

**SLOVENSKI STANDARD**  
**oSIST prEN ISO 19906:2017**  
**01-november-2017**

---

**Industrija nafte in zemeljskega plina - Naftne ploščadi za arktična območja  
(ISO/DIS 19906:2017)**

Petroleum and natural gas industries - Arctic offshore structures (ISO/DIS 19906:2017)

Erdöl- und Erdgasindustrie - Offshore-Bauwerke für den Arktis-Bereich (ISO/DIS 19906:2017)

Industries du pétrole et du gaz naturel - Structures arctiques en mer (ISO/DIS 19906)

**Ta slovenski standard je istoveten z: prEN ISO 19906**

---

[SIST EN ISO 19906:2019](https://standards.iteh.ai/catalog/standards/sist/0ad5b64f-ffb2-4be6-a0b9-300e42843689/sist-en-iso-19906-2019)

<https://standards.iteh.ai/catalog/standards/sist/0ad5b64f-ffb2-4be6-a0b9-300e42843689/sist-en-iso-19906-2019>

**ICS:**

75.180.10

Oprema za raziskovanje,  
vrtanje in odkopavanje

Exploratory, drilling and  
extraction equipment

**oSIST prEN ISO 19906:2017**

**en,fr,de**



# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 19906

ISO/TC 67/SC 7

Secretariat: BSI

Voting begins on:  
2017-08-29Voting terminates on:  
2017-11-20

---

---

## Petroleum and natural gas industries — Arctic offshore structures

*Industries du pétrole et du gaz naturel — Structures arctiques en mer*

ICS: 75.180.10

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

SIST EN ISO 19906:2019<https://standards.iteh.ai/catalog/standards/sist/0ad5b64f-ffb2-4be6-a0b9-300e42843689/sist-en-iso-19906-2019>

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document is circulated as received from the committee secretariat.

**ISO/CEN PARALLEL PROCESSING**



Reference number  
ISO/DIS 19906:2017(E)

© ISO 2017

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

SIST EN ISO 19906:2019

<https://standards.iteh.ai/catalog/standards/sist/0ad5b64f-ffb2-4be6-a0b9-300e42843689/sist-en-iso-19906-2019>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
[copyright@iso.org](mailto:copyright@iso.org)  
[www.iso.org](http://www.iso.org)

<b>Contents</b>	<b>page</b>
<b>Foreword .....</b>	<b>vii</b>
<b>Introduction.....</b>	<b>ix</b>
<b>1 Scope.....</b>	<b>10</b>
<b>2 Normative references .....</b>	<b>10</b>
<b>3 Terms and definitions .....</b>	<b>11</b>
<b>4 Symbols and abbreviated terms .....</b>	<b>18</b>
4.1 Symbols .....	18
4.2 Abbreviated terms .....	18
<b>5 General requirements and conditions.....</b>	<b>20</b>
5.1 Fundamental requirements .....	20
5.2 Design methods.....	20
5.3 Site-specific considerations.....	21
5.4 Construction, transportation and installation.....	22
5.5 Operational considerations .....	23
5.6 Environmental protection .....	23
5.7 Serviceability requirements including vibrations .....	23
5.8 Decommissioning and reclamation.....	24
<b>6 Physical environmental conditions .....</b>	<b>24</b>
6.1 General.....	24
6.2 Daylight hours.....	25
6.3 Meteorology.....	25
6.4 Oceanography .....	26
6.5 Sea ice and icebergs.....	27
6.6 Seabed considerations.....	29
<b>7 Reliability and limit states design .....</b>	<b>29</b>
7.1 Design philosophy.....	29
7.2 Limit states design method .....	31
<b>8 Events and actions .....</b>	<b>37</b>
8.1 General.....	37
8.2 Ice events and actions.....	38
8.3 Metocean related actions .....	43
8.4 Seismic actions .....	46
<b>9 Foundation design.....</b>	<b>47</b>
9.1 General.....	47
9.2 Geotechnical data acquisition and identification of hazards.....	47
9.3 Characteristic values of soil properties.....	48
9.4 Design considerations .....	49
9.5 Gravity-based structures.....	51
9.6 Piled structures .....	52
9.7 Design of anchors for floating structures .....	52
9.8 Scour .....	54
9.9 Inspection and performance monitoring .....	55
9.10 Seismic analysis.....	55
<b>10 Man-made islands .....</b>	<b>55</b>
10.1 General.....	55
10.2 Island types .....	56
10.3 Design considerations .....	56

