Maximizing the field value at cost effective operation challenges in Malaysia*

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**Abstract**: JX Nippon Oil & Gas Exploration (Malaysia) Limited (JX Nippon) is the operator of offshore gas field (Block SK10). The field has produced over 1 Tcf of natural gas since the 1st production in 2003 with an outstanding record of no Lost Time Injury (LTI) operation for 12 years. Various operation optimization and cost reduction efforts have been carried out since the beginning of the field.

Operation optimization and cost reduction would be one of the most relevant practices in upstream companies. However, the recent oil price decline enforces all parties in the industries, to take immediate and robust actions for further cost reduction to sustain and remain secure the business.

This paper introduces challenges and approaches for cost effective operation by JX Nippon for Block SK10 gas field. These approaches are not limited to individual Petroleum Arrangement Contractor (PAC) efforts but also activities under a nationwide alliance among Petroliam Nasional Berhad (PETRONAS) and all the PACs.

**Keywords**: Malaysia, efficient field management, CORAL 2.0

1. Introduction

Oil and gas industries in Malaysia has been expanding since 1974 upon the forming of Petroliam Nasional Berhad (PETRONAS), representing the government of Malaysia to manage the development and production of oil and gas in both East and West Malaysia. JX Nippon Oil & Exploration Corporation (JX Nippon) has been involved in Malaysia since the acquisition of Block SK10 in 1987. JX Nippon’s main production fields are located in Block SK10 and Block SK8. In addition to the production projects, JX Nippon is continuing several exploration projects as an operator in Malaysia. Malaysian projects have become the key operations for the company. In this paper, the focused is mainly on the JX Nippon’s activities in Block SK10.

Block SK10 is operated by JX Nippon (75%) and partnership with PETRONAS Carigali Sdn. Bhd. (PCSB) (25%). The field has been stably producing gas and condensate since 2003 while achieving the target rate instructed by PETRONAS. Block SK10 features a stable and reliable operation, recognized by PETRONAS based on the three following indexes.

- Contractor’s Compliance Index (CCI): A unique index established to evaluate the Petroleum Arrangement Contractors (PACs) compliance level in 12 components, such as Health Safety and Environment (HSE), production operation, finance, Work Program and Budget (WPB) etc.
- Unit Production Cost (UPC): The cost incurred to produce, process and transport for producing one barrel of oil equivalent.
- Overall Equipment Effectiveness (OEE): An indicator that measures the efficiency of the producing platform facilities to deliver production as planned.

Block SK10 has achieved high level of performance in accordance to the 3 indexes. In 2014, Block SK10 was ranked 2nd among PACs participated.

2. Efficient field management

The recent crisis of oil and gas price decline, enforces all of companies to take drastic counter measures to further reduce operation cost whilst sustaining stable operation, ensuring the future of the business. One of the strategic approach is “efficient field management”. Efficient field management is a system of on-going process at all stages of field life cycle. It consists of multidisciplinary process and input, aiming for updating the reservoir understanding and optimizing the field performance. The basic concepts are combination of 1) continuous reservoir data acquisition and analysis, 2) track-
ing of reservoir performance with reference to reservoir Key Performance Indexes (KPIs) and 3) response to compliance, triggering for reservoir performance optimization to address sustainable gas production as well as field long term potential (Fig. 1). In Block SK10, this system covers 1) compliance to Reservoir Management Plan (RMP), 2) prudent well surveillance and management, 3) facilities reliability management and 4) collaborative effort on best practices via participation in PETRONAS Initiatives. The detailed discussion in this paper, mainly explained JX Nippon’s activities related to collaborative effort for cost and operation optimization in Malaysia using the know-how of Block SK10 operations through the leadership of PETRONAS.

3. PETRONAS activities

PETRONAS has initiated an industry wide cost reduction program, called “Cost Reduction Alliance (CORAL)”, since 1994. It consists of three main objectives; (1) to inculcate cost conscious mindset and culture across the industry, (2) to benchmark efficiency with best-in-class performance and (3) to increase collaboration and innovation as well as infuse global best practices (Fig. 2). JX Nippon has fully supported the CORAL program with its active participation and leadership among the PACs since the very beginning of program implementation, especially in the well cost reduction initiative.

![Fig. 1 Basic concept of JX Nippon's efficient field management](source)

![Fig. 2 Basic concepts of CORAL 2.0](source)

![Fig. 3 Way forward of CORAL 2.0](source)
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The scope in year 2015 focused on control and reduction of cost (Fig. 3). PETRONAS and all PACs set a target of RM 1.4 billion cost reduction in 2015. As a result, CORAL 2.0 program has achieved an actual saving of RM 2.4 billion at the end of 2015. This achievement is proven and justified that CORAL 2.0 program is a practical and effective program. Total of 26 PACs participated in CORAL 2.0, and following 11 collaborative initiatives are executed. (Table 1)

