

तेल उद्योग सुरक्षा निदेशालय

OIL INDUSTRY SAFETY DIRECTORATE

भारत सरकार	Government of India
पेट्रोलियम और प्राकृतिक गैस मंत्रालय	Ministry of Petroleum & Natural Gas
आठवीं मंजिल, टॉवर-ए, ओ.आई.डी.बी. भवन,	8th Floor, Tower - A, OIIB Bhawan,
प्लॉट नं. 2, सेक्टर-73, नोएडा-201301	Plot No. 2, Sector-73, Noida - 201301

Preface

Guidance Notes- April 2012

'Guidance Notes' to the 'Petroleum and Natural Gas (Safety in Offshore Operations) Rules, 2008' were issued in November 2009 by OISD for ease of understanding as to what the operators are required to do, to comply with the requirements arising out of the Rules.

The guidance notes have been revised based on industry feedback, new standards, changes in international standards and OISD's audit observations. Guidance on verification of fitness of offshore drilling rigs, BOP recertification and suggested documentary evidence of compliance with each of the Rules have also been included.

'Guidance Notes' provide possible solutions for complying with the requirements of the Rules (as the Rules are goal based). The operator can choose a solution other than that mentioned in the guidance notes as long as it fulfils the functional requirements, and can be demonstrated to be equal to or better than the solution given in the guidance notes.

This, 1st revision, has been uploaded on OISD website.


Hirak Dutta
Executive Director

April 2012

Guidance notes
on
'Petroleum and Natural Gas (Safety in Offshore Operations) Rules,
2008'

INTRODUCTION

Petroleum and Natural Gas (Safety in Offshore Operations) Rules, 2008 framed under the Oilfields (Regulation and Development) Act, 1948 are meant for regulation of safety in offshore exploration, exploitation, conservation and management of petroleum and natural gas and matters connected therewith.

These rules follow goal setting approach i.e. what is to be achieved rather than prescribing specific solutions. Functional requirements have been given in the rules which among other things, refer to safety related issues without specifying any particular solution to be adopted. The rules have been supplemented by these guidance notes, wherever required. The guidance notes indicate possible solutions for complying with the requirements arising out of the rules. The operator can choose a solution other than those mentioned in the guidance notes as long as it fulfils the functional requirements, and is equal to or better than the solution given in guidance notes. Solution chosen by the operator shall be based on customary practice in the industry, requirements & specifications appearing in other documents such as nationally and internationally recognised industrial standards (e.g standards like API, ISO, OISD), codes and conventions (e.g. MARPOL, SOLAS, ISM, MODU code etc). However, evidence in form of documentation, demonstrating that solutions selected by the operator fulfil the functional requirements of the rules, shall be maintained by the operator at all times. Documentary evidence of compliance is mandated by Rule#36(5). Requirements of documentary evidence demonstrating compliance with the rules are mentioned against the rules in these guidance notes.

Unless otherwise stated, reference to and use of the standards / Recommended Practices / Guidelines is intended to be the 'latest revisions and updates'.

In case of rules having no clear-cut standards / guidelines (such as Rule-41, 43 etc), the operator himself shall define requirements and specifications for his activities and systems in order to comply with functional requirements of the rules. The operator's own defined requirements shall be binding and will constitute the basis of the supervision carried out by the competent authority.

OISD has been notified as competent authority to exercise the powers and functions as stipulated in the rules vide Gazette of India S.O.no 1502(E) dated 18th June, 2008. OISD will carry out supervision by means of consents, investigations, verification and safety audits. Other statutory requirements that are applicable to the petroleum activities in offshore areas, for instance stipulations laid down by the Ministry of Shipping, Ministry of Environment & Forest, Ministry of Defence, Ministry of Civil Aviation, Flag State etc. are not part of these rules.

In most of the rules, responsibility is placed on "The licensee, the lessee, or as the case may be, the operator" whereas in some of the rules it is on "The operator only" depending upon the requirements of the rule. In the rules / sub rules where no party is mentioned, the licensee, the lessee, or as the case may be, the operator shall be responsible. Hence, the above entities are liable for penal action for contravention of the Rules.

CHAPTER I
PRELIMINARY

Rule-1 Short title, extent and commencement:

Sub-rule (1):

The rules apply to offshore oil and gas drilling rigs and production installations and associated facilities like sub-sea production systems, Pipelines etc. Supply /support vessels and construction barges are not covered under these rules when these are outside the 500 m safety zone. While inside the safety zone, the relevant Rules like 167, 168, 54, 55, 56 shall be followed by them. Diving activities per se are covered under these rules. Seismic activities are not covered by these rules.

Sub-rule (2):

Date of publication of these rules in the official gazette is 20.06.2008.

Rule-2 Definitions:

(e): Also called SIMOPS (Simultaneous Operations).

(q) & (r): The term person means a company (ies) recognised by the law as having rights and duties.

(s): Offshore installation includes process platform, unmanned wellhead platform, drilling rig, modular rig, FPSO, FSU, SBM etc

(z): Territorial waters, contiguous zone, continental shelf and exclusive economic zone of India shall have the meaning as defined in 'The territorial waters, continental shelf, exclusive economic zone and other maritime zones act, 1974'.

CHAPTER II

PRINCIPLES RELATED TO HEALTH, SAFETY AND ENVIRONMENT

Rule-3 Safe petroleum activities:

This rule is a fundamental provision for the petroleum activities undertaken in the relevant waters. While planning and carrying out the activities, individual as well as collective assessment of all the safety related factors shall be made.

Documentary evidence of compliance:

1. Safety Policy of the company;
2. A write up on how the company ensures that the safety policy is transmitted down the line and implemented at the installation to ensure safe petroleum activities;
3. Demonstration of Management's commitment towards safety: Can be in form of periodic safety reviews/ meetings; physical visits to the installations by management.

Rule-4 Set up organization:

Sub-rule (1):

The operator shall have organizational set up in India related to HSE matters manned by competent persons to ensure that petroleum activities are conducted in accordance with the rules.

There shall be one nodal person in each organization approved by the head of the organization who will be competent to interact with OISD for regulatory compliance issues. However, OISD may contact other persons in various

departments / assets / regions of the company for technical information and records as and when required.

Sub-rule (2):

Competence means qualifications, training and experience to carry out their assigned work in safe manner.

Documentary evidence of compliance:

1. Organogram of HSE department and its linkages in both directions, downward up to installation and upward up to the board level;
2. Competency criteria and compliance thereto of key positions like OIM, Tool Pusher, Tour pusher, Driller, Barge Engineer, Process In-charge, Maintenance in charge;
3. Competency criteria and compliance thereto of the HSE persons.

Rule-5 Health, safety and environment friendly culture:

A positive health, safety and environment culture must pervade at all levels of the individual activity / facility so that everyone participating in petroleum activities takes his share of responsibility towards HSE. Systematic efforts will be made by the operator to prevent dangerous situation, undesirable condition, pollution, injury to persons, and damage to equipment. Key driver for establishing positive safety culture should be management's commitment towards safety.

Documentary evidence of compliance:

1. Recognition of safety related initiatives;

2. Increased reporting of near misses and hazards;
3. Interactive safety meetings;
4. Employees right to stop unsafe operations;
5. Awareness of key persons about Offshore Safety Rules and its compliance status for their installation;
6. Efforts towards raising safety awareness levels and positive safety culture.

Rule-6 Health:

Health related resources shall also include emergency medical evacuation. Preventive measures and routine curative services shall include resources like well equipped medical room where medical officer can perform the duties mentioned in Rule-41 of Chapter-VII.

Documentary evidence of compliance:

1. Policy/ procedure for preventive and curative medical measures taken by the company;
2. Medical evacuation arrangements.

CHAPTER III INFORMATION AND RECORDS

Rule-7 Information and records:

Sub-rule (1):

The operator shall decide the information which he considers as necessary for the activities, like Daily Progress Report, alarm record, safety systems bypass etc and document the same.

Sub-rule (2):

The information and records submitted by the operator to OISD shall be in a document format which shall be delimited, coherent and produced for a specific purpose. Reference to other document(s) shall not be made unless the referred document(s) is completely relevant and specific to the information required. Documents submitted to OISD shall clearly show issuing and approving authority in the organization.

Documentary evidence of compliance:

1. List of necessary records required to be generated for the installation;
2. Issuing and approving authority for sending information to OISD for production and drilling installations;
3. Consent for operation issued by OISD shall form part of documentation placed onboard. Also copies of clearances / certificates issued by other authorities like Ministry of Environment and Forest, Ministry of Defence, Ministry of Home Affairs, Ministry of Shipping shall be available onboard.

Rule-8 Maintenance of information and records:

Sub-rule (1) is self explanatory.

Sub-rule (2):

Occupational health survey shall be carried out at each installation at regular interval based on parameters defined by the operator and remedial measures shall be taken. It may include health record of employee.

Documentary evidence of compliance:

1. Records retention policy of the company;
2. Records for activities mentioned in Rule 8 (a) to (g);
3. Report of Occupational health survey at the installation.

Rule-9 Intimation concerning offshore installation:

The intimation in form-1 is to be given only at commencement and cessation of operations of the offshore installation.

Sub-rule (3):

Unattended wells shall exclude wells which have been permanently abandoned.

Documentary evidence of compliance:

Form -1

Rule-10 Oceanographic and meteorological data

Each installation shall receive relevant site specific weather forecasts. A typical forecast would include a general synopsis including any warnings, a summary of the wind, seas & swell.

For deep water drilling rigs, current profile throughout the water column should be recorded. The same should be used for diver & ROV activities, station holding, operational planning, riser handling etc. In addition, the above current profile data should be used to monitor riser fatigue and refine future design of risers, moorings and production facilities.

Documentary evidence of compliance:

1. Metocean data used in design of the installation;
2. Record of monitoring of metocean data over a period of time.

Rule-11 Notice of accident: Accidents as mentioned in this rule include fire and other incidents also.

Sub-rule (1):

(1) (a): 'Serious bodily injury' means:

1. head injuries involving concussion, loss of consciousness or other serious consequences;
2. loss of consciousness as a result of working environment factors;
3. skeletal injuries, with the exception of simple hairline fractures or fractures of fingers or toes;
4. injuries to internal organs;
5. whole or partial amputation of parts of the body;
6. poisoning with danger of permanent health injury, such as H₂S poisoning;
7. burns or corrosive injuries with full thickness skin injury (third degree) or partial thickness skin injury (second degree) to the face, hands, feet or abdomen, as well as all partial thickness skin injury that covers more than five per cent of the surface of the body;

8. general cooling (hypothermia);

9. permanent inability to work.

As it may not be possible to classify the injury under serious bodily injury within 24 hours, it is suggested that all work related medical evacuation cases shall be reported within 24 hours, subsequently followed by the information on the extent of injury.

(1) (c): 'Blowout' means an uncontrolled flow of well fluids and / or formation fluids from the well bore.

(1) (d): In these Rules 'major fire' has not been defined. As the rules are goal based, it is the responsibility of the operator to classify the fire incident and report accordingly. Obviously, the classification has to be based on consequences; potential for property & environment damage / endangering safety of personnel etc. of the fire incident. The operator may be required, if regulator so desires, to provide the basis for his classification.

(1) (f): It shall include well kicks encountered during drilling / work over operations.

(1) (g): BARC, Mumbai will be informed by operator in case of accidents related to radioactive substances.

(1) (h) & (i): Accidents concerned with helicopter shall be intimated to Director General, Civil Aviation also. Accidents concerned with vessels shall be intimated to the Director General of Shipping also.

(1) (l) & (m): Coast Guard also to be informed.

Notice of accident shall be followed by investigation by operator through a pre-set procedure and investigation report shall be submitted to the OISD.

In Form – 2 at line 4, sub-heading Type of accident shall include (a) to (m) of sub-rule 11(1).

Sub-rule (2):

In case of death, the operator shall inform concerned state government authority in addition to informing to the OISD.

Sub-rule (3):

For accidents not falling under sub rule (1) like first aid case, loss time injury and near miss incidents, details should include but not limited to man hour loss, opportunity cost, production loss, root cause, as applicable.

Documentary evidence of compliance:

Accident reporting and investigation procedure

Rule-12 Decommissioning plan:

The regulation requires removal of abandoned or disused offshore installation in accordance with generally accepted international standards and guidelines. The objective of such removal is to ensure safety of navigation and to prevent any potential adverse effect on marine environment. IMO Resolution A.672 (16) dated 19 October 1989 on guidelines and standards for the removal of offshore installations and structures on the continental shelf and in the exclusive economic zone should be followed.

Also section 22 of 'Petroleum and Natural Gas Rules, 1959' and MOP&NG Notification No. GSR 813(E) dated 16.12.2004 shall be followed.

Documentary evidence of compliance:

Decommissioning plan, wherever applicable.

CHAPTER IV CONSENT AND INTIMATION

Purpose of consent for operation is to gauge operator's technical and organizational capabilities against requirements arising out of these rules. Consent for operation is installation specific.

Accordance of consent for operation of an installation implies that the OISD has scrutinized the documents furnished by the operator, on face value, and has inferred that safety management system is in place to commence/ continue operations. It is pertinent to mention here that the OISD is not approving use of technology or systems, selection of equipment etc. Responsibility of safety lies with the operator.

Documents and information submitted under these schedules shall be used subsequently by the OISD during audits, investigation and verifications. Any deviation from the information on safety systems submitted for obtaining consent shall be treated as non-compliance.

Information demanded in schedules of this chapter shall be prepared as per guidance notes on the schedules issued by OISD and should be presented in line with requirements given under Rule 7 (2). Separate individual document should be submitted against each schedule.

While submitting information as demanded in the schedule, international / industry standards followed by the operator should be mentioned.

Estimated concentration of H₂S which may be encountered and facilities available for handling the same should be mentioned in the consent application.

Penalties under the act as mentioned in Rules-15 and 17 means penalties mentioned under section 9 of Oilfields (Regulations and Development) Act, 1948 which have been quoted under Guidance Note of Rule-173.

The consent shall be issued subject to compliance to the Petroleum and Natural Gas (Safety in Offshore Operations), Rules, 2008. It is recommended that the Rule-36 be implemented to confirm that the requirements arising as per these rules are being fulfilled, before applying for consent.

In case of change of operator, fresh consent shall be obtained.

Rule-13 Design intimation for fixed offshore installation:

Sub-rule (1):

OISD will need one month to examine the design intimation and therefore it should be submitted well in advance so that any issues raised by the OISD are taken care of before the design is frozen.

Serial# 3 of Schedule I implies that the operator shall identify and record those relevant provisions of the rules which have been deviated in design and submit possible compensating measures which have been incorporated in the design.

Rule-14 Application for consent for operation of new fixed offshore installation:

Serial# 4 of schedule II implies that the operator shall identify and record those relevant provisions of the rules which have been deviated in fixed offshore installation and submit information about the compensating measures which have been put in place.

Guidance notes on Schedule II are given at annexure -1.

Rule-15 Application for consent for existing fixed offshore installation:

Guidance notes on Schedule III are given at annexure -1.

Rule-16 Application for consent for mobile offshore installation:

For mobile offshore installation application for consent shall be submitted only once before entry into relevant waters; however in case of change of operator fresh consent to operate will be required to be obtained by the operator.

Guidance notes on Schedule IV for mobile installations other than drilling rigs are given at annexure-2 and for drilling rigs at annexure-3.

Rule-17 Application for consent for already operating mobile offshore installation:

In case of change of operator, fresh consent to operate will be required to be obtained by the operator.

Guidance notes on Schedule V are given at annexures -2 & 3.

Rule-18 Intimation for combined operation:

This intimation is to be submitted only once in the form of SIMOPS document. Hence, it should include all possible simultaneous operations the installation is likely to be involved in during the course of its operations. OISD GDN-186 on 'Simultaneous Operations' or equivalent industry standard should be followed.

Documentary evidence of compliance:

SIMOPS document of the company

Rule-19 Relocation intimation for production offshore installation is self explanatory.

Rule-20 Revision and resubmission of application for consent:

Following activities shall inter-alia require revision and resubmission of application for consent:

- i) Any modifications that increases loading on the installation in excess of existing load, as per the design;
- ii) Major repair after damage to the installation. Major repairs are those which require shut down of normal operations for an extended period of time (does not include routine dry-docking/ maintenance shutdown);
- iii) Converting an existing installation for a new purpose.

CHAPTER V

RISK MANAGEMENT

Risk management inter alia includes assessment and evaluation of risk, as well as planning and implementation of risk reducing measures.

Establishment of several layers of effective safety measures (barriers) to reduce the probability of hazards and accidents, and eliminate or limit their consequences should be the aim of risk management.

Priority should be given to the possibility of elimination of major accident risks. When this cannot be achieved, then the respective elements of the safety management system (SMS) should act as a barrier and provide specific attention to the procedures necessary to minimise possibility of these events, and if any was to occur, to limit their potential for causing harm. The SMS should set out the management control and monitoring procedures to be followed for this purpose.

Rule-21 Risk reduction:

Sub-rule (1):

Risk to humans, assets and the environment should be reduced to 'as low as reasonably practical' (ALARP) levels. Situation of hazard and accident constitute a collective term that includes both accidents and near misses that have occurred and other unwanted conditions that may cause harm.

To reduce the risk to humans, assets and the environment, technical solutions having good inherent safety characteristics and effective barriers should be adapted for all phases of petroleum activities.

For risk management following standards should be followed:

- ISO 17776 on 'Petroleum and Natural Gas Industries- Offshore Production Installations- Guidelines on tools and techniques for hazard identification and risk assessment'
- ISO 13702 on 'Control and mitigation of fires and explosions on offshore production installations - Requirements and guidelines'

For evaluation of risk reducing measures section 5.4.1 (Evaluation of risk reducing measures) of ISO 17776 (First edition 2000) should be followed. Hierarchy of risk reducing measures should be in the following order– prevention, detection, control, mitigation and emergency response.

Sub-rule (2):

While establishing barriers, order of priority should be inherent safety, prevention, detection, control and then mitigation

Sub-rule (3):

No interdependence between the barriers means that these barriers shall not be impaired or cease to function simultaneously, as a consequence of a single failure or a single incident.

Example of 'no interdependence' of barriers

- Two barriers during drilling -well fluid and BOP. In case of failure of first barrier (well fluid) due to increased formation pressure, BOP is not impaired. Hence no interdependence.
- However Upper Pipe ram and Lower Pipe Ram BOPs are dependent barriers because if the BOP control system fails during kick, both BOPs will not function. Hence there is interdependence between the two.

- Two barriers on pressure vessel - pressure switch high (PSH) and pressure safety valve (PSV). In case of failure of PSH due to control logic malfunction, functioning of PSV is not impaired. Hence no interdependence.

Sub-rule (4) is self explanatory.

Sub-rule (5):

Progressive approach to risk reduction should be adopted, giving attention first to those measures which have greatest efforts in risk reduction.

Protective measures which are concerned with the major accident risks should be given preference over the protective measures concerned with the risks faced by personnel on an individual basis. Protective measures such as F&G systems, active and passive fire protection, temporary refuge, and evacuation systems should be given preference over PPE.

Documentary evidence of compliance:

Risk management procedure

Rule-22 Barriers:

Barrier is a measure which reduces the probability of realising a hazard's potential for harm and its consequence. Barriers may be physical (materials, protective device, shields, segregation etc.) or nonphysical (procedures, inspection, training, drills etc.) or a combination thereof.

Sub-rule (1):

For establishing and maintaining barriers following standards should be followed:

- For production facilities, API RP14C on 'Recommended practices for analysis, design, installation and testing of basic surface safety systems for offshore production platforms'
- For drilling and well servicing operations, NORSK standard D 010 on 'Well integrity in drilling and well operations'
- For instrumented systems, IEC 61508 on 'Functional safety of Electrical / electronic / programmable electronic safety - related systems'.

Sub-rule (2):

'All concerned' means persons working offshore as well as those with supervisory responsibilities onshore, and includes both operator and contractor employees.

The basis for the requirements of the individual barrier should be understood by all concerned. This includes understanding of connection between risk and hazard assessments and requirements of the barriers through suitable techniques like bowtie analysis.

Performance requirements may be related to capacity, reliability, availability, efficiency, mobilisation time, personnel competence, ability to withstand loads, integrity, robustness etc. expressed as far as possible in a verifiable manner.

Measuring parameters, verification plan and performance requirement standards should be defined for each of the barriers.

Sub-rule (3):

Safety critical system / equipment bypass policy should be prepared. The policy should include time limits (for which

safety device can be bypassed) and corresponding authorisation at various hierarchical levels. Impairment and restoration of safety devices shall be recorded and reported to the shore management as per the policy. A bypass register should be maintained for this purpose.

Documentary evidence of compliance:

1. Risk register including identified barriers;
2. Safety barriers bypass system (procedures and records with approval of appropriate decision making levels);
3. Performance requirement of safety critical system / equipment.

CHAPTER VI

SAFETY MANAGEMENT

Rule-23 General requirements of risk assessment:

Risk assessment establishes basis of requirements arising out of these rules as the rules are goal based.

Appropriate solutions should be selected based on the results of the risk assessment.

Sub-rule (1):

Risk assessment includes hazard identification and risk evaluation. The purpose of risk assessment, assumptions and conditions on which assessment is based should be clearly stated. Assessment should be updated when changes in the conditions and /or assumptions affect the results of the assessment. For updating assessment, the criteria should be set. Criteria could be a change in process or equipment during refurbishment; manning level, learnings from related incidents etc.

Job hazard analysis (JHA) to identify and evaluate the hazards of a job / task with an objective of establishing barriers (safety measures), is a prominent risk assessment method.

Sub-rule (2):

Where the selection of mitigating measure requires risk potential in concrete terms like explosion effect, radiation level etc., risk assessment should be of quantitative type.

Recognised models, methods and techniques mean that these have been tested & validated, and are commonly used in the industry. Best available data implies that data should be

representative and valid; limitations if any should be mentioned.

