

"Standardized" Field Development Planning in Acceleration of the Upper Shuaiba Reservoirs in the North of Sultanate of Oman

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ABSTRACT

There is an ever increasing requirement to simplify and streamline work processes, driving out wasteful costs and inefficiencies as part of a bottom line focus in a changing business environment. In Shell Upstream Exploration and Production (E&P), Petroleum Development Oman (PDO) is a front runner in the implementation of LEAN. So far the successes achieved have been mainly in the arena of Well, Reservoir and Facilities Management (WRFM), Human Resources (HR), well engineering and Contract and Procurement (C&P). For the first time in PDO, a major hydrocarbon maturation project has been set up using LEAN methodologies.

Unconventional development strategy for a conventional oil development. The main production in Northern Oman is currently from Lower Shuaiba (LS) reservoirs, but the contribution of Upper Shuaiba (US) is increasing. The Lower Shuaiba reservoirs comprise clean and continuous carbonate layers, whereas the Upper Shuaiba (US) is characterized by clay-rich, less continuous and thin (average 6 m) layers. The main development scheme for the Upper Shuaiba is a horizontal line drive, lifted by ESPs and tied back to the existing production station via Remote manifold stations (RMSs).

Over the last 12 years exploration discoveries have led to the development of three areas. Despite all the exploration efforts, there was still a large uncertainty in the area extent and STOIP distribution (factor 3 between low and high case) driven by reservoir distribution and uncertainty in OWC related to the observed tilting of the contact. Based on this, accelerated appraisal and development of the US play is currently pursued.

The development aspects of the project are: An evacuation scheme with a new RMS station at every 100 km² is proposed (4 firm locations and up to 6 notional ones dependent on the appraisal results). The standard design of the RMS and the standardized urban plan is based on a generalized high-case production forecast per area and will consist of an RMS station in the center of the 100 km² block and 4 satellite stations. The installation will take place in phases, starting with installing a low case facility upon proving up a minimum volume similar to unconventional developments. Continuous monitoring of the development drilling and production results will lead to fast implementation of subsequent phases of development. The development is modular to cater for upside and changes in business setting. Equipments that form the building blocks of the development are standardized making use of standardized procedures such as price agreements.

The current centralized processing facilities will be handling the production. Expansion of the production station might be required and will be standardized and modular in order to cater for further upside and minimize the exposure. The scope of the expansion is reviewed as part of the annual planning cycle, based on the latest results from of the appraisal campaign and further development drilling. A design of this expansion will be matured in parallel with the appraisal campaign.

Therefore the main development decisions targeted by the appraisal campaign are:

1. Decide on the number and locations of new RMS facilities and the priority of these locations;
2. Decide on the development scheme appropriate for each area; and
3. Decide on the scope and phasing of the production station expansion.

This project is defined in a nested way, meaning that parallel project streams have different levels of maturity. For example, the FID for the appraisal campaign and setting up project team was received in 2014, FID for the first two RMSs was taken in 2015 and 2016, but the decision to expand the processing facilities and FID for a further six RMS locations is only envisaged in 2019.