HSE Gap Analysis and Action Plan

Uganda's Oil & Gas HSE Governance System

Petroleum Authority Uganda, Plot 34-36, Lugard Avenue, Entebbe

Report No.: 2021-4008, Rev. 0
Document No.: 1121633
Date: 2021-04-29

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Project name:	HSE Gap Analysis and Action Plan	DNV Energy Systems
Report title:	Uganda's Oil & Gas HSE Governance System	Energy Solutions
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Date of issue:	2021-04-29
Project No.:	01265901
Organisation unit:	Field Development & Operations
Report No.:	2021-4008, Rev. 0
Document No.:	1121633

Applicable contract(s) governing the provision of this Report:

Objective:

Provide the Petroleum Authority of Uganda necessary support to further develop the legal and regulatory Health, Safety and Environment framework for the oil and gas sector, by reviewing it against international accepted practice.

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0	2021-04-29	First issue for review	TJS	AMB	GEE

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1 EXECUTIVE SUMMARY

Over the last decade the potential for hydrocarbon opportunities in Uganda has been on the increase. The Government of Uganda has been anticipating this potential, notably by establishing the foundations for a good governance of the oil and gas sector.

DNV has been engaged by Petroleum Authority of Uganda to assess the current and provide guidance to the further development of the legal and regulatory Health, Safety and Environment framework for the oil and gas sector. The overall objective of this engagement has been to review the current regulatory framework against internationally accepted practice, and detail recommendations for the further development of this framework.

A basis for evaluation was established to allow for a systematic review of the applicable law and regulations for petroleum activities in Uganda's against recognized industry practices. This report presents the main and generic findings from this assessment, and action plan for further development with prioritised actions.

In general, the applicable law and regulations for petroleum activities in Uganda cover most expected topics and themes in a regulatory framework. To evolve and improve the current regulations, a few fundamental questions related to governance model, institutional design and hierarchy of documents need to be addressed. These are related to the legislative environment, roles, and responsibilities in enforcing the regulations, and the hierarchy of legislative documents.

In conclusion, the following main actions are proposed and addressed in the order suggested:

1. Confirm governance model and regulatory regime, e.g., confirm adopting a prescriptive performance-based legislative regime, introducing a certification scheme, and introducing a verification (or assurance) scheme
2. Establish a hierarchy of legislative documents
3. Ensure alignment of current regulations
4. Carry out detailed improvements of the specific regulations based on findings in this report. In terms of prioritization the rating assigned (gap, opportunity to improve) can be utilized.

Several additional tasks were requested as a part of the DNV engagement. These include providing suggestions on how to develop guidelines within (i) incident analysis and reporting and (ii) emergency response and planning, and further providing a recommendation on how to best handle information and content management moving forward. The deliverables from these tasks are also included in this report.

2 INTRODUCTION

The overall objective of this activity was to provide the Petroleum Authority of Uganda (PAU) necessary support to further develop the legal and regulatory Health, Safety and Environment (HSE) framework for the oil and gas sector, by reviewing it against international accepted practice.

2.1 Petroleum Authority of Uganda Act and Regulations

The following documentation was received from the PAU and formed the basis for the evaluation:

1. The Petroleum (Exploration, Development and Production) Act, 2013
2. The Petroleum (Exploration, Development and Production) Health, Safety and Environment Regulations, 2016
3. The Petroleum (Exploration, Development and Production) Regulations, 2016

2.2 Basis for Evaluation

2.2.1 Structure

A basis for evaluation was established, in collaboration with the PAU, to enable a systematic review of the law and regulations in Uganda's petroleum activities against recognized industry practices.

A thematic approach was applied to the evaluation where the four pillars from the Center for Chemical Process Safety (CCPC) guidelines for risk-based process safety (see Figure 2-1) in addition to specific themes form the structure of the basis for evaluation:

0. General / high level observations
1. Commitment to HSE
2. Understand hazards and risks
3. Manage risk
4. Learn from incidents and assurance activities
5. Process safety / Major accident
6. Occupational safety / occupational accident
7. Occupational health / working environment

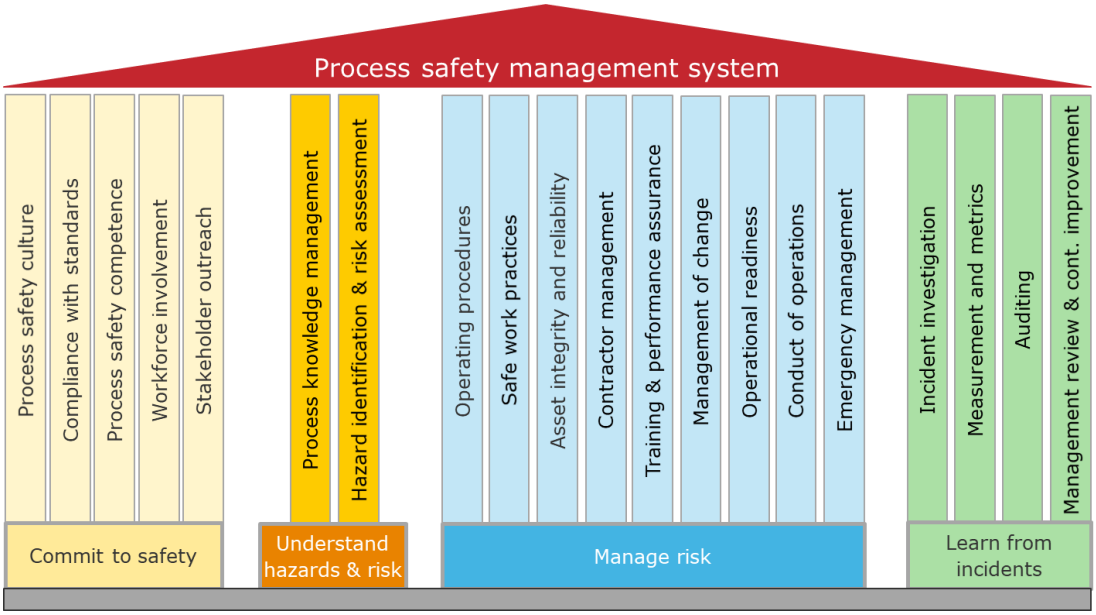

Figure 2-1- CCPS Risk-based process safety framework – four 'pillars'

Recognized industry accepted practices from several countries were deemed an important tool for documenting good practice and recommendations in the evaluation. Amongst others, the following industry accepted practices and standards were used in the evaluation:

- IOGP 510 Operating Management System Framework - for controlling risk and delivering high performance in the oil and gas industry
- IOGP 456 Process Safety – Recommended Practice on Key Performance Indicators
- ISO 31000 Risk Management – Guidelines
- ISO 17776 Petroleum and natural gas industries — Offshore production installations — Major accident hazard management during the design of new installations
- ISO 13702 Petroleum and natural gas industries — Control and mitigation of fires and explosions on offshore production installations — Requirements and guidelines
- API RP 754 Process Safety Performance Indicators for the Refining and Petrochemical Industries
- ISO 16530-1 Well integrity — Life cycle governance

2.2.2 Classification of Findings

Findings identified during the evaluation are classified as follows:

Gap	Used to highlight an area where no or only partial evidence is found to cover a given theme, topic, or intent
Opportunity to Improve	Used to highlight recommendations to improve clarity, remove inconsistencies and duplications
No comment	Used to highlight that the theme, topic, or intent is adequately covered

3 GAP ANALYSIS FINDINGS

The gap analysis was performed based on the approach as described in Section 2.2. This section summarises the main findings, while a complete overview is given in APPENDIX A. Note that the structure of this section is the same as the appendix.

3.1 Framing and Principles

To evolve and improve the current Upstream HSE Regulations 2016, a few fundamental questions related to governance model, institutional design and hierarchy of documents need to be addressed. These are related to:

- The **legislative environment**. I.e., are the regulations worded in a prescriptive manner, phrased in terms of achieving goals (goal setting or performance driven), or rather a hybrid of these two? And which legislative environment is most conducive to Uganda?
- **Roles and responsibilities in enforcing the regulations**. Currently the enforcement of the regulations lies with the designated authorities, with no role to play for (external) parties like certification bodies or independent competent parties responsible for conducting assurance and verification. Engaging these parties could alleviate some pressure on the authorities.
- The **hierarchy of legislative documents**. Currently, there is a two-tier hierarchy consisting of one act and accompanying regulations. Comparable regulatory framework in other countries have adopted another layer of documentation below the regulations referred to as 'guidance', 'codes of practice' or similar. And if this hierarchical structure would be assumed for Uganda, what should the contents of this third layer of documentation be?

The questions above are addressed in the sections below.

3.1.1 Legislative regimes

In general, distinction can be made between two types of legislative regimes: prescriptive and performance-based or goal setting. In addition, a hybrid type of regime can be adopted, with elements of both prescriptive and performance-based or goal setting regimes (see Figure 3-1).

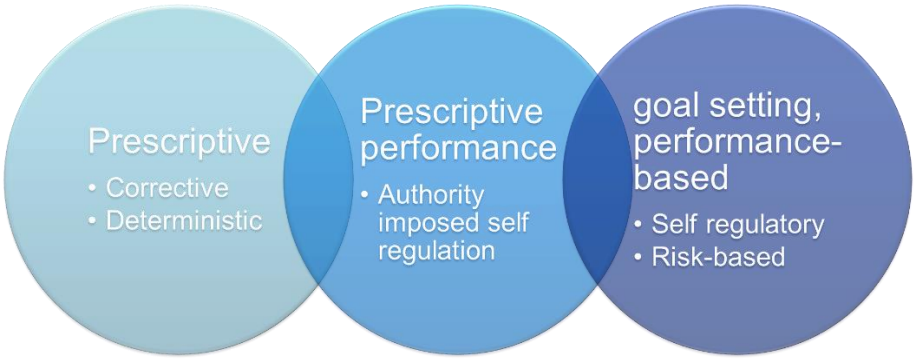

Figure 3-1 – Regulatory regimes

Opportunity to improve The current Upstream HSE Regulations 2016 are partially prescriptive and partially goal setting in nature. Though strictly speaking this is not a gap, but the wording and detail of the regulations vary, and the regulations are incoherent. It is recommended to clearly decide on the type of regime and implement this throughout the regulations.

A regime based on **prescriptive** regulations is generally based on deterministic or fixed requirements. These requirements could be stipulated in mandatory standards developed for the regulations, possibly with reference to international codes and standards. The current safety regime for the U.S. Gulf of Mexico is largely a prescriptive regime. A challenge with adopting a prescriptive regime is that the regulations may be appropriate for today, but not necessarily for tomorrow: it may not be able to prevent new types of accidents (e.g., dealing with hazards in 'unknown' environments). Also, this type of regime tends to be compliance focused and often prevents innovation due to its specific, prescriptive rules and requirements. It may also limit operators' dedication and understanding of responsibility as well as proactive initiatives to increase the safety level beyond compliance.

To be able to account for new types of events and to allow for needed innovation and new technology in the future, **performance-based or goal setting** (also referred to as functional-based) safety regimes have been introduced in several countries. In these, performance requirements and acceptance criteria are specified, and industry must document that their specific solutions meet such requirements, e.g., in terms of acceptable risk levels. Performance-based or goal setting regimes are often risk-based. The advantage of a performance-based regime is that solutions for the problem at hand can be developed without the need for specific prescriptions. The regulation will typically include comprehensive safety – or HSE – cases that document how all risks (including novel risks) for the specific facility, operational conditions and location will be prevented or mitigated. A challenge of a pure performance-based regulation is that it may require more analysis and documentation to be done in each individual case to verify that performance goals are met. It also requires a highly competent and active regulator.

The offshore safety regimes in the UK and Norway are of the performance-based type where safety cases (UK) or detailed risk assessments (Norway) must be presented to the authorities who review and accept - rather than approve – these before implementation. Once accepted, operations are required to be in conformance with the safety case.

The role of the regulator (or the authority acting on behalf of the regulator) is different for prescriptive regime and a goal setting or performance-based regime, see also Table 3-1.

- In case of a prescriptive regime, the regulator (or the authority acting on behalf of the regulator) acts as 'policeman', i.e., takes on a command and control role. This type of legislative environment also means that prescriptive and detailed regulations and guidance are required to be issued (and kept up to date) by the regulator, possibly supported by references to acknowledged international standards and codes.
- In case of a goal-setting regime, there is reliance on self-regulation of the operator / licensee; the regulator (or the authority acting on behalf of the regulator) acts as a 'facilitator'. The regulations are aimed at setting principles and 'high-level' goals. In this approach regulators responsibility is to ensure the regulated entity has identified hazards properly and adequate measures have been planned or taken to reduce the risk. This type of regulations requires a high level of maturity of operators / licensees, e.g., with the capability and resources to adopt a management system that ensures compliance with acknowledged industry practices and standards to design, build and operate a facility.

Table 3-1 – Role of regulator under different regimes

Aspect	Prescriptive	Goal setting or performance-based
Enforcement strategy	Direct rules with direct legal obligations and control-based enforcement of compliance	Indirect rules form the legal basis of control. Generally, requires monitoring of licensees' operations and performance
Role of regulator	Check and police compliance with regulatory obligations	Active role to ensure an internal management system is adopted by operator so that principles of safe design and operations can be achieved
Relationship operator	Possibly adversarial. Opposing interests creates mistrust	Mutual interest to share and learn. Trust between regulator and operator

A third option is to have a hybrid system based on performance-based regulations requiring safety cases including risk assessments supplemented by required or recommended specific prescriptive regulations for selected areas.

An example of such hybrid form is a regime referred to as **prescriptive performance**. In this type of environment, the regulator (or the authority acting on behalf of the regulator) will imposed self-regulation for a set of 'mandatory' governance processes. Canada is adopting a hybrid regulatory approach "that balances prescriptive and performance-based requirements. These requirements will be prescriptive in areas where the necessary management methods (plans, programs, systems), operational standards and reporting requirements need to be specifically defined to achieve the desired outcomes. Other requirements will be more flexible enabling the offshore oil and gas industry to determine the appropriate means to achieve regulatory objectives. This is typically in cases where there are multiple ways of achieving a desired outcome depending on specific circumstances (i.e. hazards, risks and environmental conditions)." (www.cnsopb.ns.ca).

3.1.2 Roles and responsibilities in enforcing regulations

In enforcing the HSE regulations, the duties, roles and responsibilities of the Uganda Parliament, Ministries and Authorities are transparent. Parliament issues the acts, the Ministry of Energy and Mineral Development as regulator enforces the HSE regulations, and the Petroleum Authority of Uganda acts as authority to implement the regulations. A similar hierarchy is applied to other acts and regulations.

Opportunity to improve

Enforcement of regulations requires a significant amount of resources, both in terms of numbers as well as capabilities (i.e., diverse areas of expertise to be covered). A way of offloading this pressure is to introduce a certification scheme for products, services, personnel competence etc. Certification schemes could be introduced to the management systems and underlying processes required to be implemented under Uganda HSE regulations. Another option to relief the work pressure on the Authority, is to adopt a third-party verification regime using Independent Competent Persons (ICP) or Independent Verification Body (IVB).

3.1.2.1 Certification

Certification is the assessment of conformity. In most cases, requirements are stated in acknowledged international codes and standards.

Either the management system, product or process, or personnel can be certified. With regards to use of certification to follow up regulatory compliance, this could be a certification of the operator's management system and underlying

processes required to be implemented under Uganda HSE regulations. Hardware systems, equipment, or components such as drilling rigs, mechanical packages, electrical equipment, and components, lifting equipment can also be subject to certification.

The role of the certification body is to assess whether the system, product or personnel fulfil the requirements stated in the defined standard, and to issue a Certificate of Compliance. The certification body issues the certificate based on the assessment where it verifies that the management system, product, process, or personnel fulfil the specified requirements. The granted certification is valid for a fixed period after which a recertification can be performed. Periodical audits during the validity of the certificate are usually required by the accreditation body* to maintain a certification obtained to the next recertification..

In most cases, certification is a voluntary procedure that can be used to demonstrate that the certified target fulfils the requirements imposed on it. In addition, certification can be used to demonstrate compliance with the requirements of legislation, including directives or EU regulations.

* Typically, certification bodies are accredited to ensure they are qualified. Accreditation is a third-party attestation related to a conformity assessment body (such as a certification body, inspection body or laboratory) assigning formal demonstration of its competence to carry out specific conformity assessment tasks.

An authoritative body that performs accreditation is called an 'accreditation body'. The International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC) provide international recognitions to accreditation bodies. There are many internationally recognized accreditation bodies approved by the IAF and ILAC.

3.1.2.2 Third party verification

Another option to relieve the work pressure on the Authority, is to adopt a regime using a third-party verification body, such as Independent Competent Person (ICP) or Independent Verification Body (IVB).

E.g., this practice is found in the UK, Norway and in Abu Dhabi. An operator or licensee is required to appoint one (or more) ICP or IVB to carry out verification based on an ‘assurance scheme’ (or: verification scheme) for critical systems and/or activities associated with safety, environment etc. The scope of the verification can be selected. E.g., in the UK the ‘verification scheme’ adopted by the Health and Safety Executive (HSE) is limited to Safety and Environmental Critical Elements required to manage Major Accident Hazards (MAH). In Norway, the operator shall determine the need for and scope of verifications, as well as the verification method and its degree of independence, to document compliance with requirements in the health, safety and environment legislation. In the UAE systems the assurance scheme covers systems and activities critical to managing all health and safety hazards (occupational health, occupational safety, MAH/ process safety) as well as environmental aspects.

In the UK the ICP must be an independent third party. In UAE, the IVB may be from within the operator or licensee organisation, when independence from the organisation(s) tasked with carrying out the HSE critical integrity activities can be demonstrated. Alternatively, the IVB may be an external consultant/contractor. The IVB may be a team of several individuals where this is required to ensure an appropriate level of competency or to complete verification tasks in a reasonable period.

In adopting a formal assurance regime as described above it must be clear the what the role of the ICP is. E.g., if the intent is to manage major accident hazards or process safety hazards, then a framework or process to managing these hazards must be defined. Figure 3-2 shows such a process, based on the UK offshore safety case regime. The framework is further described in APPENDIX C.

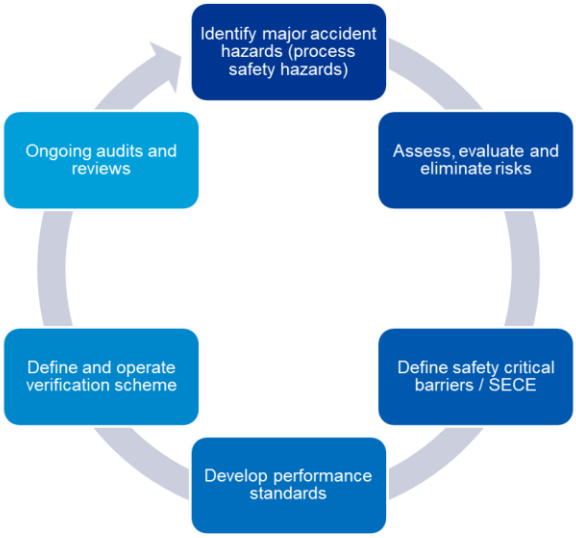

Figure 3-2 - Major accident hazard management framework (UK)

As mentioned before, the purpose is independent verification of the adherence to the performance standard by an ICP, IVB or Verifier. Independent verification could take place during design (referred to as 'initial suitability') and on a continuous basis during operations. More specifically, the role of the Verifier is (see also Figure 3-3):

- Review and comment on list of SECE
- Review and comment on verification scheme overall (this will include performance standards, written schemes of examination, etc.)
- Execution of verification activities specified in the scheme, including vendor verification activities
- Reporting results of those activities

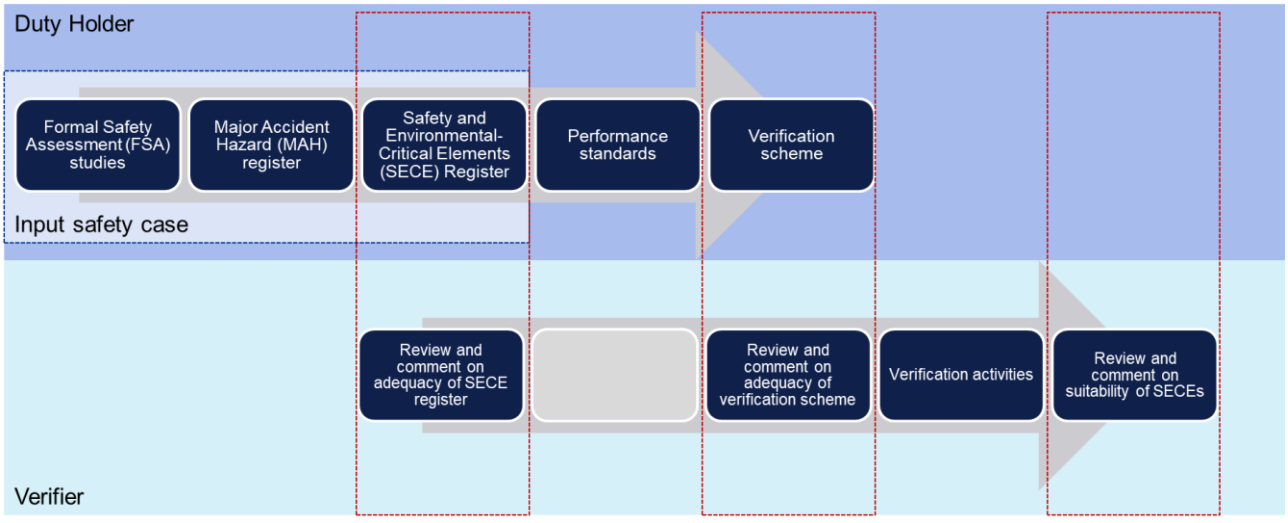

Figure 3-3 – Role of Verifier (UK)

3.1.3 Hierarchy of legislation

The Uganda legal and regulatory Health, Safety and Environment (HSE) framework is a two-tier hierarchy consisting of an act and the accompanying regulations. The Petroleum (Exploration, Development and Production) Act of 2013, issued by Parliament, is supported by the current Upstream HSE Regulations 2016 as well as the Upstream Exploration, Development and Production Regulations 2016. The regulations are not accompanied by other guiding documents.

Opportunity to improve	Adopting at least one additional layer of legislative documentation below the regulations means that a distinction can be made between a regulation (defining requirements) and a guiding document (describing in more detail 'how' to implement the regulation) is seen as a great improvement and allow for standardised interpretation of the regulations. The guiding documents could be worded as guidance notes (i.e., not prescriptive), approved codes of practice or as standards (more prescriptive).

