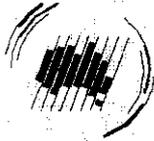


601001

TPR

OR-474.



INDUSTRY
SCIENCE
RESOURCES

Guidelines for the Preparation and Submission of Mobile Offshore Drilling Unit Safety Cases

**Department of Industry Science and Resources
Petroleum & Electricity Division**

Canberra

January 2000

© Commonwealth of Australia 1999

ISBN 0 642 72085 1

ISR 1999/114

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced by any process without prior written permission from the Commonwealth through AusInfo. Requests and inquiries concerning reproduction and rights should be addressed to the Manager, Legislative Services, AusInfo, GPO Box 1920, Canberra ACT 2601.

Cover photo courtesy Diamond Offshore General Company.

Disclaimer

Those using the guidelines should be aware that any representation, statement, opinion or advice expressed or implied in these documents are made in good faith, but on the basis that the Commonwealth Government, the State and Northern Territory Governments, and their employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement, opinion or advice referred to in these documents.

Inquires to:

National Oil and Gas Safety Advisory Committee
C/- Department of Industry, Science and Resources
Petroleum and Electricity Division
GPO Box 9839
Canberra ACT 2601

**Mobile Offshore Drilling
Unit Safety Case
Guidelines
Introduction**

Introduction

Aim

To describe the

- ***legislative framework for establishing the Australian offshore petroleum safety case regime***
- ***safety case concept and its application to Mobile Offshore Drilling Units (MODU's) under the Petroleum (Submerged Lands) Act 1967 and associated legislation***
- ***structure and purpose of the Guidelines for the Preparation and Submission of MODU Safety Cases (the Guidelines).***

Scope

The non-mandatory provisions in these guidelines underpin the objective based Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996 by proposing a model to assist

- drilling contractors to prepare and submit vessel safety cases
- operators to prepare and submit bridging documents.

These guidelines only cover MODU's while they are engaged in well operations. Other requirements come into effect during other modes of MODU operations.

Separate guidelines have been developed specifically for other classes of facilities and are available from the Department of Industry, Science and Resources.

The Regulatory Framework

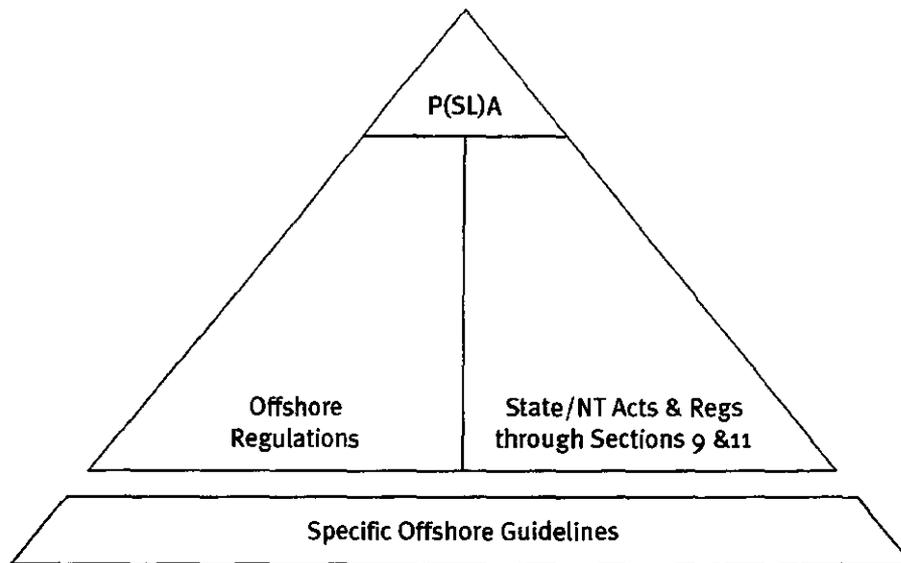
Since 1967, Australia's offshore petroleum industry has been regulated by broadly consistent Commonwealth, State and Territory legislation. The States/Northern Territory have jurisdiction over onshore petroleum operations including petroleum within coastal waters.

Petroleum operations in Australia, beyond 3 nautical miles from the territorial sea baseline, are subject to the Commonwealth *Petroleum (Submerged Lands) Act 1967* (PSLA)

- the key subordinate and related legislation which impacts on offshore health and safety is the Petroleum (Submerged Lands) (Management of Safety on Offshore facilities) Regulations 1996 and the State and Northern Territory OH&S Acts and Regulations which are applied through Section 9 of the PSLA

- Other State and Territory laws are applied to the offshore areas via Section 11 of the PSLA.

Figure 1: *Legislative framework Commonwealth waters*



The PSLA established two administrative decision-making bodies for the offshore petroleum industry – a Joint Authority and a Designated Authority in respect of each adjacent area (defined areas adjacent to each State and the Northern Territory). For the Territory of Ashmore and Cartier islands there is no Joint Authority and the Commonwealth performs the equivalent functions of Joint and Designated Authorities.

Joint Authorities comprising the Commonwealth Minister responsible for resources and the equivalent State / Northern Territory Minister were established as the principal decision making bodies to administer the Commonwealth offshore petroleum legislation of each State and the Northern Territory (eg the Commonwealth Minister for Industry Science and Resources and the Western Australian Minister for Mines constitute the Joint Authority for the Western Australian adjacent area).

the Joint Authorities grant titles to explorers and developers, and determine the conditions that apply to these titles, thus providing a legitimate basis for companies' offshore petroleum activities. These titles are:

- exploration permits
- retention leases
- production licences, and
- pipeline licences.

A Designated Authority (DA) (relevant State/NT minister and their departments), handles the day-to-day administrative matters relating to petroleum activities in the area adjacent to each State/Northern Territory. These responsibilities include offshore safety.

Title holders under the PSLA are responsible for all petroleum related activities (including safety) in the permit/licence area

- the designated representative of the title holder is the operator.

Australian Offshore Petroleum Safety Case Regime

The Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996, require operators to submit safety cases for all facilities (including MODU's) operating or proposed to be operating in Commonwealth waters.

What is a MODU Safety Case?

A MODU safety case is a detailed document, prepared by the drilling contractor and operator, that outlines the types of safety studies undertaken and the results obtained together with management arrangements in place, to ensure the continued safety of the vessel and personnel on it. The preparation and submission of a safety case constitutes a key strategy in the drive for improved safety in the offshore oil and gas industry.

A MODU safety case, prepared in consultation with employees and their representatives, must be a true reflection of the state of safety arrangements for the vessel and the drilling campaign. It must demonstrate to the satisfaction of the DA, by its contents and supporting material, that the operator and drilling contractor knows what technical and human activities occur, how they are to be managed and how safety will be managed in the event of an emergency. It must also identify methods to be used for monitoring and reviewing all activities in connection with the vessel, with a view to the continual improvement of the safety arrangements of the MODU.

Once a safety case has been accepted, the DA continually reviews the safety performance of the operator and drilling contractor, through on-site audits, inspections and statistical analysis of incidents, to determine whether the applicable standards and arrangements are being followed.

The MODU Safety Case

The MODU safety case comprises:

- a vessel safety case
- a bridging documents detailing site specific information and the interface between the operator and drilling contractor safety management systems.

Objective of a MODU Safety Case

The objectives of a MODU safety case is to demonstrate via a written description that an operator has contracted a vessel that :

- is designed (and where appropriate certified) to comply to international standards/codes;
- has a safety management system that is capable of continually and systematically identifying hazards, and assessing, eliminating or minimising in so far as is reasonably practicable risk to personnel at the vessel.

Once accepted by the DA, the MODU safety case constitutes the basis of a co-regulatory regime and become the set of recognised legal requirements with which the operator and drilling contractor must comply.

Review Mechanism

The National Oil and Gas Safety Advisory Committee (NOGSAC) was established as a mechanism to ensure continual improvement in the Australian offshore petroleum safety case regime.

NOGSAC comprises representatives from industry, its employees and State / Northern Territory and Commonwealth Governments. Committee members are appointed by the Minister for Industry, Science and Resources and the Committee Chair reports directly to the Minister. The functions include:

- to inquire into, and to report to the Minister on, matters affecting health and safety in the offshore petroleum industry
- to inquire into, and to report to the Minister on, matters referred to it by the Minister in relation to health and safety in the offshore petroleum industry
- to develop, and to submit to the Minister, recommendations, guidelines and plans for measures consistent with achieving a healthy and safe environment in the offshore petroleum industry
- to consult and co-operate with other persons and organisations in matters affecting health and safety in the offshore petroleum industry; and
- such other functions as are conferred upon the committee by the Minister.

NOGSAC through its Commonwealth secretariat and tripartite working group is responsible for the development of this edition of the *Guidelines for the Preparation and Submission of MODU Safety Cases*.

Structure of Safety Case Guidelines

The Guidelines are structured as a series of prompts under each of the system elements to provide assistance to drilling contractors and operators in the preparation and submission of MODU safety cases.

Prompts are also provided to check for system linkages - that is, the way the operator and drilling contractor ensures that, where changes occur in work systems, other work systems register the change and adjust accordingly.

Guidance notes have been provided which further elaborate on prompts and are marked in superscript for example^{xx}. These notes are not meant to be interpreted as requirements but should be consulted for clarification.

Submission Requirements – MODU safety case

The operator is not required to give information to the DA (as part of the safety case submission process) if, at any relevant time, the information has been given in compliance with any other provision of the PSLA or the regulations (for example, Petroleum (Submerged Lands) (Management of Environment) Regulations 1996).

Technical Guidelines

To further reinforce petroleum safety, the peak upstream industry body, the Australian Petroleum Production and Exploration Association (APPEA) has taken the lead in the development of a suite of technical industry guidelines for the Australian petroleum industry. These non-mandatory guidelines are designed as examples of good industry practice and cover such specialised areas as Fire and Explosion Management, Lifting Equipment, Permit to Work, Well Abandonment, Helicopter Operations and Incident Data Base Guidelines..

The APPEA Incident Data Base Guidelines provides a minimal standard for incident reporting under the PSLA. In addition, operators and drilling contractors should consult with their relevant DA to ensure that there are no additional reporting requirements in that jurisdiction.

These guidelines are available directly from APPEA.

NOTE: The *Guidelines for the Preparation and Submission of MODU Safety Cases* detail a model for structuring a MODU safety case - this is a suggested model only. The key issue in the operator / drilling contractor development of a MODU safety case is that all the elements identified in this document are adequately addressed

- operators / drilling contractor's should (where appropriate) cross reference the submitted safety case to these guidelines.

Contents

Preparation and Submission of a MODU Safety Case	1
1.0 Introduction	3
1.1 Preparation of a MODU Safety Case	4
1.2 Submission of a MODU Safety Case	9
1.3 Revision of a MODU Safety Case	11
1.4 Definitions	13
1.5 Abbreviations	20
1.6 References	21
2 Facility Description	23
2.0 Introduction	25
2.1 Design, Structure and Layout	26
2.2 Marine Systems	28
2.3 Drilling Systems	30
2.4 Safety Systems	32
2.5 Power Generation, Auxiliary Equipment and Utilities	34
2.6 Hazardous Substances and Inventories	35
2.6 Drawing Set	36
3 Safety Management System	37
3.0 Introduction	39
3.1 Leadership & Commitment	41
.1 Policy and leadership	42
.2 Organisation & Responsibilities	44
.3 Employee Involvement & Communication	46
.4 Resources	48
3.2 Planning	49
.1 Hazard Identification & Risk Management	50
.2 Objectives, Plans & Performance Standards	53
.3 Sources of Information	54
.4 Management Systems Documentation	55
3.3 Implementation	57
.1 Design, Construction & Commissioning	58

.2	Management of Change	62
.3	Purchasing & Control of Materials & Services	64
.4	Safe Operational Procedures	67
.5	Materials Handling and Storage	71
.6	Maintenance & Repair ('Alteration' covered in Change Control)	74
.7	Employee Selection, Competency & Training	76
.8	Workplace Environment	78
.9	Emergency Response	80
3.4	Monitoring & Evaluation	85
.1	Inspection, Testing & Monitoring	86
.2	Health Monitoring Systems	88
.3	Incident/Hazard investigation and reporting	89
.4	Health and Safety Information and Reports	90
3.5	Auditing & Review	93
.1	Safety Management System audit	94
.2	Review and Improvement	95
4	Formal Safety Assessment	97
4.0	Introduction	99
4.1	Formal Safety Assessment Process	101
4.2	Hazard Identification	105
4.3	Hazard and Risk Analysis Studies	107
4.4	Assessment of Results	112
4.5	Risk Reduction Measures and Application of ALARP	114
5	Bridging Document	119
5.0	Introduction	121
5.1	Site Description	123
.1	Site Description	123
.2	Primary Functions	124
.3	Hazardous Substances and Inventories	125
.4	Safety Features and Systems	125
.5	Drawing Set	126
5.2	Safety Management System	127
.1	Policy and leadership	130
.2	Organisation and Responsibility	131
.3	Employee Involvement and Communication	132

.4	Resources	133
.5	Hazard Identification and Risk Management	136
.6	Objectives, Plans and Performance Standards	137
.7	Sources of Information	138
.8	Management System Documentation	139
.9	Design Construction and Commissioning	142
.10	Management of Change	143
.11	Purchasing and Control of Materials and Services	144
.12	Safe Operational Procedures	145
.13	Materials Handling and Storage	146
.14	Maintenance and Repair	147
.15	Employee Selection Competency and Training	148
.16	Workplace Environment	149
.17	Emergency Response	150
.18	Inspection, Testing and Monitoring	152
.19	Health Monitoring System	153
.20	Health and Safety Information and Reports	154
.21	Safety Management System Audit	156
.22	Review and Improvement	157
5.3	Formal Safety Assessment	158
	Appendix - Acknowledgments	159

Mobile Offshore Drilling Unit Safety Case Guidelines Preparation and Submission

Chapter 1



Contents

1.0 Introduction	3
1.1 Preparation of a MODU Safety Case	4
1.2 Submission of a MODU Safety Case	9
1.3 Revision of a MODU Safety Case	11
1.4 Definitions	13
1.5 Abbreviations	20
1.6 References	21

1.0 Introduction

Aim

To provide assistance to operators, drilling contractors, employees and their representatives in the preparation and submission of a Mobile Offshore Drilling Unit (MODU) safety case in accordance with the requirements of the Commonwealth Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996.

Scope

To provide the basic information required to prepare a MODU safety case for MODU's intending to operate in Australian waters. Operations include any drilling, work-overs, field development and special operations.

1.1 Preparation of a MODU Safety Case

The MODU safety case may be made up of the following elements

- vessel safety case; and
- bridging document.

Vessel Safety Case

The vessel safety case comprises three sections:

- vessel facilities description (VFD),
- vessel safety management system (VSMS); and
- vessel formal safety assessment (VFSA).

Vessel Facilities Description

The vessel facility description should contain sufficient information to verify that the vessel design and operating philosophy is consistent with the vessel safety management system and the assumptions and outputs of the vessel formal safety assessment.

The vessel facility description section of the MODU safety case should contain as a minimum, a description of the:

- vessel, its purpose and its operation; and
- vessel operating parameters.

Vessel Safety Management System

The vessel safety management system should detail how hazards are identified and how risk is continually and systematically assessed and either eliminated or controlled. The vessel safety management system should demonstrate that:

- risk management objectives and action plans are in place, and are systematically pursued
- accountabilities and responsibilities are clearly defined and appropriate levels of supervision exist
- management, employees and contractors understand the hazards at a particular vessel and their role in identifying and controlling them
- work processes and facilities have been designed to reduce risk to as low as reasonably practicable

- effective communication processes exist
- safety critical activities are identified and managed appropriately
- provides assurance that risks are managed when changes occur in facilities, personnel, information, or work methods
- suitable arrangements exist for responding to any emergency situation
- people are competent and actively involved in safety management
- validation and measurement processes exist to confirm that objectives and performance standards are met; and
- system effectiveness needs are periodically assessed to ensure continuing improvement occurs
- effective incident and near miss investigation and reporting systems exist.

Where appropriate, the vessel safety management system should

- comply with the requirements of the International Safety Management Code (ISM) as required by the Commonwealth Navigation Act
- reflect the principles of the ISO 14000 series and Australian Standard 4804; and
- demonstrate that all necessary linkages between system elements (for example, change management and risk assessment) are identified.

Vessel Formal Safety Assessment (VFSA)

The vessel formal safety assessment should

- detail the risk acceptance criteria and performance standards
- describe the nature, likelihood, consequence and potential major accident events that may occur at the vessel; and
- detail the means to prevent occurrence of these events, or to minimise their consequences should they occur.

Discussion of the drilling contractor's risk acceptance criteria should include the rationale for their selection and references used.

Details of the risk assessment studies conducted into potential major accident events should cover the identification, assessment, and control measures implemented during each phase of operation. Vessel formal safety assessment studies should include but not be limited to:

- hydrocarbon releases
- fire and explosion

- toxic release
- dropped objects
- extreme environmental conditions
- well control
- aviation incidents; and
- marine incidents.

Vessel formal safety assessment studies should jointly demonstrate that the physical integrity of:

- the temporary refuge;
- escape, evacuation, and rescue routes
- emergency control systems

are maintained in so far as is reasonably practicable in the case of a major accident event and all necessary steps have been taken to ensure the safety of employees in the event of an emergency and during transit to a place of safety.

Both qualitative and quantitative methods of analysis can be applied to the assessment of risk. It is *recommended that early consultation with the DA should occur before selecting the appropriate method of analysis.*

Where appropriate the results of the vessel formal safety assessment studies should be translated into risk reduction plans. Risk reduction plans should follow the ALARP principle.

Preparation of the Bridging Document

The bridging document component of the MODU safety case comprises three sections:

- site description
- drilling safety management system (including drilling contractors and operators SMS interface)
- formal safety assessment.

Site Description

The site description should include specific details of the site eg

- metocean conditions
- geographical location
- well and subsea layout.

Drilling SMS

The drilling safety management system should:

- provide assurances of the adequacy of the drilling contractor's safety management system
- identify, eliminate or mitigate risk associated with the drilling campaign
- identify functional links between the operator and drilling contractor safety management systems and document the jointly developed arrangements to allow safe execution of activities.

Formal Safety Assessment

The bridging document FSA process should identify campaign specific risk and detail the control measures implemented.

Linkages between elements of the vessel safety case

The drilling contractor should demonstrate the linkages that exist between the three sections of the vessel safety case ie. vessel facility description, vessel safety management system and the vessel formal safety assessment.

Use of external parties in the preparation of MODU safety cases

While the operator or drilling contractor may use external resources to assist in the preparation of the MODU safety case, they should work closely with the external party in all facets of its preparation. It should be noted that under the Commonwealth *Petroleum (Submerged Lands) Act 1967*, legal responsibility for the content and execution of the MODU safety case resides with the title holder (represented by the operator) and this responsibility cannot be abrogated or devolved.

