Oil & Gas UK

the voice of the offshore industry

Industry Guidelines for the Management of Emergency Response for Offshore Installations

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1. Introduction

1.1 Background

As part of a suite of documents and guidelines produced for the Oil & Gas UK industry the industry body, Oil & Gas UK (formerly UKOOA), developed these "Industry Guidelines for the Management of Emergency Response for Offshore Installations" (ISBN 1 903003 13 8).

Since the publication of the original guidelines and the coming into force of the Offshore Installations (Prevention of Fire and Explosion and Emergency Response Regulations) 1995, the Health & Safety Executive (HSE) have expanded on the Approved Code of Practice (ACOP) and guidance to the regulations by publishing several Permanent Background Notes for their inspectors.

In an effort to bring all relevant guidance and information together and limit the need for further specific guidance a review of the original Guidelines for the Management of Emergency Response was carried out leading to the publication of Issue 2 in May 2002.

This review, to produce Issue 3, has been undertaken to ensure the guidelines continue to reflect industry best practice and also take account of recent developments in research and operational experience.

1.2 Scope

These guidelines provide guidance for Duty Holders and those parties they need to consult and/or co-operate with when developing or assessing their Emergency Response (ER) arrangements.

In particular, these guidelines address the development and assessment of offshore ER arrangements for dealing with potential major accident events on or near the installation and for rescue and recovery arrangements. It is not the purpose of these guidelines to suggest specific advice on what arrangements should be chosen or to give details of the specific technical options available.

Although specific regulations may be referred to these guidelines do not give interpretative guidance to regulations and it is suggested that Duty Holders should satisfy themselves of the adequacy of their ER arrangements to comply with all relevant provisions of the law.

These guidelines do not deal with environmental emergency response or security arrangements. These topics are usually covered within other plans though the interface between them and the ER arrangements should be considered.

1.3 Legislation

The two main regulations dealing with ER are the Offshore Installations (Prevention of Fire and Explosion and Emergency Response) Regulations 1995, known within the industry as PFEER and the Offshore Installations (Safety Case) Regulations 2005 (known as SCR).

Many of the ER arrangements constitute Safety Critical Elements as defined in the SCR and as such they will have to comply with the relevant requirements of the SCR.

Regulation 5 of PFEER requires a Duty Holder to assess major accident hazards arising from fire, explosion and other events which may require evacuation, escape and rescue, and to identify appropriate arrangements for dealing with them.

1.3.1 Approved Codes of Practice (ACOPs)

These Codes are approved by the Health and Safety Executive Board with the consent of the Secretary of State and give practical advice on how to comply with the law. ACOPs have a special legal status and if the advice is followed it will be considered sufficient to demonstrate compliance with the law in respect of the specific matters on which the Codes give advice. Alternative methods to those set out in the Codes can also be used but it will be necessary to demonstrate compliance in some other way.

1.4 How to Use this Document

These guidelines are separated into a section for each of the different ER arrangements. Each section comprises a written summary of the topic including a flow diagram that steps through the relevant process and refers to the location of more detailed information. Reference to where further guidance (see Section 1.5) can be obtained is contained at the end of each detailed information section.

1.5 Further Guidance

These guidelines make reference to other documents which may provide further information and guidance. This information does not form part of these guidelines and may be appropriate to a lesser or greater extent. A non-exhaustive list of further guidance is contained in Appendix 2.

Additionally, the International Standards Organisation (ISO) documents BS EN ISO 13702:1999 (“Petroleum and Natural Gas Industries -- Control and Mitigation of Fires and Explosions on Offshore Production Installations - Requirements and Guidelines”) and BS ISO 15544:2000 (“Petroleum and Natural Gas Industries -- Offshore Production Installations - Requirements and Guidelines for Emergency Response”), as amended by Amd 1:2009, provide some high level guidance. The information provided in this document is considered to be consistent with the objectives of these ISO standards and to provide detailed technical and managerial guidance specific to operations within the UKCS.

2. Development and Assessment of ER Arrangements

SUMMARY

S2.1 Introduction

Emergency Response (ER) arrangements include all plant and equipment provided for ER, together with the planning, procedural and organisational aspects of managing emergencies which, as an integrated system, provide the appropriate response to an incident occurring on or near the installation.

S2.2 Proposed Arrangements (see Figure 1)

The development and assessment of the ER arrangements for a new installation are essentially inseparable activities and may be regarded effectively as a single process. The main part of this process is iterative and comprises a number of key elements:

- Identify all reasonably foreseeable events that may require ER.
- Define an ER strategy, which should explain the objectives of the ER arrangements and how the objectives are to be achieved, taking account of any installation and location specific factors, which influence the ER.
- Prepare an outline of proposed arrangements to take account of the strategy.
- Analyse the ER arrangements.

Note! If, during the analysis, any of the following conditions are not met then the arrangements will need to be modified or the hazards removed or reduced to make the event no longer reasonably foreseeable:

- Check if the ER arrangements meet the strategic objectives. (see Sub-Section 2.2.1.2)
- When the strategic objectives are met assess if the arrangements reduce the risks on the installation to ALARP. (see Sub-Section 2.3)
- In addition to the arrangements reducing the risks to ALARP the PFEER regulations set out specific requirements on the installation for evacuation and escape. The arrangements provided are governed by reasonable practicability. (see Section 3)
- Rescue and recovery arrangements off the installation must be provided for all reasonably foreseeable events. This is an absolute duty required by Regulation 17 of PFEER and is not subject to a consideration of reasonable practicability. (see Section 4)
- Finally, once a set of arrangements has been developed and its adequacy demonstrated by completing the iterative part of the process the critical components of the arrangements need to be identified and performance standards need to be established. (see Section 7)
- The arrangements should then be validated by physically achieving the performance standards.
- Once validated the arrangements can be included in the Safety Case and subsequently implemented, i.e., when accepted by the HSE.

S2.3 Existing Arrangements (see Figure 2)

Although these steps should already have been taken for an existing installation and presented in the Safety Case, the adequacy of these existing arrangements still need to be assessed.

To ensure that the adequacy of the arrangements is maintained and/or to ascertain if anything has changed the arrangements should be subjected to an ongoing monitoring process.

More detailed guidance on monitoring and review is provided in Section 7.

See Page 13 for the next Summary, “ER Arrangements on the Installation”.

