

GUIDELINES REGARDING THE ACTIVITIES REGULATIONS

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**Petroleum Safety Authority Norway
Norwegian Environment Agency
Norwegian Directorate of Health
Norwegian Food Safety Authority
Norwegian Radiation Protection Authority**



**PETROLEUM SAFETY AUTHORITY
NORWAY**

Guidelines regarding the activities regulations

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CHAPTER I INTRODUCTORY PROVISIONS

Re Section 1 Scope

The scope of the regulations is limited in comparison with the scope of the Framework Regulations, so that they only apply to offshore petroleum activities.

The provision in the second subsection makes individual requirements in these regulations applicable also for facilities and equipment for conduct of manned underwater operations from vessels. For practical reasons, a choice has been made to have a general section on this, rather than repeating it in the individual provisions.

Re Section 2 Responsibilities

No comments.

Re Section 3 Definitions

No comments.

CHAPTER II ARRANGEMENTS PURSUANT TO THE WORKING ENVIRONMENT ACT

Re Section 4 Coordinating working environment committees for fields, and joint, local working environment committees for mobile facilities

The purpose of joint working environment committees is to ensure coordination of the individual enterprises' safety and environment work and to give all employees a genuine opportunity of taking part in and influencing the safety and environment work at their own workplace, regardless of their employment relationship. Reference is made to Section 7-2 of the Working Environment Act and provisions on safety delegates in Regulations 6 December 2011 relating to organisation, management and participation (in Norwegian only). These regulations also apply directly to the petroleum activities, with the specifications and limitations given in the regulations.

The duty to establish joint working environment committees does not reduce the duty of the individual employer to establish a working environment committee at its own enterprise, cf. Section 34 of the Framework Regulations. The joint working environment committee will be superior to the working environment committees of the individual enterprises in matters related to the jurisdiction of the joint working environment committee.

The term "field" is continued in the new regulations, inter alia to ensure delimitation of the areas that naturally form an entity for such co-ordination.

Coordinating working environment committees for fields as mentioned in the first subsection, should be limited organisationally to ensure representation of all main activity areas, familiarity with the local conditions at the workplace and proximity to the work of the committee. If agreement cannot be reached among the operator, the contractors in the various main activity areas and the safety delegates as to establishing a coordinating working environment committee that comprises more than one field, cf. the requirement regarding general agreement as mentioned in the first subsection, one of the parties can submit the issue to the Petroleum Safety Authority Norway; which, after having considered all aspects of the matter, can decide if such a working environment committee is to be established.

The coordinating working environment committee should set up subcommittees for the individual facilities when the committee encompasses several facilities, cf. Regulations 6 December 2011 relating to organisation, management and participation (in Norwegian only). These regulations also apply directly to the petroleum activities, with the specifications and limitations given in the regulations.

The main activity areas mentioned in the second section, include drilling, well service, catering, construction, maintenance and production. What is to be considered as main activity areas, will depend on the actual activity on the various facilities.

In order to fulfil the requirement for participation as mentioned in the second subsection, the representatives should come from the principal undertaking and from the largest contractors in the various main activity areas. The employees' representatives should be elected by and among the safety delegates and main safety delegates for the various main activity areas. Two or more trade unions that together organise the majority of the employees in a main activity area can agree that the election will take place as a proportionate representation election or that these trade unions will appoint the employees' representatives for the area, cf. Regulations 6 December 2011 relating to organisation, management and participation (in Norwegian only). These regulations also apply directly to the petroleum activities, with the specifications and limitations given in the regulations. The coordinating working environment committee for the field should have at least one employee representative from each manned facility on the field. The operator's representative on a mobile facility can have status either as an observer or as a representative with voting rights. On the joint, local working environment committee on mobile facilities, a representative of the operator can represent the employer side for contractors that have been hired by the operator.

Coordination as mentioned in the last subsection, means coordination of safety and environment-related matters that are of significance for both mobile and permanently placed facilities on the field.

Re Section 5 Occupational health service

Reference is made to Section 3-3 of the Working Environment Act as regards occupational health services. The new Working Environment Act does not have the same requirements related to safety personnel as earlier versions. However, there remains a need for safety personnel in the offshore petroleum activities, and these are defined as part of the 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.

As far as the employers use of occupational health service is concerned, reference is, inter alia, also made to provisions on occupational health service in Regulations 6 December 2011 relating to administrative schemes (in Norwegian only) and Regulations 6 December 2011 relating to organisation, management and participation (in Norwegian only). These regulations also apply directly to the petroleum activities, with the specifications and limitations given in the regulations.

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 on the facility.

Re Section 6 Medical examinations for employees

Long-term effects of working environment factors as mentioned in the first subsection, include long-term effects of hazardous noise.

For requirements related to health examinations as mentioned in the third subsection, reference is made to Section 3-1, second subsection, litera g and Section 10-11, seventh subsection of the Working Environment Act.

Health-hazardous exposure as mentioned in the fourth subsection, includes exposure to

- a) hazardous noise,
- b) isocyanates or air containing lead,
- c) heightened ambient pressure,
- d) asbestos dust,
- e) carcinogenic substances.

In order to fulfil the requirement for medical examination, the Norwegian Board of Health Supervision's guidelines regarding physicians in connection with examination of professional divers should be used for participants in manned underwater operations.

Re Section 7
Registration of working hours

Working hours as mentioned in the first subsection, mean the actual time worked, including both normal working hours and any overtime.

To follow up working hours as mentioned in the first subsection, entails that the employer has a responsibility for own employees not working more than permitted, cf. Chapter VI of the Framework Regulations.

The working time registers shall be available to the employee representatives, cf. Section 10-7 of the Working Environment Act.

CHAPTER III
HEALTH RELATED MATTERS

Re Section 8
The health service

The health service means the organisation, the personnel and the resources that are necessary in order to attend to the health-related matters in the petroleum activities as mentioned in Section 6 of the Framework Regulations.

When health personnel carry out tasks as mentioned in Section 5, the responsibility, authority and prioritisation of work tasks shall be clearly defined as mentioned in Section 13 of the Management Regulations.

In order to ensure satisfactory services, the rule stating that a physician shall have a special professional responsibility for the health service on the continental shelf, shall be continued. Physicians that participate in the health service, should have general medical experience and insight. The responsible physician shall have Norwegian authorisation or licence according to Sections 48 or 49 of the Health Personnel Act (in Norwegian only). The same applies to nurses.

In those cases where a nurse leaves the facility to accompany a patient to land, the requirement in the third subsection implies that compensating measures shall be implemented, and that the nurse returns to the facility as soon as possible.

In order to fulfil the requirement for adequate health services as mentioned in the first subsection, Chapter 5.1 of the NORSOK U-100N standard should be used for manned underwater operations.

Re Section 9
The health service's tasks

When performing the duties described in this section, the provisions relating to the health personnel's duty of secrecy, duty to report and to keep journals as stipulated in or pursuant to the Act relating to health personnel (in Norwegian only), will apply. When a mobile facility that is registered in a national ships' register is laid up, the journals should be stored by the shipping company's onshore health service.

The health emergency preparedness as mentioned in litera c, should include

- a) counselling and professional guidance for the health personnel on a facility or vessel,
- b) communication with other health services,
- c) prioritisation of transport for injured or ill personnel to land.

Re Section 10
Physician on-call

The requirement relating to arriving at the facility on the shortest possible notice, implies that systems shall be set up to enable rapid and efficient organisation of helicopter transport.

Re Section 11
Medicines and medical equipment

No comments.

Re Section 12

Communicable diseases

The physician should cooperate with personnel in the municipal health service with regard to following up actions in accordance with the legislation relating to dealing with communicable diseases.

Re Section 13

Food and drinking water

Production, packing, storage, transport and presentation of food products shall be in accordance with the Food Act and appurtenant regulations, cf. Section 1-5 of the Petroleum Act.

The Ministry of Health and Care Services laid down Regulations relating to water supply and drinking water (in Norwegian only) for implementation of the Drinking Water Directive 98/83/EC, incorporated into the EEA Agreement on 25 January 2001. These regulations entered into force on 1 January 2001 and also apply to the petroleum activities.

The Norwegian Institute of Public Health's guideline materials for design and operation of drinking water systems are drawn up to clarify regulatory requirements for offshore drinking water systems and drinking water supplies. The guideline materials, in both Norwegian and English, can be found on www.fhi.no/offshore.

In accordance with the Framework Regulations and pursuant to delegation from the Norwegian Food Safety Authority, the County Governor of Rogaland supervises that the provisions regarding food, water supply and drinking water are complied with in the petroleum activities.

According to the Drinking Water Regulations (in Norwegian only), the duty of the water supply system's owner in the petroleum activities rests with the operator and other participants in the petroleum activities, cf. Section 7 of the Framework Regulations.

When a water supply system delivers water to another water supply system, it is important to identify what is included in the individual water supply system owner's responsibility.

Re Section 14

Cleaning

In connection with planning and execution of cleaning activities, the NS-INSTA 800 standard should be used, with the following additions:

- a) it is assumed that a decision regarding the level of quality is made as mentioned in Section 11 of the Management Regulations,
 - b) when planning the cleaning, the load in the various areas should, inter alia, be used as a basis.
- In addition, the health service should take part in the planning. Cf. also Section 29.

Cleaning is of great importance in preventing e.g. respiratory disorders. The relationship between dust and health problems in sensitive individuals and individuals with asthma and allergies is well documented. The purpose of cleaning is to reduce the occurrence of dust particles, allergens and infective agents. Another purpose of cleaning is to create general welfare and well-being.

Main cleaning of indoor areas should be carried out at least once per year.

CHAPTER IV

PRELIMINARY SURVEYS AND INSTALLATION

Re Section 15

Preliminary surveys

The following standards should be used in connection with preliminary surveys:

- a) the NS-EN ISO 19901 Part 1 standard for **surveying natural conditions**,
- b) Section 3 of the DNV-OS-F101 standard should be used for **route surveys**,
- c) Chapter 7.9.1 of the NORSOK N-001 standard for **geotechnical surveys**, with the following addition: a quaternary geological description should be prepared if in a new area,
- d) Chapter 5.7.2 of the NORSOK D-010 standard in the event of **shallow gas surveys**,

- e) **subsidence** is calculated with the aid of geological models. As such models are associated with significant uncertainty, an upper 90 percentile should be used for the subsidence estimate. Consideration can be given to the stabilising effects of injection of gas or liquids.

If the surveys show that the likelihood of placing foundations above formations that contain gas is greater than one per cent, another location should be chosen.

In addition to preliminary surveys, baseline surveys shall be carried out as mentioned in Section 53 to map the environmental status.

Re Section 16 Installation and commissioning

In order to fulfil the requirement for **installation** as mentioned in the first subsection,

- a) Section 10, paragraph A through F of the DNV-OS-F101 standard should be used for steel pipeline systems,
- b) Chapter 9 of the API RP 17B guidelines should be used for flexible pipeline systems.

Commissioning as mentioned in the second subsection entails e.g. that safety systems shall be function tested and verified. To satisfy the requirement, the Norsok Z-007 standard should be used, with the following additions:

- a) Section 10, paragraphs G through J of the DNV OS-F101 standard should be used for steel pipeline systems,
- b) Chapter 9.5.3 of the API RP 17B guidelines should be used for flexible pipeline systems,
- c) Appendix H to the Norsok R-003 standard should be used for lifting equipment,
- d) Chapters 5.5 and 6.45 of the Norsok D-001 standard should be used for drilling facilities,
- e) the result of function test are compared with performance requirements and relevant calculations,
- d) Norwegian oil and gas' guideline no. 070 is used where electrical, electronic and programmable electronic systems are used in the construction of the functions.

