

GUIDELINES REGARDING THE TECHNICAL AND OPERATIONAL REGULATIONS

(Last updated 18 December 2024)

Norwegian Ocean Industry Authority

Norwegian Directorate of Health

Norwegian Food Safety Authority

Guidelines regarding the technical and operational regulations

CHAPTER I INTRODUCTORY PROVISIONS.....	6
Re Section 1 Scope.....	6
Re Section 2 Responsibilities	6
Re Section 3 Definitions.....	6
Re Section 4 Regulations stipulated by other authorities	7
CHAPTER II GENERAL PROVISIONS FOR DESIGNING ONSHORE FACILITIES.....	8
Re Section 5 Choice of development concept	8
Re Section 6 Design of onshore facilities	8
Re Section 7 Installations, systems and equipment	9
Re Section 8 Structures and materials.....	9
Re Section 9 Qualification and use of new technology and new methods	10
Re Section 10 Safety functions	10
Re Section 10a Ignition source control	10
CHAPTER III DESIGN OF AREAS, INSTALLATIONS, SYSTEMS AND EQUIPMENT.....	11
Re Section 11 Materials handling and transport routes, access and evacuation routes.....	11
Re Section 12 Lifting appliances, lifting gear and equipment for personnel transport	11
Re Section 13 Safety signs	11
Re Section 14 Pipeline systems.....	11
Re Section 15 Electrical installations	12
Re Section 16 Drainage systems	12
Re Section 17 Exhaust ducts	12
Re Section 18 Accommodation.....	12
Re Section 19 Ventilation and indoor climate	13
Re Section 20 Chemicals and chemical exposure	13
Re Section 21 Human-machine interface and information presentation.....	13
Re Section 22 Communication systems and equipment	14
CHAPTER IV WORKING ENVIRONMENT FACTORS IN THE DESIGN OF ONSHORE FACILITIES	14
Re Section 23 Ergonomic design.....	14
Re Section 24 Outdoor work areas	14

Re Section 25 Noise and acoustics	14
Re Section 26 Vibrations	15
Re Section 27 Lighting	15
Re Section 28 Radiation	15
CHAPTER V FIRE AND EXPLOSION PROTECTION IN THE DESIGN OF ONSHORE FACILITIES	15
Re Section 29 Hazardous materials and explosives	15
Re Section 30 Passive fire protection	15
Re Section 31 Fire divisions	16
Re Section 32 Fire and gas detection system	16
Re Section 33 Emergency shutdown system	16
Re Section 33a Control and monitoring system	17
Re Section 34 Process safety systems	17
Re Section 35 Depressurisation and flare system	17
Re Section 36 Firewater supply	18
Re Section 37 Fire-fighting equipment and systems for fire-fighting	18
Re Section 38 Emergency power and emergency lighting	19
CHAPTER VI GENERAL PROVISIONS FOR CONDUCTING ACTIVITIES	19
Re Section 39 Installation and commissioning	19
Re Section 40 Start-up and operation of onshore facilities	19
Re Section 41 Use of onshore facilities	19
Re Section 42 Safety systems	19
Re Section 43 Critical activities	20
Re Section 44 Simultaneous activities	20
Re Section 45 Procedures	20
Re Section 46 Organisation of work	21
Re Section 47 Psychosocial aspects	21
Re Section 48 Physical and chemical working environment	22
Re Section 49 Occupational health service	22
CHAPTER VII COMPETENCE AND INFORMATION FOR CONDUCTING ACTIVITIES	23
Re Section 50 Competence	23
Re Section 51 Training in safety and working environment	23
Re Section 52 Practice and exercises	24

Re Section 53 Risk information during execution of work.....	24
Re Section 54 Transfer of information at shift and crew changes	24
CHAPTER VIII PLANNING, OPERATION AND CONTROL DURING ACTIVITIES	24
Re Section 55 Planning	24
Re Section 56 Safety clearance of activities.....	24
Re Section 57 Monitoring and control.....	25
Re Section 58 Maintenance	25
Re Section 59 Classification	25
Re Section 59a Maintenance programme	25
Re Section 59b Planning and prioritisation	26
Re Section 59c Maintenance effectiveness	26
Re Section 60 Work on and operation of electrical installations.....	26
Re Section 61 Transport of hazardous goods	26
Re Section 62 Lifting operations	27
Re Section 63 Diving operations	27
CHAPTER IX EMERGENCY PREPAREDNESS	27
Re Section 64 Establishment of emergency preparedness.....	27
Re Section 65 Emergency preparedness organisation.....	27
Re Section 66 Emergency preparedness plans	28
Re Section 67 Handling of hazard and accident situations.....	28
CHAPTER X HEALTH-RELATED MATTERS.....	29
Re Section 68 Health-related matters.....	29
CHAPTER XI CONCLUDING PROVISIONS.....	31
Re Section 69 Supervision, decisions, enforcement, etc.	31
Re Section 70 Entry into force	32
REFERENCE LIST	33

CHAPTER I

Introductory provisions

Re Section 1

Scope

These regulations have a limited scope in relation to the Framework Regulations. The regulations are limited to apply to activities at onshore facilities, and they do not regulate the Norwegian Environment Agency's area of responsibility. As regards health related matters, the regulations apply to onshore facilities covered by the Petroleum Act, cf. Section 2 and Section 16, third subsection of the Framework Regulations.

Regulations laid down by the Ministry of Labour 6 December 2011, pursuant to the Working Environment Act, and entering into force 1 January 2013 apply directly to the petroleum activities, with the specifications and limitations given in the individual regulations. The requirements of these regulations must be complied with as an integrated part of the comprehensive regulations for the petroleum activities, relating to health, safety and the environment. In addition, reference is made to the lawmirror (in Norwegian only) of the Norwegian Labour Inspection Authority, in which the requirement of the regulations that are being repealed upon entering into force of the new regulations in pursuance of the Working Environment Act, are included.

These regulations Section 4 exempts certain regulations stipulated by the Directorate for Civil Protection and Emergency Planning (DSB) from applying on the Norwegian Ocean Industry Authority's area of responsibility. This typically regards regulations that govern "the core activities" of the petroleum activities, and which therefore are regulated specifically in the petroleum regulations. This ensures that the industry is subject to a regulation that is as comprehensive as possible.

DSB and the Norwegian Labour Inspection Authority have prepared several guidelines for their regulations, which, in addition to these guidelines, can also be used as a basis for understanding and fulfilment of requirements in the Technical and Operational Regulations, unless the guidelines belong to regulations that are exempt for the petroleum activities. In particular, this is of significance for the part of the industry that carries out services across the various areas of authority.

Re Section 2

Responsibilities

No comments.

Re Section 3

Definitions

Definitions and abbreviated forms that follow from the Framework Regulations are not repeated in these guidelines. These guidelines clarify or provide supplementary information for definitions as mentioned in this section.

Main areas can be

- a) process area
- b) auxiliary plant
- c) tank area
- d) pipe trenches
- e) flares

- f) control rooms
- g) manned buildings in general (workshop, laboratory, fire station, administration buildings)
- h) unmanned buildings (substations, analyser buildings, warehouses)
- i) quays
- j) vehicle loading/offloading areas
- k) parking lots
- l) temporary office buildings, containers, etc.

Safety functions can be

- a) process sectioning,
- b) fire detection,
- c) gas detection,
- d) ignition source disconnection,
- e) maintaining overpressure in unclassified rooms,
- f) starting and stopping fire pumps, both manually and automatically,
- g) active fire-fighting
- h) active smoke control,
- i) securing processes,
- j) depressurisation,
- k) general alarm and evacuation alarm,
- l) production and distribution of emergency power,
- m) emergency lighting.

Re Section 4 **Regulations stipulated by other authorities**

Regulations listed in Section 4 are exempt and replaced by special rules through these regulations. However, some of these regulations are referenced as standards in these guidelines. An overview of key HSE regulations and their application in the scope of these regulations, can be found in the reference list. Reference is also made to Section 24 of the Framework Regulations.

The Planning and Building Act and technical requirements defined pursuant thereto also apply to the scope of the regulations. See the Regulations on technical requirements for construction works and guidelines, <https://dibk.no/regelverk/byggteknisk-forskrift-tek17/>, which also set out recognised norms for fulfilment of the requirements in the regulations. For the assessment of structures at existing onshore facilities, see Section 70.

CHAPTER II

General provisions for designing onshore facilities

Re Section 5

Choice of development concept

When choosing a development concept, the following should be considered:

- litera a: important contributors to risk, cf. Sections 4 and 17 of the Management Regulations,
- litera b: organisation, manning, maintenance, transport solutions, working environment, manned underwater operations, if applicable,
- litera c: infrastructure, neighbour relations, agriculture, aquaculture and shipping lanes,
- litera d: topography conditions, ground conditions, weather conditions, harbour conditions, vegetation, ground water level,
- litera e: delivery commitments and finances,
- litera f: flexibility and expected changed operating conditions, as well as future use,
- litera g: removal and reuse.

The need for qualification of new technology, cf. Section 9, should also be considered.

