Offshore Helicopter Safety Inquiry

Newfoundland and Labrador • Canada

Review of Selected Offshore Petroleum Regulatory Regimes

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Presented by

Aerosafe Risk Management

AEROSAFE RISK MANAGEMENT

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LIST OF ABBREVIATIONS

AC	Advisory Circular
ALARP	As low as reasonably practicable
ANPR	Advanced Notice of Proposed Rulemaking (United States of America)
AOC	Air Operators Certificate
AoC	Acknowledgement of Compliance (Norway)
API	American Petroleum Institute
APOSC	Assessment principles for offshore safety cases (United Kingdom)
AVAD	Audio Voice Alerting Devices
BOE	Barrel oil equivalent
CAA	Civil Aviation Authority
CAA-N	Civil Aviation Authority – Norway (Norway)
CAP	Civil Aviation Publication (United Kingdom)
CAAP	Civil Aviation Advisory Publication (Australia)
CASA	Civil Aviation Safety Authority (Australia)
CFR	Code of Federal Regulations (United States of America)
CNLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board (Canada)
CNSOPB	Canada-Nova Scotia Offshore Petroleum Board (Canada)
DCR	Offshore Installations and Wells (Design and Construction, etc) Regulations 1996 (United Kingdom)
DMR	Department of Mineral Resources (South Africa)
FAA	Federal Aviation Administration (United States of America)
FSA	Formal Safety Assessment (Australia)
HID	Hazardous Installations Directorate (United Kingdom)
HSAC	Helicopter Safety Advisory Conference (United States of America)
HSE	Health and Safety Executive (United Kingdom)
HSE	Health, safety and environment
HSWA	Health and Safety at Work etc Act 1974 (United Kingdom)
HUMS	Health and Usage Monitoring System
INC	Incident of Non Compliance (United States of America)

IRF	International Regulators' Forum
JOHSC	Joint Occupational Health and Safety Committee (Canada)
MAE	Major accident event (Australia)
MCMPR	Ministerial Council on Mineral and Petroleum Resources (Australia)
MHSC	Mine Health and Safety Council (South Africa)
MMS	Minerals Management Service (United States of America)
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MRM	Minerals Revenue Management (United States of America)
NCS	Norwegian Continental Shelf
NPD	Norwegian Petroleum Directorate (Norway)
NOPSA	National Offshore Petroleum Safety Authority (Australia)
OCS	Outer Continental Shelf
OEMM	Offshore Energy and Minerals Management (United States of America)
OHS	Occupational Health and Safety
OLF	Norwegian Po; Industry Association (Norway)
OPGGSA	Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Australia)
OPS	Offshore Petroleum (Safety) Regulations 2009 (Australia)
OSCLA	Outer Continental Shelf Lands Act 1953 (United States of America)
OSD	Offshore Division (United Kingdom)
OSH	Occupational Safety and Health Act 1970 (United States of America)
OSHA	Occupational Safety and Health Administration (United States of America)
PAA	Petroleum Activities Act 1996 (Norway)
PFEER	Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 (United Kingdom)
PINC	Potential Incidents of Non Compliance (United States of America)
PPE	Personal Protection Equipment
PSA	Petroleum Safety Authority (Norway)
PSLA	Petroleum (Submerged Lands) Act 1967 (Australia)
SCR05	Offshore Installations (Safety Case) Regulations 2005 (United Kingdom)

SEMS	Safety and Environmental Management System
SMS	Safety Management System
UKCS	United Kingdom Continental Shelf
USCG	United States Coast Guard (United States of America)

1 Executive Summary

The approach to the regulation of safe offshore petroleum operations varies depending on the country; the state of the industry in that country, the degree of prescription of the regulations, and the method by which the regulators enforce and promote safety. This variation is then manifested in the effectiveness of the regulator and the regulations at creating safe offshore working environments. This report examines the offshore petroleum regulators from five nations in order to provide an overview of the different types of safety regulations and the way in which safety is enforced, as well as an overview of the Regulator itself and the degree of oversight of helicopter operations as a form of transportation to and from offshore installations.

The United Kingdom, through the “Health and Safety Executive”, and the “Petroleum Safety Authority” in Norway, and “National Offshore Petroleum Safety Authority” in Australia, each use performance and risk reduction based regimes to ensure the safety of workers on offshore installations. These regulatory systems are then supplemented by enforcement systems which monitor whether the operator has implemented the safety and management plans accepted by the Regulator.

The United States and Nova Scotia, Canada, each have one body to regulate safe offshore operations, promote the petroleum industry and provide licenses to conduct activities. The United States regime however is further complicated by two agencies being responsible for safety; one for installation safety, the other for occupational health and safety. Both North American regulators are facilitating changes to improve safety regulations, as well as address any potential conflict which may arise from the existing system.

Offshore helicopter safety is varied in its level of oversight with Norway and the United Kingdom investing resources to provide guidance to operators, and improve the overall system through collaboration with the relevant industry parties. Other regulators have, to some degree, identified the need for improved helicopter safety but have yet to implement the necessary systems.

2 Introduction

The regulation of the offshore petroleum industry is crucial to the health and safety of those who work offshore. The regulatory regimes that exist vary significantly between nations, and on some occasions within nations. More than twenty regulators operate worldwide, each different in the level of oversight, structure, funding regime and the ability to make and enforce regulations. The nature of each regulator depends on a number of factors, such as the sophistication and size of the industry in that area, the degree of involvement each regulator has in the day to day operations offshore, the level of prescription of the regulations and the level of activity each regulator exhibits in creating safe and healthy working environment for the thousands of people who work in the offshore industry.

2.1 Background

This report provides an examination of offshore petroleum regulators from five countries: United Kingdom, The United States of America, Australia, Norway, and Canada. These countries were selected for review based on the level of regulation they enforce, the type of industry they have oversight of and the political environment in which they operate. It was intended to include South Africa in this review; however the nature of the information publically and readily available made this difficult. A brief overview is included as the nature of the South African offshore industry and its regulatory regime make it valuable to study in the future.

Excluding South Africa, each of the selected countries are members of the International Regulators' Forum for Global Offshore Safety (IRF). IRF was established in 1994 to enable members to exchange information, promote improved performance, and provide a network to support and advise each other when necessary. The Forum has the aim of improving the safety of offshore petroleum activities.

Canada is the only nation which has two distinct offshore petroleum regulators. The Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) is included in this report. The Canada-Newfoundland and Labrador Offshore Petroleum Board (CNLOPB) also regulates the industry in Canada. However their jurisdiction is two separate geographical areas so it is possible to study one individually, as in done in this report.

Within the United States of America, the Minerals Management Service (MMS) is one of the responsible agencies for the health and safety of workers offshore. However, it is able to enforce the health and safety regulations of other agencies, and is also a member of the IRF. Hence MMS was chosen for this examination.

Both Norway and Australia have specific authorities who are responsible for regulating and enforcing safety in the offshore petroleum industry. The regulator in the United Kingdom, the Health and Safety Executive (HSE), is the responsible agency for ensuring workplace health and safety across the entirety of the United Kingdom. It has a specific division responsible for offshore health and safety.

2.2 Objectives

The objective of this report is to provide a summary of each of the regulators selected. In particular the following four areas were investigated in order to provide a comparison of how the offshore industry is regulated in different countries:

1. Regulator overall structure and governance
2. Safety practices and standards
3. Safety organizational structure
4. Standards and practices with respect to helicopter transportation offshore.

2.3 Report Structure

This report reviews the following petroleum regulators:

1. Health and Safety Executive (United Kingdom)

2. Minerals Management Service (United States of America)
3. National Offshore Petroleum Safety Authority (Australia)
4. Petroleum Safety Authority (Norway)
5. Canada Nova Scotia Offshore Petroleum Board (Canada)
6. Mine Health and Safety Inspectorate (South Africa)

The safety regime enforced and promoted by each regulator is of primary significance in this report. The Regulators' organizational structure and level of oversight of safety are covered in detail. An area of high significance is the oversight of helicopter transportation to and from offshore installations. Generally the aircraft airworthiness, operations and aircraft operator are under the jurisdiction of the relevant civil aviation authorities. However due to the risks associated with helicopter transportation offshore, the offshore regulator may require the installation operator to take preventative measures. The extent to which the regulator ensures safe helicopter operations is therefore included in this report.

3 United Kingdom – Health and Safety Executive

The Health and Safety Executive's (HSE) vision is "the prevention of death, injury and ill health to those at work and those affect by work activities" within Great Britain. The HSE supports the UK Government's strategic aims and current targets for health and safety at work. The HSE is a Non Departmental Public Body which is sponsored by the Department for Work and Pensions.

3.1 Overview

The HSE primary function is to secure the health and safety of people at work and those affected by work activity. In this regard, the HSE seeks to promote safe work environments, provide information and guidance in order to influence people and organizations to provide a high standard of health and safety at work. HSE also enforces, develops and revises legislation in order to ensure the safety and well being of people at work.

Following the 1998 Piper Alpha disaster and subsequent inquiry by Lord Cullen, the Offshore Division was established within the HSE. The pre existing prescriptive regulations of the offshore industry were replaced by goal setting regulations. The foundation of the current regime is the requirement of a safety case for each installation that demonstrates how major accident hazards are controlled.

3.1.1 Industry

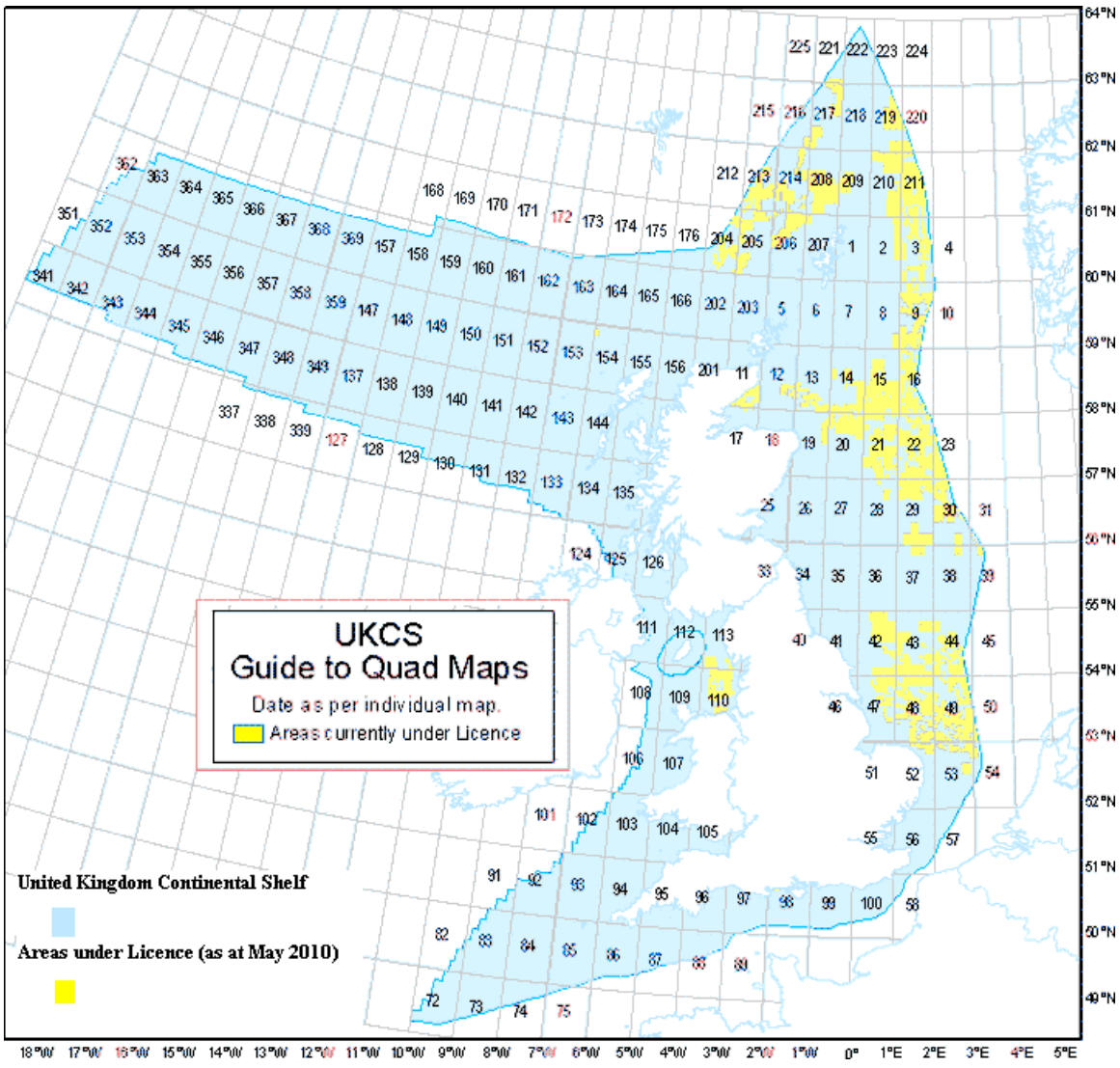
The United Kingdom Continental Shelf (UKCS) has a number of oil and gas fields, primarily in the North Sea. There has been a proven 3723 million tonnes of oil extracted from the UKCS and an additional 292 billion cubic metres of gas as at December 2008. The industry comprises around 300 installations on the UKCS.