In order to fulfil the requirement for **technical condition** as mentioned in the third subsection, the Norsok Z-006 standard should be used for preservation.

CHAPTER V TRANSPORT AND STAY

Re Section 17 Transport

No comments.

Re Section 18 Stay on facilities

No comments.

Re Section 19 Accommodation and cabin sharing

For the design of cabins, refer to Section 58 of the Facilities Regulations.

A physical barrier means a function that can prevent or limit harm in the event of an unwanted incident. Other acute situations may, inter alia, constitute hazard and accident situations that have occurred, weather conditions that reduce the possibility of transporting personnel from the facility etc.

A turnaround/revision stop is a pre-planned period in which the operations on the facility have been shut down in order to carry out an accumulated portfolio of extensive and necessary maintenance, modifications, improvements, inspections etc.

Hook-up and start-up is the period from a new facility is placed on the field to hydro carbons are contained in the processing systems, and production has started. In this period, the facility will be commissioned; all systems hooked up, tested and started.

Cabin sharing is contingent upon compensation being given to those affected by it directly. It is an established practice between the parties to come up with solutions as far as compensation is concerned, and reference can be made, for that matter, to existing arrangements in this respect.

CHAPTER VI OPERATIONAL PREREQUISITES FOR START-UP AND USE

Re Section 20 Start-up and operation of 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.

In order to fulfil the requirement for technical operations documents as mentioned in the second subsection litera b, Chapter 4 and Appendices A, C and D of the NORSOK Z-001 standard should be used. For drilling and well technical equipment, Chapter 5 and Annexes A, B and C of the NORSOK D-001 standard should also be used.

Re Section 21 Competence

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

- work with chemicals, cf. RCW chapter 3, with the exception of sections 3-23, 3-24 and 3-27,
- work with asbestos, cf. RCW chapter 4, with the exception of section 4-4,
- work involving risk of being exposed to biological factors, cf. RCW chapter 6,
- work with work equipment that requires additional carefulness, cf. RCW chapter 10, with the exception of sections 10-1, 10-2 and 10-3,
- maintenance of work equipment, cf. RCW chapter 12,
- work involving risk of being exposed to health detrimental noise or mechanical vibrations, cf. RCW chapter 14, with the exception of sections 14-1 – 14-7 included, and section 14-10,
- work involving risk of being exposed to artificial optic radiation, cf. RCW chapter 16,
- safety signs and signalling, cf. RCW chapter 22,
- work imposing ergonomic strain, cf. RCW chapter 23.

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.

In order to fulfil the requirement for competence in the area of health, safety and working environment,

- a) Chapter 6 of the NORSOK U-100N standard should be used for **manned underwater operations**,
- b) Chapter 8 of the ISO 15544 standard should be used for **emergency preparedness and safety**, with the following addition: the Norwegian Oil and Gas' guidelines for safety and emergency preparedness training No. 002 should be used for safety and emergency preparedness training for personnel on facilities and vessels,
- c) Chapter 4.9 of the NORSOK D-010 standard and 024 - Norwegian Oil and Gas' Guidelines no. 024 should be used for general competence within **drilling and well activities**, with the exception of Chapter 2.1.1 litera a and b on the requirements for examination. For posts as operators, training and examination in accordance with public curriculum VG2 well techniques should be undertaken. In cases of underbalanced drilling and completion, Chapter 13.7.2 of the NORSOK D-010 standard should also be used,
- d) the following regulations and guidelines should be used for **work on electrical installations**:
 - a) for personnel on permanently placed facilities, the Regulations relating to electrical enterprises and qualification requirements for work associated with electrical installations and electrical equipment (in Norwegian only) Sections 6, 7, 8, 9, 25 plus Appendix I or Regulations relating to

- qualification requirements and certificates for seamen (in Norwegian only) Sections 37, 44 and 45, or Norwegian oil and gas guideline 059 – recommended guidelines for professional electrical workers' competence (in Norwegian only)
- b) for personnel on mobile facilities registered in a national ships' register, the Regulations relating to qualification requirements and certificates for seamen (in Norwegian only) Sections 37, 44 and 45, or Norwegian oil and gas guideline 059 – recommended guidelines for professional electrical workers' competence (in Norwegian only)
 - c) for the designated person responsible for the electrical installations as mentioned in the guidelines to Section 91, the Regulations relating to electrical enterprises and qualification requirements for work associated with electrical installations and electrical equipment (in Norwegian only) Sections 7 and 25
 - e) Appendix 3 to the Civil Aviation Authority's Regulations relating to flight weather service (in Norwegian only) should be used for weather observers who carry out routine weather observations (METAR),
 - f) Appendix B to the NORSOK R-003 standard should be used for **lifting operations**,
 - g) the Norwegian Maritime Authority's Regulations relating to qualification requirements and certificates for seamen (in Norwegian only) should be used for **maritime operations**,
 - a) the party responsible for operating the maritime systems on permanently placed, mobile facilities, should fulfil the qualification requirements for comparable positions in the regulations mentioned in litera g of these guidelines. Control room operators who operate maritime systems on such permanently placed, mobile facilities, should fulfil the requirements related to certificates for control room operators in the same regulations. The party responsible for stability on board, should have maritime competence equivalent to the offshore installation manager in the same regulations,
 - b) in the event of operations with dynamic positioning Equipment Classes 2 and 3, those operating the equipment, should have competence in accordance with the regulations as mentioned in litera g of these guidelines, cf. Section 31. For operations in Equipment Class 1, one competent person is sufficient,

For facilities registered in a national ships' register, it is also assumed that maritime competence is documented in accordance with the requirements stipulated by the respective flag state authorities. The requirement in first subsection second sentence implies that jack-up facilities are staffed with personnel competent at and trained in operating the jacking systems in an emergency,

- h) in connection with the **use of communication equipment**, it should be ensured that the person responsible for communication, cf. Section 80, second subsection, has sufficient experience as communications operator and valid GMDSS radio operator certificate (GOC or ROC depending on radio transmitting equipment on board), as well as necessary competence in areas such as emergency preparedness management, helicopter communication, meteorological observation and monitoring of the safety zones and maritime zones surrounding the facility.
- i) 074 – Norwegian oil and gas' Recommended guidelines for helideck personnel should be used for qualifications for and training of helideck personnel.

As regards radio operators who operate maritime radio equipment, the competence requirements are specified in the licence terms set by the Ministry of Transport and Communications.

As regards certificates as mentioned in the second subsection, diving certificates issued by authorities in other countries are accepted if they document that the level of education corresponds with that which is recognised by Norwegian authorities. The reference used by the Petroleum Safety Authority Norway, is the "Diving Industry Personnel Competence Standards" 2003, issued by the European Diving Technology Committee (EDTC) in cooperation with the International Marine Contractors Association (IMCA).

Re Section 22

Safety and working environment training pursuant to the Working Environment Act

As regards training as mentioned in the first subsection, reference is made to relevant provisions on safety delegates and working environment committees in Regulations relating to organisation, management and participation (in Norwegian only). These regulations also apply, with the limitations given directly in the regulations, to the petroleum activities. 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.

The training as mentioned in the second subsection should include aspects that are of significance to the overall workload of the individual, cf. Section 33.

In order to fulfil the requirement for radiation protection training as mentioned in the third subsection, the Norwegian Radiation Protection Authority's training requirements should be used. Radioactive sources are substances that emit alpha, beta and gamma radiation

As regards requirements for training of safety delegates and members of working environment committees, reference is made to relevant provisions in Regulations relating to organisation, management and participation (in Norwegian only). These regulations also apply, with the limitations given directly in the regulations, to the petroleum activities. 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 23 Training and drills

In order to fulfil the requirements for training and drills

- a) simulator training should be used for **monitoring and control functions**,
- b) personnel who have **emergency preparedness** functions, should practice their emergency preparedness tasks at least once during each period of stay. Everyone who takes part in emergency preparedness management and collaboration on emergency preparedness against acute pollution, should practice their emergency preparedness functions at least once each year.

An emergency preparedness drill covering all personnel on the facility should be carried out at least once during a period of stay. Mustering and evacuation routines should be included in the drill. At least one annual drill should be carried out for the emergency preparedness management and for personnel attending to collaboration on emergency preparedness against acute pollution. Drills related to collaboration on emergency preparedness against acute pollution should include skill training in the individual emergency preparedness functions and co-training between the operator and any agreement parties. The result of the drill should be evaluated.

When hired facilities or vessels are used, a drill should be conducted at an early point in time in accordance with a coordinated emergency preparedness plan for the contractor and the operator. If the same facility is used for a lengthy consecutive period, a major annual drill should be held involving both unit and area resources, relevant external resources, the operator's and the contractor's onshore emergency preparedness organisations, as well as the supervisory authorities,

- c) Chapter 9.2 of the NORSOK U-100N standard should be used for **manned underwater operations**,
- d) Chapters 4.2.6, 4.2.7, 4.9.1, 4.9.2, 5.5.2, 6.5.2, 7.5.2, 9.3.5, 10.5.2, 11.5.2, 12.5.2, 13.5.2, 13.7.2 and 14.5.2 of the NORSOK D-010 standard should be used for drilling and well activities, with the following addition: regular drills should be carried out in well control, and the results should be evaluated.

The verification shall be performed in accordance with Section 19, first subsection, second sentence, and second subsection of the Framework Regulations.

Re Section 24 Procedures

Procedure as mentioned in the first subsection, means a specified way of conducting an activity or a process, cf. Chapter 3.4.5 of NS-EN ISO 9000.

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.

In order to fulfil the requirement for procedures as mentioned in the second subsection, Chapter 8.2 of the NORSOK U-100N standard should be used for manned underwater operations.

Re Section 25

Use of 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 waves, wind and temperature and functional loads such as pressure, weight, temperature and vibration.

When conducting drilling and well activities 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 also be taken into account, as well as movements in the event of loss of position due to anchor line breakage or drift, or because of dynamic positioning failure. Cf. Section 50 of the Facilities Regulations.

Facilities and parts thereof as mentioned in the first subsection, also include less complex facilities as mentioned in Section 6 of the Facilities Regulations and temporary equipment.

In order to fulfil the requirement for use as mentioned in the first subsection, the Norsok Z-015N standard should be used for temporary equipment.

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

Re Section 26

Safety systems

A safety system means technical barrier elements realised in a common system, cf. the Management Regulations Section 5 and the Facilities Regulations Section 3.

The requirement in the first subsection entails that the measures and limitations shall result in a risk reduction which is relevant, and which is proportionate to the barrier functions that are affected; examples of which are limitation in the level of activities, full shut down or other risk reducing measures.

The status of active safety systems, cf. the second subsection, shall be available in the central control room, cf. the Facilities Regulations Section 8.

To fulfil the requirements for measures and limitations as mentioned in the first subsection, Chapter 7.7 of the IEC 61508-1 standard and Chapter 7.6 of the IEC 61508-2 standard, and Chapters 10 and 11 of Norwegian Oil and Gas' Guidelines no. 070 should be used for electrical, electronic and programmable electronic safety systems.

Re Section 27

Critical activities

Critical activities can be

- a) work on pressurised, electrified or hydrocarbon-bearing systems,
- b) hot work,
- c) work with explosives or substances that 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 92.

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.

In order to fulfil the requirement for critical activities, Chapters 4.4, 4.5 and 4.6 of the Norsok D-010 standard should be used for drilling and well activities.

Re Section 28

Simultaneous activities

Activities as mentioned in the first subsection, can be production activities, drilling and well activities, and maintenance and modification activities, including activities as mentioned in Section 27.

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.