Comparable regulatory frameworks have another layer of legislative documentation adopted below the regulations which is referred to as ‘guidance’, ‘codes of practice’, ‘standards’ or similar – see Figure 3-4. Specific examples of hierarchies for the Norwegian and UK HSE legislative documents are given in APPENDIX B and APPENDIX C, respectively.

Comparable regulatory regimes in other countries have introduced guidelines (or: approved codes of practices) to distinguish what is 'mandatory' (i.e., the regulations), and what is recommended (i.e., the guidelines). An example is the UK Safety Case offshore regulations, where below the regulations two layers of legislative documentation is adopted: Approved Codes of Practice (ACOP) and guidance notes (see APPENDIX C).

It is noted that the guiding documents can be these guiding documents can be prescriptive in nature. There are regimes that have more prescriptive guiding documents like standards, e.g., ADNOC standards in UAE (see APPENDIX D), or NORSOK standards in Norway (see APPENDIX B).

Figure 3-4 – Typical hierarchy of acts, regulations and guiding documents

The current Uganda regulatory framework is incoherent with regards to the level of detail. The regulations will be more coherent if high-level regulations are accompanied by more detailed guiding documents.

Often the process of updating, modifying, and approving the guiding documents is easier than that required for the regulations. Though it is noted that this may not apply to the Uganda's legislation, as it is understood that any guideline issued would have a similar legal status as a regulation.

3.1.4 Terminology

Key terminology used in the regulations must be clearly defined and applied consistently in the acts and regulations to minimize misunderstanding and confusion. It is recommended that Section 2 Interpretation in the HSE Regulations include important definitions to be applied consistently within these regulations and across other acts and regulations.

Findings and recommended actions related to terminology are given in APPENDIX A, ID 0-4-1 – 3.

3.1.5 Interface with Resource Management Regulations

It is essential for the Uganda government to ensure that independent regulations relating to resource management in the petroleum activities are established and followed. Requirements regarding resource management are deemed of such of importance that it is recommended that these are removed from the HSE regulations and covered in separate regulations.

The finding and recommended action related to resource management is given in APPENDIX A, ID 0-6.

3.1.6 Inconsistencies

The scope of the current Uganda regulatory framework act and regulations includes requirements and expectations for both on- and offshore activities. In general, the onshore requirements are more detailed than the offshore requirements. There is no clear distinction between on- and offshore and the expectations differ in content.

The most pronounced differences are:

- Detailed technical system and equipment requirements for onshore, not for offshore,
- Maintenance, monitoring and operational requirements for onshore, not for offshore,
- Requirements of submissions to authorities differ for on- and offshore.

It is recommended that all information relevant to both onshore and offshore be included in a general section of the regulations. Specific on- and offshore requirements should be clearly defined separately.

The finding and recommended action related to inconsistencies is given in APPENDIX A, ID 0-7.

3.1.7 Other

In general, the scope of the current Upstream HSE Regulations 2016 covers most of the expected topics. However, the scope of the regulation, the structure and content could be further enhanced by ensuring a logical order, and that all requirements within each topic are gathered and repeated requirements and sections are deleted. These changes would provide an improved understanding and overview of the requirements, both for the Authority and for the Licensees.

The level of detail in the HSE regulations varies. Several topics are covered comprehensively, while others are not. As described in Section 3.1.3 it is recommended to establish a hierarchy with guidelines to the regulations. If it is decided to establish guidelines, some of the detailed and comprehensive requirements should be moved to these guidelines.

Examples and recommended actions related to other is given in APPENDIX A, ID 0-8-1 to 0-8-8.

Note: the scope of work included providing high level guidance to PAU on how to develop guidelines for two defined areas (Incident Management and Reporting and Emergency Preparedness and Planning, reference is made to Chapter 5 and 6 respectively.

3.2 Commitment to HSE

3.2.1 Leadership Commitment and HSE Culture

It is recognized in the industry that a positive and pro-active HSE leadership and culture is reflected and embodied in a mature HSE management system and the various underlying processes. A HSE culture develops over time based on individual and company values, attitude, behaviour, and competence. The importance of actions and attitudes of leaders and managers in building a HSE culture must be highlighted to drive improvement. Further, compliance to workforce involvement requirements ultimately influence the HSE culture. Several requirements are included in the regulations address the role of managers; however, no requirements that specifically address HSE culture were found.

It is recommended that the regulations set forth expectations to the HSE management system that can indirectly influence the HSE culture. The finding and recommended action related to HSE culture is given in APPENDIX A, ID 1-2.

3.2.2 Compliance with legislation and industry standards

Industry codes and standards are commonly referenced in regulations and provide procedural and technical guidance generally followed by most members of an industry. Compliance with codes and standards can range from being voluntary or optional to including regulatory requirements that stipulate expectations that work is carried out in accordance with a standard.

A requirement for equipment to be “in accordance with standards approved by the Authority and best petroleum industry practices” is defined in the regulations; but a detailed list of acceptable standards is not provided. It is recommended that either the industry standards are referenced, that submission to the authority is required or that this statement is deleted, reference is made to APPENDIX A, ID 1-3.

Minor findings were identified within HSE compliance, work force involvement and stakeholder reporting. The findings and recommendations for these areas are given in APPENDIX A, ID 1-4 to 1-7-4.

3.3 Understand Hazard and Risk

3.3.1 Risk Assessment

The structure and content of the sections addressing risk management and safety concept are not presented in clear and concise manner in the regulations. The sequence in this section is not logical and there are duplications which can cause misunderstandings and confusion to the users of the regulations. A simplified structure is recommended where the current four sections are combined into two:

- Risk Management (to cover the content in 8-13 and 16-18)
- Safety Concept (to cover the content in 14-15)

It is recommended that section 4-7 is deleted, and its contents is covered by the above topics. The process described in for example ISO 31000 (see figure 3-5) is recommended as a guide to establishing the structure of this section. A further improvement would be to establish a guideline to avoid a high degree of details in the regulations – in this context see also the comments made in Section 3.1.3. The findings and recommendations for risk management are given in APPENDIX A, ID 2-2-1 and 2-2-2.

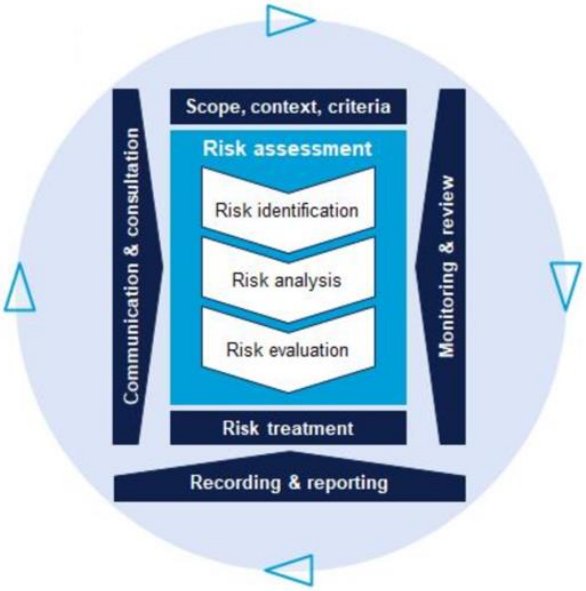

Figure 3-5 – ISO 31000 Figure 4 - Process

3.3.2 Acceptance Criteria

Adopting risk acceptance criteria relates to the evaluation phase of a risk assessment ('is a risk acceptable or not'), and review of recommended or implemented risk mitigation activities (is the mitigation sufficient to reach a tolerable level of risk). Risk acceptance criteria are often defined by a set maximum level of acceptable risks possibly combined with cost-benefit considerations (reference is made to the concept of As Low As Reasonable Practicable – ALARP).

Acceptance criteria are important in a risk assessment, and it is recommended that these are defined by the Authority or the licensee. In the evaluation conducted the responsibility for setting acceptance criteria is found inconsistent; some sections gave the impression that the criteria are set whereas other sections that it is up to the licensee. It is recommended that the Authority provide acceptance criteria in the regulations for higher risks and define which risk acceptance criteria it is expected that the licensee shall establish. Further, a guideline could be developed to provide detailed information and guidance on the acceptance criteria it is expected that the licensee shall establish. The findings and recommendations for these areas are given in APPENDIX A, ID 2-2-3 and 2-2-4.

3.4 Manage Risk

3.4.1 Operating Manuals, Asset Integrity and Training

Minor findings were identified within the areas operating manuals and procedures, asset integrity and reliability, training, and performance assurance. The findings and recommendations for these areas are given in APPENDIX A, ID 3-2-1 to 3-4-5.

3.4.2 Management of Change

Management of change is a systematic approach to technical and organizational changes with the aim of ensuring the continued management of safety, health, and environmental risks throughout and after the process. The systematic management of change processes ensure that the change is dealt with in a proactive fashion.

It was identified that management of change is not mentioned in the act nor regulation; however, it is mentioned in the HSE regulation. It is recommended that expectations for management of change are defined in the regulation or as a minimum that it is confirmed that the current statements in the HSE regulation is sufficient legally.

The findings and recommendations for management of change is given in APPENDIX A, ID 3-5.

3.4.3 Emergency Preparedness and Response

Emergency preparedness and response regulations ensure that potential hazards are identified and how to prepare and train for responding in an emergency. The regulations are deemed comprehensive in this area and provide information for employers and workers, and for those responding to the emergency.

It is recommended that sections 115, 116, form 4, section 22 (1) and 113 (3) are reviewed, updated, and simplified (remove duplications, highlight main requirements). A further improvement would be to establish a guideline to avoid a high degree of details in the regulations. Guidance on how to develop a guideline for emergency preparedness and response is provided as a delivery in Section 6 of this report.

No requirement to ensure that an emergency organization is established was found; however, requirements for responsibility for employees when responding to an emergency were found. It is recommended to include a requirement to ensure a robust organization that can handle hazard and accident situations in an efficient manner and that all of the actions in an emergency response procedure are covered by identified persons in the emergency organization.

The findings and recommendations for these areas are given in APPENDIX A, ID 3-6-1 to 3-6-10.

3.5 Learn from Incidents and Assurance Activities

3.5.1 General

Many organisations have problems in reducing the number of incidents and this can be partly attributed to the failure to learn the lessons from previous incidents. Incident prevention is strongly based on learning from previous incidents. When incidents occur, they raise awareness and understanding of things that went wrong, and perhaps can go wrong again. The challenge is to learn as much as possible about the causes of accidents and near misses that have already happened to prevent reoccurrence.

It is recommended that all sections applicable to incident investigation and reporting are reviewed, updated, and simplified (remove duplications, highlight main requirements). A further improvement would be to establish a guideline to avoid a high degree of details in the regulations. Guidance on how to develop a guideline for incident investigation and reporting is provided as a delivery in Section 5 of this report.

3.5.2 Incident Investigation and Notification

Requirements for incident investigation and reporting including expected timelines are provided in the regulations. An opportunity for improvement is to further define the expectations for the level of investigation required based on the incident, hazard or accident that has occurred. For minor incidents and hazards the industry typically concurs that a simple investigation is sufficient. The monthly report to the authority will provide the opportunity to request a more in-depth investigation and / or report if warranted. Further, it is recommended that investigation reports for serious incidents (section 157(2)) are reported to the Authority.

The regulations define the requirements for incident notification to the Authority. It is recommended that the requirements in section 155(2) and section 157(4) are reviewed and either consolidated or the difference in intent between the two sections are clarified. Further it is recommended that all mechanisms for reporting incidents and investigation reports are updated to ensure that the Authority receives required and wanted information, and to

requirements for reporting. The finding and recommendation for incident investigation and notification are given in APPENDIX A, ID 4-1.

3.5.3 Monitoring, Measurement, and Metrics

Key Performance Indicators (KPI) are used to measure performance and progress towards certain objectives.

Expectations and requirements for establishing objectives, targets, and indicators for monitoring performance are included in the regulations; however, the clarity of the requirements and the link between them should be improved to ensure a consistent approach. Further, a link to the Exploration Development and Production Regulation section 100 would ensure use of objectives, targets and indicators in the monitoring of safety critical equipment and systems. The finding and recommendation for monitoring, measurement and metrics is given in APPENDIX A, ID 4-2.

3.5.4 Audit and Inspection

Safety inspections and safety audits are both critical to achieving environmental, health and safety compliance. Both are needed as they address two different levels of safety management.

The regulations provide expectations and requirements for both audits and inspections; however, the intent and responsible parties for carrying these out is not clear. It is recommended that the regulations are updated to clarify the what are the licensee requirements, define the terms "safety management system" and "management system" and explain the reference to "performance standards". The findings and recommendations for audit and inspection are given in APPENDIX A, ID 4-3-1 and 4-3-2.

3.6 Process Safety and Major Accident

3.6.1 Process Safety and Technical Safety

Process safety management is the application of management processes and principles aimed at identifying and controlling process safety hazards and managing their risk throughout the lifecycle of an asset. Process safety hazards are associated with accidental releases of hazardous substances, or uncontrolled release of energy. Process safety incidents can have catastrophic consequences to life, asset, and environment.

Most expectations and requirements for managing process safety, technical safety systems, equipment and barriers are covered in the regulations. A further improvement would be to establish guidelines to provide reference to international standards and/or additional details to establish a level of technical basis and provide predictability for designers and vendors. Splitting the regulations into sections that describe technical and operational requirements may be beneficial.

Within the topic **process safety,** the following is recommended:

- Distinguish between process control (PCS) and process shutdown system (PSD). PCS and PSD systems are normally required to be separate from each other. PCS will ensure control during normal production/processing and PSD will shut down the process plant (fully or partially) if the PCS system is not able to control a situation.
- It is unclear if section 40 “Gas release system” and section 41 “Depressurization and flare system” cover the intent. It is recommended to review these two sections and either merge or clarify the difference between them.
- Ignition source requirements and Emergency Shutdown (ESD) are normally not defined under process safety. Process safety is often considered to cover events where hydrocarbons are still within the piping and equipment. Emergency shutdown will be initiated in events where there is a leakage, so the hydrocarbon is outside the piping and equipment (e.g. fire and gas section).

Within the topic **technical safety** gaps related to active fire protection, passive fire protection, explosion protection, integrity of HVAC systems, alarms and escape routes have been identified. It is recommended to describe clear

requirements within these areas. E.g. redundancy requirements for firewater pump system, acceptable extinguishing systems, fire rating and explosion protection of fire divisions.

The findings and recommendations for process safety and technical safety systems are given in APPENDIX A, ID 5-1-8 to 5-1-10 and 5-5-4 to 5-5-18.

3.6.2 Drilling

It is common practice for regulators to set forth an expectation and requirements for a well integrity management system where the commitments, requirements, and responsibilities of an organization to manage the risk of loss of well containment over the well lifecycle are defined.

Some gaps related to the programme, blow-outs, well barriers and well control have been identified. It is recommended that a requirement to share specific information related to the different programmes/plans, well blow-outs and well control. In addition, verification requirements of the different well barrier elements are not mentioned. A general requirement that the well operator is responsibility to define a barrier philosophy for each of the well types is recommended included in the regulations.

Further details about the findings and recommendations for drilling are given in APPENDIX A, ID 5-4-1 to 5-4-5.

3.6.3 Collision Accident

Although traffic and transportation are covered in the regulations, no expectations or requirements were found for collision accident in the context of a major accident structure collapse or hydrocarbon leak. It is recommended that the relevance for both ship collision for lake installations and vehicle collisions onshore are considered. If so, include requirements for these in the regulations.

The finding and recommendation for collision accident are given in APPENDIX A, ID 5-6.

3.7 Occupational Safety and Occupational Accidents

3.7.1 General

Most expectations and requirements for managing occupational safety and occupational accidents are covered in the regulations. A further improvement would be to establish guidelines to avoid a high degree of details in the regulations (e.g. confined spaces, electricity, and human machine interface).

The findings and recommendations for occupational safety and occupational accidents are given in Appendix A ID 6-1 to 6-12-2.

In addition, several opportunities for improvement have been identified for specific themes within occupational safety and occupational accident these are presented in Sections 3.7.2 to 3.7.4.

3.7.2 Dropped and Swinging Loads

General expectations and requirements for dropped and swinging loads are covered in the regulations; however, one observation was identified to verify that the reference to the Occupational Safety and Health Act, 2006 covers restricted areas and communication during lifting operations (ref.: APPENDIX A, ID 6-2).

3.7.3 Radiation and Explosives

Typically, regulations provide expectations and requirements to ensure safe and efficient storage, handling, and competence in handling radioactive sources and explosives where details are generally provided in a guideline. The regulations cover explosives adequately; however, no information for handling radioactive sources was found. It is

recommended to verify if another act or regulation sufficiently covers radioactive sources. If so, reference the applicable act or regulation. If not, establish regulations to set expectations for managing these hazards (ref.: APPENDIX A, ID 6-9-1 and 6-9-2).

3.7.4 Dynamic Situation – Transportation

Expectations and requirements for safe transportation of personnel to and from the facilities and / or installation was not found. It is recommended that an expectation or requirement to ensure safe transportation of personnel by air, road or water (ref.: APPENDIX A, ID 6-11-2 to 6-11-4).

3.8 Occupational Health and Working Environment

3.8.1 General

Expectations and requirements for managing occupational health and working environment have been scrutinised.

The findings and recommendations for occupational safety and occupational accidents are given in APPENDIX A, ID 7-1-1 to 7-5-5. Several opportunities for improvement have been identified for specific themes within occupational safety and occupational accident these are presented in Sections 3.8.2 to 3.8.7.

3.8.2 Physical Hazards

Most expectations and requirements for managing physical hazards are well covered in the regulations. Several minor opportunities for improvement have been identified to ensure the correct level of details in other acts, regulations and or references to international standards where relevant have been identified. The findings and recommendations for physical hazards are given in APPENDIX A, ID 7-1-1 and 7-1-5.

3.8.3 Biological Hazards

A biological safety hazard is a substance produced by an organism that may pose a threat to human health. It is deemed that the regulations provide requirements for biological substances risk assessment, handling, and storage.

No requirements for infectious diseases or food/drinking water hygiene were found. It is recommended to verify if another act or regulations sufficiently covers these areas. If so, reference the applicable act or regulation. If not, establish regulations to set expectations for managing these hazards.

The findings and recommendations for biological hazards are given in APPENDIX A, ID 7-3-1 and 7-3-2.

3.8.4 Working Hours, Shift Work and Rotations

The importance of setting expectations and requirements for work schedules ensures proper functionality, productivity, and health.

Generic requirements for working hours related to effect on health and in an emergency are well described; however, no expectations or requirements for maximum working hours nor shift work system were found. It is recommended to verify if another act or regulations sufficiently covers these areas. If so, reference the applicable act or regulation. If not, establish regulations to set expectations for managing these aspects.

The findings and recommendations for work schedules are given in APPENDIX A, ID 7-4-1 to 7-4-3.

3.8.5 Juveniles

The industry set forth expectations and requirements for the engagement of juveniles in petroleum activities; typical requirements can include minimum age, types of jobs, and limitation to work hours.

No expectations or requirements for the engagement of juveniles were found. It is recommended to verify if another act or regulations sufficiently covers these areas. If so, reference the applicable act or regulation. If not, establish regulations to set expectations for managing these aspects.

The findings and recommendations for work schedules are given in APPENDIX A, ID 7-4-4.

3.8.6 Drug, Alcohol, and Substance Abuse

Typically, regulations set forth expectations and requirements regarding drug, alcohol and substance abuse and prevention policy. Guidelines may include information on level of testing, as well as on the consequences of failing a test and handling an abuse problem depending on the specific laws of each country. In recent years the negative effect of gambling and gaming have emerged.

No expectations or requirements for drug, alcohol, and substance abuse management were found. It is recommended to verify if another act or regulations sufficiently covers these areas. If so, reference the applicable act or regulation. If not, establish regulations to set expectations for managing these aspects.

The findings and recommendations for work schedules are given in APPENDIX A, ID 7-4-5.

3.8.7 Medical Care

Most medical expectations and requirements are well documented in the regulations; however, no expectations or requirements for vaccination programs were found. It is recommended to verify if another act or regulations sufficiently covers this area. If so, reference the applicable act or regulation. If not, establish regulations to set expectations for managing this aspect.

The findings and recommendations for medical care are given in APPENDIX A, ID 7-5-1 to 7-5-8.

4 HIGH LEVEL ACTION PLAN

To improve the HSE regulations, a high-level action plan consisting of four steps is proposed.

4.1 Step 1: Confirm governance model and institutional design

As mentioned in Section 3.1, related to the governance model and institutional design of the Uganda HSE regulations three opportunities to improve were identified. Enforcement of regulations requires a significant amount of resources, both in terms of numbers as well as capabilities (i.e., diverse areas of expertise to be covered) (see Section 3.1.2).

A way of offloading this pressure is to introduce a certification scheme for products, services, personnel competence etc. Certification schemes could be introduced to the management systems and underlying processes required to be implemented under Uganda HSE regulations. Another option to relief the work pressure on the Authority, is to adopt a third-party verification regime using ICPs. The following is recommended.

1. ***Adopt prescriptive performance-based legislative regime***

   In terms of legislative environment, the current Upstream HSE Regulations 2016 are partially prescriptive and partially goal setting in nature.

   Adopt a prescriptive performance-based legislative regime, as described in Section 3.1.1. This type of regime is seen as providing a good balance between prescriptive requirements on specific HSE aspects and allowing the operators / licensees to help develop and implement good HSE practices in their operations. Also, a prescriptive performance-based legislative regime is seen as a good cultural fit for the Uganda legislative environment.

   It is recommended that (as a minimum) the following is set as mandatory, i.e., is to be considered as prescriptive:

   - *The need to develop and implement a HSE management system.*
   - *The need for the HSE management system practices to cover exploration, development, and operational phases.*
   - *The need for the HSE management system to comprise a set of 'processes', e.g., risk management, management of plant and organisational changes, the definition and management of HSE critical systems, competence assurance of employees through recruitment and training, emergency response.*

   For some of these HSE management system processes, additional requirements may be prescribed. E.g., for risk management the regulator may decide to add prescriptive rules on risk assessment scope, methodology or tools. Risk criteria to be adopted by the operator / licensee may be prescribed. Alternatively, these may be left to the operator/ licensee to decide, e.g., in this self-regulatory climate the operator / licensee may be able to determine the risk criteria to be adopted for risk assessment (note: as is currently the case). A third option would be to refer to internationally acknowledged codes and standards, applicable on this subject.