Most of the offshore installations are accessed from Aberdeen in Scotland by helicopter. Three helicopter companies, Bristow, Bond Offshore Helicopters and CHC Helicopters,

operate from Aberdeen to provide transportation to the offshore installations, making it the busiest heliport in the world. There are approximately 100 helicopters providing transportation on the UKCS.

The Petroleum Act 1998 vests all rights to the United Kingdom's petroleum resources in the Crown. However the Government, through the Department of Energy and Climate Change can grant licences that confer rights to "search and bore for and get" petroleum. The Petroleum Revenue Tax and the Ring Fence Corporation Tax, and Supplementary Charge on rind fence trades are administered by HM Revenue and Customs Large Business Service. [1]

Figure 1 – Leases on the United Kingdom Continental Shelf



3.2 Organizational Structure

The HSE is established under the *Health and Safety at Work etc. Act 1974 (HSWA)*. It has combined a number of regulatory bodies since its inception, and it remains the body responsible for the encouragement, regulation and enforcement of workplace health and safety.

The Offshore Division is responsible for enforcing health and safety legislation in offshore oil and gas installations, exploration and so on. The Offshore Division (OSD) is one of three Divisions within the Hazardous Installations Directorate (HID) as highlighted in Figure 2.

3.2.1 Board Structure

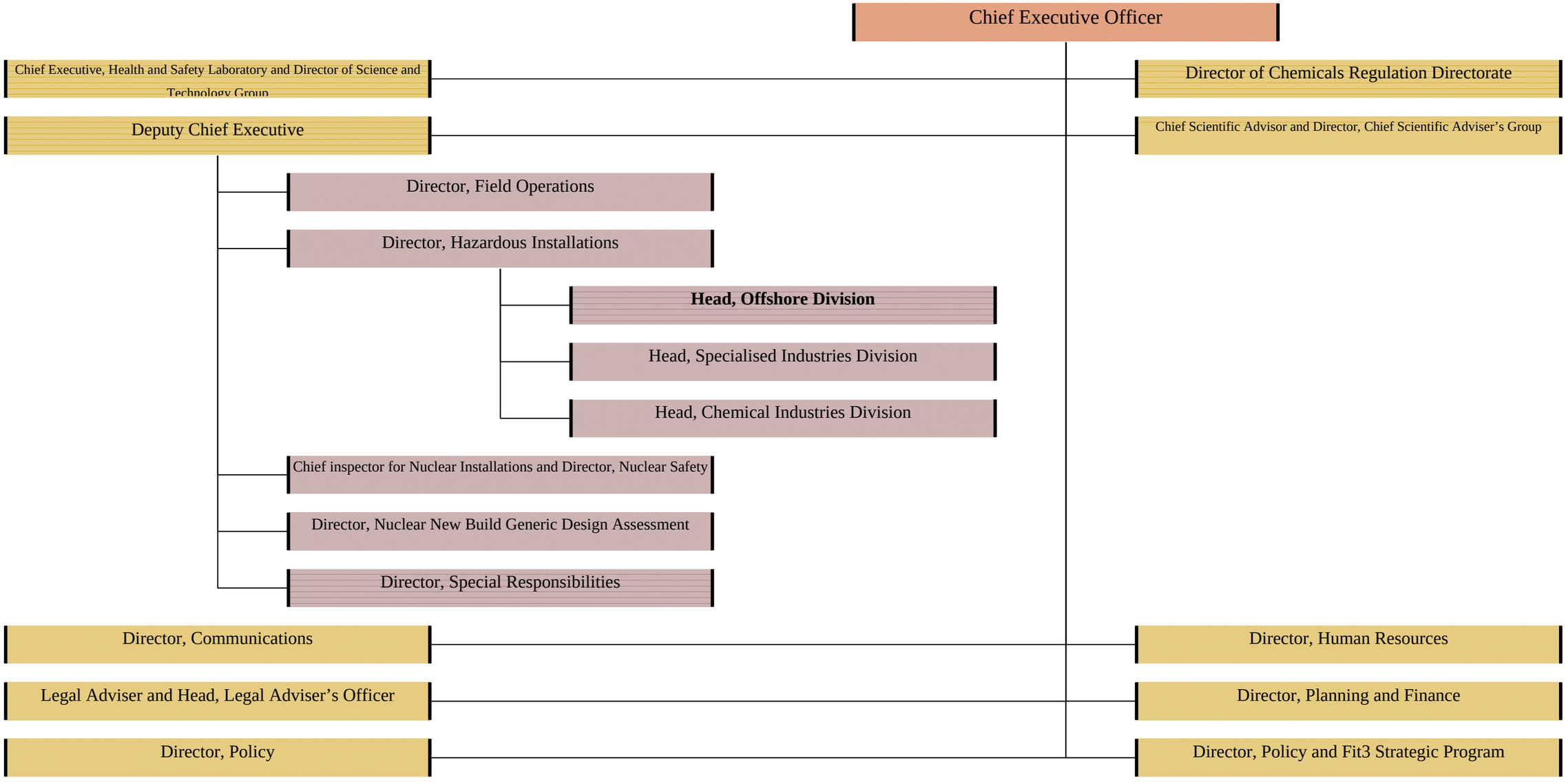
On the 1st April 2008, the Health and Safety Commission and the Health and Safety Executive merged to be a single body, under the name Health and Safety Executive. The HSE Board is specifically responsible for establishing and delivering HSE's strategic aims and objectives and ensuring that the responsible minister is kept informed of any changes which may impact HSE's strategic direction or attainability of its targets. The Board consists of the Chairperson and nine Non-Executive Board Members.

3.2.2 Offshore Division

The Offshore Division (OSD) is divided into five units, which are based in either Aberdeen or Bootle, see Figure 3. The core activities for OSD are:

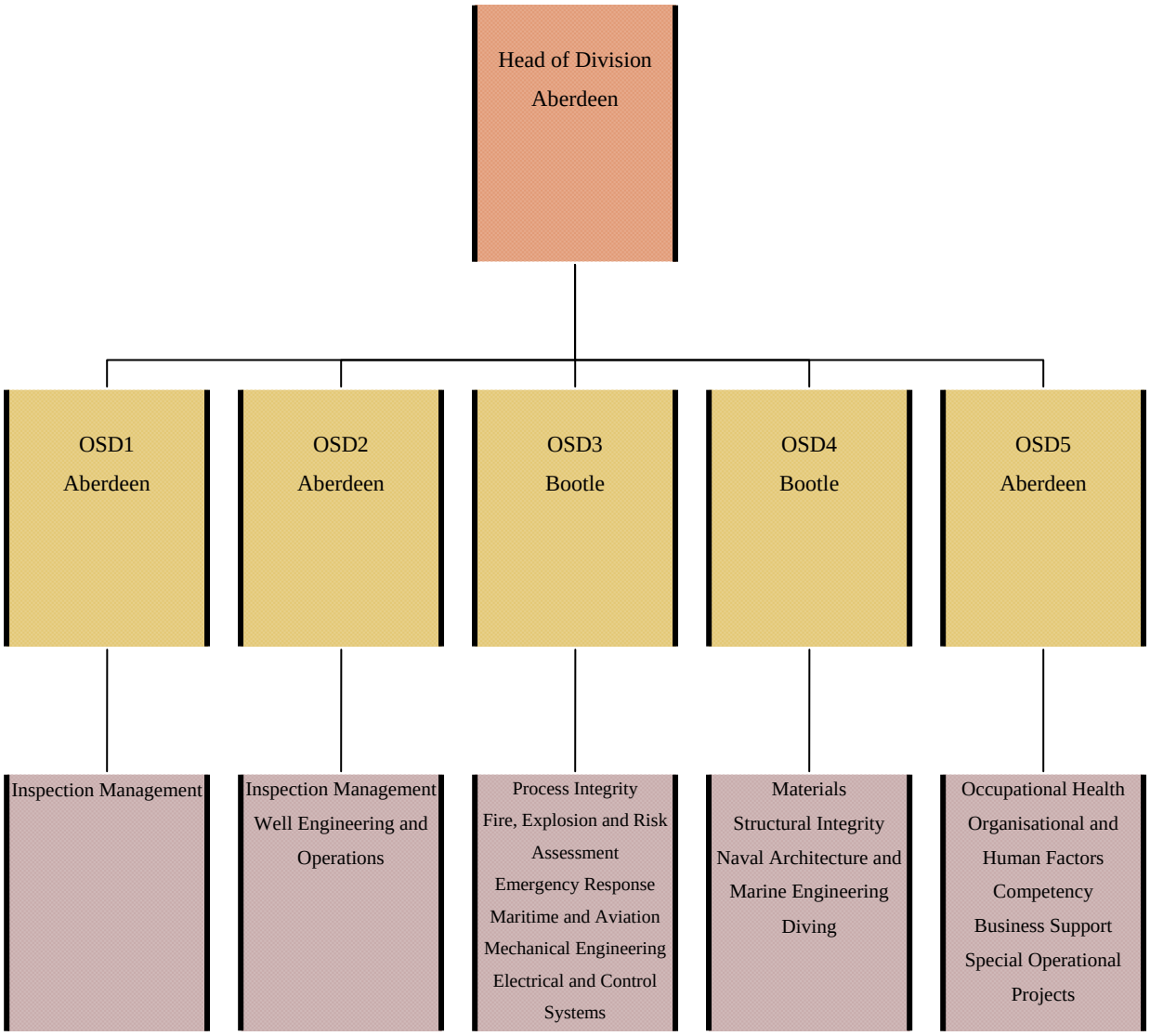
1. Safety case assessment
2. Verification
3. Inspection
4. Investigation
5. Enforcement

Figure 2 - HSE Organizational structure, highlighting position of the Offshore Division



This is reflected in the OSD mission “to assure safe management and effective control of major accident hazard risks and prevent catastrophic incidents in the Offshore Oil and Gas Industry.”

Figure 3 - Organizational structure of the Offshore Division



3.3 Safety Oversight

In order to regulate and promote health and safety and reduce the major hazard risks present across the industries, the HID’s activities include inspection of operations, investigation of accidents and incidents, enforcement of requirements as well as working with partners to identify, define, and advise on risk assessment and reduction.

Due to the nature of the HSE and the large area of responsibility it has for the health and safety of all people at work in Great Britain, there is a large number of Acts and Statutory Instruments and other legislation which the HSE enforces. Within the area of offshore petroleum exploration and production safety, the *Offshore Installations (Safety Case) Regulations 2005 (SCR05)* are the most significant piece of legislation by which the HSE, and in particular OSD, ensures the safety and well being of those at work. The operator of an installation, as defined within the *Offshore Installations and Pipeline Works (Management and Administration) Regulations 1995*, must ensure that the HSE has accepted the lodged safety case for that installation. Schedules 1 to 5 to *SCR05* detail the particulars to be included in the Safety Case, depending on the type of installation it is. Other regulations such as *Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 (PFEER)* and *Offshore Installations and Wells (Design and Construction, etc) Regulations 1996 (DCR)* provide specific details for the design and operation of installations.

3.3.1 Safety Standards

The *Health and Safety at Work etc Act* requires employers to ensure so far as it reasonably practicable the health, safety and welfare at work of employees. SCR05 replaces the previous requirement that risks to people from major accident hazards are reduced to "as low as reasonably practicable", to be that major accident risks are controlled to ensure compliance with the relevant statutory provisions (SCR05 Reg 12). In order to demonstrate compliance with this, the applicable Regulation should be referred to. For example the installation duty holders are required by Paragraph 5 of the *PFEER* Regulations to conduct an assessment which identifies events which could lead to a major accident, or require an evacuation, escape or rescue to avoid or minimize a major accident, the likelihood and consequences of such events and the selection of the appropriate measures to minimize and protect people from the event. (PFEER Paragraph 5) This assessment is to be repeated as often as appropriate and made available to the HSE. This is slightly different to the previous requirements for risk to be reduced to "as

low as reasonably practicable" (ALARP). Other regulatory requirements are phrased differently so that regulatory compliance exceeds ALARP, such as PFEER Paragraphs 17 and 19.

The *Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 (PFEER)* and the *Offshore Installations and Wells (Design and Construction, etc) Regulations 1996 (DCR)* and HSWA set the standards for the control of major accident risks. The requirement from SCR05 for an approved safety case, adds the requirement that the duty holder demonstrates that it has the ability to control major accident risks i.e. SCR05 has the additional responsibility to ensure that the duty holder is in compliance with PFEER, DCR and HSWA. The safety case must be accepted by HSE prior to the installation being in use on the UKCS.