Following standards should be followed:

For general guidance on risk assessment (including drilling operations), ISO Standard 17776 on 'Petroleum and natural gas industries –offshore production installations- Guidelines on tools and techniques for hazard identification and risk assessment'

For production facilities, API RP14C on 'Recommended practices for analysis, design, installation and testing of basic surface safety systems for offshore production platforms'

API RP 14J on 'Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities'

NORSOK standard Z-013 on 'Risk and Emergency Preparedness analysis' for quantitative risk assessment (QRA).

Sub-rule (3):

Any change in operating envelope including environmental conditions should be reviewed vis-a-vis risk assessment.

Following standards should be followed:

Annexure C (Hazards identification and risk assessment considerations for offshore E&P activities) of ISO 17776 Standard (First edition 2000) on 'Petroleum and natural gas industries –offshore production installations- Guidelines on tools and techniques for hazard identification and risk assessment'.

ISO 13702 on 'Control and mitigation of fires and explosions on offshore production installations - Requirements and guidelines'.

Sub-rule (4):

Acceptance criteria (definition at Rule 2(a)) means the upper limit of acceptable risk related to major accidents and risk related to the environment. Major accident means an accident involving several serious personal injuries or deaths or an accident that jeopardises the integrity of the facility. Environmental risk means the risk of pollution.

Sub-rule (5):

For risk acceptance criteria, established industry guidelines like those of HSE, UK should be followed.

Sub-rule (5)(c):

These acceptance criteria should take into account environmental related regulatory requirements.

Sub-rule (6):

These requirements can be met by establishing the risk picture (useful and understandable synthesis of the risk assessment), to provide useful and understandable information about the risk and the risk assessment performed. For guidance on establishing the risk picture section 5.6 of NORSOK standard Z-013 (Third edition, October 2010) should be referred.

Documentary evidence of compliance:

Risk picture including risk assessment / hazard analysis reports of the facility.

Rule-24 Risk assessment and emergency preparedness analyses:**Sub-rule (1):**

Balanced and comprehensive picture means all external and internal incidents that the facility is vulnerable to should be identified. Risk assessment includes both qualitative and quantitative risk assessment.

NORSOK standard Z-013 on 'Risk and Emergency Preparedness analysis' should be followed.

Sub-rule (1) (f):

Defined situation of hazard and accident means representative situations of hazard and accident used for dimensioning the emergency preparedness.

Sub-rule (2):

NORSOK standard Z 013 on 'Risk and Emergency Preparedness analysis' should be followed.

If there is a major change in the facility in terms of design modifications, operational parameters, manning levels or if there is some significant impact of any changes in external environment like coming up of other offshore facilities nearby etc. then emergency preparedness analysis would need to be carried out again. The competent authority may, in particular cases, stipulate further requirements with regard to the establishment of emergency preparedness as per Rule 58 (3).

Emergency preparedness is covered in Chapter X of the rules, which describes the requirements which are to be fulfilled.

Documentary evidence of compliance:

1. Escape, evacuation and rescue analysis (EERA)
2. Fire Risk analysis (FRA)

3. MODU Safety Certificate (In case of MODU, above requirements are fulfilled by following MODU code).

Rule-25 Risk assessment and emergency preparedness analyses with respect to environment:

Environmentally oriented risk assessment should inter alia include incident sequences that can result in acute pollution. Initiating incidents should be ranked by using drift and spread analyses. If applicable, the incident sequences should be supplemented with other types of incidents and conditions that also can result in acute pollution.

Acute pollution means pollution of significance which occurs suddenly and should take into account worst case discharge scenario from the facility. Typical examples are larger oil spill due to pipe rupture or a blow out from a well.

Background load means operational discharges from the facility.

Important information for carrying out environmentally oriented risk assessment should include:

- i) the physical, chemical and ecotoxicological effects of the pollution;
- ii) the characteristics of the pollution;
- iii) transport and spread of pollutants through modelling studies;
- iv) weathering;
- v) vulnerability of eco systems;
- vi) meteorological data;
- vii) environmental prioritisation map for vulnerable resources.

The way in which especially vulnerable environmental resources have been addressed, should be shown in the environmentally oriented risk and emergency preparedness assessment.

An action plan with requirements and decision criteria should be established for each defined situation of hazard and accident. For guidance Annexure G of NORSOK standard Z-013 (Third edition, October 2010) should be referred.

The Environment risk assessment and Emergency Preparedness Plan with respect to environment i.e Oil Spill Response Plan should also address the following:

- A. Worst case discharge (WCD) scenario- Well blowout
 - i) Estimated flow rates during a blowout or from pipeline
 - ii) Total volume of oil and maximum duration of flow
 - iii) Arrangements in place for surface intervention
 - iv) Time for hiring rig for drilling relief well if required
 - v) Tie-up with specialist well control and oil spill containment agencies for the worst case discharge estimated in sl (i) above
 - vi) Assumptions, calculations and models used in estimation of WCD scenario
 - vii) Measures for prevention / reducing likelihood of blowout - in case of subsea wells Subsea containment and capture equipment, including containment domes and capping stacks
- B. Arrangement of oil containment resources like

- i) Offshore surface oil containment and recovery
- ii) Near shore surface oil containment and recovery
- iii) Shoreline booming and protection strategies
- iv) Debris removal from site of blowout
- v) Support vessels, capture vessels and storage facilities

C. Response time should be specified i.e the time by which containment resources (as per B above) would be operational at site to combat oil pollution.

National Oil Spill Disaster Contingency Plan (NOSDCP) is administered by the Indian Coast Guard (ICG). As per NOSDCP, Tier-I facilities for oil spill response should be provided by the operator (i.e for oil spill up to 800 MT). Tier-II level oil spill is upto 10000 MT of oil spilled into the sea and is managed by the ICG. Tier-III level oil spill is beyond 10000 MT of oil spilled into the sea and is managed by the ICG with the help of national /international support.

Documentary evidence of compliance:

1. Environment impact assessment report;
2. Oil Spill Response Plan;
3. Tier-I facilities details.

Rule-26 Working environment analysis:

Working environment analyses should be carried out during planning, operation & shutdown of facilities, modifications of existing facilities, purchasing or hiring new equipment, entering into contracts with contractors or organisational

changes etc. The various analyses should complement each other so that they cover both situations of hazard and accident as well as exposure to working environment factors in order to ensure a proper working environment. Compliance to requirements of the Rules-89 to 97 and 135 to 140 shall be ensured during the working environment analyses.

The analyses should include data on:

- i) individual or group workloads and exposure to working environment factors of the personnel, as well as data on the perception of the employees related to physical and psychological working environment;
- ii) working environment factors in various areas of the facility and
- iii) occupational diseases and industrial accidents.

Documentary evidence of compliance:

Working environment analysis report / Health risk assessment HRA [Section B8 (Health Risk Assessment) of ISO 17776 (First edition 2000) standard].

Rule-27 Safety management system:

Sub-rule (1):

Safety Management System (SMS) should be based on PDCA (Plan, Do, Check and Act) cycle which comprises of:

- i) Policy setting – includes policy, corporate acceptance of responsibility, objectives, requirements, strategies;

- ii) Organisation – includes structure, accountability and safety culture, involvement of the workforce, systems for performing risk assessment;
- iii) Planning and execution – includes operational standards and procedures for controlling risks, permit to work, competence and training, selection & control over contractors, management of change, planning & control for emergencies and occupational health;
- iv) Measuring and evaluating – includes active monitoring, recording and investigation of incidents / accidents, auditing, handling of non-conformities;
- v) Continuous improvement – includes review and application of the lessons learnt.

Safety management system should not degenerate into a paper exercise only, conducted solely to meet regulatory requirements.

Safety management system should inter alia include elements of:

- i) Hazard identification, control of hazards / establishing barriers;
- ii) Contractor safety;
- iii) Competency of personnel
Competence means qualifications, training and experience to carry out their assigned work in safe manner.
- iv) Management of change;
- v) Emergency response plans and procedures (including pipeline related emergencies);

- vi) Asset integrity management (testing, inspection, maintenance, replacement of critical equipment);
- vii) Standard operating procedures;
- viii) Incident reporting and accident investigation;
- ix) Performance monitoring of SMS [goals, audits, management review];
- x) Regulatory requirements in the form of legal register. Legal register should incorporate
 - a. Requirements arising out of these Rules.
 - b. Actions required to be taken
 - c. Person responsible for taking action (it would be desirable to have a senior level person)
 - d. Status
- xi) Organizational structure for HSE management;
- xii) Bridging document between the operator and contractors/ service providers

Sub-rule (2):

Any of the following standards should be followed:

- API RP 75 on 'Recommended Practice for Development of a Safety and Environmental Management Program (SEMP) for Offshore Operations and Facilities'.
- HSE-UK guidance document -HS (G) 65 on 'Successful Health and Safety Management'
- OGP report No. 6.36/210 on 'Guidelines for the development and application of Health, Safety and Environmental Management Systems'
- ILO 'Guidelines on occupational safety and health management systems'.

Sub-rule (2) (a): The rule requires adequate resources including competent personnel for safe operations. A competent person [defined in Rule-2(g)] is a person, with appropriate knowledge (theoretical and practical) and experience of operations (including equipment and process). He can carry out thorough examination of operations, which will enable him to detect defects & weaknesses and assess their importance to safety and operations.

Sub-rule (2) (b):

It includes transfer of responsibility and accountability in case of organisational change and transitions from one phase of activity to the next. As a project passes through the various stages, the line of command and accountability might change to reflect changing circumstances. Basis for these changes and the arrangements to implement these should be addressed in the SMS.

Sub-rule (2) (c) is self explanatory.

Sub-rule (2) (d):

HSE objectives should be expressed in such a way that it is possible to assess to what degree objectives have been achieved. Short term and long term objectives should be consistent and not contradictory. While setting internal requirements, the regulatory requirements should be kept in view.

Sub-rule (2) (e):

Interfacing of SMS of various entities (operator, contractor / service provider, subcontractor and third-party) should be ensured through bridging document. Operator should decide what controls he would exercise over health and safety and what controls are to be within the scope of its contractors.

The respective limits should be well defined in the SMS and should be clear to all parties.

Step Change in Safety, UK - Guidance document on 'Health and Safety Management Systems Interfacing' should be followed.

Sub-rule (3):

All accidents and high potential near misses should be investigated. Near misses, which are not high potential, may not be investigated individually, but should be studied, to identify trends and common critical factors (contributing to these near misses). The investigation should, inter alia, bring out:

- i) the actual course of events and the consequences;
- ii) other potential courses and consequences;
- iii) existing non-conformities to requirements, approaches and procedures;
- iv) human, technical and organisational causes of the situation of hazard and accident;
- v) which barriers have failed, the causes of barrier failure and, if applicable, which barriers should have been established;
- vi) which barriers have functioned, i.e. which barriers have contributed to prevent a situation of hazard from developing into an accident, or which barriers have reduced the consequences of an accident and
- vii) which actions should be taken in order to prevent similar situations of hazard and accident.

Sub-rule (4):

Monitoring parameters can be lagging or leading such as:

Lagging -number of incidents, incident severity

Leading- Number of safety inspections and audits carried out, action items follow up, availability of critical safety systems, aspects related to safety culture etc.

Errors, deviations and breakdowns in safety barriers should be monitored and analysed to get true safety performance status of the facility. Objectives should be specified and criteria for their fulfilment should be established.

Sub-rules (5) & (6) are self explanatory.

Sub-rule (7):

These audits and management review shall include appraisal of adequacy of operator's as well as other participants' safety management system. Audits should include system audits that will carry out verifications and measurements of safety critical procedures and elements against pre-set performance standards. Audits should contribute to identifying technical, operational or organisational weaknesses, failures and deficiencies.

Periodicity of internal audit shall be specified by the operator in his safety management system manual.

Pre-defined time frame for implementation of internal and external audit recommendations should be reasonable i.e not too long to compromise with safety. Expected date of compliance (EDC) of recommendations should be supported by action plan for compliance. EDC should not be shifted without justifiable reasons.

Sub-rule (8) is self explanatory.

Documentary evidence of compliance:

1. Safety management system of operator, contractor, service provider and other participants.
2. Bridging document between the operator and contractor/ service provider.
3. Training matrix and record thereof, along with likely dates of trainings, in case of gaps.

Rule-28 Follow-up and development of safety management system:

This Rule mandates continuous improvement in the SMS.

Documentary evidence of compliance:

Section of SMS fulfilling above requirements.

Rule-29 Identification of offshore installation:

Signs should be affixed at a location that is visible to approaching traffic and shall contain the name of the installation and name of the organisation (operator/ contractor).

In case of MODU, SOLAS -Chapter XI-1 Regulation #3 on 'Ship identification number' should be followed.

Documentary evidence of compliance:

Compliance to SOLAS ship identification requirements.

Rule-30 Verification of fitness of offshore installation:

Sub-rule (1):

'Fit for purpose' means able to perform intended functions. Intended functions include drilling in case of drilling rigs, and top side facilities in case of production well / process

platforms. OISD guidance notes for fit for purpose certification of MODU are placed at annexure-4.

Sub-rule (2) (a)

It includes design / construction verification by independent party.

Sub-rule (2) (b):

Recognised standards inter alia include ISO 19900 series standards for offshore structures. MODU code should be followed for marine aspects of MODU. For drilling equipment and systems, API/ISO standards mentioned in OISD guidance notes for fit for purpose certification of MODU shall be followed.

Sub-rule (2) (c):

- i) Fit for purpose status of an installation is to be ensured through certification by an independent reputed party.
- ii) Valid certificate means certificate issued by an independent party (including any member of the classification society) for a fixed time period.
- iii) Offshore platform certification should include verification of underwater structure and topside facilities.
- iv) In case of drilling rig, certification should include verification of the drilling system besides class assurance by any member of the classification society.

Sub-rules (3), (4) & (5) are self explanatory.

Documentary evidence of compliance:

Certificate of fitness, meeting the above requirements.

Rule-31 Information:**Sub-rule (1):**

Identification of information is determining who needs what type of information and when. The need for information is related to activities such as engineering, maintenance, production, drilling, change process etc. Routine safety related information includes maintenance of records such as safety statistics, incident investigation reports, HSE audit reports etc.

Two important information channels are from base to installation and from installation to base. From base to installation information about operations plans and from installation to base information about impaired safety devices are two examples of critical information.

Sub-rule (2):

Acquiring information can be from internal and external sources of information. Similarly users can be internal – organisational personnel or external – suppliers of equipment and services.

Sub-rule (3) is self explanatory.

Documentary evidence of compliance:

Flow of information related to HSE in Management Information System (MIS) of the organisation.

Rule-32 Offshore Installation Manager:**Sub-rule (1):**

Alternate to OIM should be designated who can immediately take over in case OIM is not available offshore or is incapacitated.

Sub-rule (2) (a):

Necessary qualification means experience and technical / professional competence. Competence requirement includes professional competence, system knowledge and HSE aspects competence and should be in line with industry standards such as OPITO safety training standards for oil and gas industry and should be documented.

OPITO approved standard on 'OIM Controlling Emergencies' should be followed for OIM training.

For duties and competence requirements of OIM for Mobile Offshore Units (MOUs), IMO resolution 891(21) on 'Recommendations on training of personnel for MOUs' should also be followed.

Sub-rule (2) (b):

If considered necessary, OISD may evaluate the competence of OIM on this requirement.

Sub-rule (2) (d):

There should be documented record to demonstrate that individuals have been designated as OIM and their identity is known to all personnel working on the installation.

Sub-rule (3):

OIM should have empowerment commensurate with his responsibilities.

Documentary evidence of compliance:

Evidence of OIM having undergone training.

Rule-33 Safety Officer:**Sub-rule (1):**

Duties of Safety Officer include:

- i) Develop HSE goals and objectives for the installation;
- ii) Coordinate risk assessments at the installation;
- iii) Facilitate implementation of safety management system on the installation;
- iv) Facilitate implementation of HSE activities on the installation;
- v) Update safety management system and emergency response plans;
- vi) Prepare drill schedule and ensure that these are carried out as per plan;
- vii) Promote awareness and understanding of HSE issues;
- viii) Coordinate safety training and facilitate induction (safety briefing and familiarisation) of personnel at the installation;
- ix) Report HSE performance and compliance;
- x) Ensure that incidents are reported and investigated

Sub-rule (2) is self explanatory.

Documentary evidence of compliance:

Functions and responsibilities of safety officer.

Rule-34 Safety Committee:

Sub-rule (1) is self explanatory.

Sub-rule (2):

Here Convener means coordinator.

Sub-rule (3):

Representatives from each of the onboard contractors should also participate in the safety committee meeting.

Sub-rules (4), (5) & (6) are self explanatory.

Documentary evidence of compliance:

Agenda and minutes of meeting of Safety Committee along with list of participants.

Rule-35 Responsibility in respect of contractors and service providers:**Sub-rule (1):**

When entering into a contract, it should be ensured that the contractors and service providers are qualified to fulfil the requirements of the Rules. A monitoring procedure should be put in place so as to ensure that the contractors and service providers are complying with the requirements of these Rules during conduct of petroleum activities.

Though the operator is responsible for all the rules, yet there are many day to day activities for which the drilling contractor has to provide resources and is directly responsible. A Legal register should be maintained jointly by operator & drilling and other contractors, specifying therein individual responsibilities and actions to be taken against each rule.

Sub-rule (2) is self explanatory.

Documentary evidence of compliance:

1. Contractor safety policy of the operator detailing how operator ensures contractor safety aspects. This includes procedures for selection of contractors based on their previous safety performance and monitoring of safety performance of contractors during the contract duration;
2. Legal Register.

Rule-36 Verifications:**Sub-rule (1):**

Verification of compliance with requirements of these Rules necessitates verification of the internal requirements set by the organisation to comply with these Rules. Verification may include scrutiny of design calculations, drawings and fabrication by independent or in-house personnel. Verification may also include testing of equipments and systems/ procedures.

Sub-rule (2) is self explanatory.

Sub-rule (3):

The agency preparing the basis for verification and carrying out verification should be independent of the section / department whose work is to be verified. An important premise is that the party carrying out verification has the necessary competence and necessary resources to do so.

Sub-rules (4) & (5) are self explanatory.

Documentary evidence of compliance:

For installations getting fresh consents, documentary evidence of compliance should be submitted to OISD within 60 days of start of operation of the installation or as stated in the consent letter.

Rule-37 Investigation by competent authority:**Sub-rule (1):**

Investigation includes audit, inspection and review of documents. Officers of competent authority may undergo

mandatory safety trainings which will be arranged / facilitated by the operator.

Sub-rule (2):

Demonstrate means evidence of concrete actions undertaken for fulfilling requirements of these Rules.

Documentary evidence of compliance:

Documents demonstrating compliance with the rules.

Rule-38 Transport and offshore stay:

Under normal circumstances, minimum one week advance notice will be conveyed to the operator for logistics arrangements.

CHAPTER VII

HEALTH AND WELFARE MEASURES

Rule-39 Medical fitness of offshore going employees:

The purpose of minimum physical efficiency criterion is to ensure that only physically fit persons are sent to offshore installations. Following parameters can be inter alia included in the criterion:

- Vision
- Hearing
- Communicable disease
- Alcoholism/ drug addiction
- Conditions leading to loss of consciousness
- Physical handicap
- Motor system deficiencies

The allowable limits against each parameter can be fixed by the operator.

Documentary evidence of compliance:

Physical Efficiency Criteria as stated above.

Rule-40 Onboard Medical Officer:

For installations where accommodation capacity is more than 100 persons, qualified doctor (MBBS degree holder) shall be posted as medical officer. For installations with accommodation capacity less than 100 persons, a paramedic may be posted as medical officer.

In case the onboard medical officer leaves the installation to accompany a patient to land, his replacement shall be sent as early as possible.

Documentary evidence of compliance:

Qualification of onboard Medical Officer.

Rule-41 Duty of Medical Officer on board is self explanatory.

Documentary evidence of compliance:

Jobs to be carried out by onboard Medical Officer in line with sub rules 41 (a) to (f).

Rule-42 Medical examination of employees:

The operator shall frame policy for periodic health examination of employees according to their age profile.

Documentary evidence of compliance:

1. Periodic medical examination records of the employees;
2. Long term effects of working environment on the employees.

Rule-43 Measures against toxic emissions and ionizing radiation is self explanatory.

Documentary evidence of compliance:

To demonstrate compliance with each of the sub-rules under Rule 43.

Rule-44 Food and drinking water:

Sub-rule (a):

Quality of food shall be governed by relevant provisions of Food Safety and Standards Act 2006 and Prevention of Food Adulteration Act 1954 that apply to the whole of India. Policy

of quantity of dry provisions available onboard at any time shall take into consideration the probable contingencies like disruption in supply from shore due to adverse weather conditions.

Sub-rule (b):

Bureau of Indian standards IS:10500:1991 or equivalent shall be followed for drinking water quality. Drinking water sample shall be sent for quality test as per BIS at predefined frequency.

Documentary evidence of compliance:

1. Procedure to ensure adequate provisions availability onboard at all times;
2. Potable water test frequency and one test report.

Rule-45 Hours of work and rest:

Hours of work and rest period shall be such that under normal circumstances working hours do not exceed 48 hrs per week averaged out over a period not more than one year. In case an employee needs to travel on a daily basis or in isolated cases to facilities other than he is stationed after arriving at the workplace, the time spent in travelling shall be included in the working hours. This applied to both -the journey time and the waiting time.

The time used to travel to and from the workplace at the beginning or the end of each period of stay shall not be regarded as working hours.

When work is performed at more than one workplace, total working hours shall be taken into consideration.

Maximum number of days that a person can spend offshore shall be fixed by the operator subject to risk assessment. For employees overstaying, the operator shall take appropriate measures to mitigate the HSE problems arising due to overstay.

Documentary evidence of compliance:

Offshore stay policy taking into account the above requirements

CHAPTER VIII

TRANSPORT AND STAY

Rule-46 Transport:

The rule applies to transportation by boat as well as by helicopter.

