MINISTRY OF TRANSPORT
MALAYSIA

PETRONAS

MINISTRY OF HUMAN RESOURCES
MALAYSIA

Guideline For Offshore Floating Facilities (GOFF)

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FOREWORD BY DIRECTOR GENERAL OF DEPARTMENT OF OCCUPATIONAL SAFETY AND HEALTH, MALAYSIA

Assalamualaikum wbt. and greetings,

I am honoured to deliver this foreword and express my sincere appreciation on a successful collaboration between primary agencies – Department of Occupational Safety and Health ("DOSH"), Malaysia Marine Department ("MARDEPT") and PETRONAS, which is pivotal as we move towards shaping the future of Malaysia's Oil and Gas ("O&G") industry.

Malaysia continues to grow in the upstream segment of the O&G industry, therefore there is a need to seek new technology and solutions during exploration and production of our hydrocarbon resources. Floating production systems provides one of the best solutions to accelerate production start-up and hydrocarbon evacuation.

When the Offshore Self-Regulation ("OSR") journey started in 2013, DOSH was aware of the overlapping scope between the various Government agencies pertaining to offshore assets. A team comprising of industry experts was set up to study, formulate and develop a guideline that is robust and clear. This document provides a guideline for the Government agencies, PETRONAS and industry leaders to collaborate and ensure people' safety, and investment as well as assets are protected, reliable and productive. The success of this guideline is measured by the effectiveness of its implementation in which DOSH will become the enabler.

I would like to express my appreciation to all parties who have provided their valuable input and support in developing this guideline. I look forward to all parties' commitment in operationalising and ensuring successful implementation of this guideline in order to enhance the governance and safety of our people working in the offshore Malaysia waters.

Thank you.

YBhg. Ir. Hj. Omar bin Mat Piah
Director General
Department of Occupational Safety and Health
Ministry of Human Resource

FOREWORD BY DIRECTOR GENERAL OF MALAYSIA MARINE DEPARTMENT

Assalamualaikum wbt. and greetings,

This floater guideline is a joint effort between the Ministry of Transport, Ministry of Human Resources and PETRONAS to meet the ever-growing challenges of the Malaysian oil and gas industry. I am pleased that all the relevant stakeholders have contributed to this initiative as it will make it more relevant to their needs as well as facilitate its effective implementation.

This document will provide the oil and gas industry in particular, and the government in general, a guide to keep track of floater operations and its upkeep as well as flag major issues that may hinder its operational success, sustainability and profitability. In addition, this will enable timely interventions by the Government and industry players, in ensuring maximum investment returns to the nation in the face of industry challenges.

MARDEPT will continue to proactively manage this important sector and facilitate its long-term viability and sustainability. I am pleased that major timelines, benchmarks, and targets have been included to facilitate this guideline's implementation and ensure its effectiveness. I would like to thank DOSH, PETRONAS and all individuals and organisations that have contributed towards making this guideline a reality. I am sure many will benefit from this work as we seek to promote and strengthen the oil and gas sector that is such a critical component of the nation's economy.

Thank you.

YBhg. Dato` Hj. Baharin bin Dato` Abdul Hamid
Director General
Malaysia Marine Department
Ministry of Transport

FOREWORD BY SENIOR VICE PRESIDENT MALAYSIA PETROLEUM MANAGEMENT, PETRONAS

Assalamualaikum wbt. and greetings,

First and foremost, please allow me to extend my sincere appreciation to DOSH, MARDEPT, PETRONAS and all organisations and individuals who have contributed towards the successful preparation of this Guideline for Offshore Floating Facilities. PETRONAS fully supports the institutionalisation of this guideline as a reference to all Contractors, asset owner and Service Providers within the Malaysian oil and gas sector. The clarity and demarcation provided in this document is a product of close collaboration between all parties concerned. I am confident this guideline will be a useful source of reference in maintaining compliance with regulatory requirements.

I am also pleased to note that this guideline provides the necessary clarification on the relevant requirements as specified in the PETRONAS Procedures and Guidelines for Upstream Activities ("PPGUA") when related to floaters, particularly on the roles and responsibilities of DOSH and MARDEPT. Moreover, this guideline will ensure PETRONAS comply with the highest standards. In line with this, I would like to urge all Contractors, asset owners and Service Providers to take ownership and comply with the provisions in this guideline.

I would like to reaffirm PETRONAS' commitment to work together with all stakeholders to ensure sustainability of our hydrocarbon value chain. It is my sincere hope that this guideline will strengthen a safe working environment for all workers offshore. Ultimately, this collaboration will support our aspiration to achieve self-regulation in the future.

Thank you.

Ir. Mohamed Firouz bin Asnan
Senior Vice President
Malaysia Petroleum Management
Petroliam Nasional Berhad (PETRONAS)

PREFACE

Floating production facilities function as an alternative for receiving and producing hydrocarbons in deeper water depths or from marginal reservoirs. It is used as temporary facilities to realise and accelerate production start-up and hydrocarbon evacuation. Compared to fixed facilities (e.g. platforms), floaters have the advantage of being able to move from field to field following completion or depletion of reserves in a particular field. The floating production facilities are equipped with processing equipment for the separation, storage and offloading of oil and gas that are routed from sub-sea oil wells or platforms.

Floating production facilities usually take the form of trading ships and semi-submersible rigs that have been converted or custom-built to become production facilities with processing equipment located onboard its deck and hydrocarbon storage facilities located below the hull. As floaters have vessel characteristics and sea-going features, these floating production facilities fall under the purview of several Government agencies mainly the Malaysia Marine Department ("MARDEPT") and the Department of Occupational Safety and Health ("DOSH").

With the involvement of several Government agencies, there may be overlapping scope, roles and responsibilities. This guideline clearly defines and demarcate the roles and enforcement scope of each agency, enhancing the existing legal framework. This will facilitate the contractors, asset owner and service providers in meeting the minimum regulatory requirements for operating floaters within Malaysia waters.

ACKNOWLEDGEMENTS

On behalf of the Floater Sub-Committee, I am grateful that this guideline has finally been completed and ready for implementation. The knowledge and experience of the members of the committee from the respective agencies has been essential and valuable. Special thanks and appreciation on the hard work and dedication provided by PETRONAS personnel, En. Amir M Hazni, En Abdullah Abd Ghani and the following list of valuable contributors:

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ABBREVIATIONS

ABS	American Bureau of Shipping
ALARP	As Low as Reasonably Practicable
AIR	Asset Integrity & Reliability
BV	Bureau Veritas
COLREGS	International Regulations for Preventing Collisions at Sea
DNVGL	Det Norkse Veritas GL
DOSH	Department of Occupational Safety & Health
E&P	Exploration and Production
FMA	Factories and Machinery Act 1967
HSE	Health, Safety and Environment
HSSE	Health, Safety, Security and Environment
HSEMS	Health, Safety and Environment Management System
IADC	International Association of Drilling Contractors
ILLC	International Load Line Conventions
IMO	International Maritime Organisation
ISPS	The International Ship and Port Facility
ISO	International Organisation for Standardisation
JKKP	"Jabatan Keselamatan dan Kesihatan Pekerja"
KPI	Key Performance Indicator
LR	Lloyd's Register
MAH	Major Accident Hazards
MARDEPT	Malaysia Marine Department
MARPOL	International Convention for the Prevention of Pollution from Ships
MOC	Management of Change
MPM	Malaysian Petroleum Management
MSO	Malaysia Shipping Ordinance 1952
NKK	Nippon Kaijin Kyokai
OIM	Offshore Installation Manager
OSHA	Occupational Safety & Health Act 1994
OSHMS	Occupational Safety and Health Management System
OSR	Offshore Self-Regulation
OSRMS	Offshore Self-Regulation Management System

PDA	Petroleum Development Act 1974
PETRONAS	Petroliam Nasional Berhad
PIC	Person-In-Charge
PPGUA	PETRONAS Procedures and Guidelines for Upstream Activities
PSC	Production Sharing Contract
PSM	Process Safety Management
RACI	Responsible, Accountable, Consulted, Informed
RO	Recognised Organisations
RSC	Risk Sharing Contract
SCE	Safety Critical Element
SOLAS	Safety of Life at Sea
STCW	Standards of Training, Certification and Watchkeeping for Seafarers

TERMS AND DEFINITIONS

"Authority": Refers to the Department of Occupational Safety and Health (DOSH) and Malaysia Marine Department (MARDEPT) and PETRONAS.

"Contractor(s)": Refers to a contractor, i.e. a company that enters into a Production Sharing Contract or a Risk Sharing Contract with PETRONAS unless explicitly mentioned.

"Floater": A Floater is a facility that can be readily relocated with the aid of a marine spread and can perform an industrial function involving offshore oil and gas operations other than those traditionally provided by vessels covered in Chapter 1 of the 1974 SOLAS Convention.