To demonstrate management's ownership, responsibility for, and commitment to, the principles of the MODU safety case:

- the vessel safety case should be signed by the appropriate drilling contractor's senior management; and
- the bridging document should be signed by both the operator and the drilling contractor's appropriate senior management prior to submission to the DA.

Employee participation and involvement

Employees representatives from the field-based workforce, or in the absence of such a workforce, a relevant organisation whose members might make up that workforce, should be involved in the preparation of the vessel safety case. This involvement comprises two key elements

- **consultation**
- **participation.**

Consultation

Effective consultation between employees and employers should be achieved through adhering to the consultative mechanisms established under existing State / Territory and Commonwealth Occupational Health and Safety (OH&S) legislation as it applies at the vessel.

For example, consultation should occur on:

- any changes to the vessel and its operations which may impact on the health and safety of employees
- preparation of, and/or major modification to, the safety case, including hazard identification, risk assessment, risk control; and
- the investigation of incidents, the findings of incident investigation, and any resulting modifications which may affect the integrity of the vessel.

In the absence of a workforce, consultation should occur between the operator, the drilling contractor and the relevant employee organisation (where practical and appropriate) whose members might make up such a workforce and the DA.

Participation

The participation of employees and their representatives should be consistent with their knowledge and skills. Employee participation should lead to a common understanding of the vessel hazards and a common commitment to their control. For example, hazard identification sessions and ALARP workshops should have representation from field based personnel.

Both consultation and participation should provide for involvement of employee representatives in the decision-making process related to the safety of the vessel.

1.2 Submission of a MODU Safety Case

Operators intending to engage a MODU are required to submit, and have a MODU safety case (or parts of a case) accepted by the DA prior to the MODU commencing operations in the permit or licence area.

Submission of the MODU safety cases should be in accordance with the requirements of the *Petroleum (Submerged Lands) Act 1967* and the *Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996*.

There are two formats under which a MODU safety case can be submitted:

- a single MODU safety case, submitted by the operator, for the use of the MODU on the given site
- a two stage approach, with the drilling contractor submitting the vessel safety case and the operator submitting the bridging document.

NB: While under the second format the drilling contractor may with the DA's prior consent submit the vessel safety case component. The operator is responsible for the vessel safety case content and execution while in the permit / licence area.

Documentation/communication of key activities throughout the DA's review process

As MODU safety cases are likely to be submitted in parts records of communication and agreed outcomes should be kept to ensure common understanding by all concerned parties.

Unless otherwise agreed the vessel safety case should be forwarded to the DA at least 3 months prior to the anticipated date of commencement of operations. Any changes to this schedule should be discussed with the DA and where required a new submission plan developed.

Unless otherwise agreed the bridging document should be forwarded to the DA at least 1 month prior to the anticipated date of commencement of operations. Any changes to this schedule should be discussed with the DA and where required a new submission plan developed.

Provisional Acceptance

At one or more stages of the MODU safety case assessment process, provisional acceptance may be granted by the DA subject to the timely implementation by the operator / drilling contractor of an agreed remedial safety case work program being completed within a specified time frame.

Period of Validity

Once accepted by a State /Northern Territory DA, the vessel safety case component of the MODU safety case will remain valid throughout Australian offshore jurisdictions until a major change occurs, or the vessel safety case requires re-submission according to the provisions of the Commonwealth *Petroleum (Submerged Lands) Act 1967* (every 5 years).

Example: Submission of a MODU Safety Case (two stage approach)

- **Early agreement on schedule**

The drilling contractor will notify the DA of its intent to submit a vessel safety case and will meet at the first opportunity to review the safety case requirements and plan the submission schedule.

The operator will notify the DA of their intent to submit a bridging document and will meet at the first opportunity to review the drilling plan and develop the submission schedule.

The Designated Authority and the operator/drilling contractor should:

- agree on safety case content;
- agree on timing; and
- reach a common understanding on operator, drilling contractor and DA responsibilities for example agree on scope and schedule for validation in compliance with Regulation 13 of the Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996.

- **Stage 1: the vessel safety case**

The drilling contractor submits a vessel safety case comprising the vessel:

- facility description
- safety management system; and
- formal safety assessment

The DA will review the vessel safety case and if acceptable provide provisional acceptance.

- **Stage 2: Submission of the bridging document**

The operator should submit a site-specific campaign-bridging document that effectively demonstrates that:

- adequate arrangements have been made to co-ordinate safety management system's between the drilling contractor and the operator; and
- any new or changed hazards or site-specific risk arising from the proposed operations are detailed in the formal safety assessment and the control measures identified are implemented
- the operator has reviewed and accepted the vessel safety case.

1.3 Revision of an Accepted MODU Safety Case

It is the responsibility of the operator and drilling contractor to define and the DA to accept the threshold criteria to resubmit a MODU safety case following the implementation or proposed implementation of a series of minor change.

The documentation contained in the MODU safety case should be kept up to date to reflect major change to the vessel as should all supporting documentation. Apart from the obvious operational needs for updating, it will be necessary to keep a record of all changes for inspection by the DA safety case auditors.

Where proposed modifications to the vessel, its plant or systems have the potential to significantly alter the previously accepted levels of risk, the change will be considered major. The drilling contractor should then seek DA agreement for the revision of the safety case before implementing changes to the vessel under the Petroleum (Submerged Lands)(Management of Safety on Offshore Facilities) Regulations 1996.

Examples of major changes that may result in revision of the vessel component of the MODU safety case include:

- changes in the ranking of risk contributors
- major modifications to the structure, plant or equipment that have an impact on safety
- introduction of any new or simultaneous operations, which fall outside the accepted MODU safety case
- substantial changes to the operating parameters
- changes in ownership
- significant changes resulting from a serious incident
- introduction of changes in technology
- significant changes to the vessel's organisational structure that have an impact on the safety management system for example a change from company employees to contractors or vice versa, changes in management's span of control, or the introduction of multi-skill concepts
- significant changes to working or on-shift arrangements on the vessel such as duty cycles, shift times, staffing levels and other employee-related changes that may have safety implications at the vessel; and
- a regulatory change.

Notwithstanding the above, the operator/ drilling contractor will be required to submit an updated vessel safety case

- every five years or at other such intervals as specified in the Commonwealth *Petroleum (Submerged Lands) Act 1967*; and/or
- if requested by the DA.

The operator and drilling contractor should also monitor the cumulative impact of minor changes on vessel structure, plant, equipment, operating procedures or other elements of the vessel's systems. This monitoring may take the form of audits (internal, external or regulator) or may result from periodic reviews of risk as an aspect of the continuous improvement life cycle of the safety case.

A safety case must be revised and re-submitted if there is likely to be a significant change in risk levels resulting from a series of minor changes to the vessel structure, plant, equipment, operating procedures of other elements of the vessel's systems.

1.4 Definitions

Definitions and terms used in this document may vary from those adopted by individual drilling contractors and operators or in other standards. When a drilling contractor/operator uses different terms, the operator should clearly define the terms used in the particular safety case.

<i>As Low as Reasonably Practicable (ALARP)</i>	A level of risk that is not tolerable, and can not be reduced further without the expenditure of costs that are grossly disproportionate to the benefit gained.
<i>Application to construct and install</i>	As defined under the Commonwealth Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996.
<i>Assessors</i>	Personnel reviewing and auditing safety cases under the Commonwealth Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996.
<i>Audit</i>	A critical examination of all or part of a total operating system with reference to safety.
<i>Campaign</i>	One or more well operations conducted using a specific vessel.
<i>Control measures</i>	Actions to eliminate or reduce the chance of an event occurring or to reduce the effect of the hazard event if it does occur.
<i>Contractors</i>	See Employees.
<i>Drilling Contractor</i>	Operator of an offshore drilling unit.
<i>Corporate Safety</i>	Those elements of the operator's wider safety <i>Management System</i> management system that control risk but are not necessarily facility-specific. Where there is more than one facility, corporate safety management system elements are common across all facilities.
<i>Dangerous goods</i>	As defined under State/Territory legislation.
<i>Directions</i>	Refers to Directions issued under Section 101 of the Commonwealth <i>Petroleum (Submerged Lands) Act 1967</i> and the Schedule of Specific Requirements as to Offshore Petroleum Exploration and Production in waters under Commonwealth jurisdiction 1997.
<i>Design Validation Philosophy</i>	Arrangements and basis for validating aspects of the facility design.

<i>Employee</i>	<p>In relation to a facility, includes any individual on the facility (vessel) in the course of his or her duties (for example, an official or officer, or a company director) or in a self-employed capacity (for example, as a contractor).</p> <p>For the purposes of this document the <i>Petroleum (Submerged Lands) Act 1967</i> definition of employee has been extended to include:</p> <ul style="list-style-type: none"> • visiting personnel, inspectors, various officials and other government personnel.
<i>Employee representative</i>	An employee member of a health and safety committee where established in the workplace, or person elected to represent a group of employees on health and safety matters.
<i>Escape</i>	Movement from the place of work to the Temporary Refuge
<i>Evacuation</i>	Movement from the temporary refuge off the facility (orderly evacuation). Movement from anywhere off the facility (disorderly evacuation).
<i>Event</i>	Significant change in normal state (whether process or hazard management)
<i>Facility</i>	<p>A 'platform' as defined in the Directions/ Regulations, viz: a construction platform, a fixed platform, a service platform.</p> <p>For the purposes of these guidelines, a facility also includes all other associated production and ancillary equipment in the relevant area associated with the 'platform'. For example, a subsea completion is considered to be a facility. But does not include a drilling platform.</p> <p>For convenience, the definitions of the various types of 'platform' included under the legislation are provided below:</p> <p>'Construction platform' means a ship, barge or other vessel or floating structure from which construction or installation operations for, or in conjunction with, the exploration for or recovery of petroleum are or are to be carried out.</p> <p>'Fixed platform' means a structure (including a floating structure) that is:</p> <ul style="list-style-type: none"> • fixed or connected to the seabed from which operations for the recovery of petroleum are or are to be carried out; or

- fixed or connected to the seabed otherwise than only by a part of the structure lowered to the seabed for the purpose of supporting the structure, from which petroleum exploration operations or operations for the recovery of petroleum are or will be carried out, and that is not or will not to be capable of being readily moved from one position to another as such a structure.

'Service platform' means a ship, barge or other vessel, or floating or fixed structure that, in connection with petroleum exploration operations or operations for the recovery of petroleum, provides a base from or on which services such as diving, firefighting, accommodation, processing or storage are controlled, mounted or performed.

<i>Facility Safety Management System</i>	Those elements of the operator's safety management system that directly contribute to the management of a facility's safety. Facility safety management system elements support, and are an adjunct to, corporate safety management system elements.
<i>Floating, Production, Storage and Off-load facility</i>	see facility
<i>Formal Safety Assessment (FSA)</i>	A formal investigation of the nature, likelihood and impact of potential major accident events (MAEs) and the means to prevent or minimise their occurrence or consequences to as low as is reasonably practicable. Within the context of the safety case the term 'formal safety assessment' may also refer to the reporting of facility-specific studies conducted by the operator that provide reasoned arguments and judgments about the findings of the formal investigation.
<i>Good oilfield practice</i>	As defined in the Commonwealth <i>Petroleum (Submerged Lands) Act 1967</i> : All those things that are generally accepted as good and safe in the carrying on of exploration for petroleum, or in operations for the recovery of petroleum, as the case may be.
<i>Hazard</i>	A physical situation which may result in harm, including death or injury to people or damage to property.
<i>Hazardous goods</i>	As defined under State/Territory legislation.
<i>Hazard identification</i>	Identification of the nature of all hazards at the facility.

<i>Hazard register</i>	A document or process detailing hazards associated with all aspects of operating the facility. The hazard register may be ranked according to severity and/or probability and should indicate the control measures in place to manage them.
<i>Hazard/risk control</i>	Risk reduction actions that are undertaken by the operator in response to the need to reduce risk to as low as is reasonably practicable.
<i>Incident (near miss)</i>	Any unplanned event where control is lost and/or there is or could be an impairment to either employees or the facility (vessel).
<i>Individual risk</i>	The frequency at which an individual may be expected to sustain a given level of harm from the realisation of specific events (usually per annum-IRPA).
<i>Major accident event (MAE)</i>	<p>Any event connected with work activities that could cause multiple fatalities arising from hydrocarbon releases, or other events whether immediate or delayed.</p> <p>Examples of events that may be considered include:</p> <ul style="list-style-type: none"> • fire or explosion, or release of a hazardous substance; • major damage to the structure of the facility or equipment affixed thereto, or loss in the stability of the structure; • any event which significantly impairs options for escape to the temporary refuge (TR), the integrity of the TR itself, or escape from the TR to a place of safety; • helicopter or vessel collision with installation; and • failure of a life support system for diving operations.
<i>Major emergency</i>	An event with the potential to escalate to become a MAE.
<i>'Mobile Offshore Drilling Unit'</i>	A ship, barge or other vessel or floating structure, including a structure any part of which may be lowered to the seabed for the purpose of supporting the structure, that carries or includes equipment for drilling, or carrying out other operations on, a well from the vessel or structure.
<i>MODU safety case</i>	The combination of a vessel safety case and bridging document detailing site specific information and linkages between drilling contractor and operator safety management system's. Or a safety case equal in coverage to the vessel safety case and bridging document and developed for a specific campaign.

<i>Monitoring</i>	A line management function of checking for acceptable performance as tasks are completed.
<i>Operator</i>	As defined in the Commonwealth <i>Petroleum (Submerged Lands) Act 1967</i> , which states ‘... the representative of the titleholder responsible for the overall management and control of the operations for the exploration or exploitation of petroleum reserves for which the title is held’.
<i>Performance Standards</i>	A standard set by the operator for the performance of a particular piece of equipment or procedure (indicating who is responsible for carrying out an activity, what has to be done, when an activity has to be performed and what outcomes are to be expected) which complements and ensures compliance with an accepted standard.
<i>Personal risk</i>	See Individual Risk.
<i>Personnel/Persons</i>	See Employee.
<i>Place of safety</i>	<p>A place where an employee’s physical and emotional wellbeing can be assured.</p> <p>The location of a place of safety for any individual during an emergency will depend on a number of factors, including:</p> <ul style="list-style-type: none"> • physical and emotional condition (considering effects of injury and trauma); • location of facilities where the employee’s individual needs can be met (eg. another nearby facility which can provide first aid treatment for a mild injury, a hospital for a seriously injured employee). <p>The place of safety will be specified in the emergency response plan (ERP) as part of the safety case. Generally, a lifeboat or an evacuation helicopter would not be considered a place of safety. A supply boat or nearby platform could be considered a place of safety, depending on the physical and emotional condition of the employee.</p>
<i>Potential Loss of Life (PLL)</i>	The estimated number of fatalities per year on a site, evaluated by taking account of the number of persons exposed to the risk and magnitude of the <i>Individual Risk</i> .
<i>Production licence application</i>	As required by the Commonwealth <i>Petroleum (Submerged Lands) Act 1967</i> .
<i>Probability</i>	The likelihood of a specific event occurring within a specific time frame.

<i>Proposed development concept</i>	A conceptual description of a development envisaged by the operator. The proposed development concept is the first submission in the process of seeking Designated Authority approval of a new development.
<i>Petroleum (Submerged Lands) Act 1967</i>	Refers to the Commonwealth <i>Petroleum Submerged Lands) Act 1967</i> and subservient legislation.
<i>Rescue</i>	Retrieval of people from the water or lifecraft / life boats to a place of safety.
<i>Review</i>	Evaluation of how well the operators safety management system achieves its goals specified in the OH & S policies. A review check on issues such as whether audits have demonstrated compliance, whether the system remains appropriate given advances in techniques and technology.
<i>Risk</i>	The likelihood of a specified undesired event occurring within a specific period or in specified circumstances. It may be either a frequency (the number of specified events occurring in unit time) or a probability (the probability of a specified event following a prior event), depending on the circumstances.
<i>Risk acceptance criteria/ acceptance standards</i>	Qualitative and quantitative criteria/standards selected by the operator / drilling contractor which reflect contemporary societal values, what is reasonably practicable, and good oilfield practice.
<i>Risk management</i>	The ongoing management process of identifying hazards, evaluating the consequences and probabilities of these hazards, and then reducing the risk levels to as low as reasonably practicable.
<i>Risk reduction plan</i>	A plan to implement the risk reduction strategies identified in the formal safety assessment. The time frame to complete and the priorities should be provided.
<i>Safety case</i>	The presentation of a justification for the safety of an installation.
<i>Safe haven</i>	See temporary refuge.
<i>Safety Management System (SMS)</i>	A comprehensive integrated system for managing safety at a facility which sets out: <ul style="list-style-type: none"> - the safety objectives; - the systems and performance standards by which these to be achieved;

	<ul style="list-style-type: none"> - the performance standards which are to be met; and - the means by which adherence to these standards are to be maintained.
<i>Severity</i>	The level of impairment associated with the realisation of a hazard.
<i>Site</i>	MODU, well and immediate surroundings (to 500m from MODU).
<i>Staff</i>	See Employee.
<i>Temporary refuge (TR)</i>	An open and/or closed area on the facility where employees can muster without undue risk or serious harm, and from which, if necessary, safe and full evacuation can be effected. Equipment is provided within the TR for emergency communications, monitoring and control of the emergency as is necessary to ensure the safety of employees.
<i>Validation</i>	Evidence (test reports, certificates, etc) that equipment and/or systems are fit for purpose.
<i>Vessel Safety Case</i>	Those elements of a safety case that relate to the general safety management, design and construction of a vessel that are inherent to the vessel, not dependent on facility-specific conditions.
<i>Well operations</i>	Including drilling, workovers, wireline and completions

1.5 Abbreviations

ALARP	as low as reasonably practicable
AS	Australian Standards
DA	Designated Authority
EBD	emergency blow-down
ERP	emergency response plan
ERT	emergency response team
ESD	emergency shut-down
FD	facility description
FMEA	Failure mode effects analysis
FPSO	floating production, storage and off-loading facility
FSA	formal safety assessment
FSO	floating storage and off-loading facility
HAZIDS	hazard identification session
HAZOP	hazard and operability study
HS	health system
HUET	helicopter underwater escape training
IRPA	individual risk per annum
IS	information system
ISM	international safety management code
JSA	job safety analysis
MAE	Major accident event
MODU	mobile offshore drilling unit
MSDS	material safety data sheet
NORM	naturally occurring radioactive material
OH & S	Occupational health and safety
PEP	project execution plan
PIC	person-in-command
PLL	potential loss of life
PPE	personal protective equipment
PSLA	<i>Petroleum (Submerged Lands) Act 1967</i>
PSV	pressure safety valve
QRA	quantitative risk assessment
SIMOPS	simultaneous operations
SMS	safety management system
SSIV	sub-sea isolation valve
TEMPSC	totally enclosed motor propelled survival craft
TEMSEC	temporary security
TR	temporary refuge
VFD	vessel facility description
VFSA	vessel formal safety assessment
VSMS	vessel safety management system

1.6 References

Several categories of useful references are provided. It should be noted that reference material is constantly changing, and that the information provided here is not exhaustive and while accurate at the time of publication is subject to change.

