DELIN Elettronica implements PlantPAx DCS for a gas dehydration process with integrated safety management within Otumara Flow Station Node in Nigeria

PlantPAx DCS scalability and flexibility give Italian system integrator the capability to successfully implement process control with Foundation Fieldbus Technology

Challenge

Technical specifications imposed by the end-customer demanded a considerable evolution of the control system architecture, with safety management at SIL 2 Level, full redundancy and smart equipment management on Foundation Fieldbus

Solutions

A PlantPAx distributed control solution from Rockwell Automation has been installed. This includes:

- High-End process controllers in standard and SIL2 configuration
- Rockwell Automation Library of Process Objects
- Remote I/O in redundant configuration
- EtherNet/IP Infrastructure with DLR technology
- Foundation Fieldbus
- HART protocol
- Redundant OPC interface

Results

- Project standardisation
- Availability of real-time information on equipment diagnostics
- Smart equipment management on Fieldbus Foundation
- SIL 2 compliant Safety Management
- Further strengthening of an long standing collaboration for future projects

Gas dehydration, glycol regeneration and low-temperature separation at an extraction facility in Otumara, Nigeria

Background

DELIN Elettronica is a system integrator headquartered in Modena, Italy. Established in 1983 as a distributor of electronics systems for industrial automation, the company has since moved its focus from sales to engineering and now offers its system integration capabilities in both automation and process control applications.

The company has recently seen success using equipment from Rockwell Automation at an installation for gas dehydration, glycol regeneration and low-temperature separation within an extraction facility in Otumara, Nigeria.

The project, which started at the end of 2011, immediately saw a collaboration between Rockwell Automation and Delin Elettronica. It intensified along 2012 when faced with significant standardisation imposed by the end-customer which therefore required a relevant evolution in the control system architecture. The PlantPAx® distributed control system from Rockwell Automation was recommended due to its modernity, scalability and flexibility, combined with the opportunity of providing process and safety management in hazardous area.

The end-customer imposed standardisation, which required a considerable evolution in the control system architecture

Challenge

Upon extraction, the raw natural gas is saturated with water vapour and needs to be dehydrated. Most of this water must be removed prior to the gas compression and shipment in liquid form to the storage tanks through dedicated pipelines.

The dehydration process takes place at the extraction site and, in most cases, it is achieved using glycol. In this specific case, triethylene glycol (TEG) is deployed, since it is regenerated at a higher purity level, accepting that, during the process, the glycol has a loss at a lower vapour level with respect to other diols. Such achievable high purity level and lower losses during the dehydration process increase efficiency and reduce process costs.

Although the equipment used for the dehydration process is generally the same, there may be relevant changes in its installation, depending on the type of sub-systems used. For this specific project three customised packages were deployed: one for dehydration, one for glycol regeneration and another dedicated to separation at low temperature. The units are installed as an integral part of the Otumara Node Project, with the aim of commercialising hydrocarbons that were previously burnt off.

The packages are engineered and conceived for outdoor use in hazardous areas, and are installed on a complex steel structure mounted on supports and located on one of the branches of the Niger delta.

DELIN Elettronica was involved in the early stages of the project, when the manufacturer initially thought to provide an installation based on minimal automatic control, therefore requiring standard process equipment. The initial idea already included a Rockwell Automation system including controllers and Operator Workstations (OWS).

In 2012, the end-customer imposed standardisation which would have required a considerable evolution in the control system architecture. The technical specifications

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required segregation of the hardware and software within two main systems: Process Automation System (PAS) and Safety Instrumented System (SIS).

On top of that, SIL2 compliance in accordance with TUV specifications for SIS and high availability, with CPU, communications and I/O redundancy, for both the PAS and the SIS systems were now required.

The PlantPAx system, engineered on a standard multi-disciplinary control architecture, allowed the strong integration between the different subsystems and components

For management of smart field equipment the use of Foundation Fieldbus Technology was requested with redundant linking devices as well as redundant analog I/O cards with HART protocol. A redundant OPC communication link to the plant DCS was requested via two industrial PCs for remote monitoring and control of operating conditions, and overall system synchronisation.

Solution

Thanks to its advanced features and to the great flexibility, coupled with the global capability of Rockwell Automation to offer spare parts and technical support, DELIN Elettronica had no doubts about choosing the PlantPAx distributed control system based on an EtherNet/IP™ network infrastructure and Fieldbus Foundation. The reliability of the Fieldbus Foundation Technology in managing information and the seamless integration with the PlantPAx was key for the success of the project.

The PlantPAx system, engineered on a standard multi-disciplinary control architecture, allowed the strong integration between the different subsystems and components as requested by the project. The possibility to use the Rockwell Automation Library of Process Objects allowed an easy implementation of an accurate and fine control and diagnostic of all process variables as well as field instruments, devices, motors and valve actuators with HART and Foundation Fieldbus too. The flexibility and the openness of the Library of Process Objects allowed DELIN to develop specific and customised Function Blocks and Faceplates to fulfil project specific requirements. The DELIN Elettronica technical staff have always been supported by global product specialists from Rockwell Automation.

Results

Thanks to the Rockwell Automation Library of Process Objects DELIN has been able to strengthen the project standardisation in order to use it as the basis for further Oil & Gas applications.

This successful experience has also further strengthened the collaboration with Rockwell Automation, offering new joint opportunities not only in the Oil & Gas industry, but also in other markets.

Being one of the first examples of implementation for the new Foundation Fieldbus architecture in the PlantPAx solution, the support from Rockwell Automation was essential for DELIN Elettronica, in order to both manage and configure the system.

The use of Foundation Fieldbus Technology in PlantPAx enabled DELIN Elettronica to manage multiple integrated interfaces during software development, using tools that are fully integrated in the system. Upon integration, it will generate relevant information concerning equipment diagnostics, while providing predictive-assessment capabilities for maintenance. All this has a positive outcome on both the total cost of ownership (TCO) and optimisation of asset utilisation.

Additional Information

www.rockwellautomation.com

The results mentioned above are specific to DELIN Elettronica's use of Rockwell Automation products and services in conjunction with other products. Specific results may vary for other customers.

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