Relevant regulations/guidelines of Director General of Civil Aviation/ Director General of Shipping, Government of India, shall be followed.

For safe transportation by boat following should be followed:

- UKOOA (UK Offshore Operators Association) Guidelines for Safe Management and Operations of Offshore Support Vessels (issue-4, 2002);
- IMCA (International Marine Contactors Association) Information Note SEL 08/01 March 2001 on 'Guidelines on Procedures for Transfer of Personnel by Basket on the UK Continental Shelf';
- IMO (International Maritime Organisation) Code of Safe Practice for the Carriage of Cargoes and Persons by Offshore Supply Vessels (OSV Code).

For safe transfer of man and material to and from boat, 'well defined boat transfer procedures', competent crane operator and usage of SIMOPS should be ensured.

For safe transfer of man and material by helicopter, 'well defined landing/take off procedures', competent HLO & usage of SIMOPS should be ensured.

Documentary evidence of compliance:

1. Marine Operations Manual;
2. Aviation Policy;
3. SIMOPS document.

Rule-47 Helideck Operation:

Relevant regulations/guidelines of Director General of Civil Aviation, Government of India, shall be followed.

Sub-rule (a) & (b):

Competent person {as defined in Rule-2 (g)} is designated as HLO for helicopter operations. He shall be able to identify and locate helicopter operational hazards, hazardous areas, access routes and points; identify, locate and operate all relevant equipment and controls; supervise helicopter landing and departure, cargo handling, loading and unloading passengers, baggage and freight, supervise the refueling of the helicopter.

In case of flight to and from an unmanned platform, operator should ensure that the duties mentioned above can be performed by a person embarking/disembarking at such places.

For training of HLO, OPITO (Offshore Petroleum industry training organization) standard for 'Offshore Helicopter Landing Officer' (Rev.4-April 2007) or equivalent should be followed.

Sub rule (c):

These shall inter alia include procedures for radio communication, refueling of helicopter, loading / unloading of

cargo, embarkation / disembarkation of personnel, helicopter emergency at helideck.

The design and structure of the helicopter deck should be in accordance with specifications as may be approved by the Civil Aviation Authority.

Documentary evidence of compliance:

1. HLO competence record;
2. Procedures mentioned in Sub-rule c above

Rule-48 Stay on facilities:

Sub-rule (1):

The list should inter alia include details like blood group, allergy to medicine, name and telephone number of next of kin. Similar record should be available at base also. Arrival and departure of all personnel shall be recorded in manifest register.

Sub-rule (2):

In addition to Safety Induction upon arrival, information on relevant requirements arising out of rules pertaining to the installation shall be provided to all persons preferably in the form of a booklet. Also Rule- 171 on 'General duty for safety' shall be quoted for information of the persons.

A station bill setting forth the emergency duties / actions to be taken and duty stations of crew members should be available at all times and posted at conspicuous locations. The station bill shall identify the alarms for different emergencies and actions to be taken in these scenarios.

Documentary evidence of compliance:

1. POB list with above mentioned details;
2. Safety induction booklet;
3. Station bill.

Rule-49 Accommodation:

The layout and capacity of living quarters shall ensure a fully satisfactory living environment and shall be adapted to the various functions to be provided for and the anticipated need for personnel during the various phases of the petroleum activities.

Sub-rule (c):

While deciding compensating actions, requirements arising out of rules of Chapter X on Emergency Response System and Chapter VII on Health and Welfare Measures shall be reassessed.

Documentary evidence of compliance:

1. MODU safety certificate.

Rule-50 General housekeeping:

Housekeeping inter alia includes maintaining floors and walls free of dust & dirt, keeping areas hygienic, keeping aisles and stairways clean, handling rubbish and waste materials etc. Disinfection and pest control of all indoor areas shall be carried out regularly. Good housekeeping practices shall be followed at unmanned platforms also.

Separate smoking area/s shall be provided.

Maintenance of adequate standards of hygiene shall be responsibility of the onboard Medical officer as given in with Rule-41.

Documentary evidence of compliance:

1. Housekeeping inspection checklist;
2. Hygiene inspection checklist of Medical officer.

CHAPTER IX

SAFETY ZONES

Rules under this chapter has been framed in line with requirements of the IMO resolution 671 (16) on 'Safety Zones and Safety of Navigation around Offshore Installations and Structures'

Rule-51 Establishment of safety zones:

Self explanatory

Documentary evidence of compliance:

Procedure in place to control movement of vessels around the installation.

Rule-52 Specific safety zones established in situations of hazard and accident

Self explanatory

Rule-53 Revocation of safety zones

Self explanatory

Rule-54 Monitoring of safety zones

The operator shall put in place a monitoring mechanism to fulfil the requirements of this rule.

Documentary evidence of compliance:

Procedure in place for monitoring of safety zone

Rule-55 Alert and intimation in connection with entry into safety zone

Sub-rule (4):

Indian coast guard is the concerned agency mentioned in sub-rules (4) and (5).

Documentary evidence of compliance:

System in place for alerting the vessel and the concerned agency in the event of safety zone violation.

Rule-56 Measures against intruding vessels or objects:

Such measures inter alia include use of Water Monitors, LARD (Long Range Acoustic Device), Offshore Supply Vessel.

Documentary evidence of compliance:

Measures to be adopted for refusing entry to vessels, in the event of likely violation of safety zone.

Rule-57 Announcement of location of an offshore installation:

Offshore Defence Advisory Group (ODAG) and Indian Naval Hydrographic Department are the concerned agencies.

Documentary evidence of compliance

Copy of intimation provided to the concerned agency.

CHAPTER X EMERGENCY RESPONSE SYSTEM

Rule-58 Establishing emergency preparedness:

Emergency preparedness should aim at protection of human, asset and environment resources. It should include technical, operational and organizational measures planned to be implemented in case of accidental situations. The operator is responsible for ensuring that necessary measures are implemented to prevent or reduce the harmful effects of hazards or emergency situations.

For guidelines following standards (either ISO or NORSOK) should be followed:

- ISO standard 13702 on 'Control and mitigation of fires and explosions on offshore production installations -- Requirements and guidelines'
- ISO standard 15544 on 'Petroleum and natural gas industries- offshore production installations- requirements and guidelines for emergency response'
- NORSOK standard Z-13 on 'Risk and Emergency Preparedness analysis'

Sub-rule (1):

To prepare a strategy for emergency response following standards should be followed:

- ISO standard 15544 on 'Petroleum and natural gas industries- offshore production installations- requirements and guidelines for emergency response'

- ISO standard 13702 on 'Control and mitigation of fires and explosions on offshore production installations -- Requirements and guidelines'

Sub-rule (2):

For guidance on performance requirements following standards should be followed:

- Annexure A of ISO standard 15544 (First edition 2000) on 'Petroleum and natural gas industries- offshore production installations- requirements and guidelines for emergency response'
- Section 12.4 and 12. 5 of NORSOK standard Z-13 (Third Edition, October 2010) on 'Risk and Emergency Preparedness analysis'

Documentary evidence of compliance:

1. Emergency and disaster management plan of the operator;
2. Procedure for emergency preparedness; taking into account the above requirements. LSA plan in case of MODU, and Escape, Evacuation and Rescue Analysis (EERA) including Fire Risk Assessment (FRA), in case of fixed installation.

Rule-59 Emergency preparedness organisation structure:

Emergency preparedness organisation means the personnel including medical practitioner, who are directly linked to installation resources, area resources, external resources and regional resources. Such type which is capable means emphasis should be on the individual's education and competence, experience, physical suitability, personal qualities and experience from drills and training when

selecting the personnel. The situations of hazard and accident also include situations of hazard and accident other than the defined, complex situations of hazard and accident, stress situations and situations where key personnel are incapacitated or are unable to carry out their duties.

Documentary evidence of compliance:

Emergency Response organisation at base and offshore installation.

Rule-60 Emergency preparedness plans:

The emergency preparedness plans should, inter alia, include:

- i) Description of purpose, scope and responsibility;
- ii) Description of organisation, alerts, mobilisation and communication;
- iii) Action plans;
- iv) Description of field(s) and facility(s) and potential areas which could be impacted by acute pollution;
- v) Description of installation resources, area resources, regional resources and external resources and equipment, to tackle emergencies
- vi) Instructions for emergency preparedness personnel;
- vii) Co-operation procedures and agreements, if applicable, for co-ordination with other participants.

Documentary evidence of compliance:

Emergency Response Plans (ERP) manual of the installation

Rule-61 Standby vessels:

The capability of standby vessel with respect to emergency response preparedness should be decided on the basis of 'Escape, Evacuation and Rescue analysis'.

Emergency Response and Rescue Vessel Management & Survey guidelines of Oil and Gas UK should be followed.

Documentary evidence of compliance:

1. Emergency response requirements of standby vessel;
2. Fit for purpose status of the standby vessel .

Rule-62 Co-ordination of emergency preparedness:**Sub-rule 62 (1):**

The operator should ensure that emergency preparedness is coordinated with the Indian Coast Guard (ICG).

ICG is the National Maritime Search and Rescue Co-ordinating Authority (NMSARCA) for executing / coordinating Search and Rescue (SAR) missions in the Indian maritime SRR (Search and Rescue Regions). Under NMSARCA the Indian Search and Rescue Region of India is divided into four SAR areas with Maritime Rescue Coordination Centres (MRCC) located at Mumbai, Chennai and PortBlair. It has subcentres (MRSC) at Goa, New Manglore, and Kochi in the west, Porbandar, Okha and Vadinar in the North West, Vizag, Paradip and Haldia in the East and Diglipur, Campbellbay in Andaman and Nicobar.

ICG is also Central Coordinating Authority for combating oil spills in maritime zones and implementing National Oil Spill Disaster Contingency Plan (NOSDCP).

Sub-rule 62 (2):

In case of major accident hazard when emergency preparedness plan includes involvement of outside resources, these plans should be tested and validated periodically (at least once a year) by conducting joint table top and live exercises.

Documentary evidence of compliance:

Interfacing of ERP of the installation with the Regional Contingency Plan.

Rule-63 Co-operation on emergency preparedness:**Sub-rule 63 (1):**

Cooperation between operators on emergency preparedness will optimise the preparedness resources to be deployed by each of the parties. In case of acute pollution it will help in combating pollution from an individual facility as well as area/region as a whole.

Sub-rule (2):

For use of shared emergency resources, establishment of regional (common) emergency preparedness plans is required. Presently the SRR (West) covers the SAR operations in Western seaboard. The SRR (East) covers Bay of Bengal including portions of Palk Bay and Gulf of Mannar. The SRR (A&N) covers the area adjacent to Andaman and Nicobar Islands. SRR (North West) covers area in north-west (Coastal Gujarat).

Documentary evidence of compliance:

Mutual agreement between nearby operators for emergency response including combating oil spills.

Rule-64 Handling of situations of hazard and accident:

Sub-rule 64 (a): Giving the 'right alert' means alerting the relevant locations / agencies based on respective action plans for various emergencies.

These include, inter alia:

- i) The facility's central control room or another central function;
- ii) The Maritime Rescue Co-ordination Centre (MRCC);
- iii) One or more parts of the operator's emergency preparedness organization;
- iv) Contractors' emergency preparedness organisations;
- v) Other partners, as per the agreement related to coordinated emergency preparedness resources.

The MRCC, as mentioned above, will handle further necessary alerts to the agencies that have national emergency preparedness resources at their disposal.

Sub-rule 64 (c):

The requirement to 'rescue' implies that that the operator must be able to:

- i) Locate missing personnel;
- ii) Bring personnel to safe areas on vessels, facilities or land;
- iii) Provide injured personnel life saving first aid and medical treatment on their own facilities, the standby vessel or other facilities.

Sub-rule 64 (d): Evacuation actions should be such that they provide the highest possible probability that personnel can be evacuated from an exposed area to a safe area on the facility and, if applicable, to safe areas on vessels, other facilities or on land. As regards sick and injured personnel, the requirement implies that transport to the land-based health service should take place in a quick and prudent manner.

Sub-rule 64 (e): The normalisation inter alia implies that:

- i) The operation of the facility is resumed;
- ii) Injured or sick personnel are given the necessary treatment and care, such as medical treatment on land and follow-up of physical and mental injuries, and that the next of kin of such personnel are provided with the necessary information, care and follow-up after major accidents;
- iii) Environment has been restored after necessary cleanup.

Documentary evidence of compliance:

Record of drills carried out considering above factors.

Rule-65 Safety of installation in the event of industrial disputes:

Sub-rule 65 (1):

Necessary safety related actions required to be taken prior to unscheduled closure of or stoppage of work due to industrial dispute should be documented.

Also, contingency manning requirements, under such situations should be spelt out.

The employees shall be under obligation to take necessary steps, with respect to this rule. This obligation should form part of duties & responsibilities of employees.

Documentary evidence of compliance:

Contingency safety manning plan of the installation.

Rule-66 Equipment for rescue of overboard personnel:

Sub-rule 66 (1):

Man Overboard Rescue Boat with associated rescue equipment should be selected based on results of 'Escape, Evacuation and Rescue Analysis'. This equipment should not subject the rescue personnel or the personnel to be rescued to unacceptable risk. SOLAS Chapter III on 'Life saving appliances and arrangements' should be followed.

Sub-rule 66 (2):

IMO resolution A.831 (19) on Code of Safety for Diving Systems should be followed.

Documentary evidence of compliance:

LSA plan.

Rule-67 Life jackets and life buoys:

Sub-rule 67 (1):

Life jackets should be approved type as per SOLAS requirements. Quantity and locations for storing / placing life jackets and placing life buoys should be selected based on results from 'Escape, Evacuation and Rescue Analysis'.

Refer **Sub-rule (2)**:

Protection from weather and physical damage should be ensured.

Documentary evidence of compliance:

LSA plan.

Rule-68 Communication:

Sub-rule 68 (a):

It shall be possible, inter alia, to

- i) Provide important information to personnel on the facility during normal operations and in situations of hazard and accident;
- ii) Communicate important information between personnel in the control centre, personnel concerned with operation of the process facilities, drilling operations and lifting operations;
- iii) Establish and maintain direct and continuous communication between communication operators, field and platform management and internal and external emergency preparedness resources in the situations of hazard and accident;
- iv) Provide communication for coordinated action against acute pollution.

Sub-rule 68 (b): A person responsible for communications also implies that he should ensure that the facility's radio station and other communication systems are maintained in good condition at all times.

Documentary evidence of compliance:

1. Details of communication systems on the installation;
2. Name and qualification of person responsible for operation of communication equipment.

Rule-69 Muster areas:

Sub-rule 69(a):

The muster area is part of main safety functions as per rule 77(2) and should provide refuge on the installation for as long as required for evacuation of the installation.

Sub-rule 69(d):

Escape routes from the area of the initial event, should be:

- i) Designed and protected so that at least one route of escape is available for the required period of time during a defined situation of hazard or accidental event (including possible search and rescue operations).
- ii) Personnel should be able to use the escape routes without being exposed to excessive toxic fumes; smoke, unacceptable heat loads, hot liquids or falling objects.
- iii) Evacuation means should be designed and protected to ensure safe abandonment of the installation during a defined situation of hazard or accidental event for the period of time required for evacuation, and search and rescue operations.

Documentary evidence of compliance:

1. LSA plan in case of MODU;
2. Escape, Evacuation and Rescue Analysis (EERA).

Rule-70 Means of evacuation:

Sub-rule 70 (1):

Means of evacuation can be Helicopter, lifeboats and life rafts. For installations connected by bridge to other installations, bridge may be considered as primary means of evacuation.

Sub-rule 70 (2):

For fixed installations, quantity and placement of means of evacuation should be based on Escape, Evacuation and Rescue Analysis (EERA).

For MODUs, chapter 10 (Life saving appliances and equipment) of applicable MODU code should be followed.

Sub-rule 70 (3):

For MODUs, Chapter 10.3 (Survival Craft) of applicable MODU Code should be followed.

For fixed installations, issues of means of escape should be addressed in EERA. Chapter III of SOLAS on 'Life saving appliances and arrangements' should be referred.

One additional evacuation area shall be identified, to be used if approach to the main evacuation area is not possible during defined situation of hazard and accident.

Sub-rule 70 (4):

Saturation diving systems should be equipped to enable evacuation of the divers under pressure. Evacuation should also be possible in cases of loss of main power on the diving system / support vessel.

Sub-rule 70 (5):

Hyperbaric rescue unit should be constructed to withstand loads encountered during launch and should be equipped for

safe and efficient recovery. Operational procedures should include information on limitations in connection with launching, towing and recovery operations for different weather conditions. Emergency life support package should be available at a convenient location and should be equipped with external supply, monitoring and control of the hyperbaric rescue unit. Arrangements should be in place to mobilise this emergency life support package on board a suitable rescue vessel capable of reaching hyperbaric rescue unit within a reasonable time.

IMO Resolution A.692(17) for 'Hyperbaric Evacuation Systems' IMCA D014 'International code of practice for offshore diving', IMCA D025 'Evacuation of Divers' and DNV RP-E 403 on 'Hyperbaric Evacuation' should be followed.

Documentary evidence of compliance:

1. LSA plan;
2. Escape, Evacuation and Rescue Analysis (EERA).

Rule-71 Arrangement for recovery and rescue:

Documentary evidence of compliance:

Part of ERP mentioning arrangement for recovery and rescue.

Rule-72 Drills:

Sections 8 (Training on Emergency Response and Evacuation Procedures) and Section 9 (Emergency Drills and Exercises) of OISD-GDN-227 (First edition, 2007) should be followed. In addition:

- i) Various drills should be staggered so that over a defined period of time, each employee has participated in all the

drills. Also mustering and evacuation routine should be participated by each employee as part of drill during his duty period.

- ii) Exercise should be carried out involving base for the emergency preparedness management and for the regional emergency preparedness. This exercise should involve installation and area resources, relevant external resources, the operator's and contractor's emergency preparedness organisations on land, as well as the Government authorities. The operator should fix frequency of these drills. The operator should be able to demonstrate emergency preparedness at his installations, requiring assistance of external services.
- iii) During drilling and well intervention operations regular well control drills should be conducted. For detailed requirements section 8 (Drills and Training) of OISD-RP-174 (Second edition, 2008) should be followed.

Documentary evidence of compliance:

Annual drills schedule and records of drills carried out.

Rule-73 Reliability and condition of emergency response equipment: Performance standards of emergency response equipment and systems should be established. Key elements of functionality, survivability, reliability and availability should be included in performance standards. Achievement of these performance standards should be validated.

Sub-rule 73 (a):

Section 10 (Maintenance of Emergency response Equipment and Systems) of OISD-GDN-227 (First edition, 2007) should be followed.

Sub-rule 73 (b):

Inspection, testing and maintenance procedures should be established to ensure performance standards.

Sub-rule 73 (c):

Performance standards of the Emergency Response Equipment should be validated through this scheme.

Documentary evidence of compliance:

1. Procedure for systematic examination of Emergency Response equipment by a qualified and independent person;
2. Maintenance records of emergency response equipment.

CHAPTER XI

FACILITIES – DESIGN

IMO MODU code (Code for the construction and equipment of Mobile Offshore Drilling Units) should be followed for design criteria, construction standards and other safety measures of mobile offshore drilling units (MODU).

Rule-74 Facilities development:

Sub-rule (3):

Probability of damage to subsea facilities and pipelines by other activities in the vicinity should also be considered in the risk assessment. High risk scenarios should be considered in the design and installation of subsea facilities.

Sub-rule (4):

Facility shall be used for the purpose for which they are designed and constructed. If they are modified and are to be used for purpose other than for which they are designed and constructed, fresh consent shall be taken from competent authority as per **Rule-20**.

Following activities require fresh consent to operate:

- i) Any modifications that increases loading on the installation in excess of existing load, as per the design;
- ii) Major repair after damage to the installation. Major repairs are those which require shut down of normal operations for an extended period of time (does not include routine dry-docking/ maintenance shutdown);
- iii) Converting an existing installation for a new purpose.

New certificate of fitness as required by **Rule-30** shall be obtained after modifications which require fresh consent for operation.

Documentary evidence of compliance:

1. Overview of the design philosophy covering life cycle of the facilities;
2. In case of subsea facilities, risk assessment carried out for hazards due to other activities in the vicinity

Rule-75 Placing of facilities:

In order to avoid risk from external environment, shallow hazard survey and geological surveys should inter alia be carried out, wherever required.

Shallow hazard survey should be carried out to determine the presence of the following features and their likely effects on proposed placement of platform / MODU:

- Shallow faults
- Shallow gas or gas seeps
- Slump blocks or slump sediments
- Shallow water flow
- Hydrates

Geological surveys should be carried out to assess:

- Seismic activity at proposed site
- Fault zones, the extent and geometry of faulting and attenuation effects of geological condition near the site
- The possibility and effects of seafloor subsidence

Documentary evidence of compliance:

Report specifying location for placement of the facilities

Rule-76 Design of facilities:

The facility should be designed using principles of Risk Reduction as given in Rules-21 and Barriers as given in Rule 22.

All equipment shall be designed, installed and maintained in a manner which provides for efficiency, safety of operation, and protection of the environment.

Annexure-5 mentions the standards / codes which should inter alia be followed for design of conventional fixed facilities and sub-sea facilities.

Documentary evidence of compliance:

1. Process Design Criteria;
2. Process design information - flow rates, fluid properties, pressures and temperatures used to size the different subsystems;
3. Relief Valve sizing information which should include valve characteristics and basis of sizing;
4. Process Safety Information which should include SAFE chart and simplified P&ID showing all safety devices listed in SAFE chart;
5. Fire protection and safety equipment information;
6. Hazard Analysis report;
7. Safety arrangements drawings and diagrams as follows:
 - Personnel Safety Equipment layout Drawings;
 - Passive fire and blast protection;
 - Area classification;

- F&G detection system layout;
 - Escape routes, muster areas, evacuation means;
 - Fire fighting equipment
8. Piping and valve specification;
 9. Summary of engineering design data including Loading information (e.g. live, dead, environmental load), structural information (e.g., design- life; material types; cathodic protection systems; design criteria; fatigue life; jacket design; deck design); and foundation information (e.g., soil stability, design criteria);
 10. Subsea system flow assurance analysis;
 11. Subsea system reliability assessment.

