

Progress Report on the Special Cooperation Program on Research & Development of Evaluation of FCC Additives and HDS Catalysts for Vietnam

During fiscal 2013, JCCP provided technical assistance to two subsidiaries of Vietnam's state-run oil company Petrovietnam (PVN)—Vietnam Petroleum Institute (VPI) and PVPro (Research & Development Center for Petroleum Processing)—through implementation of the “Research & Development of Evaluation of FCC Additives and HDS Catalysts,” as a special cooperation program for Vietnam.

1. Background

Vietnam has 4.4 billion barrels of proven crude oil reserves (OGJ report as of January 2012) and the third-largest crude oil reserves of all countries in the Asia-Pacific region, but there is potential for this amount to increase if exploration and development of offshore oilfields is strengthened. Vietnam's crude oil production may have dropped slightly from before, but even so, the country still produces 330,000 b/d, and is one of few countries in Asia that produces oil independently. Furthermore, Vietnam has maintained a high economic growth rate of around 6 to 7% over the past decade, despite a slight slowdown in recent years, and is expected to be an important oil-producing country and trade partner to Japan in the future. Petrovietnam, in particular, is one of Japan's most important counterparts (CP), as it controls major oil businesses in Vietnam. As a



Discussion at PVPro

direct cooperation project with Petrovietnam's research departments VPI and PVPro, this project is expected to make a large contribution to Vietnam.

Petrovietnam presently operates the Dung Quat Refinery with a capacity of 150,000 b/d, which is planned to be increased in the future. The refinery's main cracking unit is the RFCC (residue fluid catalytic cracking) unit. The company also has plans to construct the Nghi Son Refinery with a 200,000 b/d capacity in the near future, to be equipped with an RFCC unit and an RDS (residue desulfurization) unit for pretreatment of residues. PVPro thus requested JCCP's guidance in evaluating FCC additives and HDS catalysts. The request reflected Vietnam's wish to actively introduce Japanese technologies to enhance technological capabilities and refinery efficiency in Vietnam's promising oil-refining industry.

Given the above background and request, PVPro and JCCP agreed to implement the following activities in fiscal 2013.

2. Overview

- 1) Implementation period: April 2013 – March 2014
- 2) Overseas counterpart: VPI (Vietnam Petroleum Institute); PVPro (Research & Development Center for Petroleum Processing)
- 3) Participating company: JGC Catalysts and Chemicals Ltd.
- 4) Activities

The project was implemented in Vietnam as part of JCCP's special cooperation program for oil-producing countries, with PVPro, the R&D department of Petrovietnam, as the counterpart. It aimed to transfer to PVPro technologies for the evaluation of two types of catalyst that are needed for stable and efficient operations of an RFCC unit: FCC additives, which are added to FCC catalysts; and HDS catalysts, which

are loaded into the RDS unit for pretreatment before sending residues to the RFCC unit.

In fiscal 2013, the final year of the three-year project, PVPro engineers were invited to Japan on two occasions to attend a training program on evaluation technologies for the two types of catalyst at JGC Catalysts and Chemicals, and to learn about the latest technologies related to oil refining catalysts through lectures. Engineers from JGC Catalysts and Chemicals were also sent to PVPro on two occasions to provide onsite technical guidance using the company's process units. Furthermore, members from the management class at VPI, an institution ranked above PVPro, and Petrovietnam were invited to Japan to exchange views on the status and degree of contribution of the project. At the end of the fiscal year, a review meeting was held in Vietnam with the attendance of all parties concerned, to summarize and share the results of the project in fiscal 2013.

3. Summary

The transfer of technologies for the evaluation of FCC additives, which are added to RFCC catalysts, and HDS catalysts, which are used in the RDS unit prior to processing residues in the RFCC unit, was carried out through the following events.

(1) Invitation of PVPro engineers to Japan

PVPro engineers were invited to Japan to receive even more practical training on FCC and HDS catalyst evaluation technologies at JGC Catalysts and Chemicals, and to discuss the latest oil refining catalyst technologies.

(2) Visits to PVPro by Japanese engineers

Engineers from JGC Catalysts and Chemicals visited PVPro on two occasions to provide technical guidance on FCC and HDS catalyst evaluation technologies.



Meeting with JGC Catalysts and Chemicals Ltd.



Members of the review meeting at PVPro

(3) Invitation of management-class personnel to Japan

Management-class personnel from PVPro, VPI and Petrovietnam were invited to Japan to meet with management-class officers at JCCP and JGC Catalysts and Chemicals and share views on the significance and results of the project.

(4) Review meeting

At the end of the fiscal year, members involved in the project, including the Petrovietnam Group, gathered at VPI and PVPro to summarize the FY2013 activities of the project and to discuss and share views on its achievements.

Through the above activities, PVPro acquired the ability to evaluate FCC catalysts on its own, where it had previously relied on licensors and catalyst makers. By being able to accurately evaluate equilibrium catalysts at the Dung Quat Refinery and assess the operational status of the refinery's FCC unit, the project also achieved the goal of enhancing evaluation technologies at PVPro. Furthermore, the project deepened understanding of FCC and HDS catalysts, and prompted PVPro to make independent efforts to examine catalysts and otherwise engage in other applications of the technology.

In the final review meeting, the enhancement of evaluation technologies at PVPro was recognized as an achievement of the project, not only by PVPro, the direct beneficiary of the technical guidance, but also by members of VPI. Also in the final review meeting held at VPI, which included the attendance of a number of members from PVN, the parent company, members shared the awareness that VPI and PVPro's technological capabilities have been enhanced through the project.

Lastly, both VPI and PVPro expressed their deep appreciation for the project, demonstrating that Japan's technical support has been beneficial.

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