10.4	Seismic design.....	63
10.5	Construction .....	63
10.6	Monitoring and maintenance .....	64
10.7	Decommissioning and reclamation.....	65
<b>11</b>	<b>Fixed steel structures.....</b>	<b>66</b>
11.1	General.....	66
11.2	General design requirements.....	66
11.3	Structural modelling and analysis .....	67
11.4	Strength of tubular members and joints.....	67
11.5	Strength of stiffened-plate panels .....	67
11.6	Strength of steel-concrete composite walls.....	68
11.7	Seismic design.....	70
11.8	Fatigue.....	71
11.9	Materials, testing and NDT .....	71
11.10	Corrosion and abrasion protection.....	72
11.11	Welding.....	72
<b>12</b>	<b>Fixed concrete structures.....</b>	<b>72</b>
12.1	General requirements.....	72
12.2	Actions and action effects .....	73
12.3	Structural analysis .....	73
12.4	Concrete works.....	75
12.5	Mechanical systems.....	82
12.6	Marine operations and construction afloat.....	83
12.7	Corrosion control .....	83
12.8	Inspection and condition monitoring .....	83
<b>13</b>	<b>Floating structures.....</b>	<b>83</b>
13.1	General.....	83
13.2	General design methodology .....	84
13.3	Environment.....	86
13.4	Actions .....	86
13.5	Hull integrity .....	90
13.6	Hull stability .....	92
13.7	Stationkeeping.....	92
13.8	Mechanical systems.....	96
13.9	Operations.....	99
<b>14</b>	<b>Subsea production systems .....</b>	<b>101</b>
14.1	General.....	101
14.2	Ice and seabed considerations.....	101
14.3	Actions on subsea production systems .....	103
14.4	Seismic design.....	105
14.5	Risk reduction.....	105
<b>15</b>	<b>Topsides.....</b>	<b>106</b>
15.1	Overall considerations .....	106
15.2	Design and operational requirements .....	109
15.3	Seismic design.....	118
<b>16</b>	<b>Other ice engineering topics .....</b>	<b>120</b>
16.1	Ice roads and supplies over ice.....	120
16.2	Man-made ice islands .....	123
16.3	Protection barriers .....	123