Re Section 6

Design of onshore facilities

For general risk reduction requirements, see Section 11 of the Framework Regulations, and Chapters II and V of the Management Regulations.

As regards design of work sites and workplaces, reference is made to relevant provisions in regulations pursuant to the Working Environment Act, laid down 6 December 2011. In addition, reference is made to the lawmirror (in Norwegian only) of the Norwegian Labour Inspection Authority, in which the requirement of the regulations that are being repealed upon entering into force of the new regulations in pursuance of the Working Environment Act, are included.

To fulfil the requirements related to design as mentioned in the first subsection, the facility should be designed such that the likelihood and consequences of accidents are reduced by having areas, equipment and functions arranged, located and oriented such that, to the extent possible,

- a) the possibility of collection and spread of hazardous substances is limited,
- b) the likelihood of ignition is limited,
- c) areas that contain hazardous substances are separated from each other and from other areas, and
- d) consequences and escalation of fires and explosions are reduced.

The facility should be divided into main areas according to their function, and should use distance to separate high risk areas from areas with low risk, as well as the personnel's regular work sites.

Risk analyses as mentioned in Chapter V of the Management Regulations and land-use plans as mentioned in the second subsection, should be used as a basis for placement and design of equipment and installations, and establishment of area restrictions surrounding onshore facilities.

As regards pipeline systems, the land-use plan should show the route, placement of buildings and facilities that are part of the system, transport concepts for both the construction and operations phases and any other area interventions.

In order to fulfil the requirement for a strategy as mentioned in the second subsection, the NS-EN ISO 13702 standard, Chapter 5 should be used.

The requirement for measures as mentioned in the last subsection, can be fulfilled using both technical and operational measures.

As regards classification of explosive areas, IEC 60079-10-1 and IP 15 should be used.

Re Section 7

Installations, systems and equipment

Reference is made to the NS-ISO 11064 standard as regards human errors.

As regards marking requirements as mentioned in the second subsection, reference is made to Section 11 of the Regulations relating to handling of hazardous substances (in Norwegian only), with the following addition: main components of the facilities should be marked with function, and pipe installations should be marked with relevant content and direction of flow.

In cavern installations where the ground water level ensures a barrier against leakage of stored substances, the ground water level above the cavern should correspond to the substance's vapour pressure at the storage temperature plus a 20-metre water column as security against structural defects in the rock.

For design of quays, reference is made to relevant provisions in regulations pursuant to the Working Environment Act, laid down 6 December 2011. In addition, reference is made to the lawmirror (in Norwegian only) of the Norwegian Labour Inspection Authority, in which the requirement of the regulations that are being repealed upon entering into force of the new regulations in pursuance of the Working Environment Act, are included.

Re Section 8

Structures and materials

To fulfil the requirement in litera c the NORSOK M-004 standard can be used as a basis.

When selecting materials with regard to technical fire qualities as mentioned in litera d, non-flammable materials should be chosen. In those cases where flammable materials are nevertheless used, such materials should have limited ability to spread flames, develop little smoke and heat and have a low level of toxicity. In areas for accommodation, electrical installations should be made from halogen-free materials. 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.

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

The Planning and Building Act and technical requirements defined pursuant thereto also apply to the scope of the regulations. See the Regulations on technical requirements for construction works and guidelines, <https://dibk.no/regelverk/byggteknisk-forskrift-tek17/>, which also set out recognised norms for fulfilment of the requirements in the regulations. For the assessment of structures at existing onshore facilities, see Section 70.

Re Section 9
Qualification and use of new technology and new methods

New technology as mentioned in the first subsection, can be new products, analyses tools or known products used in a new way.

Qualification as mentioned in the second subsection, includes investigation and provision of objective evidence that the needs are satisfied with respect to a specific, intended use, cf. Section 21 of the Management Regulations.

The methodology, the procedures and the equipment that will be used in the qualification, should also be used in the further work.

Re Section 10
Safety functions

Safety functions are defined in Section 3.

As regards the choice and design of safety functions as mentioned in the first subsection, the NS-EN ISO 13702 standard should be used. To stipulate the performance for instrumented safety functions as mentioned in the second subsection, the IEC 61508 and 61511 standards should be used.

The safety functions as mentioned in the first subsection, form part of the barriers against accident and hazard situations as mentioned in Sections 4 and 5 of the Management Regulations.

To ensure that the safety functions are always able to safeguard their functions as mentioned in the first subsection, they should be designed such that they can be tested and maintained without impairing the functions' performance. As regards disconnection of safety functions, see Section 42 of these regulations.

Re Section 10a
Ignition source control

For the systematic mapping of potential electrical and non-electric sources of ignition as mentioned in the first subsection, the EN 1127-1 standard should be used.

NEK 420A should be used for electrical equipment. For non-electrical equipment, the ISO 80079-36 standard should be used.

Equipment and safety systems shall fulfil the requirements in the Regulations relating to equipment and safety systems for use in explosive areas.

Equipment that represents a potential ignition source in naturally ventilated areas, should deactivate automatically on gas detection anywhere on the facility, unless this implies increased risk. In such cases, the alarm shall be sounded and it must be possible to deactivate manually from a central or strategic location. Equipment placed in protective rooms, should deactivate automatically on gas detection in the room, with the added possibility of manual deactivation.

CHAPTER III

Design of areas, installations, systems and equipment

Re Section 11

Materials handling and transport routes, access and evacuation routes

Stairs, doors and hatches, etc. are also included in the terms access, transport and escape routes.

When designing for handling of materials and personnel traffic as mentioned in the first subsection, account should be taken, inter alia, of the following:

- 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.

The various work sites should be designed so that they can be serviced and maintained without the use of temporary equipment such as scaffolding, ladders, etc. As a permanent solution, stepladders should be selected in favour of vertical ladders.

Escape routes as mentioned in the third subsection, should have a satisfactory guiding system.

The NORSOK R-002 standard Appendix B should be used for material handling facilitation.

As regards design of scaffolding and ladders, Chapter 4 of the Regulations concerning the construction, design and production of work equipment and chemicals (Producer regulations) (in Norwegian only) should be used.

Re Section 12

Lifting appliances, lifting gear and equipment for personnel transport

In order to fulfil requirements to design, the NORSOK R-002 standard should be used.

Re Section 13

Safety signs

No comments.

Re Section 14

Pipeline systems

As regards the design of pipeline systems, ISO 13623 and DNV-ST-F101 Appendix F should be used, with the following addition: The pipeline system should be laid and designed such that the risk of fire, explosion and other unintended incidents is minimised, and such that the surroundings are affected as little as possible. Distances between pipelines, associated equipment and the surroundings shall be evaluated based on the content's properties, temperature and pressure. The distanced should be dimensioned based on the risk of undesirable incidents such as fire, explosion or spread as a result of emissions/discharges.

The pipeline system should be marked such that its location in the terrain is clearly visible. The parts of the pipeline system that are not covered should be secured so that they are not accessible to unauthorised personnel.

The pressure in the chambers as mentioned in the second subsection, should be possible to read both before start-up and during operation.

For general requirements related to design, see Sections 6, 7, 8 and 20.

Re Section 15 **Electrical installations**

Operating modes as mentioned in the first subsection, should be stated in the facility-specific operation and maintenance strategy.

Protection against health hazard as a result of electromagnetic fields as mentioned in litera k, is regulated separately in Section 52 of the Radiation Protection Regulations (in Norwegian only).

As regards design of electrical installations and electrical equipment, reference is made to the following regulations:

- a) Regulations relating to low voltage electrical installations (in Norwegian only),
- b) Regulations relating to maritime electrical installations (in Norwegian only), and
- c) Regulations relating to electrical equipment (in Norwegian only).

In addition, the Regulations relating to electrical supply installations (in Norwegian only) and standards designated in NEK 400 Electrical low voltage installations, NEK 420 Electrical installations in explosive areas with gas and dust and NEK 440 Station facilities exceeding 1 kV should be used.

Re Section 16 **Drainage systems**

The requirement for drainage systems entails e.g.

- a) that, in addition to handling of the actual fuel leak, there is sufficient capacity to drain water that gathers in the installation during precipitation and during fire-fighting,
- b) that any oily surface water is cleaned out before discharge,
- c) that the collection system has a shutdown device,
- d) that tank drain valves are located and sheltered such that they can be operated in the event of fire,
- e) that drainage, including the drainage system, is carried out such that it is not obstructed by the formation of ice, foreign bodies, etc., and
- f) that the bottom of the collection system slopes towards the drainage opening.

Re Section 17 **Exhaust ducts**

Exhaust ducts should be designed such that the exhaust gases are routed to unclassified areas.

Re Section 18 **Accommodation**

The capacity requirement as mentioned in the second subsection, means that the living quarters are dimensioned with sufficient margins to avoid bed scarcity during peak manning. The accommodation should be designed such that personnel can sleep undisturbed and be assured of satisfactory restitution.

Particular attention should be given to prudent hygienic standards in bedrooms, dayrooms and areas where food is stored, prepared and served, cf. also the Guidelines regarding Section 68.