FLOW DIAGRAMS

Figure 1: Development and Assessment Process for Proposed ER Arrangements

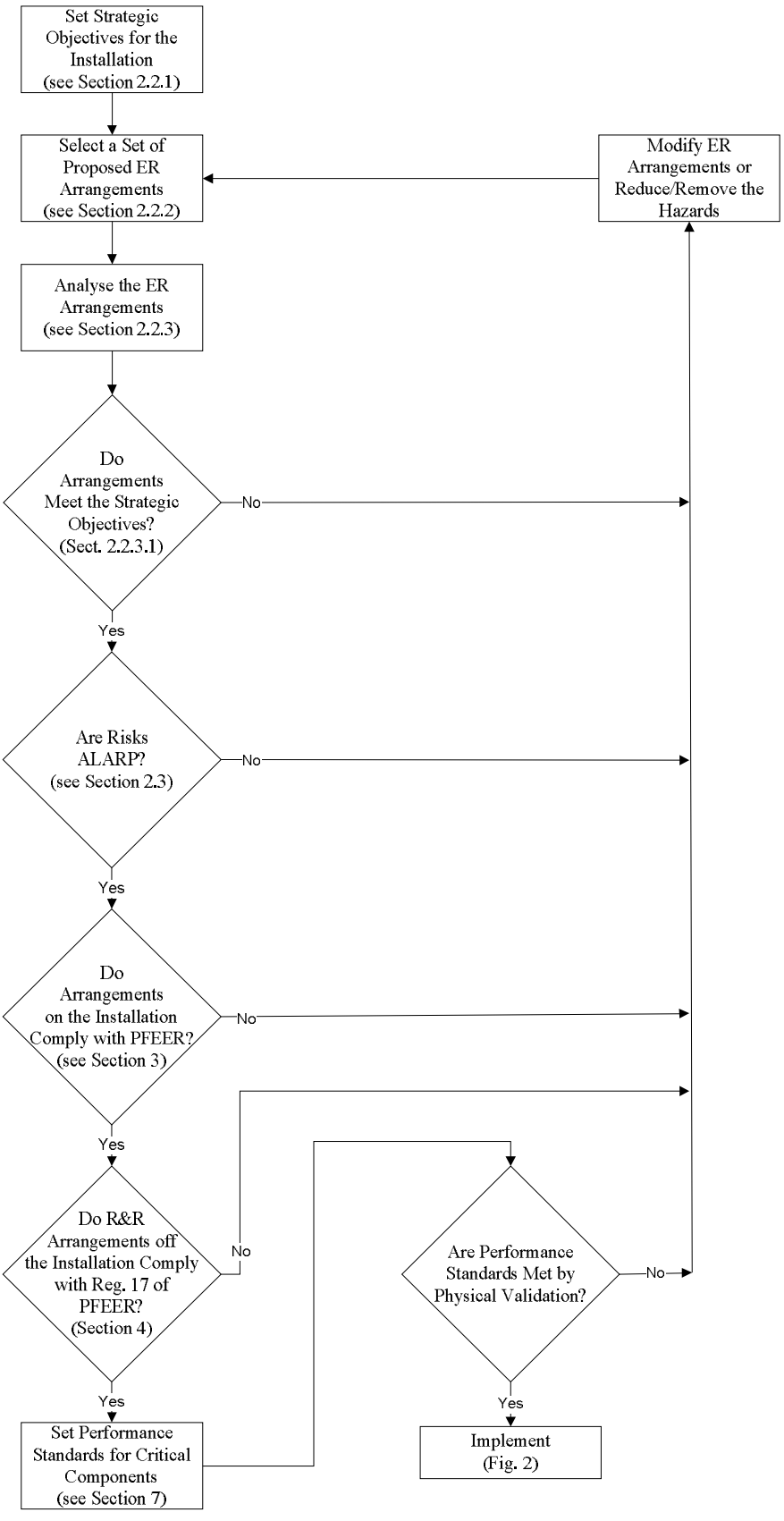
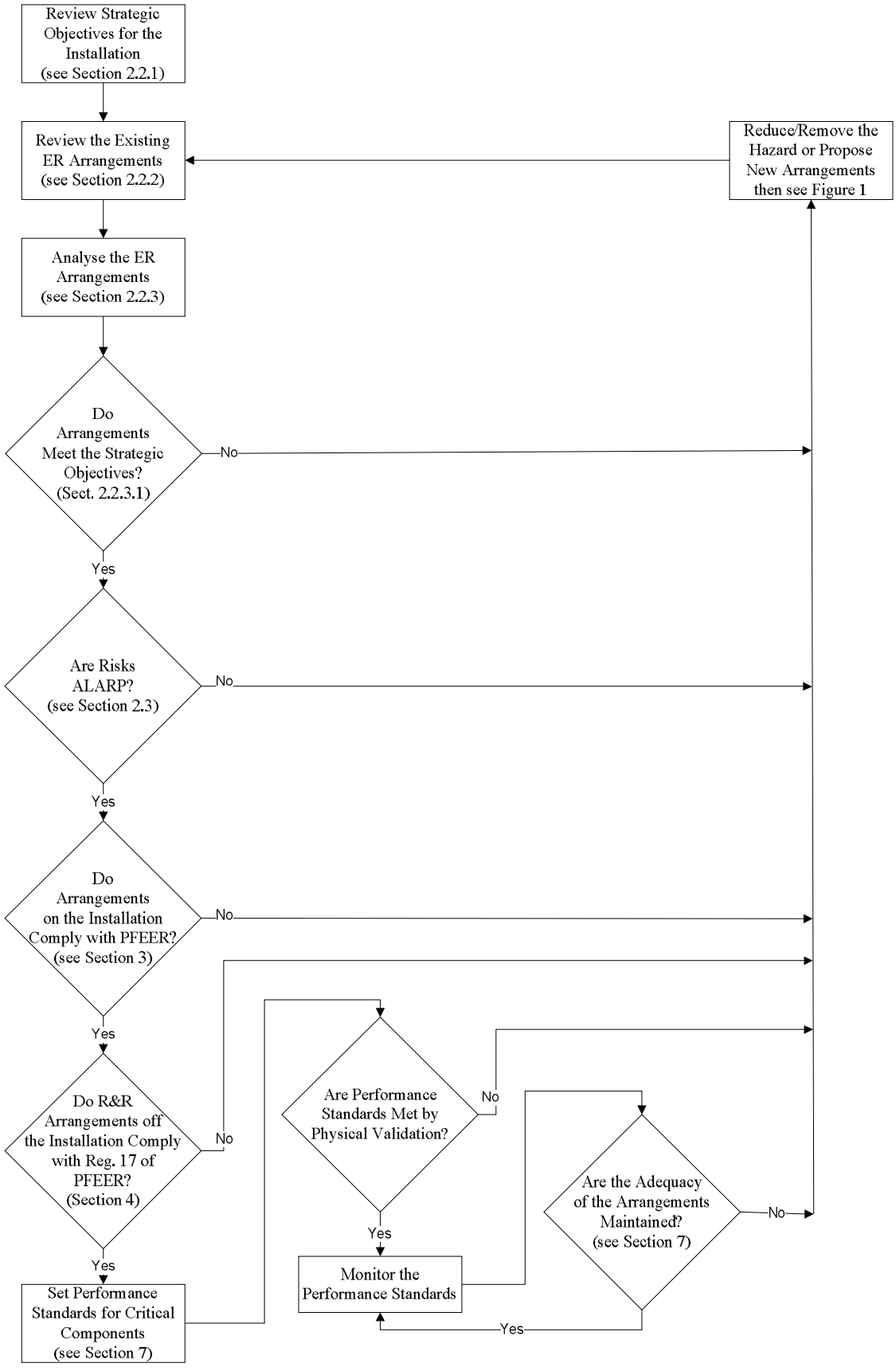


Figure 2: Development and Assessment Process for Existing ER Arrangements



DETAILED GUIDANCE

2.1 Introduction

Emergency response (ER) arrangements include all plant and equipment provided for ER, together with the planning, procedural and organisational aspects of managing emergencies which, as an integrated system, provide the appropriate response to an incident occurring on or near the installation.

The arrangements for ER should form an integral part of an installation and its management both onshore and offshore. They should include others who are expected to provide services of one sort or another in the event of an emergency, but who are not themselves directly involved in the installation management. This would include such services as providers of Rescue and Recovery arrangements.

This chapter discusses the general principles involved in the assessment and development of ER arrangements with particular reference to the role of performance standards, both as a part of the assessment and development process itself and as a means of ensuring the continuing adequacy of the ER arrangements.

2.2 Key Elements of the Development and Assessment Process

New Installations

The development and assessment of the ER arrangements for a new installation are essentially inseparable activities and may be regarded effectively as a single process. This is shown schematically in Figure 1. The main part of this process is iterative and comprises a number of key elements, which are discussed in detail below. However, before the process can begin three important steps need to have been completed:

- Identify all reasonably foreseeable events that may require ER.
- Define an ER strategy.
- Prepare an outline of proposed arrangements to take account of the strategy.

