GUIDELINES TO REGULATIONS RELATING TO DESIGN AND OUTFITTING OF FACILITIES ETC. IN THE PETROLEUM ACTIVITIES (THE FACILITIES REGULATIONS)

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Petroleum Safety Authority Norway (PSA)
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CHAPTER I
INTRODUCTORY PROVISIONS

Re Section 1
Definitions

Definitions and abbreviated forms that follow from superior and equal regulations are not repeated in these guidelines. These comments elaborate or provide additional information in relation to the definitions as mentioned in this section.

Fire divisions – Class A and Class H:
For standardised fire tests the ISO 834 standard should be used.

Simpler facilities without overnight stay possiblities:
Integrated development concepts as mentioned under simpler facilities without overnight stay possibilities litera c, means facilities with gangway connections. The simpler facility may, nevertheless, be linked to other facilities by a pipeline system.

Not constituting a danger to other facilities as mentioned under simpler facilities without overnight stay possibilities litera c, means, inter alia, that a fire on the facility does not jeopardise the safety of other facilities, e.g. through the possibility of the fire spreading or thermal stress.

Pipeline systems:
On a subsea facility, the subsea pipeline normally ends in a connection to a christmastree or wing valve. The christmastree is not considered to be a part of the pipeline system.

On a subsea facility where the above definition cannot be employed, the subsea pipeline ends at the connection to the subsea facility. The connection piece is a part of the subsea pipeline.

Subsea pipelines and risers up to and including the lock for launching or receiving tools for internal maintenance (including inspection), with associated equipment, are considered to belong to the pipeline system. If such a lock has not been installed, the pipeline system is considered to extend to the first automatic shutdown valve above water.

Safety functions:
Safety functions may include
a) sectioning of the process,
b) fire detection,
c) gas detection,
d) isolation of sources of ignition,

e) maintaining overpressure in unclassified spaces,
f) starting and stopping fire pumps, both manually and automatically,
g) active firefighting,
h) active smoke control,
i) process safety,
j) well safety,
k) depressurisation,
l) general alarm and evacuation alarm,
m) production and distribution of emergency power,
n) emergency lighting,
o) emergency drainage,
p) ballasting for mobile facilities,
q) maintenance of correct pressure, humidity, temperature and gas composition in diving facilities.

Well safety as mentioned in litera j, means blowout prevention, choke and pressure control systems, diverter system, subsurface safety valves and quick release coupling system.

Re Section 2
Systems and other equipment for manned underwater operations from vessels

This section makes individual requirements in these regulations applicable also to systems and equipment for conducting manned underwater operations from vessels. For practical reasons, one has opted for a general section on this, rather than repeating it in the individual provisions.

CHAPTER II
GENERAL PROVISIONS

Re Section 3
Choice of development concepts

When choosing development concepts, the following should be taken into account:

litera a: important contributors to risk, cf. the Management Regulations Section 1 on risk reduction and Section 14 on analysis of major accident risk,
litera b: organisation, manning, maintenance, transport solutions, working environment, manned underwater operations, if applicable,
litera c: operational discharges and acute pollution, cf. the Management Regulations Section 1 on risk reduction and Section 16 on environmentally oriented risk and emergency preparedness analyses, plus current objectives (cf. Report to the Storting No. 25 (2002-2003) The Government's Environmental Policy and the State of the Environment) with regard to reductions in discharges to sea and emissions to air,
litera d: infrastructure, other fields and facilities, distance to land and bases, fishery activities and fairways,
litera e: route, sea depth, seabed conditions, wave heights, wind and other natural conditions,
litera f: rate of recovery, pressure, temperature, oil or gas, corrosiveness and shallow gas,
litera g: delivery commitments and economy,
litera h: flexibility and anticipated changes in operating conditions, as well as future use,
litera i: removal and reuse.

Consideration should also be given to the need for qualifying new technology, cf. Section 8 on qualification and use of new technology and new methods.

Re Section 4
Design of facilities

With regard to general requirements to risk reduction, see the Management Regulations Chapter I on risk management and Chapter IV on analyses.

In order to fulfil the design requirements as mentioned in the first paragraphparagraph, the ISO 13702 standard with appendices, NORSOK standards S-001 revision 4 and S-002, revision 4 should be used for the health and safety part.

DNV OS-A101 (2001) may be used as an alternative for mobile facilities registered in a national ship's register within the area covered by the standard.

In order to fulfil the requirement to a strategy as mentioned in the second paragraphparagraph, the ISO 13702 standard should be used.

The classification requirement as mentioned in the third paragraph, implies that

a) the main areas of the facility shall be classified in order to separate high risk areas from low risk areas,
b) the facility shall be area-classified by systematically registering and evaluating potential emission/discharge sources for flammable gases and fluids. When carrying out area classification, the IEC 61892-7 standard should be used.

The requirement to areas as mentioned in the last paragraph, may be fulfilled using both technical and operational measures.

Re Section 5

Design of simpler facilities without overnight stay possibilities

Specific assessments as mentioned in the second paragraph, mean assessments of the overall risk for all activities connected with operation and maintenance of the facilities, including transportation of employees.

Examples of specific solutions as mentioned in the second paragraph, are Section 13 on ventilation and indoor climate, Section 31 on fire and gas detection systems, Section 36 on fixed fire-fighting systems, Section 40 on equipment for rescue of personnel and Section 43 on means of evacuation.

Examples of sections which allow consideration of simpler solutions than those specified in the guidelines as mentioned in the third paragraph, include Section 19 on ergonomic design, Section 24 on lighting and Section 44 on survival suits and life jackets etc.

With regard to the design of simpler facilities without overnight stay possibilities, the Danish Energy Agency's guidelines for design of fixed offshore facilities (2008) chapter 2 on design of unmanned production facilities, may be used.

Re Section 6

Main safety functions

The main safety functions as mentioned in the first paragraph, should be designed on the basis of each facility's unique characteristics. It should be specified which main safety functions that shall be intact during and after an accident situation.

In order to fulfil the requirement as mentioned in the second paragraph, the NORSOK Z-013 standard Chapter 6.12 should be used.

Re Section 7

Safety functions

The safety functions as mentioned in the first paragraph, form part of barriers against situations of accident and hazard as mentioned in the Management Regulations Section 1 on risk reduction and Section 2 on barriers.

For design of safety functions as mentioned in the first paragraph, the ISO 13702, NORSOK S-001 revision 4 and IEC 61508 standards and OLF guidelines No. 70 revision 2 should be used.

In order to ensure that the safety functions at all times will be able to provide functions as mentioned in the first paragraph, they should be designed so that they can be tested and maintained without impairing the performance of the functions. With regard to disconnection of safety functions, see the Activities Regulations Section 24 on safety systems.

In order to stipulate the performance for the safety functions as mentioned in the second paragraph, the IEC 61508 standard and OLF guidelines No. 70 revision 2 should be used where electrical, electronic and programmable electronic systems are used in constructing the functions.

In order to fulfil the requirement to available status as mentioned in the third paragraph, the NORSOK I-002 standard Chapter 4 should be used.

CHAPTER III
MULTIDICIPLINARY PROVISIONS

III-I
MULTIDICIPLINARY COMMON REQUIREMENTS

Re Section 8
Qualification and use of new technology and new methods

New technology as mentioned in the first paragraph, may be new products, analysis tools or known products used in a new way.

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

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

In order to fulfil the requirement to methods for qualifying new technology, the DNV RP-A203 Qualification Procedures for New Technology (2001) may be used.

Re Section 9
Plants, systems and equipment

With regard to the design of plants, systems and equipment, the following standards should be used in the area of health, working environment and safety:

a) NORSOK D-001 and D-002 for facilities for drilling and well activities,
b) NORSOK L-001 and L-002 for pipes and valves,
c) NORSOK P-001 revision 5 and P-100 for process plants,
d) NORSOK R-001 and R-100 for mechanical equipment,
e) NORSOK S-005 for machines,
f) NORSOK Z-015N for temporary equipment,
g) NORSOK U-100 revision 3 and U-101 for diving systems and breathing equipment,
h) NORSOK U-001 and ISO 13628 for sub sea installations,
i) IMCA/AODC 035 for electrical installations for use under water,
j) IEC 61892 for electrical intallations and electrical equipment,
k) NS-EN ISO 11064 with regard to human error.

For the design of facilities, systems and equipment with regard to regularity and reliability, the NORSOK Z-016 standard may be used.

For plants, systems and equipment on mobile facilities that are registered in a national ship's register, the following standards may be used as alternatives in the area of health, working environment and safety:

a) DNV OS-D101 for marine machinery, piping and mechanical equipment,
b) DNV OS-D201 for electrical installations and equipment,
c) DNV OS-D202 for instrumentation and control systems,
d) DNV OS-E101 for facilities for drilling and well activities.

In order to fulfil the requirement to marking as mentioned in the second paragraph, the NORSOK Z-DP-002 standard should be used, with the following addition: main components in the facilities should be marked with their function, and piping should be marked with the relevant medium and direction of flow.

See also Section 4 on design of facilities.

Re Section 10
Loads, load effects and resistance

The requirement to loads with an annual probability greater than or equal to $1x10^{-4}$ as mentioned in the first paragraph, applies to each individual type of load and not for the sum of these.

Functional loads as mentioned in the third paragraph, means permanent and variable loads for load-bearing structures.

Design loads as mentioned in the fourth paragraph, includes functional, environmental and accidental loads, including fire and explosion loads.

In order to fulfil the requirement to **load bearing structures** the following standards should be used: NORSOK N-001 and N-003 revision 2. In the case of steel structures, N-004 revision 2 should be used in addition, as should NS 3473 for concrete structures.

For **accidental loads,** the NORSOK S-001 standard revision 4, chapter 4.7 in particular, should be used in addition to other standards mentioned in these guidelines. Particular fire conditions such as jet fires, under-ventilated fires in modules, fire on the sea and the like may require additional calculation of fire loads. For mobile facilities registered in a national ship's register, DNV OS-A101 (2001) Section 2 may be used as an alternative.

For facilities that are intended to leave the field in the event of warnings of bad weather, the values for natural loads connected with the least favourable of the following factors may be used:

a) conditions on the field when the move commences,
b) conditions during the move,
c) weather conditions at the planned new location, with the specified annual probabilities in NORSOK N-003 revision 2.

For mobile facilities registered in a national ship's register, the loads that the facility has been exposed to and the expected loads during the period for which the consent for use is applied for, should be taken into account.

In order to fulfil the requirements to loads, load effects, resistance and combinations of loads, the following standards should be used for **pipeline systems**: ISO 13623 Chapter 6 and DNV OS-F101 (2007) Sections 3, 4 and 5 for steel lines, DNV OS-F201 Sections 3, 4 and 5 for catenary metallic risers and API 17J Chapter 5 for flexible pipeline systems.

In order to fulfil the requirements to loads, the NORSOK D-001 standard Chapters 5.3 and 5.10 and D-010 standard revision 3 Chapters 4 and 5 should be used for equipment for conducting **drilling and well activities** and other well-related equipment, including drilling risers, compensators, well control equipment, completion equipment and intervention equipment.