Reference is also made to the Regulations relating to environmental health protection (in Norwegian only).

Re Section 19 **Ventilation and indoor climate**

To fulfil the requirement for **ventilation** as mentioned in the first subsection, the NS A ISO 15138 standard together with the IEC 60079-10-1 and IEC 60079-13 standards should be used, with the following addition: when determining the need for air exchange, the danger of accumulation of hazardous and flammable gas and the need for weather protection should all be taken into account, cf. Section 24 of these regulations.

The requirements for **indoor climate** as mentioned in the second subsection, apply to indoor work areas.

The requirements entail that consideration is taken for the fact that the air quality is influenced by building materials and fixtures, personnel, activities and processes, cleaning and maintenance. In order to fulfil these requirements, the following should be used:

- a) the Norwegian Labour Inspection Authority's guidelines regarding climate and air quality at work and
- b) the National Institute for Public Health – recommended technical standards for indoor climate.

Requirements for ventilation and indoor climate shall be seen in the context of Section 20.

Reference is also made to the Regulations relating to environmental health protection (in Norwegian only).

Re Section 20 **Chemicals and chemical exposure**

Under normal operations, the concentration of hazardous materials in the work atmosphere, as well as skin contact with such chemicals, shall be as low as is reasonably possible. This means that onshore facilities should be designed with a safety factor in accordance with Regulations concerning Action and Limit values.

This section covers technical provisions to reduce acute and prolonged chemical influences related to transport, transfer, use and disposal of chemicals. The section also includes processes that produce chemical components.

For use of chemicals, see Section 48 of these regulations.

For design and placement as regards fire and explosion hazard as mentioned in the second subsection, litera c, reference is made to Section 29 of these regulations.

Re Section 21 **Human-machine interface and information presentation**

During design as mentioned in the first subsection, an analysis of the human-machine interface, including necessary task and function analyses, should be carried out. For such analyses, Part 2 of the NS-EN 614 standard should be used.

The NS-EN ISO 11064 standard should be used for design of the central control room.

For the design of alarm systems, refer to Section 33a.

Re Section 22
Communication systems and equipment

In order to fulfil the requirement for communication systems as mentioned in the first subsection,

- a) two-way communication systems or internal radio communication should be used where necessary to communicate important information or to quickly achieve contact with personnel,
- b) speaker systems that can provide notifications to strategic locations on onshore facilities should be used, so that all personnel can be notified regarding hazard and accident situations, see also Section 67. The central control room should be given priority to send messages via the PA system.

Protection as mentioned in the second subsection, means e.g. that the equipment shall be located such that communication is not interrupted.

The requirement for alarm systems as mentioned in the third subsection, entails that the general alarm and evacuation alarm can be activated from the central control room. Alarm systems include both audio and visual signals.

CHAPTER IV
Working environment factors in the design of onshore facilities

Re Section 23
Ergonomic design

As regards ergonomic design, reference is also made to the Norwegian Labour Inspection Authority's guidelines regarding organisation and arrangement of work – guidelines for Sections 4-1 through 4-4 of the Working Environment Act.

To fulfil the requirements for design, the ISO 6385 standard should be used. In addition, there should be

- a) easy and safe access for operation, inspection, reading and maintenance,
- b) possibility to operate outdoor handles, switches, etc. wearing gloves.

As regards monitor workstations, see Sections 21 and 48 of these regulations.

Re Section 24
Outdoor work areas

Risks as mentioned in the second subsection, can include accumulation of flammable gases, hazard of increased explosion pressure and potentially reduced access for fire-fighting.

With regard to new constructions and modifications, weather protection requirements should be specified at an early point in time.

Re Section 25
Noise and acoustics

When planning the design of onshore facilities, it should be taken into account that the use of hearing protection is not an adequate measure to fulfil the noise requirement, cf. Section 48 of these regulations.

The highest permissible noise limit (95 dB(A)) should only be allowed in connection with brief inspections or work tasks that are to be carried out in an area where there is no passage through to other

areas. Provisions should be made for noise-deflection of noisy equipment when maintenance or other work is carried out in the area, cf. Section 46 of these regulations.

Re Section 26 Vibrations

In order to assess the reaction of human beings to low-frequency vibrations, the NS 4931 standard should be used.

Re Section 27 Lighting

Lighting as mentioned in the first subsection, can be artificial lighting, daylight or direct sunlight. The lighting should be especially good and proper in the control room, cabins and other rooms where sight-intensive work takes place, where display screen equipment is used on a regular basis and 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, service and maintenance.

Re Section 28 Radiation

Radiation as mentioned in the first subsection, means ionising and non-ionising radiation.

CHAPTER V Fire and explosion protection in the design of onshore facilities

Re Section 29 Hazardous materials and explosives

To assess and select measures to prevent or reduce the risk of fire and explosion, relevant parts of ISO 13702 (Chapter 8, Annexes A and B, Table C2) and EN 1127-1 should be used.

As regards marking, handling and storage of hazardous substances, the Regulations relating to handling of hazardous substances (in Norwegian only), should be used.

As regards marking and storage of explosives, reference is made to the Regulations relating to explosive substances (in Norwegian only), in particular Sections 2-7, 2-8 and Chapter 7.

Re Section 30 Passive fire protection

As regards stipulation of fire loads as mentioned in the first subsection, see Section 6, litera a.

To determine fire resistance, the test methods in the standards ISO 834, ISO 3008, ISO 3009, NS-EN 13381- parts 4 and 8 should be used. For pool fires, the hydrocarbon curve described in standard NS-EN 1363-2 should be used. To determine the ability of passive fire protection materials to withstand jet fires, the standard ISO 22899-1 Part 1 General requirements should be used. If structures, pipes and equipment can be exposed to fire loads beyond what is covered in the mentioned standards, the ability to withstand this should be documented. In order to determine the material's ability to resist cryogenic emissions, the standard NS-EN ISO 20088 Part 1, 2 and 3 should be used.

Adequate fire resistance as mentioned in the first subsection, should be stipulated in relation to recognised standards or calculation models. When stipulating fire resistance for load-bearing structures, varying material utilisation can be taken into account.

As regards gas and liquid-filled vessels and pipe sections, the passive fire protection should be sufficient to prevent an unacceptable rupture.

Re Section 31

Fire divisions

Fire divisions with coated or sprayed-on fire protection material that does not fulfil the requirements for incombustibility, can be used if an overall assessment indicates that this is prudent from a safety point of view, cf. Section 8.

Examples of penetrations in fire divisions as mentioned in the third subsection, can include ventilation ducts, pipes, cables and beams, as well as windows and doors.

Re Section 32

Fire and gas detection system

As regards the design of the system as mentioned in the first subsection, Chapter 11 of the NS-EN ISO 13702 standard as well as Attachment B.6 should be used.

The requirement for independence as mentioned in the first subsection, implies that the fire and gas detection system comes in addition to systems for management and control and other safety systems. The fire and gas detection system can have an interface with other systems as long as it cannot be adversely affected as a consequence of system failures, failures or individual incidents in these systems.

The requirement regarding limiting the consequences as mentioned in the second subsection, entails that relevant safety functions shall be activated.

Re Section 33

Emergency shutdown system

As regards the design of the emergency shutdown system, Chapters 7 and 8 of the NS-EN ISO 13702 standard, as well as Attachments B.2 and B.3 should be used.

The requirement for independence as mentioned in the first subsection, implies that the fire and gas detection system comes in addition to systems for management and control and other safety systems. The emergency shutdown system can interface vis-à-vis other systems if it cannot be adversely affected as a consequence of system failures, failures or individual incidents in these systems.

An unambiguous command structure as mentioned in the second subsection, means that the flow of signals and command hierarchy is clearly stated. The requirement to be able to activate functions manually in the event of failure in the programmable parts of the system, implies that the activation of the functions shall be functionally designed and physically different from the programmable parts of the system.

The requirement for shutdown and isolation as mentioned in the third subsection, entails that sectioning valves in the process facility and isolation valves towards pipeline systems shall normally be emergency shutdown valves.

The number and placing of sectioning valves in the processing plant should be determined on the basis of the fire and explosion strategy, cf. Section 6.

The emergency shutdown system should be verified in accordance with the safety integrity levels set based on the IEC 61508 and 61511 standards. As regards facilities that are not covered by this standard, the

operability 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 situations where the function is triggered or put to use, can replace testing of the installation or the equipment.

Re Section 33a

Control and monitoring system

Control and monitoring systems may be interfaced with other systems, but it should be ensured that this does not weaken the system. In addition, Norwegian Oil and Gas' Guideline No. 104 should be used as a basis for protecting against ICT-related hazards.

Alarms should be defined and designed such that

- a) the alarms that are presented are relevant, easy to register and understand, and clearly show where any nonconformities and hazardous situations have arisen,
- b) the alarms are coded, categorised and assigned priority based on the safety significance of the alarms and how quickly measures must be taken to avoid undesirable consequences,
- c) the alarm systems allow for suppressing and reducing alarms, so as to avoid mental stress for control room personnel during interruptions in operations and accident incidents.