Existing Installations

Although these three steps should already have been taken for an existing installation and presented in the Safety Case, the adequacy of these existing arrangements still needs to be assessed and this is shown schematically in Figure 2.

Decommissioning Installations

In the broadest sense the process for developing and assessing the ER arrangements for an installation prior to and during the decommissioning phase is similar to those described above, i.e., identifying events, defining a strategy and outlining the arrangements that take the strategy into account.

In many respects the guidance on development and assessment as provided in this document is generic to all stages of an installation's life although decommissioning activities present a very different set of challenges in terms of

ER arrangements. It is imperative that these unique circumstances are fully considered and in particular that many of the facilities previously relied upon to provide an ER function will be removed at some stage of decommissioning.

Other factors to be considered include:

- A change in ER strategy and mustering philosophy that may be appropriate following the removal of hydrocarbon hazards upon production shutdown.
- The potential effects that large numbers of transient decommissioning and removal crew who are not familiar with the platform might have on the management and conduct of any evacuation or escape.
- The degradation of ER capability through changing out experienced core personnel who had specific roles or responsibilities, e.g., lifeboat coxswains, for transient decommissioning and removal crew.
- The need to ensure that less prominent elements of the ER capability, e.g., escape route signing, alarm and PA coverage are not impaired or misleading as a result of ongoing work.
- The positive effects provided by the possibility that a bridge-linked vessel may be alongside the installation for a reasonably long period.
- The possibility that some measure of control may be lost in cases where the Duty Holder hands over control of the platform to a decommissioning contractor after removal of all hydrocarbons.

2.2.1 ER Strategy

In setting the ER strategy for an installation, attention should be focused on defining the broad objectives of the ER arrangements in terms of how the ultimate goal of securing the safety of all those individuals involved in an emergency is to be achieved.

The strategy should:

- Define and explain the objectives of the ER arrangements.
- Explain in general terms how the objectives are to be achieved.
- Take account of any installation and location specific factors, which influence the ER.

2.2.1.1 Objectives of the ER Arrangements

The main objectives of the ER arrangements need to be clearly stated as part of the strategy, as do the principal means by which these objectives are to be achieved.

The spectrum of objectives will range from a ' fight strategy', i.e., stay on the installation as long as possible to a 'flight strategy', i.e., get off the installation as soon as possible.

2.2.1.2 Achievement of Strategic ER Objectives

The ER strategy may only involve a single objective for the arrangements or there may be a number, depending on the nature of the installation and the incidents that can occur. Similarly, there may only be one principal means to achieve all the objectives or several different means of achieving a single

objective depending on the circumstances in which the incident has occurred. Whatever the position, the strategy should clearly set out the general means of achieving the objectives so that it can be seen how these have been incorporated into the design of the ER arrangements.

For example, at one extreme the objective of transferring personnel to a Place of Safety could be achieved by the immediate and controlled evacuation of the installation whenever a significant incident is detected (flight strategy). Such an approach might be appropriate for a small normally unattended installation. At the other extreme, this objective might be achieved by the implementation of a structured series of control measures, with a precautionary evacuation of non-essential personnel, until it is clear that no alternative to complete installation evacuation remains (fight strategy). An approach of this type might be appropriate for a large integrated production installation.

Whatever the approach, the ER Strategy will shape the nature of the arrangements and it should be clearly explained and justified.

2.2.1.3 Installation and Location Specific Factors

Finally, the strategy should recognise any installation specific factors, which have particular significance for the ER arrangements.

These factors may include:

- Process, e.g., toxic gas, HP/HT wells.
- Operation, e.g., normally unattended, no helideck.
- Location – the installation may be close to shore or remotely located.
- Collision risk - it may be in a busy shipping lane.
- Environment, e.g., it may be subject to particularly strong tidal streams or currents.
- Other assistance available – it may be isolated or within a cluster of other installations.

Any of these types of factors have the potential to shape the general nature of the ER arrangements and account should be taken of them in the ER strategy.

2.2.2 Defining ER Arrangements

Existing installations will already have ER arrangements in place. These arrangements should be regularly reviewed to ensure that:

- They are sufficiently well documented to facilitate assessment.
- They continue to meet the legal requirements and strategic objectives.

For installations at the design stage the ER arrangements may only be defined in terms of general outline. Nevertheless, the proposed arrangements should be set out clearly and in as much detail as is necessary to allow their proper consideration in the assessment and development process.

ER arrangements will generally be required to deal with two distinct categories of incident:

i) Those which have no potential to escalate to a point at which there is a need to activate the Evacuation, Escape and Rescue (EER) arrangements, and

ii) Those which may require EER, either as an inevitable consequence of the incident or because control measures may fail.

The ER strategy and definition of ER arrangements should encompass both categories of incidents. However, the arrangements in place to respond solely to those incidents with no potential for EER would not normally be subjected to the same degree of assessment and justification as the arrangements provided to handle more serious accidents.

Nevertheless, even the arrangements for lesser emergencies should be reviewed to ensure that the strategic objectives will, so far as is reasonable practicable, be met under the circumstances in which the arrangements are needed. The requirements of the Management of Health and Safety at Work Regulations, particularly with respect to risk assessment, are relevant to the ER arrangements provided for these lesser emergencies.

2.2.3 Analysis and Development of ER Arrangements

Having established the ER strategy, described the ER arrangements that take account of that strategy and declared the strategic objectives against which the arrangements are to be judged, it is necessary to start the iterative part of the process of assessment and development of the arrangements. (see Figure 1 for proposed arrangements and Figure 2 for existing arrangements)

The assessment of the arrangements essentially comprises an analysis of their performance followed by a judgement as to their adequacy. The development step, necessary if the arrangements are judged to be inadequate, involves modifying either the arrangements themselves or removing or reducing the severity of the hazard which they are designed to manage or both. Following such modifications, it is then necessary to repeat the analysis stage to determine if they have been successful in correcting the inadequacy.

As mentioned in the introduction, the ER arrangements include not only the hardware and equipment provided to deal with emergencies but also the planning, management and organisational aspects as well. The assessment and development process should, therefore be directed at the ER plan, the formal command structure and all the procedural aspects of the management of emergencies. This is in addition to the assessment and development of the physical provisions installed to detect incidents, alert personnel, protect them while they are on the installation and enables evacuation or escape and rescue to a Place of Safety.

It should be noted that the identification of the major accident events or reasonably foreseeable events that would give rise to a need to use these ER arrangements, as indeed much of the analysis discussed in this section, should have been performed during the preparation and subsequent revision of a Safety Case for the installation and therefore may not need repeating.

For a Combined Operation the PFEER Regulation 5 assessment would need to be reviewed to determine if any of the arrangements need modifying.

2.2.3.1 Analysis

The first key element in the assessment stage is an analysis of the performance of the ER arrangements in response to reasonably foreseeable events that may bring about a need for their use. The analysis should involve a

consideration of the likelihood and consequences of all these reasonably foreseeable events.

The performance of all the arrangements needs to be considered in relation to the conditions that are likely to prevail during these incidents. How often the ER arrangements will be needed together with the likelihood of them functioning successfully should be considered in relation to the strategic objectives set for the installation to judge the adequacy of the arrangements.

2.2.3.2 Development

If the judgement is that the strategic objectives are not satisfied then it is necessary to consider how to modify the ER arrangements to correct this.

Particularly at the design stage it may be appropriate to consider if any changes could be made to the processes and operational procedures the failure of which may require the ER arrangements. Again this emphasises the need to integrate this ER analysis with the wider hazard analysis performed during the preparation of the Safety Case.

Having established what modifications appear necessary, the analysis of the ER arrangements would then have to be repeated to test whether the modifications are sufficient to ensure compliance with the strategic objectives. Further development may be required if this comparison reveals a continuing failure to satisfy the strategic objectives.