16.4	Measurements of ice pressure and actions.....	126
16.5	Ice model tests.....	127
16.6	Offloading in ice.....	128
<b>17</b>	<b>Ice management.....</b>	<b>129</b>
17.1	General.....	129
17.2	Ice management system .....	130
17.3	Particular considerations for floating structures.....	132
<b>18</b>	<b>Escape, evacuation and rescue .....</b>	<b>132</b>
18.1	General.....	132
18.2	EER philosophy .....	132
18.3	EER strategy .....	133
18.4	Environmental conditions .....	133
18.5	Hazard and risk analysis.....	133
18.6	EER system.....	133
18.7	Escape design.....	134
18.8	Evacuation design .....	134
18.9	Rescue design.....	134
<b>Annex A (informative) Additional information and guidance .....</b>		<b>135</b>
<b>A.1</b>	<b>Scope .....</b>	<b>135</b>
<b>A.2</b>	<b>Normative references .....</b>	<b>135</b>
<b>A.3</b>	<b>Terms and definitions.....</b>	<b>135</b>
<b>A.4</b>	<b>Symbols and abbreviated terms .....</b>	<b>136</b>
<b>A.5</b>	<b>General requirements and conditions.....</b>	<b>145</b>
<b>A.6</b>	<b>Physical environmental conditions .....</b>	<b>146</b>
<b>A.7</b>	<b>Reliability and limit states design.....</b>	<b>165</b>
<b>A.8</b>	<b>Events and actions .....</b>	<b>174</b>
<b>A.9</b>	<b>Foundation design.....</b>	<b>257</b>
<b>A.10</b>	<b>Man-made islands .....</b>	<b>264</b>
<b>A.11</b>	<b>Fixed steel structures.....</b>	<b>279</b>
<b>A.12</b>	<b>Fixed concrete structures.....</b>	<b>281</b>
<b>A.13</b>	<b>Floating structures.....</b>	<b>290</b>
<b>A.14</b>	<b>Subsea production systems .....</b>	<b>308</b>
<b>A.15</b>	<b>Topsides.....</b>	<b>316</b>
<b>A.16</b>	<b>Other ice engineering topics .....</b>	<b>323</b>
<b>A.17</b>	<b>Ice management.....</b>	<b>367</b>
<b>A.18</b>	<b>Escape, evacuation and rescue .....</b>	<b>373</b>
<b>Annex B (informative) .....</b>		<b>374</b>
<b>B.1</b>	<b>Introduction to regional information .....</b>	<b>374</b>
<b>B.2</b>	<b>Baffin Bay and Davis Strait.....</b>	<b>375</b>
<b>B.3</b>	<b>Labrador .....</b>	<b>384</b>
<b>B.4</b>	<b>Newfoundland .....</b>	<b>387</b>
<b>B.5</b>	<b>Canadian Arctic Archipelago .....</b>	<b>390</b>
<b>B.6</b>	<b>North East Greenland.....</b>	<b>395</b>
<b>B.7</b>	<b>Beaufort Sea .....</b>	<b>402</b>
<b>B.8</b>	<b>Chukchi Sea.....</b>	<b>406</b>
<b>B.9</b>	<b>Bering Sea.....</b>	<b>414</b>
<b>B.10</b>	<b>Cook Inlet .....</b>	<b>419</b>
<b>B.11</b>	<b>Okhotsk Sea .....</b>	<b>423</b>
<b>B.12</b>	<b>Tatar Strait.....</b>	<b>430</b>

ISO/DIS 19906

<b>B.13</b>	<b>Bohai Sea .....</b>	<b>434</b>
<b>B.14</b>	<b>North Caspian .....</b>	<b>437</b>
<b>B.15</b>	<b>Baltic Sea .....</b>	<b>442</b>
<b>B.16</b>	<b>Barents Sea .....</b>	<b>449</b>
<b>B.17</b>	<b>Kara Sea .....</b>	<b>456</b>
<b>B.18</b>	<b>Laptev Sea .....</b>	<b>462</b>
<b>B.19</b>	<b>East Siberian Sea.....</b>	<b>470</b>
<b>B.20</b>	<b>Black Sea.....</b>	<b>478</b>
<b>B.21</b>	<b>Sea of Azov .....</b>	<b>485</b>
	<b>Bibliography .....</b>	<b>492</b>

# iTeh Standards (<https://standards.iteh.ai>) Document Preview

[SIST EN ISO 19906:2019](https://standards.iteh.ai/catalog/standards/sist/0ad5b64f-ffb2-4be6-a0b9-300e42843689/sist-en-iso-19906-2019)

<https://standards.iteh.ai/catalog/standards/sist/0ad5b64f-ffb2-4be6-a0b9-300e42843689/sist-en-iso-19906-2019>



## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 19906 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 7, *Offshore structures*.

This second/third/... edition cancels and replaces the first/second/... edition (ISO 19901-2:2004), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO-specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 7, *Offshore structures*.

Document type: International Standard

Document subtype:

Document stage: (40) Enquiry

Document language: E

## ISO/DIS 19906

This second edition cancels and replaces the first edition (ISO 19906:2010), which has been technically revised.

ISO 19906 is one of a series of documents for offshore structures. The full series consists of the following documents.