With regard to the design of the alarm systems, standards EN 62682 and EEMUA 191 should be used. The performance requirements of EEMUA 191 Chapter 6 and EN 62682 Chapter 16.5 should be adapted to the specific facility.

Re Section 34

Process safety systems

The requirement for independence as mentioned in the first subsection, implies that the fire and gas detection system comes in addition to systems for management and control and other safety systems. The process safety system can interface with other systems if it is not adversely affected as a consequence of system failures, failures or individual incidents in these systems.

Process safety functions should be identified and implemented using a systematic approach based on an established risk-based methodology.

The requirement for two independent safety levels as mentioned in the third subsection, implies that the process safety levels shall be protected against dependent failures, so that a single failure does not lead to the failure of both safety levels. For example, the overpressure protection should consist of two independent protection levels, of which one is normally a safety valve (PSV).

The overpressure protection should be designed in accordance with the API Standard 520/NS-EN ISO 4126 and the API Standard 521.

As regards instrumented/electronic safety functions, the IEC 61508 and 61511 standards should be used.

Re Section 35

Depressurisation and flare system

The requirement for a depressurisation and flare system as mentioned in the first subsection, entails that non-flammable or hazardous gases shall be directed to a safe emission location, and that any heat load shall be calculated.

To fulfil the requirement for depressurisation and flare systems as mentioned in the first subsection, Chapter 7 of the NS-EN ISO 13702 standard as well as Attachment B.2, and the API Standard 521 should be used, with the following additions:

- a) fire protection,
- b) when designing depressurisation and flare systems, external environment considerations should be safeguarded by preferably flaring flammable, toxic or corrosive gases.

In addition to manual activation as mentioned in the second subsection, activation signals can also come from relevant safety systems such as the emergency shutdown system.

Re Section 36 Firewater supply

Sufficient firewater supply as mentioned in the first subsection, means the quantity necessary to supply all fire-fighting equipment in the onshore facility's largest fire area with one fire pump out of operation and necessary additional capacity to ensure that the fire does not spread to other adjacent areas in accordance with the chosen strategy.

To fulfil the requirements in the second, third and fourth subsections, Chapter 12 of the NS-EN ISO 13702 standard, as well as Attachment B.8, should be used.

In cases where firewater is supplied from fire pumps, the pumps should start automatically in the event of a pressure drop in the fire main and upon confirmed fire detection.

Re Section 37 Fire-fighting equipment and systems for fire-fighting

To fulfil the requirement for fixed fire-fighting installations as mentioned in the first subsection, Chapter 12 of the NS-EN ISO 13702 standard as well as Attachment B.8, should be used, with the following additions:

- a) The risk represented by other potential fires should be reduced to the extent possible,
- b) CO₂ as an extinguishant should not be used in rooms where personnel can be present,
- c) in areas where strong winds can occur, this should be taken into account when placing nozzles and in relation to the need for increased capacity,
- d) water mist systems can be installed if realistic tests have been carried out showing that the system fulfils its planned function,
- e) as regards fire-fighting in engine rooms for diesel engines, particular consideration should be given to pumps and pipes in the fuel unit, and separate spot protection should be installed, if applicable,
- f) in the event of equal fire solutions, the one that utilises the least environmentally harmful extinguishant, should be selected, cf. Section 3a of the Product Control Act (in Norwegian only).

To fulfil the requirements for manual fire-fighting and fire-fighter equipment as mentioned in the second subsection, Attachment B.8.12 to standard NS-EN ISO 13702 should be used.

Re Section 38
Emergency power and emergency lighting

To fulfil the requirement for emergency power, Chapter 10 of the NS-EN ISO 13702 standard, as well as Attachment C.1, should be used. For lifting equipment, the NORSOK R-002 standard chapter 5.15 should be used.

For design of emergency lighting as mentioned in the last paragraph, the EN 1838 standard should be used. There should be emergency lighting in those areas where personnel can be located in an accident and hazard situation. The emergency lighting should contribute to ensure evacuation, and indicate the location of manual fire-fighting equipment and other safety equipment. The emergency lighting should be connected to the emergency power system or have its own battery power source.

CHAPTER VI
General provisions for conducting activities

Re Section 39
Installation and commissioning

Commissioning as mentioned in the second subsection entails e.g. that safety systems shall be function tested and verified. In order to fulfil the requirement, the NORSOK R-005 standard Annex H should be used for lifting equipment.

Re Section 40
Start-up and operation of onshore facilities

The operational organisation as mentioned in the second subsection, litera a, also means the emergency preparedness organisation.

Governing documents as mentioned in the second subsection, litera b, also mean the guidelines, procedures, plans and programmes that are prepared according to these regulations and the Management Regulations.

Re Section 41
Use of onshore facilities

Limitations for use as mentioned in the first subsection can ensue from the loads that the facility and its individual parts shall be able to withstand, cf. Section 11 of the Facilities Regulations. The loads can include chemical loads, environmental loads such as wind and temperature and functional loads such as pressure, weight, temperature and vibration.

Status as mentioned in the second subsection means, inter alia, the backlog of preventive maintenance and the outstanding corrective maintenance.

Re Section 42
Safety systems

The requirement in the first subsection entails that the measures and restrictions shall result in a risk reduction that is relevant and relates to barrier functions concerned. This may be a question of restrictions on activities, full shutdown or other risk-reducing measures.

In order to fulfil the requirements for measures and restrictions as mentioned in the first subsection, the standards IEC 61508-1 Chapter 7.7 and IEC 61508-2 Chapter 7.6 should be used for electrical, electronic and programmable electronic safety systems.

Statuses of active safety system functions, cf. the second subsection, shall be available in the central control room, cf. Section 10.

Re Section 43 **Critical activities**

Critical activities can be

- a) work on pressurised, electrified or hydrocarbon service systems,
- b) hot work,
- c) work with explosives or substances that can self-ignite,
- d) work on radioactive sources,
- e) work that entails risk of acute pollution,
- f) work that entails disconnection of safety systems,
- g) lifting operations, cf. Section 62.

When identifying important contributors to risk, one should, inter alia, use the results from the risk analyses performed and experience from hazard and accident situations.

The limitations can be requirements for implementing compensatory measures in connection with executing an activity, or duration or frequency limitations for executing a special type of activity.

Re Section 44 **Simultaneous activities**

Activities as mentioned in the second subsection can be production, maintenance and modification activities, including activities as mentioned in Section 43.

Measures as mentioned in the second subsection can be limitations or prohibitions that are to be implemented in connection with certain types of simultaneous activities during start-up, operation and shutdown.

In connection with executing activities as mentioned in the second subsection, the effect of mutual dependence between different activities should, inter alia, be taken into account.

Re Section 45 **Procedures**

Procedure as mentioned in the first subsection means a specified way of conducting an activity or a process.

The formulation of procedures as mentioned in the second subsection, 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 use to check design and contents with regard to the intended functions.

Re Section 46

Organisation of work

As regards organisation of work, reference is also made to the Norwegian Labour Inspection Authority's guidelines regarding organisation and arrangement of work – guidelines for Sections 4-1 through 4-4 of the Working Environment Act.

The organisation as mentioned in the first subsection, should, inter alia, take into account the need for individual adaptation, including work capacity and age. Cf. also Section 21 and Chapters II and III of these regulations, and Sections 18 and 19 of the Management Regulations.

Hazardous exposure and unfortunate loads as mentioned in first subsection, mean exposure and loads that result from ergonomic conditions, chemical influences, radiation, noise, vibrations, climatic conditions and psychosocial conditions.

To avoid hazardous exposure as mentioned in the first subsection, measures or solutions should be selected at the highest of these levels:

- a) elimination of the causes of the exposure,
- b) technical measures that reduce the likelihood of exposure,
- c) technical measures that reduce exposure,
- d) operational measures that reduce exposure.

Organisation as mentioned in the first and second subsections, should be a continuous process where both employer and the employees attempt to improve the working environment, cf. also Section 23 of the Management Regulations.

Organisation of work should be based on accessible knowledge of the characteristics and needs of humans, so that the interaction between people, technology and organisation is optimised, cf. Section 13 of the Management Regulations. The ISO 6385 standard should be used in such organisation.

As regards work above ground, Chapter 17 in Regulations relating to conduct of work (in Norwegian only) should be used.

As regards work in tanks, reference is made to relevant provisions in regulations pursuant to the Working Environment Act, laid down 6 December 2011. In addition, reference is made to the lawmirror (in Norwegian only) of the Norwegian Labour Inspection Authority, in which the requirement of the regulations that are being repealed upon entering into force of the new regulations in pursuance of the Working Environment Act, are included.

Re Section 47

Psychosocial aspects

Aspects as mentioned in the first sentence, can be

- a) requirements relating to efficiency and workload in relation to the resources available for conducting the work tasks,
- b) the work's complexity in relation to competence and resources,
- c) opportunities for variation and stimulation in the job,
- d) opportunities for independence and influencing important decisions,
- e) opportunities for career development and utilisation of own competence,

- f) climate of cooperation, handling of disagreements, conflicts and harassment,
- g) work management, including feedback and follow-up in the daily work,
- h) night work and working alone.

