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Oil and gas industries — Offshore production installations — Requirements and guidelines for emergency response

*Industries du pétrole et du gaz — Installations de production
en mer — Exigences et lignes directrices pour les interventions
d'urgence*

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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.

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 document 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).

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This document was prepared by Technical Committee ISO/TC 67, *Oil and gas industries including lower carbon energy*, Subcommittee SC 6, *Process equipment, piping, systems, and related safety*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 12, *Oil and gas industries including lower carbon energy*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 15544:2000), which has been technically revised. It also incorporates the Amendment ISO 15544:2000/Amd.1:2009.

The main changes are as follows:

- clarifications of requirements;
- editorial updates, including a merge of requirements and guidelines into one subclause for each clause;
- terms and definitions and abbreviations have been updated;
- several recommendations have been changed to requirements based on operational experiences;
- Annex G has been removed and references are made to IOGP guidelines,^[10] References [11] and [12].

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Successful safety and environmental protection during the recovery of hydrocarbon resources requires a structured approach to be applied to the identification and assessment of the hazards present during the various phases in the lifecycle of an offshore installation. These principles also apply to the development of emergency response strategy, emergency response measures and procedures. Understanding of the hazards can be achieved by application of ISO 17776,^[6] which gives guidelines for hazard identification and assessment for offshore installations.

The content in this document on escape, refuge, evacuation, recovery and rescue is consistent with the content of ISO 13702^[4] but addresses in more detail how these aspects are built into development of emergency response measures.

This document has been prepared primarily to assist in the development of new installations. Retrospective application of this document is only relevant where it is reasonable to do so. During the planning of a major change to an installation there can be more opportunities to implement the requirements, and a review of this document enables identification of clauses which can be practically utilized in the change.

This document is based on an approach where the selection of measures for emergency response is determined by an evaluation of hazards on the offshore installation. The methodologies employed in this assessment and the resultant recommendations differ depending on the complexity of the production process and facilities, type of facility (i.e. open or enclosed), number of POB, and the environmental conditions associated with the location of operation.

The principal objectives of this document are to describe both the approach to be used and important considerations in determining the emergency response measures that are required on an offshore installation to:

- a) protect people;
- b) minimize impact on the environment;
- c) minimize impact on assets and operations.

The requirements in [Clauses 6](#) to [15](#) are arranged as follows:⁴

- Objectives identify the goals to be achieved by the emergency response measures being described.
- Functional requirements and guidelines represent the minimum conditions to meet the stated objectives. The functional requirements are performance-orientated measures and, as such, are applicable to the variety of offshore installations utilized for the development of hydrocarbon resources throughout the world.
- The provisions describe recognized practices for consideration in developing the measures for emergency response.
- Functional requirements and guidelines are supplemented by recognized practices in developing the measures for emergency response in [Annexes A](#) to [F](#). The guidelines and annexes are intended for use in conjunction with requirements, industry standards and individual company philosophy, to determine the measures that are necessary for emergency response.

Oil and gas industries — Offshore production installations — Requirements and guidelines for emergency response

1 Scope

This document specifies objectives, functional requirements and guidelines for emergency response (ER) measures on installations used for the development of offshore hydrocarbon resources. It is applicable to:

- fixed offshore structures;
- floating systems for production, storage and off-loading.

NOTE For mobile offshore units, the ER plans developed in conformance with the requirements and recommendations of the International Maritime Organization (IMO) are generally adequate for the normal, independent operation of the unit in most locations. The following aspects of ER planning are not generally addressed by IMO and are topics intended for inclusion in the scope of this document where relevant to the specific installation:

- area evacuation, e.g. precautionary evacuation in areas of tropical revolving storms;
- combined operations (where an integrated command and ER system is relevant);
- arctic operations;
- uncontrolled flow from a well.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

abandonment

act of personnel onboard leaving an installation in an *emergency* (3.7)

3.2

accommodation

place where personnel onboard sleep and spend their off-duty time

Note 1 to entry: Accommodation can include dining rooms, recreation rooms, lavatories, cabins, offices, sickbay, living quarters, galley, pantries, and similar permanently enclosed spaces.

3.3

control

control of hazards

limiting the extent or duration of a *hazardous event* (3.17)

3.4

central control room

place on the installation from which personnel can monitor the status of the installation, initiate appropriate shutdown actions and undertake *emergency* (3.7) communication

3.5

exercise

periodic practice event based on a potential and credible *emergency* (3.7) scenario where the *emergency response* (3.8) arrangements (including interactions with relevant external parties) are tested to verify their workability, identify improvements, and build familiarity and competence

Note 1 to entry: Exercises include emergency response drills involving routine and regular events where an emergency response action (e.g. mustering) is practiced to maintain familiarity and awareness.

