Waste Not, Want Not: Maximizing High Strength Waste Addition

WWOA Annual Conference
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Presentation Outline

➢ Background
  ▪ Plant Details
  ▪ Co-digestion Experimentation
  ▪ Biogas Utilization
  ▪ Brewery Operations

➢ Solution
  ▪ Design Goals and Preferences
  ▪ Operations Present - Future
Background:
Operations
Stevens Point WWTP

- Plant Details
  - 4.55 mgd (3 mgd)
  - EBPR
    - A/O with RAS Denite
  - Anaerobic Digestion
  - Service Area
    - 27,000 Population
    - BOD Population Equivalent of 54,000
Co-digestion Experimentation

- Possible HSW sources?
- How to handle the material properly?
- How much biogas can be produced?
How Much is too Much?

- Normal Feed Rate 125 lbs VSS/1000 cuft digestion

- Over fed at 286 lbs VSS/1000 cuft digestion
Biogas Utilization

- 180 KW CHP
- Sustainable Results
- Utilization of excess engine heat
23.5% decrease in annual net electricity consumed 2002 – 2011

98% decrease in annual net electricity consumed 2002-2014
Brewery Operations

- Currently producing 130,000 bbls per year
- Plan to double production in the future

Operational Issues
- Slug loading
- Nutrient Deficiencies
- Blower Demand
Solution: Design
Solution

➢ Design Goals and Preferences

- Tank Size
- Tank Shape
- Tank Material of Construction
- Tank Placement
- Tank Mixing
- Digester Feed Pump

- HSW Receiving
- Coatings
- Odors
- Brewery separation/handling
Solution

- Design Goals and Preferences
  - Tank Size: ✓ 40,000 gal
  - Tank Design: ✓ Circular/Concrete/Below Grade
  - Tank Mixing/Pumping: ✓ Pump&Nozzle/Rotary Lobe
  - HSW Receiving: ✓ Basic
  - Coatings: ✓ Fiber-Reinf. Polyamine Epoxy
  - Odors: ✓ Smells like Beer
  - Brewery source separation/handling: ✓Contracting/tools
Solution

Operations Present – Future

- Brewery to pump “the good stuff” through forcemain
- Transfer ASAP, or risk concrete-like deposits
- Buffer slug loads at WWTP receiving tank and mix
- Blend other HSW or sludge
- Hold volume, store for weekend/holiday
  - Save 14-15 hrs/wk running scum pump
- Passive overflow to headworks
New System

1800 gal 316L SST

Multiple Suctions

Flushing Water

Air Diaphragm Pumps

Cleanouts
New System

- Drive-on Lid for Vac-Truck
- Rock Trap
- Sanitary Drain
- Flushing Water
- Access Road and Fence
New System

Digested Sludge Transfer

Brewery Line

Chopper Pump

Ball Check Valve = OK

Cleanouts
Before (Biowin Simulation)

- **Influent Zone #1**
- **Aerobic Zone #1**
- **Secondary Clarifier**
- **Secondary Effluent**
- **Anaerobic Digester**
- **WAS Thickener**
- **Zone #2**
- **Sludge**
- **Brewery**

**Treating Aerobically**
- 2 d SRT (MLSS = 1200 mg/L)
- Aeration = 4211 lb/d Oxygen
- PSD and DAFT = 4% TS
- Biosolids = 4425 lb/d TS
- HRT = 25 d
- Gas Production = 70,000 cf/d
- Anaerobic digester
- Sludge
Operational Data - Results

After (Biowin Simulation)

- **Influent Zone #1 Aerobic Sec. Clarifier Secondary Effluent**
- **Anaerobic digester WAS Thickener**
- **Zone #2 Sludge Brewery**

**Treating Anaerobically**

- 2 d SRT (MLSS = 650 mg/L) **DECREASE**
- Aeration = 2444 lb/d Oxygen **DECREASE**
- PSD and DAFT = 4% TS **SIMILAR**
- Biosolids = 3950 lb/d TS **SIMILAR**
- HRT = 33 d (less PSD and TWAS) **SIMILAR**
- Gas Production = 112,000 cf/d **INCREASE**

**CONTINUE HSW PROGRAM**
Questions

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