In order to fulfil the requirement for a good psychosocial working environment, the standard ISO 45003 may be used.

Re Section 48 **Physical and chemical working environment**

In addition, the Norwegian Labour Inspection Authority's

- a) Orientation relating to production and use of polyurethane products (isocyanates),
- b) Guidelines regarding organisation and arrangement of work – guidelines for Sections 4-1 through 4-4 of the Working Environment Act, and
- c) Regulations relating to conduct of work chapter 5 on hot work (in Norwegian only), should be used.

Radiation as mentioned in fourth subsection, means ionising and non-ionising radiation. Handling also means handling during hazard and accident situations.

The Norwegian Radiation and Nuclear Safety Authority's Regulations relating to radiation protection and use of radiation (Radiation protection regulations) (in Norwegian only) also apply to the petroleum activities. To fulfil the requirement for avoiding exposure, the Norwegian Radiation and Nuclear Safety Authority's

- a) Guideline 1 relating to industrial radiography, and
- b) Guideline 9 relating to industrial control sources in fixed installations as well as use of radiation for research purposes,

should be used in addition.

Criteria as mentioned in the sixth subsection, should reflect the overall exposure, e.g. for temperature, wind and precipitation.

Evaluation of the physical and chemical working environment factors should be part of the safety-related clearance of the activities, cf. Section 56 of these regulations.

Re Section 49 **Occupational health service**

Reference is made to Section 3-3 of the Working Environment Act as regards occupational health service. The occupational health service shall be approved by the Norwegian Labour Inspection Authority and shall have a free and independent position in working environment matters, cf. Section 3-3, first and third subsections of the Working Environment Act.

In addition, the employer's use of the occupational health service is regulated by relevant provisions in regulations pursuant to the Working Environment Act, laid down 6 December 2011. In addition, reference is made to the lawmirror (in Norwegian only) of the Norwegian Labour Inspection Authority, in which the requirement of the regulations that are being repealed upon entering into force of the new regulations in pursuance of the Working Environment Act, are included.

In order to fulfil the requirement for cooperation as mentioned in the second subsection, the operator or the party responsible for the operation of a facility, shall enter into agreements with the principal

undertaking and the employers of the contractor employees regarding distribution of the working environment tasks carried out by the occupational health service at the onshore facility.

CHAPTER VII

Competence and information for conducting activities

Re Section 50

Competence

There are also requirements to qualifications and training in the field of working environment in Regulations relating to conduct of work (in Norwegian only). They relate to

- a) work with chemicals, cf. those regulations chapter 3,
- b) work with asbestos, cf. those regulations chapter 4, with the exception of section 4-4,
- c) work involving risk of being exposed to biological factors, cf. those regulations chapter 6,
- d) work with work equipment that requires additional carefulness, cf. those regulations chapter 10,
- e) maintenance of work equipment, cf. those regulations chapter 12,
- f) work involving risk of being exposed to health detrimental noise or mechanical vibrations, cf. those regulations chapter 14,
- g) work involving risk of being exposed to artificial optic radiation, cf. those regulations chapter 16,
- h) safety signs and signalling, cf. those regulations chapter 22,
- i) work imposing ergonomic strain, cf. those regulations chapter 23.

In order to fulfil the requirement for competence in the area of health, safety and working environment, Appendix B to the NORSOK R-005 standard should be used for lifting operations. 105 – Norwegian Oil and Gas Association's Recommended guidelines for scaffolding building should be used for work with or on scaffolding. The NS 9600 standard should be used for rope access, except for requirements for certification of businesses and personnel. For material handling and lifting operations, the training plans are published on the Labour Inspection Authority's and the Norwegian Ocean Industry Authority's web pages.

The requirement relating to ensuring competence implies, inter alia, that requirements are set for the necessary competence, that the competence is verified, and that it is maintained through practice, exercises, training and education.

For special requirements to qualifications for work related to electrical installations and electrical equipment, refer to Section 60 of these regulations.

Re Section 51

Training in safety and working environment

The training as mentioned in the first subsection, should include aspects that are of significance to the overall workload of the individual, cf. Section 46 of these regulations.

In order to fulfil the requirement for radiation protection training as mentioned in the second subsection, the Norwegian Radiation and Nuclear Safety Authority's training requirements should be used.

As regards requirements for training of safety delegates and members of working environment committees, reference is made to relevant provisions in regulations pursuant to the Working Environment Act, laid down 6 December 2011. In addition, reference is made to the lawmirror (in Norwegian only) of the Norwegian Labour Inspection Authority, in which the requirement of the regulations that are being repealed upon entering into force of the new regulations in pursuance of the Working Environment Act, are included.

Requirements for training are also set for industrial safety personnel, cf. the Guidelines regarding the Regulations relating to self-protection measures at industrial companies. There, minimum requirements are set for training, but this does not exempt the business from its obligation to carry out additional training measures if risk and emergency preparedness analyses show a need beyond the minimum requirements, e.g. to enable the industrial safety organisation to handle special situations that can occur in the company.

Re Section 52

Practice and exercises

As regards the areas of emergency preparedness covered by the Norwegian Industrial Safety and Security Organisation's provisions and guidelines for industrial safety organisations, reference is made to these for practice and exercises.

Re Section 53

Risk information during execution of work

No comments.

Re Section 54

Transfer of information at shift and crew changes

Shift and crew change means daily shift changes and replacement of personnel at the end of the period of work and stay at the onshore facility, both for operator and contractor employees.

Re Section 54a

Communication

In order to safeguard the communication mentioned in the first subsection, it should be possible to, inter alia:

- a) disseminate important information to personnel at the onshore facility during operation and in hazard and accident situations,
- b) disseminate important information between personnel at the control centre, and personnel linked to the operation and maintenance of process facilities and lifting operations,
- c) establish and maintain direct and continuous communication between the communications operator, facility management and internal and external emergency preparedness resources in hazard and accident situations.

Communications manager as mentioned in the second subsection means a person who has special responsibility for ensuring that the use of the communication systems is professionally appropriate at all times.

CHAPTER VIII

Planning, operation and control during activities

Re Section 55

Planning

No comments.

Re Section 56

Safety clearance of activities

In order to fulfil the safety clearance requirement, a work permit system should be used.

When activities are cleared in accordance with this section, a job safety analysis should be conducted when sub-activities are not covered by procedures, the procedures can conflict with each other, or the activities are new to the personnel involved.

Re Section 57

Monitoring and control

Conditions as mentioned in the first subsection, can be conditions and parameters as mentioned in Section 33, final subsection, of the Facilities Regulations, the status of other safety systems, ongoing activities and implemented compensatory measures.

The requirement relating to continuous monitoring as mentioned in the first subsection, entails that the personnel shall not be assigned tasks that can impair their handling of the control and monitoring functions, cf. also Section 21 of the Facilities Regulations and Section 18 of the Management Regulations. The requirement also entails that there should be at least two people to safeguard the monitoring and control functions in the central control room.

Re Section 58

Maintenance

Maintenance means the combination of all technical, administrative and managerial actions during the life cycle of an item intended to retain it in, or restore it to, a state in which it can perform the required function, cf. definition 2.1 (with associated terminology) in the NS-EN 13306 standard.

Maintenance includes activities such as monitoring, inspection, testing and repair, and keeping things tidy.

Functions also mean safety functions, cf. Section 3. For these functions, the requirement relating to maintenance entails that performance shall be ensured at all times, cf. Section 10.

Onshore facilities or parts thereof also mean temporary equipment.

All phases also mean periods in which the facility or parts of the facility are temporarily or permanently shut down.

Re Section 59

Classification

To fulfil the classification requirement, the NORSOK Z-008 standard should be used in the area of health, working environment and safety.

Fault (cf. functional fault), failure mode, failure cause and failure mechanism as mentioned in this section, are defined in the NS-EN 13306 standard.

Re Section 59a

Maintenance programme

The maintenance programme can consist of sub-programmes for inspection, testing, preventive maintenance, etc., cf. Section 58. The DNV-RP-G109 guideline can be used when establishing inspection programmes for processing facilities and auxiliary systems.

The requirement relating to prevention as mentioned in the first subsection, entails also that the programmes shall be available at start-up, cf. Section 40, second subsection, litera b. When preparing the maintenance programme as mentioned in the first subsection, the NORSOK Z-008 standard, the NS-EN ISO 20815 standard Appendix I and the NEK IEC 60300-3-11 standard can be used in the area of health, working environment and safety.

For activities as mentioned in the second and third subsections, recognized standards should be used in the area of health, working environment and safety that ensure that the required functions of land facilities and parts of these facilities, including temporary equipment, are safeguarded in all phases of the lifetime, cf. Section 58. Functions also mean safety functions. For these functions, the requirement relating to maintenance entails that performance shall be ensured at all times, cf. Section 10.

The area of health, working environment and safety includes safety systems, emergency shut-off systems, structures, preservation, lifting appliances and lifting gear, electrical installations with associated equipment, process systems and auxiliary systems.