In order to fulfil the requirement for simultaneous activities, Chapters 4.4, 4.5 and 4.6 of the NORSOK D-010 standard should be used for drilling and well activities.

CHAPTER VII PLANNING AND EXECUTION

Re Section 29 Planning

The requirement for planning as mentioned in the first subsection entails, inter alia, ensuring that the activities are executed within the limitations mentioned in Chapter VI.

Re Section 29a Storage, handling and use of explosives

In order to ensure that explosives do not go off unintentionally as mentioned in the second subsection, electrically triggered perforating equipment for use in drilling and well activities should be protected against the effects of radio waves and other electrical fields, cf. the requirements for electrical compatibility in Section 77.

In addition, explosives should be protected against falling loads and fires during storage.

Re Section 30 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 safe job 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.

As regards conducting safe job analyses, Appendix B.4 to the ISO 17776 standard and Chapter 4.4.3 of the NORSOK standard S-002N should be used in the area of health, safety and working environment. With regard to conducting a job safety analysis, see the last paragraph in the above-mentioned Appendix B.4, the party responsible for carrying out the work and the workers who actually carry it out, should participate, possibly also the persons responsible for the system and area.

To fulfil the requirements for measures, the Guidelines for Offshore Marine Operations (GOMO) should be used for this type of activities. In respect of measures relating to discharge of drainage water, refer to GOMO Chapter 7.8 Discharges from Facilities.

To fulfil the requirements for measures, Chapters 4.10.3, 8.2, 8.3, 8.4, 8.6 and 8.7 of the NORSOK D-010 standard and Norwegian Oil and Gas' Guideline no. 117 should be used for drilling and well activities in the event of handover of wells between units, with the following addition: the wells' barrier status should be tested and verified.

In respect of tandem transfer of hydrocarbons from an FPSO or FSU to a shuttle tanker, it should be assessed whether to reduce other shipping activities to or from the FPSO or the FSU.

Handover of wells between units means handover between production, well service, operation, maintenance, etc.

Re Section 31 Monitoring and control

Conditions as mentioned in the first subsection, can be conditions and parameters as mentioned in Sections 17 and 33 of the Facilities Regulations, status for 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.

For monitoring and control as mentioned in the first subsection, there should be at least two persons to handle the monitoring and control functions as mentioned in the third subsection,

- a) in the central control room on permanently manned facilities,
- b) for operation of equipment for dynamic positioning, Classes 2 and 3,
- c) for drilling and well activities.

To fulfil the requirement relating to monitoring and control, the NORSOK U-100N standard, Chapters 8.3 and 8.5.1, should be used for manned underwater operations.

For monitoring and control of the external environment, see Chapter X.

Re Section 32

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 stay on the facility, both for operator and contractor employees.

CHAPTER VIII

WORKING ENVIRONMENT FACTORS

Re Section 33

Organisation of work

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 Chapter IV of the Facilities 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. Factors that can influence the psychosocial working environment, can be the interaction between requirements relating to work performance, the employee's perception of control over own work and social support in the working environment.

To avoid exposure that is hazardous to health 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 employers and the employees strive 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.

The requirement relating to carrying out as much as possible of the work in the daytime as mentioned in the fourth subsection, entails that night work shall be limited to tasks and functions necessary to maintain prudent operations.

The requirement relating to necessary rest and restitution as mentioned in fourth subsection, entails that all personnel can sleep undisturbed and normally alone, cf. also Section 19, and that necessary transport in offshore periods, including helicopter transport, takes place during working hours.

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

For work in tanks, reference is made to relevant provisions in regulations under the Working Environment Act, stipulated 6 December 2011.

The purpose of the provision is to prevent unfortunate developments whereby the employee is not assured of sufficient restitution and rest, which could have safety-related consequences.

Re Section 34

Ergonomic aspects

Regulations laid down by the Ministry of Labour and Social Affairs 6 December 2011, pursuant to the Working Environment Act, and entering into force 1 January 2013, contain, inter alia, further provisions on ergonomic aspects, including heavy and monotonous work and work at computer screens. Clarification of the scope as far as the petroleum activities are concerned, is directly evident from the individual regulations. 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 connection with the organisation as mentioned in the first subsection, the NORSOK S-002N standard, Chapters 5.1 and 5.2 (the principles and the organisation part) should be used.

For work at computer screens as mentioned in the third subsection, the Labour Inspection's Guidelines for work at computer screens should be used.

For information, see also Section 20 of the Facilities Regulations.

Re Section 35

Psychosocial aspects

Aspects as mentioned in the first sentence, can include

- 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 influence on important decisions,
- e) opportunities for career development and utilisation of own competence,
- f) climate of co-operation, handling of disagreements, conflicts and harassment,
- g) work management, including feedback and follow-up in the daily work,
- h) night work and working alone.

Re Section 36

Chemical health hazard

In order to avoid exposure as mentioned in the first subsection, the Regulations relating to conduct of work should be used.

As regards CO and CO₂ as mentioned in second subsection, the NORSOK U-100N standard, Chapters 5.2.3.2 and 5.2.3.3, should be used. In addition, special consideration should be given to potential release of, from materials under high pressure, chemical substances that are detrimental to health.

For information, see also Section 15 of the Facilities Regulations.

Re Section 37

Radiation

Radiation means ionising and non-ionising radiation.

Handling also means handling during hazard and accident situations.

Regulations of 16 December 2016 No. 1659 relating to radiation protection and use of radiation (the Radiation Protection Regulations) (in Norwegian only) apply to the petroleum activities also.

To fulfil the requirement relating to avoiding exposure, the Norwegian Radiation Protection Authority's

- a) Guideline 1 relating to industrial radiography,
- b) Guideline 9 relating to industrial control sources in fixed installations as well as use of radiation for research purposes, and
- c) Guideline 13 relating to radioactive pollution and radioactive waste from the petroleum activities should be used in addition.

For information, see also Section 26 of the Facilities Regulations.

Re Section 38

Noise

Exposure action value as mentioned in this section, does not replace, but shall be seen in the context of, requirements related to risk reduction, cf. Section 11 of the Framework Regulations.

The risk assessment as mentioned in the third subsection, shall in particular take into account

- a) exposure level, type and duration and exposure to impulse noise such as impacts and bangs,
- b) effect on health and safety of employees who are especially exposed to risk,
- c) any effect on the employees' health and safety due to interaction of noise and chemical substances and between noise and vibrations in the work, to the extent possible,
- d) indirect effects on the employees' health and safety due to the noise's effect on the ability to register warning signals or other sounds that shall be audible to reduce the risk of accidents,
- e) the manufacturer's information on the noise level of the working equipment,
- f) whether alternative working equipment exists which gives lower noise exposure,
- g) exposure to noise beyond regular working hours which falls under the employer's responsibility,
- h) relevant information from health surveys, and other published information, to the extent possible, and
- i) availability of hearing protection with sufficient sound reduction.

Information and training for the employees as mentioned in the fifth subsection, should especially include

- a) the risk assessment made, and the measures implemented,
- b) limit values and action values,
- c) measurement results,
- d) when there is a need for hearing protection and training in correct use, risk related to noise and how signs of hearing injuries can be discovered and how they shall be reported,
- f) under which terms they are entitled to medical examination and the purpose of the examination,
- g) ensure working methods that limit noise exposure to the extent possible, and
- h) the risk of health injury potentially caused by the use of working equipment.

Re Section 39

Vibrations

Regulations laid down by the Ministry of Labour and Social Affairs 6 December 2011, pursuant to the Working Environment Act, and entering into force 1 January 2013, contain, inter alia, further provisions on protection against mechanical vibrations. Clarification of the scope as far as the petroleum activities are concerned, is directly evident from the individual regulations. 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.

For information, see also Section 24 of the Facilities Regulations.

Re Section 40

Outdoor work

To fulfil the requirement relating to criteria, the NORSOK S-002N standard, Chapter 5.8 should be used, see 4.4.9 for principles and organisation.

For information, see also Section 22 of the Facilities Regulations.

Re Section 41

Safety signs and signalling in the workplace

The guidelines have been removed.

Re Section 42

Personal protective equipment

The guidelines have been removed.

Re Section 43
Use of work equipment

The guidelines have been removed.

Re Section 44
Risk information during execution of work

No comments.

CHAPTER IX
MAINTENANCE

Re Section 45
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, trial and repair, and keeping things tidy.

Functions also mean safety functions, cf. Section 3 of the Facilities Regulations. For these functions, the requirement relating to maintenance entails that performance shall be ensured at all times, cf. Section 8 of the Facilities Regulations.

Facilities or parts of facilities 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 46
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 47
Maintenance programme

The maintenance programme can consist of sub-programmes for inspection, testing, preventive maintenance, etc., cf. Section 45.

The requirement relating to prevention as mentioned in the first subsection, entails also that the programmes shall be available at start-up, cf. Section 20, second subsection, litera b. When preparing the maintenance programme as mentioned in the first subsection, the NORSOK Z-008 standard, the NS-EN ISO 20815:2008 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, the following should be used in the area of health, working environment and safety:

- a) the standards ISO 13702, Appendix C5, and IEC 61508, and Norwegian Oil and Gas' Guideline 070 is used for **safety systems**,
- b) **the emergency shut-down system** is verified in accordance with the safety integrity levels set on the basis of the IEC 61508 standard and Norwegian Oil and Gas' Guideline 070. For plants that are not covered by this standard and this guideline, 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, may replace testing of the plant or the equipment,

- c) the Norsok N-005 standard should be used to monitor the condition of **structures**. See also Section 50,
- d) the Norsok Z-006 standard should be used for **preservation**,
- e) condition monitoring should be carried out at least once each year of **risers with support** and other particularly vulnerable parts of the pipeline system. Where there are multiple pipeline systems with identical properties for use, this monitoring can be performed on a representative selection,
- f) the Norsok R-003 standard, Appendices G and H should be used for maintenance of **lifting appliances and lifting gear**,
- g) the standards Norsok D-010, Chapters 4.2.3 and 4.2.4 and table 15.9, ISO 10417 and ISO 10423, Chapter 9 should be used for **well control and well intervention equipment, subsurface safety valves and christmas trees**, with the following addition: the requirement in the second subsection of the regulations also includes the condition of barrier elements and pressure integrity in wells.
- h) the IEC 61892 standard should be used for **electrical installations with associated equipment**.

The DNV RP G-101 guidelines may be used to establish the inspection programme for **process plants and auxiliary systems**.

Re Section 48 Planning and priorities

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 49 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 50 Special requirements for technical condition monitoring of structures, maritime systems and pipeline systems

To fulfil the requirement relating to technical condition monitoring as mentioned in the first subsection, the Norsok N-005 standard should be used in the area of health, working environment and safety. Floating facilities which shall be inspected and maintained at sea without regular dry-docking, should use DNVGL-RU-OU-0102, Chapter 2, Section 1, Part 12. Ship-shaped facilities should use DNVGL-OS-C103 Appendix A1.2.

For information about the second subsection, see Section 17 of the Facilities Regulations.

The examinations as mentioned in the fourth subsection, should particularly be carried out with a view towards projected new facilities and use of facilities beyond their original planned lifetime in mind.

Failure modes as mentioned in the fifth subsection, mean both external and internal failure modes.

Re Section 51 Specific requirements for testing of blow out preventer and other pressure control equipment

To fulfil the requirement relating to testing, complete overhaul and recertification so that the equipment can fulfil its required functions, the Norsok D-001 standard, Chapter 6.35.3, cf. Section 49 of the Facilities Regulations, and the Norsok D-010 standard, Chapters 4.2.3.5 and 4.2.3.6 as well as tables 15.4, 15.14, 15.19, 15.21, 15.32, 15.37, 15.38, 15.47, 15.53, 15.57, 15.58 and 15.59 and Appendix A, Table 39, DNVGL-OS-E101 as well as DNV-RP-E101 should be used. See Section 47 as regards this type of equipment in well interventions and overhaul of subsea wells.