Following the introduction of SCR05, HSE published an updated "Assessment principles for offshore safety cases" (APOSC). It details the 27 principles, or 35 in the case of combined operations, by which each safety case is assessed by which are (in abridged form):

1. Information should meet SCR05 requirements
2. Management system is adequate to ensure compliance with statutory provisions
3. Management system has an appropriate level of control during each stage of the installation life cycle
4. Systematic process to identify all reasonably foreseeable major accidents hazards
5. Clear methodology for major accident risk assessment
6. Any criteria to eliminate a risk in the evaluation should be explained
7. Risk assessment should take account of people exposed to the risks
8. The major accident risk evaluation should take account of human factors
9. Conclusions reached in risk assessment should account for uncertainty
10. Risk reduction measures should be systematic and take new knowledge into account
11. Describe reasoning for choice of risk reduction measures to be implemented
12. Risk reduction measures implemented if reasonably practicable

13. “Reasonably practicable” based on sound engineering, management and human factors principles
14. Risk reduction measures are implemented in considered timeframe
15. Describe measures taken to manage major risk hazards
16. Inherently safer design concepts applied
17. Measures for preventing major accidents take into account the various activities undertaken
18. Appropriate detection measures for a reasonably foreseeable event requiring emergency response
19. Appropriate control and mitigation measures in place to protect personnel from the consequences of a major accident
20. Arrangements for controlling an emergency take into account likely conditions in an emergency
21. Measures and arrangement for emergency management identified
22. Temporary Refuge provides sufficient protection
23. Temporary Refuge integrity maintained for the necessary time
24. Evacuation and escape arrangement integrated in a logical and systematic manner
25. Effective rescue and recovery arrangements for major accidents
26. Design Notification describes the principles of risk evaluation and management being applied to reduce major accident risks, as to ensure compliance with statutory provisions
27. Well engineering aspects included in Design Notification

In addition to SCR05 is the need for an early design notification to HSE when developing a new production installation.

Another introduction is the requirement for licensees to ensure that whoever they appoint an operator is able to fulfill their legal responsibilities for safety.

3.3.2 Safety Assurance Regime

The duty holders are required, by the change to the SCR05, to conduct a thorough and fundamental review of their safety cases at least every five years, or as required by HSE. This removes the need for safety cases to be re-submitted every three years as inspections will ensure that safety cases are implemented. The review is intended to allow updates and improvements to be made which account for additional information or practices made available since the original safety case was submitted. The review also ensures that the lifecycle of installations is fully accounted for. Ageing is becoming more significant as infrastructure investment reduces.

The OSD conducts inspections of installations to ensure compliance but not within any definite period. An initiative to increase the number of inspections carried out has been underway since 2008. This program provides verification that the duty holder is compliant with the regulations.

3.4 Helicopter Operations Oversight

The HSE has been proactive in its approach to helicopter safety for transportation to and from offshore installations. This includes identifying the responsible parties for each element. The publication *How offshore helicopter travel is regulated* provides a definitive guide for what is the responsibility of the associated agencies and individuals. A Memorandum of Understanding between the UK Civil Aviation Authority (CAA) and HSE ensures that the agencies together efficiently regulate helicopter travel offshore.

In addition to these clarification documents, the HSE has commissioned a report on the safety record of UKCS helicopter operations compared to other modes of transportation. (John Burt Associates Limited and BOMEL Limited, 2004) An employee of the Offshore Division also undertook a study of offshore helicopter safety, (Morrison, 2001) identifying trends in offshore helicopter safety as well as details regarding helicopter technology and helideck design.

The *Offshore Installations (Safety Case) Regulations 2005* require installation operators to identify, and take action to reduce the risks associated with major accidents, including helicopter accidents. Requirements for the safety of helidecks and helideck operation are included in the following regulations:

- *Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995*
- *Offshore Installation and Pipeline Works (Management and Administration) Regulations 1995*
- *Offshore Installations and Wells (Design and Construction, etc) Regulations 1996*

Through inspections, the HSE ensures that helidecks and operations associated with helidecks conform with these Regulations, as well as the practices described in the installation safety case.

The CAA is responsible for regulating the airworthiness of aircraft and the safe operation of those holding Air Operators Certificates (AOC). Through the use of Air Navigation Orders, helicopter operators are only able to make flights to suitable helidecks. The Helideck Certification Agency within the CAA inspects helidecks operational in the UKCS and ensures the application of operational limitations and restrictions as necessary. The CAA published Civil Aviation Publication 437 which provides guidance as to good practice for the design and associated operations of helidecks. The HSE accepts that compliance with CAP 437 is considered compliance with the HSE offshore regulations for helidecks. The CAA has mandated the use of Health and Usage Monitoring Systems for all helicopters providing support for the offshore oil and gas industry on the UKCS.

A Memorandum of Understanding between the CAA and HSE specifies the responsibility for each of the parties with regard to offshore helicopter safety. This document highlights

1. the role of the HSE to ensure that the Installation Manager has the appropriate safety provisions in place for any activities associated with the offshore installation, and

2. the role of the CAA to ensure that helicopter operators are able to meet the requirements for the safe transportation of passengers.

The CAA and HSE also participate in the twice yearly meetings of the Offshore Industry Advisory Committee Helicopter Liaison Group, within the HSE. This provides a regular tangible way for stakeholders to improve safe helicopter operations.

4 United States of America – Minerals Management Service

The Minerals Management Service (MMS) is a US Federal Agency within the Department of Interior. It is responsible for the minerals, oil and gas on the Outer Continental Shelf (OSC).

4.1 Overview

The regulation and enforcement of safe work environments on offshore petroleum installations is the responsibility of a number of agencies: the Minerals Management Service (MMS), the United States Coast Guard (USCG) and the Occupational Safety and Health Administration (OSHA). Through a number of pieces of legislation, Memoranda of Understanding (MOU) and guideline documents, the jurisdiction of each agency is defined.

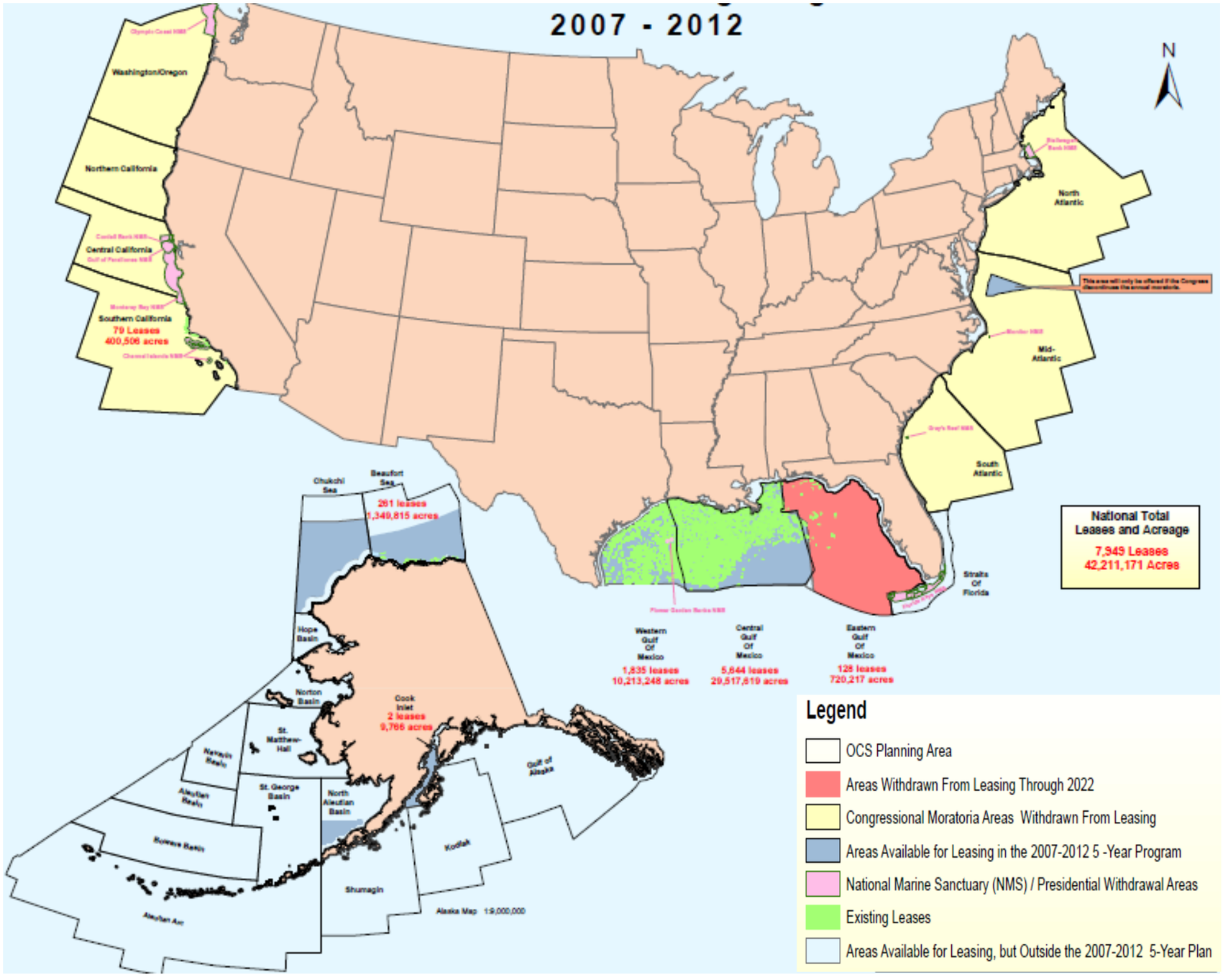
The MMS regulates the structural integrity of OCS facilities as well as enforcing regulations pertaining to production, exploration, drilling and similar activities on the OCS. The USCG regulates marine systems, such as life saving and navigation equipment, and workplace safety and health. Any work conditions which the MMS or USCG have not accounted for by regulation are then enforced by OSHA. These agencies have jurisdiction only in federal waters, which generally “commence” from the 3 nautical miles from land.

The MMS enforces USCG regulations as well as its own. These account for the majority of safety regulations enforceable on OCS facilities. For this reason, MMS will be the primary focus of this review as the offshore safety regulator.

4.1.1 Industry

The offshore oil and gas industry in the US is primarily based in the Gulf of Mexico with nearly 6000 oil and gas exploration and production installations in the Gulf of Mexico. The Pacific Region has 24 production installations and Alaska Region has none as at the

Figure 4 - United States offshore oil and gas leasing five year plan (2007-2012), as at July 2008



end of 2009. There are several leases and wells in Alaska, but none producing at this point, see Figure 4.

Following a statement by President Obama in March 2010, a number of areas in Alaska and on the Pacific and Atlantic regions of the OCS have been identified as possibly being available for lease in the 2012 release. This new strategy will form part of the 5 Year Plan that the MMS operates.

In the Gulf of Mexico, due to the large number of platforms and a total of 200 companies active in the region, there are 4000 helidecks. The small offshore distances and the large number of platforms operating in the Gulf has led to a large number of helicopter operators, with fleet size ranging from 1 to more than 200 aircraft. There are essentially two tiers of helicopter operators in the Gulf. The larger companies offer twin engine helicopters with the latest technology and are generally engaged in long term contracts with oil and gas companies. The second tier of operators tend to partake in ad hoc charter for smaller companies. This restricts the investment in large, well equipped IFR helicopters.

4.1.2 Legal Structure

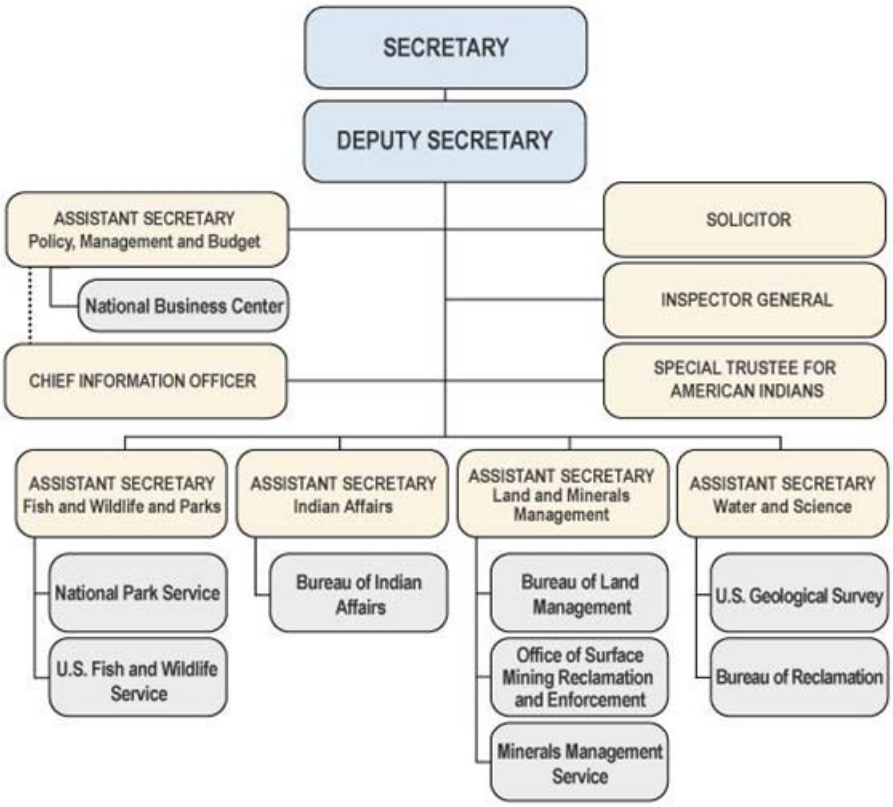
The MMS was established in 1982 under Department of Interior Secretarial Order No. 3071. This created a bureau level agency responsible for managing the royalties from oil and gas and mineral production as well as leases of federal land. The position of the MMS within the Department of the Interior is highlighted in Figure 5.