The standard NORSOK R-005 Annexes G and H should be used for the maintenance of lifting equipment.

Re Section 59b

Planning and prioritisation

In order to fulfil the requirement relating to time limits as mentioned in the second subsection, the time limits should be calculated from the time when a failure mode is identified as having occurred or is under development.

Re Section 59c

Maintenance effectiveness

Maintenance effectiveness as mentioned in the first subsection, means the ratio between the requirements stipulated for performance and technical condition and the actual results.

The standards NS-EN ISO 14224 and NS-EN ISO 20815, Appendix E, should be used when registering data as mentioned in the first subsection, including failure data and maintenance data.

Re Section 60

Work on and operation of electrical installations

Reference is made to the Regulations relating to low-voltage electrical installations (in Norwegian only). In addition, the Regulations relating to electrical supply installations (in Norwegian only) and the Regulations relating to the operational safety of electrical installations (in Norwegian only), in particular Chapter I, Section 5, Chapter II, Sections 6, 7 and 9 and Chapters III, IV and V, should be used.

To fulfil the work requirements as mentioned in the first subsection for manned underwater operations, IMCA/AODC 035 Code of practice for the safe use of electricity under water should be used.

As regards "the responsible party" as mentioned in the second subsection, reference is made to the Regulations relating to electrical enterprises etc. (in Norwegian only), which contain special provisions regarding parties responsible for operation and maintenance of electrical installations ("those having professional responsibility"), see Sections 5 and 7 in particular. Being the responsible party entails having a particular professional responsibility for ensuring that electrical installations comply with applicable regulations at all times, and for keeping up to date on electrical installations and equipment under planning, construction and commissioning, etc.

The electrical enterprise register as mentioned in Section 3 in Regulations relating to electrical enterprises etc. (in Norwegian only), dispensations as mentioned in Section 5 third subsection, control etc. of qualifications and approval as mentioned in Sections 11 and 12, are administered/handled by the Directorate for Civil Protection and Emergency Planning (DSB), also in case of work related to electrical installations and electrical equipment covered in these regulations.

Re Section 61

Transport of hazardous goods

As regards transport of hazardous goods, reference is made to the Regulations relating to ground transport of hazardous goods (in Norwegian only).

As regards portable pressure equipment for hazardous goods, reference is made to the Regulations relating to portable pressure equipment (in Norwegian only).

Re Section 62

Lifting operations

See also Sections 12 and 41.

In order to fulfil requirements to lifting operations, NORSOK R-005 should be used. See also the Regulations concerning the performance of work, Chapter 18.

The role of operationally responsible entity for materials handling and lifting operations should contribute necessary information for risk assessment before, during and after lifting operations.

Re Section 63

Diving operations

For the performance of bell diving and saturation diving at onshore facilities, NORSOK U-100 should be used.

For the performance of surface-oriented diving at onshore facilities, NORSOK U-103 should be used. In order to fulfil the competence requirement for dive leaders as mentioned in the third paragraph litera b, dive leader candidates with a diving certificate corresponding to Norwegian Ocean Industry Authority class 1 for surface-oriented diving may follow training in accordance with Section 26-13 of the Regulations concerning the performance of work. For requirements regarding the documentation of experience in accordance with NORSOK U-103, see Section 23 of the Framework Regulations.

As regards the use of air bottles for diving and respiratory protective equipment, refer to the relevant provisions in Regulations to the Working Environment Act of 6 December 2011.

In respect of annual health checks of occupational divers as mentioned in the third subsection, litera e, the Norwegian Directorate of Health's "Guidelines for health examinations of occupational divers" should be used.

CHAPTER IX

Emergency preparedness

Re Section 64

Establishment of emergency preparedness

In order to fulfil the strategy requirement as mentioned in the first subsection, Chapter 5 of the NS-EN ISO 13702 standard should be used for health and safety-related emergency preparedness.

The defined hazard and accident situations as mentioned in the first subsection, mean a representative selection of hazard and accident situations used in the dimensioning of the emergency preparedness.

For those emergency preparedness areas covered by Regulations relating to industrial safety (in Norwegian only) also, the requirements in this provision will be fulfilled by use of provisions in the regulations mentioned above.

Re Section 65

Emergency preparedness organisation

Emergency preparedness organisation as mentioned in the first subsection, means the personnel directly associated with the unit resources, area resources, the external resources and the regional resources.

In order to ensure robustness as mentioned in the first subsection, emphasis should be placed on the individual's education and competence, experience, physical suitability, personal qualities and experience from drills and training when selecting personnel.

The hazard and accident situations as mentioned in the first subsection, also include other hazard and accident situations than the defined, complex hazard and accident situations, stress situations and situations where key personnel are incapacitated or unable to carry out their duties.

For those emergency preparedness areas covered by Regulations relating to industrial safety (in Norwegian only) also, the requirements in this provision will be fulfilled by use of the provisions in the regulations mentioned above.

Re Section 66

Emergency preparedness plans

The emergency preparedness plans should include

- a) a description of purpose, scope and responsibility,
- b) a description of organisation, notification, mobilisation and communication,
- c) action plans, including preparedness strategies, emergency preparedness measures and decision criteria for emergency preparedness phases,
- d) a description of onshore facilities and prioritised vulnerable environmental resources in the impact area for acute pollution,
- e) a description of unit resources, area resources, regional resources and external resources and equipment,
- f) instructions for emergency preparedness personnel,
- g) any coordination procedures for coordination with other players and

- h) any cooperation procedures and agreements.

For those emergency preparedness areas covered by Regulations relating to industrial safety (in Norwegian only) also, the requirements in this provision will be fulfilled by use of the provisions in the regulations mentioned above.

Re Section 67 **Handling of hazard and accident situations**

Giving the **right notification** as mentioned in litera a, means notifying, inter alia,

- a) the onshore facility's central control room or another central function,
- b) one or more levels of the operator's emergency preparedness organisation,
- c) the contractors' emergency preparedness organisations,
- d) other licensees, owners and contractual partners if there is an agreement relating to coordinated emergency preparedness resources or in joint use of production and/or transport systems.

The scope of the notification will depend on the situation at hand.

The requirement relating to **rescue** as mentioned in litera c, entails that the responsible party shall be able to

- a) locate missing personnel using personnel control systems,
- b) bring personnel to a safe area,
- c) provide injured personnel with life-saving first aid and medical treatment.

The requirement relating to **evacuation** as mentioned in litera d, entails that the evacuation measures shall be of a nature to provide the highest likelihood of the personnel being evacuated from an exposed to a safe area. The transport requirement entails that transport of sick and injured personnel shall take place in a safe and prudent manner.

The requirement relating to **normalisation** as mentioned in litera e, also entails that

- a) injured or sick personnel are given the necessary treatment and care, such as medical treatment and follow-up of physical and psychological delayed injuries, and that the next of kin are provided with the necessary information, care and follow-up after major accidents,
- b) damage to onshore facilities is stabilised and corrected,
- c) the operation of onshore facilities resumes.

For those the emergency preparedness areas covered by Regulations relating to industrial safety (in Norwegian only) also, the requirements in this provision will be fulfilled by using the provisions in the regulations mentioned above.

CHAPTER X **Health-related matters**

Re Section 68 **Health-related matters**

General health legislation, etc.

To be in accordance with Section 68, the operator must establish systems for contact and information exchange with the municipality, the responsible party pursuant to the Municipal Health and Care Services Act etc. (in Norwegian only) and the Public Health Act (in Norwegian only), with the county municipality, the responsible party pursuant to the Dental Care Act (in Norwegian only), and with regional health institutions.

The general health and food legislation applies to the responsible party and for the public administration, including the health service. In addition, the Framework Regulations, the Management Regulations and these regulations apply to the responsible party. Pursuant to the Health and Care Services Act, the municipality shall ensure the necessary health service for everyone residing or temporarily staying within its area, including at onshore facilities. This includes preventive and curative health services, etc. as mentioned in Section 3-2, cf. Section 3-1, of the Health and Care Services Act (in Norwegian only). Chapter 3 of the Public Health Act (in Norwegian only) relating to environmental health protection with associated regulations as well as the Control of Communicable Diseases Act (in Norwegian only) contain certain provisions which are directed at (industrial) enterprises and others in the municipality. The Control of Communicable Diseases Act also contains certain provisions for the health service.

Chapter 2 of the Specialist Health Service Act (in Norwegian only) regulates the responsibility for specialist health services.

Health personnel in public and private health services, including occupational health services, shall provide immediate assistance pursuant to the provisions in Section 7 of the Health Personnel Act (in Norwegian only).

Reference is also made to the Norwegian Industrial Safety and Security Organisation's provisions and guidelines for industrial safety organisations.

In the current situation, the Norwegian Directorate of Health has not found any basis for proposing a legal basis for generally, or following a specific evaluation, imposing responsibility for curative health services on onshore facilities on the operator or the party responsible for the activities, neither during emergencies and accident situations nor otherwise. The operator can, on a voluntary basis, establish a private health service, alternatively use company health service personnel also for curative purposes.