1. Joint sourcing (services) Drive incremental savings for services through joint sourcing, and innovative sourcing strategies and processes
2. Logistics control tower Establish common planning and scheduling of logistics resources across PACs
3. Warehouse centralization and common stocking Consolidate and centralize warehouses, expand VMI concept and reduce inventory holding
4. Cost driver benchmarking (OPEX) Drive cost savings for asset O&M and G&A cost categories
5. Renegotiation of contracts Drive rationalization of tenders and concept rates / prices to enable better economics of E&P activities
6. Surplus material management Drive the reduction of surplus material through improved planning, inventory management and monitoring.
7. Low cost drilling Drive reduction of drilling costs through optimization of planning and well design, operation practices, etc.
8. Cost driver benchmarking (CAPEX) Establish CAPEX benchmarking across PACs and standardize CAPEX KPIs
9. Joint sourcing (materials) Drive incremental savings for materials through joint sourcing and innovative sourcing strategies
10. Technical standards Drive competitive and standardized design to optimize project CAPEX and shorten project duration
11. Late field optimization Drive cost reduction through optimization of resources, revision of O&M philosophy and sourcing re-strategization

Table 1 The 11 collaboration teams for CORAL 2.0

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4. JX Nippon activities

Beside joining the collaborative efforts of CORAL 2.0, JX Nippon also implements internal cost optimization by initiative team which following the scope of CORAL 2.0 in year 2015 – “control and reduction of cost”. This team has propelled JX Nippon to achieve an actual savings of RM 7.28 million covering 10 planned activities by the end of 2015. This saving value is equivalent to approximately 4.4% of 2015 actual budget.

Fig. 4 JX Nippon’s achievement for compliance indicator in 2015

Abbreviation: Gas Oil Ratio (GOR), Gas Injection to Gas Production ratio (GIGP), Voidage Replacement Ratio (VRR)

Fig. 5 JX Nippon’s achievement for field value indicator in 2015
The initiatives taken are mainly classified into 2 groups. The first is "cost avoidance" initiative, which means reducing the cost from originally expected by properly revising the plan such as the modification of procedures. The second is named as "cost reduction" initiative. This includes reducing the cost without changing original procedures. The 1st group is including following 6 initiatives.

1. Alternative inspection method for corrosion monitoring
2. Upgrading of pipe materials – lead to reduce corrosion inhibitor consumption
3. Changed of time based inspection to Risk Based Inspection (RBI)
4. Reduced workscope for piping replacement
5. Optimized usage of consumable materials (lubrication for main machines, replacements parts, etc.) in platform
6. Providing in-house training

And the 2nd group is including following 4 initiatives.

1. Anomaly campaign 50 persons accommodation vessel
2. Diesel fuel reduction
3. Reduced vessel charter rate
4. Renegotiations of contracts

Through these collaboration efforts of “efficient field management” and internal initiatives, JX Nippon has managed to achieve an amount of cost savings in 2015, which was higher than originally estimated with PETRONAS. For that reason, JX Nippon will continue to participate in the collaboration activities in 2016 onward. Further cost reduction is expected due to continuous RBI, operation optimization and maintenance workflow, using in-house Personnel On Board (POB) management system and contract price negotiations.

In spite of cost reduction measured to the operation in 2015, JX Nippon managed to keep a stable and reliable operation without any problems. Gas delivery is still in accordance with the supply commitment. As for the compliance indicator, all the reporting is at 100% compliance (Fig. 4). In terms of the field value indicator, all of the items monitored have recorded 70% or better (Fig. 5). For topside static equipment and metering systems availability, all of the items required to report have achieved 100% (Fig. 6). JX Nippon has maintained an outstanding achievement based on PETRONAS CCI in 2015, ranked 3rd among production PACs following a better achievement in 2014 where JX Nippon was ranked 2nd overall. Although the ranking dropped, CCI value itself has improved to 1.56 compared to 1.65 in 2014 (Fig. 7) and keeping higher ranking among the PACs. In addition, JX Nippon has reported no Lost Time Injury (LTI) record since 6th April 2004.

5. Conclusions

JX Nippon has continued operation optimization and cost reduction efforts as a prudent operator and a member of PACs’ alliance. Under the latest CORAL 2.0 program initiated by PETRONAS, JX Nippon could achieve the target in its first fiscal year of 2015, and has successfully given positive feedback to PETRONAS and other PACs.

The key factors to achieving these results are 1) persistent production monitoring, well integrity survey and facility maintenance, 2) sturdy cooperation with the national petroleum industry, 3) efficient field management, and 4) internal initiatives. These strategies have enabled JX Nippon to achieve excellent results in terms of cost savings and operational efficiency.

Fig. 6: JX Nippon’s achievement for topside static equipment and metering systems availability in 2015

Fig. 7: JX Nippon’s achievement for CCI in 2015

Abbreviation: Supply Chain Management (SCM)
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The activities mentioned in this paper are related to efforts carried within JX Nippon company only, and did not represent the approach or strategy in different organization within Malaysian operation. JX Nippon is delighted if the approach written in this paper is referred to and contributes to the maximization of field value carried out by different bodies outside of the company.

### SI unit conversion factor

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\text{Tcf} \times 2.831685 \ E + 10 = \text{m}^3
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