Alternate Use for Food Waste
Anaerobic Co-digestion

City of Fort Worth
Village Creek Water Reclamation Facility
4500 Wilma Lane, Arlington, Texas

Jerry E. Pressley, REM
Water Systems Superintendent
Service to over 1,000,000 customers in 23 communities
Rated Capacity - 166 MGD
Average daily flow - 110 MGD
Average Biosolids produced – 85 Dry Tons/day
Animal Waste Management
Food Waste Impact on Environment

Sanitary sewer overflow due to food waste blockage
Food Waste Impact on Plant and Process

- Collection
- System blockages
- Scum disposal cost
- Increased energy demand for treatment
Turning a liability into an asset

Village Creek Water Reclamation Facility

Trinity River

Biosolids

Reuse Water

Energy
Digested primary solids and “waste activated sludge” are digested in anaerobic digesters (bio reactors) for “volume reduction” and stabilization (Vector Attraction Reduction and Pathogen Reduction)

Anaerobic bacteria consume/break down solids in an environment that is without oxygen
Biogas

- Biogas is product of anaerobic digestion
- Biogas used as fuel for combustion turbines
- Insufficient biogas from influent and internal process waste streams for fuel to run one combustion turbine at full output
- Purchase additional gas from nearby landfill
- Insufficient biogas to run turbine and HRSG
- Needed to increase biogas availability
Cogeneration Background

2 – 5.2 MW Solar Taurus 60 Turbine Generators

50% on site electrical generation
Save $3 million per year
Food Waste “Co-digestion” to improve Biogas production

Key component of an overall Energy Savings Performance Contract

Goal: To Improve Energy Efficiency, reduce cost
Enhance Energy production and
Achieve Energy Independence

Facility Improvement Measures
1. Diffuser Replacement
2. Heat Recovery Steam Generation
3. Digester Mixing & Co-digestion Facility
4. SCADA replacement
5. Anoxic zones
6. HVAC, Power Factor Correction, pump efficiency
Increasing Biogas Production

- Need more “food” for the anaerobic bacteria
- Need the right “diet” for maximum biogas production
- Minimize potential problems (foaming, toxicity)
- Minimal impact on biosolids production
- Evaluated local “market” of available “high strength wastes” that meets needs
VCWRF Improvements
Heat Recovery Steam Generator
Steam Turbines
Co-Digestion Facility
Surveyed perceived “market” for available “high strength waste Streams”
Solicited interest from interested parties
Received/evaluated potential waste streams
Developed supply agreements
Scheduled deliveries for consistent digester feeding
  Offloading takes approximately 30 minutes (don’t want drivers to have to wait too long)
  Limited storage (need to ensure tank capacity to affect offload volume)
  Sufficient waste to get through the night/weekend
Received waste
  Clear through security
  Operator/supplier affect offload/complete manifests
  Sample/validate
  Set feed-rate to match expected deliveries (for consistent, effective gas production – no gas storage)
Monitor (feed rates, waste characteristics, temperature, digester performance, etc.)
Profile developed to assess waste for:

- Strength (gas production potential - COD)
- Loading on the digesters
- Pollutants that threaten digester performance or sludge quality (i.e. heavy metals, sanitizers, sulfates)
- Compatibility with other waste streams and process
- Solids content: pumpable (at varying temperatures),
- Not diluting digester; limited storage
- Non-volatile fraction (cost to treat/dispose of residuals)
Current Customers/waste types

- Internal plant “scum” (> 1 million gallons per year)
- Two grease trap waste processors (10 million)
- Two “used grease” processors (>1 million gallons)
- One biodiesel manufacturer (1/2 million gallons)
- Soft drink manufacturer (>1 million gallons)

- Other potential customers – several large/local food manufacturers/packagers; grocery stores
- Waiting list for program participation
- Total Project Cost $36,756,399
- Annual O&M and Electrical Savings $3,184,757
- 12 year payback
- No Rate Impact
Future plans

- Feasibility Study underway
- Short term – 2 more digesters incorporated into codigestion program
- Expand codigestion (receive additional feedstock)
- Develop/procure fuel for second combustion turbine
- Export excess power
Lessons learned

- Odor control
- Pipe material (long-runs of pipe, higher than expected waste temperature)
- Storage (tank size/installation considerations)
- Cam-lock connections inside secondary containment structure and braced to support weight of hoses
- Screening
- Spill containment/clean-up provisions
Questions?