"Lifting equipment": Lifting equipment or machine other than a lift whether worked by mechanical power or not, comes with a carriage platform or cage. The direction of movement of which is restricted by a guide or guides such as a lift, escalator, hoist, crane, sheer legs, gin, crab, winch, excavator, tugger, runway, transport or piling frame and allied equipment. Within the context of the floater operating in an oil and gas field, lifting equipment used are deck cranes, pedestal cranes or overhead cranes which are aided by lifting aids such as riggings, eye pads, slings, etc.

"International Maritime Organisation": The United Nation's specialised Authority responsible for safety and security of shipping and the prevention of marine pollution by ships.

"Process system": Any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities. For purposes of this definition, any group of vessels which are interconnected and separate vessels which are located such that a highly hazardous chemical could be involved in a potential release shall be considered a single process

"Pressure Vessel": Any enclosed vessel under pressure greater than atmospheric pressure by any gas, mixture, or combination of gases. This includes any vessel under pressure of steam external to the steam boiler and any vessel that is under pressure of a liquid or gas or both, and any vessel subject internally to a pressure less than atmospheric pressure but does not include gas cylinders. Typical Pressure vessels used in offshore processes includes Shell & Tube Heat Exchangers, Fin coolers or Condensers, filters, and separators [1].

"Seafarer(s)": A person who is employed or engage in any capacity on board a ship to which Merchant Shipping Ordinance 1952 applies. He or she shall has a valid certificate of competency trained or certified as competent or otherwise qualified to perform their duties in accordance with and Training and certification in accordance with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978 (STCW) as amended. He or she shall be registered with Malaysia Marine Department.

[1] FMA 1967, definition

Open

"Service Provider(s)": A company that provides floating production services to the Contractor.

"Steam Boiler": Any closed vessel in which for any purpose steam is generated under pressure greater than atmospheric pressure, and includes any economiser used to heat water being fed to the vessel, and any super heater used for heating steam, and any pipes and fittings connected thereto [2].

"Recognised Organisations (RO)": Recognised organisation or other private body carrying out surveys and issuing or endorsing Statutory Certificates on behalf of a flag State and complies with the RO Code (Resolution Msc.349(92) (Adopted On 21 June 2013) Code for Recognised Organisations (RO Code)) and or MLC, 2006. (MSO Section 10(2)).

[2] FMA (Boiler) 1970, definition

EXECUTIVE SUMMARY

This guideline is intended for all Contractors, floating production facility owners and Service Providers as well as the inspectors and officers responsible for enforcing the relevant legislation relating to the oil and gas industry.

This guideline is applicable to floaters operating in Malaysia waters, all Contractors, asset owners and Service Providers dealing with the Authority when conducting oil and gas work or activities.

This guideline is divided into nine (9) parts:

- **Section 1: Introduction**
  This section describes the scope and objectives of this guideline as well as the general overview of production facilities utilising floaters currently operating in Malaysia waters.
- **Section 2: Agencies Involved and Legislative Requirements for Floaters**
  The Government agencies' roles and responsibilities, the relevant legal and regulatory requirements in managing floating facilities, the legislative tools required to be known and applied by the primary and secondary Government agencies, and organisations of floater operations.
- **Section 3: Managing Health, Safety, Environment and Security Risks**
  Risk management includes the management of health, safety, security & environment, social responsibility, aviation risks and process safety management.
- **Section 4: Managing Asset Integrity and Reliability**
  The maintenance of floater mechanical integrity and methods to identify and manage mechanical integrity threats throughout the floater lifecycle, from initial design to the decommissioning stage.
- **Section 5: Managing Incidents Relating to Floating Facility Activities**
  Guidance in managing accidents and incidents which may occur on floaters.
- **Section 6: Training and Competency Requirements**
  Training and competency requirements for personnel working on board floaters.
- **Section 7: HSE Case**
  Requirement for floater operations towards HSE Case compliance.
- **Section 8: Miscellaneous**
  Work planning and control, Management of Change, performance monitoring, assurance, record keeping and documentation management.
- **Section 9: Conclusion.**

SECTION 1: INTRODUCTION

1.1 Scope and Objectives of this Guideline

The guideline aims to provide guidance on the legal requirements in managing HSSE matters onboard floaters that are operating in Malaysia waters. It also sets out a guideline to link the different regulatory agencies that oversee the offshore oil and gas sector, namely floater operations (e.g. MARDEPT and PETRONAS) and present demarcation of roles and responsibilities of the respective agencies.

It is designed for all Contractors, asset owners and Service Providers performing work onboard floaters. By adhering to this guideline, Contractors, asset owners and Service Providers will be able to ensure minimum requirements are met while achieving high standards of HSSE compliance and high availability and reliability of floater operations.

1.2 Overview of Floaters

Malaysia's oil and gas industry, which began over a century ago, has flourished over the years to become among the region's most dynamic owners of oil and gas reserves, and among the world's largest producers of liquefied natural gas (LNG). The contribution of the oil and gas industry to the Malaysian economy is significant. In 2014, crude oil, condensates and gas were ranked as the second largest export (in terms of revenue) after electrical and electronic goods. The oil and gas sector has contributed up to 20% of the country's Gross Domestic Product for the past few years. Thus, as one of the nation's main economic drivers, it is important for the oil and gas industry to ensure their operations are safe, reliable and continue to be productive[3].

In the 1990s, global oil and gas reserves were discovered in much deeper waters. For these cases, new design concepts, other than the traditional fixed offshore structures were required. Hence, this condition demands a new design concept for offshore platforms; whereby offshore platforms that could be placed and operated economically and reliably in increasingly deeper waters. Thus, the era of the floating drilling, production, storage, and offloading systems (of various types, functions, and features) began [4].

Fields with substantial amounts of oil may be developed either around fully self-contained platforms or from various combinations of platforms and ships or barges for drilling, accommodation and delivery of supplies. Production and processing equipment may be placed on platforms, or on ship or barge-shaped structures called FPSOs (floating, production, storage, and offloading units). In addition to processing, these floating ship-shaped offshore structures serve the important functions of storage of crude oil and their offloading capability into shuttle

[3] Ministry of Economic Affairs (MEA), 2015
[4] Jeom & Anil, 2007

tankers or even vessels of opportunity. Alternatively, oil that is processed in platforms may be stored in floating ships or barge-shaped structures called FSOs (floating, storage, and offloading units), to be offloaded into shuttle tankers.

Floater is the term used for vessel(s) which can be readily relocated and which can perform an industrial function involving offshore operations other than those traditionally provided by vessels covered by Chapter 1 of the 1974 SOLAS Convention. There are various types of floaters operating in the Malaysian oil and gas sector.

Table 1 describes some of the floater types currently in operation in Malaysia waters.

Table 1: Floater types found in Malaysia waters

TYPE	DESCRIPTION	EXAMPLE
Floating Liquefied Natural Gas (FLNG)	A liquefied natural gas (LNG) floating production unit that is used for the gas processing, gas liquefaction and storage of LNG. Comes with offloading facilities capable of offloading to LNG Carriers	PFLNG 1
Floating Production Storage and Offloading (FPSO)	A floating vessel used for the production and processing of hydrocarbons, and for the storage of oil. Comes with offloading facilities capable of offloading crude condensate to Crude oil tankers	FPSO Kikeh, FPSO Cendor
Semi-submersible Production System (Semi-FPS)	An oil production facility supported primarily on large pontoon-like structures submerged below the sea surface.	Gumusut Kakap Semi-FPS
Tension Leg Platform (TLP)	A vertically moored floating structure normally used for the offshore production of oil or gas, permanently moored by means of tethers or tendons grouped at each of the structure's corners.	Malikai TLP
Floating Storage Unit (FSU)	A floating vessel that is used for storage of crude oil or LNG.	FSU Tenaga Satu,

TYPE	DESCRIPTION	EXAMPLE
Spar (Classic or Truss)	A spar is a type of floating oil platform typically used in very deep waters, and is named for logs used as buoys in shipping that are moored in place vertically.	Kikeh SPAR
Mobile Offshore Production Unit (MOPU)	A self-elevating production unit and a type of mobile platform that consists of a buoyant hull fitted with a number of movable legs, capable of raising its hull over the surface of the sea.	MP1

An illustration of the above floater types is shown in **APPENDIX 1.**

Floaters can also be classified according to its structural types in accordance with IMO Resolution A.1079 (28).