Rule-77 Main safety functions:

Sub-rule 1:

The main safety functions shall be designed on the basis of each facility's unique characteristics.

Sub-rule 2:

It should be specified for how long time period the main five safety functions shall be intact after an accident situation, to enable personnel evacuation.

Sub-rule 2(e):

Offshore installations shall be designed, equipped and organized to provide means of safe evacuation in the widest possible range of circumstances. Section 14 (Guidance on evacuation, escape and rescue) of ISO standard 13702 (First edition 1999) on 'Control and mitigation of fires and explosions on offshore production installations -- Requirements and guidelines' should be followed for design of evacuation routes.

Documentary evidence of compliance:

Respective time limits of main safety functions for which these will remain intact after an accident situation to enable personnel evacuation.

Rule-78 Safety devices:**Sub-rule (a):**

In order to ensure that the safety devices at all times will be able to provide their intended functions, they should be designed so that they can be tested and maintained without impairing their functionality.

Sub-rule (b):

Performance requirements shall be developed by setting the goals for the safety device and by providing a mechanism to measure and validate their performance in order to identify the functionality, availability, reliability, survivability and interdependency.

Operator shall establish effective operations, inspection, testing and maintenance procedures to ensure the functional requirements of the safety devices provided are maintained. This shall be achieved by implementation of suitable maintenance, inspection and testing schemes, taking due account of the safety of personnel, protection of the environment and compliance with regulatory requirements.

In order to provide effective procedures, the following should be carried out:

i) Systems shall be subjected to appropriate testing prior to first use to confirm that they will meet the appropriate functional requirements.

- ii) A written scheme shall be prepared, detailing the inspection, testing and maintenance routines and frequencies to be followed.
- iii) All systems shall be thoroughly inspected, following established procedures. This will determine if the item inspected will function satisfactorily.
- iv) Adequate records of the results of the inspection, testing and maintenance shall be kept and shall be periodically reviewed to confirm that the written scheme is appropriate and is being adequately implemented.
- v) The maintenance procedures shall include regular visual inspection.
- vi) Appropriate operational tests shall be conducted.
- vii) The latest inspection/operational test reports shall be available on the installation.
- viii) Safety critical system / equipment bypass policy should be prepared. The policy should specify time limits (for which safety device can be bypassed) and authorisation at various hierarchical levels. Impairment and restoration of safety devices shall be recorded and reported to the shore management as per the policy. A bypass register should be maintained for this purpose.
- ix) Any identified failures or impairments shall be promptly corrected. Where safety devices cannot be promptly returned to service, contingency plans shall be implemented.

Sub rule (c):

Surface or subsurface safety devices should not be bypassed or blocked out of service unless they are temporarily out of service for startup, maintenance, or testing procedures. Personnel shall monitor the bypassed or blocked-out functions until the safety devices are placed back in service.

Any surface or subsurface safety device which is temporarily out of service shall be flagged. Such temporary disarming or de-activation of safety devices shall require approval of management as per Safety Critical System Bypass policy. The status of all overriding, disconnections and other impairments shall be known at all times to all concerned.

Documentary evidence of compliance:

1. List of safety devices
2. Performance requirements for safety devices
3. Records of testing, inspection and maintenance of safety devices
4. Safety Critical System / equipment Bypass policy
5. Bypass register. As a minimum the record should include the cause of the deficiency, period of inhibition and approving authority.

Rule-79 Plants, systems and equipment:

Plants, systems and equipment shall be designed as per applicable international standards (Refer **Rule-76**).

Sub-rule (2):

Main components in the facilities should be identifiable with name plate and tag number. Piping should be marked with direction of flow and coloured as per medium.

Documentary evidence of compliance:

List of equipment with tag numbers.

Rule-80 Loads, load effects and resistance:**Sub-rule (1):**

Main safety functions which are to be protected are given in Rule 77(2).

Sub-rule (3):

Functional loads include permanent and variable loads for load-bearing structures.

Sub-rule (4):

Design load implies functional, environmental and accidental loads, which includes fire and explosion loads.

Accidental loads shall be identified and taken into account in the design of structures. The probability, magnitude and potential consequences of identified accidental loads shall be assessed and analysed.

Relevant accidental loads include loads due to:

- Dropped objects:
Protection of structure to be dimensioned for falling container, pipes etc. based on estimated weight, probable drop height, vulnerability and criticality of the exposed areas;
- Ship collision (e.g. impact loads to be absorbed by installation structure):
The possibility of collisions caused by vessels and the need for adequate sea traffic surveillance system shall be evaluated;
- Explosion:
 - Explosion loads affecting main structures;

- Explosion loads affecting secondary structures, e.g. walls acting as barriers between main areas;
- Explosion loads acting on support of pressure vessels, flare headers, fire ring main, ESD valves etc. shall be considered;
- Heat loads caused by jet fires or pool fires on the installation or adjacent installation, from risers or from the sea surface in case of large oil releases to the sea or in case of subsea gas releases.
- Fire:
Installations that can be exposed to a dimensioning fire on sea surface shall be able to withstand this for a time period sufficient for safe evacuation of the installation. Fixed installations shall be protected against fire on sea, as identified by risk analyses.
- Loads caused by extreme weather, earthquake, damage to structural elements (damaged condition) or extreme temperatures.

Documentary evidence of compliance:

Summary of engineering design data including Loading information (e.g. live, dead, environmental load).

Rule-81 Materials:

Material specifications shall be established for all materials utilized. Such materials shall be suitable for their intended purpose and have adequate properties for all the governing conditions, considered in the design.

When considering criteria appropriate to material grade selection, adequate consideration shall be given to all relevant phases in the life cycle of the unit. In this connection there may be conditions and criteria, other than those from the in-service, operational phase, that provide the design requirements in respect to the selection of material (e.g. such criteria may be temperature and/or stress levels due to the marine environment).

Sub-rule (d):

When selecting materials with regard to technical fire qualities, non-flammable materials should be chosen. In those cases where flammable materials are nevertheless used, such materials should limit the spread of flames, develop little smoke and heat and have a low level of toxicity. The flame spread and smoke development qualities of the materials should be considered when textiles or surface treatment with paint or other coating is used.

Sub-rule (g):

Those materials should be used that neither alone nor in combination with other materials or gases are harmful to health and working environment of the employees. When choosing materials and surfaces, emphasis should be placed on comprehensive solutions adapted to the intended use and requirements to cleaning and maintenance.

Documentary evidence of compliance:

Summary of engineering design data including material to be used in construction of load bearing structures, high pressure pipeline & living quarters.

Rule-82 Handling of materials and transport routes, access and evacuation routes:

The terms transport, access and evacuation routes also include stairs, doors, hatches, etc.

Sub-rule (2):

When designing systems for handling of materials following should inter alia be taken into account:

- a) the need for, type and quantity of lifting and transport appliances, including cranes and lifts;
- b) the need for loading and unloading areas, provision for forklifts, trolleys, etc.;
- c) access to areas and workplaces in connection with operations and maintenance,
- d) safe handling of loads.

Sub-rule (3):

Section 14 (Guidance on evacuation, escape and rescue) of ISO standard 13702 (First Edition 1999) on 'Control and mitigation of fires and explosions on offshore production installations -- Requirements and guidelines' should be followed for design of evacuation routes.

Offshore installations shall be designed, equipped and organized to provide means of safe evacuation in the widest possible range of circumstances.

Evacuation route shall be fully accessible to facility personnel for rapid platform evacuation and shall be adequately

maintained. Evacuation routes should be designed so that there is free passage for personnel wearing SCBA and/or fire-fighting equipment.

Evacuation routes shall be properly identified and marked. All passages, staircases etc. shall have a skid-proof surface, and be arranged and maintained in such a condition that unobstructed passage can take place.

Sub-rule (4):

There shall be at least two evacuation routes located in a way so that it would be very unlikely for a single event to block both paths. Evacuation routes shall comprise of fixed stairways or fixed ladders of metal construction or similar material. Evacuation route should extend from the uppermost deck level, deck that contains living quarters and other decks, to each successively lower working level and to the water surface. Sufficient personnel landings shall be provided to assure safe access and egress. The personnel landings shall be provided with satisfactory illumination.

Documentary evidence of compliance:

1. Evacuation route layout drawing
2. Evacuation, Escape and Rescue Analysis(EERA) Study report

Rule-83 Ventilation and indoor climate:

ISO standard 15138 on 'Heating, ventilation and air-conditioning' should be followed for ventilation and air conditioning.

Effective ventilation of hazardous areas should be ensured to minimise likelihood of flammable atmosphere. For achieving

this Section 6 (Ventilation) of API RP-500 (Second edition 1997; reaffirmed Nov.2002) on 'Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2', and ISO13702 (Control and mitigation of fires and explosions on offshore production installations — Requirements and guidelines) should be followed.

Sub-rule (1):

When stipulating the need for air exchange, account should be taken of both the risk of accumulation of hazardous and combustible gases and the need for climate control.

Areas on drilling rigs such as shale-shaker and mud-tank shall have an air change rate determined by the air quantity required for the extraction of fumes, heat and dust.

Sub-rule (3):

Indoor climate design shall ensure that ventilation air is provided to control heat gains from personnel, equipment and heat transmitted through the walls. Heat gains from fans, fan motors and conduction into the ductwork shall be particularly included in the cooling-load calculations. Where heat gains are excessive, room air-conditioning units may be used which can be mounted within the space(s) served, such as control centers, switch rooms, telecommunications/ electronic equipment and radio rooms.

Air inlets shall be located in the open air and in areas not contaminated by exhaust outlets. There shall be easy access for internal inspection and cleaning of ducts.

Sub-rule (4):

Ventilation system supplying air to hazardous areas should take air from non hazardous area. Ventilation discharges from hazardous areas should be so located that emissions will not present a hazard to personnel during normal operations.

Documentary evidence of compliance:

Heating, ventilation and air conditioning layout diagram

Rule-84 Chemicals and chemical exposure:**Sub-rule (1):**

The design of the chemical handling system shall ensure that the exposure to chemical substances and products containing hazardous substances is minimised. The installation shall be designed such that all spillage is properly handled. The need for drains and their effectiveness shall be evaluated for all work areas. Sampling shall be possible without hazardous exposure to chemicals or process streams.

Under normal operation, the concentration of hazardous substances in the working atmosphere, and skin contact with these chemicals, shall be as low as reasonably practicable.

Control of hazardous emissions shall be achieved by the following technical measures/barriers (in order of priority):

1. Efficient enclosure of emission sources.
2. Efficient extraction/exhaust ventilation systems to remove pollutants near the source.
3. General ventilation/dilution of contamination.

Sub-rule (2):

There shall be a dedicated storage area for each type of chemical. These areas shall not be used for other purposes. The areas shall be properly ventilated and protected against fire. Chemicals that may react with each other shall not be stored together. All hazardous vapours shall be routed in such a way that they do not come in contact with personnel.

OISD-STD-114 on 'Hazardous chemicals and their handling' should be followed.

Documentary evidence of compliance:

Layout of chemical storage areas and handling systems

Rule-85 Flammable and explosive goods:

OISD-STD-191 on 'Oil field explosive' safety should be followed for safe handling, storage and use of explosive materials.

Documentary evidence of compliance:

Procedure for storage, transportation & safe handling of explosive materials

Rule-86 Instrumentation for monitoring and recording:**Sub-rule (1):**

The instrumentation should be designed so that it can monitor and record, inter alia, structural integrity for load bearing structures and pipeline systems, critical degradation of materials and critical operations parameters.

Sub-rule (2):

NORSOK standard N002 on 'Collection of Metocean Data' should be followed for recording of environment data.

Environmental data means data on oceanography, seismology and meteorology, including data that is of significance for the flight weather service.

Documentary evidence of compliance:

Metocean data records

Rule-87 Systems for internal and external communication:

Sub-rule (1):

The installation shall have necessary equipment for internal communication so that emergency response teams can communicate with each other and with the central control room (CCR) during emergencies.

A telephone system shall be installed, such that CCR may be contacted easily in an emergency situation. CCR operators shall be able to communicate with operators anywhere on the installation.

The crane operator shall be able to communicate with the CCR, ships and operators on deck.

PA system that can be operated from strategic locations on the facilities should be used, so that all personnel can be alerted to situations of accident and hazard. The central control room or the bridge should be given priority to send messages via the PA system.

The installation shall have necessary equipment for communications with external emergency response resources. The communication systems shall allow communication with other installations, helicopters, life boats, man overboard boats, life rafts, vessels and shore.

Sub-rule (2):

Each manned facility shall have a general alarm system. When operated, this system shall be audible in all parts of the facility where crew may be present. In the areas with noise levels above 85 db, audible alarm should be supported by light alarm.

It should be possible to trigger the general alarm and evacuation alarm from the central control room and the bridge, and it should be possible to trigger the evacuation alarm from the radio room.

Sub-rule (3):

The requirement to two independent warning method to shore means that alternative warning method should be independent of the primary warning method with regard to power supply and availability during situations of accident and hazard, and should also be resistant to the design accident loads for a defined period of time. Permanent communication systems such as fibre optic cables, radio lines or satellite systems should be used if the position of the facility makes this possible.

Documentary evidence of compliance:

1. System description for internal and external communication;
2. Alarm system description.

Rule-88 Communication equipment:

The communication equipment should allow communication with installations, helicopters, lifeboats, liferafts, vessels and base at all times.

Chapter IV of applicable SOLAS on 'Radio Communication' and Chapter 11 of applicable MODU code on 'Radio communication' should be followed for necessary communication equipment.

The equipment should be located in such a manner that communication is not disrupted in emergencies. Alternate communication equipment should be located in such a manner that they are not made inoperable by the one and same incident.

Documentary evidence of compliance:

1. List of communication equipment available on board;
2. Alternate communication equipment.

Rule-89 Ergonomic design:

Sub-rule (1):

Workplaces shall be designed such that the personnel are not exposed to excessive workloads with risks of musculoskeletal injury.

Efforts should be made to avoid:

- monotonous muscular load;
- excessive muscular load;
- work in fixed or static position;
- work with joints in extreme position;
- work requiring high precision and which at the same time requires substantial use of force;
- work in kneeling, squatting and lying positions;

- work of long duration and of repetitive nature with hand above shoulders or below knees;
- continuous asymmetric load on the body.

Documentary evidence of compliance:

Consideration of ergonomics aspects of work area and equipment during design.

Rule-90 Man-machine interface and information presentation:

The man-machine interface shall include a main operating interface in Central Control Room allowing manual activation of critical safety functions.

For requirements of man machine interfaces, Chapter 5.2.2 of NORSOK standard S-002 on 'Working Environment' (Revision 4, 2004) should be followed.

Sub-rule (4):

The design of alarms should be such that:

- a) the alarms are easy to register and understand, and clearly show where possible deviations and dangerous situations have arisen,
- b) the alarms are coded, categorized and assigned priority based on the safety significance of the alarms and how quickly it shall be reacted in order to avoid undesirable consequences,
- c) the alarms can be suppressed, so as to avoid mental stress on the part of control room personnel during interruptions in operations and situation of hazards.

Documentary evidence of compliance:

Relevant extracts from the design data demonstrating compliance with the sub-rules.

Rule-91 Outdoor work areas:

Outdoor operations analyses shall be carried out for open work areas and semi-open work areas, in order to identify and rectify potential problem areas due to overall exposure to temperature and wind.

Sub-rule (2):

Design/layout measures feasible with respect to both technical safety and working environment shall be considered. Measures to avoid exposed workplaces or reduce the exposure to wind etc e.g. redesign/relocation of equipment, windbreaks should be undertaken, where necessary.

Documentary evidence of compliance:

Details of windbreak walls, blower fans at work place

Rule-92 Noise and acoustics:**Sub-rule (1):**

The design and layout of workplaces, work stations and rest facilities on the installation should be such that noise exposure to workers is within permissible limits as far as practical. Use of ear protection is not a means of fulfilling the noise control requirement. Installation of low-noise equipment shall be the primary noise control measure. For piping systems, selection of low-noise valves and other components with low-noise properties shall be given priority. If possible, low-noise and high-noise areas shall be separated, and high-

noise equipment shall be located in separate room. For noise protection in work areas, OISD-GDN-166 on 'Guidelines for Occupational Health Monitoring in Oil and Gas Industry' / OSHA standard 1910.95 on 'Occupational noise exposure' should be followed.

Sub-rule (3):

No noise sources that may significantly reduce the speech intelligibility (understanding) shall be installed in the immediate vicinity of lifeboat stations and muster points.

Sub-rule (4):

Noisy equipment and equipment with high structure-borne sound emission levels and areas with noisy activities (e.g. lay down areas, workshops), shall not be located in the immediate vicinity of areas with a noise level limit e.g. offices, medical room, central control room, sleeping/recreation areas.

Documentary evidence of compliance:

Noise Survey Report

Rule-93 **Vibrations** is self explanatory.

Documentary evidence of compliance:

Relevant extracts from the design data demonstrating compliance with the Rule.

Rule-94 **Lighting:**

Lighting may be artificial lighting, daylight or direct sunlight. The lighting should be good and proper in the control room, cabins and other rooms where the work requires good

visibility during various weather conditions. There should also be specific lighting if the general lighting is not adequate for readings, operation and maintenance.

Section 9 (Lighting) of API RP 14F (Fifth Edition July 2008) on 'Recommended Practice for Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Division 1 and Division 2 Locations' and OISD-GDN-166 on 'Guidelines for Occupational Health Monitoring in Oil and Gas Industry' should be followed for illumination in work areas.

Rule-95 Radiation:

The use of radioactive substances shall be minimized, to the extent possible, by adopting alternate solutions.

OISD STD 183 on 'Logging Operation' should be followed for storage, handling and use of radioactive materials.

Documentary evidence of compliance:

Details of Radioactive materials, if used, and procedure for safe transport, handling and storage.

Rule-96 Equipment for shifting of personnel:

Equipment for shifting of personnel may be such as personnel winches, personnel baskets etc.

API-RP-2D on 'Operation and Maintenance of Cranes' should be followed.

Sub-rule (1):

There should be sufficient man riding winches to cover all drilling activities on the facility.

Documentary evidence of compliance:

Certification of personnel basket and man riding winches.

Rule-97 **Safety signs** is self explanatory.

Documentary evidence of compliance:

Safety signs chart.

Rule-98 **Christmas tree:**

The christmas tree system shall provide a safety barrier between the reservoir formation and the environment. The christmas tree, as a complete unit, is defined as one safety barrier. The system shall provide fail safe features such that any single failure will not result in an unsafe system condition.

Pressure rating of the tree should exceed the maximum expected static wellhead pressure, including future reservoir treatment or injection.

It is recommended that all the trees on an offshore installation should have same pressure rating for uniformity of operational parameters.

For the design of christmas trees, following standards should be used:

- API SPEC- 6A on 'Specification for Wellhead and Christmas Tree' or ISO 10423 or equivalent;
- API RP 17A on 'Design and operation of subsea production system' or ISO 13628 or equivalent.

The SSVs and USVs shall be inspected, installed, maintained and tested in accordance with API RP 14H on 'Recommended Practice for Design, Installation and Operation of Surface Safety Valves and Underwater Safety Valves Offshore'.

Rule-99 Production plants:

Plant shall be designed in accordance with **Rule-76**.

Sub-rule (1):

For production plants that are subsea, the pollution control requirement includes evaluation by the operator whether hydraulic fluids, well fluids and other chemicals shall be routed back to the surface or to a local storage tank.

Sub-rule (4):

For off-shore discharge of effluents, the oil content of the treated effluent without dilution shall not exceed 40 mg/l for 95% of the observation and shall never exceed 100 mg/l. Three 8 hourly grab samples are required to be collected daily and the average value of oil and grease content of the three samples shall comply with these standards. This is as per MOEF, GOI guidelines.

Documentary evidence of compliance:

Relevant extracts from the design data demonstrating compliance with the sub-rules 99 (1) to (5).

Rule-100 Pipeline systems:

Following standards / codes should inter alia be followed:

- DNV-OS-F101 on 'Submarine Pipeline System;

- API RP 1111 on 'Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines';
- API RP 14 E on 'Recommended Practice for Design and Installation of Offshore Production Platform Piping Systems';
- ASME B31.4 on 'Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids';
- ASME B31.8 on 'Gas Transmission And Distribution Piping Systems';
- API- Spec 6D or equivalent for Pipe line valve;
- API 17 J on 'Specification for Un-bonded Flexible Pipe';
- API 2RD on 'Design of Risers for Floating Production Systems (FPSs) and Tension-Leg Platforms (TLPs)';
- OISD-STD-139 on 'Inspection of Pipelines – Offshore';
- API RP 14C on 'Analysis, Design, Installation and Testing of Basic Surface Safety Systems on Offshore Production Platforms'.

Mechanical design of the pipeline system should be based on fluid and water compositions, fluid PVT properties, sand concentration, geo-technical survey data, meteorological and oceanographic data.

Sub-rule (2):

Pipeline risers shall be protected from physical damage that could result from contact with floating vessels, dropped objects etc. Pipelines and risers shall be protected by guards or positioned inside the structure.

Sub-rule (5):

Pipelines shall be provided with an external anticorrosive coating and cathodic protection for mitigating corrosion as a part of corrosion management programme.

Sub-rule (7):

Effective isolation of inventory through sub-sea isolation valves should be considered for trunk pipelines wherein consequences of riser failure would be unacceptable.

Incoming pipelines boarding a platform shall be equipped with an automatic shut down valve (SDV) immediately upon boarding the platform. The SDV shall be connected to the automatic and remote emergency shut in system. Also, FSV shall be provided in line with API-RP-14C requirements.

Pipelines shall be protected by high and low pressure sensors (PSHL) to directly or indirectly shut in all production facilities.

