OFFSHORE PLATFORM DECOMMISSIONING

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ABSTRACT

Offshore facilities decommissioning is a relevant issue in oil and gas industry. Many of offshore structures in Malaysia are fast approaching the 30 years design lives and hence reaching the end of its economic lifetime. The project no longer generates profit and options for extending the life of the field has been exhausted. Hence, the well needs to be abandoned and the structures have to be decommissioned. In Malaysia for instance, have approximately more than 300 oil and gas platforms and more than 90% of these platforms have to be decommissioned in the future. So far, there are only a few platforms have been decommissioned due to the fact that there is lack of regulatory framework in Malaysia. However, Malaysia follows the guidelines provided by its national oil company, PETRONAS which is the PETRONAS Procedures and Guidelines for Upstream Activities (PPGUA). Malaysia also follows good and modern international guidelines such as the United Nations Convention of The Law of The Sea (UNCLOS) 1982, the London Dumping Convention 1972/1996 and also the International Maritime Organization's (IMO) Guidelines and Standards. Abandonment and decommissioning process consist of activities such as Well Plugging and abandonment, Pipeline Abandonment, Conductor removal, topsides removal, and substructures removal and disposal. However, there are challenges in performing decommissioning operations namely HSE challenges, financial challenges, technical and technology challenges. In spite of these challenges, there are three decommissioning options and alternatives such as leave platform in place, partial removal and complete removal of platform. Last but not least, the decommissioning sector needs to find good solutions in order to overcome the above challenges and also gain in knowledge to help eliminate the challenges. The operations need to be comply with national and international laws and regulations. Various weak points and lessons to be learned will be identified. Hence, decommissioning regulatory landscape in Malaysia need to be improved in order to satisfy the oil industry operators and other users of the sea.

ABSTRAK

Pelucutan tauliah pelantar minyak dan gas adalah isu yang berkaitan dalam industri minyak dan gas. Banyak struktur luar pesisir di Malaysia cepat menghampiri kehidupan 30 tahun dan akan mencapai akhir hayat ekonominya. Ia tidak lagi menjana keuntungan dan pilihan untuk melanjutkan hayat telah habis. Oleh itu, ia perlu ditinggalkan dan struktur perlu ditamatkan. Malaysia mempunyai kira-kira lebih daripada 300 pelantar minyak dan gas dan lebih daripada 90% daripada pelantar minyak dan gas ini perlu ditamatkan pada masa hadapan. Setakat ini, hanya terdapat beberapa pelantar minyak dan gas telah ditamatkan disebabkan oleh kekurangan rangka kerja kawal selia di Malaysia. Walau bagaimanapun, Malaysia mengikuti garis panduan yang disediakan oleh syarikat minyak negara, yang merupakan prosedur PETRONAS (PPGUA). Malaysia juga mengikuti garis panduan antarabangsa seperti Konvensyen Bangsa-Bangsa Bersatu Undang-undang Laut (UNCLOS) 1982, Konvensyen Lambakan London 1972/1996 dan juga (IMO) Garis Panduan Pertubuhan Maritim Antarabangsa dan Standard. Peninggalan dan proses pelucutan tauliah terdiri daripada aktiviti seperti Penutupan telaga, saluran paip minyak dan gas peninggalan, Konduktor penyingkiran, sisi atas penyingkiran, dan substruktur penyingkiran dan pelupusan. Terdapat cabaran dalam menjalankan operasi iaitu cabaran HSE, cabaran kewangan, cabaran teknikal dan teknologi. Di sebalik cabaran-cabaran ini, terdapat tiga pilihan pelucutan tauliah dan alternatif seperti pelantar minyak dan gas dibiarkan di tempat asal, penyingkiran sebahagian dan pembasmian sepenuhnya pelantar minyak dan gas. Sektor penyahtauliahan perlu mencari penyelesaian yang bagus untuk mengatasi cabaran di atas dan juga mendapat ilmu pengetahuan untuk membantu menghapuskan cabaran tersebut. Operasi perlu mematuhi undang-undang dan peraturan kebangsaan dan antarabangsa. Pelbagai pengajaram yang akan dipelajari dan dikenalpasti. Oleh itu, penyahkawalan landskap pengawalseliaan di Malaysia perlu dipertingkatkan untuk memenuhi pengendali industri minyak dan pengguna lain di laut.