Complete overhaul and recertification as mentioned in the second subsection, may be carried out continuously and in a manner which ensures that single components and the whole unit will be overhauled in a rolling five year period. The complete overhaul does not necessarily imply a full dismantling of all the

parts, cf. design, operation and maintenance history, lifetime and associated risk assessments (classification) etc., but must be carried out in a way that will be eligible for recertification.

CHAPTER X MONITORING THE EXTERNAL ENVIRONMENT

Re Section 52

General requirements to environmental monitoring

Chapter X contains supplementary provisions on how to monitor the external environment. The term operator is defined in the Framework Regulations Section 6: Anyone executing on behalf of the licensee the day to day management of the petroleum activities.

Environmental monitoring of the Norwegian continental shelf includes both monitoring of benthic habitats (sediments, soft and hard benthic fauna) and monitoring of the water column. The purpose of the environmental monitoring offshore is to achieve:

- an overview and control of pollution and impacts on the external environment from the petroleum activities
- an overview of the general condition and development around the individual facilities and in the regions (trends).

The results from the monitoring shall provide factual data based information that can be used as a basis for necessary actions to be taken on the continental shelf. The results from the monitoring can also be used for:

- assessments of the risk for environmental damage and ecological effects
- verification of models for calculating environmental risk as a function of the existing and expected discharges from the offshore activities
- verification of laboratory research
- preparation of reports in accordance with national administration plans, including environmental indicators.

In addition, the results can be reported in accordance with international treaties; to OSPAR, for instance.

Results from completed environmental monitoring, baseline surveys and impact assessments for field development will, together with an overview of discharges, form the basis for planning and implementation of further environmental monitoring. In order to obtain an optimum description of the conditions around the individual facilities and in the region, it is important that the monitoring programmes are designed in light of the existing discharge situation. This means that the operators in the planning stage shall consider and include relevant pollution components in the monitoring programme, as necessary, based on what is discharged on the individual field and in the region. Such an evaluation requires that the monitoring, annual reporting in accordance with the Management Regulations Section 34 c and defined challenges from the Environmental Impact Assessments be seen as a whole.

The cooperation requirement as mentioned in the third subsection, entails that several operators cooperate so that the monitoring activities are managed in relation to regional risk, and arrangements are made for using the best available technology (BAT). The requirement relating to cooperation also entails that there shall be agreements between operators that have partly or completely identical areas of impact for pollution from their own activities. It is vital that the monitoring is conducted in accordance with a defined framework to ensure comparable results between years, and between different regions. The *Guidelines for environmental monitoring of the petroleum activities offshore (in Norwegian only)* will provide the operators with a template for a standardised way of carrying out the surveys, thus making it possible to compare results from year to year and between various regions. The guidelines cover the most important surveys that all operators shall carry out, and the operators themselves shall decide whether there is need for additional or other surveys on the individual field or in the region. Any deviations from the standard station grid that have been used in previous surveys or given in the guidelines, shall be justified in the programmes for the environmental surveys.

For monitoring and control relating to proper implementation as regards health and safety, see Section 31.

It may also be relevant to monitor areas in the beach zone and onshore if these areas are affected by the petroleum activities.

The Norwegian Environment Agency and the Norwegian Radiation Protection Authority may, as for the other operator activities, audit the environmental monitoring in their areas. This applies to all stages of the activities, from planning of the surveys through to the various operators' internal use of the results.

Plans for and results from monitoring of the external environment shall be reported to the Norwegian Environment Authority, and to the Norwegian Radiation Protection Agency for radioactivity, in accordance with Section 34 of the Management Regulations.

Re Section 53 **Baseline surveys**

The scope of baseline surveys as mentioned in the first subsection, may be adjusted to the need for obtaining new knowledge.

The scope of the surveys as mentioned in the first subsection, litera a, depends inter alia on the distance to areas that have been surveyed earlier, and benthic conditions.

The scope of the surveys as mentioned in the first subsection, litera b, depends inter alia on which vulnerable environmental values (species and habitats) that may be expected in the area. Vulnerable environmental values may include coral reefs, sponges, spawning grounds (sandeel).

The Norwegian Environment Agency may, following a concrete in-each-case assessment, alter the duration of a baseline survey. Experience has shown that it is mostly a question of prolonging the duration. If the Environment Agency alters the duration of a baseline survey, it will be effectuated as an administrative decision, which must be notified beforehand and justified, and which can be appealed against.

Re Section 54 **Environmental monitoring of benthic habitats**

As a whole, the monitoring of the benthic habitats shall contribute to explaining whether a station or a larger area around the individual facility or in a region is affected by discharges from the activities. The results from the environmental monitoring shall be such that they can be used to check the conclusions of the impact assessment (IA) for the individual field and for the region. The relation between IA, actual discharges and environmental monitoring shall be emphasised.

A normal frequency for environmental monitoring is every three years. The guidelines may allow for a lower frequency, based on pollution loads, history and regional knowledge.

Since 1997, Norway has used the terms "reference stations" and "regional stations" in connection with monitoring of the seabed on the Norwegian continental shelf. Both types of stations normally cover the background level of selected components in the area, and the reference stations can, in given instances, function as regional stations and vice versa. Reference stations and regional stations in one and the same region are used to estimate background levels in the regions.

The term reference stations is now discontinued, and all non-field-specific stations are called regional stations in the new Guidelines for environmental monitoring of the petroleum activities offshore (in Norwegian only).

Plans for environmental monitoring of the benthic habitats shall be submitted to the Norwegian Environment Authority in accordance with Section 34 of the Management Regulations.

Re Section 55 **Environmental monitoring of the water column**

The environmental monitoring of the water column is carried out so that possible effects from the discharges of the petroleum activities on the pelagic environment, can be documented. The requirement on monitoring of the water column is not limited to monitoring of produced water, but also comprises relevant added chemicals and leakage and leaks from the seabed, plus other relevant discharges, if any.

The frequency of monitoring in the field is every three years. The monitoring should include hydrographical measurements, chemical measurements and monitoring of organisms in cages and free-living organisms. The scope of the monitoring must be discussed with the Norwegian Environment Agency.

There are currently few internationally accepted standardised methods for monitoring of biological effects in the water column. A number of methods are, however, under development, and many have been tested in the field. This primarily applies to various biomarkers which are being used more and more for monitoring impact and, gradually, for monitoring condition. Still, measurement of concentration levels in

selected organisms will see further use in the environmental monitoring around petroleum facilities on the Norwegian continental shelf. The operators shall participate actively in the testing and development of suitable methods for environmental monitoring. The period between two monitoring activities in the field shall be used, hence, to develop and qualify new methods. The Norwegian Environment Agency should be consulted on significant items during the process, by presenting progress and plans for the coming year in an annual planning meeting as outlined in the *Guidelines for environmental monitoring of the petroleum activities offshore (in Norwegian only)*.

As the monitoring is still at the stage of methods being developed and tested, the guidelines will be regularly revised. As soon as suitable methods for monitoring the effects of long-term discharge impact will be established, a selection of these shall be used in a more standardised programme.

Plans for environmental monitoring of the water column shall be submitted to the Norwegian Environment Authority in accordance with Section 34 of the Management Regulations.

Re Section 56

Follow-up of monitoring results

By environmental monitoring of offshore petroleum activities irregularities and deviations connected with the activities, can be detected. Examples of such deviations can be abnormally high THC values, which cannot be linked to known discharges. The operator has a duty to determine the reason for the deviation and take corrective action if necessary.

Deviations shall be reported to the Norwegian Environment Authority as soon as possible, cf. Section 34 of the Management Regulations.

Re Section 57

Detection and mapping of acute pollution (remote sensing system)

The purpose of detection and mapping is to ensure that the information concerning the pollution is sufficient, so that the correct actions are taken in order to stop and limit the pollution, cf. Section 48 of the Framework Regulations. This provision also applies to monitoring of injection activities. That entails that the operator shall establish a system for planning and implementation of such an activity, to ensure that there will be no leaks in connection with injection. Moreover, the operator shall establish a monitoring system for early detection of possible leaks. A plan for corrective measures shall be available, and it shall be possible to implement it instantly.

A system for detection and mapping may consist of a combination of the following elements:

- a) Visual observation of the sea surface by personnel on board aircraft, seagoing vessels or facilities. Observations must be based on competence for visually quantifying oil and chemicals with the aid of area measurement and use of colour thickness maps for the relevant types of oil or chemicals.
- b) Sensors and relevant equipment placed on board satellites, aircraft, seagoing vessels or facilities, with associated competence for interpretation of monitoring data from the various sensors.
- c) Modelling tools to predict transport and spread of acute pollution.
- d) Meteorological services that are necessary in order to support the remote measurement.
- e) Measures for detection and mapping of acute pollution in the water column and on the seabed.

Re Section 58

Environmental surveys in the event of acute pollution

Follow-up surveys mean chemical and biological surveys both during and after acute pollution. It should be possible to utilise the results of such surveys both during the combat phase with regard to evaluation of relevant measures for optimal combating of the pollution, and in the restoration phase with regard to identification of environmental values that have been harmed. Such surveys may require special instrumentation and technical measuring equipment, particularly in the event of underwater discharges for surveys in the water column.

The Norwegian Environment Agency's *Guidelines for environmental surveys in marine environment following acute oil pollution (TA-2995/2012) (in Norwegian only)* provide a framework for the contents of such surveys.

A survey report shall be submitted to the National Coastal Administration and the Norwegian Environment Agency in accordance with Section 30 of the Management Regulations.

Re Section 59

Characterisation of oil and condensate

To be able to characterize as soon as possible as mentioned in the first subsection, in the event of a discovery, the oil or condensate should immediately be sampled with a sample volume sufficient to characterize physical and chemical properties. If possible, the sample volume should be sufficient to perform meso scale weathering studies. Whenever possible, the results of the meso scale weathering studies should be available prior to start-up of production drilling.

Prior to new activities in the same reservoir or in the event of field development, a full weathering study should normally also be completed.

The results of the characterization constitute, inter alia, an important basis for implementing simulations of drift and dispersion, cf. Section 17 of the Management Regulations, and for obtaining a correct description of the efficacy of current emergency preparedness material, cf. Section 42 of the Facilities Regulations.

Weathering as mentioned in the second subsection, means how the chemical and physical properties of the oil/condensate change over time as a result of the external conditions it is subjected to. Relevant external conditions include expected wind and wave conditions on the location, and the possible occurrence of ice on the sea surface.

Oil and condensate that can occur as acute pollution as mentioned in the third subsection, also mean blends of different production streams.

Re Section 59a

Analysis of radioactivity in formation water

The results of the radioactivity analyses shall form the basis for assessments in the impact assessment in a future development of the discovery, and later for an application for the discharge of naturally occurring radioactive substances from the field.

CHAPTER XI

EMISSIONS AND DISCHARGES TO THE EXTERNAL ENVIRONMENT

The operator must obtain a permit from the Norwegian Environmental Agency for petroleum activities under Chapter 3 of the Pollution Control Act (in Norwegian only). Application for permit under the Pollution Control Act is subject to Chapter 36 of the Pollution Control Regulations (in Norwegian only), and a fee is fixed for the Environmental Agency's processing relating to applications for permits pursuant to Chapter 36 of the Pollution Control Regulations (in Norwegian only).