3.6

embarkation area

place from which personnel abandon the installation during *evacuation* (3.13)

EXAMPLE A helideck and associated waiting area or a lifeboat or liferaft boarding area.

3.7

emergency

hazardous event (3.17) which cannot be handled by normal measures and requires immediate action to limit its extent, duration or consequences

3.8

emergency response

ER
action taken by personnel on or off the installation to control or mitigate a *hazardous event* (3.17) or initiate and execute *abandonment* (3.1)

3.9

emergency response plan

ERP

systematic procedures that detail what is to be done, how, when, and by whom before, during and after the time an *emergency* (3.7) occurs

[SOURCE: ISO 27917:2017, 3.4.12, modified — The notes to entry have been deleted.]

3.10

emergency response measure

systems, equipment and processes provided for use in the event of an *emergency* (3.7)

Note 1 to entry: This is a generic term including hardware provided for *emergency response* (3.8) as well as the planning, procedural and organizational aspects of responding to emergencies.

3.11

escape

act of personnel moving away from a *hazardous event* (3.17) to a place where its effects are reduced or removed

[SOURCE: ISO 13702:—, 3.16]

3.12

escape route

route from an area of an installation leading to a *muster area* (3.24), *temporary refuge* (3.35), *embarkation area* (3.6), or means of *escape* (3.11) to the sea

3.13

evacuation

planned method of abandoning the installation

3.14

escape, evacuation and rescue

EER

range of possible actions in an *emergency* (3.7)

Note 1 to entry: Such actions include *escape* (3.11), *muster* (3.23), *refuge*, *evacuation* (3.13), *escape to the sea* and *rescue* (3.30)/*recovery* (3.29).

3.15

evacuation route

escape route (3.12) which leads from the *muster area* (3.24) to the place(s) used for primary or secondary *evacuation* (3.13) from the installation

3.16

hazard

potential source of harm

Note 1 to entry: Hazard can be a *risk* (3.31) source of potential for human injury, damage to the environment, damage to property, or a combination of these.

[SOURCE: ISO/IEC Guide 51:2014, 3.2, modified — Note 1 to entry has been added.]

3.17

hazardous event

event that can cause harm

EXAMPLE The incident that occurs when a *hazard* (3.16) is realized such as release of gas, fire, loss of buoyancy.

[SOURCE: ISO/IEC Guide 51:2014, 3.3, modified — EXAMPLE has been added.]

3.18

interested party

individual or organization that can affect, be affected by, or perceive itself to be affected by your organization's decisions or activities.

Note 1 to entry: Interested parties can include, for example, customers, communities, suppliers, regulators, non-governmental organizations, investors, employees and trade unions.

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3.19

key personnel

persons with specific skills and training to perform their ER roles and if not available are replaced by nominated alternative persons

3.20

life-jacket

personal flotation device

device worn by personnel which has sufficient buoyancy and stability in water to turn the body of an unconscious person and keep the person's mouth clear of the water

3.21

mitigation

limitation of undesirable effects of a particular event

3.22

attended installation

installation on which personnel are routinely accommodated

3.23

muster

movement of people to a designated area so that the person in overall charge can account for all people and facilitate subsequent *emergency response* (3.8) actions

3.24

muster area

designated area to which personnel report when required to do so in an *emergency* (3.7)

3.25

on-scene commander

person designated to lead ER efforts at the site of the *emergency* (3.7)

3.26

place of safety

location, installation or vessel where medical treatment for the injured and other facilities for the care of survivors are available

Note 1 to entry: A place of safety represents an environment where they are not exposed to abnormally elevated *risk* (3.31) levels.

3.27

primary method for evacuation

preferred *method of leaving the installation in an emergency* (3.7) which can be carried out in a fully controlled manner

3.28

redundancy

use of more than one independent means to accomplish a given function

[SOURCE: ISO/TR 15916:2015, 3.90]

3.29

recovery

process by which personnel in *survival craft* (3.34) are retrieved to a *place of safety* (3.26)

3.30

rescue

urgent process by which those who have entered the sea are retrieved to a *place of safety* (3.26)

3.31

risk

combination of the probability of occurrence of harm and the severity of that harm

Note 1 to entry: A more general definition of risk is given in ISO 31073.

[SOURCE: ISO 13702:—, 3.35, modified — Note 1 to entry has been added.]

