

Malaysian Gas Processing Complex Reaps the Benefits of a Yokogawa APC Solution

GPP

Location: East Coast, Malaysia
Order date: April 2006
Completion: December 2007
Industry: Oil & Gas

About the Customer

A Malaysian Gas Processing and Transmission Company as a subsidiary of the national oil & gas major, plays a prominent role in the gas business value chain. The company operates as a throughput service company providing the services of processing and transmission of gas to the power generation sectors and various customers.

The company operates six gas processing plants (GPP) in East Coast Peninsular Malaysia and is the country's single largest producer and supplier of sales gas through a nationwide transmission and delivery network. In addition to sales gas, other products (ethane, propane, butane) are sold as feed stocks to downstream petrochemical plants.

Background of This Project

The company was looking for a partner with the right advance process control (APC) technology for its gas processing complex. Yokogawa conducted a feasibility study that would identify suitable technology, determine the areas that could be optimized, and estimate the potential benefits. Completed in 2005, this study found that GPP's No. 2 gas processing plant (GPP 2) was a good candidate for a Yokogawa APC solution.

The Reasons for Selecting Yokogawa

Through this feasibility study, Yokogawa concluded that its APC technology had good potential to bring the company an excellent return on its investment, generating considerable interest among this company's management. After a competitive bidding process, Yokogawa ultimately succeeded in receiving the contract for this prestigious project, and its selection as a preferred vendor was due in good part to its strong expertise in implementing optimization solutions for gas plants.

The Challenges and the Solutions

1. Continually fluctuating feed gas composition

Efforts to optimize the operations of the gas processing complex were complicated by continual fluctuations in the composition of the feed gas, which came from an offshore field. The resulting changes in the liquid load at the downstream units caused inconsistent product recovery, and this was difficult to manage at the DCS level. However, the multivariable controller is able to sense the changes in composition at an early stage and adjust the parameters to maintain a constant liquid load.

2. Feed maximization

Constant changes in multiple constraints make it difficult for operators to maximize plant throughput. While respecting safety limits, the APC controller continuously predicts the constraints so that plant throughput can be maximized.

3. System integration with Honeywell TDC3000 and EPKS systems

OPC data exchange between the APC server and the legacy Windows based application processing platform (APP) node link to the TDC3000 LCN and EPKS required configurations for optimum performance. This problem was tackled by optimizing data scanning and setting the priority for data processing in the APP node.

The Results

1. Rapid return on investment (eight times the CAPEX)

GPP 2, 3, and 4 APC economic benefits exceeded the expected return on investment and annual APC benefits exceeded eight times of CAPEX. This is equivalent to ROI in 1.5 months.

2. Big jump in product yield

A 4.6% increase in the production of sales gas, ethane, propane, and butane was registered during the successful test run of the APC application due to increase in recovery factor and plant load. This increase in production rate was attributed mainly due to:

- Maximization C2 and C3 Recovery factor
- Maximization of Gas Load
- Maximization of Liquid Load
- Maximization of C4 Recovery from Condensate
- Component shifting to maximize the more valuable product

3. Major improvement in energy efficiency

A unique energy minimization strategy led to a 2.5% improvement in energy efficiency by optimization of column operating conditions and utilization of recycle stream to recover energy from recycle streams in various plant units.

4. Operators paradigm shift to Operational Excellence

By constantly adjusting plant parameters that previously had to be manually adjusted by plant operators, the APC controller allows operators to spend more of their time focusing on improving plant efficiency and performance.

Customer Satisfaction

To the immense satisfaction of the APC team and customer's management, Yokogawa successfully implemented the APC at all three plants despite working on a tight schedule. This successful initiative has boosted the morale of all engineers and operation technicians at this complex and has spurred new initiatives to implement improvements. Continuing on the success of GPP 2, 3, and 4 APC projects, the company has decided to award Yokogawa the contract to implement the APC at GPP 5 and 6.

System Details

System

DCS: Honeywell TDC 3000/ Honeywell EPKS

OPC: APP node

APC suite: Yokogawa Exasmoc Online Multivariable, Model Predictive and Optimizing Controller

Yokogawa Exarqe Robust Quality Estimator Exarqe

Yokogawa Electric Corporation

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