4.2 MMS Organizational Structure

The MMS is a bureau within the United States Department of the Interior. The MMS consists of approximately 1700 staff across 20 offices. The two main programs are the Offshore Energy and Minerals Management (OEMM) and Mineral Revenue Management (MRM). The OEMM manages energy and mineral development on the

Outer Continental Shelf. It also issues leases for mineral, oil and gas exploration and production on the OCS through scheduled leasing programs. The MRM collects and

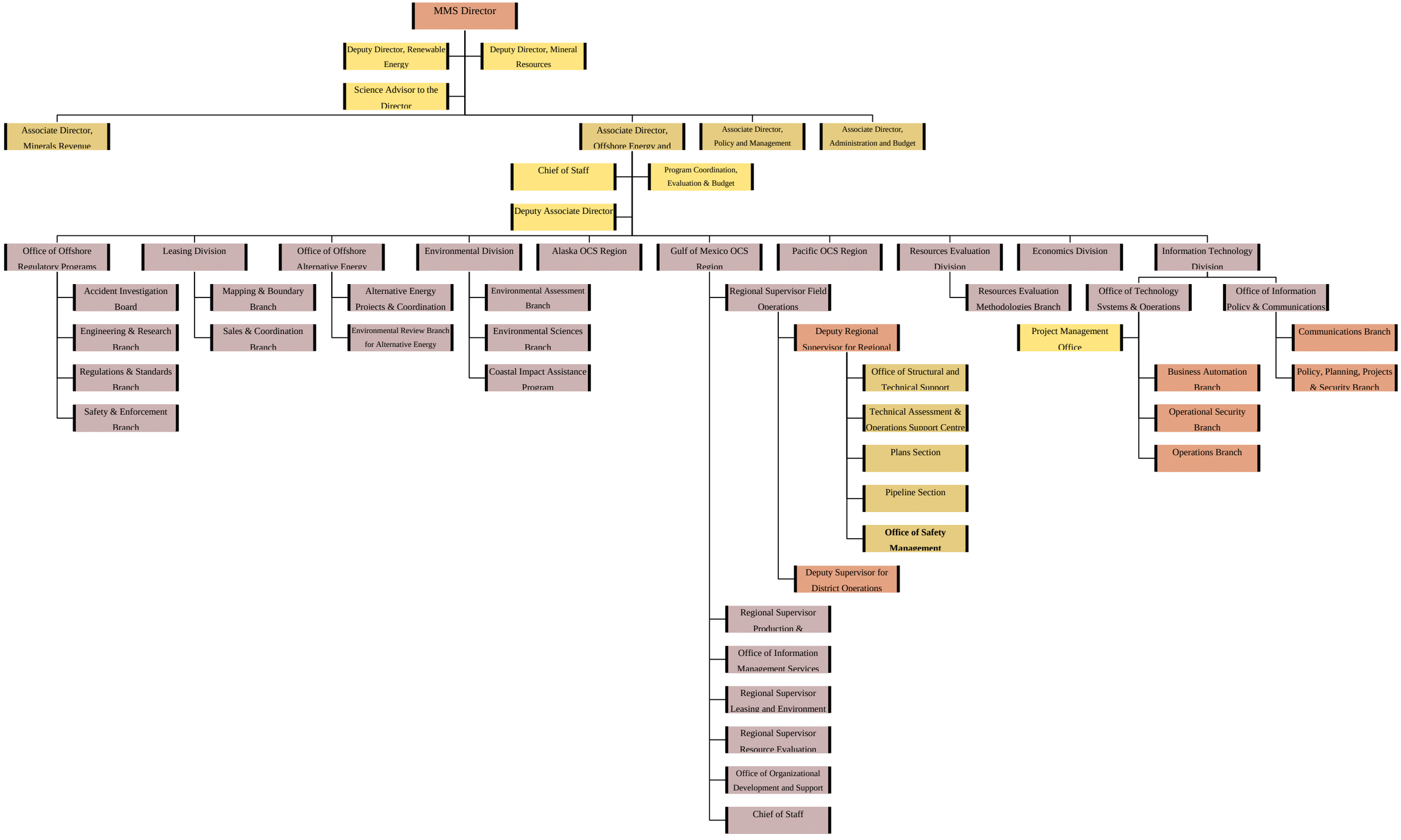
Figure 5 - Organizational structure of the Department of the Interior



accounts for revenue associated with onshore and offshore petroleum and mineral production. The MRM disburses funds to relevant parties such as the U.S. Treasury and eligible states and counties, American Indian Tribes and funds for conservation and preservation. On average US$8 billion is collected by the MMS annually from leasing and royalties.

Following the Deepwater Horizon incident in April 2010, the Interior Secretary Ken Salazar announced plans to split the MMS into two parts. One would be charged with regulatory enforcement and inspection, while the other would issue leases and collect royalties. This would end what has been described by many commentators as an ineffective regulatory regime where the same agency is responsible for collecting money from the companies it is required to inspect.

Figure 6 - Organizational Structure of MMS, focusing on OEMM, and the Gulf of Mexico OCS Region Office of Safety Management



4.2.1 Offshore Energy and Minerals Management

The OEMM program within the MMS is responsible for leasing federal land on the OCS, as well as regulating and enforcing safe, efficient and environmentally friendly operations on the OCS. The operations of the OEMM are primarily split into four regions: Pacific, Gulf of Mexico, Atlantic and Alaska. The Gulf of Mexico Regional Office conducts all leasing and resource management activities in the Atlantic where there is currently no oil or gas exploration or production. The Gulf of Mexico is the most significant region. It accounts for most of the offshore activity in the United States which is more than 6000 production platforms. The MMS has approximately 60 inspectors

4.3 Safety Oversight

Under the *Occupational Safety and Health Act of 1970 (OSH)* Section 5(a)(i) each employer should provide their employees "a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employee." The OSH is applied to the Outer Continental Shelf through the *Outer Continental Shelf Lands Act 1953 (OSCLA).* In subsequent amendments the Act also established the USCG's role as the principal safety and health authority on the OCS.[2] The USCG is therefore the primary federal agency on matters of health and safety for all offshore petroleum installations on the OCS. The MMS also has some safety and health regulations, particularly with respect to fire and explosion hazards. Any hazardous working condition for which the USCG or MMS has not yet promulgated a regulation is the responsibility of OSHA, primarily related to general industry and construction industry standards.

The USCG regulations for the OCS include Personal Protection Equipment (PPE), fire fighting equipment, emergency equipment and evacuation plans. Details are stipulated in 33 CFR Chapter I.

4.3.1 Safety Standards

Under the OSCLA Section 6 and Section 8, a lease is issued which authorizes the exploration for, and development and production of minerals on the OCS in a specified area. The holder of the lease has the duty to

> "maintain all places of employment within the lease area… in compliance with occupational safety and health standards and, in addition, free from recognized hazards to employees."

The lessee must submit to the MMS a Development and Production Plan under 30 CFR 250.204 and OSCLA 1351 which must include a description of any safety features on the facility, all safety standards to be met and how the standards will be met. The Plan may be requested by the MMS to be modified if the Plan does not show adequate provisions for safety. All production facilities are required by the MMS to be designed, installed, and maintained in a manner which provides for safety of operation. A number of American Petroleum Institute Recommended Practices (API RP 14C) are the standard for the Surface Safety Systems in place for Offshore Production Platforms.

The MMS and USCG minimum requirement for compliance is the use of "the best available and safest technology". This is defined in 30 CFR 250.105 to be technologies determined by the MMS Director as "economically feasible wherever failure of equipment would have a significant effect on safety, health, or the environment."

A number of operators on the OCS voluntarily have Safety and Environmental Management Systems (SEMS) in place. The American Petroleum Institute (API), in collaboration with industry organizations and MMS, developed API RP 75 "Recommended Practice for Development of a Safety and Environmental Management Program for Offshore Operations and Facilities". The degree of adoption of API RP 75 has varied, and the MMS has monitored this through the voluntary SEMS Performance Measures with an estimated 70 OCS operators having SEMS programs in place as at June 2009. The majority of these are what MMS defines as high activity operators i.e. an operator which produces at least 10 million barrel of oil equivalent (BOE) per year.

4.3.2 Safety Assurance Regime

The MMS and USCG under OSCLA are required to promulgate regulations which facilitate scheduled onsite inspections of each facility on the OCS. The inspection “shall include all safety equipment designed to prevent/ameliorate blowouts, fires, spillages, or other major accidents.”(43 U.S.C. 1348 (c)) MMS conducts onsite inspections at least annually to assure compliance with lease terms and plans as well as safety and environmental considerations. The USCG conducts an initial inspection of all new fixed OCS facilities and further inspections as allowed for by resources during operation. The small number of inspectors employed by the USCG means that less than 10 percent of all facilities are inspected annually. The Department of Transportation authorized in 2002 an arrangement whereby the MMS on behalf of the USCG conducts inspections on fixed facilities on the OCS and enforce the USCG regulations applicable to the facilities. This system ensures that each facility is subject to an onsite inspection at least once a year, with both MMS and USCG able to conduct inspections at any time without notice to ensure compliance. This increases the safety of workers on fixed OCS facilities and associated vessels through more frequent inspections of lifesaving and fire fighting equipment among others. Any deficiencies found by MMS are processed according to MMS regulations and Incidents of Non Compliance (INC’s) will be issued.

The Memorandum of Agreement between the MMS and the USCG (MOA OCS-01) effective from 30 September 2004, lists the lead agency for systems associated with OCS facilities, which categorises and defines the mobile offshore drilling units. These are vessels capable of engaging in drilling operations for exploring or exploiting subsea resources. A fixed facility is defined as a “bottom-founded OCS facilities permanently attached to the seabed or subsoil of the OCS, including platforms, towers, articulated gravity platforms and other structures.” A floating OCS facility is a “buoyant OCS facility securely and substantially moored so that it cannot be moved without a special effort.”

Table 1 - MMS and USCG Offshore Facility System Responsibility Matrix (Redacted)

System	Sub-System	Lead Agency		
		MODU	Fixed	Floating
Aircraft Landing and Refueling	Decks, fuel handling and storage	USCG	MMS	USCG
Fire Protection		USCG	USCG	USCG
Safety Systems	Emergency shut down systems	MMS	MMS	MMS
	Gas detection	MMS	MMS	MMS
	Drilling, production, well control safety and shutdown systems	MMS	MMS	MMS
	General alarm (including public address system)	USCG	USCG	USCG
Life saving equipment		USCG	USCG	USCG
Workplace health and safety		USCG	USCG	USCG
General arrangements	Access/egress and means of escape	USCG	USCG	USCG
	Safety plan, fire control or fire equipment and life saving equipment plans	USCG	USCG	USCG
	Emergency evacuation plans	USCG	USCG	USCG
	Drills – fire, abandon and life boat	USCG	USCG	USCG
	Safe welding, burning and hot tapping	MMS	MMS	MMS
	Diving operations and equipment	USCG	USCG	USCG
	H_2S contingency plan (including detection, PPE, and control systems)	MMS	MMS	MMS
Safety analysis	Industrial systems	USCG	MMS	MMS

The basis of the MMS regulatory enforcement is through the Self-Inspection Program. This is built on 27 specific Potential Incidents of Non-Compliance (PINCs) which were developed by USCG and MMS. The program is conducted according to 33 CFR Sub Chapter N, and is carried out by either MMS inspectors acting on behalf of USCG or USCG marine inspectors. The 27 may each be addressed, forming a full Self Inspection, or only key safety items, comprising 8 to 10 PINCs (depending on the OCS region) may be inspected. The PINC allow operators to ensure that they are compliant with the requirements as well as providing the inspectors a checklist of the necessary conditions. The enforcement actions range from "Warning" to "Shut-in Facility". The 27 PINC are (in redacted form):

1. Previous 2 years of self inspection forms filed
2. Adequate quantities of PPE available, used and well maintained
3. Respiratory protection equipment available, used and well maintained
4. Use of safety belts or harness when personnel in an activity where they may fall more than 10 feet
5. Use of approved personal flotation device if hazard of falling into water
6. Eyewash equipment immediately available
7. Walkways cleared of tripping and slipping hazards
8. Openings in decks covered or guarded when not in use
9. Required number of operational obstruction flights and fog horns are in place
10. Required types and number of means of escape for personnel
11. Personnel landing maintained to allow safe access/egress at water surface
12. Floors, decks, catwalks and stairways protected with suitable guards, rails or fence
13. Helideck perimeter protection
14. Two approved life floats/rafts etc to evacuate all onboard personnel at one time available and accessible
15. Life preserver provide for each person
16. Four life ring buoys located
17. First-aid kit available and readily accessible
18. Safety litter available and accessible

19. Operational emergency communication equipment on board
20. Readily accessible required life saving equipment
21. Additional life saving equipment if required for unmanned platform
22. Required number and type of fire extinguishers available
23. Buoyant work vests available for use by personnel
24. General alarm system installed
25. Person assigned to each life float/raft etc who is responsible for launching it in the event of an emergency
26. Emergency drills conducted on each platform
27. Complete station bill prepared and displayed

4.4 Helicopter Operations Oversight

Helicopter landing and refueling sites are included as one of the 27 PINC. The regulations for this are promulgated by USCG for floating and MODU facilities, and the MMS for fixed facilities on the OCS. The USCG has numerous regulations covering helideck design, markings and fire preparedness; all stipulated in 46 CFR Parts 107 to 109. The MMS is the lead agency for helideck facilities on fixed OCS facilities but has not promulgated specific regulations for markings etc.

