ENERGY SAVINGS ASSOCIATED WITH HIGH SPEED BLOWERS AND MICRO-TURBINES

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by
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and

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Wausau Wastewater Treatment Facility

Basis of Design
- Flow – 8.2 MGD
- BOD$_5$ – 17,000 ppd
- Suspended Solids – 15,600 ppd

Treatment Process
- Conventional Activated Sludge
- Operating at 70% of Basis of Design
- Anaerobic Digestion (70,000 cfd)

Aeration System
- Three 300 HP Positive Displacement Blowers - Installed in 1970
- One Electric Motor Drive – Installed in 1970
- Two Engine Drives – Installed in 1989
- Engine Maintenance Costs Average $53,000 per year
- Sound Level – 100 to 110 dBA
Wausau Wastewater Improvements

Three Blowers
- High Speed Turbines: 13,000 to 21,000 RPM
- 4,900 ICFM (7.5 psig, 100°F, 36% RH)
- Dissolved Oxygen Paced
- VFD Controlled
- Variable Diffuser Control Vanes (matches head to ambient conditions)
- Air Foil Style Bearings
- 200 HP Motor
- Sound Level – 80 to 83 dBA

Gas Treatment
- Siloxanes: 1,360 ppbv
- Hydrogen Sulfide: 500 to 2,270 ppmv
- Moisture
- 50 SCFM

Two 65 Kilowatt Micro-turbines
Flexible Membrane Fine Bubble Diffusers
Wausau Wastewater Projected Energy Savings

- **Electricity**
  - 0.9 Million Kilowatt - Hours per Year
  - $65,000 @ $0.074 per Kilowatt – Hours
  - 2012 – First 6 Months: 0.65 Million Kilowatt Hours

- **Natural Gas**
  - 77,000 Therms
  - $65,000 @ $0.895 per Therm

- **Wisconsin Public Service Corporation Projection**
  - $180,000 When Considering Peak Savings
DO Meter - July 2012

mg/L

Day

DO Meter 1
DO Meter 3
DO Meter 6

BECHER HOPPE
Engineers and Architects
Wausau Wastewater Project Costs

- **Overall Project**
  - Concrete Structures and Building Repairs: $210,000
  - Biogas: $1,000,000
  - Aeration: $790,000

- **Focus On Energy Grants**
  - On-site Off-gas Testing: $2,200
  - Aeration System Efficiency: $97,583
  - Bio-gas Utilization: $134,995

- **Wisconsin Public Service Corporation Grant**
  - Bundling: $7,046
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