   As is illustrated in the example above, the balance between what is prescriptive ('what needs to be done') and what is self-regulatory ('how this is done') needs to be studied and carefully chosen. In Table 4-1**Error! Reference source not found.** DNV has included a list of elements that could be considered as being mandatory, i.e., prescriptive are also included. However, this list shall be reviewed in the context of the chosen governance model and institutional design, and the hierarchy of legislative documents chosen.

Table 4-1 – Suggested list of prescriptive elements for a prescriptive performance-based legislative regime

HSE Management
Develop and implement an HSE management system
Maintain an up to date register of relevant HSE Acts and Regulations, codes, and standards
Maintain an up to date register of relevant operating permits etc.
Ensure stakeholder engagement and workforce involvement
Submit safety report ('safety concept') prior to operational phase, and update as required
Develop major accident prevention plan
Hazard identification and risk assessment
Identify all operational health hazards of the facility, and assess the associated risk
Identify all operational occupational safety hazards of the facility, and assess the associated risk
Identify all operational process safety hazards of the facility, and assess the associated risk (incl. drilling, collisions)
Identify all operational environmental aspects during of the facility, and assess the associated risk
Define risk acceptance criteria to be adopted
Ensure controls (barriers) are in defined to manage HSE risks (note: could be limited to process safety risks)
Define performance criteria for these barriers (note: could be limited to process safety risks)
Apply verification or assurance scheme to barriers (note: could be limited to process safety risks)
Apply 'inherently safer design' principles during the design of the facility
Manage knowledge - properties of hazardous materials, facility design data, barrier design data
Recruitment and training
Ensure competent workforce - recruitment
Ensure competent workforce - training
Ensure competent contractors - selection and recruitment
Ensure competent contractors - training
Risk management during operations
Ensure operational readiness of facilities (pre-start-up safety review)
Manage asset integrity through the operational phase
Manage changes to plant and organisation
Develop and implement operating procedures
Implement safe work practices
Emergency preparedness
Conduct emergency preparedness assessment
Develop and implement emergency preparedness and response plan
Establish emergency organization
Ensure sharing of information and communication during emergency
Normalize after emergency response
Learning from events and continuous improvement
Conduct incident investigation and review
Conduct audits, inspections, and management reviews
Establish key performance indicators for measuring HSE performance

2. ***Introduction of certification scheme***

Enforcement of regulations requires a significant amount of resources, both in terms of numbers as well as capabilities (i.e., diverse areas of expertise to be covered) (see Section 3.1.2). A way of offloading this pressure is to introduce a certification scheme for products, services, personnel competence etc. – providing this is organised by the operator. Certification schemes could be introduced to the management systems and underlying processes required to be implemented under Uganda HSE regulations.

Consider introducing a certification scheme for specific systems, products, services, and personnel competence. E.g., this scheme could be applied to hardware systems, equipment, or components, such as drilling rigs, mechanical packages, electrical equipment, and components, lifting equipment.

See Section 3.1.2.1 for more details.

3. ***Introduction of assurance or verification regime***

Another option to relief the work pressure on the Authority, is to adopt a third-party verification regime using ICPs.

Consider introducing a formal assurance regime, at least for managing major accident hazards or process safety hazards. In this case a framework or process to managing these hazards must be defined, e.g., encompassing the following steps:

- *Identify major accident hazards*
- *Assess, evaluate, and eliminate associated risks*
- *Define safety and environmental-critical elements (and activities)*
- *Develop performance standards*
- *Define and operate verification scheme*
- *Ongoing audits and reviews*

See Section 3.1.2.2 for more details.

It is noted that the introduction of an assurance or verification regime as described above implies that major accident hazards are managed similar to the regimes like offshore UK, Australia, UAE, i.e., through performance standards.

4.2 Step 2: Establish hierarchy of legislative documents

The next step is to review the hierarchy of legislative documents.

4. ***Improve hierarchy of legislative documents***

Introduce a new hierarchy of legislative documents, by adding guidelines (or: approved codes of practice) to support the regulations.

This will allow a distinction to be made between a regulation (describing 'what' to do) and a guideline (describing in some detail 'how' to implement the regulation). Also, this will allow the modification and approval process for regulations and guidelines to be decoupled, should this be considered in the future.

4.3 Step 3: Alignment of current regulations

The current HSE regulations will need to be aligned with new governance model and institutional design (step 1) and the new hierarchy of documents (step 2). This will require the current HSE regulations to be re-structured and re-organised. The recommendations provided in Sections 3.2 to 3.8 should help in the alignment process.

4.4 Step 4: Detailed improvements of regulations

Once the current HSE regulations have been aligned with new governance model and institutional design and the new hierarchy of documents (step 3), the regulations can be improved based on the observations made in Sections 3.2 to 3.8.

5 HOW TO DEVELOP INCIDENT AND REPORTING GUIDELINE

5.1 Overview

It is critical for any organization exposed to hazards and risks to implement a system that ensures that events and losses are identified, recorded, and analysed to identify actions to prevent similar events occurring in the future. An effective process for incidents reporting and analysis will drive continuous improvement within critical aspects such as safety, health, environment, quality, security, and business performance.

For events and losses to be recorded and lessons learned applied for continuous improvement, managers should create a no blame culture in the organization encouraging and creating a low threshold for reporting of losses and events. Reporting and learning from near misses is a must to create a learning culture in the organization.

A process should be defined and implemented to learn from events. Key features of this process are:

- The process needs to include tools and techniques which can be used for simple fast track event analysis to more thorough in-depth investigation techniques for high potential losses and accidents.
- Front line personnel and managers should always be involved in the process.
- For serious accidents with a high degree of public scrutiny, an independent investigation team may be required.
- Fact gathering, identification of direct causes and root causes are critical steps in the learning process.
- Actions must always be identified, implemented, and tracked to completion to achieve continuous improvement. Actions must address the root causes identified in the analysis or investigation.
- It is important to define specific criteria for what needs reporting to the authorities, e.g. set limits for environmental releases and leaks. A clear definition must be given for what constitutes a non-conformity.

5.2 Key references

- ISO 9001:2015(E)
- Section 9.1.3 Analysis and evaluation
- Section 10.2 Non-conformity and corrective action
- Section 10.3 Continual improvement
- ISO 14001, Section 10 Improvement
- ISO 45001:2018(E), Section 10 Improvement
- ISO 55001, Section 10 Improvement
- OSHA 1910.119, clause (m) – Incident Investigation

5.3 Examples

DNV has selected the Norwegian PSA requirements §20 Registration, Review and Investigation of Hazard and Accident Situations and associated guideline and the UAE ADNOC Health, Safety, Environment Management System Incident Notification, Investigation and Reporting Standard as go-by's for the development of regulations and associated guidelines within Incident Reporting and Analysis.

6 HOW TO DEVELOP EMERGENCY RESPONSE AND PLANNING GUIDELINE

6.1 Overview

Emergency preparedness management is the management of all technical, operational and organisational measures, including necessary equipment that are planned to be used under the management of the emergency organisation in case hazardous or accidental situations occur, in order to protect human and environmental resources and assets.

When developing a guideline for emergency preparedness, response and planning it should describe how emergency preparedness should be established as part of a process of performing an emergency preparedness assessment, including an emergency preparedness analysis.

This process is visualised in Figure 6-1 and should include the following basic steps to ensure a sufficient emergency preparedness:

- Establishment of the context for the emergency preparedness (objective, scope, responsibilities and the methodology and tools to be used)
- Identify potential hazards that can or will trigger the need for emergency preparedness. This step includes establishing the total risk picture, including analyses of the potential initiating events and potential consequences of these events.
- Establishing an overview over all the potential situations of hazards and accidents that will trigger a need for emergency preparedness. These are the defined situations of hazards and accident (DSHA).
- Performance requirements for the emergency needs to be established both for the emergency preparedness in general and for each DSHA if required. These performance requirements shall ensure that safety objectives, authority minimum requirements and established norms with regards to emergency preparedness are satisfied both with regards to design and with regards to operation. The term “performance” is, in this context to be interpreted in a wide sense regarding personnel, environment and assets and include availability, reliability, capacity, mobilisation time, functionality, vulnerability and competence, and to be expressed as far as possible in a verifiable manner.
- All technical, operational, or organisational emergency preparedness measures required to achieve the identified performance requirements must then be identified and evaluated.
- Emergency response strategies must be established. The strategies shall include a description of emergency response actions and shall be based on an assessment of the DSHAs, on the overall emergency preparedness philosophy or principles, on an evaluation of the performance requirements for emergency preparedness and on the identified measures and solutions.

These emergency preparedness assessments will form the basis to establish:

- An emergency preparedness organisation (both 1st, 2nd and 3rd line)
- An emergency preparedness and response plan
- Agreements and bridging documents for required external resources like Area Emergency Preparedness Resources, Police, Medical resources, other licensees etc.

The emergency management system must ensure that these established elements of emergency preparedness are continuously monitored, reviewed and updated if required.

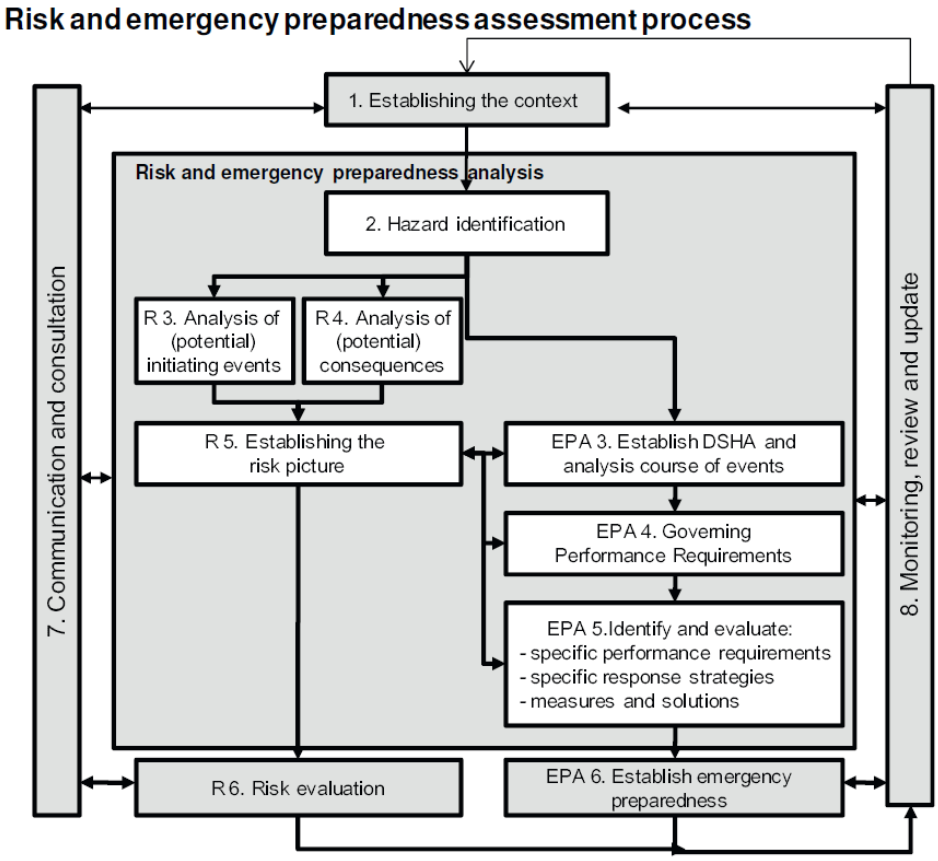

Figure 6-1 - Emergency preparedness assessment process

6.2 Key references

- ISO 45001:2018, Section 8.2 Emergency preparedness and response
- ISO 15544, Petroleum and natural gas industries — Offshore production installations — Requirements and guidelines for emergency response, All sections.
- ISO 31000, Section 5 Framework
- ISO 31000, Section 6 Process

6.3 Examples

DNV has selected the Norwegian PSA requirements:

- Management Regulations §17 (Emergency preparedness analyses)
- Activities Regulations Chapter XIII §73- 77 (Emergency preparedness strategy, the robustness of EPO, EP plan, EP measures)
- Activities Regulations §23 (training and drills)
- Facilities Regulations Chapter VI §41 – 44 and NMA regulation No. 90 (Evacuation means, life-saving appliances, rescue etc.)

7 HOW TO HANDLE INFORMATION AND CONTENT MANAGEMENT

Managing rules and regulations demands clear and transparent processes to ensure consistency and traceability as well as good and relevant user interfaces. Publishing this content to the end user could be done in many channels but is today typically done over web. Relevant examples of publicly available web portals for rules and regulations are:

- The Norwegian Lovdata with access to laws, resolutions, regulations, collective agreements. Example of the Norwegian petroleum law; https://lovdata.no/dokument/NL/lov/1996-11-29-72
- Petroleum act United Kingdom with access to laws, resolutions, regulations, collective agreements; https://www.legislation.gov.uk/ukpga/1998/17/contents
- DNV Rules and standards with rules, standards and recommendations within the Maritime, Oil & Gas and Energy. Example of the DNV Maritime Class Rules and standards; https://rules.dnvgl.com/ServiceDocuments/dnvgl/#!/home. Key DNV Rules and Standards are part of the Norwegian offshore regulations as standards and guidelines.

By making documents public through the web it is important to focus on development of a system that will handle every aspect from information to publication management demands a structured process. It is recommended to develop a guideline to encounter an even more complex future including a higher level of content and versioning challenges.

- **Security/Access control**: If the content is not intended to be available to the public, mechanisms for ensuring secure storage and right access needs to be considered. It is recommended to follow IS 27400 for cyber security measures.
- **Knowledge and content management**: To make the right content available to the end user, good search and navigation processes are important. It is recommended to establish standards for development of manuscripts as well as a standard for handling the source files, content management and the user interface. Having a standard process from development of the manuscripts through to the user interface it eases the consistency and possibility to correct or add information.
- **User interface**: Understanding the user and the usage of the publicized material is of high importance to develop an adequate search and navigation user interface (UI). There are several methods to navigate in content by introducing free text search, predefined filters, hyperlinks to more advanced search methods extracting and only presenting the relevant information to the user. It is recommended to have a standard process from development of manuscript through to the user interface.

There are several commercial tools available for enabling management of information from development through to publication as well as handling security and access. It is recommended though to develop a process to secure a transparent and good process with ability to correct and add information as well as ensuring security at relevant level.

DNV can advise on all aspects of the information and content management and in the development of guidelines. DNV also has a production environment for publication of rules and standards as well as an industry platform that manage security and distribution that is being used both by DNV and external customers. This platform can be used for the purpose of both managing information, content and developing user interface with search and navigation functionality.

8 ABBREVIATIONS AND DEFINITIONS

ACOP	Approved Code of Practice
ADNOC	Abu Dhabi National Oil Company
ALARP	As Low as Reasonably Practicable
API	American Petroleum Institute
CCPS	Centre for Chemical Process Safety
CFD	Computational Fluid Dynamics
EERA	Escape, Evacuation and Rescue Assessment
ENVID	Environmental Impacts Identification (study)
ESD	Emergency Shutdown
ESSA	Emergency System Survivability Assessment
EU	European Union
FARSI	Functionality – Availability - Reliability – Survivability – Interactions
FERA	Fire and Explosion Risk Assessment
HAZID	Hazard Identification (study)
HAZOP	Hazard Operability (study)
HSE	Health, Safety and Environment, Health and Safety Executive (UK)
HSECES	Health, Safety and Environment Critical Equipment and Systems
HSEIA	HSE Impact Assessment
HSEMS	Health Safety and Environment Management System
HVAC	Heating, Ventilation and Air Conditioning
IAF	International Accreditation Forum
ICP	Independent Competent Person, Independent Competent Party
ID	Identifcation
ILAC	International Laboratory Accreditation Cooperation
IOGP	International Association of Oil & Gas Producers
ISD	Inherently Safer Design
ISO	International Standards Organization
IVB	Independent Verification Body
KPI	Key Performance Indicators
MAH	Major Accident Hazard
MOC	Management of Change
NORSOK	Norwegian Petroleum Standard
OHID	Occupational Health Identification (study)

OHRM	Occupational Health Risk Management
OPEC	Organization of the Petroleum Exporting Countries
OSHA	Occupational Safety and Health Administration
PAU	Petroleum Authority of Uganda
PCS	Process Control System
PHSER	Project HSE Review
PPE	Personal Protective Equipment
PSA	Petroleum Safety Authority
PSD	Process Shutdown
PSSR	Pre-Start-up Safety Review
QRA	Quantitative Risk Assessment
RP	Recommended Practice
SECE	Safety and Environmental-Critical Elements
SI	Statutory Instrument
SIL	Safety Integrity Level
UAE	United Arab Emirates
UK	United Kigdom
U.S.	United States
WMS	Work Management System

APPENDIX A – DETAILED GAP ANALYSIS FINDINGS

This appendix provides the detailed findings of the gap analysis conducted for Uganda HSE legislation.

ID	Topic	Aspect	Reference to Standards	Reference to Uganda Petroleum Regulations /1/ The Petroleum Act, 2013 Act 3 /2/ The Petroleum HSE Regulation, 2016 No. 46 /3/ The Petroleum EDP Regulation, 2016 No. 47	Gap / Opportunity to Improve	Recommendation
0	**General Observations**					
0-1	Framing and Principles	Regulatory Environment Current and Vision (i.e. prescriptive, goal-setting, hybrid)		In terms of legislative environment, the current Upstream HSE Regulations 2016 are partially 'prescriptive' and partially 'goal-setting' in nature. In a prescriptive regime, the regulator (or the authority acting on behalf of the regulator) acts as 'policeman', i.e., takes on a command and control role. This type of legislative environment also means that prescriptive and detailed regulations and guidance are required to be issued (and kept up to date) by the regulator, possibly supported by reference to acknowledged international standards and codes. In a goal-setting regime, there is reliance on self-regulation of the operator / licensee; the regulator (or the authority acting on behalf of the regulator) acts as a 'facilitator'. The regulations are aimed at setting principles and 'high-level' goals. In this approach the regulators responsibility is to ensure the regulated entity has identified hazards properly and adequate measures have been planned or taken to reduce the risk. This type of regulations requires a high level of maturity of operators / licensees, e.g., with the capability and resources to adopt a management system that ensures compliance with acknowledged industry practices and standards to design, build and operate a facility.	**Opportunity to Improve**: In terms of legislative environment, the current Upstream HSE Regulations 2016 are partially 'prescriptive' and partially 'goal-setting' in nature. Though strictly speaking this is not a gap, this mix does mean that the wording and detail of the regulations vary, leaving a sense of incoherence (it is noted that this discrepancy is also related to the fact that the regulations are not accompanied by guidelines, as explained in ID 0-3). There lies an opportunity to adopt a coherent legislative environment for the Upstream HSE Regulations 2016 (note: this opportunity could also be applied to the Upstream Exploration, Development and Production Regulations 2016). Alternatively to adopting a strict prescriptive or goal-setting legislative environment, a hybrid form could be considered. An example of such hybrid form is a regime that could be referred to as 'prescriptive performance'. In this type of environment, the regulator (or the authority acting on behalf of the regulator) will imposed self-regulation for a set of 'mandatory' governance processes. E.g., there could be a requirement to develop and implement an HSE management system to manage occupational health and safety, process safety, and environmental aspects. The precise scope and contents of this system would be up to the operator / licensee to decide, in this example the regulations are prescriptive in terms of specifying 'what' to do but are goal setting in 'how' this is achieved.	Adopt a prescriptive performance-based legislative regime. This type of regime is seen as providing a good balance between prescriptive requirements on specific HSE aspects and allowing the operators / licensees to help develop and implement good HSE practices in their operations. In this type of environment, the regulator (or the authority acting on behalf of the regulator) will imposed self-regulation for a set of 'mandatory' governance processes. Also, a prescriptive performance-based legislative regime is seen as a good cultural fit for the Uganda legislative environment. It is recommended, as a minimum, that the following is considered prescriptive: - The need to develop and implement a HSE management system - The need for the HSE management system practices to cover all phases (from exploration, development, operations, and decommissioning) - The need for the HSE management system to comprise a set of 'processes', e.g., risk management, management of plant and organizational changes, the definition and management of HSE critical systems, competence assurance of employees through recruitment and training, emergency response. For some of these HSE management system processes, additional requirements may be prescribed. E.g., for risk management the regulator may decide to add prescriptive rules on risk assessment scope, methodology or tools. Risk criteria to be adopted by the operator / licensee may be prescribed. Alternatively, these may be left to the operator/ licensee to decide, e.g., in this self-regulatory climate the operator / licensee may be able to determine the risk criteria to be adopted for risk assessment (note: as is currently the case). A third option would be to refer to internationally acknowledged codes and standards, applicable on this subject. Reference to acknowledged industry codes and standards, where appropriate and available is recommended.
0-2-1	Roles and Responsibilities	Duties Roles and Responsibility (Authority/ regulator, Licensee, Operator, Contractors, Employees, Third party employees)		In enforcing the HSE regulations, the duties, roles and responsibilities of Parliament, Ministries and Authorities are transparent. Parliament issues the acts, the Ministry of Energy and Mineral Development enforces, as regulator, the HSE regulations, and the Petroleum Authority of Uganda acts as authority to implement the regulations. A similar hierarchy is applied to other acts and regulations.	**Opportunity to Improve:** Enforcement of regulations requires a significant amount of resources, both in terms of numbers as well as capabilities (i.e., diverse areas of expertise to be covered). A way of offloading this pressure is to introduce a certification scheme for products, services, personnel competence etc. Certification schemes could be introduced to the management systems and underlying processes required to be implemented under Uganda HSE regulations.	Consider introducing a certification scheme for specific systems, products, services and personnel competence. E.g., this scheme could be applied to hardware systems, equipment or components, such as drilling rigs, mechanical packages, electrical equipment and components, lifting equipment.
0-2-2					**Opportunity to Improve:** Another option to relief the work pressure on the Authority, is to adopt a regime using Independent Competent Persons (ICP). Other terminology like 'Verifier' or Independent Verification Body (IVB) are also found. E.g., this practice is found in UK and Abu Dhabi. An operator or licensee must appoint one (or more) ICP or IVB to carry out verification based on an 'assurance scheme' (or: verification scheme) for critical systems and/or activities associated with safety, environment etc. The scope of the verification can be selected. E.g., in the UK the 'verification scheme' adopted by the Health and Safety Executive (HSE) is limited to Safety and Environmental Critical Elements required to manage Major Accident Hazards (MAH). In the UAE systems the assurance scheme is applied in a much broader sense, i.e., covering systems and activities critical to managing all health and safety hazards (occupational health, occupational safety, MAH/ process safety) as well as environmental aspects. In the UK the ICP must be an independent third party. In UAE, the IVB may be from within the operator or licensee organization, if independence from the organization(s) tasked with carrying out the HSE critical integrity activities can be demonstrated. Alternatively, the IVB may be an outside consultant/contractor. The IVB may be a team of several individuals where this is required to ensure an appropriate level of competency or to complete verification tasks in a reasonable period.	Consider introducing a formal assurance regime, at least for managing major accident hazards or process safety hazards. In this case a framework or process to managing these hazards must be defined, e.g., encompassing the following steps: - Identify major accident hazards - Assess, evaluate and eliminate associated risks - Define safety and environmental-critical elements (and activities) - Develop performance standards - Define and operate verification scheme - Ongoing audits and reviews It is noted that the introduction of an assurance or verification regime as described above implies that major accident hazards are managed similar to the regimes like offshore UK, Australia, UAE, i.e., through performance standards.
0-3	Hierarchy	Hierarchy of legislation (Act - regulations - guidelines)		The Uganda legal and regulatory Health, Safety and Environment (HSE) framework is a two-tier hierarchy consisting of an act and the accompanying regulations. The Petroleum (Exploration, Development and Production) Act of 2013 (/1/), issued by Parliament, is supported by the current Upstream HSE Regulations 2016 (/2/) as well as the Upstream Exploration, Development and Production Regulations 2016 (/3/). The regulations are not accompanied by other guiding documents.	**Opportunity to Improve**: Adopting at least one additional layer of legislative documentation below the regulations means that a distinction can be made between a regulation (defining requirements) and a guiding document (describing in more detail 'how' to implement the regulation) is seen as a great improvement and allow for standardized interpretation of the regulations. The guiding documents could be worded as guidance notes (i.e., not prescriptive), approved codes of practice or as standards (more prescriptive). Having an act and regulations without guidelines has several implications for the regulations. First of all the regulations will be detailed in some places, and high-level in other places, leaving a sense of incoherence (it is noted that this discrepancy is also related to the fact that the regulations are both prescriptive as well as goal-setting, as explained in ID 0-1). Similar regulatory regimes across the world have introduced the guidelines (or: approved codes of practices) as a means to distinguish what is 'mandatory' (i.e., the regulations), and what is recommended (i.e., the guidelines). The above means that often the process of modifying and approving the guidelines is easier than that required for the regulations. It is noted that the last two points may not apply to the Uganda's legislation, as it is understood that any guideline issued has a similar legal status as a regulation. Still, the fact that a distinction can be made between a regulation (describing 'what' to do) and a guideline (describing in some detail 'how' to implement the regulation) is seen as a great advantage that will the benefit the readability of the regulations.	A new hierarchy of legislative documents should be introduced, by adding guidelines (or: approved codes of practice) to support the regulations. This will allow a distinction to be made between a regulation (describing 'what' to do) and a guideline (describing in some detail 'how' to implement the regulation). Also, this will allow the modification and approval process for regulations and guidelines to be decoupled, should this be considered in the future.

