BIODGAS GENERATION AND USE AT SIERRA NEVADA’S MILLS RIVER BREWERY

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BIOGAS GENERATION:
WASTEWATER TREATMENT

• Process wastewater and spent yeast are pretreated prior to discharge to municipal works.
• Chemical energy is converted to biogas via anaerobic digestion.
• SNBCo Mills River uses a two-phase anaerobic sequencing batch reactor (ASBR) designed and built by Symbiont.
WASTEWATER TREATMENT

- First vessel (mid) is a 325,000 gal. equalization tank, where a mixed population of microbes hydrolyzes and acidifies influent, producing acetate.
- Second vessel (left) is a 1.5 MM gal. anaerobic bioreactor. Anaerobes ferment acetate to biogas.
- Final vessel (right) is a 155,000 gal aeration tank for final polish before discharge to MSD-BC.
ODOROUS AIR TREATMENT AND BIOGAS COLLECTION

Odorous air bed under construction, to be filled with iron sponge woodchip media for hydrogen sulfide mitigation.
Biogas Conditioning

- Biogas is filtered, compressed to 90 psi, and cooled on a Unison Solutions 250 scfm skid.
- Particulate matter and water are removed, giving medium BTU biogas. 75% methane, 35 ppmv H$_2$S
- CO$_2$, H$_2$S, and siloxane removal not needed due to biogas quality/uses.
- In an ASBR, most H$_2$S is generated in EQ tank. H$_2$S generated in the reactor is precipitated by addition of ferric chloride coagulant.
BIOGAS USE AT MICROTURBINES

- Biogas is supplied to two Capstone C200 microturbines, each capable of 200 kWh.
- Turbines can operate from 100 kW - 200 kW, depending on biogas availability. Throttling minimizes start/stop cycles.
- Up to 135,000 scf biogas/day
- Turbines are configured for medium BTU biogas; that’s why we don’t scrub out CO2.
BIOGAS USE AT BOILERS

- Two 300 HP, 10,000 lb./hr fire-tube boilers blend biogas into natural gas feed at 1:8 ratio when biogas is available.
- Up to 35,000 scf biogas/day
- CO₂ content of biogas is limiting; can cause corrosion of boiler tubes.
SUMMARY - BIOGAS AT SNBCO

• Sustainability is a core company value.
  • SNBCo is Zero Waste Platinum certified
  • Mills River brewery is LEED Platinum certified
• Sierra Nevada Mills River uses an ASBR-style anaerobic digester to pretreat process wastewater and generate biogas.
  • Minimizes impact to public treatment works and environment.
  • Generates a sustainable energy source that would otherwise go to waste.
• For 2019, our wastewater treatment process generated:
  • 1.2 MM kWh, ~10% of power consumed at the brewery.
  • 3000 dTh biogas to boilers
• Wastewater treatment is responsible for <1% of net power consumption at the brewery; 10:1 return!
THANK YOU

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