

ArcelorMittal

Schneider Electric solution ensures success of new desulphurization installation at Ougree coke works

I. CUSTOMER ENVIRONMENT / PROJECT CONTEXT

Customer profile:

Since the beginning of the Industrial age, the Liege basin in eastern Belgium has been the centre of intense steel activity. Many of the techniques used in the modern steel industry were first developed there. The prominence of the steel industry in Liege is due in large part to one man in particular, John Cockerill, an English industrialist who moved to Seraing in 1817. He revolutionized the steel production process by creating the first coke fired blast furnace in 1821, replacing the coal fired ones. This innovation highlights the importance of the coke works as one of the principal activities in the production of steel, along with the blast furnace, the agglomeration and the steelworks.

The Ougree coke plant is part of steel and mining giant ArcelorMittal. It is composed of a coke plant with 139 ovens grouped into four batteries and producing 800,000 tons of steel coke a year. In order to comply with the environmental regulations for air pollution control, the Ougree coke plant recently invested in a desulphurization unit for its coke oven gas.



Project Overview

- Market segment: Mining, Minerals, Metals
- Country: Belgium
- Year order: 2011

Customer objective and constraints:

The primary challenge was to realize a desulphurization installation within the tight budget constraints. The technical experts at the Ougree site were given carte blanche on the project. They began by developing the project architecture and selecting the project methodology. The functional analysis of the method, research, equipment choice, specifications, planning and coordination of the site and the commissioning were all carried out by ArcelorMittal's multi-disciplinary teams.

The project team opted for the wet oxidative process. This method, called the Stratford process, offers the advantage of dramatically reducing the sulphur content, thereby allowing the use of standard burners in the boilers working with this desulfurized gas.

The first step in the process is the scrubber, a tower 35 metres high into which the gas is injected from the bottom and reacts with a special liquid sprayed from the top of the tower. After having absorbed the sulphur, this liquid is then passed through the oxidizers, creating a redox reaction (reduction-oxidation). The air blowers in each oxidizer cause the formation of a foam which can then be extracted and used in the sulphur treatment. The final step is the separation of the liquid from the sulphur using a centrifuge. The liquid is then reinjected into the process whereas the sulphur is removed.

Alongside these principle processes, there are also many additional steps including the preparation of the liquid, the treatment of the sludge and waste, the addition of demineralised water; it was clear that such an installation required a sophisticated and robust automation system.

II. SOLUTION IMPLEMENTATION

● Ecostruxure



Power Systems

- Power quality
- Power availability & reliability



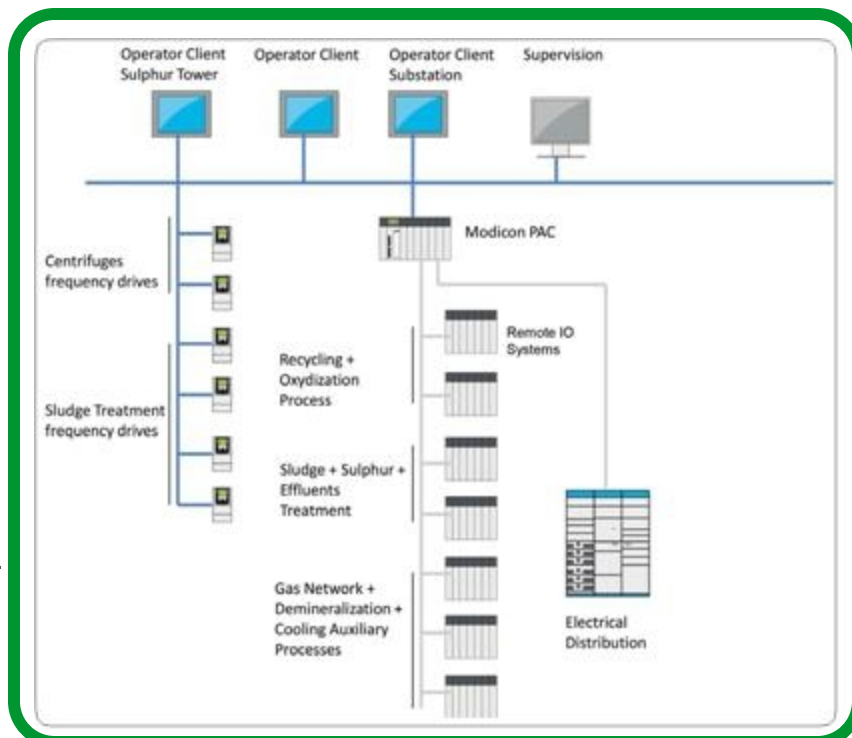
Process Systems, Machine Control

- Process control

Solution overview

In light of the environmental constraints (dust and a corrosive atmosphere), an electrical room was implemented and divided into two areas to accommodate the 1.600KVA power transformer at one end and – interconnected by using Schneider Electric's Canalis busbar system – the low voltage switchboards and control cabinets on the other. A 2.500A Masterpact circuit breaker protects the installation.

All motor starters above 30kW were installed directly in the LV switchboards. The others were installed in the control cabinets, also from Schneider Electric. The cabinet assembly, installation and commissioning were all carried out by Fabricom Industrie Sud, a system integrator based in Ans.



Due to the high number of digital (992) and analogue (152) I/Os and their distributed positions, the Modicon Premium platform was chosen. Especially helpful for this installation was the ability to interconnect up to 16 racks by means of Premium's backplane bus called Bus X.

In order to distribute the sensors and actuators per process areas (10m area) and to facilitate their connection, the I/O modules of the PAC used Telefast wiring connections. For the motor speed control requirements, all the ATV71 frequency drives are linked via an Ethernet network. The Modbus TCP/IP protocol and a star topology ensure high communication performance between the variable speed drives and the Modicon Premium PAC platform. The I/O scanning service ensures a smooth exchange between the drives and the PAC.

Supervision of the system is done using 15" Magelis HMI touch screen panels and a supervision computer. Thanks to the "Web Gate" service included in the Magelis touch screen panels, employees of ArcelorMittal can visualize and intervene in the process from any computer connected to the network simply by using an Internet browser.

Additional Ethernet networks allow communication to the Ougree Energy Department and ensure the communication with the gas analyzers. Other equipment, such as the centrifuge, is linked via a Profibus DP fieldbus. Schneider Electric also provided conformal coating for all the automation equipment to protect it from the atmospheric conditions particular to a coke plant.

The user friendliness of the Unity programming software and Vijeo Designer HMI configuration software is a significant advantage for ArcelorMittal personnel.

III RESULTS / ACHIEVEMENT

Customer benefits:

One solution provider for energy distribution, automation and instrumentation

- On a conceptual level, this was the first time the coke plant embarked on such an important project that encompassed energy distribution, automation and instrumentation. The success of the commissioning confirmed that Schneider Electric was the best choice and strengthened the mutual confidence between the technical teams from ArcelorMittal and Schneider Electric.

The PlantStruxure automation solution provided a host of benefits including:

- Reliability, scalability, ease of maintenance and security
- High performance and flexibility
- Increased process visibility

Customer testimonies (Verbatim):

"The coke plant has been equipped with Schneider Electric products and solutions for a long time to our complete satisfaction and we appreciate the quality of Schneider Electric's services."

Francis Comeron: Electrical and Instrumentation Manager, ArcelorMittal.