In order to fulfil the requirements to loads, the NORSOK L-002 standard Chapter 5 should be used for **pipe systems in production plants**.

If loads, load effects or resistance are uncertain, measurements or model experiments should be conducted in order to increase the quality of the analyses. As regards model experiments for **loadbearing structures,** the NORSOK N-003 revision 2 standard Chapter 10.2.7 should be used.

Re Section 11
Materials

In order to fulfil the requirement to materials and material protection as mentioned in literas a, b and c, the following standards should inter alia be used in the area of health, working environment and safety:

a) NORSOK M-001 revision 4 for material selection,
b) NORSOK M-101 for steel structures,
c) NORSOK M-102 for aluminium structures,
d) ISO 13623 Chapter 8 and DNV OS-F101 (2007) Sections 6 and 7 for pipeline systems,
e) DNV OS-F201 Section 7 for catenary metallic risers,
f) API 17J Chapter 6 for flexible pipeline systems,
g) NS 3420 for concrete structures,
h) NORSOK M-501 revision 5 for selection of coating, pre-treatment, application and inspection,
i) NORSOK M-503 for cathodic protection,
j) NORSOK M-601 revision 4 for pipes,
k) NORSOK R-004 for isolation of equipment.

For **mobile facilities** registered in a national ship's register, the following standards may be used as alternatives in the area of health, working environment and safety: DNV OS-B101 for metallic materials, OS-C102 (2004) Section 2 for facilities designed as ships, OS-C103 (2004) Section 2 for semi-submersible facilities and OS-C104 (2004) Section 2 for jack-up facilities.

Methods for control of manufacture and assembly as mentioned in litera b, may include materials control where the sample materials represent the product with regard to manufacture processes, geometrical design and dimensions. Requirements to surface quality should be specified in connection with carrying out non-destructive testing of forged and cast goods.

When selecting materials with regard to **technical fire qualities** as mentioned in litera d, non-flammable materials should be chosen. In those cases where flammable materials are nevertheless used, such materials should limit the spread of flames, develop little smoke and heat and have a low level of toxicity. In living

quarters, electrical installations should be constructed of halon-free materials. The flame spread and smoke development qualities of the materials should be considered when textiles or surface treatment with paint or other coating is used. The following standards should be used to determine the technical fire qualities of materials:

a) ISO 1182 for inflammability,
b) ISO 1716 for limited flammability,
c) ISO 5657 for ignitability,
d) ISO 5660-1 for heat emission,
e) ISO 5660-1 for smoke development,
f) IMO Resolution A.653 (16) for flame spread,
g) ISO 9705 for testing of surface products,
h) NT Fire 036 for testing of pipe isolation,
i) IMO Resolution A.471 (XII) for textiles
j) IEC 60331 for cables that are to maintain functionality during a fire,
k) IEC 60332 for self-extinguishing cables in areas where there is a hazard of explosion.

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

Re Section 12
Handling of materials and transport routes, access and evacuation routes

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

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

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

The various work sites should be designed so that they can be serviced and maintained without the use of temporary equipment such as scaffolding, ladders, etc. For permanent solutions, stair ladders should be chosen rather than vertical ladders.

For mobile facilities that are registered in a national ship's register, the Norwegian Maritime Directorate's Regulations concerning the construction of mobile offshore units Sections 14, 15, 16 and 17 may be used for access and transportation routes, with the following additions:

a) thresholds in access routes should be made as low as possible, cf. Section 19 on ergonomic design,
b) ladders where there is danger of falling to a lower level, should have self closing gates, cf. NORSOK S-002 revision 4 Chapter 5.1.2.

For design of **transport routes and access** as mentioned in the first and second paragraph, the following standards should be used:

a) NORSOK S-002 revision Chapters 5.1, 5.2.1 and Appendix B,
b) NORSOK C-002 revision 3 Chapters 5 (for main stairs) and 6,
c) NORSOK C-001 revision 3 Chapters 7.22 and 9.4.

For design of scaffolding, reference is made to the Directorate of Labour Inspection's Regulations relating to scaffolding, ladders and work on roofs etc.

In order to fulfil the requirements to **evacuation routes** as mentioned in the third paragraph, the NORSOK S-001 standard revision 4 Chapters 5, 6 and in particular 21 should be used, with the following additions: evacuation routes should be designed so that there is free passage for personnel wearing smoke-diver and/or fire-fighting equipment.

For mobile facilities registered in a national ship's register, DNV OS-A101 (2001) may be used as an alternative within the area covered by the standard. With regard to requirements on evacuation routes from the helicopter deck, see Section 71 on helicopter decks.

Re Section 13
Ventilation and indoor climate

In order to fulfil the requirement to **ventilation** as mentioned in the first paragraph, the ISO 13702 standard Chapter 7 and Appendix B and the NORSOK H-001 and S-001 (Chapter 6.4) standards should be used with

the following additions: when determining the need for air exchange, both the danger of accumulation of flammable gas and the need for weather protection should be taken into account, cf. Section 21 on outdoor work areas.

For mobile facilities that are registered in a national ship's register, DNV OS-D101 Chapter 2, Section 4 may be used as an alternative.

The requirements to **indoor climate** as mentioned in the second paragraph apply to living quarters and indoor working areas, including chambers for manned underwater operations. The requirements implies that account be taken of the fact that air quality is affected by construction materials, furniture and fittings, personnel, activities and processes, cleaning and maintenance. In order to fulfil these requirements, the following should be used:

a) The Directorate of Labour Inspection's guidelines relating to climate and air quality at the workplace,
b) National Institute for Public Health – recommended technical standards for indoor climate,
c) NORSOK S-002 revision 4 Chapter 5.7 and Appendix A,
d) NORSOK U-100 revision 3 Chapters 5.2.2 and 5.2.3.

Re Section 14
Chemicals and chemical exposure

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

In order to fulfil the requirements to technical solutions that prevent harmful chemical effects on human beings as mentioned in the first paragraph, the NORSOK S-002 standard revision 4 Chapters 4.4.6, 5.4 and Appendices C 2 and G 1.2 should be used.

In order to fulfil the requirements to design and placing of facilities for storage and use as mentioned in the second paragraph, the NORSOK P-100 standard Chapter 15 should be used in the area health, working environment and safety.

As regards use of chemicals, see the Activities Regulations Section 34 on chemical health hazard and Chapter X-II on use and discharge of oil and chemicals.

As regards design and location in relation to fire and explosion hazards as mentioned in the second paragraph, litera c, reference is made to Section 15 on location and handling of flammable and explosive goods.

Re Section 15
Flammable and explosive goods

In order to fulfil the storage requirements as mentioned in the first paragraph, Regulations 26 June 2002 No. 0744 relating to flammable goods, issued by the Directorate for Fire and Electrical Safety, and Regulations 26 June 2002 No. 0922 relating to handling of material liable to explode Chapter 7, issued by the Directorate for Fire and Electrical Safety, should be used.

For storage of goods as mentioned in the first paragraph, the NORSOK U-100 standard revision 3 Chapter 7.6 should be used in addition for **manned underwater operations**.

In order to ensure that explosives are not discharged unintentionally as mentioned in the third paragraph, inter alia electrically triggered perforation equipment for use in **drilling and well activities** should be protected against the effects of radio waves and other electrical fields, see also requirements to electrical compatibility in Section 78 on EMC. In addition, explosives should be protected against falling loads and fires during storage.

Re Section 16
Instrumentation for monitoring and recording

For requirements to acquisition and making data available, see the Management Regulations Section 18 on collection, processing and use of data.

The instrumentation as mentioned in the first paragraph, should be designed so that it can monitor and record, inter alia,

a) structural integrity for loadbearing structures and pipeline systems

Monitoring of structural integrity means inter alia recording parameters that result in significant tension or compression stress, or large movements as a result of waves and currents.

b) critical degradation of materials

Critical degradation may include corrosion and erosion. In order to monitor corrosion, multiple independent corrosion monitoring systems may be relevant if it is difficult to perform maintenance, including inspection.

c) critical operations parameters

Critical operations parameters can include the drilling fluid's properties, pressure and particle content in the production stream, pressure in seal oils in swivels and gas composition and pressure in facilities for manned underwater operations.

Data on natural conditions (environmental data) as mentioned in the second paragraph, means data on oceanography, seismology and meteorology, including data that is of significance for the flight weather service.

In order to fulfil the requirement to instrumentation for meteorological and oceanographic data, the NORSOK N-002 standard should be used. Measurement of seismological data should be carried out on land or on the seabed, at a sufficient distance from the facilities to ensure that the recording of data can take place without significant interference from the activities on the facilities. The measurement station should preferably be located on land since this usually provides more reliable and better data than a measurement station on the seabed.

As regards instrumentation linked to monitoring and recording pollution, see the Activities Regulations, Chapter X-I on monitoring of the external environment and Chapter X-II on the use and discharge of oil and chemicals.

New type as mentioned in the third paragraph, means a type that deviates materially from previous structural solutions, i.e. a prototype. When facilities have instruments to measure structural behaviour, environmental data should be measured simultaneously.

Re Section 17
Systems for internal and external communication

In order to fulfil the requirements to design of internal communication and alarm systems as mentioned in the first paragraph, the following standards should be used: NORSOK S-001 revision 4Chapter 17 for general sound and light alarms, T-001 and T-100 for alarm and communications systems and U-100 revision 3 Chapter 7.14 for internal communications systems for manned underwater operations. In addition:

a) two-way communication systems or internal radio communication should be used where necessary to convey important information or achieve rapid contact with personnel,
b) 112 should be used as the internal emergency telephone number on the facility,
c) PA system that can be operated from strategic locations on the facilities, should be used, so that all personnel can be alerted to situations of accident and hazard, see also the Activities Regulations Section 68 on handling of situations of hazard and accident. The central control room or the bridge should be given priority to send messages via the PA system,
d) it should be possible to trigger the general alarm and evacuation alarm from the central control room and the bridge, and it should be possible to trigger the evacuation alarm from the radio room.

The requirement to two independent warning routes as mentioned in the second paragraph, means that alternative warning routes should be independent of the primary warning route with regard to power supply and availability during situations of accident and hazard, and should also be resistant to the design accident loads for a defined period of time. Permanent communication systems such as fibre optic cables, radio lines or satellite systems should be used if the position of the facility makes this possible. If two independent warning routes via permanent communication systems cannot be achieved, one of the warning routes may be replaced by a circuit in the maritime mobile service.

Re Section 18
Communication equipment

When selecting equipment as mentioned in the first paragraph, **temporarily** and **permanently manned facilities** should be provided with the following equipment:

a) radio beacon for helicopter navigation,
b) two separate permanently installed maritime VHF radios with DSC,
c) two separate permanently installed aeromobile VHF radios, as well as portable aeromobile VHF radios,
d) one NAVTEX receiver.