2.3 ALARP Assessment of ER Arrangements on the Installation

2.3.1 Proposed Arrangements

Once the strategic objectives have been satisfied, either at a 'first pass' or after some modification to the arrangements, it is then necessary to show that risk to persons on the installation, including ER teams, are tolerable and have been reduced to as low as is reasonably practicable (ALARP). This includes the identification of practicable alternative and additional ER arrangements to those that have been assessed and an evaluation of the benefits of their adoption in relation to the costs that this would entail.

Any alternatives that are identified which deliver risk benefits that are not disproportionate to the cost should be regarded as reasonably practicable and implemented. In addition to this proportionate balance between risk benefit and cost, due account should also be taken of good industry practice and widely accepted standards, in coming to a view as to whether risks to persons have been reduced to ALARP.

QRA and good practice analyses cannot always address all the relevant factors or provide a sufficiently fair and accurate assessment on which to base a decision. There may also be the need to take into account the views and concerns of those affected by the decision. The Oil & Gas UK decision-making framework provides useful guidance to help decision making in this area.

Further Guidance: Oil & Gas UK publication "Industry Guidelines on a Framework for Risk Related Decision Support", 1999

2.3.2 Existing Arrangements

For existing arrangements, the fact that some or all of the strategic objectives had not been met may not automatically rule out the possibility of justifying its continued operation without modifications to the ER arrangements. Each case would have to be considered on its own merit and would depend critically on the nature and extent of the failure of the ER arrangements to meet the strategic objectives.

The case for continued operation in these circumstances would depend on an ability to demonstrate that the risks to persons were both tolerable and had been reduced to ALARP.

Such a demonstration would have to be a very detailed and robust one to represent an adequate justification.

When it can be shown that measures have been taken to reduce risks to persons to ALARP and any non-compliance with strategic objectives has been convincingly justified then this part of the assessment and development process is complete.

2.3.3 Assessment Outputs

One of the main outputs from the assessment process should be the critical components of the ER arrangements and the performance standards necessary to measure the adequacy of the arrangements. These performance standards will then be used to physically validate the arrangements and subsequently to verify that the arrangements remain satisfactory. (see also Section 7)

3. ER Arrangements on the Installation

SUMMARY

S3.1 Introduction

The ER arrangements on an installation encompass all the arrangements from the detection of the incident through to a point at which the emergency has been controlled or persons have either evacuated or escaped from the installation. In all cases the risks to persons should be ALARP.

In addition to providing the physical equipment to execute these sequences, comprehensive planning needs to have been performed and effective command, control and communication procedures and facilities need to be in place to ensure a sufficiently flexible and robust response to emergencies. More guidance on ER Plans and Command is given in Sections 5 and 6, respectively.

S3.2 Key Elements

The key elements in the ER arrangements on the installation include the following:

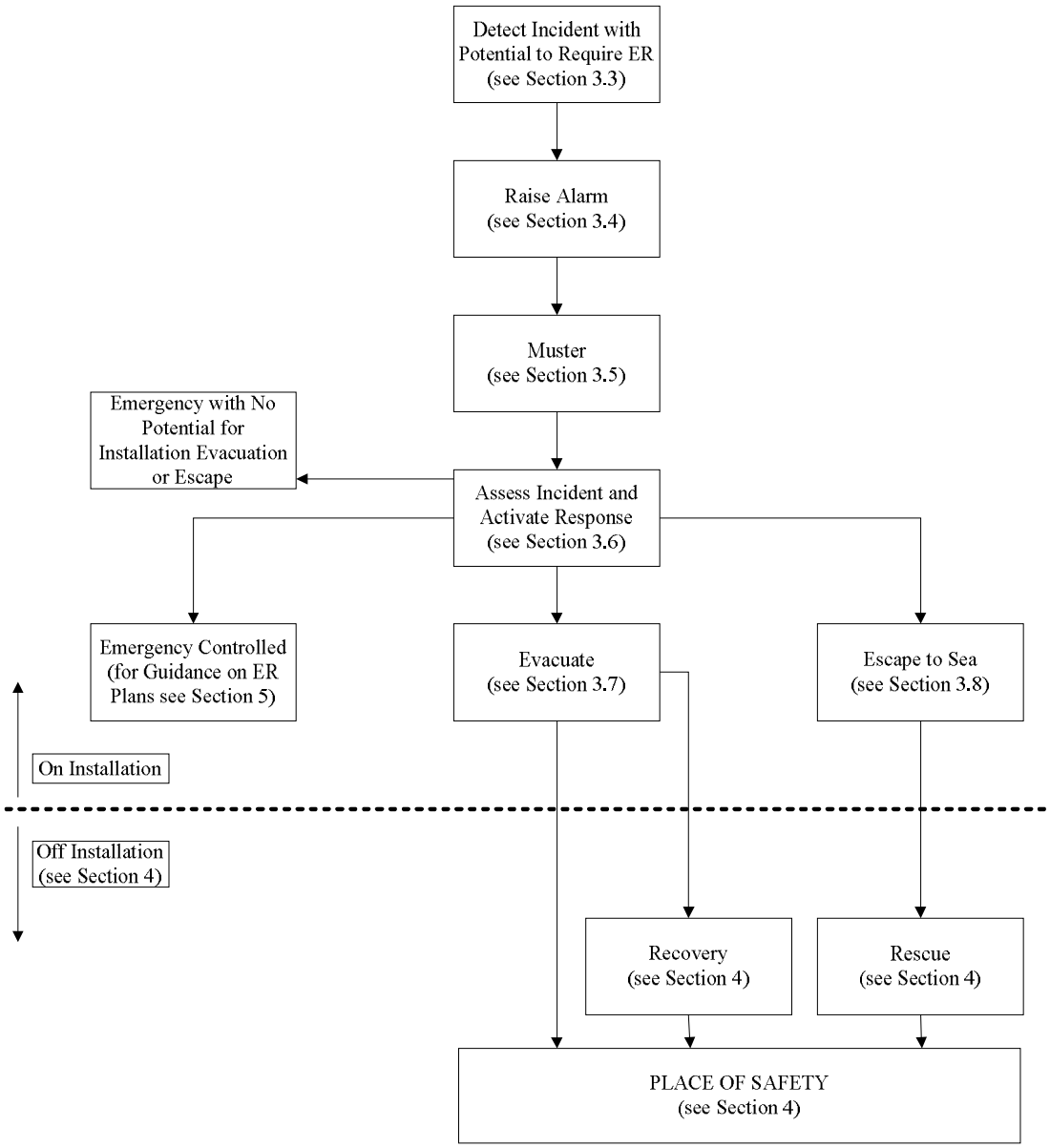
- Detection - The detection of any incident with the potential to require an emergency response. The detection arrangements should cover all emergencies from major accidents to those with no potential for either complete or partial evacuation. (see Sub-Section 3.3)
- Raise alarm - Following detection of an incident it is necessary to provide suitable arrangements for raising the alarm to ensure that all persons are alerted so they can perform their allocated emergency response activities as described in the ER plan. (see Sub-Section 3.4)
- Muster - The purpose of the muster is to provide a means of accounting for all personnel on the installation and to make available to the command and control centre the names and possible location of missing or injured persons. It should also provide a safe location in which personnel can be adequately managed and instructed with respect to the means of evacuation and/or escape. (see Sub-Section 3.5)
- Assess incident and response options – When an incident occurs on the installation its potential for escalation will need to be assessed and, bearing in mind all available options, before appropriate response decisions can be made. It is probable that continuous re-assessment will be required throughout an emergency and only those incidents with no potential to require EER would need little or no re-assessment. (see Sub-Section 3.6)
- Evacuation - Although there are different methods of effecting an evacuation, the preferred method should be the normal means of getting personnel to and from the installation, e.g., helicopters or an alternative means (such as a bridge link) if it is more appropriate in the particular circumstances. The means of evacuation should be selected on the basis of reducing the risk to persons using them to ALARP.
- Alternative Evacuation - an alternative means of evacuation, based on the installation, should be provided and in most cases this would be by sea by means of TEMPSC. (see Sub-Section 3.7)