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LIST OF ABBREVIATIONS

API	American Petroleum Institute
ASCOPE	ASEAN Council of Petroleum
CT	Compliant Tower Platform
CAPEX	Capital Expenditure
FP	Fixed Platform
FPSO	Floating Production, Storage and Offloading system
HSE	Health and Safety Environment
IMO	International Maritime Organization
LC	London Convention
NOAA	National Oceanic and Atmospheric Administration
P&A	Plugging and abandonment
RTR	Rigs-to-Reef Program
REEFS	Recreation, Environmental Enhancement and Fishing in the Sea
ROV	Remotely Operated Vehicles
UN	United Nations
UNCLOS	United Nations Convention of The Law of The Sea
SPE	Society of Petroleum Engineers
SPAR	Seagoing Platform for Acoustic Research
SS	Subsea System
TA	Temporary Abandoned
TLP	Tension Leg Platform

CHAPTER 1

INTRODUCTION

1.1 Project Background

Oil and gas industry is expecting an increase of activity in offshore platform decommissioning operations for the next few years. Eventually at one point, every well has to be permanently abandoned and the platform structures such as topside and jacket need to be decommissioned due to the fact that the production operation has reached at the end of a field's life (also when it is dry hole).

This option is necessary when the project is not generating money. Hence, it is advisable to permanently seal all wells that are no longer in production and also wells that cannot be economically repaired.

Plug, abandonment and decommissioning operation occurs when the well has reached the economic limit and therefore the production rate could not cover the operating cost. Hence the well becomes a liability and lastly, the well is being abandoned. The decision to plug and abandon is mainly due to higher cost of production and decrease in income generated.

Plug and abandonment defines as the activities that involved in securing the well to ensure that there will be no leakage. This process is also very critical because the environment needs to be protected from contamination.

Decommissioning process defines as the activities that involved in removing the entire platform from its location. Some of the activities during this operation such as topside removal, cutting and removing steel and jacket, severing piles and pipeline decommissioning.

There are two types of abandonment which are mainly Temporary Abandonment and Permanent Abandonment. Temporary Abandonment is where the well is being shut-in during a long shutdown and also waiting for work over/field redevelopment. Whereas Permanent Abandonment means that the well is plugged permanently in order to isolate the permeable and hydrocarbon bearing zone. This operation requires numerous considerations such as risk, safety, health and environments.

However, offshore platform decommissioning operation is essential for long term environmental protection and thus it needs to abandon the well in a safe manner with respect to regulatory compliance.

1.2 Problem Statement

Offshore platform decommissioning operations are quite challenging since it poses significant threats and potential hazards to the environment. When planning for the well to be plug and abandoned, a number of things need to be considered such as the type of well that being abandoned, the geographic location of the well, the impact of well on oil sand zones and also the type of cements in order to have a successful operation so that future environmental issue such as oil and gas leakage can be avoided.

Challenges such as higher operating and maintenance cost, lack of expertise, maintaining the legal compliance, comply with regulatory framework and requirements, emissions performance and operational impact need to be considered. These are some of the challenges that need to be assessed so that incidents can be prevented and reputational harm can be avoided.

Hence, proper management on environmental and safety aspects is required. Offshore platform decommissioning operation needs to adhere to proper safety management so that there will be no accidents and incidents that can happen during operation.

Typically, this operation is subjected to regulatory and legal compliance. It means that each country must follow guidelines and practices in order to proceed with this operation. For example, Malaysia follows United Nations Convention on the Continental Shelf, UNCLOS (1958) and IMO guidelines. Malaysia is also a member of ASCOPE (ASEAN Council on Petroleum) and it recently published a guideline on 'Decommissioning Guideline for Oil and Gas Facilities'.

1.3 Objectives of the Study

Below are the objectives of offshore platform decommissioning:

i. To compare the offshore platform decommissioning operations/practices between Malaysia and other countries and estimate the scale for the activities in Malaysia in next decade.
ii. To identify the challenges so that the operation would be cost effective, consumed less time, safer, greener and environmentally friendly.

iii. To examine the regulatory frameworks and identifying strong or weak points and suggesting lessons that Malaysia could be taken from other country's experience.