Both the FAA and MMS are associate members of the Helicopter Safety Advisory Conference (HSAC) which primarily focuses on improving helicopter operations within the Gulf of Mexico. HSAC, established in 1978, has issued a number of Recommended Practices which provide information and guidance on many issues, such as the use of Helicopter Underwater Escape Training and Night Offshore Helicopter Flight. While none of these guidelines is binding, these and other initiatives have improved the overall safety and awareness of safety related issues in the Gulf.

4.4.1 FAA

The Federal Aviation Administration (FAA) does not regulate the helidecks on the OCS. It has published an Advisory Circular AC 150/5390-2B Heliport Design which provides

guidance on designing and operating a heliport. In addition there are a number of Advisory Circulars providing guidance for Approved Offshore Standard Approach Procedures. The Rotorcraft Directorate with the FAA is responsible for regulations and policy relating to rotorcraft. No specific program or regulatory work is underway with respect to offshore helicopter travel by the FAA.

4.5 Upcoming Rulemaking

The Department of Interior has issued a Proposed Rule on June 17, 2009 which would require oil and gas operators in the OCS to develop and implement a Safety and Environmental Management System (SEMS). The MMS believes that implementing an SEMS will reduce the risk and number of accidents, injuries, and spills when operating on the OCS. The SEMS would consist of four elements:

1. Hazard Analysis,
2. Management of Change,
3. Operating Procedures, and
4. Mechanical Integrity.

These four areas were selected as they generally account for more than 90% of Incidents of Noncompliance observed. The MMS proposes to require each offshore lessee/operator to develop, implement, maintain and operate under an SEMS program composed of the four elements.

An Advanced Notice of Proposed Rulemaking (ANPR) was issued on May 22, 2006 which provided an opportunity for operators and relevant parties to make comments on the proposed regulatory requirement for an SEMS. The ANPR indicated MMS' goal of introducing a regulatory system which would further improve the existing regime to protect people working on the OCS in oil and gas exploration activities and the environment. In addition it would make the regulatory system more responsive to innovation and changes in the technology and the environment.

5 Australia – National Offshore Petroleum Safety Authority

The vision of the National Offshore Petroleum Safety Authority (NOPSA) is that "Health and safety risks in the Australian offshore petroleum industry are properly controlled." It is with this vision that NOPSA has been in operation since 2005, ensuring a health and safety regulatory regime for offshore petroleum operations in Australian waters, administered by a single national entity.

5.1 Overview

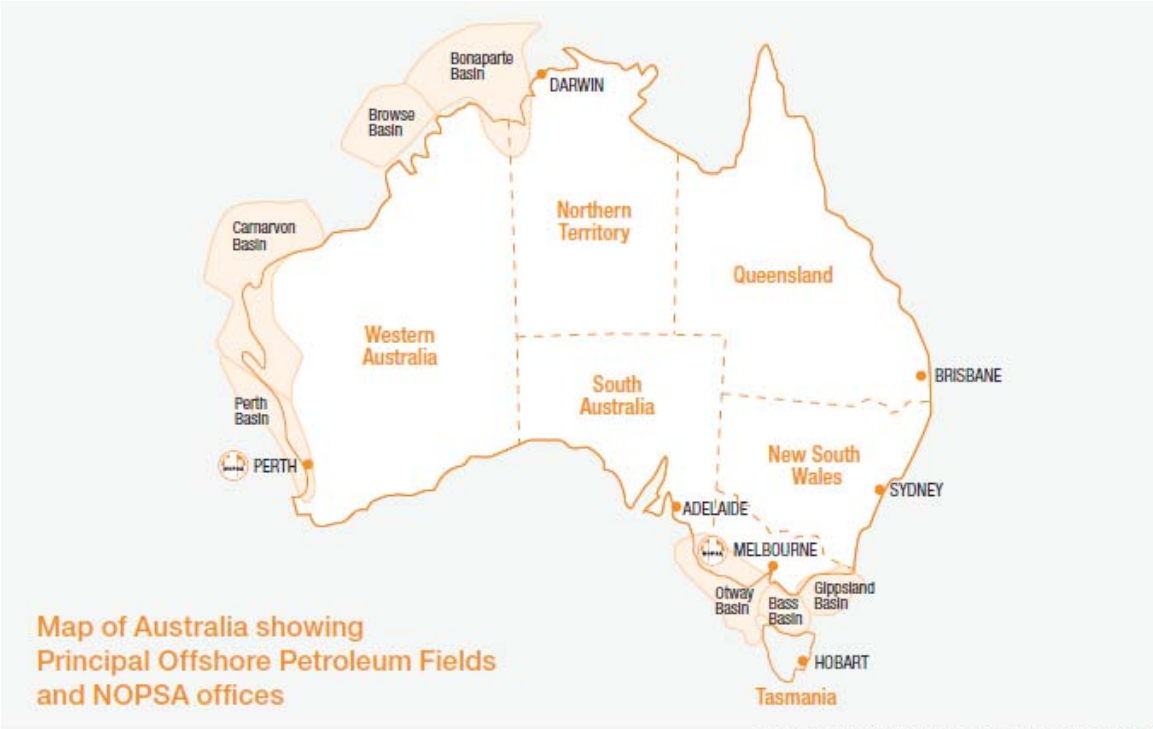
The National Offshore Petroleum Safety Authority (NOPSA) commenced operations 1 January 2005. Following the Piper Alpha disaster in 1988, the Australian Commonwealth Government, in conjunction with the States and Territories considered what lessons could be drawn that were applicable to the Australian offshore petroleum industry. Prior to this point, the offshore petroleum industry was regulated by a combination of State and Commonwealth Law. "It was decided to introduce a safety case approach and the law was modified although some prescriptive aspects remain." [3]

Australia has implemented a performance-based safety regime which imposes general duties of care on each entity associated with the regime, primarily the operator of the facility. NOPSA regulates the operator through the acceptance and oversight of the operators' safety case.

5.1.1 Industry

The Australian offshore petroleum is continually increasing with a number of ventures in 2010 expected to further expand the industry. The offshore industry in Australia, as at December 2009, consists of 166 offshore facilities.

Figure 7 - Principal offshore petroleum fields in Australia



A number of helicopter companies service the offshore industry in Australia. These include CHC Helicopters, Bristow Australia, Jayrow Helicopters and Esso's own fleet.

5.1.2 Legal Structure

The Ministerial Council on Mineral and Petroleum Resources (MCMPR) comprises of the relevant Commonwealth, State and Territory Ministers. It facilitated the formation of a consistent national approach to offshore safety regulation in all Australian waters. This is necessary because the States and Territories have title and power to make laws for the first three nautical miles of waters seaward adjacent to State or Territory land, with the Commonwealth Government having title to any petroleum seaward of the three mile mark. As petroleum resources are located in both waters, a collaborative approach was required to ensure cost-effective delivery of safety outcomes. In September 2002, the MCMPR recommended that the safety of offshore petroleum activities in both Commonwealth, State and Territorial waters be regulated by a single national statutory authority, formed under Commonwealth legislation.

NOPSA was established under the *Petroleum (Submerged Lands) Act 1967 (PSLA)* by Commonwealth legislation was introduced in 2003. The *Petroleum (Submerged Lands) Amendment Act 2003* established NOPSA as a safety regulator, amended OHS provisions and cancelled State and Territorial laws and maritime law at offshore facilities. The amended laws and NOPSA commenced 1 January 2005. The PSLA has been replaced by the *Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGSA).*

NOPSA regulates the occupational health and safety of people engaged in offshore petroleum operations under the *Offshore Petroleum (Safety) Regulations 2009 (OPS).* This is pursuant to Schedule 3 to the *OPGGSA.* The cost recovery to fund NOPSA activities is the result of *Offshore Petroleum (Safety Levies) Act 2003.* Annual safety case levies cover all of NOPSA's budget. Any investigation following a major incident is funded by the operator.

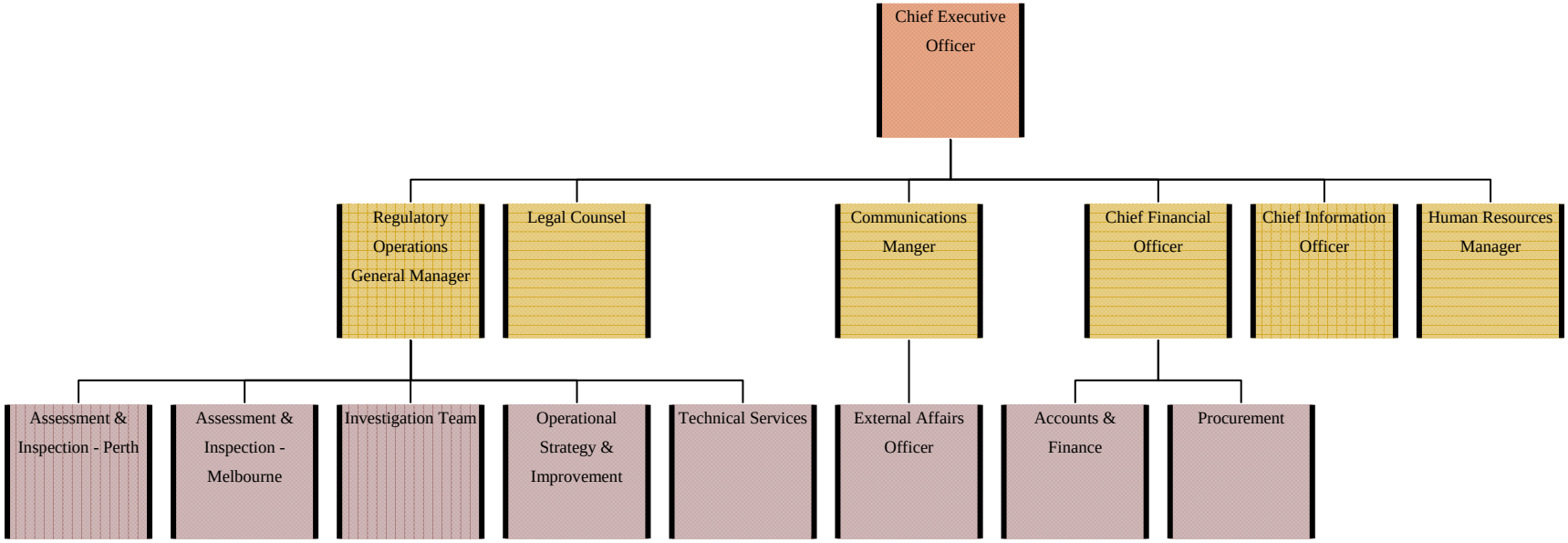
5.2 Organizational Structure

NOPSA consists of approximately 60 staff, see Figure 8. The majority of staff are based at the Head Office in Perth, Western Australia. An additional office is located in Melbourne to oversee activities in the Bass, Gippsland and Otway basins to the south east of Australia. Twenty six inspectors are employed over these two locations.

5.2.1 Board Structure

The NOPSA Board provides advice to the relevant ministers on policy and strategic matters relation to occupation health and safety of offshore petroleum activities. It also advises the Chief Executive Officer of NOPSA about operational policies to be followed. The Board consists of seven members, including one Chair, as appointed by the Commonwealth Minister. Secretariat services to the Board are provided by the Department of Resources, Energy and Tourism. The Board and NOPSA are separate legal entities, with the Board performing an "advisory" role, rather than a management approach.

Figure 8 - Organizational structure of NOPSA



5.3 Safety Oversight

The *Offshore Petroleum (Safety) Regulations 2009 (OPS)* is the legislation by which NOPSA ensures the occupational health and safety at offshore installations in Australia. This creates a safety case regime for compliance. NOPSA, through safety case assessments and inspections, operates on a quality assurance basis. The safety case consists of a Facility Description, detailed descriptions of the Formal Safety Assessment and the Safety Management System. NOPSA also administers a number of State and Northern Territory laws, which are Schedules 3, 4, 5 and 7 to *Petroleum (Submerged Lands) Act 1982* and subsequent State and Territory specific regulations.

NOPSA has two objectives; the first to regulate the industry to assist it to reduce the health and safety risks to an acceptable level, and the second, to achieve performance excellence in the provision of quality services to the industry.