Floaters exclude the conventional ships or vessels covered by Chapter 1 of the 1974 SOLAS Convention such as:

- Cargo ships
- Passenger Ships
- Other ships such as Supply vessels, Standby vessels, Anchor handling vessels, Seismic vessels, Diving support vessels, Anchor Handling Tug Ships

SECTION 2: AGENCIES INVOLVED AND LEGISLATIVE REQUIREMENTS FOR FLOATERS

This section describes the various agencies' involvement and the legal and regulatory requirements these agencies enforced. In general, there are two (2) levels of agencies or authorities that provide the legislative requirements for floaters:

1) Primary Level:

    - Department of Occupational Safety and Health (DOSH),
    - Malaysia Marine Department (MARDEPT) and
    - Petroliam Nasional Berhad (PETRONAS)

2) Secondary Level:

    - Department of Environment (DOE)
    - Civil Aviation Authority of Malaysia (CAAM)
    - Department of Fisheries (DOF)
    - Malaysia Maritime Enforcement Agency (MMEA)
    - Malaysian Communication and Multimedia Commission (MCMC)

2.1 Primary Agencies Involved in Matters Pertaining to Maritime Safety

Ensuring safety on floaters is the shared responsibility of authorities, asset owners, personnel working onboard and personnel supporting floater operations onshore. All personnel (e.g seafarer, operations, Service Providers) have different roles to play in ensuring high standards of safety onboard. In the oil and gas sector, three (3) authorities oversee safety, namely:

- DOSH
- MARDEPT
- PETRONAS

DOSH is a government agency under the Ministry of Human Resources that is responsible for administrating, managing and enforcing legislation pertaining to occupational safety and health in the country. Its activities are focused on ensuring employee and machinery safety which will comprise roles in standard setting, enforcement and promotional activities. Coinciding with the abovementioned responsibilities, DOSH will lead in enforcing legal requirements pertaining to safety and conducting inspections and investigations into matters related to production equipment on the floating facilities.

MARDEPT is under the purview of the Ministry of Transport. MARDEPT administers all shipping, ports and maritime affairs in Malaysia waters and is responsible in ensuring the

maritime safety of Malaysia waters. Maritime safety includes aspects of safety in navigation, seafarer's safety and security, oil spill response and vessel traffic management. Apart from these, MARDEPT is also responsible in preserving the marine environment.

PETRONAS via the Malaysia Petroleum Management (MPM) acts as a custodian of Malaysia's petroleum resources that manages the petroleum resources of the nation.

MPM is entrusted with the responsibility of managing the petroleum operations in Malaysia, including promoting exploration investments and facilitating the development and production activities, whilst protecting national interest with respect to the oil and gas resources. In addition, MPM's role encompasses the optimisation of Malaysian E&P assets and is responsible for the management of petroleum operations under the PSC. MPM regulates the performance Contractors and the Contractors' Services Providers to ensure that all activities pertaining to the floating facilities are conducted in a proficient, prudent, safe and effective manner.

Table 2 below summarises the roles and responsibilities of the three (3) primary agencies or Authorities (DOSH, MARDEPT and PETRONAS) with respect to floating facilities

Table 2: Role and responsibilities of the three (3) primary agencies or Authorities

	DEPARTMENT OF OCCUPATIONAL, SAFETY AND HEALTH (DOSH)	MALAYSIA MARINE DEPARTMENT (MARDEPT)	PETRONAS (MPM)
Roles and Responsibilities	• Study and review policies and legislation related to occupational safety and health • Conduct research and technical analysis on issues related to occupational safety and health at the workplace • Carry out promotional and publicity programs to employers, workers and the general public to foster and increase the awareness of occupational safety and health • Secretariat for the National Council regarding occupational safety and health • Administer and enforce legislations related to occupational safety and health	• Ensure safe navigation of merchant vessels • Provide services to merchant vessels such as ship inspection, certification, registration and licensing • Provide services to ships navigating in Malaysia waters and ports • Supervise examinations of seafarers	• Responsible in managing the petroleum operations in Malaysia, including promoting exploration investments and facilitating the development and production activities, whilst protecting the national interest in respect of oil and gas resources

2.2 Primary Level Agency or Authority Regulatory Requirements

Having mentioned the roles and responsibilities of the authorities, this guideline further clarifies the enforcement tools used by each agency or Authority body. These are presented in the form of regulatory and legislative requirements.

DOSH is responsible to carry out enforcement activities aimed at ensuring the safety, health, and welfare of workers and other persons from the hazards of work activities, as required under the following Acts and its regulations:

- Occupational Safety and Health Act 1994 (Act 514)
- Factories and Machinery Act 1967 (Act 139); and
- Petroleum (Safety Measures) Act 1984 (Act 302)

Enforcement activities that are carried out by DOSH relate to:

- Approval and Authorisation
- Registration
- Certification
- Inspection
- Investigation
- Litigation

Issues relating to safety and health in offshore facilities including floaters are managed by the Petroleum Safety Division - Offshore Section with the section's enforcement boundary mainly relating to safety and health and process facility operation (including matters relating to the usage of machinery requiring certifications).

MARDEPT is an enforcer and administer of maritime affairs related to shipping and ports within Malaysia waters.

Among acts and laws that are under MARDEPT's jurisdiction include:

- Merchant Shipping Ordinance (Amendment) 2016
- Merchant Shipping Ordinance 1952
- Merchant Shipping Ordinance 1960 (Sabah)
- Merchant Shipping Ordinance 1960 (Sarawak)
- Federation Light Dues Act 1953 (Act 250)
- Akta Pendaftaran Kapal Layar Antarabangsa Langkawi 2003
- Act 302 - Petroleum (Safety Measures) Act 1984
- International Maritime Conventions e.g. MARPOL, SOLAS, COLREGS, ILLC

Enforcement activities that are carried out by MARDEPT are:

- Approval and Authorisation
- Registration
- Certification
- Inspection
- Investigation
- Litigation

The Ship Accreditation Unit, MARDEPT with the assistance of a Recognised Organisation (RO) (e.g. ABS, NKK, LR, DNVGL, BV) have the Authority over the marine system operation and maintenance of the floater (generally for systems and machinery below the load line as well as equipment and systems specified by the RO in its class rules for floaters).

PETRONAS plans, invests and regulates of all upstream activities. These duties are executed by MPM. PDA 1974 entrusts PETRONAS with the entire ownership in, and the exclusive rights, powers, liberties and privileges of exploring, exploiting, winning and obtaining petroleum whether onshore or offshore of Malaysia. The purpose of the PDA 1974 is to regulate the oil and gas and petrochemical industries.

2.3 Secondary Level Agency or Authority Regulatory Requirements

Apart from the primary agencies, all floating facilities are required to comply with the requirements enforced by other authorities (known as secondary level agencies) that play a significant importance in the floater's activities. These secondary agencies are:

- Department of Environment (DOE)
- Civil Aviation Authority of Malaysia (CAAM)
- Department of Fisheries (DOF)
- Malaysian Maritime Enforcement Agency (MMEA)
- Malaysian Communication and Multimedia Commission (MCMC)

Table 3 below summarises the roles and responsibilities of the secondary agencies or authorities with respect to floating facilities.

Table 3: Secondary Level Authorities' Legislation for Floaters

NAME OF AGENCY	LEGISLATION TO COMPLY
Department of Environment (DOE)	Environmental Quality Act 1974 - Act 127 and its amendments
Civil Aviation Authority of Malaysia (CAAM)	Civil Aviation Authority of Malaysia Act 2017
Department of Fisheries (DOF)	Fisheries Act 1985
Malaysia Maritime Enforcement Agency (MMEA)	Malaysia Maritime Enforcement Agency Act 2004
Malaysian Communication and Multimedia Commission (MCMC)	Malaysian Communications and Multimedia Commission Act (1998)

2.4 Consequences of Non-compliance

Non-compliance to any provisions of the regulatory and statutory requirements may result in legal consequences such as penalties. In addition, Contractors, asset owners and Service Providers are required to comply with the terms of the contracts with PETRONAS. Any non-compliance by the Contractors asset owners and Service Providers will be dealt with in accordance with the respective contracts terms.

SECTION 3: MANAGING HEALTH, SAFETY, ENVIRONMENT AND SECURITY RISKS

This section will elaborate on the management of health, safety, environment and security risk. It also covers social, security, aviation and process safety management as these are considered as risk to the business.

3.1 Occupational Health and Safety Risk Management

The oil and gas industry is categorised as a high-risk industry and therefore, its hazards must be appropriately managed and addressed. Due to this, it is important that employers understand their responsibilities under the OSHA 1994, including compliance with the Occupational Safety and Health (OSH) requirements pursuant to national laws, regulations and practice. This includes ensuring employees and others are protected from anything that may cause harm and effectively controlling any risks to injury or health that could arise in the workplace. Employers must do whatever is reasonably practicable to achieve this.

ISO 45001:2018 is an international standard that specifies requirements for an OSH management system and enables organisations to provide safe and healthy workplaces by preventing work-related injury and ill health, as well as by proactively improving its OSH performance. It is applicable to any organisation that wishes to establish, implement and maintain an occupational OSH management system to improve occupational health and safety, eliminate hazards and minimise OSH risks (including system deficiencies), take advantage of OSH opportunities, and address OSH management system non-conformities associated with its activities. It also helps an organisation to achieve the intended outcomes of its OSH management system.

Consistent with the organisation's OSH policy, the expected outcome of an OSH management system includes:

- Continual improvement of OSH performance;
- Fulfilment of legal requirements and other requirements;
- Achievement of OSH objectives.