0-4-1	Terminology				**Opportunity to Improve:** Use of the term "Environment" in Regulation /2/ is unclear, i.e. does it relate to "working environment" or "external environment/nature"? See the use in e.g. Section 4.	Define the terms environment and working environment and use these consistently in the Act and the Regulations.
0-4-2					**Opportunity to Improve:** Terms for risk reducing measures are unclear/not defined: The term "Barriers" are used in Regulation /2/, but not defined in Section 2. Both "solutions" and "barriers" are used in Section 16, but barrier not explained. Sec 16 (1)(b) should refer to Sec 17 (1). In Regulation /3/ barriers is not defined and only applied for well barriers. The term "barrier" is not applied in Act /1/. To be able to fulfil the requirement /2/ Section 17 Barriers (3) and (4) there needs to be a common understanding/overview of all the barriers. In Regulation /3/ the term "critical equipment" is defined and used, the term is used once in Regulation /2/, and not applied in Act /1/. In addition, see other another Observation regarding used of "critical equipment" in Regulation /3/. In Regulation /2/ the term "safety systems" is defined and used, the term is used twice in /3/ (same requirement, once for onshore and once for offshore), and not applied in Act /1/. In addition, in /2/ "Safety function" linked to "Safety system" is defined and used.	Define the terms barriers, critical equipment and safety systems. Review and update the Regulation /2/ and /3/ according to the defined definitions.
0-4-3					**Opportunity to Improve:** Ref. /2/ Section 38. Process safety system: The use of "safety system" Section 38 seem to be a mix of requirements to a "safety management system" and to "safety system that realizes one or more active safety functions" (ref. definition in Section 2). E.g. (1)(a)-(e) seems to be about a management system, while (1)(f)-(k) and (2) seem to be about a physical safety system and not a management system.	Update /2/ Section 38 such that the requirement is clear regarding a "Process safety management system" or "Process safety systems".
0-5	Liability	Workers, General public, Environment, Assets		/1/ Section 145 - Suspension of petroleum activities /1/ Section 175 - Liability for damage caused /2/ Section 168 - Power to prohibit the use of installation or facility /3/ Section 102 - Disruption to continuous operation of facility	**Opportunity to Improve:** Ref. /1/ Section 145 (Suspension of petroleum activities) refers to Section 143 of the Act (Emergency preparedness against deliberate attacks), i.e., the Regulator can suspend activities in case of attacks against facilities. It is noted that Ref. /2/ Section 168 (Power to prohibit the use of installation or facility) also provides the Regulator with the rights to suspend operations in case the management of major accident hazards does not meet regulatory requirements. Finally, Ref. /3/ Section 102 (Disruption to continuous operation of facility) clause 4 provides the Regulator with the rights induce suspension in case of extreme weather, political instability including war that may lead to disruption of petroleum activities, operations resulting into acute pollution to the environment, and any other condition likely to affect public or employee's health and safety or safety of property.	Update Ref. /1/ Section 145 (Suspension of petroleum activities) to include all possible causes for the Regulator to suspend operations. This should include not only suspension of activities in case of attacks against facilities, but also those mentioned in Ref. /2/ Section 168 (Power to prohibit the use of installation or facility) and Ref. /3/ Section 102 (Disruption to continuous operation of facility). In this case Ref. /2/ Section 168 (Power to prohibit the use of installation or facility) and Ref. /3/ Section 102 (Disruption to continuous operation of facility) should be amended accordingly.
0-6	Interfaces	O&G Resource Management (Non-HSE Regulations)			**Opportunity to Improve:** It is noted that requirements relating to resource management are included in the law and regulations.	It is essential for the Uganda government to ensure that independent regulations relating to resource management in the petroleum activities are established and followed. Requirements regarding resource management are deemed of such of importance that it is recommended that these are removed from the HSE regulations and covered in a more appropriate area.
0-7	Inconsistencies	Onshore and Offshore			**Opportunity to Improve:** Ref. /3/ Part VII (Sec. 76-111) for onshore vs. Part VIII (Sec. 112-121) for offshore has different content and requirements. In general, more detailed content and requirements for onshore, e.g.: 1) Many technical system and equipment requirements for onshore, e.g. pipeline, valves and machinery, and not for offshore, 2) Maintenance, monitoring and operational requirements for onshore, but not for offshore, 3) Different requirements related to "submit to Authority", see Sec. 109 vs. Sec. 121.	Regulation /3/ Sec. 76-111 and Sec. 112-125 should be reviewed and compared. All information that is relevant for both onshore and offshore should be considered in overarching/other sections of the regulations. An onshore and offshore 'only' section should only include requirements relevant for onshore or offshore, respectively.

0-8-1	Other	Logical Order Repeated text			**Opportunity to Improve:** Content and order of parts and sections of Regulation /2/ are not always logical and several requirements are included several times. This make it difficult to get an overview of different areas in the regulation. Example duplication: Emergency Preparedness: Emergency response: Sec. 7(1)(d), (2), Sec. 22, Sec. 37 (1)(l), Sec. 38 (1)(b)(x) and (1)(e), Sec. 39 (2)(e), Sec. 74(4), Sec. 88 1(f) and Part VIII and Form 4 Example of not logical placing: PART III—OCCUPATIONAL HAZARDS, Process Safety. Sec. 44-47 not about Process Safety, except 46 (2)(b)) **Sub-observation 1:** /2/ Section 37, 38 (and 39) covering many similar requirements/topics: Sec. 37- "..develop process safety management.." with a list (a)-(n) Sec. 38- "..has a process safety system.." with a list (a), (b) (i)-(xiii),-(l) In addition: 1) Section 38 has two requirements to change ((1)(b)(i) and (1)(b)(Xii)) and two requirements for emergency planning ((1)(b)(x) and (1)(e)) 2) Sections 37 and 38 repeat several items covered also in other places in Regulation /2/ **Sub-observation 2:** /2/ Section 42. Installations, systems and equipment: 1) Not logically placed in the regulation, i.e. general requirements to safety systems between sections with specific safety system requirement. 2) Most requirements already covered in Sec. 37 (1)(h) and Sec. 38 (1)(h),(k) **Sub-observation 3:** /2/ Section 96. Firefighter equipment: 1) Not logical placed in the regulation between 95 and 97 2) Requirements general and already coved by 93 and 94 **Sub-observation 4:** /2/ Section 102(1) identical to 103(1)	**Opportunity to Improve:** Regulation /2/ may be simplified by covering the requirement once where it fits best and deleting all the repeating requirements. E.g., it should be sufficient to only include emergency preparedness in Part VIII. In addition topics that fits together should be covered in the same place in the document. Specific Examples: 1) Sec. 36-39 and 42 should be restructured into one section covering all common requirements related to a safety system. These comments requirements do not need to be repeated in the sections for particular safety systems. 2) Sec. 45 "Safety function" is relevant for all safety systems. This section should be deleted and be a part of Section 17 Barriers. See also recommendation regarding term (barrier, safety system, safety function). 3) Structure of Regulation /2/ Section 34. "Provision of showers" differs from the requirements defined in III. Consider moving this requirement to Part VI. Further the structure of the requirements given in Part V (e.g., Sec. 66) should be presented in a logical order.
0-8-2					**Opportunity to Improve:** /2/ Sec. 20 Safety signs, sub-section (1)(b) is not related "Safety signs".	Move Regulation /2/, Section 20, (1)(b) to relevant the part of the Regulation or delete if already covered.
0-8-3					**Opportunity to Improve:** /2/ Section 29 "Hazardous material and substances" and Section 30 "Handling or storage of hazardous substances" are both about handling and storage of hazardous substances.	Restructure Regulation /2/, Section 29 and 30 to avoid duplication.
0-8-4					**Opportunity to Improve:** /3/ Section 129 (1) "The licensee shall submit to the Authority copies of all reports of petroleum activities undertaken under the Act and these Regulations." Unclear if this is a necessary and appropriate requirement. In addition Sections 130-135 gives details of reports required.	The requirement in Regulation /2/, Section 129 (1) should be changed to "Other reports than referred to in Sec. 130-135 should on request be submitted to the Authority".
0-8-5					**Opportunity to Improve:** In both /2/ and /3/ "standards approved by the Authority" is stated however it is not clear if there is a list of approved standards available for the licensee.	Clarify the intent of the statement "standards approved by the Authority" to the user, is a list available or should the licensee submit a list to the Authority for approval.
0-8-6					**Opportunity to Improve:** /2/ Sec. 7 "Safety factors during construction": unclear if the requirements specified are for the design of the final facility or are requirements for the construction phase, ref. heading "..during construction". It seems that this section is meant for the final facility. In this case it should be clear that the stipulations are purely related to the design requirements, e.g., (1)(c) "material safety data sheets", (d) "evacuation program" and (e) "wearing of PPE" are for the operational phase. If the requirements are purely related to the design requirements, then this section does not seem to be complete, e.g., only a limited number of safety systems is included.	Regulation /2/ Section 7 should be deleted since it is already are covered in other places in the regulation, and if some of the requirements are not covered they should be added where relevant.
0-8-7					**Opportunity to Improve:** /2/ Section 161 "Effluent and drainage disposal at facility or during petroleum activity" is about pollution of the environment and referring to "the Act, regulations and guidelines made under the National Environment Act". Section 160 is also about Environment, but could also be relevant for fire/explosion if ignited.	Consider if Regulation /2/, Section 161 (and possibly Section 160) could be deleted from /2/ and fully covered under the Act, regulations and guidelines made under the National Environment Act.
0-8-8					**Opportunity to Improve (minor):** /2/ Table of content/Arrangement of Regulations is missing Section 155. Subsequently, from Section 155 onwards the numbering of sections in the table of content is out of sync with the section numbering of the regulations. E.g., in table of content "Recording of incidents, hazards and accidents" is Section 156, in the regulations it is numbered Section 155.	Regulation /2/, Section 155: update the table of contents to correct the numbering of sections.

ID	Topic	Aspect	Reference to Standards	Reference to Uganda Petroleum Regulations /1/ The Petroleum Act, 2013 Act 3 /2/ The Petroleum HSE Regulation, 2016 No. 46 /3/ The Petroleum EDP Regulation, 2016 No. 47	Gap / Opportunity to Improve	Recommendation
1	**Commitment to HSE**					
1-1	Leadership, commitment and responsibility		ISO 31000 Ch. 5.2 and 5.4.2-4, IOGP 510 Fundamental 1 and Element 1, ISO 17776 B.8	/1/ Section 174 - Responsibility for commitments /2/ Section 4 - General duties of licensee /2/ Section 6 - Management of health, safety and environment (b) /2/ Section 13 - Major accident prevention policy (2)(d) /2/ Section 24 - Responsibility of person-in-charge /2/ Section 36 -Requirements relating to petroleum activities (2) /3/ Section 3 - Responsibility of the licensee /3/ Section 32 - Person-in-charge (3), (4), (5)	**Opportunity to Improve:** Similar text is repeated several times in Regulation /2/. An example of this is a generic requirement for the licensee to ensure safe operation (see references mentioned).	Review Regulation /2/ for duplications, and define the place to define an overarching requirement. Delete any further mentions of it in the document.
1-2	HSE Culture		ISO 31000 Ch. 4 and 5, IOGP 510 Fundamental 1 and Element 1, 5 and 8		**Gap:** A HSE culture develops over time based on individual and company values, attitude, behaviour, and competence. The importance of actions and attitudes of leaders and managers in building a HSE culture must be highlighted to drive improvement. Further, compliance to workforce involvement requirements ultimately influence the HSE culture. Several requirements are included in the regulations address the role of managers; however, no requirements that specifically address HSE culture were found.	It is recommended that the regulations set forth expectations to the HSE management system that can indirectly influence the HSE culture.
1-3	Compliance with legislation and industry standards			/1/ Section 88 - Work practices for licensees (1) /1/ Section 140 - Safety (1) /2/ Section 4 - General duties of licensee (2) /2/ Section 36 - Requirements relating to petroleum activities (1) /2/ Section 39 - Implementation of the process safety programmed (1) /2/ Section 63 - Licensee's duty in ensuring a safe and healthy environment (1) /2/ Section 93 - Fire protection /3/ Section 3 - Responsibility of the licensee /3/ Section 98 - Consent to commence operations (3)(a) and Section Facility operation (1)	**Opportunity to Improve:** Similar text several times regarding "carry out petroleum activities in accordance with the Act, these regulations, any other applicable law, standards approved by the Authority and best petroleum industry practices". E.g. /2/ Sec. 4(2) and Sec. 36(1).	Each Act and Regulation should have this generic requirement once and early in the Act or Regulation. If there are relevant acts, regulations and standards for the given section/requirement in regulation /2/ there could be added information in a guideline with specific reference information.
1-4	HSE competence		ISO 31000 Ch. 5.4.4, ISO 17776 Ch. 4, IOGP 510 Element 3	/1/ Section 146 - Qualifications /2/ Section 21 - Training in safety and working environment (1) /2/ Section 153 - Training of rescue teams and persons in first aid /3/ Section 98 - Consent to commence operations (3)(c)	**Opportunity to Improve:** General competence/experience requirements except for the references noted for Regulation /2/. The requirements given in /2/ are quite generic except for radiation. It may be that the requirements related to HSE competence are referred to in another national Act, Regulation or guideline with further details. E.g., these may be included in the Occupational Safety and Health Act, ref. /2/ 21(1) "The licensee shall ensure that every employee has the competence necessary to carry out his or her duties in accordance with the Occupational Safety and Health Act, 2006 and these Regulations".	Verify if another Act or Regulation, i.e. Occupational Safety and Health Act, 2006, covers more detailed due to HSE competence. If not consider to include more detailed requirements or references in a Guideline.
1-5-1	Workforce involvement		ISO 17776 C.16.3, IOGP 510 Element 3	/2/ Section 25 - Responsibility of the employee /2/ Section 37 - General requirements relating to process safety (1)(a) /2/ Section 63 - Licensee's duty in ensuring a safe and healthy	**Opportunity to Improve:** /2/ Section 63 - Licensee's duty in ensuring a safe and healthy environment (1) refers to Section 168 and not to Section 162.	Correct the reference in /2/ section 63.
1-5-2					**Opportunity to Improve (minor):** In /2/ Section 164 the heading is "safety committee" while all the requirement is about "working environment committee".	Align the text and section heading in /2/ Section 164.
1-6	Stakeholder outreach		ISO 31000 Ch. 5.2, IOGP 510 Element 4	/2/ Section 116 - Emergency plan (3), (4) /2/ Section 138 - Pipeline warning signs /2/ Section 139 - Group pipeline signs /2/ Section 159 - Inquiry into accidents /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(a)(iii)	**Opportunity to Improve:** only /2/ Section 159 mentions outreach to the public. This is when a person conducting an inquiry under the HSE Regulation may open the inquiry to the public and conduct the inquiry in a manner and under conditions he or she considers fit for ascertaining the cause and circumstances of the incident or accident. An important means to reach out to public is the safety concept. At the moment, the safety concept (once compiled by the operator or licensee) is sent to the Authority for approval. If the safety concept covers 'offsite risk', then consultation with the public about the content of the safety concept the public should also be considered.	Consider introducing a consultation process with the public on the content of the safety concept. This could be of relevance if the safety concept addresses offsite risk, i.e., hazards and risks that could affect the public.
1-7-1	Stakeholder reporting	Safety		/2/ Section 14 - Safety concept (3),(5),(6) /2/ Section 15 - Review of safety concept (4) /2/ Section 18 - Acceptance criteria (4) /2/ Section 22 - Instructions and emergency procedures (2)	**Opportunity to Improve:** /3/ Section 99 (3) "The licensee shall submit to the Authority for approval a code of operations for the facility." What does this entail; no further details are provided. In addition, /3/ Section 98 (1) "licensee shall apply to the Authority for consent to commence operation". These two requirements are not aligned.	Clarify the requirements in Regulation /3/ Section 99 (3) vs. Section 98 (1).
1-7-2				/2/ Section 27 - Audit of safety management systems (1) /2/ Section 29 - Hazardous material and substances (6) /2/ Section 99 - /2/ Section 154 - Handling incidents, hazards and accidents (4) /2/ Section 155 - Recording of incidents, hazards and accidents (2) /2/ Section 157 - Notification	**Opportunity to Improve:** /2/Section 155(2) requires "record incidents, hazards and accidents at a work place which shall form part of the monthly incident report to the Authority". Section 157 (4) requires "within fifteen days from the end of each month in which the incident or accident occurred, submit to the Authority a report containing a summary of any incidents or accident that have occurred during the month including a record of employees who have been injured". It is unclear if 155(2) and 157(4) are the same requirement or not.	Review all the requirements regarding the reporting of incidents (with and without form, i.e. Sections 155, 157 and 158) and development of the investigation report. Modify to: 1) Ensure that the Authority receives the required and wanted information and 2) Make it easier for the operator/licensee to understand and follow the requirements for reporting.
1-7-3				/2/ Section 158 - Reporting obligation /2/ Section 160 - Spillage at facility during petroleum activity /2/ FORM 2 - MINIMUM INFORMATION TO BE INCLUDED IN A SAFETY CONCEPT	**Opportunity to Improve:** /2/ 157 (1) requires "..serious injury to any person or pollution of the environment, the licensee shall send a notification using Form 5". On inspection, Form 5 appears fit for reporting on a "person", but does not seem suitable for reporting on "pollution of the environment".	Consider to update the text in requirement Section 157(1) or to modify Form 5.
1-7-4		Occupational health		/2/ Section 154 - Handling incidents, hazards and accidents (4) /2/ Section 155 - Recording of incidents, hazards and accidents (2) /2/ Section 157 - Notification	**Opportunity to Improve:** There are requirements to perform risk assessments for health and safety; however, there is no specific requirement for addressing occupational accident and health hazards, similar to major accident hazards.	Consider the need for develop and submitting a report on occupational accident and health hazards to the Authority similar to the Safety concept report for major accident hazards.

