JRS Group Cambridge Facility Biogas Utilization

Renewable energy from high strength wastewater

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- German Based Cellulose and Food Fiber Company (Acquired Cambridge late 2014)
- Cambridge Facility-Built 1988/89- Manufactures Oat Fiber utilizing an AHP wet chemical process upon oat hulls.
- Pre-treatment system start up was late 1989.
- ADI slow rate UASB
  - “Upflow Anaerobic Sludge Blanket”
  - ~ 6 MG in volume

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- Anaerobic “Learning Curve”
  - Unique Wastewater
  - Pilot Samples less than representative
  - Macronutrients/Micronutrients
  - Problematic TSS

- Late entry into Biogas use
  - Wastewater constituents excellent animal feed
  - Pollution Prevention
  - Eras where capital was tight- WW nearly always a defensive expenditure.
  - “Bigger fish to fry”… aka problems

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- Anaerobic Stability + Business Stability = Biogas Project Timing
  - Very much fit the Corporate Mantra at the time
  - Gas prices high, project written on $9+/therm gas offset

- Biogas Quantity and Quality
  - Installed and tracked gas production
  - Acquired a handheld gas meter, with charting ability
  - We primarily monitored (O2, CO2, CH4, H2S)
  - Sent out for siloxanes, nitrogen, etc.

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- Whooops, Sorry… We've got gas…
  - Testing revealed we had issues with our cover
  - Initially we had O2 levels that were elevated
  - System membrane cover had issues moving gas to the collection system, elevated negative pressure provided infiltration of air
  - Areas were tightened, and cover was weighted with sand tubes to force biogas to collection channels.
- Gas Quality Rectified
  - CH4 55-65%, H2S 300-400 ppm…

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- We've fixed our gas and it's collection problems, now what do we do…?
  - Investigated CHP, microturbines, fuel cells, and water heating
  - Capital cost, safety interlocks, siloxane content, simplicity…. Led us to the easiest, cheapest use of the energy.
  - System ended up being a chiller/dehumidifier, and compressor feeding our hot water heating units.

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- "The Good"
  - Substantial redux in the gas used to heat hot water
  - In comparison, economically appealing entry point into utilizing our biogas
  - Gas conditioning system could be used on other "end use" technology.
- The "not so" Good
  - Another learning curve, aspiration of fluid into the gas equipment… Recommend extensive protection
  - Dormancy was bad for the compressor… Condensation-corrosion
  - Fracking ruined the economics of the ROI

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- Final Points to Consider in Summary
  - Our situation- Pretreatment anaerobically is an absolute. The POTW can't handle our raw.
  - The biogas utilization project may not have met the accountant's definition of success but has provided notable energy… And is the "right" thing to do environmentally.
  - Both situations above are likely very unique and should be considered during the due diligence of the project proposed.

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- Q and A