OSH management influences the occupational safety and health performance of the organisation, therefore in order to ensure effective action, it is essential to establish an OSH management system at all workplaces for continual improvement of working environment and preventive measures. An OSH management system shall contain key elements such as policy, organising, planning and implementation, evaluation and action for improvement.

Contractors, asset owners and Service Providers can refer to the below documents embarking on or establishing an OSH management system:

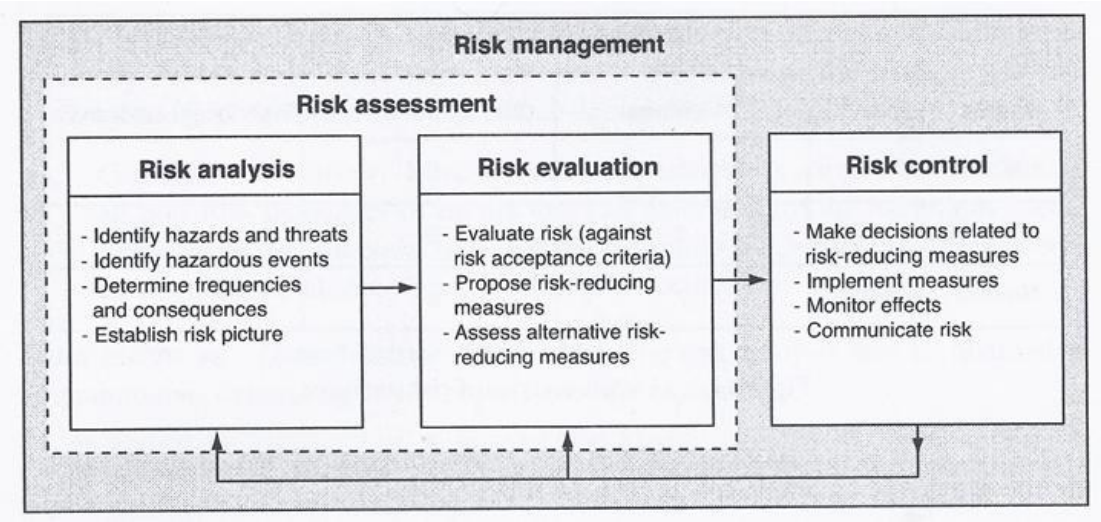
- ISO 45001, Occupational health and safety management systems - Requirements with guidance for use
- Guidelines on Occupational Safety and Health Management Systems (OSHMS), 2011
- PETRONAS Procedures and Guidelines for Upstream Activities (PPGUA) - Volume 3: Health, Safety, Security and Environment
- Offshore Self-Regulation Management System (OSRMS)

Employers have the responsibility of assessing risks in the workplace. OSH legislation requires that all potential hazards are identified and the risks arising from these hazards are eliminated or controlled. Risk assessments should be carried out to address all risks that potentially causing harm in the workplace.

Risk management is a proactive process that helps employers to change and facilitate continuous improvement in their business. It should be planned, systematic and cover all potential hazards and associated risks. Contractors, asset owners and Service Providers shall ensure that there is a structured OSH risk management and analysis process in place that identifies and establish an inventory list of all health, safety and environmental risks and hazards for the floaters.

Contractors, asset owners and Service Providers shall ensure that the facilities are operated and maintained safe, at As Low as Reasonably Practicable (ALARP) and cost-effective. Risk management can be defined as "a continuous management process with the objective to identify, analyse and assess potential hazards in a system or related to an activity, and to identify and introduce control measures to eliminate or reduce potential harms to people, environment and other assets". The elements of risk management are illustrated in Figure 1.

Figure 1: Elements of Risk Management [5]



[5] Rausand, 2013

Identifying hazards, carrying out risk assessment and implementing control measures are the key aspects of OSH risk management. Hazard identification, risk assessment and risk control are implemented through systematic application of management policies, procedures and practices.

Hazard identification involves two key tasks:

- Identification of specific undesirable consequences, and
- Identification of material, system, process and plant characteristics that could produce those consequences.

Common methods of hazard identification include analysing process materials and process conditions, reviewing organisation and industry process experience, developing interaction matrixes and applying hazard evaluation techniques. Hazard identification should include:

- Routine and non-routine activities
- Relevant incident internal or external
- Normal, abnormal and emergency situations
- People, direct or indirect to the floating facilities
- Management of change
- Other relevant issues

Risk assessment provides an effective framework for determining the relative urgency of problems and the allocation of resources to reduce risks. Subsequently, it can help target prevention, remediation, or control efforts toward areas, sources, or situations in which the greatest risk reductions can be achieved with the resources available.

Risk assessment is the process of identifying the sources of hazards, estimating the risk and evaluating the results. Risk can be expressed:

- Quantitatively, measured by e.g. loss per unit of time,
- Qualitatively, by illustrating and applying risk rating matrix or scales

Risk control include actions that can be taken to reduce the potential of exposure to the hazard, or the control measure could be to remove the hazard or to reduce the likelihood of the risk of the exposure to that hazard being realised. The ways of controlling risks can be ranked from the highest level of protection and reliability to the lowest.

This is called the hierarchy of control. The hazard controls in the hierarchy are, in order of decreasing effectiveness:

1) Elimination
2) Substitution
3) Engineering controls

4) Administrative controls
5) Personal protective equipment

The most effective control measure that is reasonably practicable should be implemented and remain effective over time. Effective controls protect workers from workplace hazards, help avoid injuries, illnesses and incidents; minimize or eliminate safety and health risks; and help employers provide workers with safe and healthful working conditions.

The aim of OSH risk management is to reduce the likelihood and consequence of a workplace and environmental incident that may result in injury, disease, environmental pollutions or catastrophes. It is a planned and systematic process for controlling workplace health, safety and environmental hazards through examination of all aspects of the work undertaken.

Risk management is an integral part of good management practice and an essential part of good corporate governance. In order for OSH risk management to be effective, it should become part of an organisation's culture. Ideally, OSH risk management should not be seen as a separate activity, rather it should be embedded in an organisation's processes and practices. Risk management lies at the core of any occupational health and safety prevention program and the success of any such program depends on the successful implementation of this principle.

Contractors, asset owners and Service Providers can refer to the below documents when conducting risk management:

- PETRONAS Procedures and Guidelines for Upstream Activities (PPGUA) - Volume 3: Health, Safety, Security and Environment, Appendix 1- Risk Assessment Activities
- Guidelines for Hazard Identification, Risk Assessment and Risk Control (HIRARC), 2008

Contractors, asset owners and Service Providers are required to conduct comprehensive risk assessments (quantitative, qualitative, or semi-quantitative) and put in place adequate controls and mitigation measures of all health, safety and environmental risks and hazards for all their operational activities.

3.2 Social Risk Management

Entities, including businesses, governments and non-profit organisations, face an evolving landscape of environmental, social and governance related risks that can impact their profitability, success and even survival. Social risk arises from negative perceptions of an organisation's impact on the community. The social risks of a venture depend on the specific issues associated with an organisation's operations, the industry sector and the geographic context. Risks typically include environmental pollution, hazards to human health, safety and security, and threats to a region's biodiversity and cultural heritage. Social risk is characterised by four components in combination: an issue, a stakeholder or group of stakeholders, a negative perception about an organisation, and the means to do damage.

Management and mitigation of social risk factors are increasingly important for business success abroad. The costs of losing that social licence, both in terms of the organisation's share price and the bottom line, may be significant. Ignoring social risk factors can lead to significant negative consequences to an organisation's reputation and operations. With no mitigation plan in place, these organisations have been subject to bad publicity, consumer boycotts and other adverse outcomes.

Contractors, asset owners and Service Providers shall conduct Social Risk Assessments (SRAs) to address human rights risks from business activities across a project or business life cycle, if applicable. A recognised method, which complies with PETRONAS Guiding Notes for Social Risk Assessment (Volume 3: Health, Safety, Security and Environment, Appendix 12), shall be used when conducting SRAs.

3.3 Environmental Risk Management

The environment is an essential part of our daily life and is an increasing global concern, particularly with respect to the oil and gas industry. Environment comprises of physical, intellectual, economic, political, cultural, social, moral and emotional aspects. Environmental Risk Management (ERM) focuses on the improvement of human welfare for present and future generations.

An ERM system is a collection of activities undertaken to ensure that environmental issues are being managed effectively. It provides the following functions:

- Compliance with environmental laws
- Improving overall environmental performance
- Addressing environmental liability from current or past practices
- Maximising investment in environmental affairs
- Integration of environmental objectives into overall mission and business objectives
- Providing an environmentally safe workplace

Environmental management promotes physical, social and economic environment of the enterprise or project. It encourages planned investment at the start of the production chain rather than forced investment in cleaning up at the end. The importance of environmental management are as follows:

- To clarify modern environmental concept like how to conserve biodiversity;
- To know the more sustainable way of living; and
- To use natural resources more efficiently.

There are three (3) broad categories of environmental management in the lifecycle:

- Construction environmental management plan;
- Operations environmental management plan and
- Decommissioning environmental management plan.

