



Eaton products ensure the reliable operation of the industrial equipment at Sorochinskiy Oil Extraction Plant (OEP)

Location:

Russia, Sorochinsk

Challenge:

In order to facilitate the round-the-clock operation of its production lines, the Sorochinskiy Oil Extraction Plant, an NMZhK Group company, was looking for an equipment vendor that would be able to ensure reliable power distribution in line with its very specific operating requirements.

Solution:

xEnergy switchgear, the Eaton Diagnose System for temperature monitoring.

Results:

The implementation of reliable power distribution across the entire production facility at the Sorochinskiy Oil Extraction Plant.

"We have been using Eaton's electrical equipment at our plant since it was first commissioned. With their high degree of dust and moisture protection and the standard-compliant form of internal separations, Eaton products help us to operate in harsh environmental conditions. Eaton's equipment is highly reliable, which makes us confident that we won't face a shutdown due to a power supply failure,"

Konstantin Udakov, Technical Director at Sorochinskiy (OEP), NMZhK Group.

Background

NMZhK Group is a vertically integrated holding company that operates oil and fat processing plants, oil extraction plants and elevators. These facilities cover the full production cycle, from the delivery of raw materials to the processing plants to the shipment of the final products to the points of sale.

The Sorochinskiy Oil Extraction Plant became operational in mid-September 2015. Its annual processing capacity amounts to 400,000 metric tons of oil seeds. The facility closed a gap in the production chain between the oil seed producers, agricultural processors and oil consumers in the region.

2016 saw an increase in the production output, thanks to the addition of a third press, an additional granulator and the installation of new hulling and purification equipment. This also necessitated an expansion of the power distribution system.

Challenge

Due to the nature of the oil extraction business, the plant had very specific energy distribution and engine control requirements. First of all, the switchgear needed to have IP54 degree of protection in order to withstand the high levels of dust and moisture.

The NMZhK Group's traditionally high safety standards required distribution cabinets with Form 4b internal separations in accordance with GOST R 51321.1-2007 (Low-voltage Switchgear and Controlgear Assemblies), which stipulates the separation of the busbars from all functional units, as well as the installation of external conductor terminals in a separate compartment. In addition, the available space for the installation of the electrical equipment was also limited.

As a second requirement, the engine controls also had to support hot swapping of any connection. In the event of a scheduled or emergency shutdown of one section, all the remaining sections thus had to operate normally.

By the time the project was launched, a remote control system for operating the production process was already in place. As such, the newly installed control elements had to be able to transmit status data from the electricity distribution equipment to the operating panels.

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Solution

From the very beginning, the energy distribution system at the Sorochinskiy Oil Extraction Plant was based on Eaton products in fact, about 100 Eaton switchgear units were delivered together with the main processing equipment. Since the equipment had proven to be both fault-free and easy to use, the plant leadership once more opted for Eaton's offer.

Within the framework of the new project, Eaton supplied 11 xEnergy sections of three different types. In addition to the XP power sections, XW withdrawable sections were installed to support hot-swap connections, while XG general-purpose sections were used to accommodate frequency inverters, soft starters and automation components. The first switchgear assembly consists of eight XP, XW, and XG sections, while the second is composed of three XW sections only.

Given the limited amount of space, the decision was made to arrange the full-height floor-mounted switchgear in a U-shape, using special side sections that support busbar transition angles of 90°.

Eaton's xEnergy switchgear meets the requirements of all applicable international standards, including IP54 degree of protection, which prevents the ingress of water and fine particles. Form 4b specifically requires internal partitions between all

equipment compartments, in order to prevent tampering with the busbars and other live equipment, and to protect people against electric shocks.

What's more, Eaton's xEnergy XW sections also support hot swapping of the engine control system. This way, there is no need to de-energize the entire switchgear assembly during repairs or scheduled downtime, thereby avoiding a complete shutdown of the system as other parts continue to operate normally.

To enable operators to access all the necessary control information directly at their work station, special Eaton sensors were installed that can transmit both digital and analogous signals to secondary terminals. These sensors are compatible with any standard software and support a wide range of information transfer protocols.

Additionally, with the Eaton Diagnose System it was possible to implement continuous temperature monitoring of the busbars and the air inside the new switchgear. This technology supports both early fault detection and the performance of routine maintenance. For instance, a temperature increase may be the result of fine particles clogging the ventilation filters.

Continuous monitoring also enables the plant to maintain the high safety standards of its other equipment. The Eaton Diagnose System replaces the

"manual" monitoring of busbar temperatures, which requires the disassembly and thus the complete de-energizing of the switchgear cabinets. Moreover, with the traditional manual procedure it is almost impossible to obtain accurate readings, as the ventilation conditions change when parts of the partition are removed. Finally, it is also not possible to take manual measurements continuously, which significantly reduces the likelihood of detecting a potentially hazardous situation in time.

At the same time, this additional protection resulted in a mere 10% increase in the project cost, a small prize to pay compared to the potential fallout from a switchgear failure.

Results

With the help of Eaton products, the Sorochinskiy Oil Extraction Plant was able to implement a state-of-the-art power distribution system that meets its requirements for reliability and integration into the monitoring system. The Eaton equipment that was installed does not require any special maintenance during operation and also allows for the repair and replacement of the plant's main industrial equipment without any service interruptions.

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