

Emerson™ screw compressor package ensures delivery of high pressure turbine fuel gas

Result

- Single source accountability for fuel gas booster package design and fabrication
- Essentially pulsation-free fuel turbine gas delivered using Vilter single screw compressor technology
- Boosted available pipeline gas pressure from 100 psig to 325 psig, independent of supply pressure variations and turbine demand
- Vilter single screw compressor design prevented bearing load wear issues associated with high pressure operation
- Packaged system included gas pre-treatment for both entrained liquids and particulates
- Enabled reliable onsite power generation that helped save \$1.5 million in electricity cost per year

Application

High pressure fuel gas delivery for 5.5-MW Solar Turbines (aero derivative) gas turbine generator.

Customer

Oregon State University (OSU) Energy Center, the first Platinum LEED-certified power facility in the nation.

Challenge

The steam plant that had served the campus until 2010 was built in 1923 and expanded in 1948. OSU was also experiencing reliability issues with its electric supply and distribution system. A Combined Heat and Power (CHP) plant was suggested that could produce about half the electricity required by the campus. Portland-based Anderson construction company served as the construction manager and general contractor.



As a compressor manufacturer and part of Emerson's hydrocarbon industry presence, Vilter was uniquely positioned to provide a custom packaged compressor system. The gas compressor package was factory-engineered, assembled, and designed to conform with all applicable industry, county/local codes and customer specifications.

One critical project challenge was the need for higher pressure fuel gas than was available from the local pipeline.

Solution

The primary fuel for the gas turbine was natural gas, which was supplied at 100 psig to the site. The gas supply was boosted to the gas turbine requirement of 325 psig using the prepackaged Emerson gas compression system.

The package featured Vilter single screw compressor technology which had the unique capability to accept high pressure suction gas (up to 300 psig). It could also handle high differential pressures up to 600 psig, and was capable of final discharge pressures over 950 psig. Due to limitations for most twin screw compressors, the Vilter single screw pressure range, inherent reliability and packaged system option made it the best choice for this end user.

Emerson was able to apply its extensive experience in engineering screw compressor systems for fuel gas boosting to deliver a pre-packaged solution. The single screw compressor solution achieved high energy efficiency using the Vilter Parallellex™ slide system. The unique ability to vary capacity and volume ratio independently enabled the compressor to run at optimum efficiency across all operating and part-load conditions.

The key to the single screw compressor's reliability is in its balanced design. At the core of this positive displacement rotary compressor is a single main rotor intermeshed with two opposing gate-rotors. This unique and balanced design results in ultra-low bearing loads with significantly decreased vibration and sound levels.

Resources

Learn more about the Vilter single screw compressors at:
EmersonClimate.com/Vilter



EmersonClimate.com