- Evacuation of Divers - If diving is taking place from the installation the assessment of evacuation arrangements should take account of the special requirements of diving personnel who will require specific additional arrangements to be put in place.
- Escape - The means of escape should be selected on the basis of reducing the risk to persons using them to ALARP and there should be a hierarchy of escape arrangements provided with this consideration in mind. (see Sub-Section 3.8)

See Page 27 for the next Summary, “Assessment of Rescue and Recovery Arrangements off the Installation”

FLOW DIAGRAMS

Figure 3: ER Arrangements on the Installation



DETAILED GUIDANCE

3.1 Introduction

ER is a process that is set in motion to safeguard the health and safety of persons on or near an installation in the event of an unplanned incident with the potential to cause harm. It encompasses all the arrangements that have been made to achieve this objective from the detection of the incident through to a point at which the risks to persons have been reduced to either ALARP or to a level equivalent to those experienced under normal operational conditions.

A generic example of the ER process is shown schematically in Figure 3 comprising a number of key elements or steps. It can be seen that a number of different outcomes are possible from an emergency response and in some cases a number of different ways of reaching the same outcome. The nature of the emergency and how it develops will determine the appropriate sequence of emergency response activities.

In addition to providing the physical equipment to execute these sequences, comprehensive planning needs to have been performed and effective command, control and communication procedures and facilities need to be in place to ensure a sufficiently flexible and robust response to emergencies.

This chapter considers the key elements of the steps in the emergency response sequence, together with the underlying management and procedural aspects that are essential to their effective execution.

3.2 Key Elements of ER

The key elements in the ER arrangements on the installation are shown schematically in Figure 3 and include the following:

- Incident detection (Sub-Section 3.3).
- Raising alarm (Sub-Section 3.4).
- Muster including access and egress (Sub-Section 3.5).
- Assessment of incident and activation of response (Sub-Section 3.6).
- Evacuation (Sub-Section 3.7).
- Escape (Sub-Section 3.8).

The elements of the ER arrangements off the installation, i.e., for rescue and recovery and Place of Safety are detailed in Section 4.

3.2.1 Underlying Aspects of ER

There are a number of aspects that are essential to a successful ER, which do not appear explicitly in the flow diagram shown in Figure 3. This is because they apply to the entire process. The following sub-sections provide guidance on these aspects.

*3.2.1.1 **ER Plan** (see detailed guidance in Section 5)*

The ER plan should set out the main elements of the arrangements for ER, from the time when the emergency is detected until it is over.

The plan should include precautionary arrangements such as the evacuation of non-essential personnel. It should embrace all types of emergency from minor incidents with no potential to require installation evacuation, to major accident events.

The principles that should be taken into account in drawing up the emergency response plan are described in Section 5.

3.2.1.2 Command Structure (see also Section 6)

A command structure should be established that will, so far as is reasonably practicable, remain effective throughout all stages of an emergency. There should be a clearly identified individual, usually the OIM, with overall responsibility for taking charge in an emergency on an installation. There should also be a clear chain of command and arrangements must be established to ensure the competency of the persons in the chain to discharge the duties required of them.

The command structure should be capable of functioning in different circumstances and in particular, there should be contingency arrangements to ensure that if individuals are, or become, unavailable there will be others identified as capable of discharging the relevant responsibilities so that the command structure remains effective.

The respective responsibilities between those on the installation and between any offshore and onshore support facilities should be specified and clearly understood by all those involved. There should be adequate arrangements for hand over of command and control functions, where necessary for different stages of the emergency.

3.2.1.3 Competency

The emergency duties need to be clearly defined and personnel undertaking them must be competent to discharge them. There should be sufficient competent personnel present on the installation at all times to carry out the required emergency duties. Competence in this sense means having been assessed as possessing the training, experience and knowledge to undertake the tasks for which they are responsible. Arrangements should be established to maintain that competence by, for example, exercises, further development training and feedback on performance.

In allocating tasks, care should be taken to avoid assigning multiple responsibilities to an individual, which may be incompatible in an emergency.

Further Guidance: HSE publication HSG 65, "Successful Health and Safety Management", 1997 (ISBN 0717612767). OPITO Industry Training & Competence Standards

3.2.1.4 Training, Instruction and Information

Training, instruction and information should be given on or before arrival at the installation. Adequate arrangements should be made for visitors or other special groups who may, for example, be particularly unfamiliar with the installation or who may have particular vulnerabilities, such as divers (see also Sub-Section 3.7.3). These arrangements should include general training in emergencies, installation specific induction training and training based on the

ER Plan. Training, instruction and information should be periodically monitored and audited as necessary.

Visitors who have not undergone adequate training should normally be accompanied throughout their stay, in addition to being given suitable instructions for the time that they are on the installation. The person in charge of them should, so far as is reasonably practicable, ensure that they take the correct actions in an emergency. (see also Sub-Section 5.3.3 on specific ER training)

3.2.1.5 Communication

Arrangements (i.e., suitable equipment, information processing and procedures) should be in place to enable effective communication between persons with command and control responsibilities and all others on the installation and/or those engaged in activities associated with the installation, e.g., loading and unloading operations, etc.

The purpose of these communication arrangements is twofold:

- To enable information on the developing incident to be reported to those in command (to facilitate an assessment of what action is required).
- To enable the required command and control action to be taken in respect of personnel on the installation.

There should be adequate provision for communicating with others who may have to take action in an emergency (e.g., to shut down pipelines) and with possible sources of external assistance, such as other installations, ERRV, other SAR facilities and shore based facilities.

So far as reasonably practicable, communication arrangements should remain available throughout the emergency.

Further Guidance: Oil & Gas UK publication "Safety Related Telecommunications Systems on Fixed Offshore Installations", 2005

3.3 Incident Detection (see also PFEER Regulation 10)

Suitable arrangements should be made for the detection of all reasonably foreseeable incidents identified in the PFEER Regulation 5 assessment and the Safety Case to ensure, so far as is reasonable practicable, that those responsible for the management of emergencies are made aware that a response is required. These arrangements should cover all emergencies from major accidents to those with no potential for complete or partial evacuation.

The means of detection of an incident may range, for example, from complex automatic systems that continuously monitor for the occurrence of an incident, to operational procedures that inform personnel as to the actions to take on observing such an occurrence. Examples of the latter might include fire watch arrangements for certain hot work operations and overside working procedures.

The characteristics and likely location of the incident that needs to be detected and the environment in which it is expected to function should define the nature of the detection system. The availability and reliability of the detection system should take account of the risk to persons associated with the incident.

Availability and reliability may be improved by introducing redundancy and/or diversity into the detection system.

For systems with in-built redundancy, consideration should also be given to the incidence of spurious detection that can degrade the effectiveness of the subsequent ER. An example of how this may be dealt with is by the introduction of voting logic to ensure that more than one detector is required to raise an alarm.

The speed with which a detection system can respond to an incident should be related to the speed with which the incident can escalate. Thus, for events that can develop rapidly into major accidents in the absence of successful control action, it would be appropriate to install continuous monitoring devices. For more slowly developing emergencies periodic monitoring may be all that is required.

The detection system should be adequately maintained and contingency arrangements, which may require limiting operational activities, should be established for situations where all or part of a detection system is not available, such as during maintenance.

In addition to taking account of these principles, the detection system itself should provide sufficient information on the nature and location of the incident to allow the appropriate ER activities to be initiated.