The categories are:

- Lead Government Agencies
- Australian Standards and Codes of Practice
- International

Lead Government Agencies (Internet address list)

- Commonwealth Department of Industry Science and Resources – <http://www.isr.gov.au>
- Northern Territory Department of Mines and Energy – <http://www.dme.nt.gov.au>
- Western Australian Department of Minerals and Energy – <http://www.dme.wa.gov.au>
- Victorian Department Natural Resources and Environment – <http://www.nre.vic.gov.au>
- South Australia Department of Mines – www.mines.sa.gov.au/petrol
- Queensland Department of Mines & Energy – <http://dme.qld.gov.au>
- Australian Maritime Safety Authority - <http://www.amsa.gov.au>

National Standards and codes of practice (Internet address list)

- Standards Australia – <http://www.standards.com.au>
- Australian Institute of Petroleum - <http://www.aip.com.au>
- Australian Petroleum Production and Exploration Association – <http://www.appea.com.au>

International

- International Maritime Organisation – <http://www.imo.org/imo>
- Oil industry International Exploration and Production Forum – <http://www.eandpforum.co.uk>
- Health and Safety Executive (United Kingdom) – <http://www.open.gov.uk/hse/>
- United Kingdom Offshore Operators Association (UKOOA) – <http://www.ukooa.co.uk/>
- American Petroleum Institute – <http://www.api.org>

Mobile Offshore Drilling Unit Safety Case Guidelines Facility Description

Chapter 2



Contents

2.0 Introduction	25
2.1 Design, Structure and Layout	26
2.2 Marine Systems	28
2.3 Drilling Systems	30
2.4 Safety Systems	32
2.5 Power Generation, Auxiliary Equipment and Utilities	34
2.6 Hazardous Substances and Inventories	35
2.7 Drawing Set	36

Introduction

Aim

To provide guidance in the preparation of the vessel facility description (VFD) component of a MODU safety case.

Scope

This checklist should be used as a guide to preparing the VFD of a MODU safety case.

The MODU safety case also requires a site description that is specifically addressed under Chapter 5 'Bridging Documents'.

The VFD of the MODU safety case should include information under the detailed seven headings:

- design, structure and layout
- marine systems
- drilling systems
- safety systems
- power generation, auxiliary equipment and utilities
- hazardous substances and inventories
- drawing set

Detailed checklists under each of these headings provide guidance in the development of the VFD.

The VFD section should contain sufficient information about the vessel to validate that the design and operating philosophy is consistent with the safety management system and the assumptions and outputs of the formal safety assessment.

The VFD section should detail all linkages to the safety management system and formal safety assessment.

The VFD section should detail all linkages to the safety management system and formal safety assessment sections.

2.1 Design, Structure and Layout

Aim

To provide an overview of the design characteristics and operational parameters as well as a description of the structure and layout of the vessel.

Scope

This description of the vessel design, structure and layout should include (as a minimum):

Design

- key design performance standards
- design validation philosophy
 - classification
 - certification
 - registration
 - independent validation
- use of novel technology and construction specifics
- principal dimensions
- design parameters for various operating conditions (drilling, towing, survival, etc.)
 - limiting water depth
 - wind speed
 - current
 - deck load
 - anchoring or jacking limitations
- staffing philosophy and arrangements for various operating conditions

Structure and Layout

- elevation/plan views
- structural details (fire ratings, loadings, etc.)
- hazardous area classification
- escape routes

General Arrangements

- accommodation
- work spaces
- storage areas
- helicopter facilities
- cranes and winches

2.2 Marine Systems

Aim

To provide a description of the marine systems.

Scope

This section should include a description of at least the following (where applicable):

- stability
 - means of stability control
 - deck load limitations
 - draft limitations
 - damage stability
 - watertight integrity
 - arrangements to prevent downflooding
 - software used to control/monitor stability and deck loading
- ballast and bilge system
 - ballast tanks
 - piping
 - pumps
 - valves
 - instrumentation
- mooring
 - anchors
 - anchor chains, pennants and chain chasers
 - anchor winches
- jacking arrangements
- towing arrangements

- propulsion and steering arrangements
- navigation equipment
 - navigation lights
 - fog signals
 - communications
 - radar
 - dynamic positioning / station keeping

2.3 Drilling Systems

Aim

To provide a description of the drilling systems.

Scope

This section should include a description of at least the following (where applicable):

- drillfloor and derrick
 - general arrangement of drillfloor and derrick
 - derrick specifications
 - drawworks/topdrive/hoisting equipment
 - pipe handling equipment
 - other drill floor/derrick equipment
- mud system
 - general arrangement of mud system
 - mud tanks
 - mud pumps
 - auxiliary pumps
 - degasser and gas venting system
 - shale shakers
 - desanders
 - desilters
 - centrifuge
 - mud lab
 - sack room
- bulk storage tanks (cement, baryte, gel, etc.)
- cementing unit

- well control
 - well control arrangements
 - kick detection systems
 - blow out preventer
 - diverter
 - hydraulic accumulator and control system
 - choke and kill manifold
- well testing equipment (including flare booms)
- wireline facilities
- tensioners and motion compensators
- remote operated vehicle
- riser release facility
- drilling tubulers and other drilling equipment
- electronic logging unit
- mud logging unit

2.4 Safety Systems

Aim

To describe safety features and systems of the vessel including the design philosophy and where applicable performance standards.

Scope

This section should include a description of at least the following (where applicable):

- general arrangements
 - fire and safety plan
 - station bill
- detection systems
 - visual monitoring system
 - fire and combustible gas detection/alarm system
 - toxic gas detection
 - heat detection
 - smoke detection
- shutdown systems
 - fuel oil shutdown(s)
 - ventilation shutdown(s)
 - power shutdown(s)
 - emergency shut down(s)
- fire and gas protection – passive
 - blast protection
 - thermal protection
- fire protection – active
 - fire pumps
 - deluge system

- sprinkler system
- hose reels, monitors and extinguishers
- inert systems
- other support services
- life saving equipment
 - lifeboats/survival capsules (TEMPSC)
 - life rafts
 - life jackets
 - life rings
 - other lifesaving equipment
- medical facilities and first aid equipment
- emergency power, communications and lighting
- escape and evacuation
 - escape routes / evacuation routes
 - muster points / temporary refuge
 - smoke hoods, rope ladders and other emergency escape equipment
- rescue
- ship movement monitoring
- pressure safety valves (PSV's)

2.5 Power Generation, Auxiliary Equipment and Utilities

Aim

To provide a description of power generation equipment and systems, auxiliary equipment and systems and utility systems.

Scope

This section should include a description of at least the following (where applicable):

- power generation and distribution
 - main engines
 - main generators
 - emergency generators
 - switchgear
 - electrical power supply
 - emergency power supply
- auxiliary equipment and systems
 - air compressors and compressed air system
 - instrument air system
 - communications (voice and data)
 - salt water cooling
 - drains and bilges
 - sewerage / waste disposal
- utilities
 - heating, ventilation and air conditioning
 - potable water
 - fuel distribution

2.6 Hazardous Substances and Inventories

Aim

To summarise all hazardous substances and hydrocarbon inventories stored and/or handled on the vessel.

Scope

This section should include a description of at least the following (where applicable):

- fuel oil inventories
- lube oil inventories
- helicopter fuel inventories
- reservoir and test fluids (hydrocarbons)
- chemical/drilling fluid additives
- paints, thinners and solvents
- cleaning agents
- stored gases
- explosives
- radioactive sources
- hazardous fibres
- other hazardous substances

Inventories used in the formal safety assessment section of the safety case, material safety data sheets and other safety documentation in the safety management system section of the safety case should be cross referenced.

2.7 Drawing Set

Aim

To detail key equipment layout, safety equipment, escape routes and protective system drawings.

Scope

This section should include a description of at least the following (where applicable):

- deck plans
- major equipment/facilities layout
- fuel oil system
- electrical, hydraulic, and pneumatic systems
- fire and blast protection
- fire and safety plan
- escape/evacuation routes
- muster areas /temporary refuge
- fire and gas detection systems
- structural layout
- quarters layout
- mooring layout
- hazardous area classification drawings
- bilge and ballast systems
- anchor pattern (typical)
- jacking system
- heating, ventilation and air conditioning systems (intakes and vents)
- combustible and toxic gas detection alarm systems interconnections diagram
- diverter system

Mobile Offshore Drilling Units Safety Case Guidelines Safety Management System

Chapter 3



Contents

3.0 Introduction	39
3.1 Leadership & Commitment	41
.1 Policy and Leadership	42
.2 Organisation & Responsibilities	44
.3 Employee Involvement & Communication	46
.4 Resources	48
3.2 Planning	49
.1 Hazard Identification & Risk Management	50
.2 Objectives, Plans & Performance Standards	53
.3 Sources of Information	54
.4 Management System Documentation	55
3.3 Implementation	57
.1 Design, Construction & Commissioning	58
.2 Management of Change	62
.3 Purchasing & Control of Materials & Services	64
.4 Safe Operational Procedures	67
.5 Materials Handling and Storage	71
.6 Maintenance & Repair	74
.7 Employee Selection, Competency & Training	76
.8 Workplace Environment	78
.9 Emergency Response	80
3.4 Monitoring & Evaluation	85
.1 Inspection, Testing and Monitoring	86
.2 Health Monitoring Systems	88
.3 Incident/Hazard investigation and reporting	89
.4 Health and Safety Information and Reports	90
3.5 Audit & Review	93
.1 SMS audit	94
.2 Review and Improvement	95

3.0 Introduction

Aim

To provide guidance in the preparation of the vessel safety management system (VSMS) of the MODU safety case.

Scope

The description of the VSMS should demonstrate that risk associated with the vessel is managed for continuous improvement. This process is shown in Figure 3.1.

Structure of Guidelines

Key elements of the SMS are identified and an aim is specified for each.

Sub-elements are grouped broadly under the key elements.

Evidence of implementation of key elements and sub-elements is demonstrated by responding to prompt questions under the sub-elements.

Several of the sub-elements detail compliance standards which provide a test of implementation.

Additional information is provided in Guidance boxes referenced in superscript (for example ¹).

Special Requirements

The safety case submission process does not require drilling contractors to submit safety management system procedures to the DA. However, it requires that a clear description of the arrangements and reference to site procedures and other supporting evidence be provided.

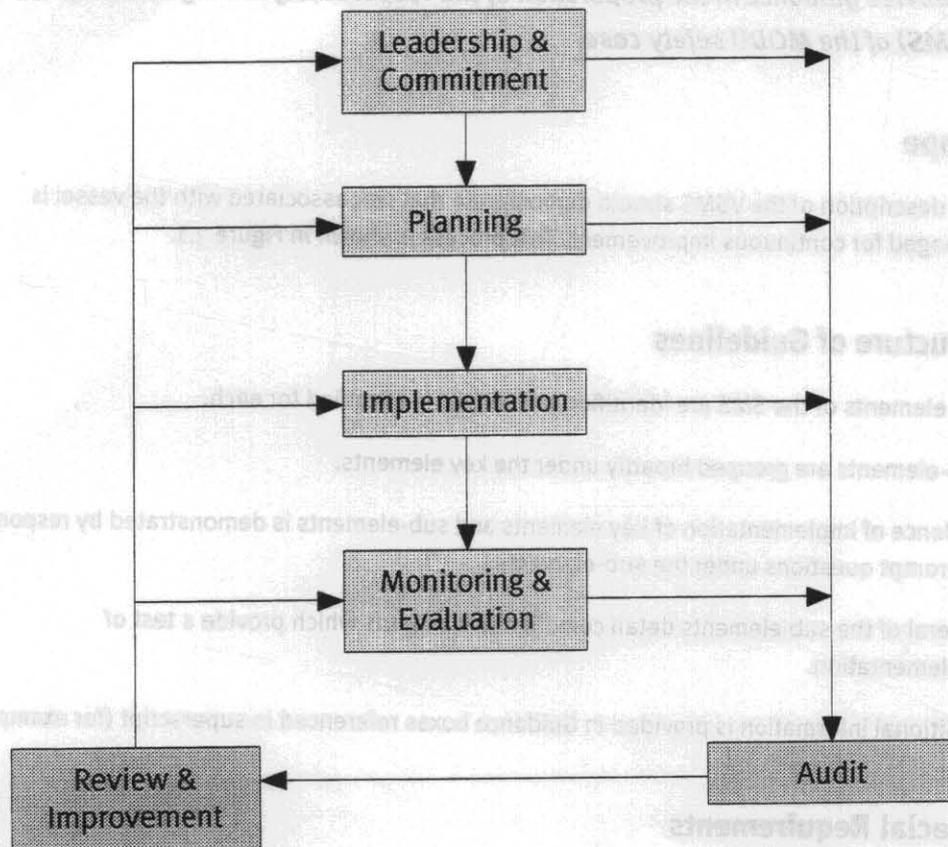
Not-with-standing the DA may at any time request operators safety management system procedures.

Verification

Details e description of the VSMS will be verified by the DA during a site verification audit and inspection.

Figure 3.1 SMS Process

Safety Management System



3.1 Key Element

Leadership and Commitment

Aim

The drilling contractor should demonstrate commitment to achieving a high standard of health and safety in the organisation through the development of effective health and safety policies supported by appropriate organisational structures, positive behaviour of individual managers and the promotion of a cooperative effort at each level in the organisation.

- reflect a commitment to safety or health to other business units
 - establish a commitment to reduce health and safety risk to as low as reasonably practicable
 - establish compliance with relevant legislation as a minimum requirement
 - provide a commitment to develop and maintain appropriate systems and arrangements for the management of safety
 - include a commitment to continual improvement
 - policy is communicated to employees and interested parties
 - management are in place for the regular review of the policy to ensure its relevance and appropriateness to the organisation's activities
- Leadership**
- The drilling contractor should demonstrate:
- appropriate senior managers take direct responsibility for coordinating the implementation and maintenance of the health and safety policy
 - there are mechanisms by which senior managers are held accountable for achievement of the health and safety outcomes established in the policy
 - there are mechanisms that promote the active involvement of all employees in achieving policy objectives

3.1.1 Policy and Leadership

Standard

The drilling contractor's health and safety policy should be supported by a high level commitment to effective risk and safety management consistent with and at least equal to other business aims.

Policy

The drilling contractor should demonstrate:

- there is a documented health and safety policy¹ authorised by the accountable chief executive that clearly states strategic health and safety objectives and a commitment to improving health and safety performance. The policy should:
 - reflect a commitment to safety at least equal to other business aims
 - establish a commitment to reduce health and safety risk to as low as is reasonably practicable
 - establish compliance with relevant legislation as a minimum requirement
 - include a commitment to develop and maintain appropriate systems and arrangements for the management of safety
 - include a commitment to continual improvement
- policy intent is communicated to employees and interested parties²
- arrangements are in place for the periodic review of the policy to ensure its relevance and appropriateness to the organisation's activities.

Leadership

The drilling contractor should demonstrate:

- appropriate senior managers take direct responsibility for coordinating the implementation and maintenance of the health and safety policy
- there are mechanisms by which senior managers are held accountable for achievement of the health and safety outcomes established in the policy
- there are mechanisms that promote the active involvement of all employees in achieving policy objectives.

Guidelines for the Preparation and Submission of Mobile Offshore Drilling Unit Safety Cases

Guidance Note: 1

In addition to a general health and safety policy the operator may have a number of specific policies. For instance;

- corporate or facility specific policies, employment policies, training policies, health policies, rehabilitation policies, etc.

Guidance Note: 2

Persons likely to be associated with the vessel include:

- permanent crew including trades-people, caterers etc
- support staff
- contractors
- visitors including management and guests.

3.1.2 Organisation and Responsibility

Standard

The drilling contractor should develop an effective organisational structure (roles and responsibilities) for implementation and maintenance of the health and safety policy.

Responsibilities

The drilling contractor should demonstrate:

- there is an appropriate structure for the management of safety
- broad safety responsibilities consistent with authority levels are defined for each level in the organisation and for specified support personnel³
- specific responsibilities are allocated for the management of safety critical activities⁴
- employees are informed of their health and safety related roles, responsibilities, accountabilities and authorities
- employee understanding of, and adherence to, roles, responsibilities, accountabilities and authorities are verified; and
- roles, responsibilities and accountabilities are regularly reviewed and maintained.

Staffing

The drilling contractor should demonstrate:

- sufficient personnel with appropriate skills are available to safely operate the vessel during normal and emergency situations
- hours of work and shift patterns reflect health and safety considerations.

Supervision

The drilling contractor should demonstrate:

- levels of supervision at a vessel are commensurate with the level of risk associated with the tasks being performed; and
- personnel and third parties entering and leaving the site are controlled.

Guidance Note: 3

General responsibilities should be consistent with the general duty of care requirements and reflect the intent of the drilling contractor's health and safety policy. Responsibilities should also reflect accountabilities of line management in the implementation and maintenance of the management system and the control of hazards and risk.

Typical examples of supporting documentation that may be cited in the safety case include:

- company organisation chart showing the reporting relationships between the corporate/company organisation and the vessel
- documented roles and responsibilities for each organisational unit / level having safety management or support responsibility
- reporting roles and responsibilities between the operator, the drilling contractor and sub-contractors
- roles and responsibilities for sub-contractor organisational units
- safety management plans showing roles and responsibilities allocated to specific individuals.

Guidance Note: 4

Specific responsibilities for controlling key safety activities such as maintenance, inspection testing and combined operations, etc should be allocated to key individuals or supervisors.

Specific responsibilities may be recorded in job descriptions, specific contracts, procedural manuals or other documents.

3.1.3 Employee Involvement and Communication

Standard

The drilling contractor should develop and maintain effective participation and consultative mechanisms that promote active communication and involvement of all personnel in the management of safety, the control of workplace hazards and risk and the development of the safety case.

Consultation

The drilling contractor should demonstrate:

- formal health and safety consultative mechanisms are in place within the organisation and at the vessel
- safety representatives and or safety committees are elected or established in accordance with the relevant health and safety legislation applying to the operation⁵
 - health and safety and or committee representatives are trained and competent to perform their duties in accordance with occupational health and safety legislative requirements
 - sufficient resources are provided to employee safety representatives or committee members involved in safety related functions.

Participation

The drilling contractor should demonstrate:

- mechanisms exist for involving personnel in:
 - the development and implementation of health and safety policies and procedures
 - the identification and management of hazards and risk; and
 - the preparation of the safety case⁶
- clearly defined issue resolution processes are in place and these are known by all concerned parties.

Communication

The drilling contractor should demonstrate:

- formal and informal methods of communication are used to inform employees of health and safety issues⁷
- formal methods of communication are used to advise personnel of their health and safety related roles, responsibilities, accountabilities and authorities

Guidance Note: 5

General health and safety legislation in most jurisdictions provides for the formal election of safety representatives or the election of safety committee members or both.