When selecting equipment as mentioned in the first paragraph, **evacuation and rescue equipment** should be provided with the following equipment that is approved for such use:

a) lifeboats: one permanently installed VHF radio and one radar transponder (SART),

b) rafts: a necessary number of portable VHF radio sets and SART located so that they are easily accessible to be brought along in rafts, e.g. in escape chute containers,
c) man overboard boats (MOB boats): one permanently installed or portable VHF radio, suitable for use under the conditions that the MOB boat is to operate under, as well as SART so that it can be located and guided during the search and rescue operation.

Protection as mentioned in the second paragraph, means, inter alia, that the equipment shall be located in such a manner that communication is not disrupted. The two maritime VHF radios with DSC should be located in separate rooms in such a manner that they are not made inoperable by the one and same incident. This also applies to the permanently installed aeromobile radios. The radio in lifeboats or MOB boats should be designed and located in such a manner that it can be used at the same time as the boats are manoeuvred with the engine at maximum revolutions.

With regard to the selection and design of communications equipment as mentioned in this section, the NORSOK U-100 standard revision 3 Chapter 7.14 should be used for **manned underwater operations**.

III-II
DESIGN OF WORK AREAS AND ACCOMMODATION SPACES

Re Section 19
Ergonomic design

In order to fulfil the requirements to design, the following standards should be used; NORSOK S-002 revision 4, Chapters 5.2, 4.4.4, 4.4.5 and Appendices B and C and ISO 6385, with these additions:

a) there should be easy access for service, inspection, readings and maintenance,
b) it should be possible to handle outdoor handles, switches, etc. while wearing gloves.

For computer screen workstations, see the Activities Regulations Section 32 on ergonomic aspects. See also these regulations Section 20 on man-machine interface and information presentation.

Re Section 20
Man-machine interface and information presentation

During design as mentioned in the first paragraph, an analysis should be performed of the man-machine interface, including necessary task and function analyses. The NORSOK S-002 revision 4 Chapter 4.4.5 and EN 614 Part 2 standards should be used for such analyses. The NS-EN ISO 11064 standard should be used for design of the central control room. With regard to requirements to man-machine interfaces, NORSOK S-002 revision 4 Chapter 5.2.2 should be used.

In order to fulfil the requirement to information as mentioned in the second paragraph, the EN 894 standard Parts 1-3 and EN 614 standard Part 1 should be used with the following addition: the information should be suitably structured and consistent with regard to the use of colour, text and symbols.

The design of alarms as mentioned in the third paragraph, should be such that

a) the alarms that are presented are easy to register and understand, and clearly show where possible deviations and dangerous situations have arisen,
b) the alarms are coded, categorised and assigned priority based on the safety significance of the alarms and how quickly it must be reacted in order to avoid undesirable consequences,
c) the alarm systems provide for suppressing and reducing alarms, so as to avoid mental stress on the part of control room personnel during interruptions in operations and accident incidents.

With regard to the design of the alarm systems, the principles of the Norwegian Petroleum Directorate's publication YA-710 (English edition YA-711) should be used as a basis.

Re Section 21
Outdoor work areas

In order to fulfil the requirement to weather protection as mentioned in the first paragraph, the NORSOK S-002 revision 4 standard Chapters 4.4.9 and 5.8 should be used.

Risks as mentioned in the second paragraph, may include accumulation of flammable gases, hazard of increased explosion pressure and potential reduced access for firefighting.

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

Re Section 22
Noise and acoustics

In order to prevent noise that is harmful to hearing as mentioned in the first paragraph, the NORSOK S-002 standard revision 4 Chapters 4.4.7, 5.5 and Appendices F and H should be used for the design of facilities, with the following addition: during planning consideration should be given to the fact that the use of ear protection is not a means of fulfilling the noise requirements, cf. the Activities Regulations, Section 36 on noise and vibrations and Section 39 on personal protective equipment.

In order to fulfil the requirements to noise in the indivdual areas as mentioned in the second paragraph, the NORSOK S-002 standard revision 4 Chapter 5.5 and Appendix A should be used, with the following additions:

a) as a consequence of varying operational conditions and uncertainty in the measurements, etc., deviations of up to 3 dB(A) from the values specified in the NORSOK S-002 standard revision 4 Chapter 5.5 and Appendix A are acceptable,
b) when measuring impulse sounds, an instantaneous value of Lpeak = 130 dB(C) will be equivalent to a maximum level of Lmax = 110 dB(A). The highest permissible noise limit (110 dB(A)) should only be allowed in connection with brief inspections or work tasks that are to be carried out in an area where there is no passage through to other areas. Provisions should be made for noise-deflectionof noisy equipment when maintenance or other work is carried out in the area, cf. the Activities Regulations Section 31 on arrangement of work.

In order to fulfil the requirement to noise, the NORSOK U-100 standard revision 3 Chapter 5.2.2.6 should be used for manned underwater operations.

As regards requirements to acoustics as mentioned in the second paragraph, the NORSOK S-002 standard revision 4 Chapter 5.5.3 should be used. With regard to sound insulation, the NORSOK S-002 standard revision 4 Chapter 5.5 Table 1 should be used.

Re Section 23
Vibrations

In order to fulfil the requirements to vibrations, the NORSOK S-002 standard revision 4 Chapter 4.4.7, 5.5.5 and Appendices A and E should be used. For mobile facilities, this standard should be used for vibrations in the frequency range 5–80 Hz.

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

Re Section 24
Lighting

Lighting as mentioned in the first paragraph, may be artificial lighting, daylight or direct sunlight. The lighting should be especially good and proper in the control room, cabins and other rooms where sight-intensive work takes place, where display screen equipment is used on a regular basis and where the work requires good visibility during various weather conditions.

In order to fulfil the requirement to lighting, the NORSOK S-002 standard revision 4 Chapter 5.6, 4.4.8 and associated lighting values in Appendix A should be used for the individual rooms and areas on the facility. There should also be specific lighting if the general lighting is not adequate for readings, service and maintenance.

Re Section 25
Radiation

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

In order to fulfil the requirement to radiation as mentioned in the first paragraph, the NORSOK S-002 standard revision 4 Chapters 5.9 and 5.10 should be used. See also the Activities Regulations Section 35 on radiation.

Re Section 26
Equipment for transportation of personnel

Equipment as mentioned in the first paragraph, may be personnel winches, personnel baskets and the like.

With regard to equipment that can be used for transportation of personnel as mentioned in the first paragraph, see also the Activities Regulations Section 40 on use of work equipment. Cf. the Activities Regulations Section 83 on lifting operations.

In order to fulfil the requirements to equipment as mentioned in the first paragraph, the NORSOK D-001 standard Chapter 5.5.3.2 should be used for personnel winches on the drill floor, with the following addition: there should be sufficient personnel winches to cover all drilling and well activities on the facility.

With regard to personnel winches on mobile facilities that are registered in a national ship's register, the DNV OS-E101 standard Chapter 2, Section 5, I 300 may be used as an alternative.

Re Section 27
Safety signs

As regards safety signs, the NORSOK C-002 revision 3 and NS 6033 standards may be used in addition.

III-III
PHYSICAL BARRIERS

Re Section 28
Passive fire protection

For stipulation of fire loads from a dimensioning fire as mentioned in the first paragraph, see Section 10 on loads, load effects and resistance.

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

To determine a structure's fire resistance, the test methods in the ISO 834, ISO 3008, ISO 3009 and NT Fire 021 standards should be used. To determine the ability of passive fire protection materials with withstand jet fires, the test method "Jet-fire resistance test of passive fire protection materials", issued by the Health and Safety Executive and the Norwegian Petroleum Directorate should be used.

In order to fulfil the requirements to loadbearing properties, integrity and insulation properties as mentioned in the first paragraph, the NORSOK S-001 standard revision 4 Chapter 19 should be used, with the following addition: for gas and liquid-filled vessels and pipe sections, the passive fire protection should be sufficient to prevent rupture before depressurisation is carried out.

For mobile facilities that are registered in a national ship's register, DNV OS-A101 (2001) Section 2 and OS-D301 may be used as an alternative within the areas covered by the standards.

Re Section 29
Fire divisions

With regard to fire divisions in living quarters, see Section 30 on fire divisions in living quarters.

For stipulation of the dimensioning fire and explosion loads as mentioned in the first and third paragraphs, see Section 10 on loads, load effects and resistance.

The main fire divisions in closed areas should be able to withstand an explosion load of at least 70 kPa for 0.2 seconds. For other areas on the facility the DNV OS-A101 (2001) Section 2 D 600 should be used. Fire barriers with coated or sprayed on fire protection material that does not fulfil the requirements to incombustibility, may be used if an overall assessment indicates that this is prudent from a safety point of view, cf. Section 11 on materials.

Fire divisions as mentioned in the second paragraph, should satisfy fire class

a) A-60 for control and emergency preparedness rooms, rooms for fire pump systems and rooms for emergency power source with associated distribution equipment and fuel tanks if these rooms are located in an area that cannot be exposed to hydrocarbon loads,
b) A-0 for rooms for electrical equipment, fan rooms, rooms where flammable or easily ignited goods are stored and rooms for fire pumps that are located in pontoons and columns.

Special fire conditions may entail a need for fire divisions with higher fire resistance.

Examples of penetrations in fire divisions as mentioned in the last paragraph, may include ventilation ducts, pipes, cables and beams, as well as windows and doors. The test methods in the following standards should be used for penetrations:

a) ISO 3008 or NS 3907 for doors,
b) ISO 3009 or NS 3908 for windows,
c) IMO Resolution A.754 (18) for other types of penetrations such as ducts, pipes and cable penetrations.

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

For mobile facilities that are registered in a national ship's register, DNV OS-D301 Chapter 2, Section 1 may be used as an alternative.

Re Section 30
Fire divisions in living quarters

If the living quarters are located on a separate facility as mentioned in the first paragraph litera c, external surfaces and distance to nearby facilities should nevertheless be such that a fire on these nearby facilities or in the surroundings (the sea) does not entail an unacceptable risk for personnel and functions in the living quarters.

In order to fulfil the requirement to interior design as mentioned in the third paragraph, the NORSOK S-001 standard revision 4 chapter 19.4.6 should be used.

Re Section 31
Fire and gas detection systems

For design of the system as mentioned in the first paragraph, the ISO 13702 standard with Appendix B.6 and NORSOK S-001 standard Chapter 9.2 should be used.

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

The requirement to limiting the consequences as mentioned in the second paragraph, implies that relevant safety functions are activated, see Section 32 on emergency shutdown systems, Section 35 on fire water supply and Section 36 on fixed fire-fighting systems.

Facilities that are not permanently manned, should also have a dedicated gas detection function for the area around and on the helicopter deck. Detection of gas should be shown by means of a light signal that is visible at a safe distance from the facility.

For mobile facilities that are registered in a national ship's register, DNV OS-D301 Chapter 2, Section 4 may be used as an alternative.