3.32

secondary method for evacuation

method of leaving the installation in an *emergency* (3.7) which can be carried out in a fully controlled manner under the direction of the person in charge, independent of external support

3.33

survival suit

protective suit made of materials that reduce body heat-loss of a person wearing it in cold water

Note 1 to entry: The suit can also have sufficient buoyancy and stability in water to turn the body of an unconscious person and keep the person's mouth clear of the water

3.34

survival craft

vessel capable of sustaining the lives of people abandoning the installation until *recovery* (3.29)

3.35

temporary refuge

TR

place provided where personnel can take shelter for a predetermined period whilst investigations, emergency *response* (3.8) and *evacuation* (3.13) preparations are undertaken

Note 1 to entry: A temporary refuge, where provided, does not need to be useable under all accident scenarios.

3.36

tertiary method for escape to the sea

method which relies on the individual's own action

4 Abbreviated terms

EPIRB	emergency position-indicating radio beacon
ER	emergency response
ERS	emergency response strategy
ESD	emergency shutdown
F&G	fire and gas
HSE	health, safety and environment
IOGP	International Association of Oil & Gas Producers
IMO	International Maritime Organization
IPIECA	International Petroleum Industry Environmental Conservation Association
GMDSS	global marine distress safety system
OPRC	International Convention on Oil Pollution Preparedness, Response, and Co-operation
POB	persons on board
SOLAS	Safety of Life at Sea (conference)

5 Objectives

Effective management systems are required to address the health and safety aspects of the activities undertaken by all companies associated with the offshore recovery of hydrocarbons. These management systems are applied to each stage in the life cycle of an installation and to all related activities. Such a management system, which has been developed for environmental issues, is described in ISO 14001^[2] and the principles contained therein can also be applied to issues relating to health and safety.

EXAMPLE Operators are expected to have an effective management system. Contractors are expected to have either their own management system or conduct their activities consistently with the operator's management system.

One key element of effective management systems is a systematic process of identification of hazards, followed by evaluation and risk management. Risk reduction is an important component of risk management, and the selection of risk reduction measures predominantly entails the use of sound engineering judgement. However, such judgements are supplemented by recognition of the particular circumstances, which can require variation to past practices and previously applied codes and standards. In certain circumstances, risk assessment can provide useful input to the decision-making process provided that the operator has established criteria for this purpose. Risk reduction measures include those to prevent incidents (i.e. reducing the probability of occurrence), to control incidents (i.e. limiting the extent and duration of a hazardous event) and to mitigate the effects (i.e. reducing the consequences). Preventative measures such as

using inherently safer designs and ensuring asset integrity are emphasized wherever practicable. Measures to recover from incidents are provided based on the evaluation, and developed considering possible failures of the control and mitigation measures. Based on the results of the evaluation, detailed health, safety and environmental objectives and functional requirements are set at appropriate levels.

This document sets out an approach to treat ER in the same systematic manner.

ER measures shall be provided based on an evaluation that takes into account possible failures of the control and mitigation measures. It is these ER measures, which, as an integrated system, provide the appropriate response to an incident occurring on or near the installation.

The results of the evaluation process and the decisions taken with respect to the need for, and role of, any measures required for ER are recorded in the emergency response strategy, see [Clause 6](#).

ISO 13702^[4] introduces the concept of strategies but states that such strategies do not have to be separately documented, as the relevant information can be included with other HSE information for an installation or can be contained in recognized codes and standards that are relevant to the operating location. Indeed, there can be significant overlap between strategies and other HSE information, so that combining this information into one source is likely to assist the understanding of the people on the installation of how the various measures are integrated.

The ERP shall be developed to set out the operational and procedural requirements to be followed under the various emergency scenarios that are relevant for a particular installation.

The resources that typically are involved in ER can be divided into three categories:

a) Installation resources

Resources which are under the direction of the person in overall charge of the installation, and which are immediately available. They include personnel and equipment, vessels and helicopters that have been assigned ER duties.

b) Area resources

Resources which are not under the direction of the person in overall charge of the installation, but which are located in the same area. The resources are made available by a mutual aid or cooperation agreement, and can include installations in the vicinity, supply vessels, other vessels and helicopters.

c) External resources

Resources which are not under the direction of the person in overall charge of the installation, and which are not located in the area. Such resources can be the organization and resources of national and international rescue services, as well as other resources who professional bodies or others can place at the disposal of the field or installation manager. These resources can include aircraft, helicopters, coast guard and navy vessels, shore-based personnel resources, regional or national oil pollution resources, the public health service and resources governed by international agreements and other agreements among the operators of installations.

6 Emergency response strategy

6.1 Objectives

The objectives are to identify and record the intended approach for ER, including the underlying risk evaluation.

6.2 Functional requirements and guidelines

An emergency response strategy (ERS) shall be developed for offshore installations based on an assessment of the potential emergencies that can arise.