ID	Topic	Aspect	Reference to Standards	Reference to Uganda Petroleum Regulations /1/ The Petroleum Act, 2013 Act 3 /2/ The Petroleum HSE Regulation, 2016 No. 46 /3/ The Petroleum EDP Regulation, 2016 No. 47	Gap / Opportunity to Improve	Recommendation
3	**Manage risk**					
3-1-1	Management systems	Development	ISO 31000 Ch. 5.5, IOGP 510 Fundamental 4	/2/ Section 13 - Major accident prevention policy (5) /2/ Section 37 - General requirements relating to process safety (1) /2/ Section 38 - Process safety system (1)(a)-(e) /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS /3/ Section 25 - Application for license for the placement and operation of facility (2)(m)	**Opportunity to Improve:** /2/ FORM 1, 1.(c) "A safety management system shall include within its scope the general management system, ...". This statement can be confusing as it suggest that the general management system to be sub-part of the safety management system. If the intent is to let the safety management system to be a part of the general management system, then this needs to be reworded. Note: For general comments and recommendations to HSE Management system see ID 1 in this Table.	Rewrite the text /2/ FORM 1, 1.(c) to be in line with the intent.
3-1-2		Planning and implementation	ISO 31000 Ch. 5.5 and 6.5.3, IOGP 510 Fundamental 4 and Element 7 and 8	/2/ Section 13 - Major accident prevention policy (5), (6) /2/ Section 14 - Safety concept (1)(a) /2/ Section 19 - Community health and safety /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(d)(i), (g)(i) /3/ Section 26 - Criteria for the grant of a facility license (1)(b)		
3-1-3		Assurance, certification, verification	ISO 31000 Ch. 5.6, IOGP 510 Element 9	/2/ Section 27 - Audit of safety management systems /2/ Section 37 - General requirements relating to process safety (1)(m) /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(h)		
3-2-1	Operating manuals and procedures		IOGP 510 Element 7	/2/ Section 16 - Risk reducing measures /2/ Section 17 - Barriers /2/ Section 20 - Safety signs /2/ Section 23 - Manual of instructions /2/ Section 37 - General requirements relating to process safety (1)(g) /2/ Section 38 - Process safety system (1)(b) /2/ Section 39 - Implementation of the process safety programme (2)(e) /2/ Section 56 - Isolation of electrical equipment /2/ Section 74 - General provisions relating to confined space /2/ Section 77 - Restricted areas /2/ Section 78 - Erection of fences (2) /2/ Section 79 - Equipment identification within the facility /2/ Section 85 - Skin protection and special clothing /2/ Section 90 - Records of protection equipment /2/ Section 92. Defective protection equipment /2/ Section 141 - Safe operating practices for pipeline systems /2/ Section 142-147 - Additional Safety Requirements for Tank Vehicles /2/ Section 169 -Shore station (2), (3) /2/ Section 170 - Control and monitoring of vessel and aircraft /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(d)(i) /3/ Section 42 - Approval to drill a well (5)(b) /3/ Section 98 - Consent to commence operations (3)(g), (h) /3/ Section 104 - Information and instruction	**Opportunity to Improve:** In /2/ Sections 142-147 there are several detailed safety requirements for tank vehicles. Some of the requirements are overlapping.	Simplify and reorganize Regulation /2/, Sections 142-147. Include the main high level requirements in the Regulation and add any detailed requirements in a corresponding guideline.
3-2-2	Safe work practice			/2/ Section 10 - Planning and implementation of risk assessment (7) /2/ Section 16 - Risk reducing measures /2/ Section 17 - Barriers /2/ Section 37 - General requirements relating to process safety (1)(d),(e) /2/ Section 53 - Safety procedures in electrical installations /2/ Section 54 - Safety watcher /2/ Section 56 - Isolation of electrical equipment /2/ Section 57 - Control devices, switches, cords and cables /2/ Section 62 - Working environment (1)(b) /2/ Section 63 - Licensee's duty in ensuring a safe and healthy environment (2)(c),(f) /2/ Section 127 - Machinery (2) /2/ Section 128 - Maintenance and repair of machinery /2/ Section 140 - Identification of pipeline installations /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(d)(i) /3/ Section 105 - Maintenance of pressure systems	No comment	

3-3	Physical/technical risk reducing measures			/2/ Section 16 - Risk reducing measures /2/ Section 17 - Barriers /2/ Section 34 - Provision of showers /2/ Section 45 - Safety functions /2/ Section 64 - Proper work station design (1)(a) /2/ Section 78 - Erection of fences (1) /2/ Section 87 - Emergency escape device /2/ Section 80 - Safety appliances, equipment material, device and clothing /2/ Sections 40, 41, 43, 48, 49, 50, 51, 87, 93-103, 110, 111 - Safety systems /2/ Sections 81-85, 88, 89 - Personnel Protective equipment /2/ Section 127 - Machinery (3) /2/ Section 130 - Human-machine interface and information presentation /3/ Section 81 - Rotating machinery	Reference is made to Technical Safety Opportunity to Improve ID 5-1-1 to 5-1-7.	
3-4-1	Asset integrity and reliability		IOGP 510 Element 6	/1/ Section 171 - Maintenance of property (1) /2/ Section 39 - Implementation of the process safety programme (2)(c) /2/ Section 69 - Process equipment maintenance (h) /2/ Section 95 - Manual fire-fighting equipment (4) /2/ Section 131. - Operation of mobile equipment (a) /2/ Section 134 - Safety requirement relating to plants, tools and equipment /2/ Section 136. Condition control and condition evaluation /2/ Section 141 -Safe operating practices for pipeline systems (7) /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(d)(i), (iii) /3/ Section 22 - Field Development Plan (1)(e)(xii), (h)(v) /3/ Section 25 -Application for license for the placement and operation of facility (2)(h) /3/ Section 98 - Consent to commence operations (3)(i) /3/ Section 100 - Maintenance of facility /3/ Section 103 - Installation of pressure equipment or a pressure system	**Opportunity to Improve:** The requirement given in Section 100(5) states "Registration of failures and replacements in order to ensure compliance with specified criteria shall be included in the maintenance schedule." This statement may warrant further explanation. In particular what are the "specified criteria".	Update the text in /3/ Sec. 100 (5) to explain the intent of the requirement and evaluate if criteria should be defined.
3-4-2					**Opportunity to Improve:** For /2/ Section 69 "Process Equipment maintenance" only requirement (h) seems to fit under the heading of the section. Both the content and the placing of this section are unclear.	Review the need of /2/ Section 69. Consider if some of the requirements in Section 69 are (or: can be) covered in other parts of the Acts and Regulation, and if some of the more detailed requirements could be a part of a Guideline to other parts of Regulation /2/.
3-4-3					**Opportunity to Improve:** Reference is made to the discussion in Feedback Session meeting 4, on 12 March 2021, regarding asset integrity and corrosion. Several requirements covers the topic "corrosion" both for design and operation (see below). However, there may be some opportunity for improvement (see recommendation). /2/ Section 136 - Condition control and condition evaluation (3) The licensee shall consider and regularly carryout internal inspection with the view to detecting any possible corrosion and mechanical failure for pipeline systems where possible damage may entail consequences to safety or lead to significant economic loss. /2/ Form 1 - 2(d)(iii) (iii) the management and control of the risks associated with ageing equipment installed in the facility and its corrosion; /3/ Section 100 - Maintenance of facility (6) The facilities shall be periodically examined for corrosion detection, and corrosion protection systems and any devices installed shall be checked regularly to ensure effective performance. (8) Anti-corrosion performance monitoring shall be carried out in accordance with standards approved by the Authority and best petroleum industry practices. /3/ Section 22 - Field Development Plan (h) information about transport systems for the transportation of produced petroleum including— (v) corrosiveness evaluation over the planned lifetime of the system; /3/ Section 82 - Consideration of materials during design (2) The licensee shall, in selecting materials for a facility or auxiliary facilities— (b) ensure that materials meet standards approved by the Authority and best petroleum industry practices regarding strength, ductility, toughness, corrosion and durability, where applicable; /3/ Section 83 - Corrosion and decay of materials The licensee shall give consideration for protection against and monitoring of corrosion, erosion and other forms of decay of materials in planning and design of mechanical equipment and facilities. /3/ Section 87 - Heating facilities (2) The licensee shall take necessary measures to mitigate external and internal corrosion.	Regulation /2/ Section 136 is covered under a sub-heading "Additional Safety Requirements for Pipelines", while the requirement should be applicable to all safety critical equipment where corrosion may threaten the function of the equipment.
3-4-4	Contractor management		IOGP 510 Element 3	/1/ Section 125 - Provision of goods and services by Uganda entrepreneurs (3)(a) /1/ Section 168 -Requirements for management of petroleum activities (3) /2/ Section 3 - Responsibility of the licensee (2) /2/ Section 37 - General requirements relating to process safety (1)(e) /2/ Section 116 - Emergency plan (4)(d) /3/ Section 3 - Responsibility of the licensee (2)	No comment	

3-4-5	Training and performance assurance		IOGP 510 Element 3 and 7	/2/ Section 21 - Training in safety and working environment /2/ Section 33 - Chemical safety (1) /2/ Section 37 - General requirements relating to process safety (1)(d) /2/ Section 38 - Process safety system (1)(a) /2/ Section 39 - Implementation of the process safety programme (2)(d) /2/ Section 53 - Safety procedures in electrical installations (2)(b) /2/ Section 54 - Safety watcher (2)(b) /2/ Section 74 - General provisions relating to confined space (7), (8)(b) /2/ Section 77 - Restricted areas (3)(b) /2/ Section 91 - Instructions and training /2/ Section 94 - Fire-fighting equipment and systems for fire-fighting (4), (5) /2/ Section 115 - Duty to prepare, maintain and implement emergency plan (1)(c),(d) /2/ Section 116 - Emergency plan (2)(c) /2/ Section 118 - Review and testing of emergency plans /2/ Section 127 - Machinery (1) /2/ Section 129 -Training inexperienced employees in use of machinery /2/ Section 131 - Operation of mobile equipment (f) /2/ Section 132 -Use of welding plants /2/ Section 153 - Training of rescue teams and persons in first aid /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(a)(ii), (f)(ii)	**Opportunity to Improve:** /2/ Sections 115(1)(c) and 116(2)(d) are identical. In addition, Section 118 gives more details on the same topic.	Review and align text in /2/ Section 115 and 116. Consider to include requirements from Section 118 as Guideline to Sections 115 and 116.
3-5	Management of change		IOGP 510 Element 3	/2/ Section 37 - General requirements relating to process safety (1)(j) /2/ Section 38 -Process safety system (1)(b)(i),(xii) /2/ Section 63 - Licensee's duty in ensuring a safe and healthy environment (2)(d) /2/ Section 64 - Proper work station design (2) /2/ Section 150 - Medical facilities and first aid services (1) /2/ FORM 1 -MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS (2)(e) /3/ Section 101 - Modification of facility /3/ FORM 14 -APPLICATION FOR APPROVAL TO MODIFY A FACILITY	**Gap:** Management of change is mentioned in Regulation /2/. However, there is no specific requirement for adopting a management of change procedure in the Act or the Regulations. However, in Form 1, (2) the following matters shall be addressed by the safety management system (e) "the management of change including the adoption and implementation of procedures for planning modifications to or the design of new installations, processes or storage facilities". Hence formally addressing management of change is important cover in the safety management system, but there is no formal requirement to the effect. It is noted that "modification of facility" is addressed in Regulation /3/, Section 101, accompanied by a dedicated application form (Form 14).	Review if specifications related to change management of facilities in a form attached to Regulation /2/ are sufficient, legally. It is recommended to have a requirement in the Regulation for management of change, similar to Regulation /3/.
3-6-1	Emergency management	Major Accident Prevention Policy (MAPP)		/2/ Section 13 - Major accident prevention policy	No comment	
3-6-2		Emergency preparedness assessment		/2/ Section 114 - Emergency preparedness (2)	**Opportunity to Improve:** Regulation /2/ Section 114 (2) indirectly requires an emergency preparedness analysis. This could be a more specific requirement and should be a part of the risk assessment requirements.	Include a requirement to conduct an emergency preparedness analysis.
3-6-3		Emergency preparedness and response plan		/1/ Section 142 - General requirements for emergency preparedness (1) /2/ Section 14 - Safety concept (1)(d)	**Opportunity to Improve:** /2/ Part VIII - Emergency Preparedness is very comprehensive and several requirements are repeated, in addition to all the requirements in Form 4.	Regulation /2/ Part VIII can be simplified to highlight the main requirements related to emergency preparedness. Additional/more detailed information are/can be included in Form 4 and/or in associated Guidelines.
3-6-4				/2/ Section 37 - General requirements relating to process safety (1)(l)	**Opportunity to Improve:** Both /2/ Sections 115 and 116 and Form 4 cover requirements for the "Emergency plan".	Review /2/ Sections 115 and 116 and Form 4 and simplify/update the requirements. This should be conducted in conjunction with the recommendation for ID 3-6-3.
3-6-5				/2/ Section 38 - Process safety system (1)(b)(x) and (1)C /2/ Section 39 - Implementation of the process safety programme (2)(e) /2/ Section 113 - Requirements relating to emergency preparedness (1), (2)	**Opportunity to Improve:** /2/ Section 116(2)(a) "emergency plan for a facility that addresses all health and safety consequences of a major incident or accident occurring" does not seem to be relevant to be includes in the emergency plan. However, this could be identified and reflected in the results of a "risk and emergency preparedness analysis" (ref. Section 114 (2)).	Delete requirement /2/116(2)(a). Alternatively a requirement to conduct an emergency preparedness analysis (ref. ID 3-6-2), and this analysis to include this information, could be added.
3-6-6				/2/ Section 115 - Duty to prepare, maintain and implement emergency plan /2/ Section 116 - Emergency plan /2/ Section 126 - Emergency preparedness cooperation	**Opportunity to Improve:** With regard to implementation of an emergency plan for the facility in the event of an emergency, Regulation /2/ Sections 115(3) and 116(7) are almost identical. However the semantics are somewhat different; Section 115(3) mentions implementing the emergency plan in 115(3), whereas Section 116(7) uses "execute relevant Emergency procedure".	With regard to implementation of an emergency plan for the facility in the event of an emergency, Regulation /2/ Sections 115(3) and 116(7) should be aligned.
3-6-7		Emergency organization		/2/ Section 22 - Instructions and emergency procedures (1) /2/ Section 113 - Requirements relating to emergency preparedness (3) /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(a)(i) /2/ FORM 2 - MINIMUM INFORMATION TO BE INCLUDED IN A SAFETY CONCEPT, 5(b)	**Gap:** There is no requirement to ensure an emergency organization. However, /2/ Form 2 - "Minimum information to be included on a safety concept", (5)(b) require the description of the organization of alert and intervention. Other references, indicate a responsibility for employees in an emergency situation.	Include a requirement for the operator / licensee to ensure to have in place a robust site-specific emergency response organization that it is able to handle hazard and accident situations in an efficient manner. All the actions defined in an emergency response procedure need to be covered by identified persons in the emergency organization. These persons can be employees with other roles/tasks in normal operation.
3-6-8				/2/ FORM 4 - INFORMATION TO BE INCLUDED IN AN EMERGENCY PLAN, 3	**Opportunity to Improve:** /2/ Sections 22(1) and 113(3) are identical.	Review and align Regulation /2/ Sections 22(1) and 113(3).
3-6-9		Information and communication		/2/ Section 115 - Duty to prepare, maintain and implement emergency plan (1)(b)(iv) /2/ Section 116 - Emergency plan (8) /2/ Section 117 - Information for local community /2/ Section 122 - Emergency alerts and notification. /2/ Section 144 - Prohibition of parking on the highway (3) /2/ FORM 4 - INFORMATION TO BE INCLUDED IN AN EMERGENCY PLAN, 3(b)	No comment	
3-6-10		Normalizations after emergency response		/1/ Section 125 - Normalization measures /1/ Section 142 - General requirements for emergency preparedness (2)	No comment	

ID	Topic	Aspect	Reference to Standards	Reference to Uganda Petroleum Regulations /1/ The Petroleum Act, 2013 Act 3 /2/ The Petroleum HSE Regulation, 2016 No. 46 /3/ The Petroleum EDP Regulation, 2016 No. 47	Gap / Opportunity to Improve	Recommendation
4	**Learn from incidents and assurance activities**					
4-1	Incident investigation	Internal and external investigation	IOGP 510 Element 9	/1/ Section 147 - Commission of inquiry /2/ Section 37 - General requirements relating to process safety (1)(k) /2/ Section 38 - Process safety system (1)(b)(ix) /2/ Section 120 - System for transference of information (2) /2/ Section 154 - Handling incidents, hazards and accidents (4) /2/ Section 155 - Recording of incidents, hazards and accidents /2/ Section 157 - Notification /2/ Section 159 - Inquiry into accidents and incidents /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(g)(ii) /2/ FORM 5 - NOTICE OF INCIDENT OR ACCIDENT	**Opportunity to Improve:** /2/ Section 154 (4) The licensee shall systematically investigate an incident, hazard or accident to find out its causes and report to the Authority within seven days after the completion of the investigation. In addition monthly incident shall be reported to the Authority, ref. Sec. 155 (2), and records with the cause of the injury, ref. Sec. 155 (4)(d).	The requirement should be more specific to ensure that it is the right level of investigation based on the incident, hazard or accident that has occurred and reported to the Authority. For some minor incidents or hazards it could be sufficient with a simple investigation done in relation to recording, ref. Section 155(4)(d). The Authority will in addition get a monthly report with all incidents, hazards and accident ref. Section 155 (2) and could therefore ask for additional investigation report if wanted. It is recommended to consider to let Section 154(4) referring to investigation reports for serious incidents to be reported to the Authority, ref. Section 157(1) and (2).
4-2	Monitoring, measurement and metrics		ISO 31000 Ch. 6.6, IOGP 510 Element 9 IOGP 456, API RP 754	/2/ Section 63 - Licensee's duty in ensuring a safe and healthy environment (2)(a), (f) /2/ Section 121 - Monitoring of emergency preparedness /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(g)(iii) /3/ Section 91 - Monitoring and reporting requirements /3/ Section 92 - Modifications of monitoring schedule /3/ Section 100 - Maintenance of facility (1), (4), (6), (7), (8), (10), (11)	**Opportunity to Improve:** Goals/KPIs and monitoring of these are covered in /2/ Sec. 63 (2)(a) and (b) and Form 1, 2(g)(iii). Complete text is given below. There should be a clearer link between the three requirements and possibly to the requirements in /3/ Section 100. Sec. 63 (2) "The licensee shall put in place measures to ensure systematic health and safe working conditions and shall—" (a) "establish goals for health, safety and environment" (f) "ensure continuous monitoring and control of the working environment and the health of the employees when necessitated by risk factors in a facility or during petroleum activities". Form 1, 2(g)(iii) "the procedures shall also include performance indicators such as safety performance indicators and other relevant indicators"	There should be a clearer link between the three requirements in /2/ Section 63 and Form 1 to ensure a consistent establishment and follow up of the goals/KPIs. In addition, this could also be linked to /3/ Section 100 to ensure goals/KPIs and monitoring of safety critical equipment/system to include technical KPIs and some leading indicators. A relevant description is given in /2/ Sec. 2 "Acceptance criteria (b), but should also be a part of e.g. /2/ Section 63 and Form 1. If a guideline is established some examples of leading and lagging indicators can be given. A reference can be: - IOGP Report 456 – Process Safety – Recommended Practice on Key Performance Indicators - API Recommended Practice (RP) 754, Process Safety Performance Indicators for the Refining and Petrochemical Industries
4-3-1	Auditing and inspection			/2/ Section 27 - Audit of safety management systems /2/ Section 37 - General requirements relating to process safety (1)(m) /2/ Section 38 - Process safety system (1)(b)(xi) /2/ Section 134 - Safety requirement relating to plants, tools and equipment (2), (3) /2/ Section 136 - Condition control and condition evaluation /2/ Section 165 - Inspections and investigations /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(h) /3/ Section 98 - Consent to commence operations (2), (3)(b) /3/ Section 100 - Maintenance of facility (12) /3/ Section 106 - Keeping of records and registers of pressure systems /3/ Section 186 - Power of authorized officers /3/ Section 194 - Regulatory supervision	**Opportunity to Improve:** Unclear what is meant by /2/ Sec. 27: (2) "The licensee shall set and monitor other aspects of the safety management system and performance standards for the audit and review process", and (4) "The licensee shall establish performance standards to identify responsibilities, timings, and systems for reviewing the safety management systems". 1) What is the requirement to the licensee in, i.e. what to do? 2) What is meant by "safety management system"? "The safety systems/barriers" or "The management system" as in Form 1. 3) What is "performance standards" referring to here? Only mentioned in these two paragraphs.	Clarify the questions under Opportunity to Improve and update the text to be more clear if possible. One option is to include a Guideline with more details to clarify.
4-3-2					**Opportunity to Improve:** Two requirements are presented in /2/: 1) Section 27 - Audit of safety management systems, and 2) Section 165 - Inspections and investigations The frequency set is annual, however, the involved parties differ. The difference in intent between these two is not described. Section 27 defines that the licensee shall engage an independent person to carry out the audit (and submit a report to Authority), while Section 165 states that the Authority shall organize the inspection and at least one on-site inspection every twelve months.	Clarify the difference in intention of /2/: 1) Section 27 - Audit of safety management systems, and 2) Section 165 - Inspections and investigations
4-4	Management review and continuous improvement		ISO 31000 Ch. 5.7, IOGP 510 Element 10	/2/ Section 6 - Management of health, safety and environment (a) /2/ Section 62 - Working environment (1)(a) /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(a)(i), 2(g) and 2(h)	No comment	