The construction phase environmental management provides specific environmental guidance for the implementation and construction phase of a project. It is intended to enable the management and mitigation of construction activities so that environmental impacts are avoided or reduced.

The operational phase environmental management provides specific guidance related to the operational activities associated with a particular development. The roles and responsibilities for mitigation, monitoring and performance assessment for the operational life of the development are specified in the environmental management plan.

The decommissioning phase of environmental management plan provides specific guidance with respect to the management of the environmental risks associated with the decommissioning stage of a project. Decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impact associated with operational activities.

Contractors, asset owners and Service Providers shall refer to relevant environmental act and regulations as well as PETRONAS E&P Minimum Environmental Specifications (MES) (Volume 3: Health, Safety, Security and Environment Appendix 12) when planning and implementing environmental management programmes. Cost-Benefit Analysis evaluation shall be applied when there are no specific environment requirements established or when there is a need to implement measures beyond minimum requirements.

3.4 Health, Safety and Environmental Management System

Employer shall demonstrate strong leadership and commitment to health, safety and environmental activities in the organisation, and make appropriate arrangements for the establishment of the Health, Safety and Environmental Management System (HSEMS). HSEMS ensures that employees work under acceptable Occupational Safety and Health conditions and also prescribes environmental protection measures to keep floater's activities environmentally sustainable. HSEMS shall be consistent with relevant Malaysia HSE laws and regulations and PETRONAS' requirements.

Contractors, asset owners and Service Providers shall establish their HSEMS which is fit-for-purpose pertinent to their business and operational needs. They are also required to ensure that their HSEMS remain relevant throughout their operations and updates the document

accordingly. The HSEMS shall be consistent with relevant HSE legislation and PETRONAS requirements.

Among HSEMS elements shall include but is not limited to:

- Leadership and Commitment
- Policy and Strategic Objectives
- Organisation, Responsibilities, Resources, Standards and Documents
- Evaluation and Risk Management
- Planning and Procedure
- Implementation and Monitoring
- Assurance
- Management Review

3.5 Security Management

Unwarranted, adverse attacks against organisations and individuals can come from the people in the local community and from half-way around the world. Organisations may face a diverse set of threats: industrial espionage from competing corporations and hostile states, to physical and virtual assaults and sabotage from terrorist groups and organised criminals, as well as assaults by mentally ill individuals.

Floaters shall identify and manage the security risks in order to keep their organisation competitive and to ensure the security of their employees. They are required to be registered with MARDEPT and comply with the Maritime Transport Safety and Security requirements as set out in the MSO Act 1952. Floaters shall also comply with International Code for the Security of Ships and Port Facilities (ISPS) requirements specify under SOLAS chapter XI-2 and requirements for ship security alert system under SOLAS chapter XI-2/5.

Apart from complying with the abovementioned requirements, Contractors, asset owners and Service Providers shall also refer to PETRONAS Emergency Communication and Coordination Protocol Guideline when encountering security threats in offshore activities. Proper security risk management ensures that threats are handled in an integrated and cost-effective manner, thus ensuring that security incidents by third-parties do not affect floater activities.

3.6 Process Safety Management

Process safety is the discipline that focuses on the prevention of fires, explosions, and accidental chemical releases at chemical processing facilities. Process safety hazards can give rise to major accidents involving the release of potentially dangerous materials, the release of

energy or both. Process safety incidents can have catastrophic effects and can results in multiple injuries and fatalities to the employees and members of public, as well as substantial economic, property and environmental damage. Process safety management is designed to manage the integrity of operating systems and processes handling hazardous substances by applying sound design principles, engineering, and operating practices.

Contractors, asset owners and Service Providers shall establish a systematic approach for an effective management of process hazards. According to the PETRONAS requirement, the systematic approach shall include guiding documents, performance monitoring and assurance activities to ensure sustainable implementation. Additionally, the management system shall minimally address the following aspects:

- Mechanical Integrity (MI)
- Management of Change (MOC)
- Operating Procedure (OP)
- Process Hazard Analysis (PHA)
- Pre-Activity Safety Review (PASR)
- Process Safety Information (PSI)
- Design Integrity (DI)
- Proprietary and Licensed Technology Assessment (PLTA)

3.7 Aviation Safety Management

Contractors, asset owners and Service Providers shall establish requirements on aviation safety which include operations and maintenance of aircraft. The minimum standard shall be as per the latest edition of OGP Aircraft Management Guideline Report No. 390, 2008. Apart from aircraft operation and maintenance, Contractors, asset owners and Service Providers shall also certify all their offshore and onshore helidecks. The certification of helicopters and aeroplanes basic configuration shall be in accordance to PETRONAS Helideck Certification Guidelines and PETRONAS Helipad Certification Guidelines, respectively.

As for the helicopters and aeroplanes basic configuration, Contractors, asset owners and Service Providers shall follow the requirements spell out in PETRONAS Procedures and Guidelines for Upstream Activities (PPGUA) - Volume 3: Health, Safety, Security and Environment Appendix 7: PETRONAS Helicopter Basic Configuration Requirement.

SECTION 4: MANAGING ASSET INTEGRITY AND RELIABILITY

Maintaining an asset's ability to function effectively and efficiently without creating undue hazards to any person or the environment is essential and this is often referred to as maintaining 'asset integrity". Managing asset integrity ensures that people, systems, processes and resources are available and used when required. The management of asset integrity covers its entire lifecycle from initial design through commissioning, operation and finally decommissioning. Asset management also involves identifying all possible threats to the asset's integrity by looking at all conceivable scenarios.

4.1 Requirements

The requirements for managing asset integrity and reliability of all offshore assets in all PETRONAS Offshore Facilities operating in Malaysia are spell out in the OSRMS. This document was developed based on the principle of ISO 55000:2004 (Asset Management System). All Contractors, asset owners and Service Providers shall use and adhere to the OSRMS requirements when conducting their Asset Integrity and Reliability management, operation, inspection and maintenance activities of the offshore assets.

All Contractors, asset owners and Service Providers shall establish a structured system for managing their asset integrity and reliability. The system established could be tailored according to Contractors', asset owners' and Service Providers' need, however, it shall incorporate these six (6) key elements mentioned below:

1. Policy and Strategic Objectives
2. Organisation Structure and Responsibilities
3. Planning and Implementation
4. Measure System Performance
5. Review System Performance
6. Audits

Apart from the above requirements, there are also other requirements that need to be complied by Contractors, asset owners and Service Providers when managing their asset integrity and reliability. They are:

- Establishing, implementing and maintaining an asset integrity management system for their facilities.
- Identifying and defining the methodologies use to assure the integrity and reliability of their facilities.

- Continuously improving their asset integrity management system so that it remains relevant and responsive to change.
- Establishing, implementing and maintaining incident and non-conformity reporting, investigating and action taking processes.
- Setting their asset integrity and reliability strategic objectives.
- Developing an annual and long-term plan for achieving their asset integrity and reliability strategic objectives.
- Developing detailed asset operational needs resource plan and personnel competencies plan (relating to assets).
- Submitting their annual and long-term plan to MPM for review.
- Establishing and implementing procedures for asset integrity and reliability assurance activities.
- Establishing and implementing procedures for the course of actions to be taken following unforeseen overruns.

These requirements are spell out in element 3.3 of OSRMS.

The asset integrity and reliability management system shall cover equipment related to offshore installations and this include the auxiliary devices, piping, rotating equipment and structures connected to this equipment. Scope of the asset integrity management system and the outputs from its asset management activities should be used to set out the approach to enable the delivery of its organisational objectives. The scope should consider:

- The assets, asset portfolio(s), their boundaries and interdependencies;
- The organisational aspects, e.g. which parts or functions of the organisation are involved;
- The organisation's period of responsibility (e.g. where the management of assets is contracted out for a set period of time), including its residual liabilities beyond the operation or use of the asset and remains accountable for risks beyond its use of an asset;
- The interactions with other parts of the management system e.g. for quality or environmental management which can require defining the boundaries, functions, and responsibilities of each part of the management system.

4.2 What Assets are Included?

ISO 55000:2004 defines an asset as: "plant, machinery, property, buildings, vehicles and other items and related systems that have a distinct and quantifiable business function or service". Therefore, based on this definition and OSRMS, Contractors, asset owners and Service Providers are responsible to ensure all assets in the offshore facilities are safely and effectively managed.

However, in managing the integrity and reliability of its assets, Contractors, asset owners and Service Providers are to give special attention towards the management of machinery certification.

Element 3.1 of the OSRMS requires Contractors, asset owners and Service Providers to assure the integrity and reliability of its certificated machinery at the offshore installation. In the context of OSRMS, certificated machinery refers to equipment that have been identified in FMA 1967 requiring certificate of fitness (CF). They are unfired pressure vessels, steam boilers and hoisting machines.

