GAS FIELD PRODUCTION OPTIMIZATION USING INTEGRATED NETWORK MODELING
CASE STUDY OF SSE GAS MANAGEMENT

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ABSTRACT

SSE (South Sumatra Extension) is one of Medco E&P Indonesia’s gas producing areas. It has 77 wells spread over 11 gas fields, with gas gathered at 6 main stations. In order to be able to make quick decisions to support monetization of the gas in SSE area, it is necessary to build an integrated network model for the area. This integrated model is designed for engineer(s) as they look for opportunities to improve and optimize the fields by anticipating any unexpected conditions that might impact on gas deliverability and by taking timely remedial action when necessary.

Generic Nodal and Network System software is used to build an integrated production network model from the wellbore to the sales point at SSE area. Generic Nodal generates a wellbore model (from reservoir to wellhead) while Network System software generates a surface facilities model (from wellhead outlet to gas sales point). When the network model was built and had been validated, it showed that there was a 3.7% difference between actual gas production and the simulation result (as per June 5th, 2010). The model is sufficiently reliable to conduct further simulation scenarios.

Some cases were simulated using the integrated network model. One of the cases was to reduce the separator pressure at 5 wells in Lagan field from medium pressure to low pressure to increase gas deliverability. This optimization scenario gives a 3.54 mmscfd gas gain as per simulation result and 3 to 4 mmscfd gain on a real application. Another case was the shut down compressor situated at Soka station, which created a 5 mmscfd loss which went to flare. High-pressure wells were optimized to fulfill the gas demand, while low-pressure wells should be shut in to reduce gas flare. This was all simulated easily and quickly with the integrated network model.

INTRODUCTION

One of the concerns about managing a gas field is how to maintain gas production to fulfill all GSAs (gas sales agreements) for the time period determined. Reservoirs and production performance vary at every gas field, since gas fields have different characteristics, so the treatment on surface facilities should also vary. It is common in Indonesia that there are many gas fields with their different reservoir characteristic in a gas contract block. It is a big challenge to cater for these varying fields within one appropriate production system by reducing the back pressure effect from each field on the meeting point.

Integrated network modeling is a tool to incorporate a gas production system (reservoir, production, surface facilities and pipeline networking) into a model in order that the complete gas system can be easily observed. All wells, surface facilities and pipeline network modeling are included.

Before discussing how to build and use integrated network modeling for gas management, there are various concerns that need to be considered in order to develop good gas field management from the