Re Section 32
Emergency shutdown systems

When designing the emergency shutdown system, the ISO 13702 standard Chapters 6 and 7 and Appendix B.2 and B.3 and NORSOK S-001 revision 4 Chapter 10 should be used.

The requirement to independence as mentioned in the first paragraph, implies that the emergency shutdown system comes in addition to systems for management and control and other safety systems. The emergency shutdown system may have an interface vis-à-vis other systems if it cannot be adversely affected as a consequence of system failures, failures or single incidents in these systems.

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

The requirement to stopping and isolation as mentioned in the third paragraph means that the following valves shall be emergency shutdown valves:

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

The number and placing of sectioning valves in the processing plant should be determined on the basis of the fire and explosion strategy, cf. Section 4 on design of facilitites.

For mobile facilities that are registered in a national ship's register, DNV OS-A101 (2001) Section 5 may be used as an alternative.

Re Section 33
Process safety systems

The requirement to independence as mentioned in the first paragraph, implies that the process safety system comes in addition to systems for management and control and other safety systems. The process safety

system may have an interface with other systems system if it is not adversely affected as a consequence of system failures, failures or single incidents in these systems.

For designing process safety systems, the ISO 10418 or API RP 14C standards should be used, in combination with NORSOK P-001 revision 5. Auxiliary facilities containing combustible media should also be secured in accordance with the methods described in these standards.

The requirement to two independent safety levels as mentioned in the third paragraph, implies that the process safety levels shall be protected against dependent failures, so that a single failure does not lead to the failure of both safety levels.

Re Section 34
Gas release systems

The gas requirement to the gas release system as mentioned in the first paragraph, implies that gases that are flammable or harmful to health, shall be routed to a safe emission site, and that any potential heat load is calculated, cf. Section 10 on loads, load effects and resistance.

In order to fulfil the requirement to the gas release system as mentioned in the first paragraph, the ISO 13702 standard Chapter 6 and Appendix B.2, the NORSOK S-001 standard revision 4 Chapter 11 and P-100 Chapter 16 should be used, with the following additions:

a) rapid depressurisation should be selected rather than passive fire protection. With regard to fire loads, reference is made to Section 10 on loads, load effects and resistance,
b) when designing gas release systems, external environment considerations should be safeguarded by preferably flaring flammable, toxic or corrosive gases.

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

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

Re Section 35
Fire water supply

Sufficient capacity as mentioned in the second paragraph, means the capacity necessary to supply all firefighting equipment in the facility's largest fire area plus the largest of the adjacent areas. On simpler facilities without overnight stay possibilities, the supply may come from a dedicated water reservoir, from seawater pumps or other available water supply.

In order to fulfil the other requirements as mentioned in this section, the ISO 13702 standard Chapter 11 and Appendix B.8 and the NORSOK S-001 standard revision 4 Chapter 20 should be used.

For mobile facilities that are registered in a national ship's register, DNV OS-D301 Chapter 2, Sections 3, 6 and 7 may be used as an alternative.

Chemicals that are added to fire water, shall be tested and evaluated as mentioned in the Activities Regulations Section 56 on testing and evaluation of chemicals.

Re Section 36
Fixed fire-fighting systems

In order to fulfil the requirement to fixed systems as mentioned in the first paragraph, the ISO 13702 standard Chapter 11 and Appendix B.8 and the NORSOK S-001 standard revision 4 Chapter 20 should be used, with the following additions:

a) the systems should be designed so that capacity and extinguishants, as well as location and selection of nozzles, provide effective fighting of defined fires. The risk represented by other potential fires should be reduced to the greatest extent possible,
b) the requirement to quickly and efficiently firefighting as mentioned in the first paragraph, makes it difficult to use CO_2 as an extinguishant in rooms where personnel may be located,
c) in areas where there may be strong winds, this should be taken into account when placing nozzles and in relation to the need for increased capacity,
d) a water mist system may be installed if realistic tests have been conducted illustrating that the system fulfils its intended function,
e) when locating nozzles for the extinguishant in engine rooms for diesel engines, particular consideration should be given to pumps and pipes in the fuel unit, and separate spot protection should be installed, if applicable,

f) when choosing among equivalent fire technical solutions, choose the solution that uses the least environmentally harmful extinguishant, cf. the Product Control Act Section 3a.

g) for chambers in diving systems, the requirement to efficient firefighting implies that it shall be possible to activate internal extinguishing equipment both from the outside and the inside. The firefighting equipment for the diving system should cover the entire system, and have capacity to also put out fires that may arise in the chambers. The firefighting equipment should also have the capability of cooling down the chamber facility and gas storage area, as well as cover other areas that must be manned in order to evacuate divers.

In order to fulfil the requirement to activation of the systems as mentioned in the second paragraph, the NORSOK S-001 standard Chapter 10.8 should be used.

For mobile facilities that are registered in a national ship's register, DNV OS-D301 Chapter 2, Sections 3, 4, 7 and 8 may be used as an alternative within the area covered by the standard.

Re Section 37
Emergency power and emergency lighting

In order to fulfil the requirement to emergency power, the ISO 13702 standard Chapter 9 and Appendix C.1, the NORSOK S-001 standard revision 4 Chapter 18, and the IMO 1989 MODU CODE standard Chapter 5 should be used with the following addition: emergency power consumers should be limited to equipment that contributes to maintain the facility's integrity in an emergency situation.

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

Re Section 38
Ballast systems

No comments.

Re Section 39
Open drainage systems

Open drainage systems as mentioned in the first paragraph, means systems that collect liquid, but are not pressurised.

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

As regards the design of open drainage systems, the following standards should be used in the area of health, working environment and safety : ISO 13702 Chapter 8 and Appendix B.4, NORSOK S-001 revision 4 chapter 8 and P-100 Chapter 23. In addition, NORSOK S-001 revision 4 Chapter 23 should be used for mobile facilities.

III-IV
EMERGENCY PREPAREDNESS

Re Section 40
Equipment for rescue of personnel

In order for the facility to have equipment available at all times as mentioned in the first paragraph, there should be two independent man overboard boat systems (MOB boat systems), cf. Section 4 on design of facilities litra c. The boat systems may be located on the facility, on the standby vessel or with one system on each of these.

In order to fulfil the requirements to diving systems as mentioned in the second paragraph, the NORSOK U-100 standard revision 3Chapter 9.3 should be used.

Re Section 41
Material for action against acute pollution

Material for action against acute pollution should be functional, robust, flexible and adapted in order to function effectively under prevailing weather, wind and current conditions in the entire area influenced by the pollution.

Realistic conditions as mentioned in the third paragraph, means that variable parameters, such as weather, wind and current conditions and changes in the physical and chemical properties of the pollution over time should be selected in such a way that they are representative of the conditions that the material is to operate under.

It should be possible to store the material in such a way that it can be mobilised at any given time in accordance with the emergency preparedness plan. It should be possible to incorporate the material in a system for coordinated action against acute pollution.

Re Section 42
Standby vessels

Standby vessel means both vessels that have emergency response functions as their primary task and other vessels that will be used, inter alia, for search and rescue, monitoring safety zones or actions taken against acute pollution.

Emergency response functions may be, inter alia,

a) supervision and management of operations,
b) handling of oil booms and skimmers,
c) handling of dispersion equipment,
d) loading and unloading of recovered oil,
e) operation in areas where there is a hazard of explosion and fire.

Airborne craft that are to be used in actions against acute pollution, should be designed so that they can be used to carry out dispersion measures and so that they can contribute to monitoring pollution and directing seagoing craft that take part in the action.

Standby vessels that have specific tasks in relation to the facilities should fulfil the technical requirements in the Norwegian Maritime Directorate's Regulations 16 October 1991, No. 853 concerning standby vessels.

Re Section 43
Means of evacuation

In order to fulfil the requirement to evacuation and means of evacuation, the NORSOK S-001 standard revision 4 Chapter 21 should be used, *with the exception of the reference made to SOLAS and national maritime regulatory requirements in 21.4.3.*

Major modifications or changes in the prerequisites for use for the facility may imply that lifeboats and escape chutes as mentioned in the third paragraph, must be installed.

In order to design free-fall lifeboats and as mentioned in the third paragraph, DNV-OS-E406 should be used.

In order to fulfil the requirements to design of hyperbaric evacuation units as mentioned in the fourth paragraph, the NORSOK U-100 standard revision 3 Chapters 7.4 and 9 should be used, with the following addition: it should be possible to lift hyperbaric evacuation units out of the water using a single anchorage point.

Re Section 44
Survival suits and life jackets etc.

No comments.

Re Section 45
Manual firefighting and fireman's equipment

In order to fulfil the requirements to manual firefighting and fireman's equipment, the ISO 13702 standard Appendix B.8.12 and the NORSOK S-001 standard revision 4 chapter 22.4.2.6 should be used.

III-V
ELECTRICAL INSTALLATIONS

Re Section 46
Electrical installations

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

The requirement to protection against electric shock during normal operation as mentioned in litera a, implies that personnel is not to be accidentally exposed to current flow, or the current shall be limited to a non-hazardous level.

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

The requirement to protection against thermal effects as mentioned in litera b, implies that suitable protection must be used to guard against abnormal heat development, arcing and fire in the unit.

The requirement to protection against overcurrent as mentioned in litera c, including protection against overloads and short circuits, implies that provision must be made for automatic and selective disconnection of consumers that cause such overcurrent before it reaches a dangerous level, or that the overcurrent is limited in some other way so that it does not represent a danger.

The requirement to protection against fault currents as mentioned in litera d, implies that other conductors than live conductors and any other part that is intended to lead a fault current resulting from isolation failure or failure, must be able to conduct this fault current without reaching too high a temperature. Particular consideration should be given to the unit's potential earth fault currents and leakage currents.

The requirement to protection against overvoltage as mentioned in litera e, means that suitable protection shall be used to safeguard against hazard and accident incidents resulting from surge caused by isolation failure, faults in voltage regulators or faults between electric circuits with varying voltage, changes in load associated with connecting and disconnecting switches, earth faults and atmospheric overvoltage.

The requirement to protection against undervoltage as mentioned in litera f, means that measures must be implemented against danger or injury resulting from the voltage returning after a full or partial cut. If such reconnection can entail a hazard, the reconnection should not take place automatically.

The requirement to protection against variations in voltage and frequency as mentioned in litera g, implies that the power supply must be of such a dimension that the voltage and frequency under normal conditions lie within the tolerances that the unit and connected equipment are intended for.

The requirement to protection against power supply failure as mentioned in litera h, implies that measures shall be implemented to ensure satisfactory and reliable power supply, cf. Section 37 on emergency power and emergency lighting.

The requirement to protection against ignition of explosive gas atmosphere as mentioned in litera i, implies that electrical equipment must be located in unclassified areas insofar as practicable. As regards requirements to area classification and facilities, systems and equipment for use in areas where there is a hazard of explosion, see Section 4 on the design of facilities and Section 9 on plants, systems and equipment.

