



**WWOA**

**BIOGAS TREATMENT SYSTEMS**

**October 20th and 21st, 2010**

# PRESENTERS

Connie Wilson, Director of Public Works  
City of Burlington, WI

Jan Scott, President , Unison Solutions, Inc.  
Dubuque, IA

# BACKGROUND

- ❑ The Burlington WI WPCF is the location for the project we will be discussing today
- ❑ The Burlington WI WPCF is a 3.3MGD facility currently operating at 3.1MGD
- ❑ The facility had been flaring biogas for 19 years
- ❑ The WWTF currently accepts special waste from companies such as Helene Curtis, Nestles, SC Johnson, Kikkoman Foods, etc.
- ❑ Goal was to utilize the biogas for digester and space heating through a boiler loop and reduce NG costs
- ❑ Total project including cover and other modifications was approximately \$1 Million

# CITY OF BURLINGTON WPCF



# CITY OF BURLINGTON WPCF



# PROJECT OVERVIEW

- ❑ To remove both the moisture and siloxanes from the biogas so it can be utilized in the boiler
- ❑ Applied Technologies, Inc. was the project engineer
- ❑ 45scfm of gas was available to utilized
- ❑ No new facility addition required to house the treatment system
- ❑ Goal was to upgrade the anaerobic treatment system to beneficially utilize the biogas for digester and space heating through a boiler loop and reduce NG costs

# LOCATION of GAS TREATMENT SYSTEM



# SYSTEM DESIGN

- ❑ The system was designed for 60scfm to accommodate future growth
- ❑ A rotary lobe blower provides 2psig gas pressure
- ❑ The system includes two 24" x 6' media based siloxane removal vessels
- ❑ Gas chilling system that can utilize effluent, cold water or glycol were installed on the system for moisture removal
- ❑ Cost of the equipment was \$176,000 with total project cost of approximately \$1 Million
- ❑ System start-up was April 2009

# GAS TREATMENT SYSTEM



# GAS TREATMENT SYSTEM



# GAS TREATMENT SYSTEM



# FINANCIAL RESULTS

- ❑ A \$150,000 Focus on Energy grant was received to support the capital cost of the project
- ❑ \$84,000 was the 2010 budget for natural gas and with the savings the budget for 2011 will be \$40,000 or a \$44,000/year savings in natural gas costs. Because of continuous solids building ventilation and heating the second digester, total savings will be closer to \$50,000/yr
- ❑ O&M cost of \$6,800/year for siloxane removal media and \$2,000/year cost for media change-outs and disposal
- ❑ Ability to generate electricity in the summer is an additional savings when thermal demand is reduced.

# BURLINGTON WPCF BUDGET

Expense Summary						
Line Item	2008 Actual	2009 Actual	2010 Anticipated	2010 Budget	2011 Proposed	% Change from 2010
111-Salaries	\$ 526,475	\$ 539,140	\$ 494,553	\$ 502,327	\$ 509,788	1.49%
113-Overtime	\$ 16,962	\$ 19,593	\$ 16,814	\$ 16,000	\$ 16,400	2.50%
145-Employee Reimbursement	\$ (9,557)	\$ (10,695)	\$ (8,204)	\$ (7,964)	\$ (8,200)	2.96%
151-FICA	\$ 39,208	\$ 38,997	\$ 41,609	\$ 39,652	\$ 40,253	1.52%
152-Retirement	\$ 55,481	\$ 55,971	\$ 57,186	\$ 55,722	\$ 59,646	7.04%
153-Employee Benefits	\$ 215	\$ 271	\$ 95	\$ 291	\$ 291	0.00%
154-Health Insurance	\$ 181,711	\$ 175,930	\$ 173,871	\$ 180,706	\$ 173,684	-3.89%
155-Life Insurance	\$ 2,075	\$ 2,090	\$ 1,948	\$ 1,707	\$ 1,637	-4.09%
156-Vision	\$ 542	\$ 540	\$ 462	\$ 447	\$ 458	2.35%
157-Inservice Training	\$ -	\$ -	\$ -	\$ -	\$ -	#DIV/0!
158-Dental	\$ 7,733	\$ 7,390	\$ 7,520	\$ 6,736	\$ 7,446	10.54%
159-Clothing Allowance	\$ 4,532	\$ 4,612	\$ 4,250	\$ 5,000	\$ 4,750	-5.00%
160-Workers Compensation	\$ -	\$ 15,478	\$ 19,197	\$ 21,873	\$ 19,581	-10.48%
162-EAP Service	\$ 422	\$ 381	\$ 503	\$ 447	\$ 447	0.00%
163-Sick, Vacation, & Comp	\$ (1,805)	\$ 3,109	\$ -	\$ -	\$ -	#DIV/0!
164- Insurance Opt Out	\$ -	\$ -	\$ -	\$ 1,200	\$ 180	-85.00%
211-Physicals-Med.	\$ 313	\$ 335	\$ 300	\$ 100	\$ 300	200.00%
220-Electric	\$ 259,696	\$ 264,356	\$ 230,000	\$ 272,480	\$ 225,000	-17.43%
221-Water	\$ 17,388	\$ 29,200	\$ 27,000	\$ 19,000	\$ 28,000	62.63%
222-Gas	\$ 86,666	\$ 63,973	\$ 40,000	\$ 84,000	\$ 48,000	-42.86%
225-Telephone	\$ 6,483	\$ 4,726	\$ 2,600	\$ 5,500	\$ 3,200	-41.82%
240-Fuel, Oil and Lubricants	\$ 14,515	\$ 7,577	\$ 9,000	\$ 10,812	\$ 10,500	-2.89%
242-Repairs and Maint - Vehicles	\$ 4,174	\$ 8,776	\$ 4,200	\$ 6,000	\$ 7,000	16.67%
244-Repairs and Maint - Equip	\$ 52,582	\$ 79,745	\$ 50,000	\$ 55,000	\$ 60,000	9.09%

# LESSONS LEARNED

- ❑ With the increase in carbon tariffs the media cost has been higher than anticipated
- ❑ System is performing very well
- ❑ Natural gas savings have been realized
- ❑ Boiler maintenance has been reduced
- ❑ This has been sustainable modification to the plant
- ❑ This is a Green Project for the city

# PROJECT SUMMARY

- ❑ The Focus on Energy grant of \$150K was a key financial incentive to move the project forward
- ❑ Net O&M cost reduction is real and is repeated every year
- ❑ Public perception has been very positive from moving from flaring the biogas to heating
- ❑ Continued growth in accepting special waste is an additional revenue stream for the City, increases the natural gas offset and electrical generation
- ❑ Project supports the goals/vision of the Burlington City Council to be a green city

**TEST AND TREAT YOUR BIOGAS**

# QUESTIONS?

CONNIE WILSON

[cwilson@bizwi.rr.com](mailto:cwilson@bizwi.rr.com)

262-539-3646

JAN SCOTT

[Jan.scott@unisonsolutions.com](mailto:Jan.scott@unisonsolutions.com)

563-585-0968