The regulations' general requirements for the petroleum activities on the continental shelf apply to all operators. The permits under the Pollution Control Act will normally contain conditions that are specific and adapted to each activity. Chapter 36 of the Pollution Control Regulations (in Norwegian only) gives further provisions on the processing of permits under the Pollution Control Act. The Norwegian Environment Agency has described further expectations for the content of applications and expected processing time in the Guidelines for applications regarding offshore petroleum activities, TA-2847-2011. Chapter 39 of the Pollution Control Regulations (in Norwegian only) gives provisions for fees for work with permits.

Re Section 60

Discharge of produced water

Section 11 of the Framework Regulations describes principles for risk reduction, including requirements regarding the use of best available techniques (BAT).

The Management Regulations set specific requirements for follow-up and improvement in Sections 19-23, including requirements for continuous improvement. In addition, the Norwegian Environment Agency shall be informed in case of changes in risk of pollution cf. Section 34 subsection one, litera b of the Management Regulations.

Oil content as mentioned in the second subsection, means content of dispersed oil in undiluted water decided in accordance with Section 70.

In accordance with principles of risk reduction and management (Chapters II and III of the Framework Regulations and Chapter II of the Management Regulations), the responsible party shall establish a management system that ensures compliance with the HSE regulations and continuous improvement. This entails that the responsible party shall establish and develop goals and strategies for compliance with the regulatory requirement to keep the oil content as low as possible. Section 55 of the Facilities Regulations does also state that facilities for treatment of produced water shall be designed in such a way that oil content in each discharge is as low as possible.

OSPAR Recommendation 2012/5 is implemented in Norwegian legislation in Section 60 of the Activities Regulations. The Recommendation includes requirements to perform risk assessments on discharge of produced water, and that best available measures shall be selected in order to reduce risk.

Risk assessments should be performed with methods based on expected environmental concentrations and expected non-harmful concentrations (PEC/PNEC) on substance level. The method based on Environmental Impact Factor may be used.

“Significant changes in the discharge of produced water” mentioned in third subsection, includes:

- a) the introduction of new measures expected to have an impact on the risk level, for example reinjection, chemical substitution and treatment measures
- b) increased discharges as a result of changes in injection rate
- c) significant changes in the composition of produced water, for example as a result of inclusion or exclusion of well streams or chemicals
- d) 50 % changes in amount of oil to sea, oil concentration or chemicals with significant contribution to the risk, applying to installations with EIF between 10 and 50
- e) 15 % changes in amount of oil to sea, oil concentration or chemicals with significant contribution to the risk, applying to installations with EIF higher than 50

When assessing how the treatment facilities shall operate to minimize the environmental impact, the oil content of the discharge shall be evaluated against inter alia use and discharge of chemicals.

The risk assessments shall be reported in accordance with Section 34 litera c of the Management Regulations.

According to Section 11 of the Framework Regulations, «the responsible party shall choose the technical, operational, or organizational solution that (...) offer the best results. In addition, Section 23 of the Management Regulations and Section 15 of the Framework Regulations demand continuous improvement. Therefore, the Norwegian Environment Agency expect that the results from the risk assessment are applied further in new BAT assessments and potential measures to reduce the environmental risk for each field.

New technology assessments are performed for all installations according to the results from risk assessments, but the level of detail may depend on the magnitude of the risk contribution or the oil content in the water discharged to sea. The assessments shall include measures to reduce the total discharged volume of water, for example with techniques such as water shut-off, downhole separation and injection, as well as treatment measures.

For fields with high risk contribution or with high oil content in the water discharged to sea, detailed assessments of costs associated with the various measures should be compared to the environmental benefits. For fields with a low risk contribution, the same degree of details in cost/benefit assessments will normally not be necessary, in particular as regards implementing of expensive technology. The Norwegian Environment Agency will consider the definition of low/high risk contribution when results from risk assessments are available. When technology is available for treating other substances than dispersed oil, the Norwegian Environment Agency may require such treatments.

Technical solutions that can reduce the environmental impact of discharges of oily water, may be downhole solutions for reduced water production, reinjection or new/altered technical elements in the treatment plant, for example. Assessments should be reported in accordance with Section 34 litera c of the Management Regulations.

Chemicals following the produced water to sea after treatment, shall be covered by the permit in accordance with Section 66 first subsection. Adding chemicals that do not contain a specific function in the production or treatment process, is not allowed.

Measures as mentioned in the sixth subsection, may include monitoring of oil and seabirds, or mechanical dispersion, for example. There may also be other technical measures to reduce the visible oil on the sea surface, changing the discharge point or temporarily reduce the discharges of produced water, for example.

Re Section 60a

Discharge of drainage water and other oily water

Oily drainage water means hosing-down water from the facility decks and rain water.

Drainage water and other oily water not treated and then discharged to the sea from the facility in accordance with Section 60a, or injected, are wastes and should be brought to an approved recipient ashore. In connection with the ban on adding unused chemicals, including chemical residues and other waste in drainage water and other oily water to be discharged to sea pursuant to this section, reference is made to Section 66, second subsection, and to Chapter 22 of the Pollution Control Regulations (in Norwegian only).

Re Section 60b

Discharge of oily displacement water

Displacement water means seawater in storage cells for oil. The seawater enters the storage cells when oil is loaded for further export and escapes to sea when the storage cells are filled with new oil.

Re Section 61

Emissions to air

Polluting emissions to air on the Norwegian shelf come under the scope of the Pollution Control Act (in Norwegian only). With regard to energy-producing plants offshore (existing and new plants with a supplied total nominal thermal output exceeding 50 MW), the EU council directive 96/61/EEC on integrated prevention and limitation of pollution (the IPPC directive) also applies. Pursuant to the EEA agreement, the directive applies to Norway and has been implemented in Norwegian legislation. The directive sets requirements for the pollution control authorities' follow-up of the enterprises and the duties of these enterprises with respect to the environment. Norway's obligations under the directive will be fulfilled by application of the Pollution Control Act (in Norwegian only). Follow-up of the directive implies the stipulation of new requirements for emissions to air from energy-producing plants offshore.

The Pollution Control Act (in Norwegian only) and the IPPC directive require that the best available techniques (BAT) be used when stipulating emission requirements to reflect what can be achieved by using BAT, while not specifying the actual techniques to be used. To help the authorities decide which techniques can be considered BAT, the EU is preparing instructive BAT reference documents, both for individual industries and across industries. These documents show which techniques can be generally considered to be consistent with the IPPC directive's requirements relating to BAT. Thus, the BREF documents cannot be said to specify BAT requirements as such, but shall be regarded as guidelines for BAT assessments. The energy-producing plants offshore are included in the BREF for large combustion plants (LCP-BREF). When stipulating what shall be considered BAT in the individual case, the pollution authorities will emphasise available relevant BREFs, the installation's technical characteristics, its geographical location and the local environmental conditions.

New fields and new development projects shall be operated in accordance with the directive from the date when the activities start (Article 4).

Choice of development solution may be of great importance to the technical and economic consequences by limiting the emissions to air. There may therefore be a mutual connection between the terms set in the emission permit to limit emissions, and the choice of development concept. Therefore, in the event of new developments and upgrading of existing ones, the operator should inform the Norwegian Environment Agency about its BAT assessments early in the development process, i.e. in ample time prior to making a choice and deciding on development solutions, and prior to entering into binding contracts. This applies regardless of whether this development is subject to the requirement for carrying out impact assessments. The BAT assessments should also be included in the impact assessment and in the application for emission permit pursuant to the Pollution Control Act (in Norwegian only). In the application, the operator shall demonstrate and substantiate that the chosen solutions can be considered BAT.

According to Section 11 of the Pollution Control Act (in Norwegian only), the company shall apply for emission of NO_x and CO₂. It follows from Section 11, second subsection of the Pollution Control Act (in Norwegian only) that "a party subject to a quota obligation pursuant to Section 4 of the Climate Quota Act (in Norwegian only), shall, upon application, be granted permission for emissions of greenhouse gases

subject to quota obligations if said party can prove that he is able to monitor and report the emissions in a satisfactory manner.”

Re Section 61a **Energy management**

The requirement shall ensure that energy efficiency is maintained and improved continuously. An energy management system is a prerequisite for operating in accordance with BAT, cf. Section 11 second subsection of the Framework Regulations. For new fields, the energy management system, including a flaring strategy, shall be in place when the field starts production. The energy management system shall be updated regularly.

Re Section 61b **Energy efficiency**

For new facilities, the requirement implies that the production facilities and the energy facilities shall be designed with the aim of achieving as energy efficient production and operation as possible throughout the lifetime of the field. For existing facilities, the requirement implies that continuous measures shall be taken to improve energy efficiency. Examples of measures are power co-operation, increased utilization of surplus energy, use of solutions that work efficiently also by changes in production volume, operational optimization and reduced flaring. NORSOK S-003 provides guidance for energy efficient design and operation of processes and energy facilities.

Re Section 62 **Ecotoxicological testing of chemicals**

A chemical is a generic term for chemical substances and/or substance mixtures.

The term “substance” implies, as referred to in OSPAR Guidelines for Completing the HOCNF, as the chemical element and its chemical compound in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product, and any impurity deriving from the process used. Solvents, which may be separated without affecting the stability of the substance or changing its composition, are excluded. Substances were previously called component.

All chemicals used in the petroleum sector, are also subject to the Product Control Act (in Norwegian only) with regulations, including REACH.

OECD’s principles for good laboratory practice as mentioned in first section, imply the principles described in OECD Series on Principles of Good Laboratory Practice (GLP) and Compliance Monitoring (ISSN: 2077-785X). Norwegian Accreditation (NA) is the Norwegian agency for the accreditation of technical matters, including GLP as mentioned in the first subsection.

Re second subsection

“OECD guidelines for testing of chemicals” refers to The OECD Guidelines for the Testing of Chemicals.

Test no. 306 (Biodegradability in Seawater) is found in OECD Guidelines for Testing of Chemicals, section 3 (1981, ISSN: 2074-577x (online)). The guideline describes two potential tests – “shaker flask test” and “closed bottle test”. Only one test is required.

“Substances that are known to be toxic to microorganisms” denotes in particular biocides. For such substances, recommendations in Annex II of OECD 1992 302 should be followed.

If biodegradation data from fresh water tests are used, a safety factor of 0.7 should be applied, for recalculation of biodegradation.

Re third subsection

“OECD guidelines for testing of chemicals” refers to The OECD Guidelines for the Testing of Chemicals.

Test no 117 (Partition Coefficient (n-octanol/water), HPLC Method) and 107 (Partition Coefficient (n-octanol/water): Shake Flask Method) are found in OECD’s guidelines for testing of chemicals section 1 (1981, ISSN: 2074-5753 (online)).

The potential for bioaccumulation is given as the partition coefficient octanol/water, Log Pow.

OECD test no. 107 is a suitable method for substances that are water soluble and which do not dissolve or dissociate, but are not suitable for lipophilic organic substances, complex substances organo metals or surface active agents. The method can be used to determine LogPow-values from -2 to 4.

OECD test no. 117 is suitable for complex substances, but not suitable for strong acids and bases, metal complexes, substances reacting with the eluent or surface active substances. The method can be used to find log Pow-values from 0 to 6. If the results from OECD test no. 117 demonstrate several values, all peaks with an area above 5 % in the chromatogram shall be stated. The highest value of these is defined as the substance's Log Pow.

“Substances that cannot be tested according to standardized methods”, denotes in particular surface active substances.

If log Pow is greater than or equal to 3, it is assumed that the substance bioaccumulates, unless experimentally determined bioaccumulation data (BCF) indicate the opposite.

Professional evaluation of bioaccumulation potential and estimated values for log Pow should be stated in the HOCNF comment field.

