



## SUCCESS STORY

# Advanced Process Control in FCCU Fuji Oil Company, Ltd. (Fuji Oil), Japan

**Location:** Sodegaura, Chiba, Japan

**Order Date:** June 2001

**Completion:** March 2002

**Industry:** Oil & Gas

Fuji Oil's Sodegaura refinery is one of the important suppliers of the oil products to other oil and petrochemical companies in Chiba Petrochemical Complex and of fuels to the Tokyo metropolitan area. In 2001, the company introduced Yokogawa's Advanced Process Control (APC) technology for use with their Fluid Catalytic Cracking Unit (FCCU). Because of its ability to produce high-octane gasoline component from gas oil, the FCCU is always expected to operate at maximum capacity.

At the beginning of this project, a careful study was made so that the most suitable system could be designed for Fuji Oil. Next the base layer controllers in the DCS were carefully tuned to react smoothly to the APC. Finally, quality estimators and controllers with several supporting programs were implemented and commissioned. This 10-month project was a big success, with the new APC maximizing the charge rate, increasing conversion, decreasing energy costs, and automating many manual operations. Fuji Oil calculated that the total annual benefit of the FCCU APC exceeds US\$700,000.

In this project, Fuji Oil used Yokogawa's Exasmoc multivariable optimizing control package, Exarqe robust quality estimator package, and Advanced Process Control Station (APCS: a PC-based control station in the Yokogawa CENTUM CS 3000 DCS family). A total of five Exasmoc controllers were designed to get maximum benefit from the FCCU. For product quality control, nine Exarqe estimators were installed instead of the on-line analyzers. In the APCS, conventional controls and supplemental calculations, e.g. surge volume control and internal reflux, were built to support Exasmoc control.

### Why Fuji Oil Selected Yokogawa

Fuji Oil decided to introduce Yokogawa's APC because they appreciated this system's capabilities as well as Yokogawa's know-how for making APC applications. They were aware that Exasmoc and Exarqe have many practical features based on the long time process control experience of Shell. Yokogawa is the only provider of this Shell APC technology. Easy and reliable connectivity with the existing DCS was also attractive to Fuji Oil: the APC system was connected with the Toshiba CIEMAC system via a gateway using Yokogawa's OPC interface technology.

### **From the Customer**

Hiroaki Usami, the Fuji Oil FCCU operator, commented as follows:

“For operators, Exasmoc and Exarqe are easy to understand. They use the actual operating data for the design. The model used in Exasmoc is not a black box. Models can be re-arranged based on our process know-how. So even when there is a control problem, it is not difficult to specify the cause and resolve the problem. That is why we can rely on it. With the introduction of Exasmoc, the productivity of our plant is increasing. The operating rate of this APC system is almost 100% and we rely on it very much. It is indispensable to our operation.

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**System:** Exasmoc, Exarqe, Exaopc, CENTUM CS 3000  
**System Configuration:** 2 x HIS, 1 x APCS, 1 x PC for Exaopc, Exasmoc and Exarqe  
**Scope:** APC design, gateway design, APC commissioning services