While legislation in each jurisdiction differs, the elected health and safety representative and or the committee should be involved and consulted on:

- the management of health and safety
- changes proposed to the vessel, plant, facility or operations
- initiatives for improving health and safety including plans, objectives and targets and any other issue relevant to health and safety at the vessel.

Guidance Note: 6

In the case of a new vessel or crew, it is recognised that vessel employees may not be available at the time of VSMS preparation. In this case attempts should be made to gain some employee representation by other means, (for example, from other areas of the organisation, appropriate employee representative bodies) to achieve a similar broad range of experience from different disciplines. In some instances consideration should be given to reviewing the safety case with employees once hired.

Guidance Note: 7

Examples of methods to communicate safety issues include:

- health and safety meetings
- e-mail correspondence
- safety alerts and bulletins
- safety representatives
- generally accessible relevant company databases
- external professional organisations

Types of information that may be communicated include:

- health and safety performance reporting
- results of health and safety audits and reviews
- reporting of incidents and system failures
- reporting on hazards identification
- reporting on preventative and corrective action.

3.1.4 Resources

Standard

The drilling contractor should ensure sufficient resources to develop, implement and maintain the VSMS.

The drilling contractor should demonstrate:

- sufficient resources (financial, human, and specialist advisers) are available to implement the health and safety policy and maintain and improve the VSMS⁸.

Guidance Note 8:

The drilling contractor should allocate sufficient resources: financial, human and time to develop, implement and maintain the VSMS.

Where necessary, specialist advisers (either inhouse or external) should be sourced to assist with development, implementation or maintenance of the system.

Specialist advisers can include (but are not limited to)

- medical practitioners
- risk engineers
- occupational health and safety advisers
- occupational hygienists
- inspection and testing specialists
- ergonomists
- human factor specialists etc.

A budget for development and implementation of the VSMS should be prepared consistent with the programs or projects being undertaken.

Specific health and safety related programs and issues requiring allocation of resources may originate from:

- different phases of operation
- incident/hazard reports
- various initiatives such as safety campaigns
- training programs
- personnel protective equipment
- emergency response
- safety audits
- safety case development and review
- changes to regulations etc.

3.2 Key Element

Planning

Aim

The drilling contractor should demonstrate a systematic approach to the management of vessel hazards and risk through the identification and assessment of hazards and risk, the establishment of objectives, plans and performance standards, and the development of adequate documentation.

- measures of risk used.
- general approach used for hazard identification and risk management
- method used to review the overall effectiveness of the risk management system
- ongoing control
- methods for ensuring risk reduction measures are implemented and maintained for
- formal hazard identification and assessment process and the selected control measures
- methods used to document, review and keep current information obtained during the
- identification, analysis and selection of risk reduction measures
- methods of monitoring, assessment and management personnel are involved in the
- methods used to ensure that risk levels are systematically reduced to ALARP
- hierarchy of risk reduction measures used for the control of risk
- each phase of operation
- the production system and technology, work environment and work activities at
- identification of hazards and assessment of risk to health and safety associated with
- scope, methods and limits for undertaking periodic, formal and informal task level
- company's risk acceptance criteria and basis for selection
- testing, drilling and well testing. The documentation should include the:
- assessment and control of hazards and risk associated with installation, including
- policies, standards and procedures as a guide for the systematic identification.

3.2.1 Hazard Identification and Risk Management

Standard

The drilling contractor should have procedures in place for the systematic review of health and safety hazards and risk during each phase of MODU operation.

(Note: While this section deals with the management of all hazards and risk, those that may result in major accident events, are more comprehensively dealt with in Chapter 4 of these Guidelines – formal safety assessment).

Hazard Identification and Risk Management

The drilling contractor should demonstrate:

- policies, standards and procedures are in place for the systematic identification, assessment and control of hazards and risk associated with mobilisation, anchoring, towing, drilling and well testing. The demonstration should establish the:
 - company's risk acceptance criteria and basis for selection⁹
 - scope, methods and timings for undertaking periodic formal and informal task level identification of hazards and assessment of risk to health and safety associated with the production system and technology, working environment and work activities at each phase of operation ¹⁰.
 - hierarchy of risk reduction measures used for the control of risk ¹¹
 - methods used to ensure that risk levels are systematically reduced to ALARP
 - methods of ensuring appropriate and competent personnel are involved in the identification of hazards and selection of risk reduction measures
 - methods used to document, review and keep current information obtained during the formal hazard identification and assessment process and the selected control measures
 - methods for ensuring risk reduction measures are implemented and maintained for ongoing control
 - method used to review the overall effectiveness of the risk management system¹²
 - general approach used for hazard identification and risk management
 - measures of risk used.

Communication

The drilling contractor should demonstrate arrangements for:

- informing employees of the risk management system and their role in identifying and controlling hazards and risk at the vessel
- communication to employees of day to day changes in the existing and newly identified hazards on the vessel
- communication to employees of day to day changes in the status of control measures at a vessel.

Specific Requirements

The drilling contractor should specifically demonstrate:

- initiating events and possible escalation factors are considered in the risk assessment for identified hazards
- physical and human factor hazards and risk associated with safety critical tasks (including commissioning, start-up, shut-down and maintenance tasks,) are identified and assessed
- how results are used in establishing organisational and vessel objectives.

Guidance Note: 9

Risk acceptance criteria may include:

- qualitative and/or quantitative organisational or vessel objectives
- regulatory requirements
- prevailing codes of practice and industry standards.

Guidance Note: 10

Documented procedures should establish:

- the processes, facilities or systems to be assessed at each operational phase: for example:
 - areas of the vessel, including engine room and auxiliary machine space
 - systems, including drilling fluids, diesel fuel, and compressed air
 - activities, and tasks including drilling, lifting, vessel entry, maintenance, operations etc
 - environment, including heat, noise, hazardous substances.

Guidance Note: 10 (cont)

- the types of formal hazard identification and risk assessment tools (quantitative or qualitative or both) to be used (HAZOP, HAZID, JSA)
- specific risk criteria associated with the identification, analysis and management of hazards being considered
- when the assessments should be carried out.

Quantitative and qualitative risk assessments may be appropriate at the new development or project level where it is likely that major hazards will be encountered. Further information on this type of analysis is provided in Chapter 4 of these guidelines.

At the task level it may be more appropriate to use a qualitative approach using, for example Job Hazard Analyses (JHA), or task reviews. Where JHAs are to be conducted, they should cover both human factor, and physical aspects of work.

Guidance Note: 11

The following hierarchy of risk reduction measures should be used in the order of preference as listed:

- elimination
- substitution
- control (engineering, procedures, training or PPE)
- mitigation
- recovery.

Guidance Note: 12

Events that may prompt a review of hazards information include:

- a planned major change by the drilling contractor
- a major incident (for the drilling contractor or in the industry generally)

3.2.2 Objectives, Plans and Performance Standards

Standard

The drilling contractor should establish, maintain and monitor measurable and achievable health and safety objectives, plans and performance standards consistent with the company's health and safety policy.

Objectives and Targets

The drilling contractor should demonstrate:

- measurable and achievable health and safety objectives are developed, documented and implemented for relevant functions and levels, within the organisation and for the vessel
- achievements against objectives are routinely reviewed.

Health and Safety Management Plans and Performance Standards

The drilling contractor should demonstrate:

- plans and performance standards are routinely established for the implementation of objectives and targets¹³
- plan implementation is monitored and performance against standards is appraised
- management is held accountable for meeting health and safety performance standards
- plans are updated to reflect changes in performance standards, or outcomes of appraisals of the systems effectiveness

Communication

The drilling contractor should demonstrate:

safety objectives, plans and performance standards and the subsequent level of achievement are communicated to all employees and interested parties.

Guidance Note: 13

There should be a balance of:

- leading indicators, for example, percentage close-out of audit actions, training schedule completion etc
- lagging indicators, for example, lost time injury frequency, total recordable case frequency etc.

3.2.3 Sources of Information (Legislative and other Standards)

Standard

The drilling contractor should develop, implement and maintain procedures for the identification, collection, review and dissemination of information and standards relevant to the safe design and operation of the vessel.

The drilling contractor should demonstrate:

- procedures and arrangements are in place for the routine identification, collection, update and effective communication of information relevant to health and safety. Information should include but is not limited to:
 - legislation and associated amendments
 - relevant industry standards (AS, API etc)
 - relevant equipment/product information
 - safety bulletins issued by Regulators and other industry bodies
 - relevant codes of practice
 - incident and hazard data
 - safety alerts.

Plans are updated to reflect changes in performance standards or outcomes of operations of the system effectiveness

Communication

The drilling contractor should demonstrate:

status objectives, plans and performance standards and the subsequent level of achievement are communicated to all employees and interested parties.

Outcomes Indicators

They should be a balance of:

- leading indicators, for example, percentage close-out of audit actions, training schedule completion etc
- lagging indicators, for example, lost time injury frequency, total recordable case frequency etc.

3.2.4 Management System Documentation

Standard

The drilling contractor should develop and maintain an accessible documented vessel safety management system integrated with other management systems.

The drilling contractor should demonstrate:

- manuals, procedures, plans, and drawings exist in either hard copy or electronic form for the management of health and safety and control of risk at a vessel. The demonstration should detail the:
 - structure of manuals and documents used to manage safety at the vessel
 - arrangements for ensuring documents are readily accessible to employees
 - how the documentation encourages the understanding and use of the VSMS.

3.3 Key Element

Implementation

Aim

The drilling contractor should demonstrate that hazards associated with facilities and work activities are controlled and arrangements are in place for responding to emergencies.

- Design changes are reviewed as part of the overall risk management process
 - Hazards are identified and risk is assessed, eliminated or controlled at each stage of the design
 - Methods of co-ordination exist that ensure design information is communicated between project and operational groups
 - Personnel involved in design are competent
 - Responsibility for design of facilities and work activities is clearly defined
 - Design phases for both process hazards and workplace hazards
 - The incorporation of results from risk assessment studies as an iterative design process
- Design Input**
- Test and facility design specifications reflect further factor considerations
 - Practice and the drilling contractor's safety objectives
 - Site design criteria, safety performance standards, regulatory requirements, good oil-field design specifications for all major project work refer to appropriate technical standards.
 - The drilling contractor should demonstrate:
- Design Output**
- Hazards and risk associated with construction, commissioning and operation are identified and assessed
 - Ergonomics are considered in design
 - Documented drawings, reports, calculations and analyses meet the design specification
 - The drilling contractor should demonstrate:

3.3.1 Design, Construction and Commissioning

Standard

The drilling contractor should demonstrate that hazards and risk associated with the design, construction and commissioning of the vessel and its plant, equipment and systems are eliminated, or reduced to as low as reasonably practicable.

Design Planning

The drilling contractor should demonstrate:

- the incorporation of results from risk assessment studies as an interactive element of the design process (for both process hazards and workplace hazards)
- responsibility for design of facilities and work systems and activities is clearly defined
- personnel involved in design are competent
- methods of co-ordination exist that ensure design information is communicated between project and operational groups
- hazards are identified and risk is assessed, eliminated or controlled at each stage of the design
- design changes are reviewed as part of the overall risk management process

Design Input

The drilling contractor should demonstrate:

- design specifications for all major project work refer to appropriate technical standards, safe design criteria, safety performance standards, regulatory requirements, good oil-field practice and the drilling contractor's safety objectives
- task and facility design specifications reflect human factor considerations¹⁴.

Design Output

The drilling contractor should demonstrate:

- documented drawings, reports, calculations and analyses meet the design specification brief
- ergonomics are considered in design¹⁵
- hazards and risk associated with construction, commissioning and operation are identified and assessed

- operations and maintenance procedures and purchasing specifications include safety performance standards.

Design Review

The drilling contractor should demonstrate:

- formal design reviews are conducted at each stage of the design
- personnel from relevant functional groups are involved in the review
- modifications to the design are initiated and controlled.

Design Validation

The drilling contractor should demonstrate:

- key hardware and systems design aspects are validated by independent and competent persons or bodies ¹⁶
- validation of the design against the design specification and safety performance standards occurs at key design phases and at commissioning.

Construction

The drilling contractor should demonstrate:

- construction hazards and risks are identified and plans and procedures are established to control them
- verification of the final construction against the design specification takes place.

Commissioning

The drilling contractor should demonstrate:

- procedures for ensuring safe commissioning are established, implemented and maintained¹⁷.

Guidance Note: 14

Human Factor issues:

Task design –

- the design of the task
- the capacity for - overwork, underwork, boredom,
- the effects of scheduling of work - stress, control of fatigue
- ergonomic requirements
- decision making requirements
- communication requirements
- availability of work standards
- information requirements
- instructions – training requirements
- warning sign requirements

Personal Factors

- skill levels
- physical attributes of personnel operating plant or conducting tasks
- experience of employees
- employee knowledge
- fitness for work

Tools, Materials and Technology

- design, control systems
- access and design of tools
- integrity and suitability of materials.

Guidance Note: 15

Ergonomic considerations associated with design can include:

Lay-out of and use of controls and displays

- controls should reflect the equipment functions
- controls should be accessible, easy to distinguish and arranged to promote ease of use.
- displays and controls should be arranged to encourage good working postures and allow movement and variation
- controls systems should be designed to accommodate drilling contractor intervention in computer controlled processes
- displays should provide essential information about fault and emergency states and safety performance standards
- displays should be visible and easily intelligible from all relevant working positions.

Guidance Note: 15 (cont)*General plant design*

- automatic safety devices should be provided where a rapid response and/or where complex information handling is required
- automatic devices or help from other personnel should be available for periods of overload on individuals
- plant, equipment and facilities should be designed to allow access and egress for normal maintenance operations and during emergencies
- lifting equipment should be provided where necessary and ease of use/access should be reviewed.

Guidance Note: 16

The Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996 (the Regulations) requires independent validation of design, construction and installation for:

- proposed facilities.
- significant changes to existing facilities.

Refer to clause 13 of the Regulations

Guidance Note: 17

Start up and commissioning procedures should address

- operations hookup
- emergency response
- review of software alarms/trips and tests
- maintenance
- personnel training issues
- project phase handover to operations personnel
- extra supervision requirements
- start-up isolation/defeats.

3.3.2 Management of Change

Standard

The drilling contractor should ensure changes and modifications are reviewed for hazards and risk prior to implementation and information on change requirements are communicated to all relevant employees and stakeholders.

Engineering

The drilling contractor should demonstrate:

- arrangements are in place for controlling modifications to plant, equipment and materials used at a vessel ¹⁸ The demonstration should detail how:
 - change requests are initiated, processed and authorised
 - change requests are prioritised and safety and risk implications are assessed
 - the cumulative impact of minor changes is assessed and actioned
 - those effected by change are consulted prior to implementation
 - changes are communicated to interested parties
- lighthouse corrections are kept up-to-date.

Organisation and Work systems

The drilling contractor should demonstrate:

- arrangements are in place for controlling permanent and temporary organisational, and work activity modifications and changes and this is communicated to relevant employees¹⁹. The demonstration should indicate how:
 - change requests are initiated, processed and authorised
 - change requests are prioritised and safety and risk implications are assessed
 - the cumulative impact of minor changes is assessed and actioned
 - those affected by change are consulted prior to implementation.

Documents

The drilling contractor should demonstrate:

- procedures are established, implemented and maintained for the control of all relevant safety and risk management documents, plans, drawings and data. The demonstration should indicate:
 - how current versions of documents and data are authorised, distributed and made available to appropriate personnel. If electronic documents are used, detail measures established to make these documents available during power outages
 - responsibility for and how documents are periodically reviewed and updated when changes occur
 - arrangements in place for the withdrawal of obsolete documents and arrangements that ensure superseded documents and data are not unintentionally used.
- documents and data are maintained and are in a format suited to the requirements of users.

Guidance Note: 18

A management of change system will ensure that changes will be analysed, evaluated and communicated to employees prior to implementation. Changes should be supported by document control systems. Features of such a system normally include:

For engineering and process changes:

- evaluation of hazards, resources needed and the effect on operational conditions, construction, decommissioning requirements, maintenance requirements
- assessment of risk levels
- review of change requirements in other systems (for example, changes in inspection and test frequencies)
- communication of intended changes to affected groups
- training requirements.

Guidance Note: 19

Health and safety implications should be assessed when there are organisational or work activity changes, for example:

- change of company ownership
- change of organisational structures and reporting relationships
- changes in staffing numbers (or staffing philosophy, down sizing, upsizing or outsourcing)
- job or task redesign
- changes in duty allocations

3.3.3 Purchasing and Control of Materials and Services

Standard

The drilling contractor should develop and maintain appropriate arrangements for the control of purchased services and materials to ensure additional hazards are minimised.

Services

The drilling contractor should demonstrate:

- tender specifications are established that incorporate health and safety requirements for all major contracts²⁰
- procedures for the selection of contractors incorporate a review of safety requirements in accordance with the tender specification
- arrangements are in place for the review and integration of the drilling contractor and sub-contractor safety management system's prior to commencement of activities. The demonstration should detail:
 - mechanisms to involve sub-contractors in hazard identification and risk assessment
 - arrangements for communicating safety related issues between the drilling contractor and sub-contractors
 - how responsibilities for emergency response are assessed and allocated between the drilling contractor and sub-contractors and revised organisational descriptions and roles and responsibilities are determined and communicated
 - arrangements in place for assuring sub-contractor competence²¹.
- procedures and arrangements for monitoring the performance of sub-contractors during and on completion of the contract or assigned work. The demonstration should establish the arrangements for:
 - supervision, monitoring and auditing of the sub-contractors performance during operation
 - verifying and accepting the work undertaken against the tender specification on completion of the contract.

Materials and Equipment

The drilling contractor should demonstrate:

- purchase specifications and/or purchase orders incorporate health and safety requirements²²
- employees are consulted prior to the purchase of materials and equipment with potential health and safety implications
- procedures are in place for the inspection and verification of materials supplied against the purchase specification
- arrangements are in place for the review of operating procedures and practices when purchases have health and safety risk implications²³
- personnel are informed of health and safety implications associated with purchases
- personnel are aware of their responsibilities with respect to hazard identification and risk management during the process of materials and equipment specification and purchasing.

Guidance Note: 20

Sub-contractor selection criteria should consider the capacity of the tenderers to comply with the tender specifications, legislative compliance, health safety and environment (HSE) performance. The sub-contractors HSE management system could include:

- objectives
- plans
- records
- training
- competence
- incident reporting etc.

Guidance Note: 21

Sub-contractors should be verified as competent in all activities critical to managing the risk associated with their assigned tasks. At a minimum, induction training should be provided in:

- emergency response
- permit to work.

Guidance Note: 22

Purchase specifications should include compliance with relevant technical, design, operational and legislative standards: for example:

- Australian Standards and Australian Petroleum Institute (API) codes and recommended practice, for example emission standards (noise etc),
- legislative standards requirements for manufacturers risk assessment, validation certificates for example *Industrial Chemicals (Notification and Assessment Act)*

Purchase specifications should also require the provision of information and data associated with the safe operation, handling and use eg Material Safety Data Sheets (MSDS)

- operational and maintenance procedures and manuals.