NOPSA addresses its core regulatory responsibilities through monitoring and enforcement strategies that include planned inspections, themed audits, assessment and acceptance of safety cases (safety management plans for diving and pipelines), investigation of incidents or complaints and enforcement activities that include measures for prosecutions and withdrawal of safety case approvals.

5.3.1 Safety Standards

An accepted safety case is required for operations in Australian waters, and the safety case must be in force in all activities throughout the entire lifecycle of the facility. The Facilities Description consists of information about the design and the use of the facility, as well as technical and other control measures in place, as a result of the Formal Safety Assessment (FSA). The FSA identifies

1. hazards having the potential to lead to a major accident event (MAE),
2. a detailed and systematic assessment of the risks, and
3. the control measures in place to reduce the risk to “as low as reasonably practicable” (ALARP).

The Safety Management System (SMS) should be integrated and comprehensive, as well as continual and systematic in the management of risk management in order maintain risks at the ALARP level.

Well and structural integrity of offshore petroleum installations are covered by the relevant State or Territorial laws. [4]

5.3.2 Safety Assurance Regime

NOPSA must accept a safety case if it

(a) Is appropriate to the facility and the activities conducted at the facility, and

(b) The contents are compliant and fulfill any validation requirements.

When assessing the safety case, NOPSA has published a policy dictating the assessment approach. This consists of three areas: General, Detailed and Validation, as described in Table 3.

NOPSA undertakes planned inspections of offshore facilities to verify the risk management commitments of the operator as specified in the accepted safety case. Both field based inspections and topic based inspections are conducted by NOPSA in order to ensure that the relevant OHS regulations are being adhered to. Field based inspections generally focus on the implementation of control measures in the safety case, while themed audits usually inspect organizational issues and maintain a common theme. The frequency of planned inspections is based on a risk assessment of the facility, as summarized in Table 2, with the Inspection Team Leader determining the appropriate frequency.

Table 2 - NOPSA planned inspection frequency guide

		Operator Maturity	
		Low	High
Facility complexity	High	At least once per year, plus themed audit of SMS issues (onshore)	Once/year
	Medium	At least once per year	Once/year
	Low	Once per safety case lifecycle (up	Once/safety case lifecycle (up to

		to 5 years), or following significant change	5 years)

Table 3 - NOPSA safety case assessment policy

Part	Assessment Area	Safety case assessment criteria overview
1	General	• Safety case generally appropriate to the facility and activities undertaken at facility, ie compliant with all items in Division 1 of OPS
2	Detailed - Specific Regulations	Safety case complies, in content and appropriateness, with respect to: • FSA description: identifies all hazards with potential to cause MAE, has detailed and systematic assessment of risk associated with those hazards; and identifies the control measures to reduce the risks to ALARP level • SMS description provides evidence the system is comprehensive and integrated • SMS description provides evidence that the system reduces risks to health and safety to ALARP level • Safety case developed in effective consultation with and participation of members of the workforce, in a manner which the workforce is able to arrive at informed opinion about the risks and hazards which they may be exposed to at work
2	Detailed - Sampling	NOPSA conducts a detailed assessment of three topic areas. Where possible at least two of these topic areas should be focused on particular MAEs. Factors considered should include: levels of risk, uncertainty and use of novel technology.
2	Detailed - Disconnectable facilities	NOPSA shall assess if the command structure is appropriate for facilities which have the capability to disconnect from the production riser. This assessment shall be conducted with the Australian Maritime Safety Authority.
3	Validation	In the case that validation is requested, NOPSA will assess that the validation complies with OPS 2.40.

Investigations are instigated by NOPSA when information indicates that there have been incidents of non compliance with the relevant OHS laws. The outcome of investigations may include a written warning, the issuance of an Improvement Notice or a prosecution.

5.4 Helicopter Operations Oversight

The Memorandum of Understanding between NOPSA and the Civil Aviation Safety Authority (CASA) executed in September 2009 ensures a consistent and comprehensive regulatory regime to protect the health and safety of those working at offshore petroleum facilities. This highlights NOPSA's responsibility to regulate the facilities operators' arrangements for the provision of a safe working environment. NOPSA is therefore the lead agency for issues concerning design and operation of the helideck, the management of helideck operations, and for the provision of a safe and healthy workplace for people on the facility. CASA is responsible for the safety regulation of civil air operations in Australian territory and the operation of Australian aircraft. As such CASA is responsible for helicopter safety during landing and taking off from offshore facilities, and the competence of the helicopter crew.

NOPSA commissioned HART Aviation to conduct a review of offshore helicopter operations in order to gain an in-depth knowledge of issues surrounding current and future helicopter usage in offshore operations in Australia. This report, published in 2007, outlined the current position of helicopter transportation in Australia compared to other industries and based on the research, highlighted some potential areas which NOPSA could influence in the future. These included the compulsory use of technology such as Health and Usage Monitoring Systems (HUMS) and Audio Voice Alerting Devices (AVAD), as well as immersion suits and helideck standards. NOPSA, at this stage has not initiated any changes as a direct result of this report.

5.4.1 CASA

CASA has issued a Civil Aviation Advisory Publication (CAAP) 92-2 (1) Guidelines for the establishment and use of helicopter landing sites in 1992. The document provides some factors that may be used to determine the suitability of a helicopter landing site.

5.5 Legislative Changes

At present, the structural integrity of facilities and wells is not within the jurisdiction of NOPSA. This was particularly evident in the inquiry following the Montara incident in 2009 when the well failed and there was a prolonged hydrocarbon release. NOPSA submitted to the Commission of Inquiry that it would be beneficial to change the legislation to ensure the integrity of wells is more regulated. Currently the relevant State or Territory agencies have responsibility for the assessment of Well Operations Management Plans. If the role of NOPSA was expanded to include structural integrity, NOPSA believes that it would be well placed to administer legislation, as well as further ensuring objectivity, by removing the enforcement role from the States and Northern Territory, who receive revenue from petroleum activities.

NOPSA also recommended to the Montara Commission of Inquiry that its powers be extended to issue Prohibition Notices to prohibit entry to facilities where immediate risk may occur. This would allow NOPSA to preemptively stop entry to facilities in the event that risk is foreseeable.

6 Norway – Petroleum Safety Authority

Norway's Petroleum Safety Authority is responsible for the supervision of safety, emergency preparedness and the working environment for both offshore and onshore petroleum facilities.

6.1 Overview

The Petroleum Safety Authority (PSA) was established January 1, 2004. Prior to this time the regulation of safety on offshore petroleum installations was the role of the Norwegian Petroleum Directorate (NPD). Establishing a separate agency has allowed the PSA to continue to enforce the performance based safety regime operation in Norway, without the additional role of managing petroleum resources, including collecting revenue generated by petroleum activities. PSA and NPD have offices in the same building at Ullandhaug in Stavanger.

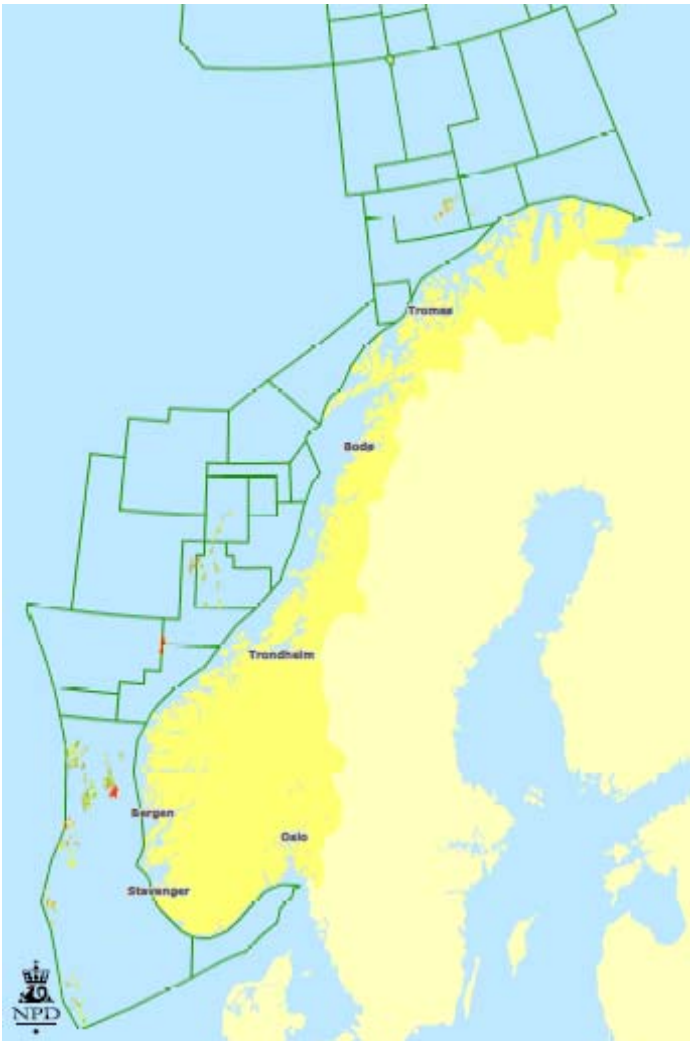
The PSA's responsibilities are:

1. Ensure that petroleum and related activities are supervised in a unified manner, through cooperation with other regulatory authorities and self-audits.
2. Contribute actively to transfer knowledge from the Health, Safety and Environment (HSE) area to society in general, by collaborating with the industry and other HSE regulators, both nationally and internationally.
3. Provide input to the supervising ministry on issues at hand, and support the ministry on issues upon request.

6.1.1 Industry

Norway is the world's fifth largest oil exporter and the third largest gas exporter. In 2008, revenue generated by petroleum activities accounted for 34% of the nation's income. Licences to operate on the NCS are issued through the Ministry of Petroleum and Energy. Figure 9 depicts the oil and gas fields on the Norwegian Continental Shelf, and highlights the location of Stavanger, where PSA is headquartered.

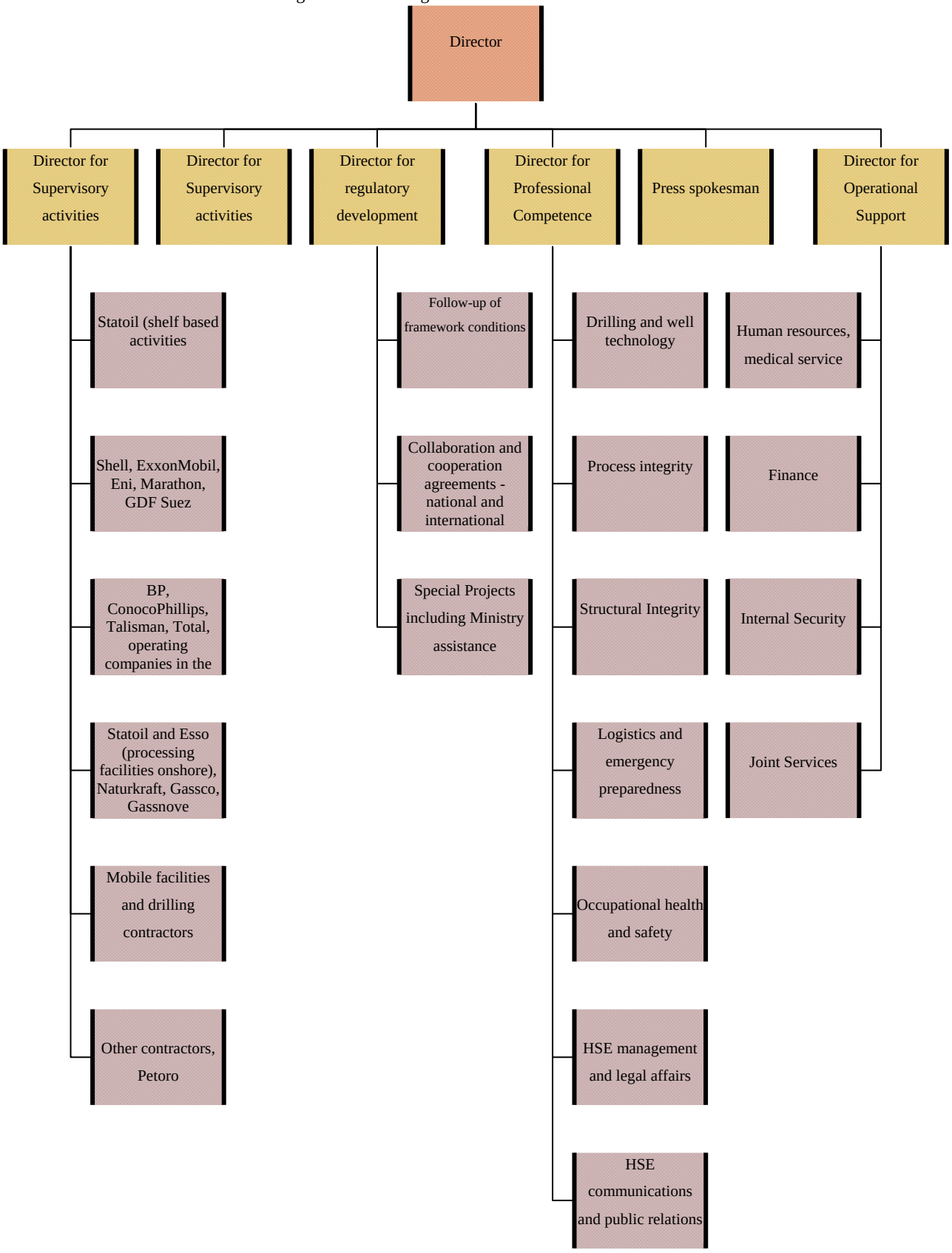
Figure 9 - Oil and gas fields on the Norwegian Continental Shelf



6.2 Organizational Structure

The PSA is within the Ministry of Labor and employs approximately 165 staff. Since its creation in 2004, responsibility of safety regulation of onshore petroleum activities has also been included in PSA's jurisdiction. The structure of PSA, as shown in Figure 10, encourages a partnership approach between operators and the relevant supervisory branch.

