

PEECO Completes Supply and Commissioning of 10.4MWe Gas Turbine Power Plant at Prudhoe Bay, AK. Electric Utility.

Philadelphia Electrical Equipment Co. (PEECO) has provided major upgrades to double the utilities electrical capacity with a 10.4MWe Gas Turbine Power Plant in Prudhoe Bay, AK.

February 23, 2010 (FPRC) -- PEECO has completed the installation of two (2) 5.2MWe Solar Gas Turbine Power Plants along with PEECO's Freedom iGear Paralleling Master Control System and 15KV primary distribution improvements. This upgrade doubles the utilities generation capabilities.

Prudhoe Bay, Alaska is the largest oil field in North America and produces approximately 1/5 of the US oil consumption. The support epicenter of the oil fields is the industrial community of Deadhorse and the location of TDX Northslope Generating Inc., a subsidiary of TDX Power, Inc an Alaskan Native Corporation (ANC).

Deadhorse experiences some of the most adverse weather conditions on the planet where temperatures dip to -60F during the winter months. Winter is also the peak production period and all hands are on deck to keep the oil flowing into the Alaskan Pipeline.

Prior to the newly installed plant TDX Northslope operated a conventional reciprocating power plant consisting of (4) Caterpillar G3500 series 1.2MWe medium and high speed gas fuel generator plants, (1) G-3616 medium speed 3.4MWe (900 RPM) gas fuel generator plant and (1) EMD 20-645 2.5MWe diesel fuel generator plant representing a total of 10.7MWe base load capacity. The plant operated from a single location in the southern part of the community.

Over the past year Prudhoe Bay experienced explosive growth with large infrastructure improvements notably the new 327 room Aurora Hotel, 100,000 sq/ft industrial complex by Baker-Hughes and a MI Swaco facility expansion. Power growth has also increased 30% on average each year for the past several years compromising the utilities reserve capacity and stressing the 15KV underground distribution system.

In order to meet the demands PEECO designed a new power plant on the North side of the community. PEECO supplied and installed (2) 5.2MWe Solar natural gas fuel gas turbine generator sets and also made significant improvements to both the North & South plants to improve reliability, efficiency and communications between the two plants.

PEECO supplied and installed the following equipment:

- 1 X 3,000 approx. sq/ft Arctic hardened powerhouse (North Plant)
- 2 X 5.2MWe Solar Gas Turbines Generating at 12,470 volt (North Plant)
- PEECO Freedom iGear Paralleling Control & Monitor System (North & South Plants)
- Gas Turbine preheat fuel system (North Plant Gas Turbines)
- 1 X 300KW Blackstart emergency diesel generator (North Plant)
- 1 X 450KW Blackstart emergency natural gas generator (South Plant)
- 1 X 15KV 1200 amp Buss Tie Breaker (North Plant)
- 1 X 5KV 1200 amp Buss Tie Breaker (South Plant)
- 1 X 5Mva 15KV Station Transformer (South Plant)

2 x 15KV 200 amp Outdoor Pad Mount Sectionalizing Switchgear Cabinets
6.5Mva Various Pad Mounted Service Transformers
13 miles 15KV 2/0 Multi-Conductor Armored Under Ground Cable

PEECO performed all of the system engineering and plant upgrades under the direction of PEECO's President Robert G. Guarini P.E. Mr. Guarini has more than 35 years of power generation experience and is a registered Professional Engineer in 5 States including Alaska.

The power plant system was commissioned in December 2009 and was officially put on line January 17, 2010 bringing the total system of installed capacity to 22MWe.

Some of the unique features of the power plant are PEECO's Freedom iGear, an "Open Architecture PLC Control and Paralleling Switchgear System, which allows complete operation from either plant location, control and monitoring of each generator and control of all distribution feeders.

User friendly Touch Screen HMI's located in both plant locations provide complete real-time status and data logging of the total system, each generating plant, and all primary feeders distributing throughout the 26 square mile 15KV underground distribution network. Individual generators can be started and seamlessly paralleled manually or automatically at each plant. Each generator operating condition is fully monitored to maintain optimum efficiency. Monitoring now captures power quality, fuel efficiency and load trending across all critical points in the system.

Control interconnection between the two plants is via a 5 mile dedicated underground fiber to PEECO's supplied GE RX3i PLCs and Woodward Governing systems. All screen display and code development for systems operation and monitoring was written by PEECO Engineering Group implementing multiple protocols via Fiber to Ethernet to serial links for Modbus RTU and DH+.

The new North plant consists of (2) modular designed Solar/Caterpillar model T60 Gen I gas turbines rated at 5.2MWe each generating at 12,470 volt, 3-phase, 60Hz using natural gas fuel. The Solar gas turbine generators are Low Emissions State-of-the-Art SoLoNOx™ Dry Low NOx Combustion System with no visible emissions for an environmentally sensitive area. The fuel consumption of the gas turbines, when compared to multiple reciprocating engines located in the south plant, is at times equal to or better than there generating counterparts and the low ambient temperature is ideal for maintaining peak efficiency and power output during the winter and mild summer months.

PEECO installed the gas turbine generators in a pre-designed structural steel building that was arctic hardened to withstand the severe weather conditions of 125+MPH winds and wind chill temperatures of -75F. PEECO's building design is an elevated 3000 sq/ft platform sitting on 3 dozen deep bore steel pilings buried to 60' depth into the permafrost to support the approx. 450,000 lb. load of the gas turbines, turbine control buildings and the powerhouse building. To address the severe weather conditions PEECO retrofitted the turbine combustion and ventilation systems with custom designed arctic filters, ventilators and diffusers to with stand the harsh environment.

While the new plant was under construction PEECO supervised the installation of more than 13 miles of 3-conductor 2/0 armored cable and more than a ½ dozen new electric services. The entire distribution system in Deadhorse is underground.

Construction supervision and installation of the power plant as well as final commissioning was

managed by PEECO's Field Service Group.

The final stage of PEECO's improvements will be to incorporate "electronic revenue metering" throughout the industrial customer base. Electronic metering will allow individual electric service real-time load monitoring and facilitate automatic billing. PEECO has tested several systems over the past year and anticipates rolling out the new system in early to mid 2010.

About PEECO

Established in 1982, Philadelphia Electrical Equipment Co. (PEECO) has been on the frontline solving the complex control problems and improving existing power generation systems with the latest technology controls.

PEECO's core business is engineering and manufacturing Power Generation Control Systems, Paralleling Switchgear under the Freedom iGear trademark and Custom Power Generation Machinery covering new and pre-owned diesel and gas generator sets 50KW through 50,000 KW for emergency power, prime power, cogeneration, peak shaving and combined heat & power applications. From conventional single systems to multi unit PLC based control and monitoring, PEECO sets the standards for design integrity and reliability in power generation.

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