Guidance Note: 23

All purchased items, equipment and material should be assessed to determine the need for changes in operating, maintenance and safety management practices and procedures, for example, training, provision of additional risk control measures, communication etc.

Sub-contractors should be verified as competent in all activities critical to managing the risk associated with their assigned tasks. At a minimum, induction training should be provided to:

- permit to work
- emergency response
- training
- records
- plans
- objectives

Sub-contractors should be verified as competent in all activities critical to managing the risk associated with their assigned tasks. At a minimum, induction training should be provided to:

- permit to work
- emergency response

3.3.4 Safe Operational Procedures

Standard

The drilling contractor should develop and use operational procedures that effectively manage risk arising from operations.

The drilling contractor should demonstrate:

- operating and maintenance procedures exist for all key work activities and tasks²⁴. The demonstration should detail:
 - safety critical procedures established as a result of risk assessment studies
 - procedures and arrangements for conveying information between shifts on matters such as maintenance in progress, plant out of service, process abnormalities etc²⁵
- arrangements in place for obtaining feedback on and reviewing the adequacy of operational procedures. The demonstration should indicate employees responsible for task execution are involved in this review.

The drilling contractor should demonstrate that standard operational procedures are in place for both routine and non-routine work activities. The demonstration should establish that safe operational procedures are:

- appropriate, established, implemented and maintained
- understood, current and assessable.

Standard Operational Procedures Should Include, but not be limited to:

Permit to work

Setting out procedures for²⁶:

- authorisation and issuing of permits
- distribution and display of permits
- isolation procedures
- hazard identification and risk management
- simultaneous operations
- change in operating status
- close-out of permits, etc

Marine Operations

Setting out procedures for

- anchoring and towing
- ballasting and maintaining stability
- propulsion and steering (if appropriate), etc.

Drilling operations

Setting out procedures for:

- running blow out preventer
- tripping drill pipe
- running casing
- well control
- operations of the mud system
- cementing, etc.

Deck operations

Setting out procedures for

- helicopter and workboat activities
- cargo handling and storage
- crane and winch operations, etc.

Safe Work

Setting out procedures for:

- working at heights
- working over the side
- confined space entry
- pressure testing, etc.

Well Management

Setting out procedures for

- well design
- well operations
- well control
- well suspension
- well abandonment.

Guidance note: 24

Safe operational procedures should be developed to control or prevent risks occurring during all phases of the facility's life: design, construction, commissioning, operation (including modification phases if any) and abandonment.

Procedures referred to in this section relate to work activities including those that adequately control hazards during normal operations (including routine and non-routine operations and maintenance) and planned change (including those that arise from construction, and changes to structures, plant, substances, other procedures, personnel, or information). Other sections of this manual deal with additional procedures for controlling emergencies, design and construction.

Operational procedures should deal with risks identified during the FSA and comply with regulatory requirements. The procedures should also be consistent with the operator's control philosophy.

A list of reference documentation should be provided to allow the assessor to trace appropriate procedures.

Guidance Note: 25

For example, employees need to be made aware of:

- the shutdown of a fire pump
- the temporary removal of a lifeboat
- the failure of part of the public address system on the facility
- inhibition of the detection or shutdown systems.

Guidance Note: 26

The operator's summary of the facility's work permit system and isolation procedures should contain references to the following:

- types of work permits in use
- type of work for which a permit is required
- methods of hazard recognition and control
- personal safety of those carrying out the work
- safety of other employees
- overall safety and integrity of the facility
- locking, tagging and isolation procedures
- limits on number of active permits
- responsibility for issue and cancellation of permits
- shift handover procedures relating to permits
- intermediate inspections (including gas testing)
- post-completion inspections
- procedures for suspension or cancellation of work
- concurrent operations
- period of permit validity, duration of work
- close-out and sign off of permits.

A list of reference documents should be provided to allow the assessor to trace control strategies.

Operational procedures should be identified during the ISA and comply with regulatory requirements. The procedures should also be consistent with the operator's control philosophy.

Guidance Note 25

For example, employees need to be made aware of:

- the location of the pump
- the location of a bleed
- the location of the public address system on the facility
- initiation of the isolation or shutdown system.

3.3.5 Materials Handling and Storage

Standard

The drilling contractor should have in place a safe system for handling and storing of materials.

Materials Handling

The drilling contractor should demonstrate that procedures are in place to ensure

- safe movement of materials and personnel²⁷
- manual handling activities are carried out safely²⁸
- activities involving cranes, hoists, winches and other lifting appliances are carried out safely²⁹

- lifting gear such as slings and shackles are used in a safe manner³⁰
- lifting equipment such as containers, pallets, racks and work baskets are used in a safe manner
- risk associated with the handling of hazardous materials are controlled³¹

Material Storage

The drilling contractor should demonstrate that procedures are in place to ensure:

- storage areas for materials are located in appropriate areas, and are fit for purpose
- hazardous materials are properly stored given due regard to the nature of the hazards and need for segregation³².

Guidance Box 27

Procedures for movement of materials and personnel should include, where applicable:

- supply vessels
- helicopter operations
- lifting operations
- manual handling
- communications
- certification and control for lifting gear
- personnel baskets
- vessel transfer limitations
- isolation/depressurisation of hydrocarbon lines if lifting over them

References should be made to any dropped object and impact studies and associated procedural and hardware controls.

Guidance Note: 28

Procedures should be in place to minimise the risk of manual handling injuries, particularly back injuries. Means to reduce the risk should include:

- the use of mechanical lifting aids, such as:
 - cranes
 - winches
 - hoists
 - fork lifts
 - wheeled trolleys
- training in safe lifting and carrying techniques

Guidance Note: 29

Procedures should be in place for the safe operation of lifting devices. These should include:

- ensuring lifting appliances meet appropriate standards and codes
- installation requirements for items such as padeyes and monorails
- inspection, testing and maintenance requirements
- operator training.

Guidance Note: 30

Procedures should be in place for the appropriate supply and usage of lifting gear such as slings and shackles. These should include:

- certification and marking requirements
- inspection, maintenance and testing requirements
- lifting gear register
- training and qualifications of persons who inspect and use lifting gear.

Guidance Note: 31

Procedures should be developed, authorised, implemented and maintained for the labelling, handling, storage and disposal of hazardous materials. These procedures should reference any standards, registers or manifests required by relevant legislation or international standards or codes.

Prior to shipping offshore, health and safety information on the relevant material should be obtained by the operator, for example:

- MSDSs and signage for all chemicals and other materials onsite
- storage, labelling and handling requirements for any hazardous or toxic substance
- disposal of any materials, eg oils, hydraulic fluids, or other petrochemical products that may impact upon the environment on or off site
- the methods used to inform employees of storage, handling and disposal methods

Guidance Note: 31

Procedures should be in place for the safe handling, storage and disposal of any materials requiring special precautions as defined by MSDSs. In addition, segregation of materials during transport, storage or usage may be required, for example:

- storage of flammable materials in specially designated areas away from sources of heat or ignition
- segregation of oxidising materials from flammable materials
- segregation of poisons from foodstuffs

3.3.6 Maintenance and Repair

Standard

The drilling contractor should have an effective system of maintenance to ensure the safe operation of the vessel.

Maintenance Planning

The drilling contractor should demonstrate:

- standards and procedures are in place for maintaining plant, equipment and facilities. The demonstration should:
 - indicate how safety critical items are determined
 - detail what maintenance procedures are validated
 - establish the operator's maintenance philosophy
 - detail responsibilities for authorising, conducting and supervising maintenance activities
 - indicate how routine maintenance frequencies are determined ³³
 - indicate how maintenance items are prioritised
- indicate how maintenance of safety critical equipment is scheduled and controlled

Maintenance Implementation

The operator should demonstrate:

- inspections, maintenance, repair and plant alteration records are established and maintained
- procedures are in place for the review of hazards and risk associated with maintenance activities and tasks prior to undertaking these activities
- plant and equipment requiring registration with external authorities is identified and procedures ensure that registration is maintained
- procedures are in place for the periodic review of action against maintenance schedules to verify critical plant maintenance is being undertaken and equipment is safe before being returned to service
- procedures are established for the reporting, isolation and withdrawal of unsafe plant and equipment from service

Guidelines for the Preparation and Submission of Mobile Offshore Drilling Unit Safety Cases

- procedures are in place for the periodic review and improvement of maintenance procedures.

The operator should detail how maintenance employees are involved in the review of procedures and planning schedules.

Guidance Note: 33

Maintenance schedules should:

- reflect the assumptions and outcomes of the FSA studies and
- be consistent with relevant codes and standards and manufacturer's recommendations.

3.3.7 Employee Selection, Competency & Training

Standard

The drilling contractor should ensure ongoing competence of personnel.

Employee Selection

The drilling contractor should demonstrate:

- procedures exist for the specification, selection and placement of competent personnel³⁴ detailing how competence and personal attributes relating to safety are identified and used in the selection of personnel:
 - establishing the method for reviewing job and position specifications
 - indicating how minimum skills, experience and qualifications of prospective employees are assessed and verified
- the mechanism for communicating roles and responsibilities to employees.

Competency and Training

The drilling contractor should demonstrate:

- adequate resources are allocated to training
- health and safety training needs are periodically assessed in conjunction with employees
- training and development specific to health and safety occurs³⁵
- training in relevant work and safety critical procedures is provided to new, transferring and existing employees
- visitors, casual and new employees are inducted
- competence of employees is assessed on appointment and periodically reviewed
- training courses, programs, and modules are assessed, maintained and current
- training records are maintained and reviewed (to capture refresher training requirements)
- training programs effectiveness are reviewed (including verification of employees competence) and modified or updated where necessary.

Guidance Note: 34

Typically, job specifications may be detailed in position descriptions, job descriptions and employee contracts.

Position descriptions or job specifications should identify minimum skills, qualifications and experience requirements including health, physical and psychological capacities for the tasks to be undertaken.

Guidance Note: 35

Training programs should be established for each level in the organisation

Training could include:

- safety management system
- legal requirements
- human factors
- hazard identification and control

Job Training

- operational procedures
- emergency response
- health and safety responsibilities
- training in areas specified in legislation
- training in the use of PPE, hazardous substances handling etc

Induction Training

- emergency response
- health and safety responsibilities
- incident / hazard reporting
- permit to work
- hazard identification and control

Guidance Note 36
Noise and Vibration

- Procedures should be in place for the identification, assessment and control of noise and vibration risks associated with the design, selection and operation of plant and equipment.
- Noise levels should be reassessed when changes occur.
- Design and purchase specifications establish noise levels consistent with legislative requirements.

3.3.8 Workplace Environment

Standard:

The drilling contractor should demonstrate facilities and processes are in place to ensure and promote a safe work environment.

The drilling contractor should address (as a minimum):

- atmospheric contaminants
- housekeeping
- lighting and ventilation³⁶
- noise and vibration³⁷
- sign posting
- personal protective equipment³⁸
- temperature extremes³⁹
- hygiene⁴⁰
- radiation
- working hours
- basic amenities⁴¹

Guidance Note: 36

Lighting and Ventilation

Lighting and ventilation levels should be assessed and periodically reviewed to ensure they are adequate with regard to the location and nature of the work being done.

Guidance Note: 37

Noise and Vibration

- procedures should be in place for the identification, assessment and control of noise and vibration risks associated with the design, selection and operation of plant and equipment.
- noise levels should be reassessed when changes occur
- design and purchase specifications establish noise levels consistent with legislative requirements

Guidance Note: 38

Personal Protective Equipment

Personal protective equipment (PPE) needs should be assessed and procedures in place for the selection, issue, training and use of the PPE.

Guidance Note: 39

Temperature extremes

Facilities and procedures should be in place to ensure that;

- as far as is practicable, heating and cooling is provided to enable employees to work in a comfortable environment; and
- employees are protected from extremes of heat and cold.

Guidance Note: 40

Hygiene

Procedures should be in place for the transport, storage and preparation of food.

Guidance Note: 41

Work Place Facilities

Facilities and amenities must conform to legislative requirements, standards and codes of practice for items such as:

- drinking water
- sufficient workspace
- surfaces and floors
- change rooms, toilets and showers
- cabins and other accommodation spaces.

3.3.9 First Aid and Emergency Response

Standard

The drilling contractor should implement effective first aid and emergency response arrangements.

First Aid

The drilling contractor should demonstrate:

- first aid requirements and facilities are identified and assessed. The demonstration should:
 - identify the types of incidents that may occur on or in the area of the vessel
 - indicate the inventories of first aid equipment and facilities
 - detail the need for numbers, classifications and competence of trained first aid personnel
 - detail the types of training provided to personnel
 - detail the management of first aid coverage at remote sites (if applicable)
 - detail the arrangements for 24-hour cover for first aid.
- procedures are established for maintenance of first aid facilities. The demonstration should indicate the:
 - arrangements for ensuring the security of prescription medications
 - arrangements for maintaining the first aid inventory
 - availability of additional medical advice.

Emergency Response

The drilling contractor should demonstrate:

- all potential emergencies (including those listed in the FSA) are identified and procedures and facilities exist for mitigating their effects⁴². The demonstration should indicate:
 - the offshore command structure to manage the emergency response on the vessel
 - the onshore command structure to co-ordinate and support the emergency response on the vessel
 - the roles and responsibilities of all key employees associated with the execution of the emergency response plan

- how all parties, including external agencies, are informed of their role in executing emergency response actions for example, onshore office, police, maritime agencies and other emergency services
- how conflicting demands are managed where services and equipment of one contractor are shared by a number of drilling contractors, for example, helicopters for pre-cyclone evacuation, emergency and rescue equipment
- the procedures for issuing and maintenance of safety equipment, emergency equipment and specialised tools
- the procedures in place for search, rescue and recovery operations
- the availability of sufficient numbers of competent emergency trained response team personnel at all times
- the procedures for accounting for all personnel on board in an emergency
- a schedule of regular emergency drills and exercises are conducted for each emergency scenario
- procedures are established to assist employees who are exposed to critical incidents at work.
- all personnel are competent to perform their roles during an emergency. The drilling contractor should:
 - indicate how the emergency command ability of the person-in-charge of the vessel is assessed prior to appointment
 - establish the training provided and the methods of assessing competence for all key personnel
- procedures are established for communicating emergency response arrangements to employees
- emergency communication procedures are established
- emergency equipment is fit for purpose, available at appropriate locations and accessible⁴³. The demonstration should indicate contingencies in the event of damage/loss or unavailability of equipment, for example life boats
- emergency equipment, exit signs and alarm systems are inspected, tested and maintained at regular intervals
- the effectiveness of the emergency response system is periodically assessed, reviewed and improved.

Guidance Note: 42

The drilling contractor should have plans and procedures in place for all identified emergency scenarios that could reasonably be expected to occur during each operational phase.

Identified scenarios should cover at a minimum those identified in the formal safety assessment studies, for example:

- hydrocarbon release resulting in fire/explosion
- oil spill
- serious injury or death
- helicopter incidents
- loss of well control
- ship collision
- adverse weather
- loss of ballast control, stability and station keeping
- subsea hydrocarbon releases, for example pipelines or flowlines
- diving emergencies
- terrorist activities
- events requiring evacuation of the vessel
- confined space emergencies
- person overboard
- toxic release.

The emergency response plan should reflect the combined drilling contractor and contractor procedures and be discussed and agreed with all relevant parties. Emergency response procedures should:

- have clear contents and directions for use
- contain up-to-date names and contact numbers for key personnel and organisations
- clearly show the chain of command and lines of communication to be put in place during an emergency
- define the responsibilities of essential personnel and outline the basic procedures for responding to emergencies
- ensure all relevant personnel and organisations are kept informed of the plan and any updates.

The plan should also contain or reference a program of emergency drills and exercises which:

- involves all relevant vessel and support personnel as well as outside agencies
- is closely aligned with emergency scenarios relevant to those identified in the FSA
- includes a review on completion of the exercises and allowance for updates if necessary.

Guidance Note: 43

In the event of unavailability or insufficient TEMSC either personnel should be transported from the facility or operations ceased and made safe.

3.4 Key Element

Monitoring and Evaluation

Aim

The drilling contractor should demonstrate that vessel, plant, process, work system and management arrangements are measured, monitored and evaluated and, where deficiencies are identified, corrective actions are implemented.

- Inspection and test results are regularly recorded.
- The contractor should demonstrate that inspection and test regimes are defined.
- Completion of test activities is verified.
- Procedures exist for the execution of inspection and test activities.
- Inspection processes should seek input from personnel required to undertake the tasks being inspected.
- Inspection test and monitoring equipment is maintained, stored and calibrated to an appropriate standard.
- Inspection reports contain recommendations for the prioritisation and implementation of corrective actions.
- Responsibility for implementing corrective actions arising from inspection reports is assigned to specific personnel.
- Arrangements exist for ensuring that corrective actions have been completed.
- Corrective actions arising from inspections are evaluated to determine their effectiveness.
- Workplace environment monitoring is conducted (where appropriate) and records of the results are maintained.
- Inspection and testing results are periodically reviewed and used in assessment of work priorities.

3.4.1 Inspection, Testing and Monitoring

Standard

The drilling contractor should have effective systems of inspection, testing and monitoring to ensure technical integrity of the vessel.

The drilling contractor should demonstrate:

- appropriate condition monitoring programs exist
- regular inspections of workplace and facilities are carried out
- informal hazard inspections take place
- inspection and tests of safety critical risk control and mitigation devices are regularly conducted⁴⁴. The demonstration should indicate how:
 - inspection and test frequencies are determined
 - completion of test schedules is verified
- procedures exist for the safe execution of inspection and test activities
 - inspection processes should seek input from personnel required to undertake the tasks being inspected
- inspection, test and monitoring equipment is maintained, stored and calibrated to an appropriate standard
- inspection reports contain recommendations for the prioritisation and implementation of corrective actions
- responsibility for implementing corrective actions arising from inspection reports is assigned to specified personnel
- arrangements exist for verifying that corrective actions have been completed
- corrective actions arising from inspections are evaluated to determine their effectiveness
- workplace environmental monitoring is conducted (where appropriate) and records of the results are maintained
- inspection and testing results are periodically reviewed and used in assessment of work priorities.

Guidance Notes: 44

Facilities typically subject to inspection activities include:

- well control equipment
- electrical and control loop integrity
- emergency power
- lifting and rigging equipment
- navigation and communications equipment
- emergency response equipment
- pressurised equipment – PSVs etc
- vessel integrity (for example, corrosion)

The frequency of routine inspections should match:

- the specifications cited in the assumption outcomes of the formal safety assessment studies and the assessment of the general risk
- regulatory requirements
- good oil field practice (for example, vibrations and corrosion checks)
- manufacturer's recommendations
- appropriate Australian (or international) standards or codes of practice.

3.4.2 Health Monitoring System

Standard

The drilling contractor should monitor and evaluate the effects of the work environment on the health of employees.