3.4 Raising the Alarm (see also PFEER Regulation 11)

Following detection of an incident it is necessary for alarms to be raised to ensure that all appropriate persons are alerted in a timely manner to the need to perform their allocated emergency response activities (as described in the ER plan). These activities may range from making safe the workplace and mustering at predetermined locations, to assessing the nature of the incident and deciding which, if any, subsequent parts of the plan should be executed.

The type and location of alarms should be determined by the characteristics and severity of the incidents that trigger them. In deciding what types of alarm are appropriate and where they should be located, account should be taken of the environment in which they are expected to work, the speed with which the incident is likely to escalate and the probable distribution of personnel around the installation. A guiding principle should be that Duty Holders endeavour to ensure that alarm types are harmonised to industry standards.

Alarms should include audible and visual alarms and voice communications systems. Where it is not reasonably practicable to give an alarm automatically (e.g., in a remote, rarely visited part of an installation) there should be clear procedures for passing information to the appropriate people in the event of an incident being detected.

Particular attention should be paid to ensuring that alarms are raised at locations where individuals are expected to initiate control or mitigation measures. An example of this would be the alarm arrangements on a normally unattended installation. It may also be appropriate to relay alarms to those responsible for mobilising emergency resources external to the installation.

3.5 Mustering and Muster Areas (see also PFEER Regulation 14)

The purpose of the muster is to provide a means of accounting for all personnel on the installation and to make available to the command and control centre the names and possible location of missing or injured persons.

Muster areas also provide a safe location or series of safe locations in which personnel can be adequately managed and instructed with respect to the means of evacuation and escape.

3.5.1 Access to and Egress from Muster Areas

Essential to successful ER is the safe and rapid movement of persons on the installation from wherever they may be to muster areas and from muster areas to evacuation and escape points.

These routes should remain passable, so far as reasonably practicable, for as long as they are needed during the emergency despite the effects of the incident. By preference this should be achieved by design, i.e., positioning, or direct protection of the route, rather than by the use of personal protective equipment. Nevertheless, personal survival equipment (breathing apparatus, smoke hoods, etc.) may be deemed necessary (by assessment) to facilitate egress from certain locations on the installation. Where the primary means of access or egress may be impaired, alternative means should be provided which are unlikely to be affected by the same incident.

Emergency doors should open in an appropriate direction or be sliding doors. They should not be fastened so that they cannot be readily opened in an emergency.

Access and egress routes should be easily identifiable by the use of suitable signs and markings and all personnel arriving on the installation should be made aware of the signs and marking as part of the induction process. Adequate emergency lighting should be provided which will illuminate the route for sufficient time for personnel to make use of it.

The access and egress routes, the protection required for these routes and the times for which they should remain available, will generally be identified as critical to the success of ER and as such should have appropriate performance standards. They should take account of the number of personnel who need to use the route, the distribution of personnel on the installation and the way in which incidents could affect the route.

Casualty recovery may extend the time for which routes need to remain available and account should be taken of the possible requirement to use stretchers particularly where ladders, stairways, corners and doorways may have to be negotiated. A route suitable for stretcher cases should be identified between the sick bay and preferred evacuation point.

3.5.2 Muster Areas

The muster areas should be clearly identified by suitable signs. Adequate emergency lighting should be provided, giving illumination throughout the period for which personnel may have to use the area. Appropriate facilities should be provided in muster areas for communication. The areas should

remain unobstructed and be able to accommodate all personnel who may need to use them. They should also be spacious enough to allow all the personnel to don any PPE required during evacuation or escape.

All personnel on arrival at the installation should be assigned to a muster area and be given adequate information about its location and all relevant procedures. A list of the assigned personnel should be displayed at the muster area. Mustering procedures should be specified in the emergency response plan. There should be contingencies to accommodate the possibility of personnel responsible for conducting the muster being unavailable.

Muster areas should provide temporary protection to personnel, so far as reasonably practicable, from the effects of incidents for as long as they are required. Part or all of the Temporary Refuge (TR), where one is provided, may be designated as a muster area, or it may contain several muster areas. It is sometimes helpful if personnel muster in discrete groups, which relate to their TEMPSC allocation. However, additional muster areas associated with evacuation points should be designated outside the TR (where one is provided) in the event of incidents which may affect the TR or which require personnel to muster away from the TR, e.g., structural failure or for a mobile, loss of stability. If the assessment shows that it is reasonably foreseeable for events to affect access to the evacuation systems for certain personnel then additional muster areas associated with escape points should be designated. These additional muster areas should be suitable for the number of personnel likely to be affected.

For muster areas that are designated as a TR, the requirements of and guidance to the SCR are relevant, in particular Schedules 1-3.

These specify that safety cases include particulars of TR and associated facilities 'for protecting persons on the installation from hazards of explosion, fire, heat, smoke, toxic gases or fumes'.

Further Guidance: HSE publication L30, "A Guide to the Offshore Installations (Safety Case) Regulations 2005", Second Edition 2006, (ISBN 0717661849)

3.6 Assessment of Incident and Activation of Response (see also PFEER Regulation 8)

For some defined incidents, for example MOB from overside working, it may be sufficient to have standing instructions to react to the incident. For other types of incident particularly those that might escalate rapidly, it will be desirable to use the detection system itself to activate the early stages of ER; such as automatic control action on a fire monitoring system may also initiate the general alarm. This would ensure efficient use of time while the development of the incident is being assessed and possible control measures are initiated. However, there will generally be a need to assess any incident on the installation and its potential once it has been detected and a local alarm raised, before decisions can be made as to whether a continuing ER is required and, if so, what the most appropriate ER should be.

Although indicated as a discrete activity on the flow diagram shown in Figure 3, this assessment activity may in reality continue throughout the emergency depending on the type of incident and the way it develops. Indeed, it is

probable that only those incidents with no potential to require EER would need little or no re-assessment as the incident runs its course.

The essential aspects that contribute to the success of this assessment and response activation activity are:

- Comprehensive emergency planning.
- Clearly identified responsibilities for decision making.
- Clearly identified lines of command and control.
- Competence in those with responsibility for decisions, based upon selection, experience, knowledge, training and practice.
- Contingency arrangements to cope in the event of key personnel being unavailable.
- Communications to provide sufficient information for decision-making. Such as information on: People - how many, casualties, condition, location; Plant - deluge, power, fire pumps, damage, lifeboats available; Peripherals- boats, helicopters, helideck availability.
- Announcements to ensure that all personnel are adequately informed as to the action they should take.
- Information flow to personnel regarding the progress of the assessment and response process, e.g., announcements to personnel at muster to provide reassurance.

3.7 Evacuation (see also PFEER Regulation 15)

Means of evacuation may include the provision of services from agencies off the installation to achieve evacuation. Helicopter operators fall into this category. While it is recognised that Duty Holders would not normally be responsible for the provision of such services directly, they are required to be able to demonstrate that they have made adequate arrangements with respect to the supply of these services if and when required.

3.7.1 Means of Evacuation

Although the method of evacuation is selected in accordance with the emergency response strategy, the means of evacuation should be selected on the basis of their contribution to reducing risks to persons using them to as low as is reasonably practicable. The arrangements for evacuation should take into account any constraints on their use imposed by such factors as the weather conditions, the nature and location of the emergency and the time available to evacuate. The means of evacuation should take into account the likely distribution of personnel and likely evacuation scenarios and in particular it should be readily accessible from the Temporary Refuge.

Although there are different methods of effecting an evacuation, the preferred method should be the normal means of getting personnel to and from the installation (typically helicopters), unless the emergency makes this impracticable (e.g., a major gas release) or an alternative means (such as a bridge link) is more appropriate in the particular circumstances.

