Sinopec Jiujiang Pioneers an Intelligent Factory

By Zongbin Zheng, Reporter for Energy Magazine

On the bank of the Yangtze River and at the foot of famous Mount Lushan, Sinopec Jiujiang began as Jiujiang Refinery in 1980, and eventually became one of Sinopec’s forty-four subsidiaries. Thirty-five years later, the Jiujiang refinery’s production plant, equipment, and methods were lagging behind its peers. In response, the management of Sinopec Jiujiang is acting on the promise of Industry 4.0 technologies by committing to build smart business applications for planning and scheduling, energy management, safety, environmental protection, device operation, and IT governance.

The company’s efforts have created a model for implementing Industry 4.0 fac- tory intelligence in other Sinopec subsidiaries throughout China.

Industry 4.0 in the Petrochemical Industry

Any enterprise choosing to deploy an “intelligent factory” is aiming to achieve operational and management excellence through the use of innovative technology. The concept of “Industry 4.0” includes highly computerized, modular, and integrated factories under visualized control. According to Zongbin Li, Deputy Director of Information Management for Sinopec, their intelligent digital factory for oil and gas production is designed to incorporate and achieve the following:

- Build a comprehensive sensor system.
- Coordinate business operations at all levels.
- Improve forecast and warning capabilities to enhance production safety and meet best-practice standards for environmental protection.
- Use cloud computing and Big Data technologies to support better decision-making.

Operationally, the goal of every intelligent factory is to provide data capture, analysis, forecasting, and process optimization capabilities for the enterprise. Although the Intelligent Factory embraces the advanced concepts of fully-networked Industry 4.0 solutions, real-world implementations remain in their infancy. According to Zongbin Li, intelligent hardware deployments for pilot projects in China are doing well, but progress with application systems is slow, as many systems must be developed from the ground up.

To achieve company objectives, Sinopec Jiujiang plans to construct three large platforms, consisting of eight primary production systems and two supporting IT systems for each. The three platforms are expected to handle every business activity inside the company, from development and construction to production operations management and control. To help guide their business focus, the intelligent factory project at Sinopec Jiujiang is incorporating input from business departments across the organization in contrast to previous projects within Sinopec that were run by the IT depart- ment alone.

Intelligent Factory Initiatives

Sinopec Jiujiang began planning for the intelligent factory in 2011. The 2012 goal was to define a foundation that included upgraded ICT systems and applications such as Enterprise Resource Planning (ERP) and Manufacturing Execution Systems (MES). Through 2014, key systems ini-
tialized included:

- Health, Safety, and Environment (HSE) emergency command
- Energy optimization
- 3D factory visualization
- Enterprise business analytics and operations monitoring
- Business process optimization

Completion of these items has pushed Sinopec Jiujiang to the top tier of Sinopec’s ICT capabilities. Once fully operational, Sinopec Jiujiang expects to achieve an annual production capacity of one million tons.

Strategic Partnership with Huawei

Sinopec Jiujiang chose Huawei to design and build its intelligent factory solution. To achieve company objectives, Sinopec Jiujiang plans to construct three large platforms, consisting of eight primary production systems and two supporting IT systems for each. The three platforms are expected to handle every business activity inside the company, from development and construction to production operations management and control. To help guide their business focus, the intelligent factory project at Sinopec Jiujiang is incorporating input from business departments across the organization in contrast to previous projects within Sinopec that were run by the IT depart- ment alone.

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tion. The Huawei intelligent factory solution for the oil and gas industry includes a converged wired and WiLTE wireless communication platform that considers the special conditions of petrochemical industries. For example, oil refineries are dense with thousands of meters of steel pipe that block and interfere with radio transmission signals. The Huawei eLTE solution uses radio frequency technologies with optimized diffraction and penetration performance.

“Once we begin intelligent factory construction, our journey will not end. We will continue to advance our efforts as new technologies and business needs emerge.” — Zongbin Li, Sinopec Deputy Director of Information Management