The requirement on electromagnetic interference as mentioned in litera j, implies that electrical units and equipment must function in a satisfactory manner in their electromagnetic environment without causing unacceptable electromagnetic interference for other equipment in this environment. With regard to requirements to electrical equipment, see also Section 78 on EMC, Section 79 on ex-equipment and Section 80 on ATEX.

For the design of electrical installations, the IEC 61892 standard should be used. In those cases where IEC 61892 is not suitable, relevant parts of the IEC 60092 series should be used.

For electrical installations on mobile facilities registered in a national ship's register, the DNV OS-D201 standard may be used as an alternative.

CHAPTER IV
SPECIFIC SUPPLEMENTARY PROVISIONS

IV-I
DRILLING AND WELL SYSTEMS

Re Section 47
Well barriers

The well's life span as mentioned in the first paragraph, means service time and time subsequent to permanent plugging and abandonment.

In order to fulfil the requirement to well barriers, the NORSOK D-010 standard revision 3 Chapters 4.2.1, 4.2.3, 5.6, 9 and 15 should be used in the area of health, working environment and safety. See also the Management Regulations Section 2 on barriers and these regulations Section 7 on safety functions.

The requirements in the first paragraph also imply that the barriers shall be designed so that unintended outflow of injected material is prevented.

Verification of the performance of well barriers may be based on pressure testing, testing of accessibility, response time and leakage rates, as well as observation of physical properties.

The requirement to sufficient independence among the barriers as mentioned in the Management Regulations Section 1 on risk reduction, implies that well barriers shall be independent, without common well barrier elements, also when the barriers have a common outflow source. One of the barriers may be drilling and well fluids.

With regard to the requirement to dimensioning of binding agents, plugs and seals, particularly in relation to the reduction in strength that can arise over time, see Section 10 on loads, load effects and resistance.

Re Section 48
Well control equipment

In order to fulfil the requirement to design of well control equipment, the NORSOK D-001 standard Chapter 5.10 should be used with the following additions:

a) the main unit of activation system should be located at a safe distance from the well so as to avoid exposure in the event of an uncontrolled well situation,
b) it should be possible to activate the blowout preventer from at least three locations on the facility:
    a) one activation panel at the driller's position,
    b) as least one independent activation panel in a safe area,
    c) the third activation alternative may be activation directly on the main unit,
c) in the event of well intervention, it should be possible to activate pressure control equipment from at least two locations on the facility, with one activation panel in a safe area.

In order to fulfil the requirement to equipment as mentioned in the first paragraph, second sentence, the NORSOK D-010 standard revision 3 Chapter 5.7.2 and NORSOK D-010 revision 2 chapter 5.10.3.3 and appendix C should be used for diverter lines, with the following additions:

a) for dynamically positioned facilities that drill top hole sections, a straight pipeline can be used, but without valve outlets and with an inner diameter of at least 400 mm (16"),
b) if a diverter system is installed on the seabed, there should also be a diverter system on board the facility.

In the event of well interventions as mentioned in the last paragraph, including cable, coiled tubing and snubbing activities through the christmas tree, drill pipe or casing that has not been set, the NORSOK D-002 standard revision 1 should be used.

An alternative system for activation as mentioned in the fourth paragraph, means a system that is acoustically operated, ROV operated or remote-controlled in some other way.

The shear ram should have the capacity to cut the work string, with the exception of collars and bottomhole string components. All outlets for the blowout preventer's circulation lines should be equipped with two closing arrangements as close to the outlet as possible.

For mobile facilities that are registered in a national ship's register, DNV OS-E101 Chapter 2, Section 5, C 100-500 may be used as an alternative.

Re Section 49
Compensator and disconnection systems

In order to fulfil the requirements to compensator and disconnection systems, the NORSOK D-001 standard Chapter 5.3 should be used, with the following additions:

a) for dynamically positioned facilities, the disconnection system should be sequence controlled,
b) for anchored drilling facilities it should be possible to move the facility quickly off the drilling location in case of a critical situation,
c) for interventions on subsea wells with high pressure risers, the valve and disconnection system should consist of
    a) a remote-operated valve located under the release point, which cuts all objects that penetrate the well barriers, as well as maintains full working pressure after cutting,
    b) a remote-operated main valve that closes after the cutting is completed,
    c) a block valve over the release point which prevents blowout from the riser to the sea,
    d) a vent valve that releases shut-in pressure between the casing ram and the shear ram or block valve prior to release.

For requirements to specific analyses to detect situations of accident and hazard, reference is made to the Management Regulations Section 14 on analysis of major accident risk. For general requirements to the dimensioning of compensator and disconnection systems with regard to loads, see Section 10 on loads, load effects and resistance. When determining limitations of drilling equipment, the following should be taken into account:

a) movements of the facility as a result of resonance between the wave frequency and the frequency of thee facility itself,
b) movement of the facility as a result of loss of position because of anchor line breakage or drift,
c) loads on well and well head from pull in riser,
d) margin because of uncertainty in calculated riser design,
e) unintended locking of compensator.

For mobile facilities that are registered in a national ship's register, DNV OS-E101 Chapter 2, Section 5, D 100-300 may be used as an alternative.

Re Section 50
Drilling fluid systems

Drilling fluid systems mean complete systems with sufficient capacity sensors, indicators and alarms to monitor, record, recondition, transfer and store fluids.

For general requirements to the design of chemical systems, see Section 14 on chemicals and chemical exposure.

In order to fulfil the requirement to drilling fluid systems, the NORSOK D-001 standard Chapters 5.6, 5.7, 5.8, 5.9 and 5.11 should be used in the area of health, working environment and safety , with the following additions:

a) return of the drilling fluid from the well should take place in a closed system to avoid evaporation,
b) the system for monitoring drilling fluid volume should compensate for the facility's movements and should include indicators on the drill floor with sound and light alarms. When drilling wells with high pressure and high temperature, the need for temperature and pressure sensors in critical locations such as before and after the choke manifold and in the blowout preventer, should be assessed. For general requirements to monitoring of drilling fluid parameters, see Section 16 on instrumentation for monitoring and recording,
c) gases from the reconditioning unit should be vented through separate pipes to a safe area.

For general requirements to barriers, see the Management Regulations Section 2 on barriers and these regulations Section 7 on safety functions.

For mobile facilities that are registered in a national ship's register, DNV OS-E101 Chapter 2, Section 5, G 100-400 may be used as an alternative.

Re Section 51
Cementing unit

For general requirements to the design of cementing units, see Section 14 on chemicals and chemical exposure.

In order to fulfil the requirement to cementing units, the NORSOK D-001 standard revision 2 Chapter 5.11 and Appendices B and C should be used in the area of health, working environment and safety, with the following additions:

the cementing unit and the cementing head should be designed for remot operation.

For mobile facilities that are registered in a national ship's register, DNV OS-E101 Chapter 2, Section 5, G 400 may be used as an alternative.

Re Section 52
Casings and anchoring of wells

The section no longer applies, hence no comments.

Re Section 53
Equipment for completion and controlled well flow

In order to fulfil the requirement to completion of production wells, the NORSOK D-010 standard revision 3 Chapters 7, 8, 14 and 15 and D-SR-007 should be used in the area of health, working environment and safety.

By equipment design to handle controlled well flow as mentioned in the first paragraph, is meant

a) equipment used for production and injection of gas, fluids and solids,
b) need for equipment in case of changes in preconditions, failing of barrier elements, for instance,

The equipment should be designed for well intervention, work over and plugging of wells and for collection of well data of significance to safety.

By well testing as mentioned in the third paragraph, is meant flow during formation testing, test production, cleanup and stimulation of the well.

See also formation testing in the Regulations for resource management in the petroleum activities.

For mobile facilities that are registered in a national ship's register, DNV OS-E101 Chapter 2, Section 5, H 100-200 may be used as an alternative.

Re Section 54
Christmas tree and well head

The equipment as mentioned in the first paragraph, also encompasses casing hangers and annular preventers. For the design of christmas trees, the ISO 10423 and ISO 13628 standards should be used, with the following additions:

a) the christmas tree should have a side outlet valve for each level of the tree. There should be one shut-off assembly in each barrel, located above the side outlets,
b) the main valves as mentioned in the second paragraph, should be integrated into or mounted directly on the christmas tree. It should be possible to close inlets and outlets in the christmas tree that can be subjected to well pressure in at least two independent ways. Injection points should have check valves as close to the injection point as possible,
c) it should be possible to isolate christmas trees with activation systems so that misoperations are avoided during intervention in the wells,
d) christmas trees with activation systems should be designed so that the closing time for the main valve on standard christmas trees and side outlets on sub sea christmas trees is evaluated in relation to the barrier function the valve shall take care of. This evaluation should, inter alia, encompass necessary closing time in relation the risk reducing function and the location of the valve.

For general requirements to barriers, see the Management Regulations Section 2 on barriers. See also these regulations Section 7 on safety functions and Section 32 on emergency shutdown systems, and the Activities Regulations Section 44 on maintenance programme.

Re Section 55
Remote operation of pipes and workstrings

The guidelines have been removed. They are now incorporated into the guidelines to section 70 on lifting appliances and lifting gear.

IV-II
PRODUCTION PLANTS

Re Section 56
Production plants

For design of production plants as mentioned in the first paragraph, the NORSOK standards P-100, L-001 and L-002 should be used in the area of health, working environment and safety.

In those cases where the production plant is subsea, the NORSOK standards U-001 and the ISO 13628 standard should be used in the area health, working environment and safety.

For production plants that are subsea, the pollution requirement as mentioned in the first paragraph, means that the responsible party shall evaluate whether hydraulic fluids, well fluids and other chemicals shall be routed back to the surface or to a local storage tank.

The design requirement as mentioned in the first paragraph, shall be viewed in context with the Framework Regulations Chapter III on principles relating to health, environment and safety.

With regard to general requirements to the design of chemical plants, see Chapter 14 on chemicals and chemical effects.

For protection of production facilities under water against mechanical damage, see the Framework Regulations Section 24 on development concepts.

With regard to general requirements to design, see Section 4 on design of facilities and Section 9 on plants, systems and equipment.

IV-III
MAIN LOADBEARING STRUCTURES AND PIPELINE SYSTEMS

Re Section 57
Main loadbearing structures

Main loadbearing structures mean the facility's substructure and module support frame.

A single component means

a) for steel structures, a part of the structure between struts or adjacent parts of the structure (here steel structures mean plate or shell structures),
b) for concrete structures, a part of the structure between two walls.

In order to fulfil the requirement to main load bearing structures, the NORSOK N-003 revision 2 Chapter 9.1.1.should be used in the event of loss of a single component.

With regard to water penetration in mobile facilities, reference is made to Section 38 on ballast systems and Section 63 on stability. For general provisions, see Section 4 on design of facilities and Section 6 on main safety functions.

With regard to verification requirements, see the Framework Regulations Section 15 on verification. For verification of main loadbearing structures, the NORSOK N-001 standard Chapter 5.2 should be used.

Re Section 58
Pipeline systems

It should be possible to take a reading of the pressure in the launchers and receivers as mentioned in the second paragraph, both before startup and during operation.