- ISO 19900, Petroleum and natural gas industries — General requirements for offshore structures
- ISO 19901 (all parts), Petroleum and natural gas industries — Specific requirements for offshore structures
- ISO 19902, Petroleum and natural gas industries — Fixed steel offshore structures
- ISO 19903, Petroleum and natural gas industries — Fixed concrete offshore structures
- ISO 19904-1, Petroleum and natural gas industries — Floating offshore structures — Part 1: Monohulls, semi-submersibles and spars
- ISO 19905 (all parts), Petroleum and natural gas industries — Site-specific assessment of mobile offshore units
- ISO 19906, Petroleum and natural gas industries — Arctic offshore structures

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

SIST EN ISO 19906:2019

<https://standards.iteh.ai/catalog/standards/sist/0ad5b64f-ffb2-4be6-a0b9-300e42843689/sist-en-iso-19906-2019>

## Introduction

The series of documents ISO 19900 to ISO 19906 addresses design requirements and assessments for all offshore structures used by the petroleum and natural gas industries worldwide. Through their application, the intention is to achieve reliability levels appropriate for manned and unmanned offshore structures, regardless of the type of structure and the nature or combination of the materials used.

It is important to recognize that structural integrity is an overall concept comprising models for describing actions, structural analyses, design rules, safety elements, workmanship, quality control procedures and national requirements, all of which are mutually dependent. The modification of one aspect of design in isolation can disturb the balance of reliability inherent in the overall concept or structural system. The implications involved in modifications, therefore, need to be considered in relation to the overall reliability of all offshore structural systems.

The series of documents applicable to the various types of offshore structure is intended to provide wide latitude in the choice of structural configurations, materials and techniques without hindering innovation. Sound engineering judgment is, therefore, necessary in the use of these documents.

This document was developed in response to the offshore industry's demand for a coherent and consistent definition of methodologies to design, analyse and assess arctic and cold region offshore structures within the scope of Clause 1.

Structures capable of resisting ice have been in use in temperate regions for well over a century. These include bridge piers and navigation aids in ice-covered rivers and estuaries. In fact, bridge codes in cold countries have included methods for addressing ice loads dating back many decades. In more severe arctic and cold regions, ice-resistant structures are more recent. But much experience has been gained commencing in the 1960s, and this knowledge is incorporated into this document. Where uncertainties still exist, conservative approaches and methods have been recommended.

This document also addresses issues, such as topsides winterization, and escape, evacuation and rescue, that go beyond what is strictly necessary for the design, construction, transportation, installation and decommissioning of the structure. These issues are essential for offshore operations in arctic and cold region conditions and they are not covered in other documents. When future editions of ISO 19906 and other documents are prepared, efforts will be made to avoid duplication of scope.

Annex A provides background to and guidance on the use of this document and it is intended that it be read in conjunction with the main body of this document. The clause numbering in Annex A follows the numbering in the normative text to facilitate cross-referencing.

Annex B provides regional information on the physical environment of specific offshore areas in arctic and cold regions.

Some symbols in this document are not in accordance with the system of quantities on which the International System of Units is based, due to the need to conform with current ice literature. This might change in future editions of this document.

To meet certain needs of industry for linking software to specific elements in this document, a special clause-based numbering system has been permitted for figures, tables and formulae.

# Petroleum and natural gas industries — Arctic offshore structures

## 1 Scope

This document specifies requirements and provides recommendations and guidance for the design, construction, transportation, installation and decommissioning of offshore structures related to the activities of the petroleum and natural gas industries in arctic and cold regions. Reference to arctic and cold regions in this document is deemed to include both the Arctic and other locations characterized by low ambient temperatures and the presence or possibility of sea ice, icebergs, icing conditions, persistent snow cover, and/or permafrost.

The objective of this document is to ensure that complete structures, including substructures, topsides structures, floating production vessel hulls, foundations and mooring systems, in arctic and cold regions provide an appropriate level of reliability with respect to personnel safety, environmental protection and asset value. Value includes value to the owner, to the industry and to society in general.

This document does not contain requirements for the operation, maintenance, service-life inspection or repair of arctic and cold region offshore structures, unless the design strategy imposes specific requirements such as ice management to reduce ice actions.

While this document does not apply specifically to mobile offshore drilling units (see ISO 19905-1), the procedures relating to ice actions and ice management contained herein are applicable to the assessment of such units.