The drilling contractor should demonstrate:

- employee health monitoring requirements are identified and procedures exist for conducting monitoring⁴⁵
- where required by legislation, the health of employees exposed to specified hazards is monitored and recorded
- employee health monitoring records are periodically reviewed and programs are established to reduce health risk
- pre-employment assessments are carried out on employees.

Rehabilitation

The drilling contractor should demonstrate procedures exist for rehabilitation and supervised return to work for employees injured or suffering ill health.

Guidance Note: 45

A program of employee health monitoring may consist of:

- pre-employment medicals
- ongoing medicals, for example, pre SOLAS training
- lifestyle assessments
- specific monitoring and analysis for identified hazards, for example noise and hearing loss, hazardous substances and exposure effects.

3.4.3 Incident/Hazard Investigating and Reporting

Standard

The drilling contractor has an effective system of reporting, investigating hazards and incidents and establishes measures to prevent recurrence.

The drilling contractor should demonstrate:

- procedures exist for reporting and investigating hazards and incidents and implementing corrective actions. The drilling contractor should:
 - indicate how the level of investigations is determined
 - specify the reporting requirements
 - indicate the roles and responsibilities of employees, supervisors, health and safety representatives and visitors for reporting and investigating incidents
 - indicate who is involved in the investigation of different categories of incident or accident
 - indicate how the investigative information is used
 - indicate how the quality of the investigation is reviewed
 - indicate how the close-out of corrective actions is monitored
 - indicate how regulatory reporting requirements are satisfied
 - indicate the methods of informing employees of significant incident and corrective actions
- employees, supervisors, health and safety representatives and managers involved in incident and hazard investigation and reporting are trained and competent.

3.4.4 Health and Safety Information and Reports

Standard

The drilling contractor should maintain a system for the analysis, dissemination, storage/archiving and retrieval of information relevant to health and safety.

Managing Health and Safety Information

The drilling contractor should demonstrate:

- procedures are in place for the collection, maintenance and confidential retention of employee health and safety records
- documents and data relevant to health and safety are collected, disseminated, filed and retained⁴⁶. The demonstration should indicate:
 - the types of documents and data collected
 - how health and safety documents are used.

Analysis and Reporting of Health and Safety Performance Data

The drilling contractor should demonstrate:

- procedures exist for the collection and analysis of health and safety performance data. The drilling contractor should describe the lead and lag indicators used for measuring health and safety performance⁴⁷
- regular reports on health and safety performance are produced and disseminated to relevant personnel.

Guidance Note: 46

Documents, reports and data collected by the drilling contractor can include:

- safety alerts
- hazard and Incident reports
- log books
- audit close-out reports
- inspection maintenance records
- hazards registers and other documents
- statistical information
- training records
- calibration results
- non destructive testing (NDT) reports
- measures of injury or loss potential

Where appropriate, analysis of the data should take place and reports should be developed that provide personnel with indicators of the effectiveness of the health and safety programs and initiatives.

Reports and data should be retained for periods consistent with local legislation.

Guidance Note: 47

The procedures should specify the method of collecting and analysing incident data to provide information on the:

- location and nature of incidents
- frequency and severity of incidents
- effectiveness of hazard and risk controls

This information should be provided to employees and to management to allow trends to be identified and performance to be monitored.

3.5 Key Element

Auditing and Review

Aim

The drilling contractor should demonstrate the system for managing health and safety risk is implemented, effective and continually improving.

The drilling contractor's audit system should evaluate whether safety procedures and management arrangements are:

- documented
- implemented
- used as intended by the organisation
- effective

3.5.1 SMS Audit

Standard

The drilling contractor should periodically verify the operation of the safety management arrangements.

The drilling contractor should demonstrate

- an audit program and procedures are established, implemented and maintained to verify that health and safety management arrangements are being operated to specified performance standards⁴⁸. The demonstration should indicate:
 - the schedule of internal and independent audits
 - the methodology for conducting audits, including: audit scope and objectives, criteria for selection of audit teams and leaders and reporting requirements
 - how relevant employees are involved in the audit process
- procedures exist for the reporting of audit results and the implementation of corrective actions. The demonstration should indicate how:
 - corrective actions and findings are recorded and prioritised
 - affected employees are made aware of audit results and corrective actions
 - corrective actions are reviewed for appropriateness prior to implementation
 - follow-up action is monitored for timely close-out.

Guidance Note: 48

The drilling contractor's audit system should evaluate whether safety procedures and management arrangements are:

- documented
- implemented
- used as intended by the organisation
- effective.

3.5.2 Review and Improvement

Standard

The drilling contractor should regularly review the safety management system to assure the arrangements adopted are effective in meeting the drilling contractors policies and objectives.

The drilling contractor should demonstrate

- accountable senior management periodically review the effectiveness of the safety management system. The demonstration should indicate:
 - when reviews take place and who is involved
 - the sources of information used to determine if the system is adequate, policy is complied with and objectives are being met⁴⁹
 - how the drilling contractor makes use of the review
 - how outcomes are communicated to employees
 - what continuous improvement plans exist.

Guidance Note:. 49

Information that may be used in a management review include:

- changes to legislation
- changes in business objectives and expectations
- changes in business/operational activities
- changes in technology
- employee feedback
- results of audits and associated actions
- results of accident and incident investigations
- sampling of work practices
- sampling of safety perception/safety 'climate' (for example surveys)
- performance against objectives and targets
- review of community expectations

Information and benchmark data from other organisations and industries may also be used if appropriate.

**Mobile Offshore
Drilling Unit Safety
Case Guidelines
Formal Safety
Assessment**

Chapter 4

Contents

4.0 Introduction	99
4.1 Formal Safety Assessment Process	101
4.2 Hazard Identification	105
4.3 Hazard and Risk Assessment Studies	107
4.4 Assessment of Results	112
4.5 Risk Reduction Measures and Application of ALARP	114

4.0 Introduction

Aim

To provide guidance to drilling contractors in the preparation of the vessel formal safety assessment (VFSA) of the MODU safety case.

Scope

The guidelines detail six key elements that should form the basis of the vessel FSA methodology:

- process (technique)
- hazard identification
- hazard and risk assessment studies
- assessment of results
- hazard and risk reduction measures
- apply ALARP principles (assessment of tolerability and fitness for purpose).

These steps are shown in Figure 4.1: FSA schematic.

Structure of Guidance

An aim is specified for each element.

Prompts are grouped under the following categories as a guide to matters that would generally be expected to be included within the VFSA:

- methodology
- assumptions and data
- outcome and results.

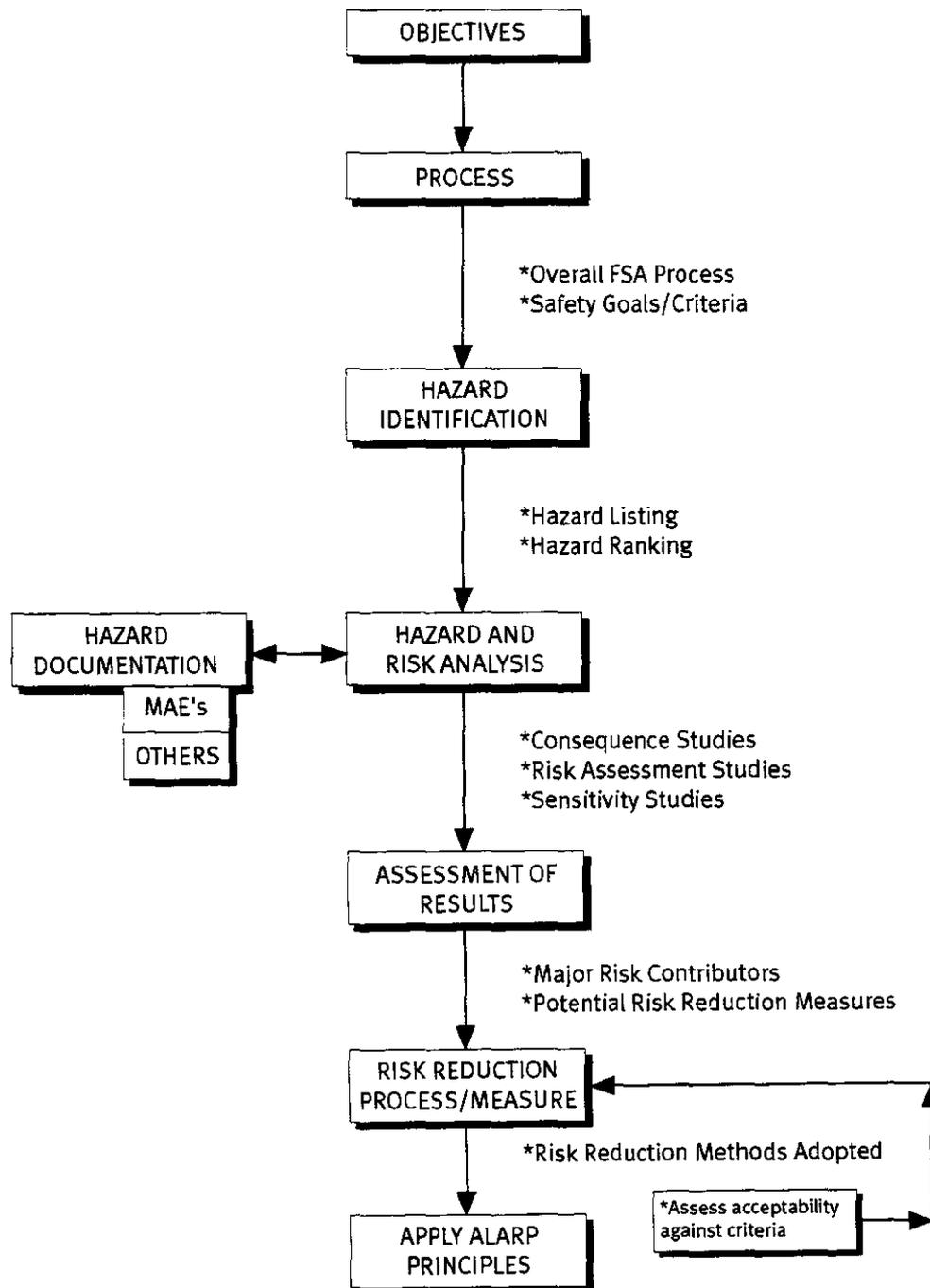
Employee Participation in FSA Studies

There should be a demonstration that there has been appropriate field based employee (or their representatives) involvement in the VFSA process to maximise opportunities to identify and control hazards.

Vessel Formal Safety Assessment Studies

The relative effort expended between vessel safety management system development/implementation and vessel formal safety assessment studies varies between vessels. The balance of effort should be discussed with the DA.

Figure 4.1: Formal Safety Assessment (FSA) Schematic



4.1 Formal Safety Assessment Process

Aim

To reduce Major Accident Event risk to as low as reasonably practicable (ALARP).

Including but not limited to a demonstration that:

- ***the exposure of employees on the vessel to hazards has been minimised, firstly through elimination of hazards; and secondly through control of remaining hazards***
- ***the integrity of the temporary refuge, protection and detection systems, escape routes, evacuation/embarkation points and lifeboats/liferafts is maintained and steps have been taken to ensure the safety of persons in the temporary refuge, in the escape routes and at the embarkation points until such time as all employees have reached a place of safety or left the vessel, whichever is first.***
- ***there are adequate facilities within the temporary refuge to expedite safe escape and evacuation of employees during a major accident event.***

Methodology

The drilling contractor should demonstrate that

- the FSA process adequately addresses⁵⁰
 - hazard identification
 - hazard and risk analysis
 - assessment of results; and
 - risk reduction measures
- initial VFSA results are based on the given vessel description and all drawings/documents are referenced in document control registers
- appropriate and competent employees are involved in the VFSA process.⁵¹
- appropriate quality assurance procedures are adopted in the development of the VFSA.

Assumptions

The drilling contractor should demonstrate that assumptions made in the VFSA are based on appropriate data, which:

- track change
- are referenced
- details geographical limitations
- are reasonable
- are justified for example by comparison with external data and/or references
- are reviewed by appropriate personnel;
- highlight modifications.

Outcomes and Results

The drilling contractor should demonstrate that the:

- VFSA process includes all assessments necessary for a comprehensive safety analysis for the defined activities
 - the analysis includes well testing
- risk goals and acceptance criteria are adequate and justifiable⁵³.

Guidance Note 50

The VFSA process typically includes the following elements:

- **Hazard Identification**

This step involves the identification of hazards at the vessel. The hazards are typically categorised into major groups such as hydrocarbon and non-hydrocarbon and sub groups of loss of well control, fire and explosion, dropped objects, structural failure, ship collision, loss of station, etc. A hazard register or similar document is then developed for all identified hazards.

The next step involves ranking identified hazards by their consequence and determining if they fall inside the definition of a major accident event. (see the definition of a major accident event in section 1.4). Hazards identified as potential major accident events are then carried forward to the assessment phase of the analysis.

The ranking process may rely solely on qualitative (judgemental assessment), or may include a degree of preliminary quantitative assessment (including an assessment of relative likelihood).

Guidance Note 50 (cont)**• Hazard and Risk Analysis**

Following identification of hazards and major accident events, analysis should then concentrate on the likelihood and the impact or consequences of the hazards relating to major accident events. These major accident event studies may be carried out using qualitative or quantitative techniques, or a combination of both.

These studies should typically address the following areas:

- fire and explosion hazards
- vulnerability of critical emergency systems
- impact on escape, evacuation and rescue
- temporary refuge integrity
- the impact of smoke and toxic gases
- other impacts for example storm, transportation and towing
- loss of stability
- vessel collision
- simultaneous operations

The drilling contractor should provide a description of the assumptions made during the hazard ranking process and during the more detailed assessment of major accident events. These assumptions may draw on the operator's and drilling contractors procedures described in the vessel safety management system and the vessel facility description components of the MODU safety case.

• Assessment of Results

The results of hazard and risk assessment studies should be used to identify and rank the major risk contributors. The results may be expressed in terms of consequence, personnel risk basis or a combination of both. Sensitivity studies should be carried out to assess the benefits of various risk reduction options, and/or when a change in the input assumptions markedly affects the results .

• Risk Reduction Measures

This step develops hazard and risk reduction measures to reduce overall risk from major accident events to as low as reasonably practicable. References to the vessel safety management system and facility description components of the MODU safety case should be made where appropriate.

• Apply ALARP Principle (Assess Tolerability and Fitness for Purpose)

This final step ensures that risk levels are as low as reasonably practicable (ALARP). This is often demonstrated by adopting risk reduction measures until their benefit is exceeded by their cost. This is usually done by cost benefit analysis (CBA).

The residual risk levels (after risk reduction measures are allowed for) needs to be checked against the organisation's risk acceptance criteria. Consideration should also be made of societal risk aversion to low frequency, high consequence events.

Guidance Note: 51

Design engineers require training in the principles of the safety case philosophy and risk based design and on their responsibilities and accountabilities in the process ie attendance at HAZIDS, ALARP workshops, HAZOPS etc. Specialist risk assessment and safety management expertise will be required and safety management expertise will be required in support of this process.

4.2 Hazard Identification

Aim

To demonstrate that the drilling contractor has systematically identified hazards (both hydrocarbon and non-hydrocarbon) associated with the vessel and that the selection of major accident event's is reasonable and justifiable.

Methodology

The drilling contractor should demonstrate:

- steps taken in the hazard identification process
- hazard identification processes and techniques used⁵²
- adequate resourcing of the hazard identification process
- comprehensive hazard identification documentation
- how the hazard identification approach meets the performance standards of the vessel safety management system
- hazards have been identified on both a compartment and systems basis
- appropriateness of the criteria used for selecting major accident events from the ranked hazard list
- the mechanism and extent of employee involvement in the hazard identification process.
- sources of information including its relevance, validity and currency used in identifying hazards.

Outcome and Results

The drilling contractor should demonstrate:

- a hazard register⁵³ or similar document which describes:
 - identified hazards and their causes
 - risk level
 - major accident events
 - control/mitigation and recovery measures
 - links to the vessel safety management system.

- steps undertaken to ensure that the hazards and major accident events listed in the hazard register are comprehensive enough for the vessel.
- the system for maintenance of the hazard register
- how identified corrective actions are documented for example remedial action list
- mechanisms in place to ensure remedial actions are assessed and closed-out.

Guidance Note 52

Hazard identification can be based on:

- safety reviews
- task based reviews
- industry experience
- operations experience
- audits
- employee involvement
- incident/hazard investigations/reports
- ALARP workshops

In addition, there are several well-recognised hazard identification techniques:

- Hazard and operability study (HAZOP)
- 'what if?' analysis
- checklist
- failure mode and effects analysis (FMEA)
- human factor analysis.

Guidance Note 53

When assessing the hazards register and the major accident events, cross reference should be made to:

- the vessel safety management system to ensure that assumptions concerning safety management and the input assumptions for the VFSAs are consistent; and
- the vessel facility description to ensure the hazards register is consistent with the operations and function of the vessel.

Hazard categories identified could include:

- fire / explosion, for example loss of well control
- toxic substances release eg H₂S
- non-hydrocarbon type hazards, for example dropped objects, helicopter incident
- external hazards, for example ship collision.

4.3 Hazard and Risk Assessment Studies

Aim

To determine the consequences of identified major accident events and the likelihood with which these events may occur with respect to the safety of employees.

Methodology

The drilling contractor should demonstrate:

- the systematic approach used for the analysis of major accident events⁵⁴
- that the type and extent of VFSA studies undertaken are commensurate with the type of vessel and the major accident events that have been identified⁵⁵
- the relationship between all the studies which have been completed detailing linkages
 - between the studies to ensure an appropriate use of common data
 - to the operator's safety management system
- the use and choice of analytical tools⁵⁶.

Assumptions and Data

The drilling contractor should demonstrate:

- the assumptions for physical/climatic data including the geographic limits for the data. The basis for the selection of data (including its relevance and currency) should be identified and justified⁵⁷.

Outcome

The drilling contractor should demonstrate

- the likelihood and consequence of all identified major accident events
- the mechanism for evaluating major accident events including:
 - integrity of the temporary refuge
 - availability of escape routes
 - integrity of safe evacuation and rescue systems
 - escalation potential.

- that integrity assessments are consistent with the physical features of the vessel described in the vessel facility description⁵⁸. Document control systems should ensure that
 - the assessment team have the latest design information
 - a given assessment can be traced back to a specific vessel facility description.
- that sensitivity analyses have been conducted to determine the adequacy of critical input assumptions⁵⁹
 - sensitivity analyses have improved the quality of the results
 - sufficient critical variables been tested for their sensitivity
- assessment have been undertaken by competent analysts
- where assessments are not conducted inhouse, the mechanism which ensured there will be sufficient knowledge of the assessment tools to manage the on-going maintenance of risk assessment
- the mechanism to verify software model results
- that adequate provision has been made to protect employees from the consequences of major accident events.
- that identified hazards and major accident events are reasonably in line with findings from industry hazard identification for similar vessels.

