.

The consistent, odor free, pathogen free natural 12-8-8 fertilizer is trucked off the property.
Construction photos at Valley View of Crystal Peak
Crystal Peak Digesters and plant
Processing plant powered by biogas
Valley View CPF Plant

- 107,000 average finishing inventory
- Production of 8,674 tons per year 12-8-8 fertilizer
- Product will be charred to remove odor and pathogens
- Earthwork complete
- Digester/dryer start-up this spring
- Product delivery Spring 05
- Carbon credits traded next year
CPF Advantages

- Reduce Odor
- Reduce Air Emissions
- Minimize or Eliminate Irrigation
- Eliminate Lagoons
- Minimize Spill Risk
- Eliminate Phosphorus Issue
- Capture carbon credits
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