In order to fulfil the requirement to safety level as mentioned in the third paragraph, the failure probabilities in the DNV OS-F101 (2007) and OS-F201 standard Section 2, Table 2-5, should be used.

With regard to general requirements to design, see Section 4 on design of facilities and Section 9 on plants, systems and equipment, Section 11 on materials and Section 14 on chemicals and chemical exposure.

IV-IV
LIVING QUARTERS

Re Section 59
Living quarters

In order to fulfil the requirements to living quarters as mentioned in the first paragraph, the NORSOK standards C-001 revision 3, C-002 revision 3, S-001 revision 4 and S-002 revision 4 should be used with the following additions:

a) the capacity requirement as mentioned in the first paragraph, means that the living quarters are dimensioned with sufficient margins to avoid bed scarcity during peak manning,
b) the living quarters should be designed so that personnel can sleep undisturbed and be assured of satisfactory restitution.

For mobile facilities that are registered in a national ship's register, the Norwegian Maritime Directorate's regulations 17 December 1986 No. 2318 concerning construction and outfitting of the living quarter on mobile offshore units, last amended 11 April 2003, Sections 6, 7, 8, 12, 13, 14, 15, 17 and 18 may be used as an alternative to the standards NORSOK C-001 revision 3 and C-002 revision 3, with the following additions:

a) the additions as mentioned in the first paragraph,
b) bunks should be replaced with beds on the floor, cf. Section 19 on ergonomic design.

The requirements as mentioned in the first paragraph, also apply to simpler facilities with overnight stay possibilities, but consideration may be given to whether

a) the dining hall should be included in the total recreation area,
b) adaptation of kitchen and washing-up areas should be in proportion to the need on the facility,
c) the laundry room can be omitted,
d) the dedicated health department can be omitted.

If a dedicated health department is omitted, there should be adequate area and equipment on the facility to cover the need for first aid until the helicopter arrives.

The standard of hygiene as mentioned in the second paragraph, should particularly be maintained in cabins, day rooms, the health department and areas where food is stored, prepared and served, see Section 62 on supply of food products and drinking water.

For facilities where no permanent manning is planned, consideration should be given to whether living quarters should be built, or emergency quarters. These evaluations shall include, as a minimum,

a) anticipated scope of work and work organisation,
b) risk related to transportation and stay on the facility,
c) working environment matters,
d) need for restitution and rest,
e) hygienic conditions.

Re Section 60
Health department

If facilities are connected by gangways, the requirement as mentioned in the first paragraph, implies that at least one of the facilities shall have a health department.

In order to fulfil the requirements to a health department as mentioned in the first paragraph, the NORSOK standard C-001 revision 3 Chapter 7.17 should be used with the following additions: the health department should be located such that it to the smallest extent possible is exposed to noise and vibrations, and such that stretcher transport to the health department of sick or injured personnel can be accomplished in a prudent manner. For mobile facilities that are registered in a national ship's register, the Norwegian Maritime Directorate's regulations 17 December 1986 No. 2318 concerning construction and outfitting of the living quarter on mobile offshore units, last amended 11 April 2003, Section 16 may be used as an alternative to the standard NORSOK C-001 revision 3, with the same additions as mentioned in the second paragraph.

The health department's equipment should be assessed on the basis of the defined situations of accident and hazard as mentioned in the Management Regulations Section 15 on quantitative risk analyses and emergency preparedness analyses.

Equipment as mentioned in the second paragraph, encompasses, inter alia, medications and first aid equipment, stretchers and medical rescue equipment.

Re Section 61
Emergency unit

The emergency unit will normally be a room that has another primary function, but that can quickly be converted into an emergency unit if needed.

In order to fulfil the requirements to the emergency unit, the NORSOK C-001 revision 3 standard Chapter 7.17 should be used.

Re Section 62
Supply of food and drinking water

The requirement to design as mentioned in the second paragraph, implies that technical solutions for food and drinking water supply shall satisfy the provisions in the food regulations for land-based activities, as well as the Regulations relating to water supply and drinking water. In addition, the technical solutions should be based on recognised methods to the extent possible.

Reference is also made to the guidelines to the Activities Regulation Section 11 on food and drinking water.

Reference is also made to Chapter III in the Regulations 4 September 1987 concerning potable water system and potable water supply on mobile offshore units, issued by the Norwegian Maritime Directorate pursuant to the Seaworthiness Act. By adhering to the somewhat more detailed provisions, etc. stipulated in the latter regulations, one will normally also fulfil the Facilities Regulations' provisions on drinking water systems. The Norwegian Maritime Directorate's regulationsare not legally binding, however, with respect to anything other than facilities that are or will be registered in a Norwegian ship's register, cf. Section 2 of the regulations. The provisions of the Facilities Regulations may thus also be fulfilled by selecting other means than those given in the regulations of the Norwegian Maritime Directorate.

Reference is also made to the following standard: NORSOK P-100 Chapter 22. It is assumed that the NORSOK standard will be supplemented with the National Institute of Public Health's guideline material for design of drinking water systems.

The Norwegian Board of Health, or anyone authorised by the Board, also carries out supervision in accordance with the Framework Regulations to ensure that the provision on food, water supply and drinking water is fulfilled in the petroleum activities.

IV-V
MARITIME INSTALLATIONS

Re Section 63
Stability

For design of facilities as regards stability, the NORSOK N-001 standard Chapter 7.10 should be used.

For requirements to the design of ballast systems, see Section 38 on ballast systems.

Re Section 64
Anchoring, mooring and positioning

In order to fulfil the requirement to anchoring analysis, the ISO 19901-7 may be used as an alternative in connection with survival mode, cf. the second, third, fourth an fifth paragraph.

For design of tension legs, the NORSOK N-001 standard Chapters 7.11 and 8.3 should be used.

For design of anchoring systems, the NORSOK N-001 standard Chapters 7.11 and 7.12 should be used.

For general requirements to loads, load effects and resistance, see Section 10 on loads, load effects and resistance.

For design of dynamic positioning systems as mentioned in the last paragraph, the technical provisions in the IMO MSC/Circular 645 standard should be used.

For requirements to disconnection of risers, see Section 49 on compensator and disconnection systems.

Re Section 65
Turret

For design of turrets, the NORSOK S-001 standard revision 4 Chapter 5.4.8.2 should be used in addition.

IV-VI
DIVING SYSTEMS

Re Section 66
Systems and equipment for manned underwater operations

For design of systems and equipment for manned underwater operations on **vessels**, see Section 2 on systems and equipment for manned underwater operations from vessels.

For general requirements to design of plants, systems and equipment for manned underwater operations, see Section 9 on plants, systems and equipment.

IV-VII
OTHER SUPPLEMENTARY PROVISIONS

Re Section 67
Loading and discharging facilities

Hose connections in loading and discharging facilities should be of the quick-release type in the event of overloads. They should also be self-closing.

Loading hoses for loading and discharging from supply vessels should be equipped with floats.

In order to fulfil the requirement to design of loading and discharging facilities on floating production, storage and offloading vessels (FPSOs) and floating storage units (FPUs), DNV-OS-E201(2005) section 4 C and D, and Norwegian Maritime Directorate's regulations of 10 February 1994 No. 123 for mobile offshore units with production technical plants and equipment sections 21 to 28 inclusive, sections 30 to 32 inclusive and sections 34 to 36 inclusive, should be used.

Re Section 68
Waste

No comments.

Re Section 69
Exhaust ducts

In order to fulfil the requirement to exhaust ducts as mentioned in the first paragraph, the NORSOK S-001 standard revision 4 should be used with the following additions:

a) exhaust ducts should be designed so that the exhaust gases are routed to unclassified areas,
b) if water-cooled spark catchers are used, a signal should sound in the central control room in the event of a failure in the water supply.

With regard to exhaust ducts from reconditioning plants in drilling fluid systems, see Section 50 on drilling fluid systems.

Re Section 70
Lifting appliances and lifting gear

The Machinery Regulations apply to design, manufacture and sale of lifting appliances and lifting gear for use on permanently placed facilities. The machinery regulations are expanded on in harnonised standards, including the EN 13852-1 for offshore cranes. The standard EN 13852-1 should also be used on mobile facilities that are registered in a national ship's register. With regard to evaluation of the technical condition of cranes on existing mobile facilities that will be put into service on the Norwegian continental shelf, reference is made to the Norwegian Shipowners' Association's Guidelines for implementation of EN 13852-1 on existing offshore cranes on mobile offshore units.

The requirement as mentioned in the first paragraph second sentence, continues the current law in the regulations under the Petroleum Act and applies only to the safety aspects, not the health and environment aspects.

In order to fulfil the requirement to remote operation as mentioned in the third paragraph, the NORSOK D-001 standard Chapter 5.4 and OLF/NR guideline No. 081 revision 2 should be used, with the following addition:

lifting equipment should have independent safety assemblies and be hung off and stored in such a way that the equipment is secure in the event of heeling, and that the danger of falling objects is limited.

Snubbing units as mentioned in the last paragraph, means mobile units that are installed so that forces are transferred directly to the wellhead. For snubbing units, the requirement will be made applicable to the extent that equipment to be used with such units, has been developed and tested.

For lifting appliances and lifting gear on the drill floor of mobile facilities that are registered in a national ship's register, the ISO 13535 standard and relevant parts of the DNV OS-E101 standard may be used as an alternative to the standard NORSOK D-001.

For remote operation of pipes and work strings on mobile facilities that are registered in a national ship's register, the DNV OS-E101 chapter 2, section 5, F 100-400 may be used as an alternative to the standard NORSOK D-001 chapter 5.4.

Re Section 71
Helicopter decks

In order to fulfil the requirement to helicopter decks as mentioned in the first paragraph, the NORSOK C-004 standard may be used as an additional document. The requirements in the regulations of the Civil Aviation Authority shall be complied with in all cases.

For design of helicopter decks, the NORSOK S-001 standard revision 4 Chapter 20.4.9 should be used with the following addition:

for facilities where there are particular problems related to take-off and landing, consideration should be given to such problems when determining the design and location of the helicopter deck.

Re Section 72
Marking of facilities

In agreement with the Coast Directorate, the following provisions shall be used for marking of facilities as mentioned in the first paragraph: IALA Recommendation on the marking of offshore structures (IALA Recommendation O-114 May 1998) with the following modifications and additions:

Re O-114 Section 2.3.1

The main light shall have a nominal range of 15 nautical miles.

The horizontal extremities of the facility, with the exception of extremities that are marked with a main light, shall, in case it is considered to be necessary, be marked with a red light ("subsidiary light"). This light shall have the same code/character as the main light and have a nominal range of 3 nautical miles. Subsidiary lights shall be synchronised, but not necessarily synchronised with the main light.

As regards calculation of the light intensity required to achieve the given ranges, reference is made to the Recommendation on the Photometri of Marine Aids to Navigation Signal Lights (IALA Recommendation E-122 June 2001).