Systems for contact and exchange of information relating to health matters

The requirement to contact and to exchange information as mentioned in the first and second subsections should be seen in context of, inter alia, Section 5 of the Public Health Act. According to this provision, the municipality shall at all times have the overview of the health situation in the population and the factors that may influence it. See also Regulation no. 692 of 28 June 2012 concerning the overview of public health. The municipality shall implement necessary measures to meet the municipality's health challenges according to the overview; see Section 7 of the Public Health Act. The municipality can cooperate with private organisations, etc., where suitable to promote the health service's purposes, cf. Section 3-4, first subsection of the Health and Care Services Act.

Hygienic conditions as mentioned in the second subsection, includes, inter alia, contagion protection, cleaning and drinking water supply.

Risk and vulnerability analyses

The risk and vulnerability analyses as mentioned in the third subsection, will form the basis for the operator's information to the public health service, so that this can be dimensioned to cover the need for health assistance at the onshore facility.

Emergency preparedness

The health-related emergency preparedness which the regulations make the operator responsible for, should include

- a) advice to and professional guidance of relevant personnel on onshore facilities,
- b) communication with public emergency preparedness resources,
- c) prioritisation of transport for injured and sick persons.

Food and drinking water

As regards foods, etc., the provisions of the Food Act (in Norwegian only) apply. As regards water supply and drinking water in the enterprise, the provisions of the Drinking Water Regulations (in Norwegian only) apply. The regulations were stipulated by the Ministry of Health and Care Services for implementation of the drinking water directive 98/83/EEC, included in the EEA Agreement on 25 January 2001. The regulations are now the responsibility of the Ministry of Health and Care Services.

The party responsible shall ensure that production, packing, storage, transport and the offering of foods take place in accordance with the food legislation.

Technical solutions for food and drinking water supply shall comply with the provisions in the Food Regulations for onshore activities as well as the Drinking Water Regulations (in Norwegian only). In addition, the technical solutions should be based on recognised methods to the extent possible.

The prohibition against polluting drinking water systems and internal distribution systems in Section 4 of the Drinking Water Regulations (in Norwegian only), apply to everyone, including operators of petroleum activities and owners of onshore facilities, and regardless of who the waterworks owner is. The water supply system and internal distribution system are defined in Section 3 of these regulations.

The operator or others participating in the activities, including owners of onshore facilities, may be the owner of (parts of) a water supply system. The owner will be subject to the provisions that apply for waterworks owners pursuant to the Drinking Water Regulations, cf. the definitions of water supply systems and waterworks owners in Section 3, litera k and m of the Drinking Water Regulations (in Norwegian only).

The waterworks owner shall ensure that the drinking water fulfils the requirements relating to quality, quantity and supply security when delivering to recipients, cf. Section 5, first subsection of the Drinking Water Regulations (in Norwegian only). If there are multiple waterworks owners on the route from water source to consumer, an owner later on the route, that may be an operator of petroleum activities, will be responsible vis-à-vis the recipient, also for poor water quality caused by a waterworks owner earlier on the route, pursuant to the Drinking Water Regulations (in Norwegian only). However, the operator can in certain cases hold its supplier responsible, cf. civil law rules.

As the owner of an internal distribution grid, the operator and others are responsible for drinking water quality as stipulated in Section 5, final subsection of the Drinking Water Regulations (in Norwegian only), i.e. for ensuring that the drinking water quality, when the water is offered to the consumer, is not impaired beyond the requirements in the Drinking Water Regulations (in Norwegian only). However, pursuant to the Drinking Water Regulations (in Norwegian only), the owner of an internal distribution grid, however, is not responsible for a sufficient amount of water and supply security, which the waterworks owner is.

Reference is made to the Guidelines to the Drinking Water Regulations and the most recently updated available guideline material from the Norwegian Institute of Public Health relating to how to ensure drinking water with sufficient quality.

Concerning supervision of foods and drinking water: In accordance with the Petroleum Act with regulations, the Norwegian Board of Health Supervision supervises the health service and health-related emergency preparedness at the onshore facilities. The task has been delegated to the County Governor of Rogaland pursuant to Section 67 of the Framework Regulations. The supervision of foodstuffs and water supply systems at the onshore facilities is carried out by the Norwegian Food Safety Authority. For land-based public or private water supplies which the onshore facility is connected to, in addition to the Norwegian Food Safety Authority, the municipality also conducts supervision, pursuant to Section 9 of the Public Health Act (in Norwegian only).

CHAPTER XI

Concluding provisions

Re Section 69

Supervision, decisions, enforcement, etc.

No comments.

Re Section 70

Entry into force

This section entails that, in the area of health, safety and working environment, the technical requirements in regulations that were in force until these regulations entered into force, can still be used as a basis. All the same, the responsible party must, also when using technical requirements in earlier regulations, take the regulations' general requirements to prudent activities into account too. See, in particular, the Framework Regulations Sections 10, 11 and 23.

Major rebuilding and modifications as mentioned in the second subsection, can be installation of a new module, major intervention in hydrocarbon-bearing systems or larger changes to physical barriers.

Existing onshore facilities as mentioned in the second subsection, mean onshore facilities where one of the following approvals or permits has been granted before these regulations entered into force: Plan for Development and Operations (PDO) of petroleum deposits approved in accordance with Section 4-2 of the Petroleum Act, or special permit granted based on a Plan for Installation and Operation (PIO) of facilities for transport, and for utilisation of petroleum in accordance with Section 4-3 of the Petroleum Act, or permit granted in accordance with the Temporary Regulations of 19 December 2003 No. 1595 relating to safety and working environment for certain petroleum facilities on land and associated pipeline systems, Section 16 (in Norwegian only) regarding application for permit for development of new activities (main application), or corresponding permit granted in accordance with regulations that were in force before the Temporary Regulations entered into force.

REFERENCE LIST

1. Orientation on key regulations that apply to the activities in addition to these regulations for the Norwegian Ocean Industry Authority's area of authority

Regulations of 6 December 2011 No. 1355 concerning organisation, management and employee participation,

Regulations of 6 December 2011 No. 1356 concerning the design and layout of workplaces and work premises,

Regulations of 6 December 2011 No. 1360 concerning administrative arrangements within the area of application of the Working Environment Act,

Regulations of 6 December 2011 No. 1358 concerning action and limit values for physical and chemical agents in the working environment and classified biological agents,

Regulations of 6 December 2011 No. 1357 concerning the performance of work, use of work equipment and related technical requirements,

Regulations of 6 December 2011 No. 1359 concerning the construction, design and production of work equipment and chemicals,

(In Norwegian only:)

Forskrift 13. februar 1984 nr. 477 om forbud mot svært brennbare tekstiler,

Forskrift 10. februar 2017 nr. 171 om enkle trykkbeholdere,

Forskrift 22. juni 2018 nr. 1019 om konstruksjon, utforming og produksjon av personlig verneutstyr (PVU),

Forskrift 26. juni 2018 nr. 1025 om gassapparater ,

Forskrift 1. mars 1996 nr. 229 om aerosolbeholdere,

Forskrift 29. desember 2017 nr. 1849 om utstyr og sikkerhetssystem til bruk i eksplosjonsfarlig område,

Forskrift 17. september 1998 nr. 982 om helse og sikkerhet i forbindelse med boringsrelatert utvinningsindustri for landbasert sektor,

Forskrift 6. november 1998 nr. 1060 om elektriske lavspenningsanlegg,

Forskrift 10. februar 1999 nr. 206 om reduksjon av utslipp av bensindamp fra lagring og distribusjon av bensin,

Forskrift 16. april 1999 nr. 525 om antennelighet av madrasser og stoppede møbler,

Forskrift 10. oktober 2017 nr. 1631 om trykkpåkjent utstyr,

Forskrift 29. november 2013 nr. 1373 om håndtering av medisinsk utstyr,

Forskrift 22. november 2012 nr. 1088 om transportabelt trykkutstyr,

Forskrift 4. desember 2001 nr. 1450 om maritime elektriske anlegg,

Forskrift 26. juni 2002 nr. 922 om håndtering av eksplosjonsfarlig stoff,

Forskrift 5. juli 2002 nr. 715 om arbeid som utføres i arbeidstakers hjem,

Forskrift 16. juni 2012 nr. 622 om klassifisering, merking og emballering av stoffer og stoffblandinger (CLP),

Forskrift 30. juni 2003 nr. 911 om helse og sikkerhet i eksplosjonsfarlige atmosfærer,
Forskrift 3. juni 2016 nr. 569 om tiltak for å forebygge og begrense konsekvensene av storulykker i virksomheter der farlige kjemikalier forekommer,
Forskrift 10. november 2017 nr. 1598 om elektrisk utstyr,
Forskrift 1. april 2009 nr. 384 om landtransport av farlig gods,
Forskrift 20. mai 2009 nr. 544 om maskiner,
Forskrift 3. august 2009 nr. 1028 om sikkerhet, helse og arbeidsmiljø på bygge- eller anleggsplasser.