Guidance Note 54

Acceptable methods for analysis of hazards include qualitative comparisons and the use of quantitative analysis. The analysis methodologies should develop step by step description detailing how the:

- energy or toxic capacity of each identified hazard can be realised (with particular emphasis on hazards linked to major accident events)

emergency systems needed to protect employees from serious injury or death may be impaired, and how the employees on, or escaping from the vessel may be affected.

Guidance Note 55

Studies undertaken should include an analysis of major accident events. Typically, these studies should assess (where applicable):

- extreme climate events such as storms, tsunamis and earthquakes
- hydrocarbon releases frequency/size/duration, explosions, smoke and fires, including jet fires
- external events such as ship collision
- toxic release exposures
- dropped objects
- loss of stability
- loss of well control

For hydrocarbon/flammable events, where applicable, the following aspects of the event and its consequences could be analysed:

- release frequency
- directional nature of event
- ignition probability
- flame effects - emissivity, surface extent, width and length, and the radiation levels at various distances from the flame surface
- smoke generation
- blast effects
- toxicity;
- other employee impairment mechanisms
- population distribution to cover other operating conditions, simultaneous operations (SIMOPs) and campaign maintenance.

The studies should also include an analysis of the ability of critical control and safety equipment to continue functioning under the conditions identified in the analysis of major accident events. The analysis should demonstrate that a series of logical scenarios has been developed to determine which critical safety systems will be required for the preservation of life during any major accident event.

An analysis of the functionality of the escape, evacuation and rescue routes, and facilities should be completed. For a new vessel this may be conducted using a simulation; for existing vessel's a simulation or a scenario-based approach may be followed.

The analysis should show the probable location of employees at the start of any incident and justify those locations. The analysis should show for each of the scenarios, or for the whole of the simulation, both the assessed and probabilistically analysed fractional fatalities. These may be split into immediate, delayed or evacuation and rescue. The possible impairments to the vessel, equipment or escape route, which may cause loss of life, should be described, so that alternatives can be evaluated as part of the process of minimising risk.

Guidance Note 55 (cont)

The hazard and risk assessment studies should consider the vulnerability and endurance under major accident event conditions of the following, as a minimum:

- well control system
- temporary refuge boundaries and its impairment (whether outside or inside)
- emergency shutdown systems
- fire water system, including the fire pump system
- emergency communication systems
- emergency power systems
- escape, evacuation and rescue system
- life saving equipment
- ballast and other emergency control systems
- life saving equipment

Guidance Note 56

Typical tools, which are used, include proprietary software products and spreadsheet-based software. New software is regularly released and therefore it is inappropriate to define what software should be used. However, the use by the drilling contractor of new or untested software, or unprotected spreadsheets / models, should be evaluated. The assessment of new software should either be an audit of the results obtained using a known and accepted software package, or by review of the software assumptions and appropriateness of application and the software developer's quality control system. Also important is the application of principles by the person using the package with respect to checking input data to models, especially with spreadsheets.

Guidance Note 57

Typical examples of justification of data selection include:

- Australian experience
- overseas experience
- logical argument.

When a number of information sources provide different data on the same subject, such as the range of release frequencies quoted in different databases, the drilling contractor should provide information which shows why the selected data are the most appropriate for the application. Sensitivity studies should be considered over the credible range of frequencies.

The drilling contractor should adopt a system of checking the work of analysts to ensure the appropriate choice and application of data, and the validity of output.

Guidance Note 58

At any stage in the analysis a given study should be able to be traced back to a defined vessel facility description. The design will be ever changing: this requires good document control to ensure that the risk engineers have the latest documents.

Guidance Note 59

Sensitivity analyses are usually used as part of a quantitative risk assessment (QRA) to test the effect of the input assumptions on the QRA results and thus qualify confidence in the numerical results.

If, for example, varying an input assumption by an order of magnitude has little impact on the results, then usually the input assumption need not be subject to further scrutiny.

If, on the other hand, an order of magnitude variation in the input assumption has a similar effect on the results of a particular event, then the validity of the results is highly dependent on the validity of that input assumption. In this case, the quality of the input assumption should be re-considered. If there is high confidence in the value selected, then no further scrutiny would normally be required. If, however, there is low confidence in the input assumptions, there should be a demonstration as to how the lack of certainty has been dealt with as part of assessing and presenting the results of the analysis.

4.4 Assessment of Results

Aim

To demonstrate that the drilling contractor has properly assessed the results of the hazard and risk assessment studies and has identified major risk contributors.

Methodology

The drilling contractor should demonstrate

- how analysis results have been used
- the review mechanism for the analysis results⁶⁰
- the impact of the analysis results on confidence.

Assumptions And Data

The drilling contractor should demonstrate

- what assumptions, if any, have been made in assessing the results.

Outcomes

The drilling contractor should demonstrate

- the mechanism for identifying major risk contributors⁶¹
 - qualitatively – for example risk matrix
 - quantitatively - including potential loss of life (PLL), individual risk per annum (IRPA)⁶²
- The mechanism for communicating the results of the hazard and risk assessment studies, identification of major risk contributors, and potential risk reduction measures to employees.

Guidance Note 60

The analysis should:

- address uncertainties in the key assumptions
- ensure adequate sensitivity analyses are conducted to ensure confidence in the results
- identify the major risk contributors
- identify and justify risk reduction measures which have been considered and those which were rejected
- demonstrate that risk is as low as reasonably practicable
- consider societal risk aversion for credible events with very high consequences.

Guidance Note 61

Demonstrate a clear understanding of the major risk contributors:

- are there several events contributing equally to risk or is the risk dominated by a single (or few) scenario(s)?

Demonstrate a clear understanding of the reasons why each identified event is a major risk contributor for example:

- high frequency of serious consequences
- occurs in the immediate area of the temporary refuge
- occurs during evacuation, escape and rescue.

Any escalation mechanism contributing significantly to risk should be identified. Examples of escalation mechanisms include:

- vessel or structural failure due to fire impingement; and
- explosive damage causing the incident to escalate or a safety system to become inoperative.

Guidance Note 62

The quantified risk assessment (QRA) should be reviewed with the knowledge that QRA is not an exact analytical tool. Despite advances in techniques and input data quality in recent years it remains, principally, a comparative tool.

The results from QRA are highly dependent on the quality of the input assumptions and the integrity of the modelling of the sequence of events that follows an initiating occurrence.

QRA does aid risk assessment and control measure evaluations, however it should not be used in isolation; it should be used in conjunction with other types of qualitative and engineering assessments.

Reliance on the use of QRA in absolute terms should generally be avoided. QRA can be used with more confidence when comparing the risk reduction benefits of two or more alternatives.

4.5 Risk Reduction Measures and Application of ALARP

Aim

To demonstrate that appropriate risk control measures have been adopted to reduce risk to personnel to as low as reasonably practicable .

Methodology

The drilling contractor should demonstrate

- the criteria for selection of risk reduction measures
- adequate employee consultation in the selection of risk control measures
- the range of risk reduction measures considered⁶³.

Assumptions And Data

The drilling contractor should demonstrate:

- the assumptions (if any), in selecting the risk reduction measures.

Outcome

The drilling contractor should demonstrate:

- risk control measures for major accident events (where appropriate) are identified⁶⁴
- that appropriate risk reduction measures have been adopted for each major accident event until risk has been reduced to as low as reasonably practicable⁶⁵
- the application of a hierarchy of risk reduction measures for example elimination, prevention, control, mitigation and recovery
 - the implementation plan and time frame for the introduction of selected risk reduction measures
- how control measures are linked and referenced to the vessel safety management system and vessel facility description⁶⁶.

Guidance Note 63

The process for determination of risk reduction measures should be detailed. The risk reduction measures will aim to do one of the following:

- remove the hazard
- decrease the initiating event frequency
- decrease the consequences of the initiating event
- decrease the potential for escalation; or
- increase the probability of successful escape, evacuation and rescue.

The drilling contractor should ensure that risk reduction measures have been considered for all major risk contributors and that the measures considered include either hardware changes or vessel safety management system solutions, or both.

Risk reduction measures are specific to a vessel. Measures which might be considered include decreasing the vulnerability of: emergency systems, well control, ballast and stability system, temporary refuge, control room and communications centre during major accident events.

Increased benefits can come from early adoption of risk reduction measures. Incorporating the measures early in design can often remove the hazards altogether and lead to inherently safer design.

Guidance Note 64

Measures available for the elimination, prevention, control, mitigation or recovery of hazard are shown below.

Elimination

Designing out the hazard should be the first priority. If designing out is not possible, consideration should be given to the following risk reduction measures.

Prevention Measures

Sequences of events that may result in major accident events occurring should have already been identified and discussed. To ensure the safe operation of the vessel, measures should be considered to prevent the initiation of each of these sequences.

The discussion concerning the measures should take the form of a structured, qualitative argument which should take into account relevant employee input.

The discussion should also include consideration of the management system as applied to the following typical list:

- design procedures
- quality assurances
- inspection
- maintenance

Guidance Note 64 (cont)**Control Measures**

It may not be possible to prevent the initiation of all the sequences of events that could lead to a major accident event. In cases where preventive measures are not possible, risk reduction measures should be considered to prevent or reduce escalation. These measures act to intervene at some point in the sequence of events, in an attempt to control and contain the developing situation before a major accident event occurs.

Risk reduction measures could include:

- well control system
- fire and gas detection/protection
- emergency shutdown systems - manual or automatic
- pressure relief systems
- ventilation
- liquid dumping
- ignition control.
- well control
- station keeping system
- anti-collision devices.

Mitigation Measures

It may not always be possible to intervene in the sequence of events to avoid the major accident event starting. In such cases measures should be taken to mitigate and minimise the consequences of the major accident event. Such measures will have effect only after the major accident event has started.

Such measures could include:

- alarm system
- public address/communications system
- fire protection - active and passive
- temporary refuge
- escape and evacuation procedures
- procedures
- protective personal equipment (PPE).

Recovery Measures

Dealing with a major accident event includes returning to normal operations. Return to normal operations can be hazardous. Plans which address return to normal operations could include:

- recovery measures
- making the vessel safe; and
- repair, testing and recommissioning.

Guidance Note 64 (cont)**Remedial Measures**

During the VFSA studies, the results may show that some hazards will not have been adequately managed. In such cases, further risk assessment may need to be carried out to investigate what remedial work is required.

Remedial work may take the form of engineering modifications, changes to procedures or to system controls.

It is possible that engineering modifications are not reasonably practicable (for example elimination, intensification, alleviation, substitution and simplification). In such cases, more reliance may have to be placed upon procedural or system controls. These controls should provide equivalent levels of risk reduction compared to engineering modifications. The level of residual risk needs to be linked to the drilling contractor's risk acceptance criteria, and the vessel safety management system for its management.

Guidance Note 65

The drilling contractor should show that the risk to employees is as low as reasonably practicable by describing risk reduction measures and showing that the cost associated with adopting further control measures is disproportionate to the accrued benefits.

The assessment of the benefit of each risk reduction measure should take into account:

- risk from implementation of the measure
- the risk in installing and maintaining the measure (particularly relevant for sub-sea measures)
- the reduction in other forms of risk such as environmental, asset, business interruptions and reputation that follow as a consequence of the risk reduction measures.

The effectiveness of risk reduction measures may be determined individually and in groups. It is possible that risk reduction measures may not be independent.

Cost alone should not be the sole criteria for adopting (or not adopting) risk reduction measures. Results of qualitative processes such as the ALARP workshops (including regulator participation where possible) should also be taken into consideration.

The drilling contractor should demonstrate that the employees carrying out activities have been adequately consulted as to their safety implications.

Guidance Note 66

The equipment system and procedures which help eliminate, detect or control identified hazards should be included in this review. Many should be covered in the vessel safety management system or vessel facility description for example:

- well control system
- fire and gas detection systems
- heating, ventilation, air conditioning (HVAC) and maintenance system(s)
- emergency shutdown system
- fire protection system (active and passive)
- PSV and pressure vessel inspection system
- corrosion monitoring
- crane safety system
- work management and maintenance system
- stability and station keeping
- anti-collision system.

The nominated testing and maintenance frequencies and required performance standards for these various systems should assure the performance and reliability assumed in the VFSA (for example regular testing of firewater pump systems).

The drilling contractor should demonstrate that the employees carrying out activities have been adequately consulted as to their safety implications.

Mobile Offshore Drilling Unit Safety Case Guidelines Bridging Document

Chapter 5

Contents

5.0 Introduction	121
5.1 Site Description	123
.1 Site Description	123
.2 Primary Functions	124
.3 Hazardous Substances and Inventories	125
.4 Safety Features and Systems	125
.5 Drawing Set	126
5.2 Safety Management System	127
.1 Policy and leadership	130
.2 Organisation and Responsibility	131
.3 Employee Involvement and Communication	132
.4 Resources	133
.5 Hazard Identification and Risk Management	136
.6 Objectives, Plans and Performance Standards	137
.7 Sources of Information	138
.8 Management System Documentation	139
.9 Design Construction and Commissioning	142
.10 Management of Change	143
.11 Purchasing and Control of Materials and Services	144
.12 Safe Operational Procedures	145
.13 Materials handling	146
.14 Maintenance and Repair	147
.15 Employee Selection Competency and Training	148
.16 Workplace Environment	149
.17 Emergency Response	150
.18 Inspection, Testing and Monitoring	152
.19 Health Monitoring System	153
.20 Health and Safety Information and Reports	154
.21 Safety Management System Audit	156
.22 Review and Improvement	157
5.3 Formal Safety Assessment	158
Appendix Acknowledgments	159

5.0 Introduction

Aim

To assist operators in the preparation and submission of a MODU bridging document.

Preparation of a MODU Bridging Document

In the development of the bridging document there should be consultation between operator, drilling contractor, service contractor and employees and ongoing consultation with the Designated Authority (DA).

It is the operator's responsibility to ensure that the bridging document adequately covers intended well operations and is complete.

The bridging document should contain:

- site description - well and vessel description, and other general information.
- safety management system (SMS)- integrated, linked SMS for operator/drilling contractor.
- formal safety assessment (FSA) - hazards and risk levels associated with the campaign.

The level of detail in the bridging document should be commensurate with the hazards of the campaign.

Submission of the Bridging Document

Provided the vessel safety case has already been submitted to the DA, it will not be necessary to resubmit it, as part of the MODU safety case. Only the bridging document will have to be submitted in this instance.

Drilling can not commence prior to the acceptance of the MODU safety case.

Example Submission of a Safety Case for a MODU

The operator should submit a site specific bridging document, which effectively demonstrates that:

- adequate arrangements have been made to co-ordinate safety management system's between the operator, drilling and other contractors; and
- any new or changed hazard or site specific risks arising from the proposed operations are detailed in a formal safety system and the control measures identified are adhered to.

Revision of a Bridging Document

Information contained in the MODU safety case, and thus the vessel safety case and bridging document should be kept up to date.

5.1.0 Site Description

Aim

To assist operators and drilling contractors in describing the site which also applies to the support services

(NB: The information required for this section of the bridging document need only be referenced to where it can be found in existing documentation.)

5.1.1 General Description of Site

Aim

To provide a description of the drilling site, including general description of the vessel, and wells.

Metocean Conditions

Aim

To describe the metocean conditions expected at the location for the duration of the campaign

Scope

The metocean section may include the following

- wave/current conditions
- wind
- seawater/air temperature
- storm/cyclone
- earthquakes
- seabed stability

General

- geographical location
- water depth

Well Layout

- well equipment (eg wellhead, casing strings, tubulars)
- well structural details, including calculations of the structure and loadings.

5.1.2 Primary Functions

Aim

To provide details of the functions of the well and vessel.

(The support services are usually the responsibility of the operator).

Scope

The primary functions section should include details of the following:

- the function of the wellhead and downhole equipment and the extent and type of activity
- the marine functions and systems for the following vessels:
 - supply
 - standby
 - diving
- helicopter operations
 - onshore base
 - capability of aircraft
 - helicopter availability (for example search and rescue)
 - flight following.

5.1.3 Hazardous Substances and Inventories

Aim

To summarise all hazardous substances and inventories to be stored and/or handled on the facility.

The hazardous substances that will normally be stored and/or handled on the vessel should be described in the vessel safety case. If hazardous substances are introduced because of well activities or are used in the drilling of a well and they have not been covered in the vessel safety case then they should be described.

Scope

The hazardous inventories section should cover at least the following:

- drilling fluid and cementing chemicals
- reservoir fluids
- well testing fluids
- equipment containing hazardous materials used in the drilling of a well (for example logging tools containing radioactive isotopes)
- explosives
- compressed gases.

5.1.4 Safety Features and Systems

Aim

To provide a description of the safety features, design safety philosophy, and features that relate to the well.

Scope

The safety features should include the casing program, mud program and other programs or systems implemented by the drilling contractor and operator to ensure the safety of personnel (for example shallow gas seismic program and well control).

Links

Where additional equipment is brought onto a vessel for well operations the interface points should be described and references made to the appropriate safety management system links.

5.1.5 Drawing Set

Aim

To provide key equipment layouts, process flow and safety equipment.

Drawings for the vessel that detail the key process equipment, process flow, safety equipment, escape routes and protective system drawings should be found in the vessel safety case. Modifications to the vessel for a specific campaign should be in the bridging document, if they will be removed at the end of the campaign.

Modifications that will be permanent may initially be in a bridging document but should subsequently be in the vessel safety case.

Scope

A typical drawing set would include the vessel drawings and could include:

- well location map
- wellhead details and well structural layout/arrangement
- well testing equipment layouts and safety systems.

Links

Where significant additional equipment, which may have safety implications, is brought onto a vessel for a campaign the interface points should be shown on the appropriate drawings.

5.2 Safety Management System

Aim

To provide guidance in the preparation of the bridging safety management system (SMS) of the MODU safety case.

Scope

The description of the bridging SMS should demonstrate that risks associated with the MODU are managed for continuous improvement.

Key Element

Leadership and Commitment

Aim

The operator should demonstrate commitment to achieving a high standard of health and safety during the campaign through the effective implementation of linked health and safety policies.

- The operator and drilling contractor have jointly agreed their safety policy to ensure possible conflict
- The safety policy and management objectives demonstrate that both parties have a commitment to controlling of hazards and that on the whole to as far as reasonably practicable
- Obligations and responsibilities have been specified for the operator and drilling contractor personnel for the implementation of their agreed safety policy and objectives - during the campaign - that will maintain effective health and safety management systems at the facility
- The means of communicating to the personnel involved in the operations, the policies and objectives of the campaign and their responsibilities and obligations while on site have been specified
- Appropriate roles and responsibilities from both parties have been specified for controlling the implementation and maintenance of the health and safety policies
- There are mechanisms in place for which senior management are held accountable for achievement of the health and safety objectives established in their respective policies
- There are mechanisms that promote the active involvement of all employees in achieving policy objectives

5.2.1 Policy and Leadership

Standard

The linking of the operator and drilling contractor SMSs must not create conflicts between their policies and objectives. The operator's and drilling contractor's health and safety policies should be supported by a high level commitment to effective risk and safety management consistent with and at least equal to other business aims.