Re fourth subsection

With ISO 10253:2006 implies ISO 10253:2006: Marine algal growth inhibition test with *Skeletonema costatum* and *Phaeodactylum tricorutum*.

With "ISO 14669:1999" implies ISO 14669:1999: Determination of acute lethal toxicity to marine copepods (Copepoda, Crustacea).

“OSPAR’s protocol for testing of chemicals used in the offshore oil industry” refers to "OSPAR Protocols on Methods for the Testing of Chemicals Used in the Offshore Oil Industry (reference number: 2005-11 (a revised version of agreement 1995-07))". Testing of acute toxicity on fish is described in "Part B: Protocol for a Fish Acute-Toxicity Test", while testing of toxicity on *Corophium* sp is described in "Part A: A Sediment Bioassay using the Amphipod *Corophium* sp".

Corophium sp. is a benthic amphipod, and is therefore an appropriate model organism to study toxicity of substances that could be expected to end up in sediments.

Re sixth subsection

"Harmonised Offshore Chemical Notification Format", refers to annex 1 in OSPAR Recommendation 2010/3 on a Harmonised Offshore Chemical Notification Format (HOCNF). With "part 2" implies Part 2: Ecotoxicological information.

To fill out the HOCNF, see OSPAR Guidelines for Completing the Harmonised Offshore Chemical Notification Format (HOCNF) (Reference number: 2010-05) and Supplementary guidance for the completing of harmonised offshore notification format (HOCNF) for the Norwegian sector. Submitting the HOCNF to the Norwegian Environment Agency is not required, however, it has to be available on request.

The requirements apply for chemicals used in the petroleum industry (see Section 6 litera g of the Framework Regulations); including those associated with exploration, normal operation and maintenance during the extraction and processing of oil, gas and, condensate, shut-down of installations and plugging of wells, including emergency preparedness chemicals. Chemicals used exclusively for household purposes and on the facility's living quarters, are exempt.

Chemicals used in auxiliary system, pipe lines and water-injection, including chemicals that remain in the well and chemicals that will follow the hydrocarbon stream even though they are not intended for discharge on the field, are covered by requirements for ecotoxicological testing and documentation.

In the context of testing of bioaccumulation and biodegradability of dope, the grease part is considered to be a substance. All components of grease must be expressed in HOCNF.

Chemicals in fire water systems have since 1st of January 2013 been covered by requirements for ecotoxicological testing and documentation.

Accidental emissions of chemicals occur in closed systems. If the system volume is large, it will mean there is potential for large emissions. Testing and ecotoxicological documentation shall ensure that there is available information about chemicals in such systems in case of accidental emissions. Consumption, as mentioned in sixth subsection litera b, denotes the first filling of the system, replacement and all other use of the chemical. Chemicals in closed systems with no discharge to the external environment, may for example be BOP-liquid or hydraulic liquid.

For testing and documentation of dispersants and shoreline cleaning agents, the requirements in Chapter 19 of the Regulations relating to pollution control (in Norwegian only) .

Exact denomination of the strong acids and bases that are exempted for requirements on ecotoxicological testing, cf. subsection eight, with corresponding CAS-numbers, are included in the table below.

Polymers exempted from testing and ecotoxicological documentation in the form of HONF Part Two are considered to be non-degradable, but not toxic or accumulative. The operator may choose to provide data if he considers this relevant to the environmental assessments.

Substance	CAS-no.
Potassium hydroxide	1310-58-3
Sodium hydroxide	1310-73-2
Hydrochloric acid	7647-01-0
Sulfuric acid	7664-93-9
Nitric acid	7697-37-2
Phosphoric acid	7664-38-2

Re seventh subsection

Additive packages in Chemicals in closed systems with no discharge to the external environment, can be named additive packages as a single substance in the HOCNF, even if consisting of several substances.

Impurities from the production process as mentioned above, which comprises more than 1 percent of the substance mixture, are considered as substances to be mentioned in the HOCNF, but are not subject to testing requirements.

Re Section 63

Categorisation of substances and chemicals

A chemical is a generic term for chemical substances and/or mixtures of substances.

“Substance” refers to, as in OSPAR Guidelines for Completing the HOCNF; the chemical element and its chemical compound in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product, and any impurity deriving from the process used. Solvents which may be separated without affecting the stability of the substance or changing its composition, are excluded. Substances were previously called component.

The priority list can be found in www.miljostatus.no/prioritetslisten.

“OSPAR’s Priority List” refers to OSPAR List of Chemicals for Priority Action (Revised 2011) (Reference number 2004-12).

Substances covered by REACH’s list of candidates can be found in <http://www.echa.europa.eu/candidate-list-table>.

The exception from classification for mixtures in black category is sustained for substances where the content of substance is below the lowest concentration limit for classification, cf. the Regulations on classification, labelling and packaging of substances and mixtures (CLP) (in Norwegian only).

Mutagenic and reprotoxic substances denote substances that damage genetic material in gametes (Muta) category 1A and 1B and reprotoxic substances (Repr) 1A and 1B, cf. the Regulations on classification, labelling and packaging of substances and mixtures (CLP) (in Norwegian only).

When assessing the properties of degradation products for substances with moderate degradation, results from testing of inherent biodegradability, among other things, may be used together with other available information on substances. The assessment should be documented. In the industry, the terms y1, y2 and y3 and respective yellow subcategories 1, 2 and 3 are often used.

If there is a lack of knowledge on degradation products, these should be considered to fall in subcategory 3 in accordance with the precautionary principle.

The strong acids and bases which are exempt from requirements for ecotoxicological testing, cf. Section 62 eighth subsection, are treated as substances in yellow category. “OSPAR’s PLONOR list”, as mentioned in the second subsection, refers to OSPAR List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment (PLONOR) (OSPAR Agreement 2013-06).

REACH Annex V includes substances that are exempted registration in REACH. Entry 8 and 9 in Annex V include naturally occurring substances. Some of these are classified as non-hazardous and can be equated with substances on the PLONOR list. Substances in Entry 7 can be treated likewise if it can be demonstrated that they are not hazardous, in accordance with Directive 67/548/EEC with regard to the marine environment, and not OBT or vPvN as given in the criteria in REACH Annex XIII, or identifies in

accordance to Article 59 (1) or Article 57 (f). If questions whether a substance which is covered in REACH Annex V is in green category, the Norwegian Environment Agency shall be contacted for an assessment.

Re Section 64

Environmental assessments of chemicals

Environmental assessments shall also be performed for chemicals that are not covered by requirements to ecotoxicological testing and documentation. The operator should assess the toxicity, biodegradability and potential for bioaccumulation of these chemicals. The assessment should be documented and based on test data or literature data.

The assessment of the chemicals as mentioned in the first subsection, should also include treatment of waste/hazardous waste and necessary transport. Assessment of the fate of the chemicals in the environment may be included under “other matters of significance”.

Re Section 65

Choice of chemicals

The duty to substitute chemicals which may harm health or the environment with less damaging alternatives, also follows from Section 3a on substitution duty in the Product Control Act (in Norwegian only).

Impurities as mentioned in the second subsection, mean, inter alia, heavy metals in weight materials.

Separate plans for substitution of chemicals in the red and black category, and the yellow category, subcategories 2 and 3, shall be reported annually to the Norwegian Environment Agency in accordance with Section 34, first subsection, litera c.

Re Section 66

Use and discharge of chemicals

The basis for permits as mentioned in the first subsection, is the results from testing, categorisation and assessment of chemicals as mentioned in Sections 62, 63 and 64.

Ordinary pollution from living quarters, offices, etc., including sanitary drainage and chemicals used for cleaning of drinking water systems, are permitted pursuant to Section 8, first subsection, No. 2 of the Pollution Control Act (in Norwegian only), and is therefore not subject to the duty of obtaining a permit either. The Product Control Act (in Norwegian only) and its regulations apply to all chemicals used. This means, inter alia, that the substitution requirement also applies.

In activities that entail use and/or discharge of chemicals in amounts which the operator considers to be very small and not covered by applicable permits, the Norwegian Environment Agency may be contacted to clarify the need for a permit.

The ban on discharges of unused chemicals as mentioned in the second subsection, also applies to chemicals on the OSPAR PLONOR list.

The duty to reduce the use and discharge to the extent possible, also applies to chemicals for which there are no specific use and discharge limits, cf. Section 11 of the Framework Regulations.

Even if the operator has received permission to use and discharge chemicals, an assessment shall be made of whether there are other less environmentally harmful alternatives pursuant to the substitution duty in Section 3a of the Product Control Act (in Norwegian only), and Section 65 of these regulations.

As a basis to determine the assumed colour category in connection with field testing of chemicals, the operator must make an assessment of the toxicity of the chemicals and the biodegradability and potential for bioaccumulation. The assessment should be documented and be based on test data or literature data.

When handling applications for the discharge of large amounts of water containing chemicals from pipelines as mentioned in the eighth subsection, the Norwegian Environment Agency will place great emphasis on the recommendations from the relevant expert agencies. The conclusions following from the consultations with independent expert agencies, should be included in the application. Large amounts in this case refer to volumes greater than 1000 m³ of water.

As regards use of dispersants and beach cleaning agents for combating acute oil pollution, reference is made to Chapter 19 of the Pollution Control Regulations (in Norwegian only). The Norwegian Coastal Administration is the professional authority in an acute situation if dispersants are not included in the

operator's emergency preparedness plans. All use and discharge of chemicals shall be reported in accordance with Section 34 litera c of the Management Regulations.

Regarding planning and use of dispersants and beach-cleaning agents, refer to Chapter 19 of the Pollution Control Regulations (in Norwegian only). See also the Activities Regulations Sections 73 and 79.

Re Section 66a

Use and discharge of radioactive trace elements

Although the permission is given for use and discharge of a certain amount of radioactive trace elements, emissions shall be as low as possible.

Re Section 67

Chemicals for emergency preparedness

Emergency preparedness chemicals shall be tested and assessed as mentioned in Sections 62 and 64. The assessment shall not be submitted.

Any possible use and discharge of chemicals for emergency preparedness, cf. Section 66, shall be reported as mentioned in Section 34 litera c of the Management Regulations.

The responsible party shall assess whether there are less hazardous emergency preparedness chemicals than those in the list of emergency preparedness chemicals, in accordance with Section 3a of the Product Control Act (in Norwegian only).

Re Section 68

Discharge of cuttings, sand and solid particles

Normally, the Norwegian Environment Agency will not impose further requirements for handling of cuttings with appendages of water-based drilling fluid. This will be considered, however, in areas with vulnerable benthic communities.

Cuttings means both solid material from the formation and solid material added as part of the drilling fluid or other fluids used in drilling and well activities. Organic drilling fluid means mineral oil-based and synthetic drilling fluid.

Even if the oil or base fluid in synthetic drilling fluid as mentioned in the second subsection, is less than ten grams per kilo of dry substance, the operator should consider additional cleaning or other disposal methods than discharge to sea, for example injection.

Information on case processing times can be obtained from the Norwegian Environment Agency upon request.

Re Section 69

Discharge from formation testing and clean-up of wells

Start-up of any flaring as mentioned in the second subsection, should take place in daylight. Information on case processing times can be obtained from the Norwegian Environment Agency upon request.

Re Section 70

Measuring the quantity of discharged oil, other substances and water

With regard to measuring, Norwegian Oil and Gas' guidelines for sampling and analysis of produced water can be used.

An overview of which substances the requirement applies to, can be found in *Guidelines for reporting from the petroleum activities offshore (in Norwegian only)*. The measurement programme as mentioned in the second subsection, should include a description of the method for manual measurement if an automatic analyser is out of commission. The measurement programme should also cover changes in procedures in cases where unstable operation of the installation is expected or detected.