Pig launchers and receivers should be provided with quick opening end closures equipped with safety locking system and should be capable of passing smart pigs.

Provision should be available to take a reading of the pressure in the launchers and receivers, both before startup and during operation.

Documentary evidence of compliance:

- 1) Details regarding connecting facilities; pipeline size; fluid to be transported with anticipated gravity or density; burial depth; direction of flow and XY coordinate of key points.;

- 2) A schematic drawing showing the size, grade and wall thickness of line pipe and risers; pressure regulating devices (including backpressure regulators); sensing devices with associated pressure-control lines; PSVs; SDVs, NRVs, and block valves; manifolds; associated safety equipment and pig launchers and receivers;
- 3) List of safety devices associated with pipeline operation and its set point details;
- 4) General information as follows:
 - i) Description of cathodic protection system. If pipeline anodes are to be used, specify the type, size, weight, number, spacing, and anticipated life;
 - ii) Description of external pipeline coating system;
 - iii) Description of internal protective measures;
 - iv) Maximum shut in pressure;
 - v) MAOP and calculations used in its determination;
 - vi) Hydrostatic test pressure, medium, and period of time when the line was tested;
 - vii) MAOP of the receiving pipeline or facility.
- 5) Description of any additional design precautions which were taken to enable the pipeline to withstand the effects of water currents, storm, soft bottoms, mudslides, earthquakes, and other environmental factors;
- 6) Inspection plan for pipelines;
- 7) Details of repair(s), if any.

Rule-101 Living quarters:

The LQ shall be dimensioned, designed and equipped, to accommodate and cater for the maximum number of personnel required at any time during the field's various operational phases. This includes start-up, drilling, production, as well as periods of planned production shutdown for modifications and maintenance etc. In this respect, the operator shall perform necessary analyses in the conceptual phase, in order to verify the required manning level.

Living quarters shall be located in the safest place on the installation. It shall be protected from hazardous areas by external walls and roofs, which are fire and blast resistant in accordance with results of risk and emergency preparedness analyses.

There shall be at least two exits to escape routes leading in different directions from each level in the LQ with at least one internal stairway linking all levels.

Common toilets, washrooms, change and shower rooms shall be of adequate number, functionally arranged, and conveniently located in relation to workplaces, recreation and catering areas. Common toilets shall have direct access from corridors.

The interior of the LQ building should have sufficient exhaust system to preclude accumulation of smoke and odours. Smoke detectors should be provided as per API RP 14G. Passageway should have emergency lighting and illuminated exit signs.

Windows shall not be installed in walls facing process area. Choice of materials and interior design of the LQ shall be decided in relation to the fire risk. With respect to paint or the coating used, the properties of the product with regard to flame spread shall be considered. A corresponding evaluation shall also be carried out with regard to textiles also.

The living quarters (LQ) shall be dimensioned with sufficient margins so as to accommodate excess personnel, where the circumstances so demand {refer Rule- 49(b) and (c)}.

Table C4 (Typical fire integrity requirements for load bearing structures) and C5 (Typical fire integrity for fire barriers) of ISO 13702 (First edition 1999) on 'Control and mitigation of fires and explosions on offshore production installations - Requirements and guidelines' should be followed for fire integrity requirements.

Sub-rule (4):

Emergency quarter on unmanned facilities should:

- a) be located in a non-hazardous area. No doors, windows or openings shall face a hazardous area;
- b) provided with proper lighting and ventilation.

Documentary evidence of compliance:

General arrangement drawing of the living quarters

Rule-102 Medical room is self explanatory.

Documentary evidence of compliance:

List of medical equipment available on manned installations and first aid provisions on unmanned installations.

Rule-103 Facilities for food and drinking water is self explanatory.

Documentary evidence of compliance:

Relevant extracts from the design data demonstrating compliance with the rule.

Rule-104 Classification of hazardous area:

For classification of hazardous areas, API RP 500 on 'Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2' / API RP 505 on 'Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2' should be followed.

In case of floating facilities, classification of hazardous area should meet requirements of applicable standards of certifying members of the classifying society.

Documentary evidence of compliance:

Hazardous area classification drawing

Rule-105 Electrical systems:

When designing electrical units, consideration should, inter alia, be given to the output needs, distribution system, earthing system, protection against interruption and adequate selectivity between protection in the event of failures in the unit.

Sub-rule (2):

For design, installation, and maintenance of electrical systems API 14F 'Recommended Practice for Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum

Facilities for Unclassified and Class I, Division 1 and Division 2 Locations' should be followed.

Sub-rule (2) (a):

The requirement of protection against electric shock during normal operation implies that accidental exposure of personnel to the current shall be limited to a non-hazardous level.

The requirement to protection against electric shock in failure situations implies that quick, automatic disconnection of the power supply shall be provided when a failure arises that can lead to a dangerous flow of current for personnel that unintentionally come into contact with exposed parts of the unit.

For lighting circuit, the voltage between the phases should not exceed 250 volts.

Sub-rule (2) (b): The requirement of protection against thermal effects implies that suitable protection shall be used to guard against abnormal heat development, arcing and fire in the electrical system.

Sub-rule (2) (c): The requirement of protection against over-current includes protection against short circuits, and implies that provision shall be made for automatic and selective disconnection of loads that cause over-current before it reaches a dangerous level, or that the over-current is limited in some other way so that it does not represent a danger.

Sub-rule (2) (d): The requirement of protection against fault currents implies that conductors and other parts that are intended to carry a fault current resulting from insulation

failure shall be able to conduct this fault current without reaching too high a temperature. Particular consideration should be given to the unit's potential earth fault currents and leakage currents.

Sub-rule (2) (e): The requirement of protection against over-voltage means that suitable protection shall be provided to safeguard against hazard and accident incidents resulting from surge caused by sudden reduction in load, faults in voltage regulators or faults between electric circuits with varying voltage, changes in load associated with connecting and disconnecting switches, earth faults and lightning over-voltage.

Sub-rule (2) (f): The requirement of protection against under voltage, means that measures shall be implemented against danger of fire and equipment failure due to excessive current resulting from the system fault or heavy load conditions. If such reconnection can entail a hazard, the reconnection should not take place automatically.

Sub-rule (2) (g): The requirement of protection against variations in voltage and frequency implies that the power supply shall be of such a dimension that the voltage and frequency under normal conditions lie within the tolerances that the unit and connected equipment are intended for.

Sub-rule (2) (h): The requirement of protection against power supply failure implies that measures shall be implemented to ensure satisfactory and reliable power supply to emergency power equipment and emergency lighting. Rule-118 should be referred for emergency power and emergency lighting.

Sub-rule (2) (i): The requirement of protection against ignition of explosive gas atmosphere implies that electrical equipment shall be located in unclassified areas insofar as practicable. As regards requirements to area classification and facilities, systems and equipment for use in areas where there is a hazard of explosion, see rule 76(b) on the design of facilities and rule 79 on plants, systems and equipment.

Sub-rule (2) (j) & (k): The requirement on electromagnetic interference implies that electrical units and equipment shall function in a satisfactory manner in their electromagnetic environment without causing unacceptable electromagnetic interference for other equipment in that environment and health hazard.

Documentary evidence of compliance:

1. Electrical Design criteria;
2. Hazardous area classification drawing;
3. Hazardous area electrical equipment register.

Rule-106 Systems and other equipment for underwater operations from vessels:

Mutatis- Mutandis, a Latin word, means with respective differences taken into consideration.

Documentary evidence of compliance:

Design documents demonstrating that all the relevant applicable rules of this chapter have been complied with.

CHAPTER XII

PHYSICAL BARRIERS IN FACILITIES

IMO MODU code (Code for the construction and equipment of Mobile Offshore Drilling Units) should be followed for requirements of physical barriers in mobile offshore drilling units (MODU).

Rule-107 Passive fire protection:

Sub-rule (1):

Adequate fire resistance should be provided to relevant structures and equipment in line with section 12 (Passive fire protection) and Annexure B.9 (Passive fire protection) of ISO 13702 (First edition-1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines'.

For determination of fire and explosion loads due to dimensioning fire, Rule 80 on 'Loads, load effects and resistance' shall be followed.

Sub-rule (2):

For gas and liquid filled vessels and pipe sections, the passive fire protection should be sufficient to prevent rupture before depressurization occurs.

Documentary evidence of compliance:

Details of passive fire protection.

Rule-108 Fire divisions:

Fire divisions should be designed as per passive fire protection requirement given in table C5 (Typical fire integrity for fire barriers) and C6 (Typical protection criteria for critical equipment) of ISO standard 13702 (First edition-1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines'.

For explosion mitigation and protection system, Section B 10 (Explosion mitigation and protection systems) and section C 4 (Typical PFP applications) of ISO 13702 (First edition-1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines' should be followed.

Sub-rule (3):

Main safety functions required to be maintained in case of dimensioning fire and explosion loads have been given in Rule 77(2) on 'Main safety functions'.

Sub-rule (4):

Penetrations in fire divisions include ventilation ducts, pipes, cables and beams, as well as windows and doors.

Penetrations in fire divisions with fire class H should be avoided to the extent possible.

Documentary evidence of compliance:

Details of Fire divisions.

Rule-109 Fire divisions in living quarters:

Living Quarters shall be designed and protected to ensure that the emergency functions therein can be maintained during dimensioning fire scenario. Table C5 (Typical fire integrity for fire barriers) of ISO standard 13702 (First edition-1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines' should be followed for living quarters passive fire protection.

Outer surfaces of Living Quarters shall be fitted with fire divisions of minimum class H-60 if the surfaces can be subject to a heat flux exceeding 100 kW/m² in a dimensioning fire scenario.

Windows shall not be installed in H partitions or walls facing process area.

Interior design of living quarters shall be such that it reduces spread of fire.

Documentary evidence of compliance:

Details of Fire divisions.

Rule-110 Fire and gas detection systems:

Following standards should be followed for design of fire and gas detection system

- a. Annexure B.6 (Fire and gas detection systems) of ISO 13702 (First edition 1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines' -.

- b. Appendix C (Support systems) of API RP 14C (Seventh edition 2001) on 'Recommended practices for analysis, design, installation and testing of basic surface safety systems for offshore production platforms'.
- c. Chapter 11.2 (Gas detection systems) & 11.3 (Fire detection systems) of API RP 14 F (Fourth edition 1999) on 'Recommended practices for design and installation of electrical systems for fixed and floating offshore petroleum facilities for unclassified and class I, Division 1 and Division 2 locations'.

Sub-rule (2):

Fire and gas detection system may have an interface with other systems if it cannot be adversely affected as a consequence of other individual or system failure.

Documentary evidence of compliance:

1. F&G detection system plan;
2. Flow chart of sequence of action post fire and gas shutdown actuation;
3. Inspection and test records of F&G detection system.

Rule-111 Emergency shutdown systems:

Chapter 6 & Annexure B2 (Emergency shutdown systems & Blow down) and Chapter 7 & Annexure B3 (Control of ignitions) of ISO 13702 (First edition 1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines' should be followed for design of emergency shutdown system.

Sub-rule (2):

The requirement of independence implies that the emergency shutdown system should be in addition to other control & safety systems e.g. if an ESD valve is connected to the Process Control System, the process control function shall be performed completely separate from the ESD functions.

The emergency shutdown system may have an interface with other systems if it cannot be adversely affected as a consequence of individual or system failure.

Sub-rule (4):

An unambiguous command structure means that the flow of signals and command hierarchy is clearly stated.

Sub-rule (6):

Manual activation of ESD shall be functionally designed and be physically different from the programmable parts of the system.

Sub-rule (7):

The requirement of stopping and isolation means that the following valves shall be emergency shutdown valves:

- a) subsurface safety valves;
- b) wing valves and automatic master valves for production or injection wells;
- c) valves on the christmas tree in connection with chemical injection or gas lifting;
- d) sectioning valves in the processing plant;
- e) isolation valves in the pipeline systems.

For mobile facilities, design standard of relevant classification society member may be used as an alternative.

Documentary evidence of compliance:

1. SAFE charts;

2. Performance requirement of the ESD system;
3. Emergency shutdown flowchart;
4. Inspection and test records of ESD system.

Rule-112 Process safety systems:

For design of process safety systems, ISO 10418 (Second edition 2003) on 'Petroleum and natural gas industries-offshore production installations- basic surface process safety systems' or API RP 14C (Seventh edition 2001) on 'Recommended practices for analysis, design, installation and testing of basic surface safety systems for offshore production platforms' should be followed.

Auxiliary facilities (other than process system) containing combustible media should also be secured in accordance with the methods described in above standards.

The operation of the safety systems should be verified through a full-scale function test at least once each year. The test should cover all parts of the safety function, including closing of valves. The test should also include measurement of interior leakage through closed valves. Recording of the plant's or equipment's functionality in situation where the function is triggered or put to use may replace testing of the plant or the equipment.

Sub-rule (2):

The process safety system may have an interface with other safety system if it is not adversely affected as a consequence of individual or system failure.

Sub-rule (4):

The requirement of independence of two safety levels implies that a single failure does not lead to the failure of both safety levels.

Documentary evidence of compliance:

1. SAFE chart;
2. Inspection and test records of safety instruments and equipment of process system.

Rule-113 Gas release systems:

For design of gas release system, following standards should be followed:

- Chapter 6 and Annexure B.2 (Emergency shutdown systems and blow down) of ISO 13702 (First edition 1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines'.
- Appendix E (Emergency depressurizing design consideration) of API RP 14 G (Fourth edition 2007) on 'Recommended practices for fire prevention and control on fixed open type offshore production platforms'.

Following additional points should also be considered while designing gas release system:

- a) rapid depressurisation should be selected rather than passive fire protection.

b) external environment considerations should be safeguarded by preferably flaring flammable, toxic or corrosive gases.

Sub-rule (4):

In order to secure liquid separators against overfilling as mentioned, the production should be shut down in the event of a high liquid level.

Documentary evidence of compliance:

1. SAFE charts;
2. Inspection and test records of components of Gas release system.

Rule-114 Fire water supply:

Sufficient capacity means the capacity necessary to supply all firefighting equipment in the facility's largest fire area plus the largest of the adjacent areas.

In order to fulfil the requirements as mentioned in this Rule, the following standards should be followed:

- Chapter 11 and Annexure B.8 (Active fire protection) of ISO 13702 (First edition 1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines'.
- Section 5 (Fire control) of API RP 14 G (Fourth edition 2007) on 'Recommended practices for fire prevention and control on fixed open type offshore production platforms'.

Documentary evidence of compliance:

1. Design criteria (name of standard) for active fire protection;
2. Details of firewater system;
3. Details of any other system supplying water to firewater main header.

Rule-115 Fixed fire-fighting systems:**Sub-rule (1):**

In order to fulfil the requirements of this Rule, following standards should be followed:

- Chapter 11 and Annexure B.8 on (Active fire protection) of ISO 13702 (First edition 1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines'.
- Section 5 (Fire control) & section 6 (Portable fire extinguishers) of API RP 14 G (Fourth edition 2007) on 'Recommended practices for fire prevention and control on fixed open type offshore production platforms'.

with the following additions:

- a) in areas where there may be strong winds, this should be taken into account when placing nozzles and in relation to the need for increased capacity;
- b) when locating nozzles for the extinguishant for diesel engine in engine rooms , particular consideration should be given to pumps and pipes in the fuel unit,

and separate spot protection should be installed, if applicable.

- c) Fire extinguishing system should be least environmentally harmful extinguishant among equivalents.

- e) For fire protection in diving systems Section 6 (Fire prevention, detection and extinction) of DNV-OS-E402 (October 2010) on 'Offshore standard for diving systems' should be followed. For special fire protection requirements in units with Diving systems, Section 9C (Supplementary Requirements for Other Special Service Type Units or Installations) of DNV-OS-D301 (October 2008) on 'Fire protection' should be followed.

Documentary evidence of compliance:

1. Design criteria (name of standard) for active fire protection;
2. Fixed fire fighting plan and system details.

Rule-116 Manual fire fighting and fireman's equipment:

For manual fire fighting requirements, section 6 (Portable fire extinguishers) of (Fourth edition 2007) API RP 14G on 'Recommended practices for fire prevention and control on fixed open type offshore production platforms' should be followed. Required number of portable and semi portable fire extinguishers should be made available for personnel safety on manned platforms and on unmanned platforms.

Documentary evidence of compliance:

Approved fire fighting appliances layout diagram deck-wise.

Rule-117 Life saving appliances

Number of life saving appliances (LSA) should be based on emergency evacuation and escape analysis (EEEA) which is a follow up of Risk Assessment. LSA code (issued by IMO to meet requirements of SOLAS) should be followed for specifications, testing and evaluation of LSA.

Documentary evidence of compliance:

1. EEEA;
2. LSA plan.

Rule-118 Emergency power and emergency lighting:

In order to fulfill the requirements of this Rule, Chapter 9 (Emergency Power Systems) and Annexure C.1 (Typical emergency electrical power requirements) of ISO 13702 (First edition 1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines' should be followed.

Sub-rule (4):

There should be emergency lighting in those areas where personnel may be located in situations of accident and hazard. The emergency lighting should contribute to ensure evacuation on and from the facility, and indicate the location of manual firefighting equipment and other safety equipment. The emergency lighting should be connected to the emergency power system or have its own battery as a power source. For design of emergency lighting, chapter 18.4.4

(Emergency lighting) of NORSOK standard S-001 on 'Technical safety' (Fourth edition , 2008) should be followed.

Documentary evidence of compliance:

1. Arrangement of emergency power including equipment connected to the system;
2. Details of UPS for emergency equipment, emergency batteries and their power back up period.

Rule-119 Drainage systems:

For requirements of drainage system chapter 8 (Open Drain) of NORSOK standard S-001 (Fourth edition, 2008) on 'Technical safety' and Annexure B 4 (control of spills) of ISO 13702 (First edition 1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines' should be followed.

There should be a number of drain openings and drip pans on the decks to collect and direct escaped liquid hydrocarbon to a safe location. The collected liquid should be discharged up to sump tank which shall be equipped with automatic discharge system. Liquid hydrocarbon can be skimmed off by specific gravity difference and routed back into production system.

Drain piping should be adequately sized and sloped to prevent plugging and arrangement should be provided for cleaning.

Separate drainage systems should be used for pressurized hydrocarbon (closed drain system) and rain water, wash water etc.

Design of overall drain system should include at least one liquid seal to prevent gas from sump migrating into the drain system. Drain system from enclosures should not be tied in directly to deck drain system. There should be a break in the piping with a liquid seal and a system should be available to verify that liquid seal is maintained.

The discharge point for drainage water should be located so that potential discharges have the least possible impact on the marine environment, and so that discharges are not a nuisance to personnel on vessels near the facilities.

Drainage system should be designed or modified so that it shall be possible to conform to MOEF stipulation on water discharges into sea.

Sump system shall not allow flow of oil into the sea.

Documentary evidence of compliance:

1. Drainage system diagrams from P&ID;
2. Discharge water –oil ppm sampling readings

CHAPTER XIII

OPERATIONAL PREREQUISITES

Rule-120 Pre-Surveys:

The following surveys, inter alia, should be carried out prior to placing of the facilities:

- a) Seabed survey;
- b) Bathymetry survey;
- c) Shallow gas surveys.

Documentary evidence of compliance:

Copy of typical seabed, bathymetry and shallow gas surveys.

Rule-121 Start-up and operation of facilities:**Sub-rule (2):**

The operational organisation includes emergency preparedness organisation also.

In order to fulfill the requirement of technical documents for operation, section 6 (Documentation) of API RP 14 J (Second edition 2001) on 'Recommended practice for design and hazard analysis for offshore production facilities' should be followed.

In case of mobile offshore drilling units, requirements of MODU code should be followed.

Documentary evidence of compliance:

1. Start up procedures (in case of new facilities and after plant maintenance shutdown);
2. Standard Operating Procedures;
3. Shut down procedures for both emergency and routine normal situations to stop operations safely;
4. Procedures for adjustment, testing, inspection and routine maintenance;
5. For process components listing of design conditions and safety devices set points.

Rule-122 Manning, competence and trainings:

Ensuring competence implies that requirements are set for the necessary competence, that the competence is verified, and that it is maintained through practice, exercises, training and education.

In order to fulfil the requirement of competence, the onboard personnel shall have requisite technical qualifications / skills, training and experience in his work area, besides basic trainings for offshore working.

The following codes and standards should inter alia be followed:

- OPITO Safety Training standards for oil and gas industry;
- IMO resolution A.891(21) on 'Recommendations on Training of Personnel on Mobile Offshore Units (MOUs)'
- Chapter 8 and Annexure D (Competence) of ISO 15544 standard (First edition 2000) on 'Petroleum and natural gas industries- offshore production installations- requirements and guidelines for emergency response'

along with section 8 (Competence and training) of OISD GDN-227 (First edition 2007) on 'Emergency response preparedness in E&P industry';

- Well control certification from IWCF/IADC of appropriate level;
- Appendix A1 (Commentary on crane operator training) and Appendix A3 (Commentary on rigger training) of API standard RP 2D (Fifth edition, 2003) on 'Operation and maintenance of offshore cranes';
- IMCA D05/10 on 'Diver and diving supervisor certification';
- Global Marine Distress Signalling System- General Operator's Certificate (GMDSS-GOC) or 'Authority to operate GMDSS equipment onboard Indian registered vessel' issued by Ministry of Communication and IT, Govt. of India.

Documentary evidence of compliance:

1. Manning levels at the installation;
2. Competence requirements for key positions on the installation;
3. Training Matrix and record of training of onboard employees as per training matrix.

Rule-123 Practice and exercises:

Simulator training should be provided for monitoring and control functions.

An emergency preparedness drill covering all personnel on the facility should be carried out at least once during the course of a period of stay. Personnel, who have emergency preparedness functions, should practice their emergency preparedness tasks during such drills. Mustering and

evacuation routines should be included as part of the basis for the drill.