4.2.1 Unfired Pressure Vessels and Boiler

According to FMA 1967, unfired pressure vessel means any enclosed vessel which is under pressure greater than atmospheric pressure. Therefore, any enclosed vessel that meet the above definition is classified as UPV and their owners are required to obtain a CF in order to operate it. However, in the latest order, P.U. (A) 261 Order 2017 had exempted certain type of UPVs from the requirements of Section 19 of FMA 1967, FMA (Steam Boiler and Unfired Pressure Vessel) Regulations 1970 and Regulation 10, 11, 12, 19(1), 25, 28, 35 plus paragraph 17(b) of FMA (Notification, Certificate of Fitness and Inspection) Regulations 1970. Thus, this means that UPVs described in Schedule of P.U. (A) 261 Order 2017 were not classified as UPVs and therefore they are not required to have CF in order to operate.

Apart from UPV, steam boilers (hereinafter referred as "boiler") is also define in FMA 1967. Boiler is defined as any closed vessel in which under pressure greater than atmospheric pressure and its generate steams. Economisers, superheaters, pipes and fitting connecting to the closed vessel are also considered as part of the boiler. The same approach mentioned above was also utilize in managing the integrity and reliability of the boiler.

Boilers are one of the essential equipment on board of floating facilities. They are often located near the bottom or at the rear of the facility. Boilers were primarily installed on the facility for the propulsion plant, which used to propel the facility or to supply the amount of steam required by various system on the facility. However, UPVs are often found in the topsides of floating facilities. Topsides consist of processing facilities that are typically located as elevated modules that are several meters above the main deck of the ship-shaped offshore installations hull. Depending on the ship-shaped offshore installations size and topsides layout, the topsides modules may have multiple decks that contain the oil-, water-, and gas-processing facilities; utility systems; and similar functions. The topsides modules are typically prepared as Pre-Assembled Units (PAU) that are then mounted onto the deck of the floating offshore unit using heavy-lift cranes.

The topsides facilities may consist of several types of modules, skids, units, or facilities, each addressing one of the following functions:

- Oil and water separation
- Gas compression
- Water injection
- Cargo handling and offloading
- Utility and support
- Safeguards

The topsides modules typically are divided into process area and utility area. The process area includes space for hydrocarbon-containing equipment, flare tower, compression equipment, and separation equipment. The utility area includes space for utility equipment and power-generation equipment.

Two types of topsides module fabrication are relevant: built-in grillage deck and Pre-Assembled Unit. In a built-in type construction, one builds the topsides deck at an elevation above the hull upper deck. Facilities and equipment are at most pre-packaged onto skids and then are lifted on the built-in grillage deck. Piping, electrical, and instrumentation systems are interconnected after that. In the PAU method, single or multiple assemblies of topsides modules containing the necessary facilities and equipment with as many pre-connected piping, electrical, and instrumentation systems as possible are fabricated. The PAUs are then lifted onto the hull upper deck by relatively expensive heavy-lift operations.

4.2.2 Hoisting Machine

Similar to UPVs and boilers, FMA 1967 also defines hoisting machine such as lifts, escalators, hoist, cranes, sheer legs, gins, crabs, winches, excavators, teagles, runways, transporters or filing frames and allied equipment. Thus, all hoisting machine installed on offshore floating facilities, including but not limited to pedestal cranes and moveable platforms are classified as hoisting machines and their owners are required to obtain a CF in order to operate it. However, in one of the most recent order, P.U. (A) 179 Order 2015 had exempted certain type of hoisting machine from the requirements of Section 19(1) of FMA 1967 and Regulation 10 of FMA (Notification, CF and Inspection) Regulations 1970. Thus, this means that hoisting machine described in Schedule of P.U. (A) 179 Order 2015 were not classified as hoisting machine and therefore they are not required to have CF in order to operate.

4.3 Process of Managing Certificated Machinery

FMA 1967: P.U. (A) 106 Order 2013 have given conditional exemption to PETRONAS to self-manage their certificated machinery. Thus, PETRONAS has introduced its own approach in managing certificated machinery through OSRMS. Appendix B (Part 1) of OSRMS covers the

full life cycle of the UPV and boilers whilst Appendix B (Part 2) of OSRM covers hoisting machines. Based on the approach mentioned Contractors, asset owners and Service Providers are accountable and responsible to ensure all requirements specified in Appendix B of OSRMS are adhered to.

However, the exemption of P.U. (A) 106 Order 2013 and the requirements specify in Appendix B of OSRMS does not apply to rental UPVs, boilers and hoisting machine. Hence, the owner of the rental UPVs, boilers or hoisting machine is required to hold a valid CF and the relevant Contractor shall submit a list of rental equipment to PETRONAS prior to operate the rental certificated machinery in any of PETRONAS facilities operated by the Contractor.

In order to self-manage PETRONAS certificated machinery, PETRONAS had introduced OSR Inspector who are competent personnel to undertake the asset integrity and reliability related activities. PETRONAS has set out the requirement, competency framework, role and responsibilities of the OSR Inspector in Appendix C of the OSRMS.

Appendix C of the OSRMS consists of five (5) parts:

- Part 1 – Detailed on the commissioning and authorization of the OSR Inspector
- Part 2 – Overview of the OSR competency framework
- Part 3 – Elaboration of the roles and responsibilities of the OSR Inspector
- Part 4 – OSR Inspector duties
- Part 5 – Code of ethics that need to be conform by the OSR Inspector

Other than Appendix C of OSRMS, the OSR Inspector shall also make reference of the RACI Chart presented in item 1.2 and 2.2 of Appendix B in OSRMS, which explain the OSR Inspectors' roles, responsibilities and task in connection with the OSR implementation.

4.4 Authorities Responsible for Enforcing Matters Related to Certificated Machinery

FMA 1967: P.U. (A) 106 Order 2013 provides conditional exemption to PETRONAS to self-manage their certificated machinery. Therefore, for all certificated machineries owned by PETRONAS, the Contractors shall be responsible for matters related to the machinery operated in their facilities.

As for rental certificated machinery, the owner of the machinery must obtain a CF for the machinery from the relevant authorities. Thus, all rental UPVs, boilers and hoisting machine will have to undergo a series of processes which include testing, inquiring permits and approvals before it can be used. Typically, these processes will be led by DOSH officers and applications should be submitted to DOSH, Industrial Safety Division located in Putrajaya.

For clarity, the following are applied:

- CF of UPVs and boiler for Topside process facilities will be under jurisdiction of DOSH.
- Cargo Handling Machinery and Gear Certificates for Hoisting machine will be under jurisdiction of MARDEPT.

Classification is a form of design and construction oversight carried out by a classification society in accordance with the published rules and guidelines of the selected classification society. The classification process may consist of the review and approval of technical submissions in accordance with relevant class rules; physical confirmation of manufacture; fabrication; assembly or installation of components or finished item in accordance with approved drawings and details; and subsequent testing as required by the rules and associated issuance of documents attesting to the degree of compliance with the requirements of the classification society.

Classification society is a non-governmental organisation that establishes and maintains technical standards for construction and operation of marine vessels and offshore units. Classification society is responsible for classification of all offshore units where the society workforce validates the design and calculations of the offshore units. The following classification bodies have been recognised to act on behalf of MARDEPT for the surveys and certifications:

- American Bureau of Shipping (ABS)
- Bureau Veritas (BV)
- Det Norske Veritas Germanischer Lloyd (DNVGL)
- Lloyd's Register of Shipping (LRS)
- Nippon Kaiji Kyokai (ClassNK)
- Korean Register of Shipping (KR)
- China Classification Society (CCS)
- Indian Register of Shipping (IRS)
- Registro Italiano Navale (RINA)
- Ship Classification Malaysia (SCM)

The classification process might cover inspection of engines, shipboard pumps and other vital floater’s machines such as hull and marine portion of the floater. They also inspect offshore structures, components and machinery.

SECTION 5: MANAGING INCIDENTS RELATING TO FLOATING FACILITY ACTIVITIES

In floating facility, personnel tend to work within a marine culture, thus, its personnel typically consist of operational and seafarer. Operational crew working on the offshore floating facilities are considered as employees under OSHA 1994, therefore, their safety, health and wellbeing are covered under that particular law. On the other hand, seafarer who has a valid certificate of competency are exempted from OSHA 1994 and this is due to OSHA's Section 3 provision where the act detailed the non-application requirement of such activity.

Hence, different incident reporting mechanism will have to be established by Contractors in managing these two types of personnel, as follows:

- For operational crew, incidences must be reported to DOSH and PETRONAS
- For seafarer, incidences must be reported to MARDEPT and PETRONAS

The OSHA 1994 requires an employer to notify to the nearest DOSH office of any accident, dangerous occurrence, occupational poisoning and occupational disease that has occurred in the place of work. The Occupational Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations 2004 (NADOPOD 2004) provides further requirement and information on the notification method, procedure and process to be followed by the employer and the medical practitioner in pursuant to the requirements of section 32 of OSHA 1994.