Re O-114 Section 2.3.3

Use of sound signals will not be ordered. Earlier orders relating to the use of sound signals are revoked.

Re O-114 Section 2.3.6

Only in exceptional cases will it be of relevance to use floating marking equipment for traditional marking of facilities in the petroleum activities.

Re O-114 Section 2.4

In addition the equipment mentioned, it may also be of relevance to use AIS as additional marking.

It will also be generally required that all marking of facilities in the petroleum activities shall have an availability of 99.8 per cent measured over a three year period (cf. IALA Recommendation O-130 On Categorisation and Availability Objectives for Short Range Aids to Navigation December 2004).

Identification panels

Facilities shall be fitted with identification panels displaying block number, name of field and name of facility, in black letters/ figures 1 meter high on a yellow background. The identification panels shall be so arranged that at least one panel is visible from any direction. The identification panels shall be visible in daylight as well as in darkness.

For requirements to marking of mobile facilities that are registered in a national ship's register, reference is made to the Framework Regulations Section 3 on use of maritime legislation in the petroleum activities.

Re Section 73
Marking of equipment and cargo

This section is a continuation of the former Safety Regulations Section 41.

Re Section 74
Lifts

In order to fulfil the requirement to lifts, harmonised EN standards that are prepared on the basis of the Lift Directive, should be used. The Lift Directive itself is not made appliccable to the petroleum activities. On mobile facilities, the ISO 8383 standard should be used.

CHAPTER V
IMPLEMENTATION OF EEA LAW

Re Section 75
Simple pressure vessels

This section continues the previous incorporation in the petroleum activities of Council Directive 87/404/EEC relating to simple pressure vessels.

Re Section 76
Personal protective equipment

This section continues the previous incorporation in the petroleum activities of Council Directive 89/686/EEC relating to personal safety equipment. In addition, the changes made in Council Directive 93/95/EEC, have been incorporated.

Re Section 77
Aerosols

This section continues the previous incorporation in the petroleum activities of Council Directive 75/364/EEC relating to aerosols, as well as the adopted changes in Commission Directive 94/1/EEC.

Re Section 78
EMC

This section continues the previous incorporation in the petroleum activities of Council Directive 89/336/EEC and Council Directive 92/31/EEC (electromagnetic compatibility – EMC).

Re Section 79
Ex-equipment

This section no longer applies, hence no comment.

Re Section 80
ATEX

This section continues the previous incorporation in the petroleum activities of Council Directive 94/9/EU relating to equipment and safety systems for use in areas where there is a hazard of explosion (ATEX).

The ATEX Regulations have limited application in the petroleum activities.

See the guidelines to Section 83 on entry into force as regards the transitional arrangement up to 30 June 2003.

Re Section 81
Pressure equipment not comprised by the Facilities Regulations

The purpose of this section is to clarify the relationship to the Regulations 9 June 1999 No. 721 relating to pressure equipment (RPE).

The RPE have limited application in the petroleum activities.

The RPE entered into force on 29 November 1999 with a transitional period up to 29 May 2002. The regulations that applied when the RPE entered into force, will be accepted until 29 May 2002.

Reference is made to the Framework Regulations Section 63 on entry into force and repeal of regulations No. 2, litera o, which states that the Regulations 7 February 1992 No. 151 relating to process and auxiliary facilities in the petroleum activities may be used for pressure equipment covered under the RPE up to 29 May 2002.

In those cases where the RPE do not apply, relevant parts of the Facilities Regulations will apply.

Re Section 82
Machinery and safety components not comprised by the Facilities Regulations

The purpose of this section is to clarify the relationship to the regulations 20 May 2009 No. 544 relating to machinery (the Machinery Regulations).

The Machinery Regulations have limited application in the petroleum activities and do not comprise seagoing vessels and mobile facilities together with machinery on board such vessels or facilities, cf. the Machinery Regulations Section 1, No. 2, litera f. This means that the Machinery Regulations apply to permanently placed facilities, including floating production facilities in permanent positions (in position for the entire life span of the field). As regards these floating production facilities, the Machinery Regulations apply to equipment that is necessary for carrying out drilling and production activities, and that does not have any function in relation to normal maritime activities.

The Machinery Regulations Sections 1 and 2 of stipulate the scope of the regulations and which equipment is comprised by the Machinery Regulations. In those cases where the Machinery Regulations do not apply, relevant parts of the Facilities Regulations will apply.

CHAPTER VI
ENTRY INTO FORCE

Re Section 83
Entry into force

See the Framework Regulations Section 63 on entry into force and repeal of regulations No. 2 for an overview of which regulations are repealed when these regulations enter into force.

Within the scope of the Pollution Control Act, the complete Facilities Regulations enter into force 1 January 2002. This also applies to existing facilities. This implies that an assessment has to be made of existing facilities to determine whether the facility fulfils the requirements of the regulations. This applies in particular to the requirements in Sections 14, 39, 47, 50, 51, 53, 56 and 68 of the regulations. If the facility does not fulfil the requirements of the regulations, changes must be made to the facilty. If particular reasons so warrant, the NPCA can exempt from requirements in the regulations. This could, for example, be instances where the costs of making changes far exeed the environmental gain. It is not presumed that the regulations' requirements on account be taken of the external environment, will entail major or costly changes to existing facilities. In many of the requirements, provision is made for making a cost-benefit assessment in relation to that of deciding whether the requirements of the regulations are fulfilled or not. This applies, for example, to Section 39 on open drainage systems.

Sections 3, 4, 5, 9 and 11 say that consideration shall be given to the risk of pollution or environmental risk when selecting materials and when choosing and designing facilities and plants. These provisisons will be of significance in the planning and designing phase, and when modifying plants and facilities. These sections do not require, however, that changes are made to existing plants and facilities.

This Section No. 2 viewed in context with the Framework Regulations Section 63 on entry into force and repeal of regulations, implies that, in the area of health, working environment and safety, it is the technical requirements in the regulations that applied up to the date when these regulations entered into force, that can still be used as a basis.

See also the Framework Regulations Section 63 on entry into force and repeal of regulations No. 2, litera o which stipulates a transitional arrangement for pressure equipment comprised by the Regulations 9 June 1999 No. 721 relating to pressure equipment. See the comments to Section 81 on pressure equipment not comprised by the Facilities Regulations.

The transitional arrangement up to 30 June 2003 for equipment comprised by these regulations Section 80 on ATEX, still applies. This implies that provisions on such equipment in regulations that applied at the time of entry into force of these regulations, may still be used up to 30 June 2003.

Major rebuildings and modifications as mentioned in this Section No. 3, may be the installation of a new module, major interventions in hydrocarbon-carrying systems or major changes in physical barriers. With regard to the use of new standards in such contexts, see the Framework Regulations Section 18 on documentation.

Existing facilities as mentioned in this Section No. 3, means facilities where the plan for development and operation of petroleum deposits (PDO) has been approved according to the Petroleum Act Section 4-2, or where special permission has been given on the basis of plans for installation and operation of facilities for

transport and exploitation of petroleum (PIO) according to the Petroleum Act Section 4-3, or facilities that have beenn granted consent to carry out petroleum activities before these regulations entered into force.

For mobile facilities that are registered in a national ship's register, the requirements in the new regulations will apply when a new consent is applied for, see the Framework Regulations Section 63 on entry into force and repeal of regulations. It ensues from the Information Duty Regulations Section 6 on contents of application for consent that, when applying for consent, the operator shall provide an overview of previously granted exceptions for mobile facilities. Previously granted exemptions follow the mobile facility. New operators must, however, evaluate whether it is prudent to operate with the exemptions granted, and whether changed conditions exist that make it necessary to apply for a new exemption, see the Framework Regulations Section 59 on exemptions.

REFERENCE LIST

1. Acts

Act 17 June 2005 No. 62 relating to working environment, working hours and employment protection, etc. (Working Enviorment Act).
Act 29 November 1996 No. 72 relating to the petroleum activities.
Act 11 June 1976 No. 79 relating to product control and consumer services (the Product Control Act).

2. Regulations and guidelines issued by the authorities

The Directorate of Labour Inspection
Regulations 26 June 1998 No. 608 relating to use of work equipment, last amended 13 September 2004 No. 1291.
Regulations 14 April 1989 No. 335 relating to scaffolding, ladders and work on roofs etc., last amended 13 September 2006,
Regulations December 1994, No. 1259 relating to work at computer monitors (ordering No. 528).
Regulations October 1994 No. 0972 relating to safety signs and signals in the workplace, last amended 30 June 2003, (ordering No. 526).
Regulations 20 May 2009 No. 544 relating to machinery (the Machinery Regulations). (The Machinery Regulations are joint regulations for the Directorate of Labour Inspection, the Directorate for Civil Protection and Emergency Planning and the Petroleum Safety Authority), (ordering No. 522).
Regulations 25 January 2005 No. 47 relating to soluble chromium VI in cement.
Regulations 6 July 2005 No. 804 relating to protection against mechanical vibrations, last amended 19 December 2006.
Guidelines of February 1996, Ordering No. 0361 relating to administrative standards for pollution in the work atmosphere.
Guidelines of March 1996, Ordering No. 0444 relating to climate and air quality in the workplace.
Guidelines of December 1996, Ordering No. 540 relating to work at computer monitors.

The Directorate for Civil Protection and Emergency Planning
Regulations 26 June 2002 No. 0744 relating to flammable goods,
Regulations 26 June 2002 No. 0922 relating to handling of material liable to explode, last amended 15 October 2008.
Regulations June 1999 No. 721 relating to pressure equipment (RPE), last amended 10 July 2001. (The RPE are joint regulations for the Directorate for Civil Protection and Emergency Planning and the Norwegian Petroleum Safety Authority).
Regulations 9 December 1996 No. 1242 relating to equipment and safety systems for use in areas where there is a hazard of explosion (the ATEX Regulations), last amended 8 December 2003.

Regulations 31 October 2008 No. 1164 relating to electrical equipment (the EE regulations).
Regulations 7 July 1994 No. 735 relating to simple pressure vessels (the SPV regulations), last amended 6 November 2003.
Regulations 19 August 1994 No. 819 relating to construction, design and production of personal protective equipment (the PPE regulations), last amended 20 February 2004.
Regulations 1 March 1996 No. 229 relating to aerosols (the aerosol regulations), last amended 6 November 2003.

The Norwegian Coast Directorate
Guidelines of November 1999 relating to marking of facilities in the petroleum activities.

The Civil Aviation Authority
Regulations of 26 October 2007 No. 1181 relating to continental shelf aviation – commercial air transport to and from helidecks on facilities and vessels at sea, last amended 28 January 2008.
Regulations of 28 January 2008 No. 81 relating to meterological services for aviation.

The Norwegian Petroleum Directorate
Regulations for resource management in the petroleum activities, 18 June 2001 No. 749, last amended 30 November 2007.
Guidelines of January 1997 No.789 Jet-fire resistance test of passive fire protection materials.
Publication YA-710 Principles for design of alarm systems, February 2001.