The means of evacuation should, so far as reasonably practicable, provide protection for personnel during its use. Arrangements for the adequate care of injured personnel using the means of evacuation including those who may be

on stretchers should be provided. The means of evacuation should be such as to facilitate the identified means of recovery to a Place of Safety. Means of communication between evacuees and other parties involved in recovery operations should also be available.

The means of evacuation remaining available on the installation following reasonably foreseeable emergencies should provide sufficient capacity to enable all persons to evacuate the installation.

All the evacuation systems and any personal survival equipment that is provided for use in an emergency should be compatible, for example automatically deployed lifejackets would not be compatible with helicopter evacuation.

If there are some weather conditions which prevent the launch or use of a TEMPSC then operational restrictions may be necessary to reduce the requirement for evacuation by TEMPSC during these weather conditions.

3.7.2 Alternative Evacuation Provisions

Whilst the normal means of getting personnel to and from the installation would generally be the preferred means, an alternative means of evacuation, based on the installation, should be provided and in most cases this would be by sea by means of TEMPSC. There should be sufficient spare capacity in this evacuation system such that in the event of some part of the system becoming unavailable, there remains available capacity elsewhere sufficient to accommodate safely all persons on the installation. The degree of spare capacity should be determined and justified by the assessment of the ER arrangements.

Means of evacuation by sea should be suitably located so as to be readily accessible to all persons on board from the temporary refuge. TEMPSC should be easy to deploy, reliable in launch, give protection against hazards such as fire and smoke, be able to move away quickly from the installation and, where it is reasonably practicable, should be oriented away from the installation on completion of launch.

In certain circumstances, (e.g., a small normally unattended gas installation), it may be reasonably practicable to rely on only one evacuation system, e.g., helicopter. Where this is so, arrangements should be made to ensure that the means of evacuation is available while personnel are on the installation. Available in the case of a helicopter means able to effect an evacuation in the time available.

Where the nature of the incident or the function of the installation means that this is not reasonably practicable, then other arrangements should be made to ensure that personnel are put at no more risk than they would have been if an alternative means of evacuation by sea had been available. This would have to be justified in the assessment of the ER arrangements.

3.7.3 Evacuation of Divers

If a diving activity is planned to take place from the installation the Duty Holder will need to address the evacuation of personnel from the diving project in consultation with the diving contractor. The assessment of evacuation arrangements for the installation should take account of the special

requirements of surface supplied diving personnel and where appropriate saturation diving personnel who will require specific additional arrangements to be put in place.

When diving operations are ongoing then Duty Holders should consider routinely limiting other operations so the need for evacuation is reduced to as low as reasonably practicable.

3.7.3.1 Surface Supplied Diving

When surface supplied diving is being carried out from an installation it should be planned and managed to minimise any requirement for surface and/or in-water decompression. However if a surface supplied diver, for whatever reason, requires therapeutic recompression on the installation, then the positioning of the chamber should be such that the diver can be evacuated in the event of an emergency.

If evacuation becomes necessary there may be a need for further recompression onshore and alternative recompression facilities should be identified.

3.7.3.2 Saturation Diving

Divers in saturation can not be evacuated by the same means as other personnel on the installation. Special arrangements and procedures will need to be made to evacuate them safely while keeping them under pressure and with life support for a minimum of 24 hours.

The type of equipment and its method of deployment will depend on the facilities available and the number of divers to be evacuated. The use of a purpose built hyperbaric lifeboat is one option that can be considered.

Redundancy and diversity in evacuation systems for saturation divers will have to be considered in relation to the equipment and procedures to reduce risks to ALARP. The special vulnerability of this group should be taken into account in these considerations.

Further Guidance: IMCA publication "Evacuation of Divers from Installations", April 2001

3.8 Escape (see also PFEER Regulation 16)

Sufficient means of escape should be provided to ensure that they are available for all personnel who may have to use them as a result of reasonably foreseeable events, which may impair the planned evacuation arrangements. The location, range and number of escape arrangements provided should be related to the number and distribution of personnel on the installation and the circumstances in which these arrangements may be required. There should be sufficient redundancy in the provision of means of escape to take into account the likelihood of damage from an incident.

Means of escape range from devices that offer some of the features of an evacuation system, such as davit launched life rafts, to simple means of controlled descent to the sea, e.g., chute systems, 'Donuts' and ladders. It is unlikely that a Duty Holder could demonstrate that knotted ropes are a means

of controlled descent or comply with the ALARP principle if they are the sole means of escape.

The means of escape should be selected on the basis of reducing the risk to persons using them to ALARP and there should be a hierarchy of escape arrangements provided with this consideration in mind. This means that preference should be given to devices which avoid the need to enter the sea directly, that offer some degree of protection from the elements and from conditions on the installation during their use. In addition, however, sufficient means of direct entry to the sea should be provided on all installations along with the necessary personal survival equipment to ensure a 'good prospect' of rescue.

The means of escape and any personal survival equipment that is provided for use in an emergency should be compatible. (see also Appendix 2, Reference 8)

If the assessment required by PFEER Regulation 5 has justified only one means of evacuation and the nature of the incident makes this unavailable then immediate escape may be the planned response, it being the best and quickest response in these circumstances to reduce the overall risk to those concerned. An example may be a gas release on a small Normally Unattended Installation involving the whole installation preventing evacuation by helicopter.

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4. Assessment of Rescue and Recovery Arrangements off the Installation

SUMMARY

S4.1 Introduction

Effective rescue and recovery arrangements should be capable of securing a good prospect that persons who end up in the sea near an installation are recovered or rescued and taken to a Place of Safety.

S4.2 Key Steps

- Identify all events that could give rise to people entering the sea near an installation.
- Judge if any of these events are reasonably foreseeable - record and document justification for considering any events 'not reasonably foreseeable'.
- Estimate the survival time for individuals under the anticipated conditions for each of the identified reasonably foreseeable events.
- Estimate the overall time for the rescue of all individuals involved in such events.
- Demonstrate the effectiveness of the arrangements to provide a 'good prospect' of survival, e.g., survival times $>$ 1.5 rescue times.
- Assess the adequacy of the Place of Safety to meet all the challenges from all the reasonably foreseeable events.
- Identify the critical components to achieve a 'good prospect' of rescue and recovery and taking to a Place of Safety such as times for survival and times for rescue.
- Set performance standards for these components including the limiting weather and sea conditions that the arrangements are suitable for.
- Verify performance standards to ensure that the adequacy of the arrangements is maintained. (see Appendix 4)

S4.3 Factors Relevant to Survival Time Estimation

Account should be taken of the weather, water temperature and sea-state, the likely physical condition of the survivors, their state of dress and any protective clothing or equipment they may be wearing. The suitability and compatibility of combinations of protective clothing and equipment should also be considered. (see Appendix 2, Reference 8)

S4.4 Factors Relevant to Rescue and Recovery Time Estimation

This total time should include realistic estimates for the time to activate the arrangements for rescue resources to arrive at the scene, to locate and recover all the individuals involved and to take them to a Place of Safety. In making these time estimates due account should be taken of the numbers of people

involved, the time of day, the weather and sea state. It should be noted in relation to rescue by FRC that care in rescue is more important than speed.

S4.5 Place of Safety

Primarily a Place of Safety must have adequate facilities and competent personnel in sufficient numbers to be capable of providing:

- Access for survivors.
- Reception for survivors.
- Initial medical diagnosis.
- Initial treatment and stabilization.
- Facilities for subsequent transfer of survivors.

