A Study on Remote Control Production Mode Before Typhoon’s Arrival for Offshore Platforms

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ABSTRACT

For offshore oil and gas production platforms in South China Sea, each year during the typhoon season from July to September many platforms shall be shut down before typhoon’s arrival. However, it will result in much production loss for several days sometimes more than one week. In order to reduce the loss during typhoon season, it is badly needed to design a remote control production mode to delay the shutdown time as late as possible before Typhoon’s arrival. Based on certain newly-built offshore Central Production Platform (CEP) in South China Sea, a remote control production mode is designed, in which main design principles are studied including considerations on restart, well killing, self-support days, water content of export in subsea pipeline and pipeline replacement and so on, and also special power managing system, control system and communication system are designed. Under the remote control production mode, for the newly-built CEP each year at least 4185m³ crude oil loss during the typhoon season could be avoided. It is expected to provide reference for offshore platforms in similar sea area.

KEY WORDS: offshore; oil&gas production; typhoon; remote control; shutdown.

NOMENCLATURE

CEP Central Production Platform
FPSO Floating Production Storage and Offloading
UPS Uninterruptible Power Supply
PCS Process Control System
SIS Safety Instrument System
RMB Renminbi

INTRODUCTION

For offshore oil and gas production platforms, it was noted (Ma and Gao, 2017; Miao, Liu, Wu and Wang, 2015) that it is usually to shut down earlier enough and evacuate personnel before typhoon’s arrival in order to make sure the absolute safety. However, it will result in much oil production loss for several days, especially sometimes the typhoon just bypass or turn round without arriving finally, which was proposed by Song (2022) and Lin, Jian and Nie (2022). In South China Sea, there are lots of oil and gas production platforms, and each year during the typhoon season from July to September, many platforms shall be shut down with much oil production loss. In order to reduce the loss during typhoon season, it is badly needed to design a remote control production mode to delay the shutdown time as late as possible before Typhoon’s arrival.

Based on certain newly-built offshore CEP in South China Sea, a remote control production mode is designed, in which main design principles are studied including considerations on restart, well killing, self-support days, water content of export in subsea pipeline and pipeline replacement and so on, and also special power managing system, control system and communication system are designed. CEP is a central production platform with one stage separation, and crude oil with 20% water content is transported to the existing FPSO which is 42km away for further process treatment through subsea pipeline, referring to figure 1. On the FPSO, after two-stage separation, oil with 0.5% water content flows to the crude oil cabins for storage and offloading. The CEP is powered by crude oil generators on the platform.