Figure 10 - PSA Organizational Structure



6.3 Safety Oversight

Under the *Petroleum Activities Act 1996 (PAA)*, operations on the Norwegian Continental Shelf (NCS) must be carried out in compliance with a reasonable standard of care, taking into consideration the safety of employees. The Petroleum Act specifically requires that operations be carried out in such a manner that a "high level of safety is maintained and further developed in accordance with the technological development" (PAA Section 9.1).

6.3.1 Safety Standards

The trend from 1985 in Norway has been a slow progression from prescriptive regulations, to a performance based regime, strongly based on risk management. Regulatory reform has enabled this transition. There was major reform in 2002 when the NPD, the Norwegian Pollution Control Authority, and the Board of Health adopted joint regulations on HSE for the petroleum sector. Five regulations control safety of design and operation on offshore installations on the NCS:

- *Regulations relating to Health, Safety and the Environment in the Petroleum Activities (the Framework regulations) 2002*
- *Regulations relating to Management in the Petroleum Activities (the Management regulations) 2002*
- *Regulations relating to Material and Information in the Petroleum Activities (the Information Duty regulations) 2002*
- *Regulations relating to the Design and Outfitting of Facilities etc. in the Petroleum Activities (the Facilities regulations) 2002*
- *Regulations relating to Conduct of Activities in the Petroleum Activities (the Activities regulations) 2002*

The Framework regulations are high level and overarching, with details described in the supplementary regulations. The Framework regulations stipulate the Norwegian equivalent of "as low as reasonable practicable":

> "Harm or danger of harm… shall be prevented or limited in accordance with the legislation related to health, the environment and safety, including

> internal requirements and acceptance criteria. Over and above this level the risk shall be further reduced to the extent possible." (Framework regulations, Section 9)

The Management regulations define the requirements for management in the areas of health, safety and the environment. These include requirement to identify and address risk which contribute to major accidents, including the risk connected with the transportation of personnel to and from the facilities, as well as emergency preparedness analyses. These regulations also identify the need for barriers, which are a system of functions which prevent or reduce harm in the event of an incident. The strategies or principles implemented to create a barrier, whether it be physical or non-physical, are to be identified and described in the risk assessment.

The Information Duties regulations set the standard for information and material which is to be submitted, or made available to authorities. This includes requirements to applications for consent, incident reporting and so on.

The Facilities regulations specify the design and outfitting of facilities, particularly defining minimum requirements for safety functions, loads, materials and other engineering considerations.

Operations and activities undertaken on the facility are governed by the Activities regulations. These lay out requirements for planning, working environment, health-related aspects, maintenance and emergency preparedness.

New regulations replace these from 1 January 2011. The new regime continues the full integration of onshore petroleum related activities, and places a strong emphasis on risk reduction principles to HSE.

6.3.2 Safety Assurance Regime

Under the NPD, the term “inspection” was exchanged for “supervision”, and “approvals” was replaced by “consent.” This change in language is not merely superficial, but rather it represents the philosophy of the Norwegian regulatory regime. Supervision is not confined to monitoring, which is undertaken through audits, verifications and investigations, but it also refers to an interaction between the industry and the regulator. This can be through research programs, seminars and the development of regulations. Supervision embraces all the activities which PSA undertakes in order to gather information about the safety status of operations, promote safety and health in the workplace and ensure that all operators conduct their activities in accordance with regulatory and agreed additional requirements. This extends to the consent process and other application considerations including Acknowledgement of Compliance and plans for development of operation/installation.

In a similar sense, the use of the word consent does not imply that PSA guarantees the safety of activities, but that it provides consent to operate. This allows the PSA to express confidence in the operator and how it will go about its activities. The operator and the PSA engage in discussion prior to the operator seeking consent. An official consent is also required at important milestones of operation in order to continue. The consent application includes the current Safety Management System (SMS) as well as a number of binding commitments specific to that facility. There are minimum standards which the operator must meet, and any commitments made beyond this minimum constitute a legal requirement for the operation.

An Acknowledgement of Compliance (AoC) is a statement verifying that a mobile installation’s technical condition, as well as the organization and management systems are considered to comply with the relevant requirements in Norway’s offshore regulations. A total of 41 mobile units had received AoC as at the end of 2009. An AoC is mandatory for mobile drilling units to operate on the NCS.

Each year a supervisory plan is established within the PSA which determines all planned supervisory activities including audits and verifications. The plan is based on yearly priorities established by the Ministry, the operating companies' own activity plans, accidents and incidents, and the experience and observations of the PSA and other HSE agencies. Audits consist of a systematic examination of management and control systems, while verifications check that the actual circumstances on facilities conform with regulatory requirements.

The PSA has a 'step' approach to enforcement, which generally starts with a dialogue with the operator. This is generally an effective approach in the industry as official Notice of Orders and Orders (enforcement measures) are published on the PSA website. Given the nature of the petroleum industry and its stature in Norway, the potential for public embarrassment is a sufficient deterrent for companies to engage with the Regulator. Dialogue is a key part of the supervisory role, and is influential in causing changes. Fines and charges, as well as the removal of consent are considered last steps, or only necessary in serious cases.

6.4 Helicopter Operations Oversight

Norway has long been recognized as leaders in helicopter safety for offshore transportation. This is highlighted by the three Helicopter Safety Studies undertaken by SINTEF Industrial Management. These reports aim to contribute to the improved safety of personnel to and from installations on the NCS. The first two reports were conducted by Sintef on behalf of the Committee for the Review of helicopter Safety on the Norwegian Continental Shelf, as appointed by the Ministry of Transport and Communications in 2000. The most recent report, Helicopter Safety Study 3 (HSS 3), was commissioned by a group of eight oil companies. While only the Executive Summary of HSS 3 has been translated into English at present, it utilizes a number of techniques in order to make judgements on the present situation and recommendations for future areas of improvement. The final recommendation of this report is that the Norwegian Oil Industry Association (OLF) and the Civil Aviation Authority – Norway

(CAA-N) form a body to follow up on the reports evaluations and potentially implement some of the recommendations.

7 Nova Scotia – Canada-Nova Scotia Offshore Petroleum Board

The Canada-Nova Scotia Offshore Petroleum Board (CNSOPB), or the Board, was established in 1990. CNSOPB is an independent joint agency of the Canada and Nova Scotia Governments, which supervises the activity in the Nova Scotia offshore area in undertaken in a safe, environmentally sound, and efficient manner. The Board is currently overseeing regulatory change and shifting towards a goal orientated regime. This will allow the operators in Nova Scotia to comply with regulations more effectively and in a way that takes into account the latest technology and culture changes.

7.1 Overview

The CNSOPB is responsible for ensuring that offshore operations are conducted safely and in a manner which protects the environment. The Board also has responsibility for managing offshore resources, issuing licences for offshore exploration and development, and collecting and distributing resource data. Federal and provincial regulations set the standards for occupational health and safety in the offshore industry but the Board is responsible for enforcement.

7.1.1 Industry

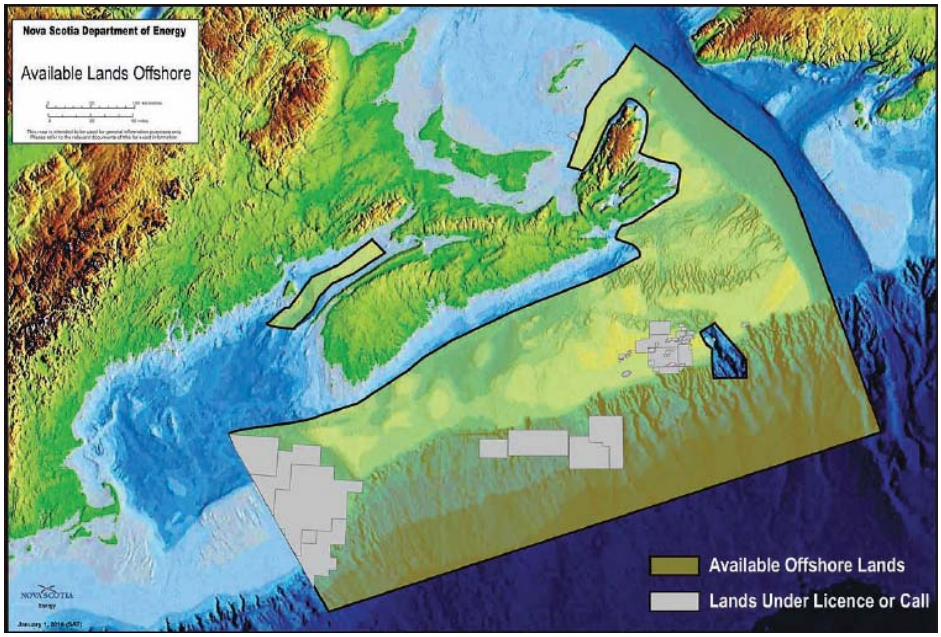
The offshore petroleum industry in Nova Scotia, is relatively small but increasing rapidly, as can bee seen in Figure 11. The Cohasset-Panuke Project in 1992 was the first Canadian offshore oil project. The current Sable Energy Project in the Nova Scotia area consists of 5 offshore facilities. The Deep Panuke Project is expected to see ‘first gas’ in early 2011.

Helicopter transportation is provided by two large multinational corporations, Cougar Helicopters Inc. and CHC Helicopters. These companies utilize the large, twin engine helicopters such as the Super Puma, Sikorsky S-76 and S-92.

7.1.2 Legal Structure

CNSOPB was established as a joint agency of the Canada and Nova Scotia Governments, pursuant to the federal *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* and the provincial *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act. C*ollectively they are called the *Accord Acts*. Under the Accord Acts, the CNSOPB regulates the Nova Scotia Offshore Area with respect to the safety of operations in the area and managing the resources through research and licencing.

Figure 11 - Nova Scotia offshore area



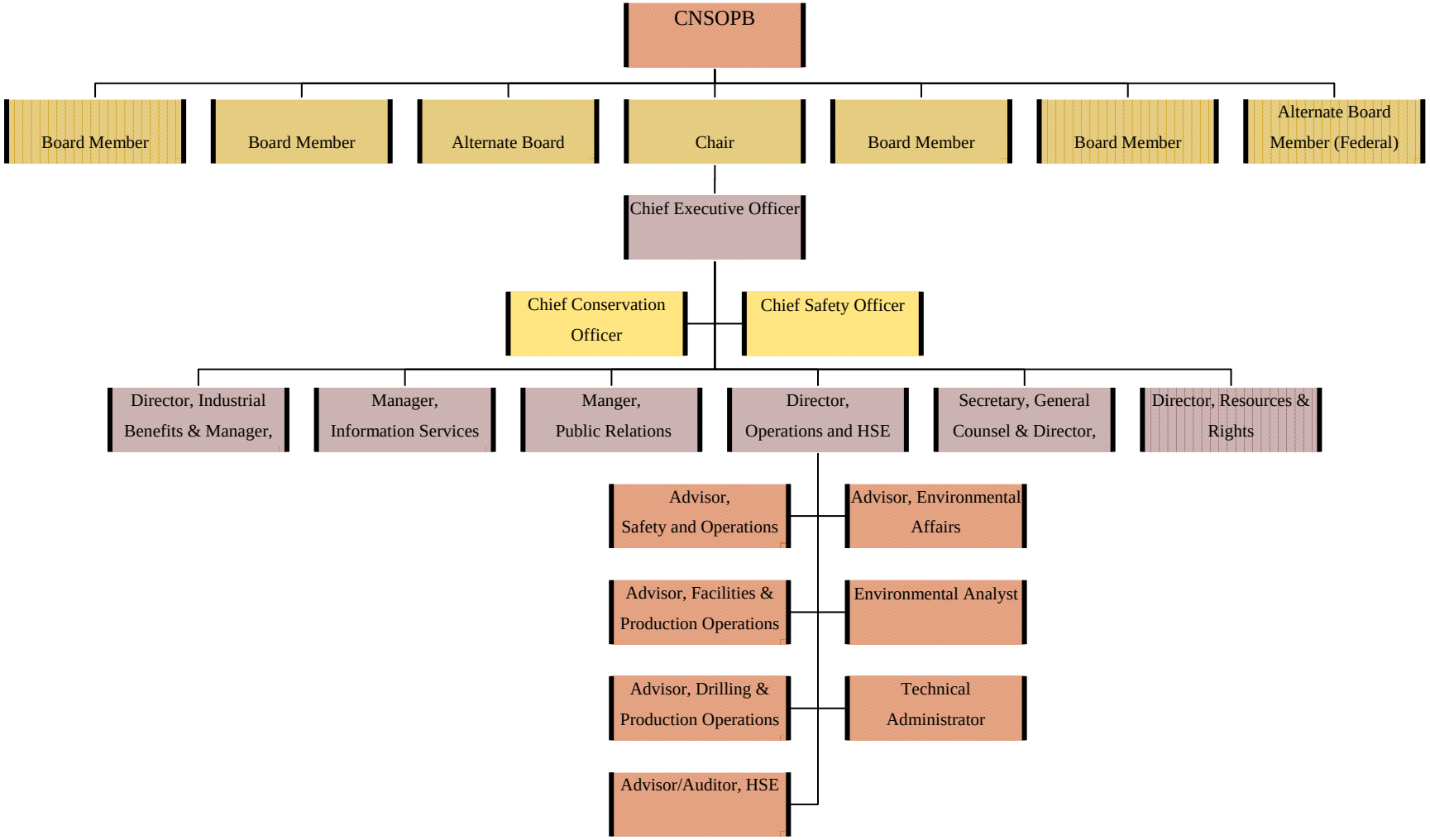
7.2 Organizational Structure

The Chief Executive Officer Reports to the Board and oversees the operations of the Board and the approximately 35 staff. There is no one employed specifically as an inspector but as is evident in Figure 12 as number of staff are Advisors within the Operations and HS&E Branch.

