

ARTICLE

PCS100 AVC - future investment for a leading gas and processing plant, Gubkinskiy GPP in Russia



The oil and gas industry is one of the most socially important sectors in Russian economy. Active development of this sector primarily depends on energy-consuming manufacturing processes and quality of electricity supply at all stages of production process. ABB has developed and implemented two PCS100 Active Voltage Conditioners (PCS100 AVCs) to protect power systems for a leading gas and processing plant, Gubkinskiy GPP. This will eliminate voltage sags caused by the external power grid.

Gubkinskiy GPP is the northernmost gas processing plant in Russia. It was built as part of the “Sibneftegazpererabotka” association in 1988. Today, it is a branch of a leading gas processing enterprise JSC “SiburTyumenGaz” which main activity is associated petroleum gas (APG) acceptance and processing. Gubkinskiy GPP produces a broad fraction of natural gas liquids (NGL). NGL is the most valuable raw

material for petrochemical industry, which is also used for producing a wide variety of consumer goods from polyethylene film and disposable tableware, to plastic tubes for land reclamation. “SiburTyumenGaz” also carries out APG compression and dehydration and provides local consumers with fuel gas.

Identifying the cause

Voltage sags, when the root mean square (rms) voltage decreases between 30 and 40 percent of nominal voltage for a period of 1-2 seconds, often become the actual cause of poor electric power quality. They can occur by reason of natural phenomena such as storm and hurricane and technical activities carried out on high-voltage side of transmission lines.

Gubkinskiy GPP's economic losses were caused by a voltage sag by the external power grid which was caused by man-made and natural factors such as power supply companies system emergencies, working peculiarities of high power consumers (e.g. starting up high power compression facilities, etc.), single phase – ground faults, two phase – ground fault in external overhead transmission lines caused by unfavorable natural conditions (strong winds, thunderstorms, etc.). All these factors led to shutdown of sensitive to voltage sags technological equipment. This resulted in operational delays and financial losses. It was necessary for GPP to eliminate voltage sags of 20 percent of nominal voltage and duration of up to 2 seconds. To maintain seamless and secure operations in these areas, efficient, high-quality and uninterrupted power supply is of primary importance.

A power protection solution

The PCS100 AVC has a number of advantages over traditionally used solutions to this problem. These are high efficiency (97-99 percent), small footprint, high integration (solution completeness), and no serviceable parts. The PCS100 AVC consists of a booster transformer, a DC link, IGBT inverters, a bypass system and an electronic control system, making it the ideal solution for Gubkinskiy GPP.

Unlike many other modern solutions for protection of electrical systems ABB's PCS100 AVC system has small footprint. Many industries today, including Gubkinskiy GPP have limited floor space to install vital equipment. Therefore, it was important that the installation of the PCS100 AVC was compact in size due to the existing small space of the power facility. The industrial design of the PCS100 AVC and internal bypass guarantee high reliability of this solution and makes it possible to use in harsh environments. Moreover, since the PCS100 AVC consumes additional current required for voltage correction from the power supply network, the

system no longer needs an energy storage unit. This leads to lower costs for maintenance and high efficiency of the system which is greater than 98 percent.

Proven results

Over a period of operation at Gubkinskiy GPP, ABB's PCS100 AVC avoided a number of potential shutdowns caused by voltage sags by the external grid and thus reducing lost production and financial costs of the plant. In future, Gubkinskiy GPP plans to investigate the possibility of buying another PCS100 AVC set for protection of the second production line. So far, ABB has installed PCS100 AVC systems with a total capacity of more than 381 MVA and PCS100 based system with a total capacity of more than 800 MVA for commercial and industrial applications.

To find out more about ABB's power protection solutions:

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Additional information

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