Gas to Energy Equipment Description

Overview

The landfill gas fired generation plant began operation in February 2001 and was retired in September 2017. The plant major components consist of a gas conditioning skid, engine/generator, switchgear/distribution system, continuous emissions monitoring system CEMS, gas analyzer, and master control system. The gas drawn from the landfill gas collection system under a vacuum was conditioned on the gas skid and directed to the Deutz internal combustion engine (ICE). The ICE turned a Newage Stamford AC generator to generate renewable electricity that was sent to the electric grid as wholesale renewable power.

The main equipment components contained within each major plant component is itemized below:

Gas Conditioning Skid:

- Wet gas scrubbing vessel
- 6 micron coalescing filter vessel
- 0.3 micron coalescing filter vessel
- Tri-lobe gas compressor, Model TL80, 60HP 480V 3PH motor, Yaskawa VFD
- 22 ton Carrier AquaSnap air cooled water chilling unit, Model 30RAN-022
- Two Ameridex plate type heat exchangers (HX); HX-1 (model ADX-35-43) is a gas to gas exchanger, and HX-2 (model ADX-35-47) is a gas to water exchanger.
- EMCO TMP-700 thermal mass flow meter
- 1.5 HP chilled water circulation pump
- 0.5 HP drain pump
- Various valves, gages, regulators, switches, strainers, traps, post heater, temperature sensors, and pressure transmitter.

Engine/Generator:

- Deutz MWM AG Model TGB 620K V16 internal combustion engine, 1400 KW at 1800 RPM.
- AB TPS-50 Turbocharger
- Engine water cooling system with jacket and intercooler circuits. Pumps for each circuit.
- Engine Radiator by Young Touchstone with expansion tank
- Lube oil system
- Deutz supplied Total Electronic Management (TEM) system for complete engine integration and control.
- Engine enclosure with designed with sound control barrier system and fresh air ventilation
- Newage Stamford AC Generator, air cooled type HCI734G2, 480V
- Air intake system drawn from evaporative cooling system
- Exhaust System
- Gas Control Section (Gas Train). Includes pneumatic valve, pressure gage, pressure transducer, filter, pressure regulator, and fuel mixing system.

Switchgear and Electrical Distribution (Cutler Hammer built switchgear and controls):

- Cutler-Hammer Type SPB Pow-R-Breaker (52G1)
- Cutler-Hammer Capacitor Trip Device
- Beckwith M-3420 Generator Protective Relay
- Beckwith M-3520 Intertie Protective Relay
- Woodward Digital Synchronizer
- Breaker Close Relay
- Breaker Trip Relay

CEMS Equipment (Horiba Instruments Inc.):

- Horiba ENDA 4220 continuous emission monitor for NOx

Daniels Gas Chromatograph

Master Controls with Allen Bradly and Direct Logic programmable controllers and Wonderware HMI integrated for data collection an alarm functions.