ID	Topic	Aspect	Reference to Standards	Reference to Uganda Petroleum Regulations /1/ The Petroleum Act, 2013 Act 3 /2/ The Petroleum HSE Regulation, 2016 No. 46 /3/ The Petroleum EDP Regulation, 2016 No. 47	Gap / Opportunity to Improve	Recommendation
5	**Process Safety/ Major accident**					
5-1-1	Technical safety Systems/Equipment/ Barriers	Design	ISO 17776 Ch. 5, IOGP 510 Element 5	/2/ Section 14 - Safety concept (1) (c) /2/ Section 17 - Barriers (1), (2) /2/ Section 37 - General requirements relating to process safety (1)(h), (2), (3) /2/ Section 38 - Process safety system (1)(f)-(k) /2/ Section 40 - Gas release system /2/ Section 41 - Depressurization and flare system /2/ Section 42 - Installations, systems and equipment /2/ Section 43 - Emergency shutdown system /2/ Section 46 - Material handling, transport routes, access and evacuation routes /2/ Section 48 - Control and monitoring system /2/ Section 49 - Control room /2/ Section 50 - Ballast system /2/ Section 51 - Drainage systems /2/ Section 53 - Safety procedures in electrical installations (7)(i) /2/ Section 68 - Ventilation and indoor climate (2) /2/ Section 94 - Fire-fighting equipment and systems for fire-fighting incl. Sec. 95-103 /2/ Section 110 - Fire and gas detection system /2/ Section 111 - Escape exits /2/ Section 130 - Human-machine interface and information presentation (2), (3) /2/ Section 133 - Internal combustion engine exhaust /2/ Section 134 - Safety requirement relating to plants, tools and equipment (1)(d) /2/ Section 135 - Arrangements for incidents and emergencies for pipeline systems /2/ Section 137 - Safety systems /3/ Section 42 - Approval to drill a well (5)(a)(iii) /3/ Section 98 - Consent to commence operations (3)(d)	**Opportunity to Improve:** /3/ Section 98 (3)(d) refers to critical equipment. This seems to mainly be production critical equipment, while the definition of "critical equipment" in the regulations is about safety critical equipment.	There should be a clear and consistent definition and use of "critical equipment". E.g., in Regulation /3/ Section 100(3) it is required to "Preventive maintenance schedules on critical equipment shall be prepared and submitted to the Authority annually at the beginning of each calendar year" while the term "critical equipment are used differently in the regulation, e.g. Section 2 and 98. In addition, Section 100(5) is particular important in the context of safety critical equipment ('sleeping systems'), and "critical equipment" should therefore be added to this sub-section.
5-1-2					**Opportunity to Improve:** /2/ Both Section 43 - Emergency shutdown system and Section 137 - Safety systems have requirements to emergency shutdown system/valves.	Reorganize Regulation /2/ Sections 43 and 137 to have one section on the emergency shutdown system. Consider to move some detailed requirements to a guideline for this section. ISO 13702 may also be referred to.
5-1-3					**Opportunity to Improve:** /2/ Section 137(1) gives general/high level requirement, while Section 135 gives some detailed requirement in addition to a general requirement (2) in line with 137(1).	Reorganize Regulation Sections 135 and 137(1) to avoid repetition and consider moving the detailed requirements to a guideline for this section.
5-1-4		Performance Standards	ISO 17776 Ch. 5.2.5, 6.3.5, 7.3.6, 8.3.7	/2/ Section 17 - Barriers (3)	**Opportunity to Improve:** /2/ Section 17(3) requires ".. the functions they are intended to fulfil, as well as the performance requirements defined in respect of the technical, operational or organizational elements ...". There should be a guideline with more details regarding what kind of performance requirements to expect.	A guideline should give more details about the expectation to "performance requirements", e.g. ref. ISO 13702: The strategies should describe the role and any functional requirements for each of the systems required to manage possible hazardous events on the installation. In developing functional requirements, the following should be considered: a) the functional parameters of the particular system. This should be a statement of the purpose and essential duties that the system is expected to perform; b) the integrity, reliability and availability of the system; c) the survivability of the system under the emergency conditions which may be present when it is required to operate; d) the dependency on other systems which may not be available in an emergency. References with some relevant information are: - ISO 13702 Petroleum and natural gas industries — Control and mitigation of fires and explosions on offshore production installations - ISO 17776 Petroleum and natural gas industries — Offshore production installations — Major accident hazard management during the design of new installations - IEC 61608 Functional safety of electrical/electronic/programmable electronic safety-related systems
5-1-5		Human interface/interaction		/2/ Section 130 - Human-machine interface and information presentation	**Note:** See "Opportunity to Improve" under Human-machine interface Part 6, Occupational Safety/ Occupational accident.	
5-1-6		Safety exclusion zones / community zones		/1/ Section 88 - Work practices for licensees (2h) /1/ Section 135 - Restrictions and rights of others /1/ Section 144 - Safety zones /2/ Section 20 - Safety signs (1)(a) /3/ Section 22 - Field Development Plan (1)(e)(viii) /3/ Section 39 - Seismic surveys (6)	No comment	
5-1-7		Monitor/examination/ inspection and maintain integrity of barriers in operation	ISO 17776 Ch. 9	/2/ Section 14 - Safety concept (1)(c) /2/ Section 17 - Barriers (2), (3) /2/ Section 37 - General requirements relating to process safety (1)(h) /2/ Section 38 - Process safety system (1)(b)(iii),(viii) /2/ Section 39 - Implementation of the process safety programme (2)(a)(c) /2/ FORM 1 - MATTERS TO BE ADDRESSED IN SAFETY MANAGEMENT SYSTEMS 2(d)(iv) /3/ Section 100 - Maintenance of facility	**Note:** Reference is made to ID 3-4-1	

5-1-8	Process safety	Process control vs process shutdown		/2/ Section 7 - Safety factors during construction (1)(g) /2/ Section 32 - Control of asphyxiant gas (2)(b) /2/ Section 43 - Emergency shutdown system	**Opportunity to improve:** Emergency shutdown is covered in Regulation /2/, but no distinction is made between process control (PCS) and process shutdown system (PSD). PCS and PSD systems are normally required to be separate from each other. PCS will ensure control during normal production/processing and PSD will shutdown the process plant (fully or partially) if the PCS system is not able to control a situation. Also, there is normally a requirement for two levels of protection (of different type) for PSD functions.	As part of Regulation /2/ Section 43, consider distinguishing between process control (PCS) and process shutdown system (PSD); possibly at part of a detailed guideline.
5-1-9		Gas release system		/2/ Section 40 - Gas release system /2/ Section 41 - Depressurization and flare system	**Opportunity to improve:** Regulation /2/ Section 40 "Gas release system" and Section 41 "Depressurization and flare system": it is not fully understood if these are covering same system.	Review and align Regulation /2/ Sections 40 and 41.
5-1-10		Emergency shutdown		/2/ Section 43 - Emergency shutdown system	**Opportunity to improve (minor):** Ignition source requirements and Emergency Shutdown (ESD) are normally not defined under process safety. Process safety is often considered to cover events where hydrocarbons are still within the piping and equipment. Emergency shutdown will be initiated in events where there is a leakage, so the hydrocarbon is outside the piping and equipment (e.g. fire and gas section).	Consider moving ignition source and ESD requirements into e.g. fire and gas section.
5-2	Operational safe	Organization/Personnel		/2/ Section 37 - General requirements relating to process safety (1)(f)(g)(i) /2/ Section 38 - Process safety system (1)(b)(iv) /2/ Section 75 - Hot work operations in confined spaces /3/ Section 61 - Well control /3/ Section 105 - Maintenance of pressure systems	**Opportunity to Improve:** The need for a work permit is only mentioned for hot work.	Consider to require a work permit system for more than hot work. Other critical activities that typically could be covered under such a system are: - Work on pressurized, electrified or hydrocarbon-bearing systems, - Work with explosives or substances that self-ignite, - Lifting operations, - Work in confined spaces.
5-3-1	Managing changes in operation	Plant changes		/2/ Section 37 - General requirements relating to process safety (1)(j) /2/ Section 38 - Process safety system (1)(b)(xii) /2/ Section 44 - Qualification and use of new technology and new methods	**Note:** Reference is made to ID 3-5.	
5-3-2		Organizational changes		/2/ Section 37 - General requirements relating to process safety (1)(j) /2/ Section 38 -Process safety system (1)(b)(i),(xii) /2/ Section 44 -Qualification and use of new technology and new methods		
5-4-1	Drilling	Programme		/3/ Part V - Drilling operations, Section 43, 44, 45, 46, 47, 48, 49, 50	**Gap:** /3/ Section 43 does not include: - Requirements for reporting contingency material, such as LCM material, H2S scavengers etc. to be able to mitigate challenges during drilling operations - Any known factors that could adversely affect the quality of the drilling fluid, and procedures to be adopted if circulation is lost - Environmental evaluation/classification of drilling fluid based on the chemical composition to ensure a permit system is in place for environmentally hazardous chemicals **Gap:** /3/ Section 44 does not include: - (1)(b) - safety factors for burst, collapse, axial and tri-axial (and also casing's rating of these parameters) - For barrier verification, casing test pressures adjusted to actual mud density (i.e. well barrier verification) not included **Gap:** /3/ Section 45 does not include: - Centralization and simulated stand-off and contingency plans for cementing to ensure sufficient well barrier and required functionality of cement - Required excess cement for each casing size to ensure required top of cement is reached **Gap:** /3/ Section 46 does not include: - Depth reference, to avoid misunderstandings - (2) Separation Factor (SF), to avoid anticollision issues while drilling **Gap:** /3/ Section 50 does not include: - (2) production packer setting depth, to ensure the production packer is set at a depth with verified annulus cement	It is recommended to update the regulations to include the gaps identified in section 43, 44, 45,46 and 50. General notes: Section 43: - Example of classification: Black: Chemicals that are not allowed to be released in the first place. Permission is granted in special cases. Red: Chemicals that are environmentally hazardous and should therefore be replaced. Requirements given in the permit that the chemicals are given special priority for substitution. Yellow: Chemicals in use but not covered by any of the other categories. Permission is normally granted without specified conditions. Section 46: Generally SF>1 is required for anticollision In general, verification of the different well barrier elements is not mentioned. It is recommended to stress the importance of barrier verifications.
5-4-2		Blow-outs		/3/ Section 42 - Approval to drill a well (5)(b)	**Gap:** /3/ Section 42 (5)(b) does not included: - (xii) kill fluid requirements - Kick margin for the different sections - Fingerprinting procedures.	It is recommended to update the regulations to include the gap identified in section 42.
5-4-3		Barriers	IOGP 510 Element 5, ISO 16530-1	/3/ Section 22 - Field Development Plan (1)(d)(ii) /3/ Section 60 - Barriers	**Opportunity to Improve:** /3/ Section 60 (5) - It is stated that the well barriers shall be tested by an independent person. It is recommended to either clarify the meaning of "independent person" or remove "…by an independent person". **Gap:** /3/ Section 60 - There is no general requirement that the well operator responsibility to define a barrier philosophy for each of the well types within the Well Integrity Management System (WIMS). **Gap:** /3/ Section 60 (6) - there are no differentiation of well barrier requirements in wells capable of sustained flow to surface VS wells that is not capable of natural flow to surface.	Consider clarifying the meaning of "independent person" or remove "…by an independent person". It is recommended to update the regulations to include the gaps identified in section 60.
5-4-4		Well control systems		/3/ Section 61 - Well control	**Gap:** /3/ Section 61 (8) - No requirement of having capping stack available in the area stated. **Gap:** /3/ Section 61 (9) - No requirement of establishing a bridging document between operator and contractor stated.	It is recommended to update the regulations to include the gaps identified in section 61.

5-5-1	Fire and explosi	Identification and assessment	ISO 13702	/2/ Section 37 - General requirements relating to process safety (1)(c)(f)	No comment	
5-5-2		Prevention		/2/ Section 134 - Safety requirement relating to plants, tools and equipment (1)(d) /2/ Section 136 - Condition control and condition evaluation	No comment	
5-5-3		Mitigation		/2/ Section 46 - Material handling, transport routes, access and evacuation routes /2/ Section 69 - Process equipment maintenance (a) /2/ Section 94 - Fire-fighting equipment and systems for fire-fighting incl. Sec. 95-103 /2/ Section 133 - Internal combustion engine exhaust /2/ Section 135 - Arrangements for incidents and emergencies for pipeline systems /3/ Section 81 - Rotating machinery (2)(d) /3/ Section 99 - Facility operation (2)	No comment	
5-5-4		Active fire protection		/2/ Section 94 - Fire-fighting equipment and systems for fire-fighting /2/ Section 97 - Fixed fire-fighting system /2/ Section 98 - Fire pump systems	**Opportunity to Improve:** Firefighting equipment incl. capacity are normally defined for typical areas (e.g. processing, drilling, mud processing, machinery spaces etc.) with specific capacity requirements.	Consider to implement requirements for type of extinguishing equipment for typical areas and minimum capacity requirements for these (alternative reference to a technical standard).
5-5-5					**Opportunity to Improve:** Areas considered as major fire risk varies between regulators, designers and operators, and some guidance could be useful.	Consider to implement a guidance or definition of areas with major risk of fires.
5-5-6					**Opportunity to Improve:** Time criteria for efficient system may be defined (e.g. typical 30s is often defined for deluge systems)	Consider to implement time criteria for deluge release, alternatively a reference to a technical standard.
5-5-7					**Opportunity to Improve:** Type of local firefighting systems are often defined, e.g. water mist and gaseous systems (with restrictions, e.g. non halon systems)	Consider to describe acceptable type of local fire-fighting systems.
5-5-8					**Opportunity to Improve:** Clear minimum requirements may be considered. E.g. minimum 2x100% pump systems, independently driven, separation.	It's recommended to implement a requirement for firewater pump configuration (typical 2x100% independent pump systems)
5-5-9		Fire divisions		/2/ Section 100 - Technical requirements for fire divisions	**Opportunity to Improve:** Explosion requirements are not described for fire divisions which may be exposed for dimensioning explosion loads.	It's recommended to implement requirement to ensure that fire divisions are designed to withstand explosion pressure
5-5-10		Fire divisions		/2/ Section 102 - Passive fire protection of living quarters /2/ Section 103 - Passive fire protection of other areas	**Opportunity to Improve:** Requirements for fire divisions between specific areas are normally defined (e.g. A-0 and A-60 fire rating).	Consider to implement requirements for minimum fire rating of decks and bulkheads between typical areas.
5-5-11		Fire risk category of areas		/2/ Section 97 - Fixed fire-fighting systems /2/ Section 103 - Passive fire protection of other areas	**Opportunity to Improve:** It seems like the terminology major fire risk and high fire risk are used in different sections.	Consider to align the terminology and define e.g. "Major risk or fire" or "high fire risk"
5-5-12		Active smoke control		/2/ Section 106 - Active smoke control	**Opportunity to Improve:** Active smoke control is often used in living quarters, but there is normally no dimensioning fire scenario inside LQ.	It's recommended to limit the requirement for active smoke control to living quarters.
5-5-13		Fire integrity of HVAC		Section 68 - Ventilation and indoor climate	**Opportunity to Improve:** /2/ Section 68: Fire integrity requirements for HVAC systems are not described clearly.	It's recommended to implement fire integrity requirements for HVAC systems, alternatively make reference to a technical standard.
5-5-14		Fire & Gas systems		/2/ Section 110 - Fire and gas detection systems	**Opportunity to Improve:** Requirements for fire & gas systems are defined at a high level, more detailed requirements may be considered (e.g. detection type in different areas, reliability/redundancy, voting, minimum actions)	It's recommended to implement more detailed requirements for fire and gas detection systems (e.g. detection type in different areas, reliability/redundancy, voting, minimum actions).
5-5-15		Gas hazardous areas		/2/ Section 105 - Fire and explosion	**Opportunity to Improve**: Requirements for defining gas hazardous zones and ignition source control are not identified.	It's recommended to implement requirements describing gas hazardous zones and ignition source control (typical Ex requirements for electrical equipment in hazardous areas and trip of non-Ex equipment in vicinity of such zones)
5-5-16		Alarm systems		/2/ Section 107 - Fire and evacuation alarm	**Opportunity to Improve:** Requirements for alarm systems are normally valid for a total installation or plant, not limited to the LQ.	Consider to expand the requirement for alarm systems to include a total installation/plant
5-5-17		Escape routes - size of escape routes		/2/ Section 111 - Escape exits	**Opportunity to Improve:** International practice on offshore installations are normally two exits from normally manned areas (except for areas like offices, cabins and small rooms). Size requirements for escape routes may be considered.	Consider to implement size requirements for escape routes, and also include requirement for two exits from normally manned areas (except for areas like offices, cabins and small rooms).
5-5-18		Escape routes - use of stairs		/2/ Section 111 - Escape exits	**Opportunity to Improve:** Stair may be considered as minimum solution for regularly or normally manned areas.	Consider to implement minimum requirements for use of stairs in main escape routes in regularly or normally manned areas.
5-6	Collision accidents				**Gap:** No relevant requirements identified particular for "Collision accident". The following sections in Regulation /2/ covers traffic/transportation, but not in the context "Process safety/Major accident": Section 29 - Hazardous material and substances Section 35 - Storage and transportation of corrosives (a) Section 46 - Material handling, transport routes, access and evacuation routes Section 70 - Radiation (2) The following Section in Regulation /3/ may indirectly cover such hazard: Section 114 - Application for consent to construct fixed platform (1)(d)(vii): "An application for consent to construct or install a fixed platform shall be made in writing and shall—state particulars of—particulars of the plan for transportation of materials and personnel, including safety consideration".	If relevant for Uganda petroleum industry, consider to include a requirement or examples in a Guideline, regarding collision risk, e.g.: - Ship collision risk for lake installations - Vehicle collision risk within an onshore facility

ID	Topic	Aspect	Reference to Standards	Reference to Uganda Petroleum Regulations /1/ The Petroleum Act, 2013 Act 3 /2/ The Petroleum HSE Regulation, 2016 No. 46 /3/ The Petroleum EDP Regulation, 2016 No. 47	Gap / Opportunity to Improve	Recommendation
6	**Occupational Safety/ Occupational accidents**					
6-1	Confined spaces	Asphyxiates		/2/ Section 32 - Control of asphyxiant gas (2)(c) /2/ Section 74 - General provisions relating to confined space /2/ Section 75 - Hot work operations in confined spaces /2/ Section 76 - Ventilation equipment in confined spaces	**Opportunity to Improve:** Confined spaces are well covered in /2/ Section 74-76. However, there are a lot of detailed requirements that can be included in a Guideline to the sections which can cover the more high level/generic requirement.	Reference is made to ID 0-3.
6-2	Dropped/swinging loads /equipment			/2/ Section 20 - Safety signs (1)(a) /2/ Section 77 - Restricted areas /2/ Section 78 - Erection of fences (1) /2/ Section 47 - Lifting appliances and equipment (2), (3) /2/ Section 81 - Head protection /2/ Section 86 - Fall-protection systems (1)(b) /2/ Section 131 - Operation of mobile equipment (c)	**Opportunity to Improve:** There are several direct or indirect requirements to prevent incidents caused by dropped/swinging loads and to mitigate the consequence. However, the most important is probably /2/ Sec. 47 (3) "The licensee shall ensure that lifting appliances and operations comply with requirements of the Occupational Safety and Health Act, 2006 and standards approved by the Authority and best petroleum industry practices."	Verify/ensure that Occupational Safety and Health Act, 2006 covers e.g., restricted areas and communication during lifting operations.
6-3	Material handling	Include manual handling		/2/ Section 46 - Material handling, transport routes, access and evacuation routes /2/ Section 64 - Proper work station design (1)(a)	No comment	
6-4-1	Difference in height	Working at height		/2/ Section 47 - Lifting appliances and equipment (1) /2/ Section 86 - Fall-protection systems	No comment	
6-4-2		Working below grade		/2/ Section 47 - Lifting appliances and equipment (1) /2/ Section 86 - Fall-protection systems	**Opportunity to Improve:** Working below grade is not adequately addressed in Regulation /2/. Working below grade (e.g., in pits, ditches) can be hazardous, similar to working at heights. In addition, there could be additional hazards that may not be immediately relevant to working at height, e.g., accumulation of hydrogen sulphide.	Ensure hazards associated with working below grade are addressed in Regulation /2/, or an associated Guideline.
6-5-1	Electricity	Voltage		/2/ Section 52 - Working and operation of electrical installations /2/ Section 53 - Safety procedures in electrical installations /2/ Section 54 - Safety watcher /2/ Section 55 - Coordination of work /2/ Section 56 - Isolation of electrical equipment /2/ Section 57 - Control devices, switches, cords and cables /2/ Section 58 - Defective electrical equipment /2/ Section 59 - Electrical fuses /2/ Section 60 - Power supply cables /2/ Section 61 - Grounded electrical equipment /2/ Section 83 - Protective footwear and hand wear	**Opportunity to Improve:** Electricity is covered in /2/ (Part IV, Sec. 52-61). However, the requirements are comprehensive and there are a lot of detailed requirements that can be included in a Guideline to the sections which can cover the more high level/generic requirement.	Reference is made to ID 0-3.
6-5-2		Electrostatic energy				
6-6-1	Exposure to acutely hazardous fluids/gases	Corrosives		/2/ Section 29 - Hazardous material and substances /2/ Section 30 - Handling or storage of hazardous substances /2/ Section 33 - Chemical safety /2/ Section 35 - Storage and transportation of corrosives	No comment	
6-6-2		Toxic liquids		/2/ Section 29 - Hazardous material and substances /2/ Section 30 - Handling or storage of hazardous substances /2/ Section 33 - Chemical safety /2/ Section 34 - Provision of showers /2/ Section 51 - Drainage systems /2/ Section 62 - Working environment (3) /2/ Section 82 - Eye and face protection /2/ Section 85 - Skin protection and special clothing		
6-6-3		Fumes/toxic gases		/2/ Section 29 - Hazardous material and substances /2/ Section 30 - Handling or storage of hazardous substances /2/ Section 31 - Exhaust ducts and gases /2/ Section 32 - Control of asphyxiant gas /2/ Section 33 - Chemical safety /2/ Section 84 - Respiratory protection.		

