



Prime power

> Case History

San Alberto Gas Field, Bolivia



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Generation**

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Where:

San Alberto gas processing plant in Bolivia

What:

Three 1.25 MW lean-burn gas engine generator sets, featuring Cummins Power Generation PowerCommand® pre-integrated controls

Purpose:

Prime power and emergency backup power for the San Alberto gas processing plant

Primary choice factors:

Fuel efficiency, low-maintenance and low-emissions capabilities of generator sets

Lean-burn gas generator sets provide prime power for Bolivia gas plant

SAN ALBERTO, BOLIVIA — The San Alberto Gas Field is located in a lush and mountainous region of southern Bolivia where they have no electric utility service. However, they do have plenty of energy available in the ground from natural gas. So much, in fact, that the region has been recognized in the past as second in natural gas reserves among South American countries. But getting that energy out of the ground and transporting it to waiting customers in Brazil's industrial centers nearly 2,000 miles away has been a big undertaking.

A consortium headed by the Brazilian oil company, Petrobras, built a new gas processing plant that removes liquid hydrocarbons, water and other impurities from the gas as it comes from San Alberto's wells. From the plant, the processed gas is sent along the 1,953-mile-long pipeline to Brazil at the rate of up to 77 million cubic feet of natural gas per day. Production at this natural gas site is expected to reach 176 million cubic feet per day.

Powering the remote San Alberto processing plant required on-site generation, and Cummins Power Generation was selected to supply the generators that provide



Two 1.25 MW lean-burn gas generator sets from Cummins Power Generation provide all the power for the San Alberto gas processing plant that feeds the Bolivia-Brazil pipeline.

electric power to the facility. Currently, two 1.25 MW generator sets powered by lean-burn gas engines run 24 hours a day. A third 1.25 MW generator set was installed as a permanent standby unit for use during emergencies or maintenance operations.

According to Enzo Burgio, a marketing representative with Cummins Power Generation in Latin America, each Cummins Power Generation QSV91G generator set is powered by an 18-cylinder, 180 mm bore, 91-liter gas engine. "The new lean-burn gas engine generator sets have proven to be reliable with over 200,000 collective hours of continuous operation in prime power installations around the world. What's more, these spark-ignited lean-burn engines are ideally suited to running on gas of varying quality — from wellhead gas to high-quality pipeline gas. However, the gas coming from the Petrobras facility to feed the engines is very high quality with a high energy content." More fuel-efficient than a gas turbine, the reciprocating engine-powered QSV91G is also easy to maintain, he says.

Low emissions

The new lean-burn gas generator sets are not only efficient and reliable, they are also very clean burning, says Burgio. "This region of Bolivia is very beautiful and environmentally sensitive, and it was important to provide a method of generating electricity that would not create emissions that would harm the environment."

A major advantage of the new lean-burn engine technology is that it produces low NOx emissions in the combustion process. The amount of emissions is kept extremely low by precisely controlling the ratio of gas and air in the combustion chamber. Sensors on the engine, in the air intake and exhaust, continually



A Cummins Power Generation 275 kW diesel generator provides emergency backup and "black start" capability at the San Alberto gas field facilities.

monitor conditions to ensure efficient and complete combustion within narrow parameters, even when the methane index of the gas fluctuates.

Controls

The QSV91G generator sets also feature Cummins Power Generation PowerCommand® digital controls for precise control of the voltage, frequency and power quality. PowerCommand allows both operating generators to run in parallel and accommodate varying loads quickly and precisely. As examples of the unit's load flexibility and power quality, in large cities like São Paulo and Porto Alegre, similar QSV91G generator sets are often used for peak shaving and cogeneration by utilities and large industrial facilities.

In the event of a power emergency, the San Alberto facility also has a 275 kW Cummins Power Generation standby diesel generator to supply emergency systems and to provide power for restarting the prime power generator sets. Within 10 seconds after receiving a start signal from the main power distribution switchboard, the diesel generator can start, get up to operating speed and accept full-rated load. Having this so-called "black start" capability is critical to high reliability in remote prime power applications. When a generator set needs to be taken out of service for maintenance, such as an oil change or even a major overhaul, the standby unit can be started and paralleled with the running generator sets, and then the generator needing maintenance can be turned off. Changeovers can be accomplished with no disruption in electric service to the facility.

For more information about integrated prime power systems, contact your local Cummins Power Generation distributor or visit www.cumminspower.com.

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