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Result and knowledge of the 6th and 7th drilling campaigns based on the integrated geological and reservoir studies in Lufeng 13-1 Oil Field in South China Sea

—As an example of efforts for enhancement of production in late stage of the oil field—

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Abstract: Lufeng 13-1 Oil Field operated by JHN Oil Operating Company (JHN) is located in South China Sea. For enhancement of oil production rate, the 6th and 7th drilling campaigns were carried out from 2004 to 2006 on the basis of the geological and reservoir study. Ten horizontal wells were drilled in total on these campaigns. The wells on the 6th drilling campaign show rapid decrease of oil production rate with rapid increase of water cut after production start (categorized as Type 1). On the other hand, most of the wells on the 7th drilling campaign perform gradual decrease of oil production rate with gradual increase of water cut (categorized as Type 2) or stable oil production rate with much lower and stable water cut (categorized as Type 3). These types seem to be controlled by geological factors; permeability of the oil reservoir, presence of the low permeable zone such as mudstone or muddy sandstone just below the oil reservoir etc. The wells of Type 2 and Type 3 contribute to enhance oil production rate of the oil field significantly. The present oil production rate on the 7th drilling campaign accounts for nearly 50% of the total oil production rate in the oil field.

Two important knowledge concerning control factors of water cut and oil production rate in late development stage of the oil field are derived from the result of the 6th and 7th drilling campaigns.

(1) Careful considerations of the presence of the low permeable zone acting as “barrier” or

“filter” below the reservoir are needed as well as the oil reservoir quality in the target section (2) Precise skills of reservoir navigation are required to secure enough oil reservoir section contributing in stable oil production as planned.

Key words: water cut, oil production rate, low permeable zone, water coning, barrier, filter, reservoir navigation, late stage

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