Re Section 70a

Measuring the discharged amount of radioactive substances

No comments.

Re Section 71

Measuring associated fluids discharged with solids

Organic drilling fluid means mineral oil-based and synthetic drilling fluid. Solids include cuttings, produced sand and other solid materials from the well, such as packing and inert materials.

The requirement relating to measuring also applies to sediments and deposits from process equipment

CHAPTER XII WASTE

Re Section 72

Waste

Handling of waste as mentioned in the second subsection, shall be done in accordance with the Pollution Control Act (in Norwegian only). Reference is made to Section 7 on the duty to avoid pollution, Section 28 on prohibition against litter and Section 32 on handling of production waste. Unless otherwise specifically determined, regulations relating to waste from the petroleum activities are applicable to the extent they are suitable. In this connection, reference is made to Chapter 11 on hazardous waste of the Waste Regulations (in Norwegian only) and Chapter 21 of the Pollution Control Regulations (in Norwegian only), Prohibition against incineration at sea, and Chapter 22 on dredging and dumping in sea and watercourses.

The prohibition against the leaving behind of equipment on the seabed as mentioned in the third subsection, is a specification of Section 7 and Section 28 of the Pollution Control Act (in Norwegian only). The prohibition entails that equipment that is used in activities associated with the petroleum activities, including well heads, shall be retrieved after use if leaving it behind will result in damage or negative consequences to the environment. The Norwegian Environment Agency may, upon application, permit the leaving behind of equipment on the seabed. The Norwegian Environment Agency will, however, follow a strict practice when handling applications for leaving equipment behind, and permission will be granted in exceptional cases only. The operator is recommended to contact the Norwegian Environment Agency with regard to the assessment of whether concrete cases of leaving behind will result in damage or negative consequences to the environment, and before submitting applications for leaving behind. As far as the prohibition against dumping is concerned, reference is made to Chapter 22 of the Pollution Control Regulations (in Norwegian only).

The plan for treatment of waste as mentioned in the fourth subsection, should include reduction of waste volume, source separation, reuse, recycling and potential energy recovery.

Waste oil as mentioned in the fifth subsection, means used lubricants and similar oils (used in engines, gear boxes, hydraulic systems, transformers, switches etc.) that can no longer be used as originally intended.

CHAPTER XIII EMERGENCY PREPAREDNESS

Re Section 73

Establishment of emergency preparedness

To fulfil the requirement relating to the strategy as mentioned in the first subsection, the standard ISO 15544 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.

In order to fulfil the requirement relating to establishing emergency preparedness as mentioned in the first subsection, the NORSOK U-100N standard, Chapters 5.1.5 and 9, should be used for manned underwater operations.

The emergency preparedness shall be coordinated, cf. Section 20 of the Framework Regulations, and the operator shall cooperate with other operators, cf. Section 21 of the Framework Regulations.

The results of the environmental risk and emergency preparedness analysis and the description of planned emergency preparedness, as mentioned in the first subsection, should be submitted as part of the application for permit pursuant to the Pollution Control Act (in Norwegian only).

Re Section 74

Shared use of emergency preparedness resources

Contractual cooperation as mentioned in the first subsection, means, for example, entering into agreements relating to common emergency preparedness plans or agreements to use the emergency preparedness resources of others to ensure optimal emergency response in major acute incidents within an area or region. The availability of public resources in acute pollution situations will depend on no other prioritised activities being underway. Necessary evaluations of sensitivity and uncertainty with respect to availability of such resources shall be performed.

Re Section 75

Emergency preparedness organisation

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

In order to ensure robustness as mentioned in the first subsection, emphasis should be placed on the individual's education and expertise, experience, physical suitability, personal qualities and experience from drills and training when selecting the 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 are unable to carry out their duties.

Necessary functions as mentioned in the second subsection, means, inter alia, operational leadership, operation, remote measurement, environment, economy, logistics and information.

Re Section 76

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,
- d) a description of fields and facility(-ies) and prioritised vulnerable environmental values 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 vis-à-vis other involved parties, cf. Section 74, second and third subsections,
- h) any cooperation procedures and agreements, cf. Section 78.

Action plans as mentioned in litera c of these guidelines, should cover, inter alia,

- a) emergency preparedness strategy, emergency preparedness measures and decision criteria for the emergency preparedness phases,
- b) in order to handle acute pollution, the emergency preparedness strategy should comprise objectives for protection of prioritised vulnerable environmental values. The description of emergency preparedness measures and decision criteria for the various emergency preparedness phases should include response times for relevant emergency preparedness measures, remote measurements, choice of emergency preparedness measures based on minimum environmental harm considerations, shore clean-up and environmental surveys in case of acute pollution,
- c) for the health-related emergency preparedness, treatment of
 - a) personal injuries in the event of major accident situations,
 - b) personal injuries in the event of industrial accidents,
 - c) acute illness,

- d) psychological reactions,
- e) communicable diseases,
- f) poisoning.

To fulfil the requirement relating to emergency preparedness plans, the NORSOK U-100N standard, Chapter 9.1, should be used for manned underwater operations.

With regard to Chapter 19 of the Pollution Control Regulations (in Norwegian only), certain supporting documents have been prepared as an aid to enterprises wishing to include dispersion as a method of emergency preparedness. They consist of “Control form for use of dispersants” and “Decision form for use of dispersants with guidelines”. Further information can be found on the websites of the Norwegian Environment Agency (www.miljodirektoratet.no) and the Norwegian Coastal Administration (www.kystverket.no).

Re Section 77

Handling of hazard and accident situations

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

- a) the facility's central control room or other central function,
- b) the Joint Rescue Coordination Centre
- c) one or more parts of the operator's emergency preparedness organisation,
- d) the contractors' emergency preparedness organisations,
- e) other licensees and partners in the event of an agreement relating to coordinated emergency preparedness resources, or in the event of joint use of production and/or transport systems.

The scope of the notification will depend on the situation at hand. The Joint Rescue Coordination Centre as mentioned in litera b of these guidelines, handles further notification of bodies that have national emergency resources. This includes notification of the Norwegian Coastal Administration, which is responsible for the public emergency preparedness in relation to acute pollution. For information, see also Section 18 of the Facilities Regulations.

To fulfil the requirement to notification of well control incidents, the Norwegian Oil and Gas Guideline No. 135 should be used.

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 safe areas on vessels, facilities or land,
- c) give injured personnel lifesaving first aid and medical treatment on their own facilities, the standby vessel or other facilities.

The requirement relating to rescue also entails that MOB boat systems have their own crews. For information, see Section 41 of the Facilities Regulations.

The requirement relating to **evacuation** as mentioned in litera d, entails that the evacuation measures shall be of a nature that provides the highest possible likelihood 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 takes place in a safe and prudent manner. For information, see also Section 44 of the Facilities Regulations.

In order to fulfil the evacuation requirement as mentioned in litera d, the NORSOK U-100N standard, Chapter 9.5, should be used for divers under pressure.

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

- a) injured or sick personnel are given the necessary treatment and care, such as medical treatment on land 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 the facility and reservoir is stabilised and corrected,
- c) the operation of the facility is resumed.

Re Section 78

Collaboration on preparedness against acute pollution

The total emergency preparedness shall be dynamic and suited to the needs in various areas and time periods. It may be necessary, for example, to increase the availability of resources in the Barents Sea in periods of high activity.

Measures as mentioned in the third subsection, can for example be development of a new concept or new solutions, rescheduling of activities or strengthened emergency preparedness.

Re Section 79

Action against acute pollution

When preparing the plan as mentioned in the first subsection, the basis should be the emergency preparedness action plans, cf. Section 76.

As mentioned in Section 30 of the Management Regulations, the plans for action against acute pollution shall be submitted to the Norwegian Coastal Administration.

In the event of action against acute pollution, both mechanical and chemical alternatives shall be considered. Chemical combatting shall be used if this, overall, results in the lowest strain on the environment, cf. the Pollution Regulations (in Norwegian only) Chapter 19.

Documentation as mentioned in the fourth subsection, means a clarification of

- a) measures taken,
- b) results from mapping, cf. Section 57, and environmental surveys in connection with acute pollution, cf. Section 58,
- c) damage or negative consequences to the environment,
- d) criteria for concluding measures.

CHAPTER XIV COMMUNICATION

Re Section 80 Communication

In order to communicate as mentioned in the first subsection, it should be possible, inter alia, to

- a) provide important information to personnel on the facility during operations and in hazard and accident situations,
- b) communicate important information between personnel in the control centre, personnel engaged in the operation of process facilities, drilling operations and lifting operations,
- c) establish and maintain direct and continuous communication between communication operators, field and platform management, internal and external emergency resources during hazard and accident situations,
- d) provide communication in the event of a coordinated action against acute pollution.

The requirement relating to external communication as mentioned in the first subsection, means that manned facilities shall have 24-hour continuous telecommunications services with monitoring service on VHF channel 70 (DSC) and channel 16. The service can be established on one's own facility or as a part of a joint solution where several facilities are within a specifically defined area.

In connection with such a solution,

- a) a central communications centre should be established on one of the facilities and an alternative centre should be prepared on one of the other facilities,
- b) the facilities covered by the solution should be covered by mutual VHF radio communication and be organised under the second-line emergency preparedness management,
- c) efficient routines should be established to achieve contact with the facilities when the local radio station is not manned,
- d) the facilities shall have mutual permanent communication systems.

The other facilities covered by this solution should have a communication operator who primarily handles communication tasks in hazard and accident situations.

A person responsible for communications as mentioned in the second subsection, means a person who has a particular responsibility to ensure the professional operation of the facility's radio station and use of the other communication systems at all times.

CHAPTER XV DRILLING AND WELL ACTIVITIES

Re Section 81 Well programme

For information, see Section 10 of the Facilities Regulations.

In order to fulfil the requirement relating to the programme as mentioned in the first subsection, the Norsok D-010 standard, Chapters 4.3, 4.7, 4.10.2 and 9.3 should be used in the area of health, working environment and safety.

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

- a) plans for future use of the well,
- b) securing of the wellhead,
- c) planned location inspections and their frequency,
- d) an evaluation of well integrity seen in the context of the design life for the barriers, cf. also Section 88.

The updating as mentioned in the second subsection, implies, for example, that a new programme shall be prepared for wells that have not been put to use according to the original plan, or that have been temporarily plugged back for three years.

Re Section 82 Well location and wellbore

In order to fulfil the requirement relating to well location and wellbore as mentioned in the first subsection, the Norsok D-010 standard, Chapters 4.3 and 5.7.4 should be used, with the following addition:

the well's location and wellbore should be stated in Universal Transverse of Mercator (UTM) coordinates.

Re Section 83 Shallow gas and shallow formation fluids

Formation fluids as mentioned in the first subsection, also means hydrates and water under pressure.

In order to fulfil the requirement, the Norsok D-010 standard, Chapter 5.7.2 should be used in the area of health, working environment and safety.

Re Section 84 Monitoring well parameters

The requirement relating to collection implies, inter alia, that data that could indicate a possible well control incident, are monitored, recorded and processed.

In order to fulfil the requirement relating to collection, the Norsok D-010 standard, Chapters 4.7, 5.7.3 and 5.7.4 should be used, with the following addition: when testing the formation's fracture strength, pressure testing to the maximum anticipated pressure for the well section should be carried out.

Re Section 85 Well barriers

In order to fulfil the requirement relating to the barrier as mentioned in the first subsection, the Norsok D-010 standard, Chapters 4.2, 4.3, 4.4, 5.1, 5.2, 5.3 and 15 should be used in the area of health, working environment and safety. For information, see also Section 48 of the Facilities Regulations.