When hired facilities or vessels are used, a drill should be conducted at the earliest opportunity in accordance with a coordinated emergency preparedness plan for the contractor and the operator.

Documentary evidence of compliance:

Drills schedule of the installation and record thereof.

Rule-124 Procedures:

Sub-rule (1):

Procedure, as mentioned, means a specified way of conducting an activity or a process.

Sub-rule (2):

The formulation of procedures should be unambiguous, user-friendly and adapted to the users' competence.

The users of the procedures should take part in the formulation and revision of such procedures. The procedures should be tested before usage, to check for their correctness with regard to the intended functions.

Documentary evidence of compliance:

Standard operating Procedures manual.

Rule-125 Use of facilities:

Sub-rule (1):

Limitations for use, as mentioned, are from the loads that the facility and its individual parts will be able to withstand. Rule-

80 on 'Loads, load effects and resistance' shall be followed for calculation of loads. The loads may include chemical loads, environmental loads such as waves, wind and temperature and functional loads such as pressure, weight, temperature and vibration.

When conducting drilling and well operations with mobile facilities, the vertical movements of the facility and movements brought about by resonance between the wave frequency and the frequency of the facility itself should be taken into account, plus movements in case of loss of position because of anchor line breakage or drift, or because of dynamic positioning failure (refer **Rule-149** on 'Compensator and disconnection systems').

Documentary evidence of compliance:

Hazop study and risk assessment report considering modification if any.

Rule-126 Safety Systems:

Sub-rule (1):

Actions and limitations, as mentioned, may be activity restrictions, full shutdown or other actions that compensate for the impairment of safety functions that follows from overriding or interruption.

To fulfill the requirements of actions and limitations to be imposed, IEC standard 61508 on 'Functional safety of Electrical / electronic / programmable electronic safety - related systems' Part 0-7 should be followed.

Documentary evidence of compliance:

1. Functional test documentation of the safety instrumented system;
2. Installation trips and shutdown reports;
3. Any change to the application logic including adjustment of thresholds, timers, filters etc. (It is to be treated as modification).

Rule-127 Critical Activities:

Critical activities inter alia include:

- a) Work on pressurised, electrified or hydrocarbon service systems;
- b) Hot work;
- c) Work with explosives or substances that self-ignite;
- d) Work that entails risk of acute pollution;
- e) Lifting operations;
- f) Work that entails disconnection of safety systems;
- g) Working at heights;
- h) Confined space entry.

When identifying important contributors to risk, results from the risk analyses performed and experience from situations of hazard and accident should be used.

Documentary evidence of compliance:

SOPs and work permit requirements for all the critical activities.

Rule-128 Combined operation:**Sub-rule (1):**

Combined or simultaneous operations may involve inter alia production activities, drilling/well activities and/or maintenance / modification activities.

Examples are interface management between rig and platform when a rig is deployed on a production platform;

For a rig on a standalone basis (like on an exploratory location / sub-sea well) helicopter operation, crane operation, vessel movement, diving operation etc in the vicinity of the rig.

Sub-rule (2):

Necessary actions may be limitations or prohibitions that are to be imposed in connection with certain types of simultaneous activities during start-up, operation and shutdown.

OISD GDN 186 on 'Simultaneous operations in E&P industries' should be followed.

Documentary evidence of compliance:

Company's SIMOPS/ combined operation procedures.

CHAPTER XIV

PLANNING AND CONDUCT OF ACTIVITIES

Rule-129 **Planning** is self explanatory.

Documentary evidence of compliance:

Copy of drilling and workover well plans;

In case of a process platform, copy of production plan including details of wells on production/ injection and status of safety devices in these wells.

Rule-130 **Actions during conduct of activities:**

In order to fulfill the safety clearance requirement, work permit system should be used in line with OISD-STD-105.

Job safety analysis (JSA) should be conducted when part of activities are not covered by procedures, the procedures may conflict with each other, or the activities are new to the personnel involved.

For conducting JSA, Appendix B.4 (Job Hazard Analysis) of ISO 17776 Standard (First edition 2000) on 'Petroleum and natural gas industries –offshore production installations- Guidelines on tools and techniques for hazard identification and risk assessment' should be followed. The person supervising the work and the workers carrying out the work should participate in the JSA.

Documentary evidence of compliance:

1. Copy of filled in work permit;
2. Copy of JSA done.

Rule-131 Permit to work:

OISD-STD-105 (Revision 1, 2004) on 'Work Permit' should be followed.

Documentary evidence of compliance:

Filled up work permit for various activities.

Rule-132 Collection, processing and use of data is self explanatory.**Documentary evidence of compliance:**

1. HSE performance monitoring system;
2. Production and drilling daily progress report;
3. Legal register for drilling and production installations;
4. Corrective action report of internal and external audits.

Rule-133 Monitoring and control:**Sub-rule (1):**

To ensure monitoring and control at all times, alternate competent persons shall be made available in critical areas.

Matters concerning health, safety and environment inter alia include:

- a. Long term effects of working environment as mentioned in Rule 42 on 'Medical examination of employees'.
- b. Monitoring of parameters related to integrity of the facility and environment, through instrumentation as per rule 86;
- c. Status of emergency shutdown system as per Rule-111.

Documentary evidence of compliance:

Alternate designated personnel for critical areas of operation.

Rule-134 Transfer of information:

Key onboard persons (OIM, Tool Pusher, all sectional I/C's) should pass on written information to their respective relievers upon crew change under well defined categories. e.g.

- a) Brief of activities carried out in the last hitch;
- b) Major maintenance done and pending maintenance jobs;
- c) Bypassed safety systems if any;
- d) Pending material requirement if any;
- e) Upcoming jobs on the installation.

Tool Pusher should write work instructions in the shift instructions register for Driller.

Documentary evidence of compliance:

1. Copy of crew change hand over register for OIM & Mechanical I/C;
2. Tool Pusher instructions register.

CHAPTER XV

WORKING ENVIRONMENT FACTORS

Rule-135 Arrangement of work:

The Work arrangement shall be based on Work Environment Analyses which shall be performed to identify and assess occupational safety and health risks, and potential problem areas associated with the various work environment factors, as input to design development. Work environment analysis shall include how work environment factors influence task performance in work systems where human error may have severe consequences.

Chapter 4.4 (Working environment analysis) of NORSOK S-002 on 'Work Environment' (Revision 4, 2004) should be followed.

Documentary evidence of compliance:

Work environment analysis.

Rule-136 Noise and Vibrations

For noise hazards, OSHA standard 1910.95 on 'Occupational noise exposure' should be followed.

Noise exposure should be reduced by establishing and implementing programme of organizational and technical measures, excluding the provision of hearing protectors, appropriate to the activity.

The actions taken for noise control should include consideration of:

- (a) other working methods which reduce exposure to noise;

- (b) choice of appropriate work equipment emitting the least possible noise, taking account of the work to be done;
- (c) suitable and sufficient information and training for employees, such that work equipment may be used correctly, in order to minimise their exposure to noise;
- (e) reduction of noise by technical means;
- (f) appropriate maintenance programmes for work equipment, the workplace and workplace systems;
- (g) limitation of the duration and intensity of exposure to noise; and
- (h) appropriate work schedules with adequate rest periods.

If any area of the workplace is likely to be exposed to noise at or above 90 db for any reason the operator shall ensure that—

- (a) the area is designated a Hearing Protection Zone;
- (b) the area is demarcated and identified by means of the sign specified for the purpose of indicating that ear protection must be worn; and
- (c) access to the area is restricted where this is practicable and the risk from exposure justifies it, and shall ensure so far as is reasonably practicable that nobody enters the area without wearing personal hearing protector.

Documentary evidence of compliance:

Noise survey report

Rule-137 Ergonomics:

An analysis shall be performed for all relevant workplaces involving tasks in operation or maintenance with a significant risk of musculoskeletal injuries/ disorders. Such tasks will include jobs requiring repetitive, forceful or prolonged exertions of the hands, frequent or heavy lifting, pushing, pulling or carrying of heavy objects or prolonged awkward postures. Input concerning manning, work sequences, frequency of operation, inspection and maintenance tasks, necessary equipment for performance of the tasks, personnel selection, and previous experience in similar tasks should be ensured prior to the analysis. Results of the analysis should be documented and corrective actions if required should be taken to avoid any ill effects on the workers.

Documentary evidence of compliance:

Ergonomics study

Rule-138 Chemical health hazard:

OISD-STD-114 on 'Hazardous chemicals and their handling' should be followed.

The chemicals Health Risk Analysis (HRA) shall be performed for all activities where hazardous chemicals are planned to be used during operations or maintenance, and for all processes containing hazardous chemicals that are, or can be, emitted to the working environment. Processes in this respect means production systems, drilling and well operations, combustion (exhaust), workshop activities (e.g. hot work, handling of coating products), evaporation from storage tanks, etc. If the actual identity and composition of a chemical is not known, the chemicals HRA shall be based on the composition of a typical chemical.

Operator shall instruct personnel handling chemicals, with information about the physical and health hazards of chemicals in the work area, and the protective measures that can be taken against these hazards. Training of the personnel should include the work practices, engineering controls, emergency procedures, and use of personal protective equipment.

MSDS shall be displayed in tabular form for hazardous chemical used. Only relevant portions of MSDS (emergency first aid procedure and PPE requirements) should be displayed in local language also, at easily accessible locations.

Documentary evidence of compliance:

1. MSDS of chemicals used;
2. Procedure for handling chemicals.

Rule- 139 Radiation:

For safe handling, storage and use of radioactive materials in well logging operation, OISD-STD-183 on 'Logging Operations' should be followed.

Documentary evidence of compliance:

Details of Radioactive materials, if used, and procedure for safe transport, handling and storage.

Rule- 140 Personal protective equipment is self explanatory.

Documentary evidence of compliance:

Demonstration of compliance with sub-rule 140 (1) & (2).

CHAPTER XVI

DRILLING AND WELL ACTIVITIES

Rule- 141 Well Programme:

Well programme shall be issued prior to commencement of drilling, formation testing, completion, well intervention and suspension / abandonment of well. Significant deviations from the programme shall be formally documented, approved and distributed to relevant persons. For contents of well programme table 4.7.2 of NORSOK standard D 010 on “Well integrity in drilling and well operations” should be referred (NORSOK standard D 010 referred in this chapter is Rev. 3, August 2004 issue).

Well design process should be carried out for any new well, change/ modification in existing wells and changes in well design basis (data or assumptions). Load calculations and safety factors as per industry practice should be ensured.

Rules-21, 22, 23 and 24 on risk reduction, barriers and risk assessment should be complied with. In addition to risk assessment for normal / routine operations, risk assessment such as safe job analysis should be carried out for new or non-standard operations; operations involving new or modified equipment; hazardous operations and change in actual conditions which may increase the risk. Simultaneous and critical activities / operations should comply with the **Rule-128** on combined operation. ‘Summary of operation boundaries – combined operations’ (Section 4.7.3) of IADC HSE case guidelines for MODU (Issue 3.2.1, May 2009), may be referred for this.

In addition to requirement of table 4.7.2 of NORSOK standard D 010, well programme during well servicing / completion should also contain:

- i) Well status before and expected after carrying out operations in the well, stating hole diameter, casing size, cementing heights, completion drawing, test string, plugs and any other equipment in the well.
- ii) The safety assessment in connection with choice of drilling fluids for the operations.

For wells that are to be temporarily plugged back, the programme should also describe:

- i) Plans for future use of the well
- ii) Securing of the wellhead
- iii) Planned well / location inspections and their frequency
- iv) An assessment of the well integrity in relation to the lifetime of the barriers.

Documentary evidence of compliance:

Well design procedure manual of the operator and sample well programme for drilling of a proposed well with the rig; also if rig is proposed to be utilised for carrying out well servicing operations, sample well servicing programme of one well.

Rule-142 Well Barriers:

For well barriers, NORSK standard D 010 should be referred.

Sub-rule (1):

Example of barriers during drilling: primary well barrier is drilling fluid column and secondary barrier elements are casing, casing cement, wellhead, BOP etc.

Example of barriers during production: primary well barrier elements are SCSSV, production packer & completion string. Secondary barrier elements include christmas tree, tubing hanger, wellhead, casing and cement.

All the wells shall be equipped with surface-controlled subsurface safety equipment that will shut off the flow from the well in the event of an emergency. A surface-controlled SSV or an injection valve capable of preventing backflow shall be installed in all injection wells.

The following standard should be followed:

API SPEC 14A on 'Specification for Subsurface Safety Valve' or ISO 10432 or equivalent;

All SSSV's shall be inspected, installed, maintained and tested in accordance with API RP 14B on 'Recommended Practice for Design, Installation and Operation of Subsurface Safety Valve Systems'.

The requirement to sufficient independence among the barriers as mentioned in the **Rule 21** on risk reduction implies that well barriers shall be independent, without common well barrier elements.

The function of the well barrier shall be clearly defined. For example, function of the fluid column is to exert a hydrostatic pressure in the wellbore to prevent inflow of well fluid. Function of drilling BOP is to provide capabilities to close in and seal the wellbore with or without tools / equipment through the BOP.

Requirements and guidelines for proper use of a well barrier in order to maintain its function and prevent damage during execution of activities and operations shall be described. In case of BOP these requirements can be installation of BOP and well control equipment as per industry standards and their periodic function and pressure (at least equal to maximum well design pressure) testing as per industry standards.

All parameters relevant for preventing uncontrolled flow from the well shall be monitored. Methods and frequency for verifying the condition of the well barrier shall be defined and documented. For example in case of drilling fluid column, verification can be done by verifying stable fluid level in the well bore and fluid properties such as density as per required specifications.

Sub-rule (2) also implies that the barriers shall be designed so that unintended outflow of injected material is prevented.

Sub-rule (3):

Performance requirements should be realistic (achievable) and verifiable.

Functional requirements for control measures should include:

- a. Parameters which are clearly identifiable.
- b. Operational criteria which are essential for control of risk.
- c. Directly verifiable criteria which do not require extensive computational effort.
- d. Recording of data to confirm compliance with functional requirements.

Functional requirements should ensure that barriers, safety functions or safety systems:

- Are suitable and fully effective for the type of identified hazards
- Have sufficient capacity for the duration of hazards
- Have adequate response time to fulfill its role
- Are suitable for operating conditions envelope
- Have sufficient availability to match the frequency of the initiating event (hazard)

Verification of the performance of well barriers may be based on pressure testing, response time and leakage rates in case of BOP, and observation of physical properties in case of drilling fluids.

Sub-rule (4):

If a barrier fails, only permissible activities are activities required to restore the barrier.

Sub-rule (5):

If in a well, during production, primary barrier (surface controlled sub-surface safety valve) fails, additional control measures, like sub surface controlled sub-surface safety valve, shall be introduced, till such time the primary barrier is restored. Restoration of primary barrier is to be taken up on priority.

Sub-rule (6):

During design of the barriers, before abandoning well, requirements of Rule 148 shall also be considered.

Documentary evidence of compliance:

Well barrier policy and procedures. These should include details of identified barriers during different stages of well operations. These documents should also include acceptance criteria of these barriers based on parameters of function, initial test and periodic verification (performance requirements).

Rule-143 Well location and well path:**Sub-rule (1):**

Identification of hazards, which can be encountered during drilling operations, will help in proper well planning and minimizing risk. Before drilling a well, the operator shall attempt to identify and analyze potential flow zones. A number of techniques are available to do this.

Potential sources of deeper drilling hazards include abnormal pressure, pressure depleted zones, faults, tectonic stresses, salt flows, and lost circulation. Such hazards can often be identified through seismic interpretation and/or analysis of offset wells or fields. If available, deep seismic data from offset wells or adjacent fields should also be analyzed to aid in the prediction of flow zones.

For details, API RP-65 Part-2 on 'Isolating Potential Flow Zones in Well Drilling and Cementing Operations' should be referred.

Sub-rule (2):

The well's location and path should be given in Universal Transverse of Mercator (UTM) co-ordinates or in a co-ordinate

system of comparable accuracy. Minimum acceptable separation distance between wellbores and corresponding risk control action(s) shall be defined. For acceptance criteria for separation between wellbores section 5.7.4.3 of NORISK standard D 010 (Revision 2,1998) should be referred.

Documentary evidence of compliance:

Deviation plan including information about adjacent wells.

Rule-144 Handling of shallow gas:

Requirements of Rule shall be met by assessing risk for drilling into shallow gas (including other formation fluids such as hydrates and water under pressure) for all wells, together with risk reducing measures. The risk assessment shall be based on interpretation of data from relevant offset wells, and interpretation of the shallow seismic survey at the indented well location.

The following shall be established:

- A procedure for defining the risk of shallow gas and operational constraints.
- Criteria for drilling a pilot hole and when to drill with riser/diverter installed.
- Operational procedures and well control action procedures for drilling through potential shallow gas zones with focus on risk reducing measures.
- Selection of alternate locations.

The following operational constraints are applicable for a potential shallow gas well:

- The well location shall (if possible) be moved, if

- consequence and/or probability of shallow gas are high.
- A pilot hole shall be drilled through all potential shallow gas zones.
 - Predicted shallow gas abnormal pressured zones shall be drilled with weighted drilling fluid.
 - It shall be possible to kill the pilot hole dynamically
 - A float valve without an orifice shall be installed in the BHA.
 - The potential shallow zones should be logged with LWD gamma ray resistivity.
 - Returns from the borehole shall be observed with ROV camera or remote camera.
 - Kill fluid shall be available, before the pilot hole has been opened.
 - Cementing materials shall be onboard to set a 50 m long gas tight cement plug in the pilot hole with 200 % excess.
 - Plans and materials for setting surface casing above a shallow gas zone should be prepared.

For risk assessment and risk reducing measures section 5.7.2 of NORISK standard D 010 (Revision 2, 1998) should be referred.

Documentary evidence of compliance:

Policy to handle shallow gas and details of diverter system available on board.

Rule-145 Monitoring of well parameters:

The requirement to collection also implies that well kick signals are monitored, recorded and treated as early as

possible so as to reduce the consequences of an unplanned inflow.

Documentary evidence of compliance:

System for monitoring of well parameters including IADC reports and online instrumented systems.

Rule-146 Well control:

Sub-rule (1):

In order to meet requirements, industry standards OISD-RP-174; API SPEC 16A, SPEC 16C, SPEC 16D, RP 16E, SPEC 16R; RP 53, RP 59, RP 64, RP 65 - Part 2; and IADC deepwater well control guidelines should be referred.

Well control equipment should be designed, installed, maintained, tested and used meeting the requirements of above applicable industry standards. OISD may specify additional requirements, if necessary.

Empirical correlations developed by BOP OEM shall be used to confirm that the Shear RAM BOP is capable of shearing the highest grade and largest size tubular. Notwithstanding the above, following is recommended:

- a) Perform actual shearing test at site / yard to confirm the shearability of the tubulars in use.
- b) Select highest grade and largest size drill pipe in use, for the test.
- c) The test should be witnessed and certified by an independent reputed party.

Sub-rule (2):

Use of diverter equipment is essential, when drilling top hole section with riser or conductor.

Sub-rule (3):

An alternative activation system, as mentioned, means an emergency control system that is acoustically operated, remotely operated vehicle (ROV) operated or remote-controlled in some other way (Auto shear and dead man system on DP rigs). This system should be used in the event that the BOP functions are inoperative due to a failure of the primary control system. Emergency control system should charge and discharge stack mounted accumulator, close at least one ram type preventer, blind shear ram and open Lower Marine Riser Package (LMRP) hydraulic connector.

Sub-rule (4):

For minimum usable fluid capacity as per industry standards, refer sections 6.3.1 IX and 6.4.2 III of OISD-RP-174 on 'Well Control' (2008) or sections 2.2.1.5 and 2.2.2.5 API SPEC 16 D (1993).

Sub-rule (7):

Loss of well control, as mentioned, means the failure of one or more well barriers [for instance reduction in drilling fluid head leading to influx from the wellbore is failure of well barrier (drilling fluid); this would require closure of the well with the help of BOP to bring the well back under control].

Sub-rule (8):

The action plan, as mentioned, for direct intervention should contain, inter alia,

- i) Identification of well intervention equipment and service provider(s).
- ii) Evaluation of equipment requirements with regard to capacities and dimensions.
- iii) Mobilisation of personnel and equipment (including tie up arrangements with external resources).

Documentary evidence of compliance:

Details of well control equipment available on board and well control manual incorporating above requirements.

Rule-147 Controlled well flow:

Controlled well flow means formation testing, test production, clean-up and stimulation of the well. Rule 153 on 'Equipment for completion and controlled well flow' should also be referred. For further guidance on barriers during testing, completion and production sections 6, 7, and 8 of NORISK standard D 010 (Revision 2, 1998) should be referred.

Documentary evidence of compliance:

Flow parameters (pressure, flow rate etc) vis-à-vis surface flow equipment

Rule-148 Securing of wells before abandoning:**Sub-rule (1):**

When a well is abandoned, the barriers should be designed so as to provide for well integrity for the period of time that the well is expected to be abandoned, inter alia so that outflow from the well or leakages to the external environment do not occur. Well barriers should be designed so that unintentional influx, cross flow to shallow formation layers and outflow to the external environment is prevented. For further guidance, section 11 of OISD-STD-175 (2008) on 'Cementing operations' and API bulletin - E3 on 'Environmental Guidance Document: Well Abandonment and Inactive Well Practices for U.S. Exploration and Production Operations' should be referred.

Well barriers should be designed so that their performance can be verified.

Documentary evidence of compliance:

Policy and procedures for temporary and permanent abandonment of wells.

Rule-149 Compensator and disconnection systems:

For guidance on compensator and disconnection systems, sections 5.3 of NORISK standard D 001 (Rev. 2, July 1998) on 'Drilling Facilities' should be referred.

For dynamically positioned facilities, the disconnection system should be sequence controlled. For anchored drilling facilities

it should be possible to pull the facility quickly off the drilling location in case of loss of well control.

