

Control valves for a huge petrochemicals complex Metso-Shell relations and Nanhai China

Metso Automation will supply all rotary control valves for the new Chinese petrochemicals complex in southern China. In total, Metso will deliver approximately 3,500 to 4,000 control valves as well as digital Foundation Fieldbus positioners for the CSPC project. The order is one of Metso Automation's most extensive deliveries ever for the hydrocarbon industry.

The vast project worth EUR 4.3 billion will be built by the CNOOC and Shell Petrochemicals Company Limited (CSPC) joint venture, which was established between Shell Nanhai BV and China National Offshore Oil Corporation Petrochemicals Investment Limited (CNOOC).



Major construction work is expected to start in 2003, and the complex is scheduled to start operations at the end of 2005

Long-term relationship with Shell

The value of Metso's share in this order will be approximately EUR 10 million, and the deliveries will take place from 2003 to 2005. Markku Simula, Vice-President, Sales and Services, Metso Automation, says that the order of rotary control valves is a break through for Metso Automation on the Chinese market.

"In 2002, we had a growth rate of 44% in field equipment and valve deliveries. So, we have experience in working with Chinese companies. To win this valuable deal, we had extensive negotiations with BSF consortium (Bechtel, Foster Wheeler and Sinopec). With Shell, our customer relationship dates back to the late seventies."

The China-Shell Petrochemical Complex will be a huge petrochemical complex. Simula gives an example: A large greenfield paper mill requires about 600–700 control valves, whereas the CSPC delivery includes at least 3,500 valves. Once completed, the joint-venture company will produce about 2.3 million tons annually of petrochemical products, primarily supplying customers in Guangdong and other high consumption areas of China's coastal economic zones. The entire complex has been designed to international environmental standards and for the efficient use of energy and materials.

"Metso Automation has a long-term relationship with Shell in the various countries and on a global level via Shell international by means of the Metso Automation Global Key Account approach," says Simula.

"Wherever we are, our aim is to combine global presence with local expertise. A local Metso person will be hired to provide local services. This person is part of the Metso organization and will be supported by the Global Key Account and service organization."

Because of this long-term relationship and history with Shell, Metso Automation has a good installed base all over the world in Shell plants. This installed base is considered to be "proven technology" and has shown its reliability. "For the coming 5–10 years, China will

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continue to be a fast-growing petrochemical/chemical market and a focus area for Metso Automation," Simula concludes.

Spirited teamwork

For the China-Shell Petrochemical Complex, Metso Automation formed a small, but flexible project team at an early stage. The persons in charge of the project are Mr. Hans Schaap, Director Global Key Account Management, who acts as Sales Project Manager and Mr. Oscar Bronsveld, Global Key Account Manager Shell. Both form part of the CSPC Nanhai Sales Project Management Team. Also in charge are Mr. Dave Irvine, Proposal Manager, and Mr. Jari Kousa, Execution Project Manager. Oscar Bronsveld says that Metso's flexibility enabled a fast response. "We could fulfill the customer needs for this project not only from a product point of view, but also in terms of the Metso organization serving Shell on the local and international levels. Metso is also able to provide the latest technologies, which are required in new plants like this one. We meet the latest Shell specifications, and have solutions and technology available to suit the applications."

Metso Automation proposed a "rotary concept" for this project based on Metso's rotary control valve technology. "This technology enables us, for example, to provide valves with a large range and low fugitive emission capabilities as standard compared to globe valves. Metso is able to handle complex projects like these by having local offices to serve the different engineering contractors all over the world who have a specific part of this project. Worldwide coverage and coordination are a key issues here," according to the project team. "Metso provides in-house engineering in each engineering office around the world. This means that a Metso instrument engineer assists in the selection and sizing of the products by being physically present in the engineering contractor offices to allow short communication lines and expertise 'in-house' for proper solution or application advice."

Metso has local presence in China (Beijing and Shanghai) and will invest resources at the location of the new plant to serve CSPC during the project and after the plant has started up. Above all, this combination includes quality, price and reliability, which are always important for a customer in the decision-making process. "Of course we cannot speak on behalf of Shell, and how that company made its final decision. We can only make sure that our customers get what they expect from us in order to have the confidence that the job will be properly done." According to the project team, the negotiations proceeded well. The negotiations lasted approximately eight months until the "MFPA", the control valve contract for this project, was signed. "Due to our early involvement in the project. we did not face surprises. We were prepared for what was coming and what was expected from us. In this project, we did not have direct cooperation with the Chinese project partners. We only worked with the BSF project management team and Metso's local Chinese offices. Also regarding the newest technologies, we dealt with the Shell/ BSF project management teams."

Shell has a 50% ownership in this project, and it is Shell/CSPC that is the technology provider for the whole project. The Shell DEP and MESC project specifications had to be followed, stresses Bronsveld. CSPC's Mr. Johan Veerman, Principal Instrument and Process Control Engineer of the project, explains the basis for the control valve order: "A good product, but more importantly, is that the relation etween supplier and client is based on confidence and trust in supplying and delivering the control valves for the project as promised. This combination creates a win-win situation. With the selection of Metso, we believe we have obtained both, which is essential as the project involves multiple engineering contractors and locations."

Rotary concept

About 90 to 95% of the valves will be of the Metso rotary type. The main Metso valve series in this project are Neles Finetrol, a rotary eccentric control valve, as well as the Neles R-series, representing the rotary segment control valve. Also the Neles T-series, top-entry rotary control valves, are part of the delivery.



Metso will deliver a total of approximately 3,500 to 4,000 control valves as well as digital Foundation Fieldbus positioners for the CSCP project.

All these valves will be supplied with the Metso intelligent positioners, which will communicate according to the Foundation Fieldbus communication protocols. All types of diagnostic and predictive maintenance possibilities are included. These Metso positioners communicate directly with the plant DCS system, which is also based on the Foundation Fieldbus protocol. Fieldbus positioners represent a new-generation of communication technology, which makes it easier to have information on valve maintenance and service. The information provided is mostly online data. The Foundation Fieldbus protocol provides much better data transfer capabilities. Speed is a lot higher than the HART protocol, for example. This enables more exact and faster data communication, creating a lot of new opportunities within control loop efficiency and performance.

According to Oliver Jenkins, Director of Fieldbus and Smart Solutions, long-term benefits of fieldbus are based on increased production efficiency. "To start, standardized control functions mean flexible control for a potentially more accurate response. Fast and accurate control performance, as well as strategy optimization, cut down process variability. "An efficient information flow from field devices ensures that the operator can make effective decisions. With Fieldbus, a status message is enclosed in every control cycle, indicating the validity of the signal. If it is not good, then a selector can switch to the signal using a back-up device. All in all, Fieldbus features a consistent flow of data. Maintenance planning is thus much easier. There is also a reduction in the use of shutdown spares."

Metso will also deliver safety measures like NelesValvGuard to Shell/CSCP. This is an electronic safety device that replaces the normal solenoid valves. This device is used on ESD (Emergency Shut Down) and depressurizing valves. The device tests the valve and actuator, as well as its own electronics and pneumatics. Neles ValvGuard is TUV approved to be used in SIL 3 environments. The use of this product in this project is still under negotiation.

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