Where a homogeneous liquid column constitutes the primary barrier, the barrier requirement as mentioned in the first subsection, entails that there is sufficient drilling fluid material and drilling fluid available to maintain the barrier, cf. also Section 51 of the Facilities Regulations.

The handover as mentioned in the third subsection, includes handover between companies and handover between units on the facility. Examples of such units are “production”, “well service”, “operation” and “maintenance”.

Pumping and fluid capacity, as mentioned in the third subsection, means preparedness for handling a failure in one or more well barriers, cf. Section 86 on well control. By heavy well intervention, as mentioned in the third subsection, is meant coiled tubing and snubbing operations. By light well intervention, as mentioned in the third subsection, is meant cable and pumping operations. In order to fulfil the requirement in the third subsection, NORSOK D-010 standard, Chapters 4.2.8 and 10.4 should be used.

In order to fulfil the requirement for handover of wells as mentioned in the third subsection, the NORSOK D-010 standard, Chapters 4.10, 8.2, 8.3, 8.6, 8.7 and 8.8 and Norwegian Oil and Gas’ Guideline no. 117 should be used for drilling and well activities.

Re Section 86 Well control

Well control incident as mentioned in the first subsection, means the failure of one or more well barriers where the failure results in unintended flow of formation fluid into the well, cross flow in the well or outflow to the external environment.

Intervening directly in or on the well as mentioned in the first subsection, means re-establishment of barriers by using established well control methods or by using capping equipment.

In the event of using established well control methods, the NORSOK D-010 standard, Chapter 4.2.8 should be used.

In the event of using capping equipment for subsea wells, the NORSOK D-010 standard, Chapter 4.8.3 should be used.

In order to regain well control by relief well drilling as mentioned in the first subsection, the NORSOK D-010 standard, Chapter 4.8.2 should be used.

When planning activities as mentioned in the second subsection, the NORSOK D-010 standard, Chapter 4.8 should be used, with the following addition: evaluation of technical and operational feasibility, plus location, operation and well specific risk assessments for the method chosen.

Organisational independence as mentioned in the second subsection, is described in the guidelines to Section 19 of the Framework Regulations.

To fulfil the requirement to plans as mentioned in the fourth subsection, the NORSOK D-010 standard, Chapters 4.8 should be used, with the following additions:

- a) the plans should describe the need for and availability of facility(ies) and services,
- b) plans for relief well drilling and capping operations that require modifications of facility(ies), use of additional equipment, vessels or new technology, should detail how this can be mobilised and operative prior to start-up of the operation that requires this.

Re Section 87 Controlled well stream

Controlled well stream means formation testing, test production, clean-up and stimulation of the well. Discharges from formation testing and clean-up of wells are regulated in Section 69.

In order to fulfil the requirement to operational limitations in the area of health, working environment and safety, the NORSOK D-010 standard, Chapters 6, 7, 8 and 14, plus tables 15.27, 15.32, 15.34, 15.35, 15.36, 15.45 and 15.46 should be used. Cf. also Section 53 of the Facilities Regulations.

Re Section 88 Securing wells

To fulfil the requirement relating to securing as mentioned in the first subsection, the NORSOK D-010 standard, Chapter 9 should be used in the area of health, working environment and safety. For information, see also Section 48 of the Facilities Regulations.

The monitoring as mentioned in the first subsection, should be carried out by monitoring the pressure above the lowermost barrier.

In order to control the well integrity as mentioned in the second subsection, one should, inter alia, be able to monitor pressure conditions or set a blind plug just above or below the packer element. For surface-completed wells, it should be possible to monitor the pressure in the annulus and in the production tubing, or as an alternative, in the last casing set. For subsea-completed wells, it should be possible to monitor the pressure in the production tubing and in the production annulus.

If it is necessary to abandon the radioactive source in the well, as mentioned in the third subsection, the NOR-SOK D-010 standard, Chapter 9 and table 15.24 should be used, with the following additions:

- an internal overview of abandoned sources should be established and maintained. The overview should contain details about every single source and its position,
- radioactive sources abandoned in work strings should be secured in a manner which clearly indicates any unintentional drilling close to/in the direction of the source's position.

Section 14 second subsection of the Radiation Protection Regulations (in Norwegian only) also requires that information on abandoned sources shall be given to the Norwegian Radiation Protection Authority.

Re Section 89

Remote operation of pipes and work strings

In order to fulfil the requirement for remote-operated pipe handling, Norwegian Oil and Gas' guideline No. 081 should be used. For information, see also Section 69 of the Facilities Regulations.

The requirement regarding limitations as mentioned in the second subsection, implies, inter alia, that the work area for the remote-operated systems shall be determined.

Personnel as mentioned in the third subsection, means those manning the control and monitoring functions, and personnel staying inside the work area of these systems. The personnel should be able to have corresponding contact and communication among themselves.

CHAPTER XVI MARITIME OPERATIONS

Re Section 90 Positioning

In order to fulfil the requirement relating to marine operations as mentioned in the first subsection, Table 1 Equipment Class should be used for vessels and facilities with dynamic positioning, with the following addition:

in the event of dynamic positioning near other floating facilities or vessels, consideration should be given, inter alia, to

- a) mutual movement and different movement patterns,
- b) the effect of current and noise from propellers,
- c) interference with other or joint transponders
- d) varying shadow effect for antennas connected to the dynamic positioning system.

For calculation of anchoring systems, see also Section 25.

Table 1 Equipment Class

For a description of the equipment classes in this table, see IMO/MSC Circular 645, Chapter 2, Equipment Classes.

ACTIVITY	
a) Manned underwater operations where loss of position entails a high risk for divers or diver platforms	3
b) Other manned underwater operations where loss of position entails risk for divers or diver platforms	2
c) Support vessels for manned underwater operations conducted from work boats	2

where loss of position for the support vessel has direct consequences for the work boat	
d) Drilling and well activities where well control is ensured by a facility with dynamic positioning	3
e) Facilities that produce or store hydrocarbons	3
f) Flotels with gangway connected Two reference systems may be accepted for arrival and departure	3
g) Activities carried out by lifting vessels or pipe-laying vessels in the vicinity of the facility (here permanently placed and mobile/floating) It may be acceptable for only two out of three reference systems to be operational upon arrival and departure	3
h) Other activities within the safety zone, where the vessel represents a risk to the facility The requirement applies if the vessel exceeds the vessel size the facility is designed for with regard to withstanding a collision. Two reference systems may be accepted for arrival and departure	2
i 1) Tank vessel loading from facilities handling hydrocarbons	2
i 2) Tank vessel loading from subsea loading and off-loading installations where the tank vessel is not moored or anchored to these installations	2
i 3) Tank vessel loading from subsea loading and off-loading installations where the tank vessel is moored or anchored to these installations	1* or 2*
j) Loading operations from buoys	1
k) Other well activities The requirement applies to well maintenance facilities if well control is handled by another facility	2
l) Shallow drilling if encountering hydrocarbons is not expected	1

**Class 1 if the distance between associated facility(-ies) and tank vessel is 2.5 km or more, Class 2 if not.*

Notes to the table

- 1) For dynamic positioning, consideration should be given to the reference systems' limitations as regards reliability, availability and quality.
- 2) High risk as mentioned in this table litera a, means the cases when the diver does not have an unrestricted return to the diving bell, or where loss of the vessel's position can lead to loss of or damage to the diving bell, and possibly the associated bottom weight.
- 3) The requirement relating to Equipment Class 3 for drilling and well activities as mentioned in this table litera d, does not apply to shallow drilling and core drilling. For shallow drilling, however, other requirements in the table may be relevant, such as the requirement relating to Equipment Class 2 for other activities within the safety zone without risk to health, environment and safety. Well activities that require Equipment Class 3, include well intervention, such as wireline operations. Other well activities as mentioned in this table litera k, with requirements for Equipment Class 2, where the production facility has well control equipment, may be well stimulations and unmanned underwater operations, including the use of remote-controlled subsea vessels or subsea tools.
- 4) The recommendation for Equipment Class 2 for tank vessels as mentioned in this table, is conditional upon the preparation of a positioning capacity plot for the dynamic positioning system.

In order to maintain the position as mentioned in the second subsection, floating production, storage and offloading facilities (FPSOs) and floating storage units (FSUs) that offload to tank vessels, should be equipped with directional control. For information, see also Section 63 of the Facilities Regulations.

Floating production and storage facilities should at all times know their own position and direction and the position and direction of nearby facilities and larger vessels, cf. Section 31.

In loading operations where no hawser is being used, the tank vessel should be able to stop the loading automatically if the limits for distance and direction are exceeded, at the same time as emergency shutdown valves are being closed on the facility and on the vessel, cf. Section 33 of the Facilities Regulations.

Operation of positioning and anchoring systems should be in accordance with Sections 15-17 of the Norwegian Maritime Authority's Regulations relating to positioning and anchoring systems on mobile facilities (in Norwegian only).

For vessels anchored within the safety zone which are larger than the facility has been designed to withstand collision with, the anchoring should fulfil Sections 6 through 17 of the Norwegian Maritime Authority's Regulations relating to positioning and anchoring systems on mobile facilities (in Norwegian only) (the Anchoring Regulations 09), and should conform with Section 16 of the Norwegian Maritime Authority's Regulations for mobile facilities with technical production installations and equipment (in Norwegian only) if they lie adjacent to the facility.

CHAPTER XVII ELECTRICAL INSTALLATIONS

Re Section 91

Work on and operation of electrical installations

In order to fulfil the requirements relating to work as mentioned in the first subsection,

- a) Chapter I Section 5, Chapter II Sections 6, 7 and 9 and Chapters III, IV and B of the Regulations relating to operational safety of electrical installations (in Norwegian only),
- b) NEK EN 50110-1 Safety when working on and operating electrical installations (in Norwegian only)
- c) Regulations relating to handling of medical equipment (in Norwegian only), Section 1 up to and including Section 5 and Section 7 up to and including Section 12, should be used, as well as
- d) IMCA D 045, R 015 Code of practice for the safe use of electricity under water, which should be used for manned underwater operations.

Being the designated responsible person as mentioned in the second subsection, 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. As regards qualifications for the person with responsibility for the electrical installations, see Section 21.

CHAPTER XVIII LIFTING OPERATIONS

Re Section 92

Lifting operations

In order to fulfil the requirement relating to lifting operations as mentioned in the first subsection, the NORSOK R-003 standard should be used. Cf. also Section 69 of the Facilities Regulations and Section 25 of these regulations.

For information, see also Section 18 of the Facilities Regulations.

CHAPTER XIX MANNED UNDERWATER OPERATIONS

Re Section 93

Manned underwater operations

The NORSOK U-100N standard should be used during manned underwater operations.

Re Section 94
Time limit provisions

Stays at working depth as mentioned in litera a, means the time between completed compression, alternatively first compression if work is to be carried out at several pressure levels, and start of final decompression.

Bell runs as mentioned in litera c, shall be calculated continuously from when the clamp between the bell and the chamber is first loosened and stops when the clamp is reconnected, ready for pressure equalisation and final transfer of the divers back to the chamber complex.

Surface personnel as mentioned in litera h, means the diving supervisor or possibly a diving supervisor candidate under qualified leadership.

When stipulating breaks as mentioned in litera h, the workload should be used as a basis; however, the breaks should not be shorter than a half hour.

CHAPTER XX
CONCLUDING PROVISIONS

Re Section 95
Supervision, decisions, enforcement, etc.

No comments.

Re Section 96
Entry into force

See Section 73 of the Framework Regulations, too.

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