2. Regulations that are recommended as standards throughout these guidelines

Regulations of 20 December 2005 No. 1626 relating to electrical supply installations (in Norwegian only),
Regulations of 28 April 2006 No. 458 relating to safety when working on and operating electrical installations (in Norwegian only),
Regulations of 8 June 2009 No. 602 relating to handling of flammable, reactive and pressurised substances as well as equipment and systems used in such handling (in Norwegian only).

3. Other regulations

The Ministry of Health and Care Services

Regulations of 22 December 2016 No. 1868 relating to water supply and potable water (in Norwegian only),
Regulations of 28 June 2012 No. 692 relating to the overview of public health (in Norwegian only),
Regulations of 16 December 2016 No. 1659 relating to radiation protection and use of radiation (in Norwegian only).

The Directorate for Civil Protection and Emergency Planning

Regulations of 19 June 2013 No. 739 relating to electrical enterprises and qualifications for work related to electrical installations and electrical equipment (in Norwegian only).
Regulations of 20 December 2011 No. 1434 relating to industrial safety (in Norwegian only).

4. Standards and guidelines

American Petroleum Institute (API)

API Standard 521 Pressure-relieving and Depressuring Systems, Sixth Edition, January 2014,
API Standard 520 Sizing, Selection, and Installation of Pressure-relieving Devices, Part II – Installation, Sixth Edition, March 2015.

The Norwegian Directorate of Health

IS-1879 Health requirements for workers on the petroleum field. Guidance for the regulations on health requirements for persons working on facilities in the petroleum activities offshore (in Norwegian only).

The Norwegian Radiation and Nuclear Safety Authority

Guidelines for the radiation protection regulations (in Norwegian only):

Guideline 1 relating to industrial radiography,

Guideline 9 relating to industrial control sources.

DNV

DNV-RP-G109 Risk based management of corrosion under insulation, Edition December 2019, amended September 2021,

DNV-ST-F101 Submarine pipeline systems, Edition August 2021, amended December 2021.

EEMUA (Engineering Equipment and Materials Users Association)

EEMUA Publication 191 Third edition – Alarm Systems: Guide to design, management and procurement.

European Standard (EN)

NS-EN 894-1:1997+A1:2008 Safety of machinery – Ergonomics requirements for the design of displays and control actuators – Part 1: General principles for human interactions with displays and control actuators, Edition 1, 2009,

NS-EN 894-2:1997+A1:2008 Safety of machinery – Ergonomics requirements for the design of displays and control actuators – Part 2: Displays, Edition 1, 2009,

NS-EN 894-3:2000+A1:2008 Safety of machinery – Ergonomics requirements for the design of displays and control actuators – Part 3: Control actuators, Edition 1, 2009,

EN 1127-1:2011 Explosive atmospheres – Explosion prevention and protection – Part 1: Basic concepts and methodology, Edition 1, 2011,

NS-EN 1363-2: 1999, Fire resistance tests – Part 2: Alternative and additional procedures, Edition 1, 1999,

NEK EN 62682:2015 Management of alarms systems for the process industries, Edition 1, 2015,

NS-EN 13381-4:2013 Test methods for determining the contribution to the fire resistance of structural members - Part 4: Applied passive protection to steel members, Edition 1, 2013,

NS-EN 13381-8:2013 Test methods for determining the contribution to the fire resistance of structural members - Part 8: Applied reactive protection to steel members, Edition 1, 2013,

NS-EN 1838:2013 Lighting applications – Emergency lightning, Edition 1, 2013.

International Electrotechnical Commission (IEC)

NEK IEC 60300-3-11 Dependability management - Part 3-11: Application guide – Reliability centred maintenance. Edition 2, June 2009,

NEK IEC 60079-10-1:2015 Explosive atmospheres - Part 10-1: Classification of areas – Explosive gas atmospheres, Edition 2.0, 2015,

NEK IEC 60079-13:2017 Explosive atmospheres – Part 13: Equipment protection by pressurized room “p” and artificially ventilated room “v”, Edition 2.0, 2017, NEK IEC 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems, Parts 1-7, Edition 2.0, 2010,

Part 1: General requirements,

Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems,

Part 3: Software requirements,

Part 4: Definitions and abbreviations,

Part 5: Examples of methods for the determination of safety integrity levels,

Part 6: Guidelines on the application of IEC 61508-2 and 61508-3,

Part 7: Overview of techniques and measures,

NEK IEC 61511:2016 SER Functional safety – Safety instrumented systems for the process industry sector – ALL PARTS, Edition 1.0, 2016.

Energy Institute

EI Model code of safe practice - Part 15: Area classification for installations handling flammable fluids, 2015.

International Organization for Standardization (ISO)

ISO 834 Fire-resistance tests – Elements of building construction, Part 1 (1999), 3 (2012) and 4 through 7 (2000),

ISO 3008:2007 Fire-resistance tests - Door and shutter assemblies, Edition 3, 2007,

ISO 3009:2003 Fire-resistance tests – Elements of building construction - Glazed elements, edition 2, 2003,

ISO 6385: 2016 Ergonomic principles in the design of work systems, Edition 3, 2016,

ISO 13623:2017 Petroleum and natural gas industries – Pipeline transportation systems, Edition 3, 2017,

NS-EN ISO 14224:2016 Petroleum, petrochemical and natural gas industries — Collection and exchange of reliability and maintenance data for equipment (ISO 14224:2016, Corrected version 2016-10-01), Edition 1, 2017,

NS-EN ISO 20088-1:2016 Determination of the resistance to cryogenic spillage of insulation materials — Part 1: Liquid phase (ISO 20088-1:2016), Edition 1, 2017,

NS-EN ISO 20088-2:2020 Determination of the resistance to cryogenic spill of insulation materials — Part 2: Vapour exposure (ISO 20088-2:2020), Edition 2020-04, 2020,

NS-EN ISO 20088-3:2019 Determination of the resistance to cryogenic spillage of insulation materials — Part 3: Jet release (ISO 20088-3:2019), Edition 1, 2020,

NS-EN ISO 20815:2018 Petroleum, petrochemical and natural gas industries — Production assurance and reliability management (ISO 20815:2018), Edition 1, 2019,

ISO 22899-1:2007 Determination of the resistance to jet fires of passive fire protection materials – Part 1: General requirements,

NS-ISO 45003:2021 Occupational health and safety management – Psychological health and safety at work – Guidelines for managing psychosocial risks, Edition 1, 2021,

ISO 80079-36:2016 Non-electrical equipment for explosive atmospheres – Basic method and requirements, Edition 1, 2016.

The Norwegian Electrotechnical Committee (NEK)

NEK 400:2018 Electrical low voltage installations, Edition 6.0, 2018,

NEK 420A:2016 Electrical installations in potential explosive atmospheres, Edition 5.0, 2016,

NEK 440:2015 Station installations exceeding 1 kV, Edition 3.0, 2015.

Norwegian Standard (NS)

NS 4931 Guidelines for assessing human reactions to low-frequency horizontal movements (0.063 to 1 Hz) in permanent structures, particularly buildings and offshore installations (ISO 6897:1984), Edition 2, 1985,

NS-EN 614-1:2006+A1:2009 Safety of machinery – Ergonomic design principles part 1: Terminology and general principles, Edition 1, June 2009,

NS-EN 614-2:2000+A1:2008 Safety of machinery – Ergonomic design principles part 2: Interactions between the design of machinery and work tasks, Edition 1, January 2009,

NS-EN 13306:2017 Maintenance – Maintenance terminology, Edition 1, 2017,

NS-EN ISO 11064 Ergonomic design of control centres, Parts 1-4, 1999-2013,

NS-EN ISO 13702:2015 Petroleum and science gas industries – Control and mitigation of fire and explosions on offshore production installations – Requirements and guidelines, Edition 1, 2015

NS-EN ISO 15138:2018 Petroleum and natural gas industry – Offshore production facilities – Heating, ventilation and air conditioning (ISO 15138:2018), Edition 1, 2018,

NS-EN ISO 4126 Safety devices for protection against excessive pressure, Parts 1-7, 2006-2014,

NS 9600:2010 Rope access techniques, Parts 1-4, Edition 1, 2010.

NORSOK standards

NORSOK M-004 Piping and equipment insulation, Edition 1, December 2018,

NORSOK R-002 Lifting equipment, Edition 3, March 2017,

NORSOK R-005 Safe use of lifting and transport equipment at onshore petroleum facilities, Edition 1, November 2008,

NORSOK Z-008 Risk based maintenance and consequence classification, Edition 4, December 2017,

NORSOK U-100 Manned underwater operations, Edition 5, December 2015, Corrected May 2016,
NORSOK U-103 Petroleum related manned underwater operations inshore, Edition 3, January 2014.

Offshore Norge

104 – Offshore Norge Recommended Guidelines for Information Security Baseline Requirements for Process Control, Safety and Support ICT Systems, revision no. 06, December 2016,

105 – Offshore Norge Recommended guidelines for scaffolding building, revision no. 01, April 2019.

The International Marine Contractors Association (IMCA)

IMCA D 045, R 015 Code of practice for the safe use of electricity under water, October 2010.