1.4 Scope of the Study

This project mainly focuses on the following aspects:

i. To suggest on how to implement the offshore platform decommissioning process in a safe manner with proper management planning and hence proposing the best practice for the operation which adheres to regulatory frameworks, standards and guidelines available.
ii. To focus on how to tackle the challenges such as technical and technology challenges, financial challenges and HSE challenges.
iii. To summarize the existing regulations and thus Malaysia can learn and adopt practices from other county regarding offshore decommissioning operations.

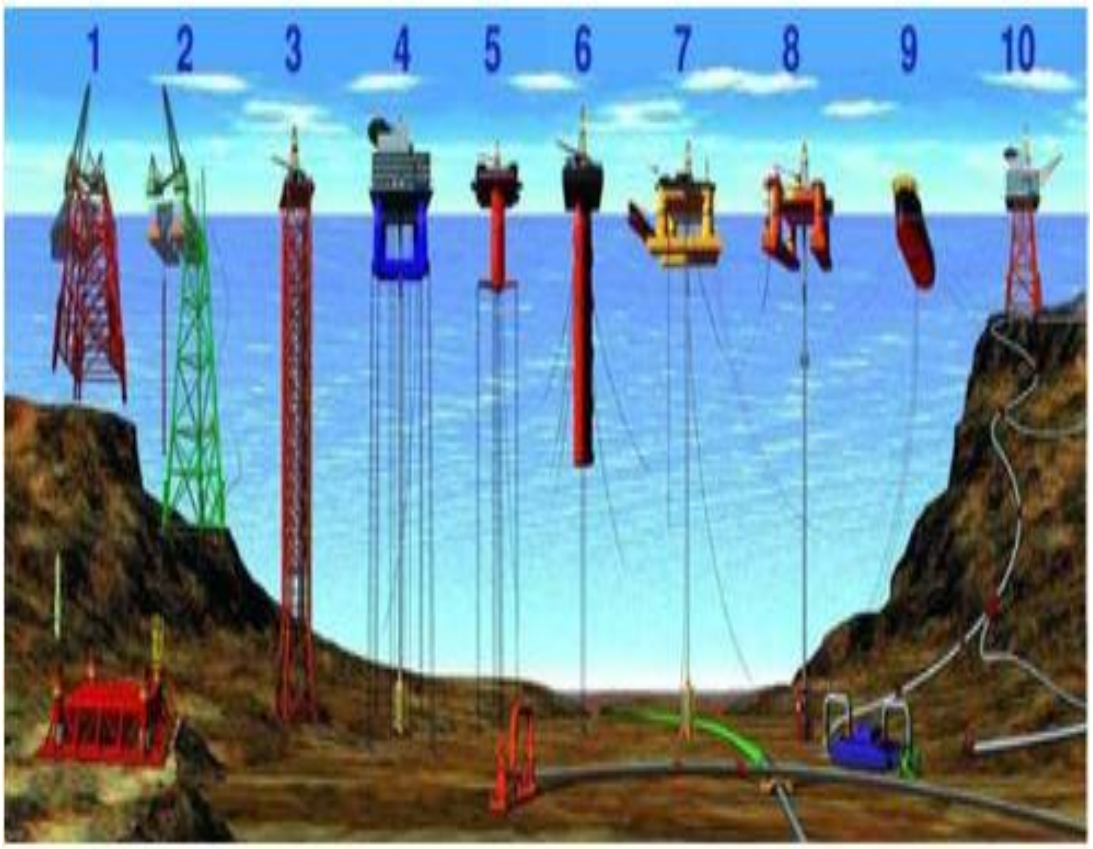

Figure 2.1: Typical types of offshore oil and gas structures. (NOAA, 2003)

From left to right:

1. Fixed platform (FP)
2. Fixed platform (FP)
3. Compliant tower platform (CT)
4. Tension leg platform (TLP)
5. Mini-tension leg platform (Mini TLP)
6. Seagoing Platform for Acoustic Research (SPAR)
7. Semi-submersible Platform (SS Platform)
8. Semi-submersible Platform (SS Platform)
9. Floating Production, Storage, and Offloading Facility (FPSO)
10. Sub-sea completion and tie-back to host facility

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