7.2.1 Board Structure

The Board consists of five members and a Chair. The Chair is appointed jointly by the Government of Canada and the Government of Nova Scotia. Each Government appoints two members each, and may choose an alternate member.

Figure 12 - CNSOPB Organizational Structure



7.3 Safety Oversight

The Accords Acts and subsequent regulations are intended to ensure the safety of offshore petroleum activities. The Board is responsible to ensure that offshore operations are conducted in a way where hazards are identified and the associated risks are assessed and managed.

In order to conduct activity in the offshore area, operators require an authorization from the Board. As a part of the process to gain authorization, operators are required to submit a number of documents including the Operator Safety Plan. The safety plan identifies critical requirements for safe operations.

7.3.1 Safety Standards

When reviewing safety plan submissions, attention is given to the following:

1. Command structure
2. Risk assessment
3. operation and maintenance
4. Contingency planning
5. Training and qualification

CNSOPB has issued draft guidelines for safety plans in December 2009. These guidelines were published in conjunction with the Canada-Newfoundland and Labrador Offshore Petroleum Board (CNLOPB) and the National Energy Board, and are undergoing a one year consultation phase.

The *Drilling and Production Regulations* require that the operator "take all reasonable precautions to ensure safety". This is not explicitly requiring the risks to be reduced to "as low as reasonably practicable" (ALARP), however the Draft Safety Plan Guidelines state that "The Board expects that [the ALARP] concept will continue to be a factor when considering a safety plan."[i]

The *Nova Scotia Offshore Petroleum Installation Regulations 1995* stipulate requirements for installations in the Nova Scotia Offshore Area. These include general requirements such as a lifesaving equipment standard, fire preparedness, as well as design and operation requirements for installations.

7.3.2 Safety Assurance Regime

The safety plan which is required for authorization to commence operation in the Nova Scotia offshore area, must meet the requirements in the *Drilling and Production Regulations* Section 8. The safety plan should include the procedures, practices, resources, and monitoring techniques which ensure the safety of the activity. The safety plan should include:

1. Summary of the management system which demonstrates how it will be applied to the proposed activity and how safety requirements will be fulfilled.
2. Description of the technique used to identify the hazards and evaluate the risks associated with the activity.
3. Description of the hazards identified and the risk evaluation.
4. Summary of the risk reduction or management techniques.
5. Description of the organizational and command structure of the installation including the person accountable for the safety plan and its implementation.
6. Measures used to protect the installation if possibility of sea ice or icebergs exists.
7. Description of arrangements for monitoring compliance with the safety plan, and measuring its performance.

Once the safety plan is accepted by the Board, and an authorization of the activity has been issued, the operator must continue to demonstrate that the management system and safety plan effectively identifies, assesses and reduces risks posed to worker health and safety.

Daily or weekly status reports are required by the Board, depending on the type of activity been undertaken, which are reviewed to identify any health or safety compliance issues. In addition to this the Board reviews the minutes from the Joint Occupational

Health and Safety Committee (JOHSC) meetings to ensure that any OHS issues raised in this forum are appropriately dealt with by the Operator. [5]

7.4 Helicopter Operations Oversight

Under the *Drilling and Petroleum Regulations* the management system is required to ensure that the integrity of all facilities, structure, installations, support craft and equipment to ensure safety. Helicopters used to transport workers to and from offshore installations are included within the term "support craft". Furthermore, the duty of the operator is to ensure that:

1. any operation necessary for the safety of persons on a support craft has priority, at all times, over any work or activity, and
2. all persons in transit to or from an installation receive instruction in and are familiar with safety and evacuation procedures… including emergency response procedures.

Under this regulation then, the operator of the installation is responsible for the safe operation of support craft i.e. personnel transfer helicopter, and the training people receive prior to boarding the craft. Through the acceptance and enforcement of the management and safety plans submitted for activity authorization, CNSOPB is ensuring that this is adhered to.

The *Nova Scotia Offshore Petroleum Installations Regulations* state that every helideck which forms part of an offshore installation must conform to Transport Canada TP 4414, Guidelines Respecting Helicopter Facilities on Ships. CNSOPB issued a Notice to Operators in April 2010, authorising the substitution of TP 4414 with the standards of CAP 437 Offshore Helicopter Landing Areas – Guidance on Standards, where parts of CAP 437 are deemed to be a higher standard. This is the result of TP 4414 being published in 1987, and the United Kingdom Civil Aviation Authority publication representing a "worldwide standard" and a document which incorporates the "latest technological changes and research regarding helicopter aviation safety." [7]

The use of helicopter passenger transportation suit systems is regulated under *Canada Aviation Regulations* 602.63(7).

7.5 Upcoming Legislation

The Canada, Nova Scotia, and Newfoundland and Labrador Governments have drafted new occupational health and safety (OHS) regulations which are currently in the consultation phase, and are expected to be passed through the respective parliaments in the late 2010. The aim of the new legislation and amendments to the Accord Acts, is to ensure that offshore workers have at least the same protection as onshore workers. It would also provide some separation of the potentially conflicting priorities of ensuring the safety and health of offshore workers, while simultaneously promoting continued offshore development.

Presently the safe operation of offshore activity is regulated under the Accord Acts, and the OHS provisions are regulated by the specific provincial regulations. This change would ensure that the Accord Acts provide the sole authority for offshore OHS.

8 South Africa – Mine Health and Safety Inspectorate

The Mine Health and Safety Inspectorate, within the Department of Minerals Resources (DMR), regulates the safety of mines, and the offshore petroleum industry in South Africa.

The *Mine Health and Safety Act 1996 (MHSA)* provides for the health and safety of employees at mines. The definition of mine extends to offshore oil and gas facilities. The object of the Act is to protect the health and safety of people at mines, to require employers and employees to identify hazards and eliminate risks relating to health and safety, as well as to promote a culture of safety, cooperation and increased training within the industry. The Act establishes the Mine Health and Safety Inspectorate and the Chief Inspector whose role is to ensure that the provisions within the Act are adhered to. The Mine Health and Safety Council (MHSC) is also established by the MHSA. The role of the Council is to advise the Minister on health and safety at mines, and to facilitate sustained improvement in OHS at mines.

South Africa is currently reviewing the mine health and safety regulations in order to achieve greater efficiency and effectiveness of the regulations and regulators, as well as to improve the occupational health and safety of those working at mines. The DMR is working with a number of institutions, such as the MHSC to strengthen its health and safety monitoring and evaluation practices, as well as further building on the existing work of inspectors.

9 Conclusion

The safety of the offshore industry on the United Kingdom Continental Shelf is regulated by the Health and Safety Executive, and the Offshore Division in particular. This regulatory regime has been very effective in encouraging safe operations through use of safety cases. Risk assessment has been an integral part of the UK technique to address major accident hazards. The United Kingdom has been a world leader in safety regulation for offshore regulations following changes instigated by the Cullen Report. Continued recent improvements have allowed the industry to maintain high standards of safety. The Health and Safety Executive and the UK Civil Aviation Authority have been proactive in conducting research in order to improve offshore helicopter safety. A number of guidelines are available to operators, as well as a definitive publication, stipulating the responsibilities of all parties to ensure safe helicopter operations.

The number and type of regulations and the number of agencies responsible for regulating safety within the offshore petroleum industry in the United States has resulted in a regulatory regime that is not very effective and not respected by the industry. The Minerals Management Service has proposed new regulations in order to improve safe operations. The Minerals Management Service and the United States Coast Guard are jointly responsible for the safety of offshore installations, and while the responsible agency is clearly identified for each system, a simplified system may be beneficial. The Notice of Proposed Rulemaking reflects upcoming legislative developments, and the more recent commitments from the Secretary of the Interior to form a separate safety agency, indicate that a positive change is expected for the offshore petroleum industry and those who work on the installations. A more closely regulated service or the provision of more guidelines for operators, with respect to offshore helicopter transport, would be highly beneficial particularly in the Gulf of Mexico where such a large number of installations are located.

The National Offshore Petroleum Safety Authority of Australia is a relatively new agency and has been able to establish an effective regime of regulations for safety and a well defined inspection and auditing system. The ongoing development of the Authority, and the potential to extend its jurisdiction to include structural integrity of offshore installations, will allow NOPSA to become more effective. The commissioning of the review of helicopter operations indicates an awareness of the risks associated with the helicopter operations offshore, but continued actions are required to mitigate the potential of a major accident event involving a helicopter.

The Norwegian Petroleum Safety Authority has benefitted significantly from the separation of the safety and licensing bodies. The large role that the offshore petroleum industry plays in the Norwegian economy is reflected in the resources allocated to the PSA. The philosophy behind the regulator engaging in dialogue and providing consent and supervision, is successful in creating a collaborative regime in which the safety of people and the environment are clear priorities for the industry. The enforcement regime is effective in that companies do not wish to have their shortcomings made public, so dialogue prior to an official notice of orders is typically very successful. The resources invested in improving helicopter safety have resulted in Norway being a renowned world leader in the field.

The regulatory regime in Nova Scotia is under reform, so at this point it difficult to draw any particularly valuable conclusions. What is evident is the need to introduce a clearer separation of the safety and the licensing roles of Canada-Nova Scotia Offshore Petroleum Board. The new regulations will facilitate this, as well as improve the occupational health and safety of the workers offshore. The size of both the industry and the regulator is comparatively small, but as the potential of the Nova Scotian offshore area increases, the resources allocated to promoting and enforcing safety in the area will need to also increase. Collaboration between CNSOPB and Transport Canada in order to provide guidelines or legislation would enable the offshore helicopter operators to improve or validate their existing regime.

Overall the use of a performance based regime has been proven to be successful for many offshore safety regulators. What has been demonstrated in several examples is the benefit of having a specific body or division that is responsible for promoting and enforcing safety. A strict initial assessment of the operator's safety and management systems enables a good regime to be established. However it is through the consistent follow up, whether by inspections that are more than just ticking boxes, or a collaborative approach to address potential safety issues, that the established systems are actually valuable. Ensuring that the efficient regulations are in place is one step, and an integrated and effectual enforcement system is the second.

With respect to the offshore petroleum regulators' role to ensure safe helicopter travel, it is not sufficient to look solely at the petroleum regulator. Due to the jurisdiction of the regulations, it is essential to look first and foremost to the civil aviation authority. Most of the petroleum regulators have a Memorandum of Understanding or similar in place with the respective civil aviation authority. However in order to make the significant changes required to improve the regulations, and through that the overall safety, a commitment is required from both parties. In Norway, which is recognized as best practice for offshore helicopter safety, two significant reports were commissioned by a committee which has representatives from both regulatory authorities. This initiated many improvements. The third report in the Norwegian 'series' has now been commissioned by the oil companies. This highlights not only the need for the regulators to make the first step, but also that the industry is equally eager to facilitate change and improve safety.

From the perspective of the ability for the petroleum regulators to improve helicopter safety, this is emphasized through the need for operators to anticipate the risks from a major accident, and take measures to reduce the likelihood and consequences of these risks. Several regulators specifically identify helicopter operations as an example of a major accident. Operators must demonstrate that they have taken precautions to ensure that the risk of a helicopter accident is "as low as reasonably practicable". This is one

already demonstrated way that the regulators can specifically ensure that the risks to employees' safety when being transported offshore by helicopter are minimized.

Many changes are underway in several nations to improve the way in which safety on offshore installations is regulated. This can be done through new systems as well as through enforcement. What is evident is that safety has been identified as a priority for each operator by the regulators, and that safety should be integrated into all operations, to prevent major accidents, improve safety culture and reduce hazards and risks.

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