6-7-1	Exposure to extreme temperatures	Atmosphere		/2/ Section 31 - Exhaust ducts and gases /2/ Section 53 - Safety procedures in electrical installations (7)(b) /2/ Section 85 - Skin protection and special clothing /2/ Section 89 - Protection from extreme temperatures	No comment	
6-7-2		Fluids				
6-7-3		Surfaces				
6-7-4		Open flame				
6-8-1	Objects under stress	Objects under tension			**Note:** The category "objects under stress" is to capture hazards related to objects that are under tension (e.g. wires, lines) or compression (e.g. springs in valves). If the energy stored due to this stress is released, then it forms a hazard. No relevant requirements identified, but no "gap" since this not very relevant to require a separate requirement.	
6-8-2		Objects under compression				
6-9-1	Radiation	Electromagnetic radiation		/2/ Section 21 - Training in safety and working environment (3) /2/ Section 29 - Hazardous material and substances /2/ Section 30 - Handling or storage of hazardous substances /2/ Section 62 - Working environment (1)(h) /2/ Section 70 - Radiation /3/ Section 64 - Safety of suspended wells (3)	**Opportunity to improve:** Typically, regulations provide expectations and requirements to ensure safe and efficient storage, handling, and competence in handling radioactive sources and explosives where details are generally provided in a guideline. The regulations cover explosives adequately; however, no information for handling radioactive sources was found.	It is recommended to verify if another act or regulation sufficiently covers radioactive sources. If so, reference the applicable act or regulation. If not, establish regulations to set expectations for managing these hazards
6-9-2		Ionizing radiation				
6-10	Explosives			/2/ Section 21 - Training in safety and working environment (2) /2/ Section 29 - Hazardous material and substances /2/ Section 30 - Handling or storage of hazardous substances /3/ Section 133 - Final geophysical and geological reports (5)(a)	**Opportunity to Improve:** Requirements for handling and storage of hazardous materials and substances, incl. explosives, are covered by /2/ Sec. 29 and 30 and generic competence requirement in Sec. 21 (1). However, as for Radiation it should be a specific competence requirement and references to another national Act or Regulation with details related to explosives.	Include similar requirements for Explosives as for Radiation, ref. Sec. 21 (3) and Sec. 70 (3).
6-11-1	Dynamic situation - transportation	Plant/installation movement		/2/ Section 46 - Material handling, transport routes, access and evacuation routes (1) /2/ Section 83 - Protective footwear and hand wear /2/ Section 72 - Provision of sufficient lighting for workplaces (d) /2/ Section 131 - Operation of mobile equipment	No comment	
6-11-2		Travel by road			**Gap:** No requirements found for travel to/from the facility/installation.	Include a requirement to ensure that people can be transported safely to, from and between facilities.
6-11-3		Travel by air				
6-11-4		Travel by water				
6-12-1	Human-machine interface		ISO 3407, EN 894, EN 62682	/2/ Section 127 - Machinery (3) /2/ Section 128 - Maintenance and repair of machinery /2/ Section 130 - Human-machine interface and information presentation /3/ Section 81 - Rotating machinery (2)(d)	**Opportunity to Improve:** /2/ Sec. 127 includes both generic requirements and detailed requirements.	Regulation /2/ Sections 127 and 128 should be reorganized to one section including the more generic requirements in Section 127 (1), (4) and (5), while the more detailed requirements are moved to a Guideline for this section, i.e., for Section 127 (2), (3) and Section 128. In addition Section 129 can be a Guideline to Section 127 (1).
6-12-2					**Opportunity to Improve:** /2/ Sec. 130 covers sufficiently the Human -machine interface. However, there could be useful for the licensee with some additional information in a guideline.	Consider to include a guideline for /2/ Sec. 130, e.g. with reference to: - ISO 3407 - Human-centered design processes for interactive systems - EN 894 - Safety of machinery - Ergonomics requirements for the design of displays and control actuators - EN 62682 - Management of alarms systems for the process industries

ID	Topic	Aspect	Reference to Standards	Reference to Uganda Petroleum Regulations /1/ The Petroleum Act, 2013 Act 3 /2/ The Petroleum HSE Regulation, 2016 No. 46 /3/ The Petroleum EDP Regulation, 2016 No. 47	Gap / Opportunity to Improve	Recommendation
7	**Occupational Health/ Working environment**					
7-1-1	Physical hazards	Noise	ISO 717, ISO 11688, ISO 11690	/2/ Section 62 - Working environment (1)(h) /2/ Section 65 - Noise, acoustics and vibrations (1), (3)	**Opportunity to Improve:** /2/ Sec. 65 (3) refers to The National Environment (Noise Standards and Control) Regulations, 2003. It is assumed that this Regulation gives more details or references to international standards.	Verify that National Environment (Noise Standards and Control) Regulations, 2003 gives more details or references to international standards such as e.g.: - ISO 11688 - Recommended practice for the design of low-noise machinery and equipment - ISO 11690 - Acoustics — Recommended practice for the design of low-noise workplaces containing machinery - ISO 717 - Acoustics — Rating of sound insulation in buildings and of building elements. If not, included such references in a Guideline.
7-1-2		Vibration	ISO 2631, ISO 5349, EN 14253	/2/ Section 62 - Working environment (1)(j) /2/ Section 65 - Noise, acoustics and vibrations (2), (3)	**Opportunity to Improve:** /2/ Sec. 65 (3) states "The National Environment (Noise Standards and Control) Regulations, 2003 and any other applicable law shall apply in relation to noise and vibrations in petroleum activities". It is assumed that other Acts or Regulations give more details or references to international standards.	Verify if any other Regulations or Acts give details or references to international standards such as e.g.: - ISO 2631 - Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration - ISO 5349 - Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration - EN 14253 - Mechanical vibration. Measurement and calculation of occupational exposure to whole-body vibration with reference to health. If yes, refer to the relevant Act or Regulation in Regulation /2/, Section 65(3). If not, included such references in a Guideline.
7-1-3		Radiation		/2/ Section 21 - Training in safety and working environment (3) /2/ Section 29 - Hazardous material and substances /2/ Section 30 - Handling or storage of hazardous substances /2/ Section 62 - Working environment (1)(h) /2/ Section 70 - Radiation /3/ Section 64 - Safety of suspended wells (3)	**Note:** Reference is made to ID 6-9-1 and ID 6-9-2.	
7-1-4		Ergonomics	ISO 6385, ISO 17776 C.16, EN 614	/2/ Section 49 - Control room (2) /2/ Section 62 - Working environment (1)(i), (j) /2/ Section 64 - Proper work station design	**Opportunity to Improve (Minor):** Seems that the focus of /2/ Section 64 -Proper work station design is on ergonomics.	Suggest to rephrase the heading of the section to "Ergonomic" in line with other sections, e.g. 65 - Noise, acoustics and vibrations.
7-1-5					**Opportunity to Improve:** Requirements for ergonomic as expected. However, it is not unlikely that there could be references to another national Act or Regulation or Guideline with details related to Ergonomic.	Verify if another Act or Regulation, i.e. Occupational Safety and Health Act, 2006, covers more detailed requirements related to ergonomic. If not consider to include more detailed requirements or references in a Guideline. Relevant international standards, e.g.: - ISO 6385 - Ergonomics principles in the design of work systems - ISO 17776 - Petroleum and natural gas industries — Offshore production installations — Major accident hazard management during the design of new installations, Annex C.16 - EN 614 - Safety of machinery. Ergonomic design principles. Terminology and general principles
7-2-1	Chemical hazards	Fumes/toxic gases		/2/ Section 29 - Hazardous material and substances /2/ Section 30 - Handling or storage of hazardous substances /2/ Section 33 - Chemical safety /2/ Section 34 - Provision of showers /2/ Section 68 - Ventilation and indoor climate (1) /2/ Section 84 - Respiratory protection	No comment	
7-2-2		Chemicals		/2/ Section 9 - Facility specific occupational safety and health (2) /2/ Section 29 - Hazardous material and substances /2/ Section 30 - Handling or storage of hazardous substances /2/ Section 33 - Chemical safety /2/ Section 34 - Provision of showers /2/ Section 51 - Drainage system /2/ Section 62 - Working environment (3) /2/ Section 68 - Ventilation and indoor climate (1) /2/ Section 82 - Eye and face protection /2/ Section 85 - Skin protection and special clothing /2/ FORM 3 - NOTIFICATION OF HAZARDOUS CHEMICALS AND BIOLOGICAL SUBSTANCES	No comment	

7-3-1	Biological hazards	Infectious diseases		/2/ Section 29 - Hazardous material and substances (5), (6) /2/ Section 62 -Working environment (1)(g), (3) /2/ FORM 3 - NOTIFICATION OF HAZARDOUS CHEMICALS AND BIOLOGICAL SUBSTANCES	**Opportunity to Improve:** Biological substances are covered in requirements related to risk assessment, handling and storage. Requirements covering infectious diseases or food/drinking water hygiene are not covered.	Verify if another Act or Regulation, i.e. Occupational Safety and Health Act, 2006, covers more detailed requirements related to biological hazards. If "yes", this Act or Regulation should be referred to. If "no", some requirements due to communicable diseases control and hygienic control of food and drinking water should be included.
7-3-2		Food hygiene				
7-4-1	Psychosocial hazards /human factors	Working hours, shift work/ rotations		/2/ Section 62 - Working environment (1)(c) /2/ Section 66 - Incapacity of employees to work (2), (7)	**Gap:** There are generic requirements related to the effect of working hours on health and the reduction of working capacity due to incident/accident. However, requirements to given maximum working hours for a day, week etc. and shift work system are not included. These requirements do not need to be in the HSE Regulation, but should refer to relevant Acts or Regulations.	Verify/ensure that one of the following Acts include information regarding minimum working hours and shift work system: Employment Act, 2006, Workers' Compensation Act, 2000 or Occupational Safety and Health Act, 2006. Include the relevant reference in the HSE Regulation.
7-4-2		Fatigue		/2/ Section 62 - Working environment (1)(c) /2/ Section 66 - Incapacity of employees to work (4) /2/ Section 72 - Provision of sufficient lighting for workplaces	No comment	
7-4-3		Work stress		/2/ Section 62 - Working environment (1)(c) /2/ Section 66 - Incapacity of employees to work (1), (2), (4)	No comment	
7-4-4		Juveniles			**Note:** No relevant requirements are identified in the Act and Regulations reviewed. In feedback meeting no. 4, 12 March 2021, Uganda confirmed that this is covered by other Acts or Regulations. Therefore this finding is changed from a Gap to a Note. This also make sense since Uganda has ratified the following ILO conventions: - C138 - Minimum Age Convention. - C182 - Worst Forms of Child Labor Convention, 1999 (No. 182)	
7-4-5		Drugs, alcohol and substance abuse			**Note:** No relevant requirements are identified in the Act and Regulations reviewed. In feedback meeting no. 4, 12 March 2021, Uganda confirmed that this is covered by other Acts or Regulations.	
7-4-6		Accommodation		/2/ Section 62 - Working environment (1)(d), (e), (g) /2/ Section 67 - Accommodation /2/ Section 68 - Ventilation and indoor climate (3)	**Opportunity to Improve (typo/minor):** /2/ Section 62. Working environment: (1)(e): change the word "carter" to "cater". (1)(h): Suggest to change from "A licensee shall ensure that the physical working environment caters for buildings and equipment, indoor climate, lighting, noise and radiation" to e.g. "A licensee shall ensure that physical working environment is considered in buildings and for equipment and covers as a minimum indoor climate, lighting, noise and radiation".	Implement opportunity to improve.

7-5-1	Medical care	Onsite		/2/ Section 148 - Special requirements for health care and health services /2/ Section 150 - Medical facilities and first aid services	**Opportunity to Improve:** /2/ Section 148 (6) referees to the Occupational Safety and Health Act, 2006.	Check if the Occupational Safety and Health Act, 2006, includes similar or additional requirements to Sec. 148 (1) - (5). If, similar it should be adequate to refer to that Act.
7-5-2		Periodic examination		/2/ Section 149 - Medical examinations for employees	No comment	
7-5-3		Medical evacuation		/2/ Section 115 - Duty to prepare, maintain and implement emergency plan (1)(b)(iii)	**Note:** Medical evacuation is not mentioned in particular, but "medical treatment and assistance in an emergency situation" is discussed. The requirements due to emergency preparedness is comprehensive and includes i.e. Form 4, 5(a) requires "The emergency plan shall describe the procedures for the safe evacuation of, and accounting for all people on site". If "Medical evacuation" should be included, this can a part of /2/ Sec. 124. Evacuation.	
7-5-4		Ambulance stations		/2/ Section 152 - Ambulance stations	No comment	
7-5-5		Medical personnel		/2/ Section 148 - Special requirements for health care and health services (3) /2/ Section 153 - Training of rescue teams and persons in first aid	No comment	
7-5-6		First aid training and facilities		/2/ Section 150 - Medical facilities and first aid service /2/ Section 151 - Posting of information /2/ Section 152 - Ambulance stations (2) /2/ Section 153 - Training of rescue teams and persons in first aid	No comment	
7-5-7		Vaccines			**Gap:** No relevant requirements are identified in the Act and Regulations. This may be covered in: Employment Act, 2006, or Occupational Safety and Health Act, 2006.	Verify/ensure that one of the following Acts include information regarding vaccines; Employment Act, 2006, or Occupational Safety and Health Act, 2006. Include the relevant reference in the HSE Regulation, e.g. to /2/ Section 149.
7-5-8		Sanitary facilities		/2/ Section 62 - Working environment (1)(d), (e), (g) /2/ Section 73 - Provision of adequate sanitary conveniences	No comment	

APPENDIX B– OVERVIEW OF NORWEGIAN REGULATIONS AND GUIDANCE

This appendix provides an overview of the Norwegian HSE legislation.

The key legislative body is Petroleum Safety Authority (PSA). An overview of the acts and regulations governing HSE that are enforced by PSA are shown in Figure B-1.

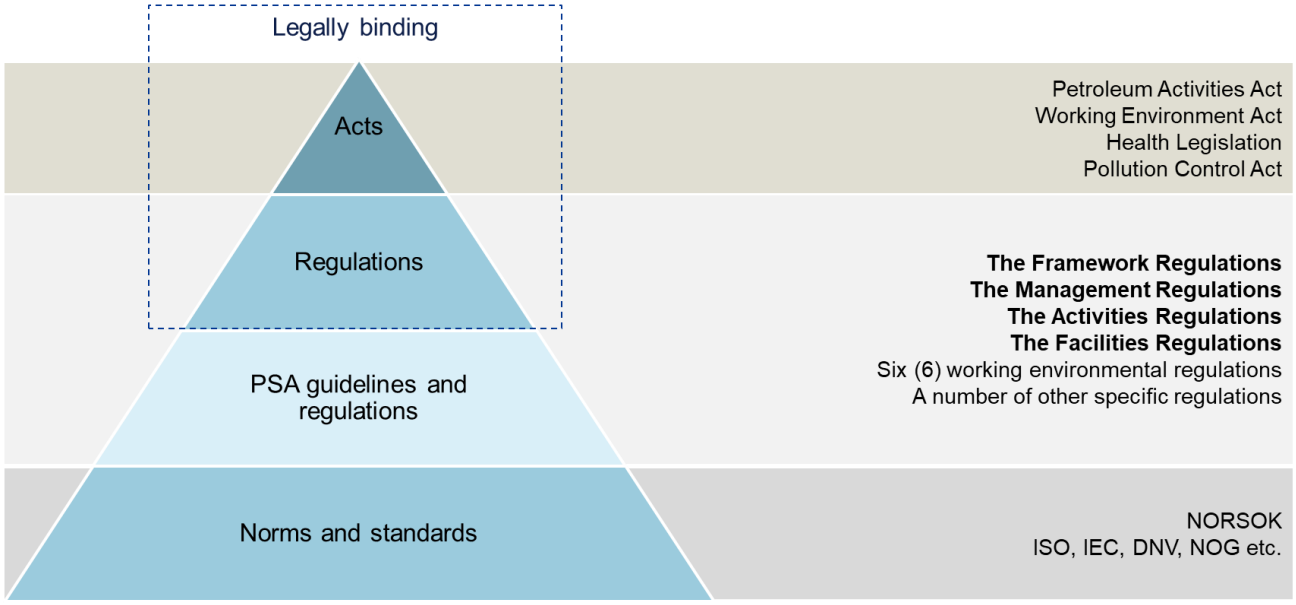

Figure B-1 - Acts and regulations governing HSE (Norway)

With reference to the diagram, it is noted that the "PSA guidelines and regulations" are not legally binding, but regulations and guidelines have to be applied together to gain the best possible interpretation of the provisions and how they are to be met. Hence in practice it will be difficult to ignore these guidelines and regulations. Also, this type of functional requirements opens up for the use of new technology that is not yet standardized, e.g., in complex projects with a high number of deviations from standards and guidelines, even if the regulations are met.

The most important regulations are, the Framework Regulations, the Management Regulations, the Activities Regulations and, especially, the Facilities Regulations:

- Framework HSE Regulations: These regulations contain the overall principles which are described further in other regulations. The purpose of the framework regulations is to develop and further improve health, environment, and safety for petroleum activities.
- Management Regulations: These are regulations relating to management and the duty to provide information for petroleum activities. The Management regulations cover various aspects relating to the management of health, environment, and safety for petroleum activities.
- Facilities Regulations: These set of regulations govern the design and outfitting of petroleum facilities.
- Activities Regulations: These are regulations relating to conducting petroleum activities.

For the design and engineering of (offshore) facilities, the Facilities Regulations are probable the most relevant, though the other regulations cannot be ignored. Often the Facilities Regulations contain references to the other regulations, as well as NORSOK standards, EU Directives, DNV Offshore Standards etc. An overview of the NORSOK standards is given in Table B-1.

Table B-1 – NORSOK standards (for design of offshore facilities)

No.	Title
C-001	Living quarters area
C-002	Architectural components and equipment
C-004	Helicopter deck on offshore installations
H-003	Heating, ventilation, and air conditioning (HVAC) and sanitary systems
I-002	Safety and automation system (SAS)
L-001	Piping and valves
L-002	Piping system layout, design, and structural analysis
L-004	Piping fabrication, installation, flushing and testing
M-001	Materials selection
M-101	Structural steel fabrication
M-501	Surface preparation and protective coating
M-503	Cathodic protection
M-601	Welding and inspection of piping
N-001	Integrity of offshore structures
N-003	Actions and action effects
N-004	Design of steel structures
P-002	Process system design
R-001	Mechanical equipment
R-002	Lifting equipment
R-004	Piping and equipment insulation
S-001	Technical safety
S-002	Working environment
S-005	Machinery - working environment analyses and documentation
T-001	Telecom systems
T-100	Telecom subsystems
U-001	Subsea production systems
U-100	Manned underwater operations
U-101	Diving respiratory equipment
Z-013	Risk and emergency preparedness assessment
Z-015	Temporary equipment

APPENDIX C – OVERVIEW OF UK HSE REGULATIONS AND GUIDANCE

This appendix provides an overview of the UK Offshore HSE legislation.

UK legislative hierarchy

Figure C-1shows the legislative hierarchy found in the UK.

UK law is enacted through Acts of Parliament. Acts often cover an area of legislation and generally remain in place for several decades. Under an Act of Parliament, the UK Government creates Statutory Instruments (Sis) in the form of regulations.

ACOPs contain advice on how to achieve the legislative requirements. If the ACOP is complied with then that is sufficient to ensure compliance with the relevant regulations.

Guidance contains other material describing good practice. Following this guidance is not compulsory but doing so is normally enough to comply with UK law.

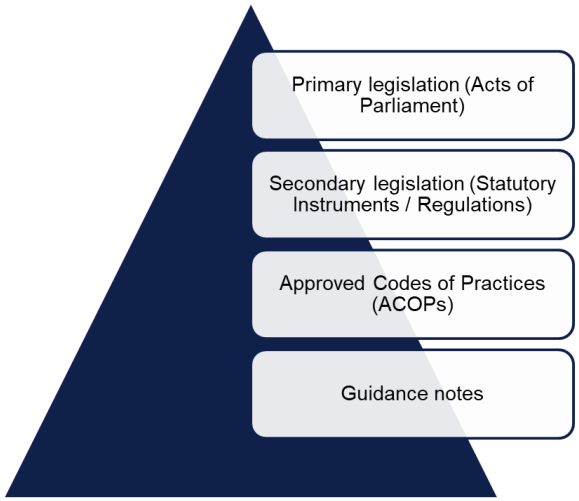

Figure C-1 – Legislative Framework for UK

The following types of regulations can be distinguished:

- Environmental legislation
- Legislation associated with management of MAHs, following the Piper Alpha disaster in 1998. These are referred to as Offshore Installation Regulations
- Health and safety related legislation
- UK Statutory Instruments (SIs) that directly apply to European Union (EU) Directives
- Other legislation. This includes e.g., regulations that are related to merchant shipping, but that also apply to a floating offshore facility

Overview UK Offshore regulations and guidance

An overview of the key UK regulations is provided in the tables in this appendix (see Table C-1 and Table C-2). These tables also indicate the type of legislation, reflecting the types of regulations summarised above. It is noted that regulations can fall into more than one category, e.g., it could be aimed at managing health and safety on the facility and be based on an EU Directive.

Figure C-1 shows such a process, based on the UK offshore safety case regime.

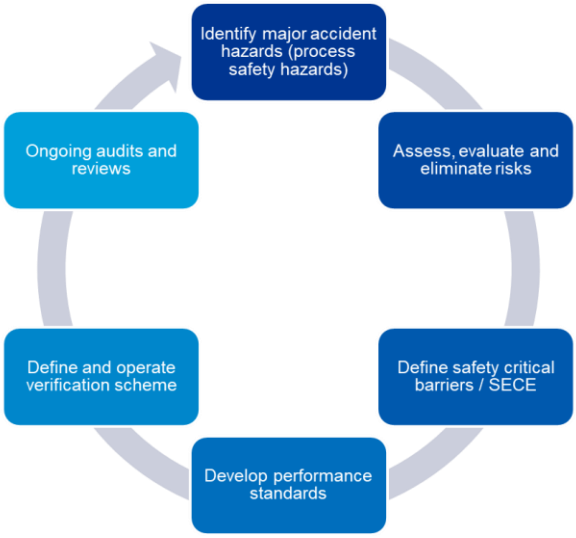

Figure C-1 - Major accident hazard management framework (UK)

1. **Identify major accident hazards**

   The first step is to select and identify major accident hazards or process safety hazards. Typically, this requires dedicated studies like Hazard Identification (HAZID) studies and Hazard and Operability studies (HAZOP) to be undertaken, preferably already as part of the design phase.

2. **Assess, evaluate, and eliminate risks**

   Once the major accident hazards are identified, their risk should be determined, typically based on a semi-quantitative and quantitative risk analysis. The risks should be assessed against criteria, and risk mitigation should be pursued of these criteria are not met. The concept of As Low as Reasonably Practicable (ALARP) can be adopted as part of this process.

3. **Define safety and environmental-critical elements (and activities)**

   Next, the safety and environmental-critical elements are defined. Safety and Environmental-Critical Elements (SECEs) are those whose failure could cause or contribute to an accident (as assessed in the first two steps) with severe or catastrophic consequences or whose purpose it is to prevent or limit the effect of such an accident. Current acknowledge practice is to adopt barrier analysis for this, distinguishes both technical and operational type barriers to prevent or mitigate a major accident.

   It is also possible to define safety and environmental critical activities. These are activities which when performed satisfactorily contribute to control of major accident hazards. Often these are related to maintaining the integrity of the SECEs or barriers during operations. But for operational type barriers this definition can be extended to include operational type activities if these have an effect on the status of the barrier.

4. **Develop performance standards**

For the SECEs (or: barriers) performance criteria are defined, referred to as 'performance standards'. A performance standard sets measurable targets for the performance of SECE to prevent, detect, control, mitigate or recover from a process safety event. More specifically, it looks at the following (referred to as FARSI):

- Functionality - what must the SECE or barrier do?
- Availability - how likely is it to perform on demand? Are there any times when it is acceptable for the SECE or barrier to be unavailable?
- Reliability – how often is the SECE or barrier required to be operating effectively?
- Survivability – what events must the SECE or barrier be able to survive, and how long should it perform its function under adverse conditions?
- Interactions – what is the interaction with and dependencies on other SECEs or barriers?

5. **Define and operate verification scheme**

Assurance and verification are required to ensure that the SECEs or barriers maintain their integrity throughout the lifecycle of the facility. Purpose of verification scheme is to document measures to be taken (either in terms of testing or other examination) to ensure that the SECE meets its performance standard.

Inspection, testing and maintenance requirements of the verification scheme should be incorporated into the maintenance management system.

As mentioned before, the purpose is independent verification of the adherence to the performance standard by an ICP, IVB or Verifier. Independent verification could take place during design (referred to as 'initial suitability') and on a continuous basis during operations. More specifically, the role of the Verifier is (see also Figure C-2):

- Review and comment on list of SECE
- Review and comment on verification scheme overall (this will include performance standards, written schemes of examination, etc.)
- Execution of verification activities specified in the scheme, including vendor verification activities
- Reporting results of those activities
- Participating in the regular reviews and/or revisions of the scheme

6. **Ongoing audits and reviews**

This step is to ensure that the process described in the five steps above is conducted as planned. Typically, this is conducted through internal audits, but could also be the focus of an external audit (ISO related) or regulatory inspection. Key performance indicators (KPIs) can be used as means to monitor the effectiveness of the process for managing the major accident hazards, as described in steps 1 to 5.