The Norwegian Maritime Directorate
Regulations 17 December 1986 No. 2318 concerning the construction and outfitting of the living quarter on mobile offshore units, last amended 14 March 2008.
Regulations 10 February 1994 No. 123 for mobile offshore units with production plants and equipment, last amended 14 March 2008.
Regulations 16 October 1991 No. 853 concerning standby vessels, last amended 29 June 2007.
Regulations 4 September 1987 No. 856 concerning the construction of mobile offshore units, last amended 14 March 2008.
Regulations of 10 July 2009 No. 998 relating to positioning and anchoring systems on mobile offshore units (the anchoring regulations 09).
Regulations 20 December 1991 No. 878 concerning stability, watertight subdivision and watertight/weathertight closing means on mobile offshore units, last amended 14 March 2008.
Regulations December 1991 No. 879 concerning ballast systems on mobile offshore units, last amended 14 March 2008.
Regulations 4 September 1987 No. 860 concerning potable water system and potable water supply on mobile offshore units, last amended 14 March 2008.

The National Institute for Public Health
Recommended standards for indoor climate, November 1998.

The Norwegian Board of Health
The Ministry of Health and Social Affairs' Regulations 1 January 1995 relating to water supply and drinking water, etc., which will be replaced by
The Ministry of Health and Social Affairs' new regulations relating to water supply and drinking water, currently being developed, planned entry into force in 2002.
The Ministry of Social Affairs and the Norwegian Directorate of Health's Regulations 17 June 1991 relating to hygienic factors, etc. for installations involved in the petroleum activities, Chap. III.
Detailed regulations relating to requirements to drinking water units on facilities for production, etc. of submarine petroleum deposits, with guidelines for disinfection issued by the Ministry of Social Affairs on 23 October 1978.
The Norwegian Maritime Directorate's Regulations 4 September 1987 concerning potable water system and potable water supply on mobile offshore units.
The National Institute for Public Health's guideline material for drinking water units.

The Norwegian Post and Telecommunications Authority
Regualtions of 22 January 2007 No. 89 relating to electromagnetic compatibility (EMC) for electronic communication.

3. Standards and guidelines

American Petroleum Institute (API)

API 17J, Specification for Unbonded Flexible Pipe, 2nd Edition November 1999, Errata May 25, 2001, Addendum 1, June 2002, Effective date: December 2002.
API RP 14C, Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms, 7th Edition 2001.

Det Norske Veritas (DNV)
DNV OS-A101, Safety Principles and Arrangement, 2001.
DNV OS-B101, Metallic Materials, 2001.

DNV OS-C102, Structural Design of Offshore Ships, 2004.
DNV OS-C103, Structural Design of Column Stabilised Units (LRFD-method), 2004.
DNV OS-C104, Structural Design of Self Elevating Units, 2004.
DNV OS-D101, Marine & Machinery Systems & Equipment, 2001.
DNV OS-D201, Electrical System and Equipment, 2001.
DNV OS-D202, Instrumentation, Control & Safety Systems, 2000.
DNV OS-D301, Fire Protection, 2001.
DNV OS-E101, Drilling Plant, 2000.
DNV-OS-E201 Oil and gas processing systems, 2005.
DNV-OS-E406 Design of Free Fall Lifeboats, April 2009,
DNV OS-F101, Submarine Pipeline System, 2000.
DNV OS-F201, Dynamic Risers, 2001.
DNV RP-A203 Qualification Procedures for New Technology, 2001.

The Danish Energy Agency (Denmark)
Guidelines for the design of fixed offshore installations (2008) chapter 2 on design of unmanned production platforms.

European Standard (EN)
EN 614-1, Safety of machinery – Ergonomic design principles Part 1: Terminology and general principles, 1995.
prEN 614-2, Safety of machinery – Ergonomic design principles Part 2: Interactions between the design of machinery and work tasks.
EN 894-1, Safety of machinery – Ergonomics requirements to the design of displays and control actuators – Part 1: General principles for human interactions with displays and control actuators, 1997.
EN 894-2, Safety of machinery – Ergonomics requirements to the design of displays and control actuators – Part 2: Displays, 1997.
EN 894-3, Safety of machinery – Ergonomics requirements to the design of displays and control actuators – Part 3: Control actuators, 2000.
EN 1838, Lighting applications – Emergency lighting, April 1999.
EN 13852-1, Cranes – Offshore cranes – Part 1: General – purpose offshore cranes, 2004.

International Electrotechnical Commission (IEC)
IEC 60092 Electrical installations in ships (relevant parts).
IEC 60331 Tests for electric cables under fire conditions - Circuit integrity, Part 11, 21, 23 and 25, 1999.
IEC 60332 Tests on electric cables under fire conditions - Part 1 (1993), 2 (1989), 3-10 and 3-21 through 3-25 (2000).
IEC 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems, Part 1-7, 1998.
IEC 61892 Fixed and mobile offshore units - Electrical Installations, Part 3, 5, 6 and 7, 1997-2000.

The International Marine Contractors Association (IMCA)
The Association of Offshore Diving Contractors: AODC- 035 Code of practice for the safe use of electricity under water, 1985.

International Maritime Organization (IMO)
Code for the construction and equipment of mobile offshore drilling units (MODU Code), 1989 with amendments in 1991.
MSC/Circ. 645, Guidelines for vessels with dynamic positioning systems, 6th June 1994.
Resolution A.471 (XII) Recommendation on test method for determining the resistance to flame of vertically supported textiles and films, 1984.
Resolution A.653 (16) Flame spread, surface materials and floorings.
Resolution A.754 (18) Recommendation on fire resistance tests for “A”, “B” and “F” class divisions, 4th November 1993.

International Organization for Standardization (ISO)

ISO 834 Fire-resistance tests – Elements of building construction, Part 1 (1999), 3 (1994) and 4 through 7 (2000).
ISO 1182 Fire Tests – Building Materials – Non-Combustibility Test, third edition, 1990.
ISO 1716 Building Materials – Determination of Calorific Potential, first edition, 1973.
ISO 3008 Fire-Resistance Tests on Door and Shutter Assemblies, first edition, 1976 with additions and corrections from 1976, 1977, 1982 and 1984.
ISO 3009 Fire-Resistance Tests – Glazed Elements, first edition, 1976 with additions from 1977 and 1984.
ISO 5657 Reaction to fire tests – Ignitability of building products using a radiant heat source, 1997.
ISO 5660-1: Fire tests – reaction to fire – part 1: rate of heat release from building products (Cone Calorimeter method), first edition, 1993.
ISO 6385: Ergonomic principles in the design of work systems, first edition 1981.
ISO 8383 Lifts on ships – specific requirements, 1985.
ISO 9705 Fire Tests – Full-Scale Room Test for Surface Products, first edition, 1993 with corrections in 1996.
ISO 10418 Petroleum and natural gas industries - Offshore production platforms - Basic surface safety systems, 2003.
ISO/FDIS 10423 Petroleum and natural gas industries - Drilling and production equipment - Wellhead and christmas tree equipment, 2003.
ISO/FDIS 13535 Petroleum and natural gas industries - Drilling and production equipment - Hoisting equipment, 2000.
ISO 13623 Petroleum and natural gas industries – Pipeline transportation systems, 2000.
ISO 13628 Petroleum and natural gas industries – Design and operation of subsea production systems, part 1-9, 1999-2002.
ISO 13702 Petroleum and natural gas industries – Control and mitigation of fires and explosions on offshore production installations – Requirements and guidelines", 1999.
ISO 19901-7 Petroleum and natural gas industries – Specific requirements for offshore structures – Part 7: Stationkeeping systems for floating offshore structures and mobile offshore units, 2005.

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NS 3420 Descriptive texts for buildings and construction, 2004.
NS 3473 Engineering of concrete structures, calculation and structural rules, 2003.
NS 3907 Technical fire testing of doors, ports and hatches – fire resistance, 1977.
NS 3908 Technical fire testing of glass sections – fire resistance, 1977.
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NORSOK H-001 HVAC – Heating, Ventilation and Air Conditioning, revision 4, November 2001.
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NORSOK L-002 Piping Design, Layout and Stress Analysis, revision 2, September 1997.
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NORSOK P-001 Process Design, revision 5, September 2006.
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NORSOK S-005 Machinery-working environment analyses and documentation, revision 1, March 1999.
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The Norwegian Oil Industry Association (OLF)
Guidelines for the application of IEC 61508 and IEC 61511 in the petroleum activities on the Norwegian continental shelf, No.: 070, revision No. 02, 29 October 2004.

OLF/NR-081 Recommended guidelines for the remote operation of pipe handling, revision 2, 12 February 2009.

4. Accessibility of regulations and documents
The acts, the central regulations (regulations that apply to the entire country) and the local regulations may also be found on "Lovdata's" web site at http://www.lovdata.no/

Det Norske Veritas' documents may be ordered from Det Norske Veritas, P.O. Box 200, 1322 Høvik, Norway, tel. +47 67 57 99 00 or fax +47 67 57 99 12, or via http://www.dnv.com/

The Directorate for Labour Inspection's regulations may be ordered from Tiden Norsk Forlag A/S, P.O. Box 8813 Youngstorget, 0028 Oslo, Norway, or via http://www.arbeidstilsynet.no/

The Directorate for Civil Protection and Emergency Planning's regulations. See http://www.dsb.no.

The National Institute of Public Health's guideline material may be ordered from the National Institute of Public Health, P.O. Box 4404 Torshov, 0403 Oslo, Norway, or via the web site at http://www.folkehelsa.no/fag/drikkevann/offshore.html

The Civil Aviation Authority's regulations may be ordered from the Civil Aviation Authority, P.O. Box 8050 Dep., 0032 Oslo, Norway, tel. +47 23 31 78 00, fax +47 23 31 79 95, e-mail postmottak@caa.no or via http://www.luftfartstilsynet.no/

Norsk Standard (NS), European (EN) and international (ISO) standards may be ordered via http://www.standard.no

The NORSOK standards are available on the Internet at the following address: http://www.nts.no/norsok/

The Norwegian Petroleum Directorate's regulations may be ordered from the Norwegian Petroleum Directorate, P.O. Box 600, 4001 Stavanger, Norway, tel. +47 51 87 60 19 or fax +47 51 55 15 71 or via http://www.npd.no/

The Norwegian Maritime Directorate's regulations may be ordered from Elanders Publishing, P.O. Box 1156 Sentrum, 0107 Oslo, Norway, tel. +47 22 63 63 19, fax +47 22 63 65 94.

The regulations of the health authorities may be ordered from the Social and Health Directorate or Fylkeslegen <*County Medical Officer*> in Rogaland , P.O. Box 680, N-4003 Stavanger, tel. +47 51 56 87 50 or fax mailto:+ 47 51 53 00 79.

The Norwegian Pollution Control Authority's regulations may be ordered from the Norwegian Pollution Control Authority, P.O. Box 8100 Dep., 0032 Oslo, Norway, tel. +47 22 57 34 00, fax +47 22 67 67 06 or via http://www.sft.no/