However, PETRONAS also requires Contractors to notify to them any incidences that occur on floating facilities. This requirement does not release the Contractor of its obligation to notify any incidences to the relevant authorities as it is also made mandatory (refer to Section 1.6 of Volume 3: Health, Safety, Security and Environment of PPGUA) by PETRONAS for their Contractors to do so.

Seafarer are also required to report to MARDEPT of any accidents or damage related to the ship or marine personnel. However, this requirement is not explicitly spelt out in the MSO. Nevertheless, the absence of such explicit requirement does not prevent MARDEPT for conducting investigation pertaining to the incident nor prevent MARDEPT from setting the requirement of incident reporting since MARDEPT is the authorizing agency in protecting ships and personnel in Malaysia waters.

Contractors, asset owners and Service Providers will have to establish their own process flow and procedures for handling failures, incidents, non-conformities and near misses associated to their assets and crews. They also have an obligation to ensure these procedures are continuously being implemented and their effectiveness are being tested and measured.

5.1 Why Incidents Reporting is Required?

The main purpose of reporting incidences to DOSH is to determine the underlying causes of the incident, identify remedial actions and prevent re-occurrence in the future. The data gathered would allow DOSH to carry out analysis and to come out with its strategic plan to administer and enforce the law. Thus, for this purpose, it is essential for uniformity of data recorded to facilitate analysis and to assure the validity of the statistical results.

5.2 What Incidents are Reportable?

NADOPOD 2004 requires that all accident, dangerous occurrences, occupational poisoning and occupational diseases must be notified to DOSH. Here, "accident" can be defined as an occurrence arising out of or in connection with work which results in fatal injury or non-fatal injury while "dangerous occurrence" referred to an occurrence arising out of or in connection with work and is of a class specified in Schedule 2 of the NADOPOD 2004. As for "occupational poisoning and occupational disease", it means a poisoning or a disease arising out of or in connection with work and is of a class specified in Schedule 3 of the same regulation.

In addition to the above requirement, PETRONAS through Section 1.6 of Volume 3: Health, Safety, Security and Environment of PPGUA also make it mandatory for the Contractor to report accidents listed in Table 4 below occurred in the floating facility.

Table 4: Types of Reportable Incident

Types of Reportable Incident
1. Fatality
2. Major Process Fire
3. Major Loss of Primary Containment
4. Major Oil Spill

5.3 When and How Reports Should Be Made?

Below are three (3) forms that are used for notifying and record-keeping incidents:

- Form JKKP 6: Form for Notification of Accident and Dangerous Occurrence.
- Form JKKP 7: Form for Notification of Occupational Poisoning and Occupational Disease.
- Form JKKP 8: Serves as the Register of Occupational Accidents, Dangerous Occurrence, Occupational Poisoning and Occupational Disease, on which the occurrence and extent of cases are recorded during the year; and is used to summarize the records of occupational accidents, dangerous occurrence, occupational poisoning and occupational disease, at the end of the year to satisfy employers' obligations to submit the register.

Employers are required to notify the nearest DOSH office by the quickest means available of the following incident which arises out of or in connection with the work:

- Death; or
- Serious bodily injury, as specified in First Schedule, which prevents the person from following his normal occupation for more than four calendar days; or
- A dangerous occurrence, as specified in Second Schedule of NADOPOD 2004,

Following the initial report and within seven (7) days of the abovementioned incident, a formal report should be made in the approved form (JKKP 6 Form).

A formal report shall be made within seven (7) days to DOSH office using an approved form (JKKP 6 Form) for any non-fatal injury arising out of or in connection with work which causes bodily injury to any person which prevents the person from following his normal occupation for more than four (4) calendar days. Similar reporting mechanism shall apply when one of the occupational poisonings or occupational diseases specified in column 1 of Third Schedule and the work involves one of the activities specified in the corresponding entry in column 2 of that schedule (NADOPOD 2004) occur. A formal report using JKKP 7 form must be used for Occupational Poisoning and Occupational Diseases notification.

PETRONAS implements incident notification pursuant to PPGUA Volume 3: Health, Safety, Security and Environment as follows:

- Appendix 2 -using the Incident Notification Form (INF),
- Appendix 3 - incident notification form
- Appendix 4 - Incident & Emergency Notification Flowchart & workflow

Preliminary incident investigation report shall be submitted to PETRONAS within a month from the date of the incident for any incident that is listed in Table 4 above, while for any other incidents (not listed in Table 4), the preliminary investigation report shall be submitted to PETRONAS upon request.

In addition to the above requirements, within one (1) week after the conclusion of the incident investigation, Contractors are required to submit the HSE lessons learnt to PETRONAS using PETRONAS HSE Lessons Learnt format as described in Volume 3: Health, Safety, Security and Environment, Appendix 5.

Oil spills and Medical Evacuation (MEDEVAC) cases:

Contractors must report to PETRONAS. For unknown spills, samples shall be collected, analysed and reported in accordance with PETRONAS Guidelines on Upstream Hydrocarbon Fingerprinting (PPGUA Volume 3: Health, Safety, Security and Environment, Appendix 12)

MEDEVAC cases related to illnesses (Work and non-work related):

Contractors must submit the Post-Incident Reporting Off Illness-related Emergency MEDEVAC within one (1) month from the date of the incident following the format in PPGUA Volume 3: Health, Safety, Security and Environment, Appendix 6.

Incidences in the workplace:

Contractors must record them in the register (JKKP 8 Form). The register is used to record details of all accidents, dangerous occurrences, occupational poisonings and occupational diseases that occurred at the workplace whether notifiable or not. The register also used to class occupational injuries, occupational poisoning and occupational disease, and for noting the extent of each case. The register consists of three parts:

- A descriptive section which identifies the employee and briefly describes the injury or poisoning or diseases;
- A section covering the extent of the injuries recorded and
- A section on the type and extent of poisoning or diseases.

It shows when the accidents, dangerous occurrence, occupational poisoning or occupational diseases occurred, to whom, the regular job of the injured or ill person at the time of the accident or poisoning or diseases exposure, the kind of injury or poisoning or diseases, how much time was lost, whether the case resulted in a fatality, etc.

Marine incidents in relation to hull, machinery and seafarer shall be reported to MARDEPT by notifying the Marine Operation Division via email at bom@marine.gov.my.

SECTION 6: TRAINING AND COMPETENCY REQUIREMENTS

Training is an important tool for ensuring crews are equipped and competent to manage the workplace as well as to safely manage risks and apply controls measures. Additional training may be needed depending on the roles assigned to employees.

Examples of employees require training are as follows:

- New recruits (e.g. basic induction training, first aid, fire and evacuation, etc.);
- Employees in new positions or with additional scope of work;
- Inexperienced employees (e.g. supervision, basic induction, etc.)
- Employee representatives or safety representatives (e.g. specific training in relation to their required responsibilities);
- Refresher training for existing employees.

Operational and seafarer are required to be trained based on their work tasks.

Competency can be described as the combination of training, skills, experience and knowledge that a person has and their ability to apply them to perform a task safely. Due to the uniqueness of the floating facility operations (i.e. marine, operations), Contractors, asset owners and Service Providers are required to:

- Determine the necessary competency;
- Ensure the competency program is conducted;
- Ensure, where applicable, the necessary actions to acquire and maintain the competency are taken and evaluate the effectiveness of the actions taken for these two types of crews.

The competency requirements and framework must be available to both the asset integrity and reliability management system as well as safety and health management system. The competency required can vary depending on the work or workplace involved. The competency program shall take in account the knowledge, skills and experience of the personnel. Contractors and Service Providers shall oblige to all relevant Authority requirements pertaining to the competency of their personnel.

Table 5 gave an overview of the roles and responsibilities of the floating facilities crews.

Table 5: General Floater Roles and Responsibilities

ROLES	RESPONSIBILITIES	RESPONSIBLE AUTHORITY
Offshore Installation Manager (OIM) or Person in Charge (PIC)	A competent person appointed by the owner as the Person in Charge, who has complete and ultimate command of the unit and to whom all personnel on board are responsible.	Department of Occupational Safety and Health
Maintenance Supervisor and Technician	Responsible and trained to maintain mechanical, electrical, instrumentation and communications equipment. The Maintenance Supervisor on some floater may also be referred to as the Chief Engineer, Technical Section Leader and Rig Mechanic.	
Production Supervisor and Technician	Responsible to operate and handle hydrocarbon process facilities and production operations	
Operation and Services	Responsible for all other activities necessary for an efficient offshore operation. This include personnel dedicated to logistical, crane and material handling, helicopter operations, material, and catering etc.	
Seafarers	Responsible for all activities related to floater operation, including propulsion, thruster and ballasting operations, maintenance of vessel stability, monitoring of mooring loads, deck loading, and station keeping. May comprise the OIM, Barge Supervisor, Ballast Control Operator and Maintenance Supervisor as well as other Deck and Engineer or Officers, Radio Operators and rating defined in STCW Convention, as amended.	Malaysia Marine Department

Section 11.6.2 of Volume 11: Others of PPGUA states that all seafarer shall meet the competency requirement as per Standard Training Certification for Watchkeeping 1978 as amended and recognised by MARDEPT. Contractors, owners and Service Providers are advised to go through all the requirements stated in the document.

