Cynergy Electric Company, Inc.

Alpha Ridge Landfill
Methane Cogeneration Plant
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Marriottsville, MD 21104

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Howard County's Alpha Ridge Landfill is a 30 year old facility accepting various types of waste. The landfill produced an average 600SCFM of 52% methane gas and has a 2200SCFM flare system to burn the gas. The $1,931,055 contract was to design and build a cogeneration plant using the landfill (methane) gas to energy with a 1059KW Jenbacher generator.

The civil, structural and mechanical design services were provided by Whitman Requardt and Associates, the electrical design was provided by Cynergy and the flare design modifications were provided by the John Zink Company. The design utilized the existing landfill piping for the gas generator, gas compressor and new gas blower. The gas generator consumes 325SCFM at full load. The existing flare system had to be modified to burn the excess gas and be able to burn all the available gas during times when the gas generator was offline. A gas piping bypass circuit was designed so when the available gas diminished and could only operate the generator the flare system could be shutdown.

The cogeneration plant provided power for the existing and new station loads and the excess power was sold to the PJM grid. The interconnection to the PJM grid was via the BGE transmission/distribution system. The project included a substation consisting of; 13200V step up transformer, 15KV switchgear, 480V switchgear, BGE metering cubicle, station service breaker and a PLC/controls section. All required PJM and BGE relays, meters and protective devices were part of the project. A new circuit was provided for County electric vehicles from the station service.

Mechanical features that were incorporated into the project included;

- Schedule 80 PVC piping for gas and condensate
- 400SCFM gas compressor
- 800SCFM gas blower

- Gas flow meters
- Pressure and vacuum transmitters
- Automatic gas valve
- Manual and check valves
- Manometers
- Modifications to the existing flare
- Pipe testing

Structural/Civil features that were incorporated into the project included;

- 4000PSI concrete pad with retention dike for the transformer/switchgear
- 4000PSI concrete pads for the generator and gas compressor
- Concrete piping supports
- Underground trench drain system
- Underground utility location
- Stone yard area

Electrical features that were incorporated into the project included;

- 1500KVA 13200V-480Y277V step down transformer
- Outdoor walk-in 480V switchgear
- 13.2KV switchgear
- Station service-480V
- Power circuits for the generator
- Feeder circuits for the gas blower, gas compressor, generator service and switchgear service
- VFD for the gas blower
- Replacement flare control panel
- Remote monitoring system
- Coordination and arc flash study
- Hazardous area piping system

Miscellaneous installation items included; fiber optic cable, Ethernet cabling, low voltage circuits to the parasitic equipment in support of the generator, blower, compressor, variable frequency drive, control circuits, etc.

Commissioning and field testing were a large component in the project. Testing was performed on each piece of equipment and the generator system as a whole to demonstrate paralleling capabilities. Third party testing was provided for all medium voltage equipment, switchgear and cables. Factory field services were provided for the generator, compressor, switchgear and transformers. Hands on training and operation and maintenance manuals were provided for all operational systems.