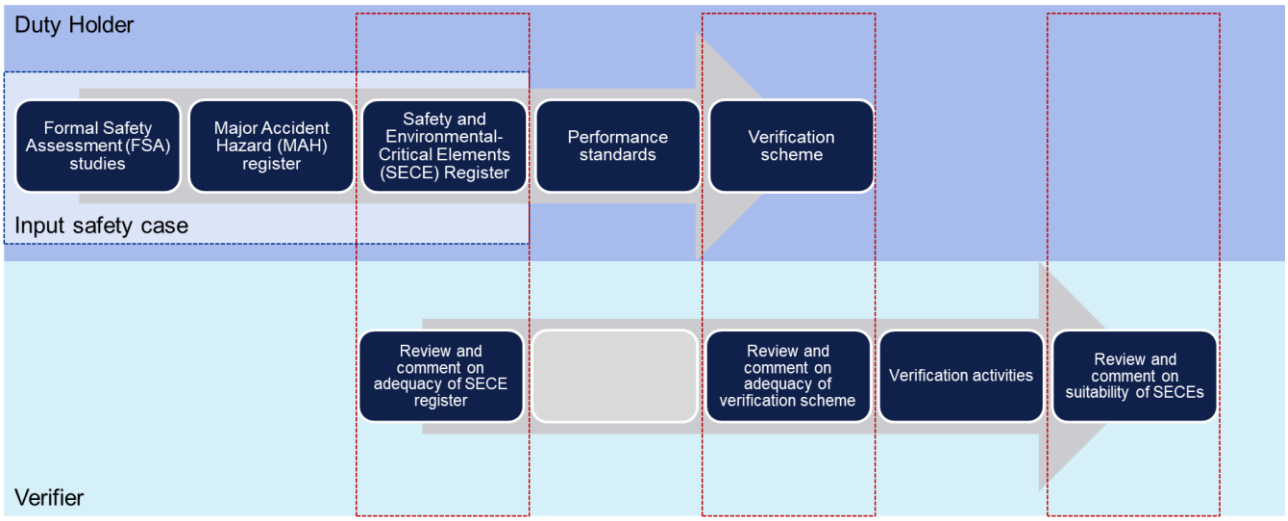

Figure C-2 – Role of Verifier (UK)

Table C-1 - Overview of UK HSE regulations and guidance (ACOP, guidance notes etc.)

Title	Abbr.	No.	Guidance (ACOP or otherwise)	Offshore	Health & Safety	Environment	EU Directive
Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015	SCR	2015/398	L154	X			
Offshore Installations and Pipeline Works (Management and Administration) Regulations 1995	MAR	1995/738	L70		X		
Offshore Installations (Prevention of Fire & Explosion & Emergency Response) Regulations 1995	PFEER	1995/743	L65	X			
Offshore Installations and Wells (Design and Construction) Regulations 1996	DCR	1996/913	L84	X			
Pipeline Safety Regulations 1996	PSR	1996/825	L82	X			
Diving at Work Regulations 1997		1997/2776	L103	X			
Borehole Sites and Operations Regulations 1995		1995/2018	L72	X			X
Offshore Installations (Safety Representatives and Safety Committees) Regulations 1989		1989/971	L110		X		
Offshore Installations and Pipeline Works (First-Aid) Regulations 1989			L123		X		
Health and Safety at Work Act 1974	HSWA	Act			X		
Management of Health and Safety at Work Regulations 1999	MHSWR	1999/3242	HSG65		X		
Provision and Use of Work Equipment Regulations 1998	PUWER	1998/2306	L22		X		
Manual Handling Operations Regulations 1992	MHOR	1992/2793	L23		X		
Personal Protective Equipment Regulations 2002		2002/1144	L25		X		X
Health and Safety (Safety Signs and Signals) Regulations 1996		1996/341	L64		X		X
Confined Spaces Regulations 1997		1997/1713	L101		X		X
Lifting Operations and Lifting Equipment Regulations 1998	LOLER	1998/2307	L113		X		X
Ionising Radiations Regulations 1999	IRR	1999/3232	L121		X		
Control of Noise at Work Regulations 2005		2005/1643	L108		X		
Control of Vibration at Work Regulations 2005		2005/1093	INDG242		X		

Title	Abbr.	No.	Guidance (ACOP or otherwise)	Offshore	Health & Safety	Environment	EU Directive
Control of Substances Hazardous to Health Regulations 2002	COSHH	2002/2677	L5		X		
Control of Substances Hazardous to Health (Amendment) Regulations 2003	COSHH	2003/978	L5		X		
Control of Substances Hazardous to Health (Amendment) Regulations 2004	COSHH	2004/3386	L5		X		
Control of Asbestos Regulations 2012		2012/632	L143		X		
Control of Lead at Work Regulations 2002	CLAW	2002/2676	L132		X		
Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016	ATEX 114	2016/1107					X
Dangerous Substances and Explosive Atmosphere Regulations 2002	DSEAR / ATEX 137	2002/2776					X
Electricity at Work Regulations 1989		1989/635	HSR25		X		
Electrical Equipment (Safety) Regulations 2016		2016/1101					X
Electromagnetic Compatibility Regulations 2006		2006/3418					X
Radio Equipment and Telecommunications Terminal Equipment Regulations 2000		2000/730					X
Pressure Systems Safety Regulations 2000	PSSR	2000/128	L122 INDG178		X		
Pressure Equipment Regulations 1999	PER	1999/2001					X
Pressure Equipment (Amendment) Regulations 2002	PER	2002/1267					X
Pressure Equipment (Amendment) Regulations 2015	PER	2015/399					X
Pressure Equipment (Safety) Regulations 2016		2016/1105					X
Simple Pressure Vessels (Safety) Regulations 2016		2016/1092					X
Supply of Machinery (Safety) Regulations 2008		2008/1597	INDG270 INDG271				X

Title	Abbr.	No.	Guidance (ACOP or otherwise)	Offshore	Health & Safety	Environment	EU Directive
Supply of Machinery (Safety) (Amendment) Regulations 2011		2011/2157	INDG270 INDG271				X
Lifts Regulations 2016		2016/1093	[S1]				X
CLP (Classification, Labelling and Packaging) Regulation	CLP	EC no. 1272/2008					X
CAA Standards for offshore helicopter landing areas (Edition 8, December 2016)		CAP437	Paper 2008/03	X			
Conservation of Offshore Marine Habitats and Species Regulations 2017		2017/1013				X	
Offshore Combustion Installations (Prevention & Control of Pollution) Regulations 2013	PPC	2013/971	[E7]			X	
Offshore Installations (Emergency Pollution Control) Regulations 2002		2002/1861	[E1]			X	
Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005		2005/2055	[E2]			X	
Offshore Petroleum Activities (Oil Pollution Prevention and Control) (Amendment) Regulations 2011		2011/983				X	
Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999		1999/360	[E3]			X	
Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) (Amendment) Regulations 2007		2007/933	[E4]			X	
Environmental Assessment of Plans and Programmes Regulations 2004		2004/1633					X
Offshore Chemicals Regulations 2002		2002/1355	[E5]			X	
Offshore Chemicals (Amendment) Regulations 2011		2011/982	[E6]			X	
Registration, Evaluation, Authorisation and Restrictions of Chemicals Enforcement Regulations 2008	REACH	2008/2852				X	
Registration, Evaluation, Authorisation and Restrictions of Chemicals Enforcement (Amendment) Regulations 2013	REACH	2013/2919				X	
Registration, Evaluation, Authorisation and Restrictions of Chemicals Enforcement (Amendment) Regulations 2014	REACH	2014/2882				X	
Fluorinated Greenhouse Gases Regulations 2015		2015/310				X	
Greenhouse Gas Emissions Trading Scheme Regulations 2012		2012/3038				X	
Greenhouse Gas Emissions Trading Scheme (Amendment) Regulations 2013		2013/1037				X	

Title	Abbr.	No.	Guidance (ACOP or otherwise)	Offshore	Health & Safety	Environment	EU Directive
Greenhouse Gas Emissions Trading Scheme (Amendment) Regulations 2014		2014/3125				X	
Greenhouse Gas Emissions Trading Scheme (Amendment) Regulations 2015		2015/1849				X	
Greenhouse Gas Emissions Trading Scheme (Amendment) Regulations 2017		2017/1207				X	
Ozone-Depleting Substances Regulations 2015		2015/168				X	
Energy Savings Opportunity Scheme Regulations 2014		2014/1643				X	
Energy Savings Opportunity Scheme (Amendment) Regulations 2015		2015/1731				X	
Radioactive Substances Act 1993 Amendment (Scotland) Regulations 2011		SSI 2011 /207				X	
Merchant Shipping (Load Line) Regulations 1998		1998/2241				X	
Merchant Shipping (Load Line) (Amendment) Regulations 2000		2000/1335				X	
Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2008		2008/2924				X	
Merchant Shipping (Prevention of Air Pollution from Ships) (Amendment) Regulations 2010		2010/895				X	
Merchant Shipping (Prevention of Pollution by Sewage and Garbage from Ships) Regulations 2008		2008/3257				X	
Merchant Shipping (Anti-Fouling Systems) Regulations 2009		2009/2796				X	
Merchant Shipping (Prevention of Oil Pollution) Regulations 1996		1996/2154				X	
Merchant Shipping (Prevention of Oil Pollution) (Amendment) Regulations 1997		1997/1910				X	
Merchant Shipping (Prevention of Oil Pollution) (Amendment) Regulations 2000		2000/483				X	
Merchant Shipping (Prevention of Oil Pollution) (Amendment) Regulations 2004		2004/303				X	
Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Convention) Regulations 1998		1998/1056				X	
Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Convention) (Amendment) Regulations 2001		2001/1639				X	
Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Convention) (Amendment) Regulations 2015		2015/386				X	

Table C-2 - Overview of UK HSE guidance notes

No.	Title
HSG65	"Managing for health and safety", third edition 2013.
HSR25	"The Electricity at Work Regulations 1989 - Guidance on Regulations", third edition 2015.
INDG163	"Risk assessment -A brief guide to controlling risks in the workplace", Rev. 4, 08/14.
INDG178	"Written schemes of examination - Pressure Systems Safety Regulations 2000", Rev. 2, 11/12.
INDG242	"Control back-pain risks from whole-body vibration - Advice for employers on the Control of Vibration at Work Regulations 2005, Rev. 1, 06/05.
INDG270	"Supplying new machinery - A short guide to the law and your responsibilities when supplying machinery for use at work", Rev 1, 09/11.
INDG271	"Buying new machinery - A short guide to the law and your responsibilities when buying new machinery for use at work", Rev 1, 09/11.
L5	"Control of substances hazardous to health - The Control of Substances Hazardous to Health Regulations 2002 (as amended) - Approved Code of Practice and guidance", sixth edition, 2013
L22	"Safe use of work equipment - Provision and Use of Work Equipment Regulations 1998 - Approved Code of Practice and guidance", fourth edition 2014.
L23	"Manual handling - Manual Handling Operations Regulations 1992 - Guidance on Regulations", fourth edition 2016.
L25	"Personal protective equipment at work - Personal Protective Equipment at Work Regulations 1992 - Guidance on Regulations", third edition 2015.
L64	"Safety signs and signals - The Health and Safety (Safety Signs and Signals) Regulations 1996 - Guidance on Regulations", third edition 2015.
L65	L65 "Prevention of fire and explosion, and emergency response on offshore installations - Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 - Approved Code of Practice and guidance", third edition 2016.
L70	"A guide to the Offshore Installations and Pipelines Works (Management and Administration) Regulations 1995 - Guidance on Regulations", first published 1995 (reprinted 2002).
L72	"A guide to the Borehole Sites and Operations Regulations 1995 - Guidance on Regulations", second edition 2008.
L82	"A guide to the Pipelines Safety Regulations 1996 - Guidance on Regulations", first published 1996 (reprinted 2012).
L84	"A guide to the well aspects of the Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996 - Guidance on Regulations", second edition 2008.
L101	"Safe work in confined spaces - Confined Spaces Regulations 1997 -Approved Code of Practice and guidance", third edition 2014.
L103	"Commercial diving projects offshore - Diving at Work Regulations 1997 - Approved Code of Practice and guidance", second edition 2014.
L108	"Controlling noise at work - The Control of Noise at Work Regulations 2005 Guidance on Regulations", second edition 2005.
L110	"A guide to the Offshore Installations (Safety Representatives and Safety Committees) Regulations 1989 - Guidance on regulations", third edition 2012.
L113	"Safe use of lifting equipment - Lifting Operations and Lifting Equipment Regulations 1998 - Approved Code of Practice and guidance", second edition 2014.
L121	"Work with ionising radiation - Ionising Radiations Regulations 1999 - Approved Code of Practice and guidance", first edition 2000.

No.	Title
L122	"Safety of pressure systems - Pressure Systems Safety Regulations 2000 - Approved Code of Practice and guidance", second edition 2014.
L123	"Health care and first aid on offshore installations and pipeline works - Offshore Installations and Pipeline Works (First-Aid) Regulations 1989 - Approved Code of Practice and guidance", third edition 2016.
L132	"Control of lead at work - Control of Lead at Work Regulations 2002 - Approved Code of Practice and guidance", third edition 2002.
L138	"Dangerous substances and explosive atmospheres - Dangerous Substances and Explosive Atmospheres Regulations 2002 - Approved Code of Practice and guidance", second edition 2013.
L143	"Managing and working with asbestos - Control of Asbestos Regulations 2012 - Approved Code of Practice and guidance", second edition 2013.
L154	"The Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015 - Guidance on Regulations", first edition 2015.
[S1]	Department for Business, Energy & Industrial Strategy - Regulatory Delivery "Lifts Regulations 2016 - Guidance", August 2017.
Paper 2008/03	Paper Civil Aviation Authority - Safety Regulation Group, " Helideck Design Considerations - Environmental Effects", Paper 2008/03, July 2009.
[E1]	"Guidance on Offshore Installations (Emergency Pollution Control) Regulations 2002 Emergency Pollution Control (EPC)", July 2016.
[E2]	DECC, "Guidance notes - The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (as amended)", April 2014.
[E3]	"Guidance on Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999", Version No:- 2011 /0 (date of Issue: October 2011).
[E4]	"Final Regulatory Impact Assessment (RIA)".
[E5]	"Regulatory Impact Assessment".
[E6]	DECC, "Guidance Notes on The Offshore Chemicals Regulations 2002 (As Amended 2011)", March 2011, Edition 1.
[E7]	DECC, "Offshore Combustion Installations (Prevention and Control of Pollution) Regulations 2001 (As Amended)", Edition 3, Version 2.

APPENDIX D– OVERVIEW OF UAE ADNOC HSE REGULATIONS

This appendix provides an overview of the HSE standards issued in Abu Dhabi, UAE.

Introduction

The UAE is among the world's ten largest oil producers and is a member of the Organization of the Petroleum Exporting Countries (OPEC), the Organization of Arab Petroleum Exporting Countries and the Gas Exporting Countries Forum. Around 95% of the UAE's oil reserves are in Abu Dhabi and each of the seven individual Emirates that constitute the UAE are responsible for the regulation of the sector within their own territory. In addition to oil, individual Emirates within the UAE have provided concessions for the extraction of natural gas, and the UAE plans to boost this domestic natural gas production to help meet growing internal demand.

Pursuant to article 23 of the UAE Constitution, the natural resources in each Emirate are the public property of that Emirate. The federal Ministry of Energy develops general policy but there are no unified federal oil and gas laws and each Emirate has autonomy to determine its own regulatory framework.

Abu Dhabi, Dubai, and Sharjah each have a Supreme Council with authority over the petroleum sector in their respective Emirates. Abu Dhabi's Supreme Petroleum Council creates and administers policy and regulations and sets the fiscal framework for the industry. The Supreme Petroleum Council also performs all functions of ADNOC's Board and ADNOC participates in concessions on behalf of the Government of Abu Dhabi.

HSE legislation

The respective Emirates do not have comprehensive oil and gas legislation in place and the relevant law is instead established through various applicable laws and decrees. The health, safety and environmental regime for the oil and gas sector in the UAE is derived from a range of sources. Generally, Federal Law No. 8/1980 (Concerning the Regulation of Labour Relations), and Federal Law No 24/1999 (on the Protection and Development of the Environment) will apply together with specific regulations, orders, standards, and policies dealing with health and safety requirements. There is a federal Ministry of Environment, Water, and Environmental Agency but, in practice, local environmental regulatory bodies monitor the implementation of environmental laws and regulations in each Emirate. Environmental impact assessment and other permitting requirements are set out in Federal Law No 24/1999.

HSE standards

HSE administration and management standards (also referred to as ‘HSE standards’) were issued in 2020 to support the implementation and enforcement of HSE regulations. The HSE administration and management standards are organised as indicated in Figure D-1. An overview of the HSE administration and management standards is given in Table D-1.

Figure D-1 – ADNOC HSE Standards

Table D-1 – ADNOC HSE administration and management standards

HSE Governance and Administration Standards	
HSE-GA-ST02	Health Safety and Environment Management System (HSEMS) Standard
HSE-GA-ST03	HSE Critical Roles and Competencies
HSE-GA-ST04	Incident Notification Investigation and Reporting Standard
HSE-GA-ST05	Contractor HSE Management Standard
HSE-GA-ST06	Project HSE Plan Standard
HSE-GA-ST07	HSE Design Philosophy Standard
HSE-GA-ST08	HSE Performance Monitoring and Reporting Standard
HSE-GA-ST09	HSE Audit and Assurance
HSE-GA-ST11	Life Saving Rules Standard
HSE Environment Standards	
HSE-EN-ST01	Environment Impact Assessment Standard
HSE-EN-ST02	Pollution Prevention and Control Standard
HSE-EN-ST03	Energy Management System Standard
HSE-EN-ST04	Waste Management Standard
HSE-EN-ST05	Environmental Performance Monitoring Standard
HSE-EN-ST06	Biodiversity Assessment Standard
HSE-EN-ST07	Air Dispersion Modelling Techniques Standard
Occupational Health Management Standards	
HSE-OH-ST01	Occupational Health Framework
HSE-OH-ST02	Occupational Health Hazard Manual
HSE-OH-ST03	Occupational Health Risk Management (OHRM) Standard
HSE-OH-ST04	Case Management and Rehabilitation Standard
HSE-OH-ST05	Health Screening and Surveillance Standard
HSE-OH-ST06	Food and Water Safety Standard
HSE-OH-ST07	Contractor Welfare Management Standard
HSE-OH-ST08	Physical Health Hazards Standard
HSE-OH-ST09	Chemical Hazards Standard
HSE-OH-ST10	Biological Hazards Standard
HSE-OH-ST11	Ergonomics Hazards Standard
HSE-OH-ST12	Indoor Air Quality Standard
HSE Operational Safety Standards	
HSE-OS-ST01	Work Management System (WMS) Framework Standard
HSE-OS-ST02	Permit to Work Standard
HSE-OS-ST03	Job Safety Analysis Standard
HSE-OS-ST04	Energy Isolation Standard
HSE-OS-ST05	Temporary Defeat Standard
HSE-OS-ST06	Simultaneous Operations Standard
HSE-OS-ST07	Compressed Gas Cylinders Standard
HSE-OS-ST08	Confined Space Standard
HSE-OS-ST09	Electrical Safety Standard
HSE-OS-ST10	High Pressure Water Jetting Standard
HSE-OS-ST11	Control of Temporary Equipment in Classified Hazardous Areas

HSE-OS-ST12	Explosives Standard
HSE-OS-ST13	Hazardous Substances Standard
HSE-OS-ST14	Cutting, Welding and Allied Processes Standard
HSE-OS-ST15	Excavation Standard
HSE-OS-ST16	Scaffolding Standard
HSE-OS-ST17	Manual Handling
HSE-OS-ST18	Abrasive Blasting and Spray-Painting Standard
HSE-OS-ST19	Lifting and Hoisting Operations Standard
HSE-OS-ST20	Personal Protective Equipment (PPE) Standard
HSE-OS-ST21	Management of Hydrogen Sulphide (H_2S) Standard
HSE-OS-ST22	Working at Height Standard
HSE-OS-ST23	Diving Operations Safety
HSE-OS-ST24	Marine Operations Safety
HSE-OS-ST25	Road Transport Operations Safety Standard
HSE-OS-ST26	Air Transport Operations Safety
HSE-OS-ST27	Hazard Communication Standard
HSE-OS-ST28	Office Safety Standard
HSE-OS-ST29	HSECES Management Standard
HSE-OS-ST30	Management of Technical Changes - MOC
HSE-OS-ST31	Management of Downgraded Situations
HSE Risk Management Standards	
HSE-RM-ST01	HSE Risk Management
HSE-RM-ST02	HSE Impact Assessment (HSEIA)
HSE-RM-ST03	Hazard Identification Study (HAZID), Environmental Impacts Identification Study (ENVID) and Occupational Health Identification Study (OHID) Standard
HSE-RM-ST04	Hazard Operability Study (HAZOP)
HSE-RM-ST05	Safety Integrity Levels (SIL) Determination Standard
HSE-RM-ST06	Control of Major Accident Hazards (COMAH) Standard
HSE-RM-ST07	Escape, Evacuation and Rescue Assessment (EERA) Standard
HSE-RM-ST08	Emergency System Survivability Assessment (ESSA) Standard
HSE-RM-ST09	Fire and Explosion Risk Assessment (FERA)
HSE-RM-ST10	Quantitative Risk Assessment (QRA) Standard
HSE-RM-ST11	Project HSE Review (PHSER) Standard
HSE-RM-ST12	Pre-Start-up Safety Review (PSSR) Standard
HSE-RM-ST13	Inherently Safer Design (ISD) Standard
HSE-RM-ST14	CFD Dispersion and Explosion Modelling
HSE Administration & Management Standards	
HSE-CE-ST01	Crisis Management and Emergency Response Standard
HSE-CE-ST02	Oil Spill Response Standard
HSE-CE-ST03	Fire and Rescue Operations Standard

About DNV

DNV is the independent expert in risk management and assurance, operating in more than 100 countries. Through its broad experience and deep expertise DNV advances safety and sustainable performance, sets industry benchmarks, and inspires and invents solutions.

Whether assessing a new ship design, optimizing the performance of a wind farm, analyzing sensor data from a gas pipeline or certifying a food company's supply chain, DNV enables its customers and their stakeholders to make critical decisions with confidence.

Driven by its purpose, to safeguard life, property, and the environment, DNV helps tackle the challenges and global transformations facing its customers and the world today and is a trusted voice for many of the world's most successful and forward-thinking companies.