DOSH also specifies the OSH competency requirements for personnel. This is available from their website at www.dosh.gov.my.

SECTION 7: HSE CASE

Apart from complying to the relevant authorities' legal requirements, the Contractors, asset owners and Service Providers shall also refer to and comply with PPGUA when executing its operations, which shall be done in a manner that is prudent, proficient and effective. Non-compliance to this document may lead to financial and or legal consequences.

Thus, other than the requirement of HSEMS and risk management, certain types of floaters are required to develop HSE cases for their facilities for all phases of its lifecycle. They are:

- Drilling units (in accordance to IADC Guidelines), and
- Onshore and offshore production facilities (FSO and FPSO).

HSE case is a document that addresses safety impact in throughout the life cycle phases of the facilities. The HSE case must demonstrate that all Major Accident Hazards (MAH) have been identified and controlled, mitigation and recovery measures are provided or implemented and emergency response plans in relation to those MAH have been prepared.

Contractors, asset owners and Service Providers are responsible to ensure that the facility is operated in conformity with the contractor's HSSE management system and other arrangements described in the HSE case. HSE cases is a living documents, to be kept up to date and revised as necessary during the operational life of the floater. The Contractor, asset owners and Service Providers shall revise the HSE case whenever appropriate to ensure it remains current and reflects operational reality of the installation. The validity period to the HSE case shall not exceed 5 years.

SECTION 8: MISCELLANEOUS

For an Asset Integrity and Reliability (AIR) system to be successfully implemented, the system requires some basic management system components. These components are considered crucial for effective implementation. They are:

- Planning and Control
- Management of Change
- Performance Monitoring
- Assurance
- Records and documentation

These elements are briefly discussed in the following sections.

8.1 Planning and Control

Contractors, asset owners and Service Providers shall develop a proper planning system and control system by adopting best practices in order to avoid abnormalities that will lead to failures.

8.2 Management of Change

Contractors, asset owners and Service Providers shall develop and maintain a system to manage temporary and permanent changes. The system shall cover changes to facility, organisational and procedural. Changes shall be reviewed and controlled to the extent necessary to ensure continuing conformity with requirements.

Contractors, asset owners and Service Providers shall retain documented information describing the results of the review of changes, the person(s) authorizing the change and any necessary actions arising from the review.

Class Memoranda are to be formalised and recorded as part of the MOC system.

8.3 Performance Monitoring

Contractors, asset owners and Service Providers shall measure the performance of HSE, Asset Integrity and Reliability (AIR) including classification and certification program. Contractors, asset owners and Service Providers shall ensure that performance monitoring is integral to the HSE and AIR management system to give assurance that the processes remain effective and the system is performing as intended.

Contractors, asset owners and Service Providers shall have a proactive monitoring process to seek assurance that the HSE and AIR management system and facilities are operating as intended, as well as a reactive monitoring process to address asset related deterioration, failure or incidents. Examples of Key Performance Indicators (KPI) are, but not limited to:

HEALTH, SAFETY AND ENVIRONMENT (HSE)	ASSET INTEGRITY & RELIABILITY (AIR)
Fatality	Pressure Vessel Inspection and Certification
Loss Time Incident	Lifting Equipment Inspection and Certification
1. Major or minor Fire 2. Major or minor Loss of Primary Containment	Safety Critical Equipment (SCE) Inspection

8.4 Assurance

Contractors, asset owners and Service Providers shall ensure each floater should have an assurance process that align to the HSE and AIR management system and conforms to statutory and regulatory requirements. The assurance process should continuously and systematically evaluate the adequacy and appropriateness of floater's policies, procedures and its implementation.

Contractors, asset owners and Service Providers shall conduct internal audits to floaters at planned intervals and cover the following but not limited to:

- Management system adequacy and effectiveness of its implementation
- Compliance to legal requirement and other requirement
- Conformance to Class requirement.

Contractors, asset owners and Service Providers shall ensure that the assurance program is part of its annual planned activity.

8.5 Records and Documentation

Contractors, asset owners and Service Providers shall have their own document and record management system and shall keep and maintain all the inspection reports, survey reports, certificates accordingly. The document and record management system should address as a minimum:

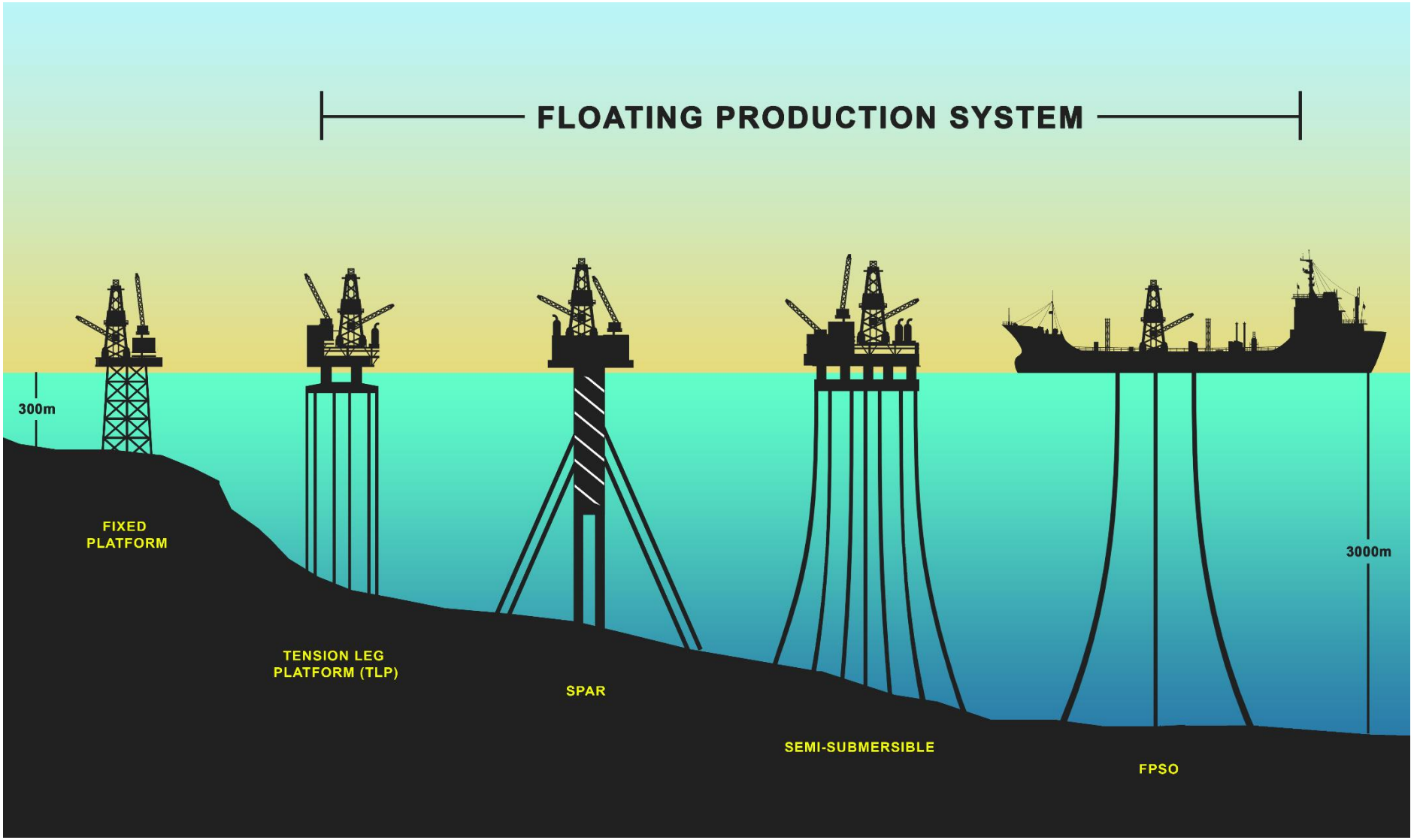
- Distribution and control
- Record retention period
- Frequency of update and review

SECTION 9: CONCLUSION

In conclusion, this guideline clearly defines the roles and enforcement scope of DOSH, MARDEPT and PETRONAS. The enhancement of the existing legal framework for floaters has been discussed with special attention given towards the management of certificated machinery, i.e. process, responsible approving Authority.

Contractors, asset owners and Service Providers shall refer to this guideline in meeting the minimum regulatory requirements. Apart from this guideline, Contractors, asset owners and Service Providers shall also comply with the requirements stipulated of OSRMS and PPGUA. Compliance with these guidelines will ensure that all activities related to floating facilities can be conducted in a proficient, prudent, safe and effective manner.

APPENDIX 1


FLOATING PRODUCTION SYSTEM
300m
FIXED PLATFORM
TENSION LEG PLATFORM (TLP)
SPAR
SEMI-SUBMERSIBLE
FPSO
3000m