Solutions to the Problems after Marginal Oilfield Joins to Complicated Pipe Network

Wenguang Wang, Yufei Wan, Ping Lu, Lin Cheng, Yueqi Wang

CNOOC China Limited, Tianjin Branch
Tianjin, China

ABSTRACT

Marginal oilfield is becoming the primary alternative oil and gas resources in Bohai Oilfield as most of the existing oilfields are entering the middle-late development phase. In general, the development of marginal oilfield relies on other oilfields or facilities due to low IRR (internal rate of return) if developed independently. However, the existing pipe networks of Bohai Oilfield are rather complicated. A number of problems would need to be resolved if marginal oilfields were connected to these networks. These problems are illustrated with a given marginal oilfield in Bohai Bay of China, which would be developed by three production wells and two water injection wells. The nearest existing platform is about 16.1 km away from the marginal oilfield and the existing pipe network contains five pipelines. In order to realize the development of this marginal oilfield, the problems requiring attention include the pressure change caused by the change of fluid properties of the marginal field, and the influence on flow assurance of the original pipeline and existing platform. Feasible and safe solutions are proposed in this paper to resolve these problems, which could help provide useful references to other marginal oilfields.

KEY WORDS: marginal oilfield; complicated pipe network; heavy oil; reverse point; demulsifier; slug flow.

NOMENCLATURE

CEP Central Platform
IRR Internal Rate of Return
WHP Wellhead Platform

INTRODUCTION

Marginal oilfield is becoming the primary alternative oil and gas resources in Bohai Oilfield as most of the existing oilfields are entering the middle-late development phase. The proved reserves of marginal oilfield in Bohai can be rather large (Wan, Qian and Wang, 2018). However, the degree of difficulty in developing these oilfields is rather high due to many factors, such as environment, higher technology requirement and low IRR. In order to develop marginal oilfield economically, a strong reliance on existing infrastructure is often required. However, the existing pipe networks of Bohai Oilfield are rather complicated. A number of problems will need to be resolved if a marginal oilfield were to connect to these networks. A comprehensive assessment of these pipe network issues is required before proceeding with the development of a marginal oilfield.

BACKGROUND

Oilfield A is a typical marginal oilfield of Bohai Oilfield, which will be developed by three production wells and two water injection wells. The sketch map of oilfield and nearby oilfield is shown in Fig. 1.

Fig. 1 Field Development Plot Plan of Oilfield A-D

Oilfield A is a new oilfield to be developed. The nearest existing