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Leveraging Lessons Learned Across Multiple Deepwater Projects

L.B. Waters, P.P. Smith, and C.A. Prescott, ExxonMobil Development Co.

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Abstract

Two key strategies for managing and executing large-scale capital projects have been employed recently for West Africa deepwater developments. “Design One, Build Multiple” and the Early Production System (EPS) allow leveraging of lessons learned across multiple deepwater projects and reduce project cycle time, cost, and development risks. The “Design One, Build Multiple” strategy has been employed for the large Kizomba A and B developments in Angola and smaller EPS projects, such as Yoho (Nigeria), Zafiro (Equatorial Guinea), and Xikomba (Angola).

Construction of two nearly identical Kizomba floating production, storage, and offloading vessels (FPSOs) and tension-leg platforms (TLPs) required a different approach from traditional stand-alone projects. Key implementation success factors included continuity between projects and strict adherence to change control. This strategy resulted in significant cost savings and schedule contraction for the Kizomba B project.

Use of the EPS strategy during development of Xikomba demonstrated that this approach can be effectively applied for relatively small, remote resources that are not readily accessible to existing infrastructure. The depletion plan was modified to utilize an existing FPSO design rather than designing a new FPSO to match an optimized depletion plan. Project cycle time was only 19 months. EPS can thus reduce development risk in cases of significant resource uncertainty.

Introduction

The Angola Block 15 development has been a flagship for deepwater development in the industry. The speed with which the Kizomba B project was brought on-line set industry records for construction and production ramp-up. This fast-track development would not have been possible without the early management decision to create a single design for Block 15 offshore platforms, production vessels, and subsea systems and to use that design for multiple projects.

The development of Angola Block 15 provides a prime example for successful application of the “Design One, Build Multiple” strategy, which was employed in the construction of FPSOs; TLPs; and subsea umbilical, riser, and flowline (SURF) systems for the Kizomba A and B projects. This strategy can be coupled with the EPS strategy to accelerate first oil in a development area. In Block 15, this collaboration of strategies was demonstrated in the application of EPS at Xikomba.

The West Africa experience has led to the identification of key project conditions for successful implementation of the “Design One, Build Multiple” strategy. These include use of the same

- engineering design,
- engineering and fabrication contractors,
- fabrication yards,
- vendors and suppliers,
- project leadership teams, and
- project management systems.

In addition the strategy requires different approaches than those used on traditional stand-alone projects, including

- alignment of project schedules and execution plans,
- employment of common safety and quality programs,
- adoption of a “No Design Change” philosophy,
- alignment of engineering and procurement deliverables with fabricators’ construction methods, and
- real-time capture of lessons learned.

The “Design One, Build Multiple” strategy, if properly planned, managed, and executed, can optimize project economics for multiple large developments that have similar geologic, geographic, economic, and contractual elements. The learnings realized from West Africa deepwater applications of this strategy can be applied in other oil and gas development projects.

The EPS strategy employed in Angola Block 15 also relies heavily on the “Design One, Build Multiple” concept. Since EPS systems are designed to achieve first oil in a fraction of the time required to develop permanent production facilities, the transfer of knowledge and experience from one project to the next is crucial to prevent construction delays. The Xikomba FPSO, following the execution of the Yoho and Zafiro projects, exemplifies the use of “Design One, Build Multiple” to facilitate EPS applications.