Links

The bridging document should demonstrate that:

- the operator and drilling contractor have jointly reviewed their safety policies to manage possible conflicts
- the safety policies and management objectives demonstrate that both parties have a commitment to controlling of hazards and risk on the facility to as low as reasonably practicable
- obligations and responsibilities have been specified for the operator and drilling contractor personnel for the implementation of their agreed safety policies and objectives - during the campaign - that will maintain effective health and safety management systems at the facility
- the means of communicating to the personnel involved in the operations, the policies and objectives of the campaign and their responsibilities and obligations while on site have been specified
- appropriate senior managers from both parties take direct responsibility for coordinating the implementation and maintenance of the health and safety policies
- there are mechanisms by which senior managers are held accountable for achievement of the health and safety outcomes established in their respective policies
- there are mechanisms that promote the active involvement of all employees in achieving policy objectives.

5.2.2 Organisation and Responsibility

Standard

The operator should develop an effective organisational structure (roles and responsibilities) for implementation and maintenance of the health and safety policy during the campaign.

Links

The bridging document should demonstrate that:

- the organisation structure for the site and onshore support, during the campaign, and the reporting relationships between the operator and drilling contractor is clearly defined
- the roles and responsibilities for the management of safety activities during the campaign, for the involved personnel, are defined.
- the roles and responsibilities of key positions in the operation are defined for example
 - operator senior representative
 - person in command
 - support vessel captain
 - support service personnel
- procedures and systems are defined for the communication to personnel of:
 - technical information
 - drilling and work program information
 - safety information
- the systems and procedures for communicating to new personnel, their role and responsibilities for health and safety during the campaign are in place
- sufficient personnel with appropriate skills are available to perform the campaign and deal with emergencies.

5.2.3 Employee Involvement and Communication

Standard

The operator and drilling contractor should develop and maintain effective participation and consultative mechanisms during the campaign that promote active communication and involvement of all personnel in the management of safety, the control of workplace hazards and risk and the development of the safety case.

Links

The bridging document should demonstrate that:

- formal health and safety consultative mechanisms are in place for the campaign
- safety representatives and or safety committees are elected or established in accordance with the relevant health and safety legislation applying to the campaign
- mechanisms exist for involving personnel in the day-to-day management of hazards identification, risk assessment, risk minimisation and residual risk control during the campaign
- formal and informal methods of communication are used to inform personnel of health and safety issues, the relevant safety systems and objectives of the campaign.

5.2.4 Resources

Standard

The operator and drilling contractor should ensure sufficient resources to develop, implement and maintain the linked SMSs.

Links

The bridging document should demonstrate that both parties have sufficient resources (financial, human, and specialist advisers) for the campaign to:

- implement the health and safety policy,
- integrate the operator's and drilling contractor's SMS and
- maintain and improve the linked SMSs.

Key Element

Planning

Aim

The operator should demonstrate a systematic approach to the management of campaign hazards and risk through the identification and assessment of campaign specific hazards and risk, the establishment of objectives, plans and performance standards, and the development of adequate documentation.

- The operator should demonstrate a systematic approach to the management of campaign hazards and risk through the identification and assessment of campaign specific hazards and risk, the establishment of objectives, plans and performance standards, and the development of adequate documentation.
- The operator should demonstrate a systematic approach to the management of campaign hazards and risk through the identification and assessment of campaign specific hazards and risk, the establishment of objectives, plans and performance standards, and the development of adequate documentation.
- The operator should demonstrate a systematic approach to the management of campaign hazards and risk through the identification and assessment of campaign specific hazards and risk, the establishment of objectives, plans and performance standards, and the development of adequate documentation.
- The operator should demonstrate a systematic approach to the management of campaign hazards and risk through the identification and assessment of campaign specific hazards and risk, the establishment of objectives, plans and performance standards, and the development of adequate documentation.

5.2.5 Hazard Identification and Risk Management

Standard

The operator and drilling contractor should have procedures in place for the systematic review of health and safety hazards and risk for the duration of the campaign.

Links

The bridging document should demonstrate:

- policies, standards and procedures are in place for the systematic identification, assessment and control of hazards and risk associated with all aspects of the campaign
- additional hazard identification and risk assessment has been carried out for campaign specific hazards not covered in the vessel safety case
- the hazards for the campaign are documented in a hazard register or similar document
- an agreed system for review of hazards and associated corrective actions is in place
- the roles and responsibilities defined for carrying out hazard identification, risk assessment and the implementation of acceptable controls are in place for the campaign.

5.2.6 Objectives, Plans and Performance Standards

Standard

The operator should establish, maintain and monitor measurable and achievable health and safety objectives, plans and performance standards for the campaign.

Links

The bridging document should demonstrate:

- measurable and achievable health and safety objectives, have been developed, documented and implemented for the campaign
- achievements against objectives are reviewed
- plans and performance standards are established for the implementation of objectives and targets for the campaign
- plan implementation is monitored and performance against standards is appraised
- management is held accountable for meeting health and safety performance standards
- health and safety objectives, plans and performance standards and the subsequent level of achievement are communicated to all personnel and parties involved in the campaign.

5.2.7 Sources of Information (Legislative and other Standards)

Standard

The operator should develop, implement and maintain procedures for the identification, collection, review and dissemination of information and standards relevant to the safe conduct of the campaign.

Links

The bridging document should demonstrate that:

- procedures and arrangements are in place - for the duration of the campaign - for the routine identification, collection, update and effective communication of information relevant to health and safety.

5.2.8 Management System Documentation

Standard

The operator and drilling contractor should maintain accessible documented SMS - linked for the campaign - and integrated with other management systems.

Links

The bridging document should demonstrate:

- manuals, procedures, plans, and drawings exist in either hard copy or electronic form for the management of health and safety and control of risk during the campaign.

Key Element

Implementation

Aim

The operator should demonstrate hazards associated with the campaign are controlled, and arrangements are in place for responding to emergencies.

- design of well or operations at the vessel associated with the campaign, including work systems and activities, is properly managed through
- use of appropriate systems and procedures ensuring coordination between the operator and contractors
- selection of competent personnel
- hazards identification and risk assessment at each design stage are clearly defined
- use of design specifications which incorporate the campaign safety objectives
- formal design reviews
- independent verification of significant hardware and systems changes
- hazards and risks associated with construction and commissioning are identified, assessed and controlled.

Note:

Only activities that will take place on the lease location where the campaign will take place need to be covered within the drilling document

5.2.9 Design, Construction and Commissioning

Standard

The operator should demonstrate that hazards and risk associated with the design, construction and commissioning of well(s) or vessel modifications for the campaign are eliminated, or reduced to as low as reasonably practicable.

Links

The bridging document should demonstrate:

- design of well(s) or modifications to the vessel associated with the campaign, including work systems and activities, is properly managed through:
 - use of appropriate systems and procedures ensuring coordination between the operator and contractors
 - selection of competent personnel
 - hazards identification and risk assessment at each design stage are clearly defined
 - use of design specifications, which incorporate the campaign safety objectives
 - formal design reviews
 - independent validation of significant hardware and systems changes
- hazards and risk associated with construction and commissioning are identified, assessed and controlled.

Note:

Only activities that will take place on the lease location where the campaign will take place need to be covered within the bridging document

5.2.10 Management of Change

Standard

The operator should ensure changes and modifications associated the campaign are reviewed for hazards and risk prior to implementation and information on change requirements are communicated to all relevant employers and stakeholders.

Links

The bridging document should demonstrate:

- various management of change systems used during the campaign cover all aspects of activities associated with the campaign and are properly linked
- arrangements are in place for controlling permanent and temporary engineering, organisational, and work activity modifications and changes for the campaign
- changes and modifications are communicated to relevant employees.

5.2.11 Purchasing and Control of Materials and Services

Standard

The operator should ensure that appropriate arrangements for the control of purchased services and materials exist during the campaign in order to minimise additional hazards.

Links

The bridging document should demonstrate:

- procedures for the selection of contractors incorporate a review of safety requirements in accordance with the safety requirements of the tender specification
- arrangements are in place for the review and integration of the operator, drilling contractor and other contractors safety management systems prior to commencement of the campaign. The demonstration should detail:
 - mechanisms to involve all contractors involved in the campaign in hazard identification and risk assessment
 - arrangements for communicating safety related issues between all parties involved in the campaign
 - how responsibilities for emergency response are assessed and allocated arrangements in place for assuring contractor competence
- procedures and arrangements for monitoring the performance of contractors during and on completion of the contract or the campaign
- purchase specifications and or purchase orders associated with the campaign incorporate health and safety requirements
- procedures are in place for the inspection and verification of materials supplied against the purchase specification
- arrangements are in place for the review of operating procedures and practices when purchases have health and safety risk implications
- personnel are informed of health and safety implications associated with purchases during the campaign

5.2.12 Safe Operational Procedures

Standard

The operator should ensure that operational procedures exist that effectively manage risk arising from the campaign.

Links

The bridging document should demonstrate:

- operating and maintenance procedures have been updated and linked for all key work activities and equipment, which may require interaction between two or more companies.
- if more than one procedure exists for the same activity (for example well control, permit to work), applicability of each is clearly defined and communicated to the appropriate personnel
- arrangements in place for obtaining feedback on and reviewing the adequacy of operational procedures. The demonstration should indicate employees responsible for task execution are involved in the review.
- procedures exist for the control of safety critical simultaneous and non-routine activities specific to the campaign.

5.2.13 Materials Handling

Standard

The operator should demonstrate that all companies involved in the campaign have in place safe systems for handling and storing of materials and movement of personnel.

Links

The bridging document should demonstrate:

- An integrated system is developed, implemented and maintained for safe storage of materials and movement of materials and personnel during the campaign
- Procedures relevant to the campaign have been updated and communicated to the relevant personnel to ensure that all activities associated with storage of materials and movement of materials and personnel are covered

5.2.14 Maintenance

Standard

The operator should ensure that all companies involved in the campaign have effective systems of maintenance to guarantee the safe operation of their equipment.

Links

The bridging document should demonstrate:

- standards and procedures are in place for maintaining plant, equipment and facilities for all companies involved in the campaign
- inspections, maintenance, repair and plant alteration records are established and maintained by all parties involved in the campaign. A review of those records should be conducted for all third party equipment prior to or on its arrival at the site
- procedures are in place for the review of hazards and risk associated with maintenance activities and tasks that may take place during the campaign
- procedures are in place for the periodic review of action against maintenance schedules to verify critical plant maintenance is being undertaken and equipment is safe before being returned to service
- procedures are established for the reporting, isolation and withdrawal of unsafe plant and equipment from service.

5.2.15 Employee Selection, Competency & Training

Standard

The operator should ensure that personnel selected for the campaign are trained and competent.

Links

The bridging document should demonstrate:

- all companies involved in the campaign have procedures which specify:
 - selection and placement of competent personnel
 - competency and health and safety training
 - allocation of resources for training
 - periodical assessment of competency requirements and training needs
 - mechanism for communicating roles and responsibilities to employees
- Training records are maintained.

5.2.16 Workplace Environment

Standard

The operator should demonstrate that facilities and processes are in place to ensure and promote safe work environment during the campaign.

Links

The bridging document should demonstrate:

- All companies involved in the campaign address (where applicable):
 - atmospheric contaminants
 - housekeeping
 - lighting and ventilation
 - noise and vibration
 - sign posting
 - personal protective equipment
 - temperature extremes
 - hygiene
 - radiation
 - working hours
 - basic amenities

5.2.17 Emergency Response

Standard

The operator should implement effective emergency response arrangements for the duration of the campaign.

Links

The bridging document should demonstrate:

- the operator and drilling contractor emergency response systems are linked
- organisation charts exist that show the lines of communication and chain of command during an emergency
- all potential emergencies during the campaign are identified and procedures and facilities exist for mitigating their effects. The demonstration should indicate:
 - a schedule of emergency drills and exercises to be conducted during the campaign.
 - all personnel are competent to perform their roles during an emergency
 - procedures are established for communicating emergency response arrangements to personnel
- the effectiveness of the emergency response arrangements for the campaign is periodically assessed.

Key Element

Monitoring and Evaluation

Aim

The operator should demonstrate that facility, plant, process, work systems and management arrangements are measured, monitored and evaluated during the campaign and where deficiencies are identified, corrective actions are implemented.

- procedures have been modified/linked for equipment which require interaction between the personnel of two or more companies during inspection, testing or monitoring
- inspection and test of safety-critical and complex systems (test control and mitigation devices) are regularly conducted
- inspection reports contain recommendations for the prohibition and implementation of corrective actions
- responsibility for implementing corrective actions arising from inspection reports is assigned to specific personnel
- arrangements exist for verifying corrective actions have been completed
- inspection and testing results are periodically reviewed and used in assessment of the work practice

5.2.18 Inspection, Testing and Monitoring

Standard

The operator should ensure that all companies involved in the campaign have effective systems of inspection, testing and monitoring to maintain their equipment and working environment in optimum condition.

Links

The bridging document should demonstrate:

- inspection, testing and monitoring systems exist for equipment to be used during the campaign
- procedures have been modified/linked for equipment, which requires interaction between the personnel of two or more companies during inspection, testing or monitoring
- inspection and test of safety critical and campaign specific risk control and mitigation devices are regularly conducted
- inspection reports contain recommendations for the prioritisation and implementation of corrective actions
- responsibility for implementing corrective actions arising from inspection reports is assigned to specified personnel
- arrangements exist for verifying corrective actions have been completed
- inspection and testing results are periodically reviewed and used in assessment of the work priorities.

5.2.19 Health Monitoring System

Standard

Companies involved in the campaign should monitor and evaluate the employee health effects of the work environment on the health of employees.

Links

The bridging document should demonstrate that:

- links exist between the operator and contractor health systems
- systems, which identify employee health surveillance requirements, and procedures for conducting surveillance exist
- where required by legislation, the health of employees exposed to specified hazards is monitored and recorded
- employee health monitoring records are periodically reviewed and programs are established to reduce health risk
- pre-employment, return to work after sickness and periodic health assessments are carried out on employees.

5.2.20 Health and Safety Information and Reports

Standard

The operator should maintain a system for the analysis, dissemination, storage/archiving and retrieval of information relevant to campaign health and safety.

Links

The bridging document should demonstrate:

- operator and contractors have procedures in place for the collection, maintenance, and confidential retention of employee health and safety records
- documents and data relevant to health and safety are collected, disseminated, filed and retained. The demonstration should indicate:
 - procedures exist for the collection and analysis of health and safety performance data. The operator should describe the lead and lag indicators used for measuring health and safety performance during the campaign.
 - regular reports on health and safety performance are produced and disseminated to relevant personnel

Key Element

Auditing and Review

Aim

The operator should demonstrate the system for managing health and safety risk during the campaign is implemented, effective and continually improves.

- An audit program and procedures - covering the campaign - are established, implemented and maintained to verify that the campaign health and safety management arrangements are being operated to a high performance standard.
- Operators and contractors' audit activities are synchronized under one campaign audit program.
- Procedures exist for the reporting of audit results and the implementation of corrective actions.
- Key relevant employees are involved in the audit process.

5.2.21 SMS Audit

Standard

The operator should periodically verify the operation of the campaign safety management arrangements.

Links

The bridging document should demonstrate

- an audit program and procedures – commensurate with the risk level identified for the campaign - are established, implemented and maintained to verify that the campaign health and safety management arrangements are being operated to specified performance standards.
- operator's and contractors' audit schedules are synchronised under one campaign audit program.
- procedures exist for the reporting of audit results and the implementation of corrective actions
- how relevant employees are involved in the audit process.

5.2.22 Review and Improvement

Standard

The operator should regularly review the safety management system used for the campaign(s) to assure the arrangements adopted are effective in meeting the operator's policies and objectives.

Links

The bridging document should demonstrate

- accountable senior management periodically reviews the effectiveness of the safety management system.

5.3 Formal Safety Assessment

Standard

The operator should identify any new or changed hazards or site specific risks arising from the proposed campaign and have control measures implemented to ensure that campaign risk level is acceptable.

The operator should demonstrate:

- review of the vessel safety case for adequacy of coverage of the identified hazards and associated risk
- validation of assumptions with respect to risk assessment
- hazards identified but not adequately covered associated with the campaign,
- the risk level for these additional hazards is assessed
- control measures and risk minimisation strategies for assessed hazards are identified and implemented
- acceptability of residual risk.

Appendix – Acknowledgments

The Department of Industry, Science and Resources would like to thank the following people for their efforts in developing these guidelines.

Participants in the National Oil and Gas Safety Advisory Committee safety case review sub-group

Mr Dan Ahern
Occupational Health and Safety Officer
Atwood Oceanics Australia Pty Ltd
Western Australia

Mr Glenn Jordan
Consultant
Sys Tec P/L
Victoria

Mr Zbigniew Lambert
Mechanical Engineer
Safety Health and Environment Branch
Department Minerals and Energy
Western Australia

Mr Eddie Knott
Transfield Worley
AMWU

Ms Sally Larkings
Regulatory co-ordinator
Corporate and External affairs
Esso Australia

Mr Phil Percival
HSE Co-ordinator
Well Construction
Woodside Energy Ltd

Mr Murray West
Safety Case Engineer
Offshore Operations
Woodside Energy Ltd

Mr Armad Nadjee
Snr Petroleum Engineer
Petroleum Regulations Branch
Department of natural Resources and Environment
Victoria

Mr Colin Turner
State Counsellor
CEPU

Safety Assessment - Acknowledgements

The Department of Natural Resources and Environment would like to thank the following people for their contribution to the preparation of this document. The views expressed in this document are those of the CEPU and do not necessarily reflect the views of the Department of Natural Resources and Environment.

The operator should demonstrate:

- review of the vessel safety case for adequacy of coverage of associated risk
Mr Dan Ahern
Occupational Health and Safety
Wood Oceanic Australia Pty Ltd
Western Australia
- validation of assumptions with respect to risk assessment
Mr Glenn Jordan
Consultant
Sys Tec Pty
Victoria
- hazards identified but not adequately covered associated with the campaign
Mr Zdzigniew Lambert
Mechanical Engineer
Safety Health and Environment Branch
Department Minerals and Energy
Western Australia
- the risk level for these additional hazards is assessed
Mr Eddie Knox
Transfield Worley
AMUL
- control measures and risk minimization strategies for assessed hazards are identified and implemented
Ms Sally Lathings
Regulatory co-ordinator
Corporate and External Affairs
Esso Australia
- acceptability of residual risk
Mr Phil Percival
HSE Co-ordinator
Well Construction
Woodside Energy Ltd
Mr Murray West
Safety Case Engineer
Offshore Operations
Woodside Energy Ltd

Mr Assad Najjar
Senior Petroleum Engineer
Petroleum Regulations Branch
Department of Natural Resources and Environment
Victoria