For interventions on subsea wells with high pressure risers, the valve and disconnection system should consist of:

- i) Remote-operated valve located under the release point, which cuts all objects that penetrate the well barriers, as well as maintains full working pressure after cutting;
- ii) Remote-operated main valve that closes after the cutting is completed;
- iii) Block valve over the release point which prevents blowout from the riser to the sea;
- iv) Vent valve that releases shut-in pressure between the casing ram and the shear ram or block valve prior to release.

Documentary evidence of compliance:

Details of compensator and disconnection systems.

Rule-150 Drilling fluid system:

Drilling fluid systems mean systems with tanks (pits), pumps, piping, chemical store, sensors, indicators and alarms to monitor, record, recondition, transfer and store fluids. For selection of chemicals (during design of drilling fluid) Rule-84 on 'Chemicals and chemical exposure' should be referred. For monitoring instrumentation (sensors, indicators and alarms) refer Rule 86 on 'Instrumentation for monitoring and recording' and section 9 of OISD-RP-174 on 'Well Control' (2008).

The system for monitoring drilling fluid volume should compensate for the facility's movements and should include indicators on the drill floor with sound and light alarms. When drilling wells with high pressure and high temperature, the need for temperature and pressure sensors in critical locations such as before and after the choke manifold and in the blowout preventer, should be assessed.

MoEF guidelines on offshore disposal of drill cuttings and drilling fluids shall be complied with.

Documentary evidence of compliance:

Description of drilling fluid system of the rig and policy / procedure to ensure availability of sufficient quantity of drilling fluid weighting materials onboard.

Rule-151 Cementing unit:

For cementing operations, OISD-STD-175 should be referred. For selection of chemicals (during cementing operations) Rule-84 on 'Chemicals and chemical exposure' should be referred.

Documentary evidence of compliance:

Demonstration of compliance with sub-rules.

Rule-152 Casings and anchoring of wells:

The life time of the well as mentioned in the Rule, means service time and subsequent time till final abandonment.

For further guidance on casing cementation OISD-STD-175 on 'Cementing Operations' should be referred. For casing design, section 5.6 of NORSK standard D 010 (Revision 2, 1998) should be referred.

Documentary evidence of compliance:

Policy / procedures to ensure well integrity, during all stages (drilling / production / well servicing / abandonment).

Rule-153 Equipment for completion and controlled well flow:

Sub-rule (1):

Well barrier elements include deep-set plugs under the production packer and plugs in the hanger assembly for the completion string.

Sub-rule (2):

Setting depth for the subsurface safety valve should be adapted to the pressure and temperature conditions in the well and the danger of hydrates, wax and mineral deposits in the valve. For high pressure, high temperature and subsea wells, installation of two subsurface safety valves in the completion string should be considered.

CHAPTER XVII MAINTENANCE

Rule-154 Maintenance:

Maintenance means the combination of all technical, administrative and managerial actions during the life cycle of a facility or parts thereof, required to retain it in or restore it to a state in which it can perform the intended functions. Facility or parts thereof includes temporary equipment and third party equipment also. Life cycle include periods in which the facility or parts thereof are temporarily or permanently shut down.

Maintenance encompasses activities such as monitoring, inspection, testing, repair and housekeeping.

Documentary evidence of compliance:

1. Maintenance policy, objectives and targets;
2. Dry docking policy for offshore drilling rigs.

Rule-155 Classification:

To fulfil the requirement of classification, fault modes and failure mechanisms, NORSOK standard Z-008 on 'Criticality analysis for maintenance purposes' should be followed.

Documentary evidence of compliance:

Classification of Safety Critical Equipment based on consequences of potential functional failures.

Rule-156 Maintenance programme:

The maintenance programme may consist of sub programmes for inspection, testing, and preventive maintenance.

Sub-rule (1):

Maintenance programme for offshore facilities should include Maintenance strategy, Reliability Centered Maintenance, Spare parts, Risk Based Inspection and Reliability / Risk based testing. Chapter 8.4 (Maintenance planning) of NORSOK standard Z-016 (Revision one, 1998) on 'Regularity management and reliability technology' should be followed.

Sub-rules (2) & (3):

1. Table C 7 (Inspection and testing matrix) of ISO 13702 (First edition-1999) on 'Petroleum and natural gas industries- control and mitigation of fires and explosions on offshore production installations- Requirement and guidelines' should be followed for safety systems;
2. The emergency shutdown system should be verified in accordance with the safety integrity levels stipulated on the basis of IEC 61508 on 'Functional safety of Electrical / electronic / programmable electronic safety - related systems'.

The operation of the safety systems should be verified through a full-scale function test at least once each year. The test should cover all parts of the safety function, including closing / partial closing of valves. The test should include measurement of interior leakage in case of valves closed. Recording of the plant's or equipment's functionality in situation where the function is triggered or put to use may replace testing of the plant or the equipment.

3. API RP 2 D on 'Operation and maintenance of offshore cranes' should be followed for maintenance of lifting appliances and lifting gear.

Documentary evidence of compliance:

1. Topside facility maintenance programme;
2. Subsea production system maintenance programme.

Rule 157 Specific requirements to condition monitoring of structures and pipeline systems:

Sub-rule (3):

Corrosion as mentioned in this sub rule means both external and internal corrosion.

Section 14 (Surveys) of API RP 2A-WSD (21st edition, 2000) on 'Recommended practice on planning, designing and constructing fixed offshore platforms- Working stress design' or ISO 19900:2002 on 'Petroleum and natural gas industries – General requirements for offshore structures' should be followed for monitoring the condition of offshore structures.

Documentary evidence of compliance:

1. Jacket maintenance policy;
2. Pipeline inspection and replacement policy;
3. Record of inspection of pipeline and structures.

Rule 158 Specific requirements to testing of blow out preventer and other pressure control equipment:

Sub-rule (1):

For testing of BOP and other pressure control equipment OISD-RP-174 on 'Well control' or API RP 53 on 'Blowout prevention equipment systems for drilling systems' and API RP 64 on 'Diverter systems equipment and operations' should

be followed. ROV function should be tested during stump test and at least one set of rams in initial test on the sea floor. Shear rams should be pressure tested after usage.

Sub-rule (2):

Complete overhaul and recertification as mentioned in this sub rule should be carried out periodically and in a manner, which ensures that single components and the whole unit will be overhauled in a rolling five-year period. The certification should be carried out by OEM or OEM authorised workshop. In this regard Notice to Operators numbered OISD/OFF/NTO/1-11 dated 07.01.11 on Recertification of Well Control Equipment is placed at annexure 6.

Documentary evidence of compliance:

1. Well control equipment certification/ recertification records;
2. BOP testing records.

Rule 159 Planning and priority of maintenance:

Sub-rule (2):

Criteria for giving priority to various maintenance activities should be based on classification done as per Rule # 155.

Documentary evidence of compliance:

Safety Critical equipment classification along with time limits fixed for routine and break-down maintenance.

Rule-160 Maintenance effectiveness:

Sub-rule (1):

Maintenance effectiveness as mentioned in this sub rule means the ratio between the requirements stipulated for performance and technical conditions and the actual results.

For recording data as mentioned in this sub rule, including failure data and maintenance data, ISO 14224 standard on 'Petroleum, petrochemical and natural gas industries- collection and exchange of reliability and maintenance data for equipment' ; Chapters 6.1 (collection of reliability data) and chapter 6.2 (Qualification and application of reliability data) of Norsok standard Z-016 (Revision one, 1998) on 'Regularity management and reliability technology' should be followed.

Documentary evidence of compliance:

1. Procedure adopted for evaluating maintenance effectiveness;
2. Evidence of improvement in maintenance activities (increase in system / equipment availability).

Chapter XVIII

SPECIFIC OPERATIONS

Rule-161 Work on and operation of electric systems:

Sub-rule (1):

When designing electrical units, consideration should be given to the output needs, distribution system, earthing system, protection against interruption and adequate protections in the event of failures in the unit.

For electrical systems following standards should be followed:

- API RP 14F on 'Recommended Practice for Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Division 1 and Division 2 Locations'.
- API RP 500 (Recommended Practice for classification of location for electrical installations at petroleum facility classified as Class I, Division 1 and Division 2 Locations).
- DNV- OS- D 201 on 'Electrical Installations' {for principles, technical requirements and guidance for design, manufacturing and installation of electrical installations on mobile offshore units and floating offshore installations}.

Sub-rule (2):

Electrical activities shall be safety cleared before they are conducted. The safety clearance shall show which conditions have to be met, including the actions required to be taken before, during and after the work so that those who

participate in or may be affected by the activities are not injured, and so that the probability of mistakes that can result in situations of hazard and accident is reduced.

OISD-STD-105 on 'Work Permit' should be followed.

Documentary evidence of compliance:

1. 'Electrical Permit to Work' form;
2. Hazardous area electrical equipment register.

Rule-162 Lifting operations:

Sub-rule (2):

Lifting gear and lifting equipment inter alia include winches, slings, shackles, offshore containers, personnel transfer basket, safety belt, harness, lanyard, lifting tackles and personnel work trolley.

All gear and equipment provided for rigging and materials handling shall be inspected before each shift and whenever necessary during its use to ensure that it is safe. Defective gear shall be removed and repaired or replaced before further use.

Maximum safe working load shall be marked on every hoist or lift together with an identification mark. Every lifting machine used for the purpose of raising or lowering persons, goods or materials shall be properly maintained and thoroughly examined as per OEM recommendations. No lifting machine shall, except for the purpose of test, be loaded beyond the safe working load marked thereon.

For guidance on lifting operations the following standards should be followed:

- API-RP-2D (Fourth edition, 1999) on 'Recommended Practice for Operation and Maintenance of Offshore Cranes';
- The International Association of Oil & Gas producers (OGP) lifting and hoisting safety recommended practices (Report 346-April-06);
- Guidelines on Procedures for Transfer of Personnel by Basket on the UK Continental Shelf (Information Note IMCA SEL 08/01 March 2001).

Documentary evidence of compliance:

1. Cargo gear certificate;
2. Inspection and test record for hoisting and lifting tackle;
3. Personnel transfer procedure.

Rule-163 Underwater operations:

For underwater operations, requirements of the following standards should be followed:

- IMO D014 (October,2007) on 'Code of Practice for Offshore Diving'
- OGP report no 411 (June, 2008) on Diving Recommended practice

Documentary evidence of compliance:

1. Underwater Emergency procedures;
2. SIMOPS document;
3. Bridging document between diving contractor and operator.

Rule- 164 Operations involving hydrogen sulphide:

For necessary precautions and measures to be taken during operations involving Hydrogen Sulphide, following standards should be followed:

- API-RP-49 on 'Recommended Practice for Drilling and Well Servicing Operations Involving Hydrogen Sulfide';
- API-RP-68 on 'Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide';
- API-RP-55 on 'Recommended Practice for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulphide' -
- OISD-RP-201 'Environment Management in Exploration & Production Sector', annexure-IV.

Documentary evidence of compliance:

1. H₂S Contingency Plan;
2. H₂S detection and monitoring system.

Chapter XIX

MARINE FACILITIES AND OPERATIONS

Rule-165 Stability:

Following standards should be followed:

- IMO code on intact stability for all type of ships covered by IMO instruments (IMO resolution A 749(18));
- IMO MODU code;
- IMO International convention on load lines.

Documentary evidence of compliance:

1. Load line certificate
2. Stability booklet

Rule-166 Anchoring, mooring and positioning:

Sub-rule (1):

Following standards should be followed:

- API RP 2SK on 'Recommended practice for design and analysis of station keeping systems for floating structures';
- ISO 19901-7 on 'Station keeping systems for floating offshore structures and mobile offshore units';
- DNV OS E-301 on 'Position mooring' or equivalent for criteria, technical requirements and guidelines on design and construction of position mooring systems.

Sub-rule (2):

Following standards should be followed:

- IMO/MSC circular 645 on 'Guidelines for vessels with dynamic positioning systems';
- IMCA guidelines for The Safe Operation of Dynamically Positioned Offshore Supply Vessels- Rev1, August 2009.

Sub-rule (4):

Following standards should be followed:

- API RP 2SK on 'Recommended practice for design and analysis of station keeping systems for floating structures';

Documentary evidence of compliance:

1. Mooring analysis
2. FMEA of DP system
3. Class certification of the MODU / production facility w.r.t to mooring and DP facility

Rule-167 Collision risk management:

Following standards should be followed:

- UKOOA guidelines for ship/installation collision (issue1, Feb.2003);
- UKOOA guidelines for safe management and operations of offshore support vessels (issue-4, 2002);
- UK Oil & Gas Emergency Response & Rescue Vessel Management Guidelines (issue-4, May 2008).

Documentary evidence of compliance:

Documents showing compliance with requirements as given in Sub Rules (2)- (a) to (h)

Rule-168 Control in the safety zone:

Following standards should be followed:

- UKOOA guidelines for safe management and operations of offshore support vessels (issue-4, 2002)

Documentary evidence of compliance:

1. SIMOPS
2. Procedure for working inside 500 m safety zone
3. Interface management between operator (OIM of the installation) and OSV / MSV / tanker contractor (Master of vessel)

Rule-169 Operations in rough weather conditions:**Sub Rule (1):**

Environment conditions specific to the location of installation shall be identified and accounted for in the planning and execution of all lifting operations. Whenever there is a reasonable chance of changes in environmental conditions, contingency plans and procedures shall be developed as part of the work planning. Parameters to be addressed may include sea state, weather, visibility, noise, communications, surrounding operations and installations, and site access and egress.

Sub Rule (2):

Simultaneous nearby operations and their work environment conditions that could impact or be impacted by the transfer operation shall be identified and addressed in the risk assessment. Controls shall be established, including criteria for suspending operations, and communicated to all relevant personnel.

Following standards should be followed:

- UKOOA guidelines for safe management and operations of offshore support vessels (issue-4, 2002);
- UKOOA guidelines for ship/installation collision (issue1, Feb.2003).

Documentary evidence of compliance:

1. SIMOPS;
2. Personal and cargo transfer procedure;
3. Adverse weather working criteria (operating envelope).

Rule- 170 Cargo management:

Following standards should be followed:

- IMO MSC/CIRC 860 on Guidelines for the approval of offshore containers handled in open seas;
- Section 6.3 (Deck Cargo operations) of UKOOA guidelines for safe management and operations of offshore support vessels (issue-4, 2002);
- Oil & Gas UK guidelines for The Safe Packing and Handling of Cargo to and from Offshore Locations (issue 4, Nov.2008);
- DNV standard no 2.7-1 for certification of offshore containers.

Documentary evidence of compliance:

1. Voyage planning documentation
2. Lift plan (Routine/ non routine)
3. Container certification in line with IMO MSC/Circ 860

Chapter XX
MISCELLANEOUS

Rule-171 General duty for safety:

Employee includes employees of other participants also i.e those of contractors, service providers etc. as defined at rule 2(1)(l).

Documentary evidence of compliance:

Communication regarding information about this rule to the employees.

Rule-172 Place of accident not to be disturbed is self explanatory.

Documentary evidence of compliance:

Records pertaining to past accident fulfilling requirements of sub-rules.

Rule-173 Penalty for contravention of the rules:

Penalty for contravention of these rules shall be in accordance with section 9 of the ORD Act, 1948, which is quoted below:

- 1) Any rule made under any of the provisions of this Act may provide that any contravention thereof shall be punishable with imprisonment which may extend to six months or with fine which may extend to one thousand rupees or with both.
- 2) Whoever, after having been convicted of any offence referred to in sub-section (1), continues to commit such offence shall be punishable for each day after the date of first conviction during which he continues so to

offend, with fine which may extend to one hundred rupees.

Rule-174 Direction:

Using powers provided in this rule, the Govt of India in the Ministry of Petroleum and Natural Gas has issued Gazette notification no S.O 1502 (E) dated 18.06.2008. It designates OISD as competent authority to exercise the powers and functions as stipulated in the Petroleum and Natural Gas (Safety in Offshore Operations) Rules, 2008.

**Guidance note on 'Application for Consent' for fixed offshore installation
(Schedule II / Schedule III of Offshore Safety Rules)**

While applying for consent for fixed offshore installation, the Operator is expected to include the information as mentioned below. Items, of Schedule II / Schedule III, which are not covered below are self explanatory.

In case of the information, which is provided in soft copy form (in CD), it's location should be clearly specified by giving the file name, section/sub-section no. and page no. against the item no. in Schedule II / Schedule III.

Refer: II 6 / III 7

The Safety Management System (SMS) should include the following critical elements –

- Hazard identification, control of hazards / establishing barriers
- Contractor safety
- Competency of personnel
- Management of change
- Emergency Response Plans (including pipeline related emergencies)
- Asset Integrity Management
- Operating procedures
- Incident reporting and accident investigation
- Performance monitoring of SMS (goals; audits; management review)
- Regulatory requirements in the form of legal register
- Organizational structure for HSE management

In case the installation is on O&M contract, SMS document of both the company and contractor to be provided.

Bridging Document between the operator and the contractor, for interface management, should also be provided.

Refer: II 7a

Deck-wise arrangements; broad classification of material of construction of the structure; measures for corrosion protection; policy of periodic inspection and maintenance of underwater structure (including risers).

General arrangement drawings (preferably in soft copy form).

Refer: II 7b / III 8a

- (1) The general description and handling capacity of the plant and its associated systems, with suitable layout diagrams.
- (2) Brief description of process safety system (including safety instrumentation); fire & gas system; shutdown philosophy.

Codes / Standards followed.

- (3) Details about the control measures which are in place for identified hazardous situations (major accident hazards) such as fire incidents, hydrocarbon leakage, H₂S leakage (where applicable), pipeline / riser damage, collision etc. (Basically demonstration of risk control).
- (4) Policy of periodic inspection & maintenance and testing of process safety and F&G system
- (5) Hazardous area classification; type of electrical equipment used in hazardous areas.
- (6) Installation's '**Fit-for-purpose Status**' evidence in the form of valid certificates of fitness for topside facilities and underwater structure.

Refer: II 7c / III 8b

Basic information [service, design & envisaged/present throughput, length, dia, thickness, pipe grade, pressure (design, MAOP,OP), temperature] of incoming and outgoing pipelines.

General description of the to be connected / connected installations including process facilities and F&G system available thereon (connected installations mean both bridge connected and pipeline connected).

Refer: II 7d / III 8c

In the information regarding the wells to be connected / connected directly or indirectly to the installation (indirectly means well platform outgoing pipeline may be routed to the manifold of other well platform instead of going directly to the installation) please indicate (1) type of wells (Oil/Gas/WI) and completion – single / dual string (2) mode of flow (self flow or artificial lift) (3) X-mas tree rating (4) broad pressure range (downstream of choke / at platform manifold)

Refer: II 8 / III 9

To include details of the envisaged / actual input and output process parameters at the battery limits vis-à-vis design capabilities of the plant.

Refer: II 10a / III 11a

Details about safety features of the wells; policy of testing, inspection & maintenance. Policy of managing sustained casing pressure.

Refer: II 10 b / III 11 b

Measures for ensuring pipeline integrity; repair policy.

Refer: II 11 / III 12

Description of the life saving appliances and fire fighting arrangement along with layout drawings (drawings preferably in soft copy form in pdf or dwf format)

Policy of testing, inspection and maintenance of life saving appliances and fire fighting system.

Refer: II 12 / III 13

Detailed emergency response manual to enable OISD to verify that the requirements of all the rules under Chapter X are being met.

Annexure-2

**Guidance note on 'Application for Consent' for mobile offshore installation
(other than mobile drilling rig)
(Schedule IV / Schedule V of Offshore Safety Rules)**

(this does not pertain to mobile drilling rig; it pertains to all other mobile installations including production/injection/gas compression installations.)

While applying for consent for mobile offshore installation, the Operator is expected to include the information as mentioned below. Items, of Schedule IV / Schedule V, which are not covered below are self explanatory.

In case of the information, which is provided in soft copy form (in CD), it's location should be clearly specified by giving the file name, section/sub-section no. and page no. against the item no. in Schedule IV / Schedule V.

Refer: IV 4 / V 6

The Safety Management System (SMS) should include the following critical elements –

- Hazard identification, control of hazards / establishing barriers
- Contractor safety
- Competency of personnel
- Management of change
- Emergency Response Plans (including pipeline related emergencies)
- Maintenance practices for ensuring mechanical integrity
- Operating procedures
- Incident reporting and accident investigation
- Performance monitoring of SMS (goals; audits; management review)
- Regulatory requirements in the form of legal register
- Organizational structure for HSE management

In case of hired mobile offshore installation / the company owned installation on O&M contract, SMS document of both the company and contractor to be provided.

Bridging Document between the operator and the contractor, for interface management, should also be provided.

Refer: IV 5a

General description of the type of structure (like fixed leg, semi-sub, floater); deck-wise arrangements; broad operational features [including (as applicable) installation movement and placement; station keeping; mooring]; broad classification of material of construction of the structure; measures for corrosion protection; policy of periodic inspection and maintenance of underwater structure (including risers).

General arrangement drawings (preferably in soft copy form).

Mooring analysis report (where applicable).

Refer: IV 5b / V 7a

1. The general description and handling & storage capacity of the plant and its associated systems, with suitable layout diagrams.
2. Brief description of process safety system (including safety instrumentation); fire & gas system; shutdown philosophy.

Codes / Standards followed.

3. Details about the control measures which are in place for identified hazardous situations (major accident hazards) such as fire incidents, hydrocarbon leakage, H₂S leakage (where applicable), pipeline / riser damage, stability (where applicable), collision etc. (Basically demonstration of risk control).
4. Policy of periodic inspection & maintenance and testing of process safety and F&G system
5. Hazardous area classification; type of electrical equipment used in hazardous areas.
6. Installation's '**Fit-for-purpose Status**' evidence in the form of valid certificates of fitness for topside facilities and underwater structure.

Refer: IV 5c / V 7b

Basic information [service, design & envisaged/present throughput, length, dia, thickness, pipe grade, pressure (design, MAOP,OP), temperature] of incoming and outgoing pipelines.