This document does not apply to mechanical, process and electrical equipment or any specialized process equipment associated with arctic and cold region offshore operations except in so far as it is necessary for the structure to sustain safely the actions imposed by the installation, housing and operation of such equipment.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 17776, *Petroleum and natural gas industries — Offshore production installations — Guidelines on tools and techniques for hazard identification and risk assessment*

ISO 19900:2013, *Petroleum and natural gas industries — General requirements for offshore structures*

ISO 19901-1, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 1: Metocean design and operating considerations*

ISO 19901-2, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 2: Seismic design procedures and criteria*

ISO 19901-3, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 3: Topsides structure*

ISO 19901-4, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 4: Geotechnical and foundation design considerations*

ISO 19901-6, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 6: Marine operations*

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*

ISO 19901-8, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 8: Marine soil investigations*

ISO 19902, *Petroleum and natural gas industries — Fixed steel offshore structures*

ISO 19903, *Petroleum and natural gas industries — Fixed concrete offshore structures*

ISO 19904-1, *Petroleum and natural gas industries — Floating offshore structures — Part 1: Monohulls, semi-submersibles and spars*

ISO 35101, *Petroleum and natural gas industries — Arctic operations — Working environment*

ISO 35102, *Petroleum and natural gas industries — Arctic operations — Escape, evacuation and rescue from offshore installations*

ISO 35104, *Petroleum and natural gas industries — Arctic operations — Ice management*

ISO 35106, *Petroleum and natural gas industries — Arctic operations — Arctic metocean, ice, and seabed data*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19900:2013, ISO 19901-1, ISO 19901-2, ISO 19901-4, ISO 35102, ISO 35104, ISO 35106 and the following apply.

#### 3.1

##### **abrasion**

effect of ice grinding against the surface of a structure thus removing paint, surface protrusions and coatings, oxidized material, or concrete particles and aggregate

#### 3.2

##### **action combination**

expression in which design values of individual simultaneous actions for a design situation are summed to obtain the total design action for the verification of the reliability of a structure for a specific limit state

#### 3.3

##### **adfreeze**

freezing of ice or soil onto the surface of a structure

#### 3.4

##### **aspect ratio**

ratio of structure diameter or width to ice thickness

#### 3.5

##### **broken ice**

ice pieces of varying size, broken up as a result of natural processes, or active or passive intervention

Note 1 to entry: Active intervention includes ice management resulting in managed ice; passive intervention includes the channel, or wake, caused by a stationary structure in moving ice cover.

ISO/DIS 19906

### 3.6

#### **companion environmental action**

environmental action applied simultaneously with the principal environmental action

### 3.7

#### **consolidation**

process of freezing of pore water in voids within ice rubble or between floes

Note 1 to entry: For soils, consolidation involves drainage of pore fluid as a result of overburden pressures.

### 3.8

#### **consolidated layer**

portion of an ice ridge keel, rubble pile, rubble field or stamukha below the waterline formed by the ice consolidation process

### 3.9

#### **design action**

sum of design values of individual simultaneous actions for an action combination

### 3.10

#### **design resistance**

resistance limit calculated from factored representative values of basic variables, or from factored expressions based on unfactored representative values of basic variables

Note 1 to entry: Material properties are examples of basic variables relevant to resistance.

### 3.11

#### **disconnection**

planned separation of the risers (and mooring, if applicable) from a floating structure

### 3.12

#### **ductility**

ability of a material to deform and absorb energy beyond its elastic limit or ability of a component to sustain action effects beyond yield

Note 1 to entry: See also *system ductility* (3.67).

### 3.13

#### **dynamic action**

action that induces acceleration of a structure or a structural component of a magnitude sufficient to require specific consideration

### 3.14

#### **dynamic positioning**

stationkeeping technique consisting primarily of a system of automatically controlled on-board thrusters, which generate appropriate thrust vectors to counter the mean and slowly varying induced actions

[SOURCE: ISO 19901-7:2013]

### 3.15

#### **emergency disconnection**

planned separation of the risers (and mooring, if applicable) from a floating structure, without depressurization of the risers