General description of the to be connected / connected installations including process facilities and F&G system available thereon (connected installations mean both bridge connected and pipeline connected).

Refer: IV 5d / V 7c

In the information regarding the wells to be connected / connected directly or indirectly to the installation (indirectly means well platform outgoing pipeline may be routed to the manifold of other well platform instead of going directly to the installation) please indicate (1) type of wells (Oil/Gas/WI) and completion – single / dual string (2) mode of flow (self flow or artificial lift) (3) X-mas tree rating (4) broad pressure range (downstream of choke / at platform manifold)

Refer: IV 6 / V 8

To include details of the envisaged / actual input and output process parameters at the battery limits vis-à-vis design capabilities of the plant.

Refer: IV 8a / V 10a

Details about safety features of the wells; policy of testing, inspection & maintenance. Policy of managing sustained casing pressure.

Refer: IV 8b / V 10b

Measures for ensuring pipeline integrity; repair policy.

Refer: IV 9 / V 11

Description of the life saving appliances and fire fighting arrangement along with layout drawings (drawings preferably in soft copy form in pdf or dwf format)

Policy of testing, inspection and maintenance of life saving appliances and fire fighting system.

Refer: IV 10 / V 12

Detailed emergency response manual to enable OISD to verify that the requirements of all the rules under Chapter X are being met.

Refer: IV 11 / V 13

These include interface management between rig and installation (when rig is deployed on a connected well platform) - helicopter operation, crane operation, vessel movement, diving operation etc in the vicinity of the rig.

On an installation, on stand alone basis, the precautions to be taken during operations like helicopter movement, vessel movement, diving etc (which fall under the ambit of simultaneous operations) are to be documented and be part of the operating procedures manual under SMS. Copies of such procedures are to be submitted.

**Guidance note on 'Application for Consent' for mobile drilling Rigs
(Schedule IV / Schedule V of Offshore Safety Rules)**

While applying for consent for mobile drilling rigs, the Operator is expected to include the information as mentioned below. Items, of Schedule IV / Schedule V, which are not covered below are self explanatory.

In case of the information, which is provided in soft copy form (in CD), it's location should be clearly specified by giving the file name, section/sub-section no. and page no. against the item no. in Schedule IV / Schedule V.

Refer: IV 4 / V 6

The Safety Management System (SMS) should include the following critical elements –

- Hazard identification, control of hazards / establishing barriers
- Contractor safety
- Competency of personnel
- Management of change
- Emergency Response Plans
- Maintenance practices for ensuring mechanical integrity
- Operating procedures
- Incident reporting and accident investigation
- Performance monitoring of SMS (goals; audits; management review)
- Regulatory requirements in the form of legal register
- Organizational structure for HSE management

In case of hired rig/company owned rig on O&M contract, SMS document of both the company and the contractor to be provided.

Bridging Document between the operator and the contractor, for interface management, should also be provided.

Refer: IV 5a

General description of the type of structure (like fixed leg, semi-sub, drill ship); deck-wise arrangements; broad operational features [including (as applicable) rig movement and placement; station keeping; mooring]; broad classification of material of construction of the structure; measures for corrosion protection; policy of periodic inspection and maintenance of underwater structure.

General arrangement drawings (preferably in soft copy form).

Mooring analysis report (where applicable).

Refer: IV 5b / V 7a

Besides the general description and broad specifications of the rig and its systems, with suitable layout diagrams, include details about the control measures which are in place for identified hazardous situations (major accident hazards) such as uncontrolled well flow (including shallow hazards), fire incidents, encountering H₂S, stability (where applicable), collision etc. (Basically demonstration of risk control).

Hazardous area classification

Rig **'fit-for-purpose status'** evidence in the form of valid certificate of class for **intended services**.

Refer: IV 6 / V 8

Detailed requirements of well(s) (based on anticipated down-hole pressures, planned depth, well profile, well architecture, water depth etc) such as anticipated maximum loads, well control equipment rating, etc vis-à-vis capabilities of the rig which is proposed to be deployed.

Refer: IV 8a / V 10a

Information on well control equipment – BOP stack, diverter assembly, C and K manifold and BOP control unit etc. available on the rig.

Well control manual, including information regarding establishing and maintaining barriers at all times [during all phases of well drilling (overbalanced drilling and managed pressure drilling) and completion] along with contingency plans to restore barriers.

Policy of periodic inspection & maintenance and major over haul of well control equipment.

Refer: IV 10 / V 12

Detailed emergency response manual to enable OISD to verify that the requirements of all the rules under Chapter X are being met.

Refer: IV 11 / V 13

These include interface management between rig and platform (when rig is deployed on a production platform) - helicopter operation, crane operation, vessel movement, diving operation etc in the vicinity of the rig.

On a rig, on stand alone basis (like on an exploratory location / sub-sea well), the precautions to be taken during operations like helicopter movement, vessel movement, diving etc (which fall under the ambit of simultaneous operations) are to be documented and be part of the operating procedures manual under SMS. Copies of such procedures are to be submitted.

Subject: Verification of fitness of offshore Drilling Rigs**Date: 28th September 2011**

OISD guidance note on the above subject has been available on OISD website since October 2010. The same has been updated.

Reason for update: Based on the feedback from industry, specifics like standards' edition (revision number and year) have been included where particular section of the standard has been referred [elsewhere, latest standards are to be referred] and reference to ISO standards which had equivalency issues & API publication which has been withdrawn, have been deleted. **Basic framework of the guidance note remains the same.**

Rule 30 on the above subject requires independent verification of fit for purpose condition, which is the ability of the installation to perform intended function. Requirements as per sub-rule (2) includes, assessment of design and construction of the installation in relation to the conditions under which it is to be installed and used; designing, constructing, installing and maintaining the installation in accordance with recognized standards; and maintaining a valid certificate of fitness for the installation.

Actions required, for complying with the requirements of Rule 30 include:

- a. Design / construction verification by independent party.
- b. Fit for purpose status of an installation is to be ensured through certification by an independent reputed party or by any member of the classification society.
- c. Valid certificate means certificate issued by an independent party (including any member of the classification society) for a fixed time period.
- d. Certification / classification should include verification of the drilling system.

This guidance note is being issued to specify the detailed elements to be addressed by Operator, to demonstrate that 'Mobile Offshore Drilling rig (MODU) has been designed and maintained for the identified operating and environmental conditions, in compliance with the Rule 30.

AA Documents required to be submitted to demonstrate compliance are:

1. Classification certificate.
2. MODU safety certificate.
3. Certification of drilling system and other related equipment.
4. Description of operations which may be carried out by the MODU under implied limitations resulting from:
 - a. Risk analyses
 - b. Extreme condition (damaged stability)
 - c. Extreme environment
 - d. Simultaneous operations
 - e. Impairment of safety critical equipment

BB Alternate certification requirements

These requirements are to be met in the absence of evidence of compliance against point 2 and 3 of AA above.

Explanatory note:

1. Unless it is specifically asked for from classification society (would be in form of additional notation), the classification requirements normally do not cover equipment used exclusively for drilling and related operations.
 - a. Machinery, electrical and piping systems used exclusively for drilling purposes are not covered by the requirements, except in so far as their design or arrangement may affect the safety of the unit.
 - b. The assessment of the required holding capacity, arrangement and operation of position mooring equipment and dynamic positioning equipment used for station-keeping activities in

connection with the unit’s operation is the responsibility of the owner, and is not included in the requirements.

2. MODU safety certificate may not be the requirement of the flag state, where MODU is registered.

The requirements of the following referred applicable standards for the listed equipment shall be met to demonstrate that drilling systems are in compliance with requirements of the Petroleum and Natural Gas (Safety in Offshore Operations) Rules, 2008 and MODU is thus fit for purpose:

S. No.	Equipment	Verification requirements	Reference Standard
1.	Drilling structure, drill floor, sub structure, lifting equipment.	<p>A. Derrick / structures</p> <ul style="list-style-type: none"> i. Structures have been designed and fabricated by manufacturers as per API Spec 4F or equivalent. This verification should include structural safety level (refer sections 6 and B.6 of API Spec 4F). ii. Different categories’ inspection(s) of derrick, structures and drill floor have been carried out as per section 6 of API RP 4G or equivalent and OEM’s recommendations, besides NDE as considered necessary. iii. Repair and modification of structures (if carried out, based on inspection) have been carried out as per section 7 and 8 respectively of API RP 4G or equivalent and OEM’s recommendations. Quality control of repair and modification has been ensured in line with requirements of section 11 of API SPEC 4F or equivalent. <p>B. Drilling equipment</p>	<p>API Spec 4F (3rd Edition 2008)</p> <p>API RP 4G (3rd Edition, 2004)</p> <p>API RP 4G(3rd Edition, 2004)</p> <p>API Spec 4F (3rd Edition 2008)</p>

		<p>i. Installation, inspection and maintenance of IC engines have been carried out as per API Spec 7C-11F or equivalent and OEM's recommendations. For minimizing potential fires and/or explosions in the operations of IC engines requirements given in Appendix A of API Spec 7C-11F or equivalent, are being followed. Functional testing of safety devices and emergency stop function has been carried out.</p> <p>ii. Design, inspection and operating limits of drill stem components is as per API RP 7G or equivalent.</p> <p>iii. Design of drilling equipment (rotary equipment, slush pumps, power tongs and draw works) is as per API Spec 7K or equivalent.</p> <p>iv. Inspection, maintenance and repair of rotary equipment, slush pumps, power tongs and draw works has been carried out as per API RP 7L or equivalent and OEM's recommendations. Inspection has included NDE and/or opening of equipment as considered necessary. Functional testing of safety devices and emergency stop function has been carried out.</p> <p>v. Design of drilling hoisting equipment is as per API Spec 8A and API Spec 8C or equivalent.</p> <p>vi. Inspection, maintenance and repair of hoisting equipment are as per API RP 8B or equivalent and OEM's</p>	<p>API Spec 7C-11F (5th Edition 1994)</p> <p>API RP 7G</p> <p>API Spec 7K</p> <p>API RP 7L</p> <p>API Spec 8A and API Spec 8C</p>
--	--	--	--

		<p>recommendations. Inspection of hoisting equipment has focused on structural integrity and personnel protection. Category III and IV inspection has included NDE / MPI and/or opening of equipment as considered necessary. Functional testing of safety devices and emergency stop function has been carried out.</p> <p>vii. Minimum requirements and terms of acceptance of steel wire ropes as per API Spec 9A / ISO 10425 or equivalent are being followed.</p> <p>viii. Field care (inspection) and use of wire rope and evaluation of rotary drilling line has been carried out as per API RP 9B or equivalent.</p> <p>ix. Inspection of piping and piping systems has been carried out as per API RP 570 and API RP 574.</p> <p>x. Pressure vessels have been inspected externally and internally; thickness measurement / crack detection tests have been carried out as deemed necessary. Pressure testing at a pressure equal to maximum allowable working pressure has been carried out. Safety valves / instrumentation have been tested.</p>	<p>API RP 8B</p> <p>API Spec 9A / ISO 10425</p> <p>API RP 9B</p> <p>API RP 570 and API RP 574</p>
2.	Well Control Systems: blow out preventers, diverters, marine risers, choke and kill system, control	A. Design of drill through equipment / blowout prevention equipment – ram and annular blowout preventers, hydraulic connectors, drilling spools, adaptors etc. is as per API Spec 16A / ISO 13533 or equivalent. Records of maintenance (including major inspection as per section	<p>API Spec 16A (3rd Edition 2004) / ISO 13533 (2001)</p> <p>API RP 53</p>

	<p>systems for well control equipment.</p>	<p>17.10.3 of API RP 53 and OEM's recommendations) have been reviewed. Installation and testing (complete performance testing including functional and pressure tests) of blow out control equipment is being carried out in line with API RP 53 or OISD-RP-174 or equivalent.</p> <p>B. Design and maintenance of diverter systems is as per API RP 64 or equivalent. Inspection and testing of diverter systems has been carried out as per API RP 64 or OISD-RP-174 or equivalent.</p> <p>C. Design of choke and kill systems is as per API Spec 16C or equivalent. Pressure testing of choke and kill systems is being carried out in line with API RP 53 or OISD-RP-174 or equivalent. Flexible choke and kill lines and choke manifold are inspected as per section 17.10.3 of API RP-53(3rd Edition 1997) and OEM's recommendations.</p> <p>D. Design of control systems for well control equipment and diverter equipment is as per API Spec 16D and API RP 53 or equivalent and performance requirements/ testing, inspection and maintenance is as per API RP 53 or OISD-RP-174 or equivalent and OEM's recommendations.</p> <p>E. Marine drilling riser systems for floating drilling operations have been selected, operated and maintained in line with API RP 16Q or equivalent. Design, manufacture and fabrication of marine drilling riser system and associated equipment</p>	<p>(3rd Edition 1997) or OISD-RP-174</p> <p>API RP 64 or OISD-RP-174</p> <p>API Spec 16C</p> <p>API RP 53(3rd Edition 1997) or OISD-RP-174</p> <p>API Spec 16D and API RP 53</p> <p>API RP 53 or OISD-RP-174</p> <p>API RP 16Q</p> <p>API Spec 16F /</p>
--	--	--	--

		used in conjunction with a subsea blowout preventer (BOP) stack is as per API Spec 16F or equivalent. Design and standards of performance for marine drilling riser coupling is as per API Spec 16R or equivalent. Risers and riser couplings / joints are being inspected for wear, cracks and corrosion; thickness measurement has been carried out as required.	API Spec 16R
3.	Man riding equipment	Selection of man riding equipment is done ensuring that equipment is suitable for man riding operations, and the equipment are inspected and maintained regularly.	
4.	Station keeping systems: anchoring, mooring, dynamic positioning, compensator and disconnection systems.	Verify that MODU's station keeping and stability characteristics are suitable for the environmental (including sea bed and soil conditions) and operating conditions envelope. Inspection and maintenance of mooring hardware is as per API RP 21 or equivalent and OEM's recommendations; and design, manufacturing and maintenance of synthetic fiber ropes for offshore mooring is as per API RP 2 SM or equivalent.	API RP 2SK (for station keeping) MODU code(for stability) API RP 21 API RP 2 SM
5.	Drilling fluid handling and cementing system	Physical condition of the equipment is satisfactory and instrumentation, safety alarms and pressure safety valves are being tested regularly.	
6.	Electrical Systems	A. Design and maintenance of electrical systems is as per IMO MODU code meeting requirements of industry standards API RP 500 or API RP 505. B. Inspection and functional testing of emergency power system is being carried out.	MODU code API RP 500 API RP 505

<p>7.</p>	<p>Safety systems (exclude items which are covered by MODU safety certificate, provided the rig has valid MODU safety certificate)</p>	<p>A. Inspection and testing of the following safety systems is being carried out periodically:</p> <ul style="list-style-type: none"> - Fire detection system - Gas detection system – HC and H₂S - Drilling operations related alarm system - Life saving appliances - SCBA - Gas measuring devices - Firefighting system - Communication systems <p>B. Safety systems are as per MODU code requirements, as applicable.</p>	
<p>8.</p>	<p>Cranes (If classed certificate notation does not cover cranes)</p>	<p>A. Design and testing of pedestal mounted offshore cranes are as per API Spec 2C or equivalent.</p> <p>B. Operations and maintenance of offshore cranes are as per API RP 2D or equivalent. Inspection has focused on structural integrity and includes:</p> <ul style="list-style-type: none"> - Blocks and sheaves - Wire ropes and end attachments - Hooks - Bearings - Shackles - Securing arrangements - Support structure - Axle pin and housing <p>C. Inspection and function testing has included:</p> <ul style="list-style-type: none"> - Correct adjustment of brakes - Resistance measurement of electrical systems - Leakages in hydraulic systems <p>D. Load charts have been verified by carrying out load tests as per applicable requirements.</p>	<p>API Spec 2C</p> <p>API RP 2D</p>

		Functional testing of safety devices and emergency stop function are being carried out.	
9.	Helideck (If classed certificate notation does not cover helideck)	Inspection has included: <ul style="list-style-type: none"> - Structural integrity of deck and supporting structure - Surface of deck - Obstacles and marking - Safety net - Fire safety arrangements 	

The validity of certificate shall be 5 years, provided follow up midterm survey / inspection is carried out within 3 years period from date of certification.

For design of facilities following standards / codes should inter alia be followed:

- American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code;
- API RP 2A-LRFD on 'Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms - Load and Resistance Factor Design';
- API RP 2A-WSD on 'Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms - Working Stress Design';
- API RP 2L on 'Planning, Designing and Constructing Heliports for Fixed Offshore Platforms';
- API RP 2FB on 'Recommended Practice for the Design of Offshore Facilities Against Fire and Blast Loading';
- API RP 2FPS on 'Recommended Practice for Planning, Designing, and Construction Floating Production Systems';
- API RP 2SK on 'Design and Analysis of Station keeping Systems for Floating Structures';
- API RP 2SM on 'Recommended Practice for Design, Manufacture, Installation, and Maintenance of Synthetic Fiber Ropes for Offshore Mooring';
- API 4F on 'Specification for Drilling and Well Servicing Structures';
- API RP 14B on 'Design, Installation, Repair and Operation of Subsurface Safety Valve Systems';
- API RP 14C on 'Analysis, Design, Installation and Testing of Basic Surface Safety Systems on Offshore Production Platforms';

- API 14D on 'Specification for Wellhead Surface Safety Valves and Underwater Safety Valves for Offshore Service';
- API RP 14E on 'Recommended Practice for Design and Installation of Offshore Production Platform Piping Systems';
- API RP 14F on 'Recommended Practice for Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Division 1 and Division 2 Locations';
- API RP 14G on 'Recommended Practice for Fire Prevention and Control on Open Type Offshore Production Platforms';
- API RP 14H on 'Recommended Practice for Installation, Maintenance and Repair of Surface Safety Valves and Underwater Safety Valves Offshore';
- API RP 14J on 'Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities';
- API 16C on 'Specification for Choke and Kill Systems';
- API 16D on 'Specification for Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment';
- API RP 16E on 'Recommended Practice for Design of Control Systems for Drilling Well Control Equipment';
- API RP 16Q on 'Recommended Practice for Design, Selection, Operation and Maintenance of Marine Drilling Riser Systems First Edition; Formerly RP 2Q and RP 2K';
- API RP 49 on 'Recommended Practice for Drilling and Well Servicing Operations Involving Hydrogen Sulfide';
- API RP 53 on 'Blowout Prevention Equipment Systems for Drilling Wells';

- API RP 54 on 'Recommended Practice for Occupational Safety for Oil and Gas Well Drilling and Servicing Operations';
- API RP 55 on 'Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide';
- API RP 64 on 'Recommended Practices for Diverter Systems Equipment and Operations';
- API RP 68 on 'Recommended Practice for Oil and Gas Well Servicing and Work over Operations Involving Hydrogen Sulfide';
- API RP 500 on 'Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2';
- API RP 505 on 'Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2';
- API 510 on 'API Pressure Vessel Inspection Code: In-Service Inspection, Rating, Repair, and Alteration';
- API RP 1111 on 'Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines'.

Equivalent ISO standards may be used in place of API standards.

For design and operation of subsea production systems following ISO standards should inter alia be followed:

- ISO 13628 - Part 1 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems : General requirements and recommendations'

- ISO 13628 - Part 2 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems : Unbonded flexible pipe systems for subsea and marine applications'
- ISO 13628 - Part 3 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems : Through flowline (TFL) systems'
- ISO 13628- Part 4 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems : Subsea wellhead and tree equipment'
- ISO 13628- Part 5 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems: Subsea umbilicals.'
- ISO 13628- Part 6 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems: Subsea production control systems'
- ISO 13628- Part 7 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems: Completion/workover riser systems'
- ISO 13628- Part 8 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems: Remotely Operated Vehicle (ROV) interfaces on subsea production systems'
- ISO 13628- Part 9 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems: Remotely Operated Tool (ROT) intervention systems'
- ISO 13628- Part 10 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems: Specification for bonded flexible pipe'

- ISO 13628- Part 11 on 'Petroleum and natural gas industries -- Design and operation of subsea production systems: Flexible pipe systems for subsea and marine applications'

Notice to Operators

OISD/OFF/NTO/1-11

7th January, 2011

AA) **Recertification of well control equipment:** Rule 158(2) of the Petroleum and Natural Gas (Safety in Offshore Operations) Rules, 2008 requires that “The blow out preventer with associated valves and other pressure control equipment on the facility shall be subjected to a complete overhaul and shall be recertified at regular intervals based on original equipment manufacturer’s recommendations and international standards and recommended practises”.

In the guidance document issued by OISD it has been further clarified that “Complete overhaul and recertification as mentioned in this sub rule may be carried out periodically and in a manner, which ensures that single components and the whole unit will be overhauled in a rolling five-year period”.

On perusal of the certificates being submitted by operators, in compliance to the above Rule, the following two categories of certificates have been observed:

- i. A certificate issued by manufacturer or their authorized facility, where compliance to both industry standards and OEM’s repair / remanufacture specifications is certified.
- ii. A certificate issued by a facility not having OEM authorization, where only compliance to industry standards is certified.

Please note that Category II certificate as above, is not acceptable.

Well control equipment is a safety critical equipment. In case it is remanufactured / repaired by a facility not having authorization from the original equipment manufacturer, it may have an effect on the reliability of the equipment.

Operators shall ensure that BOP and other well control equipment on offshore rigs is certified / recertified by OEM or OEM authorized facility.

BB) Guidance Note on Rule-30 on ‘**Verification of fitness of offshore installation**’ pertaining to **offshore drilling rig** is available on OISD Website ‘www.oisd.gov.in’. It may please be complied with.




ISD's Commitment:
NIL ACCIDENT
 in hydrocarbon sector



OISD (Oil Industry Safety Directorate), established in 1986, is a technical directorate under the Ministry of Petroleum and Natural Gas; formulates and coordinates the implementation of a series of self regulatory measures aimed at enhancing the safety in the oil & gas industry in India.