See Page 41 for the next Summary, “Formulation and Assessment of the ER Plan”

FLOW DIAGRAMS

Figure 4: Assessment of Rescue and Recovery Arrangements off the Installation

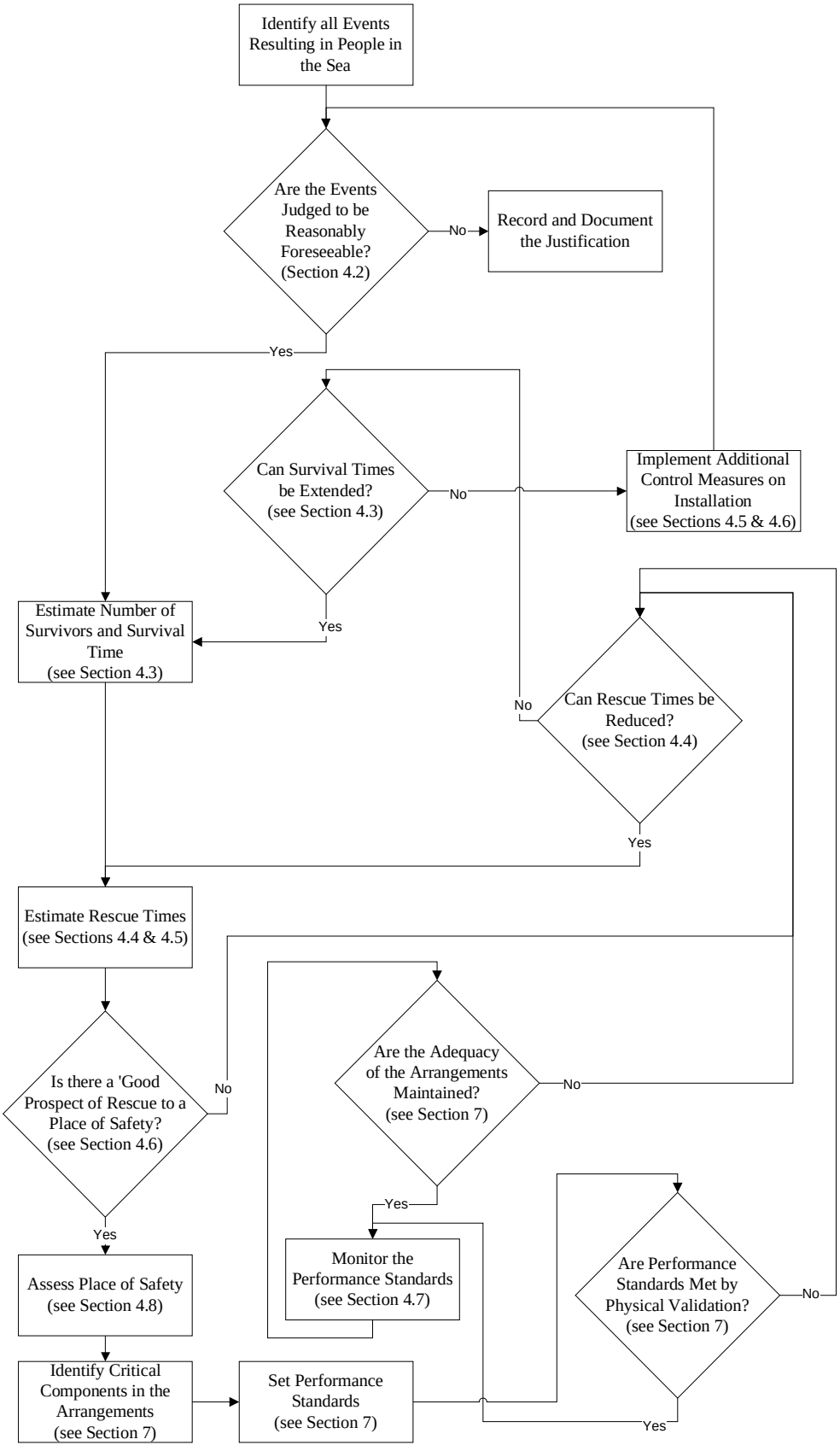


Figure 4.1: Place of Safety Process

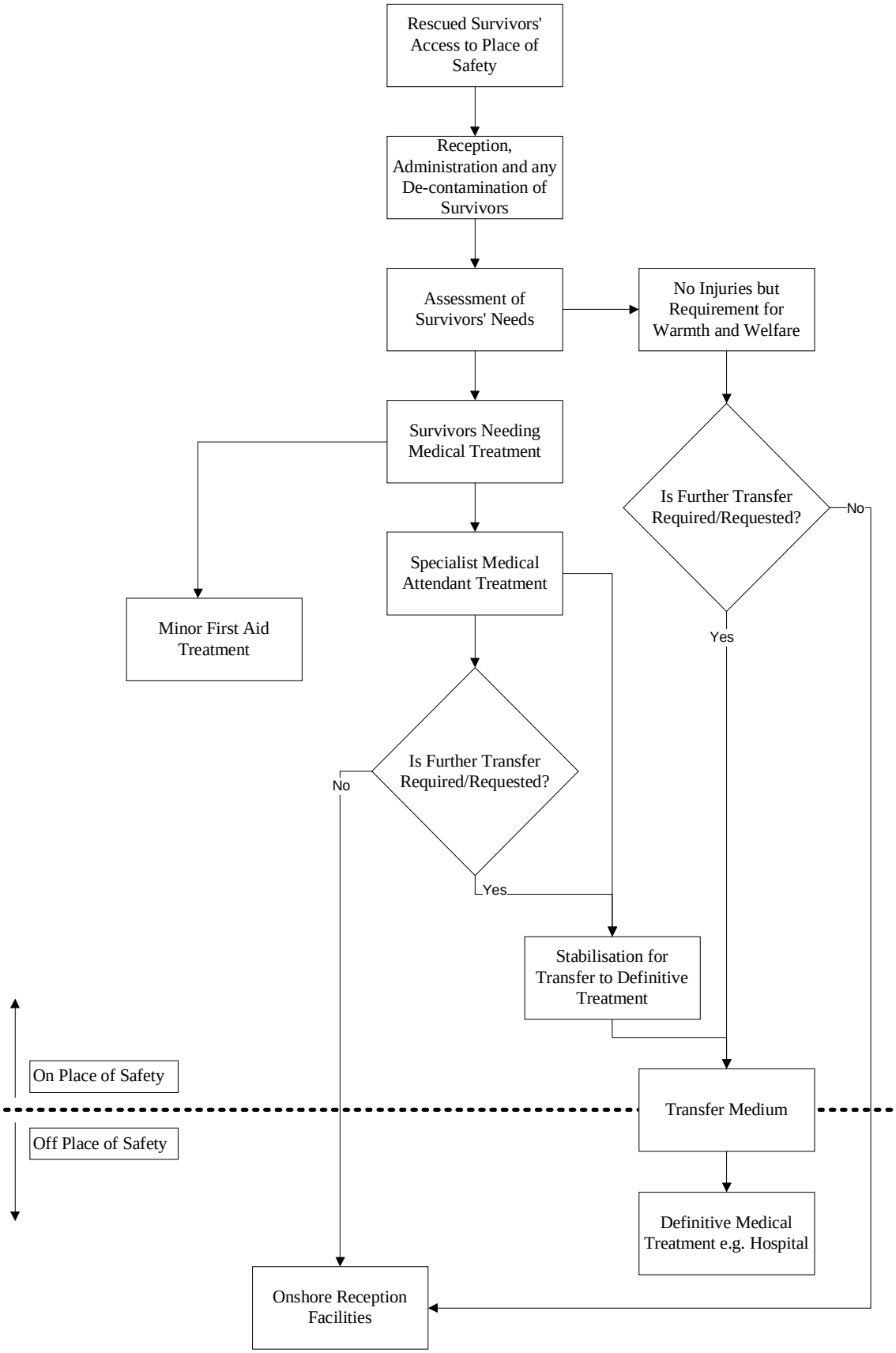
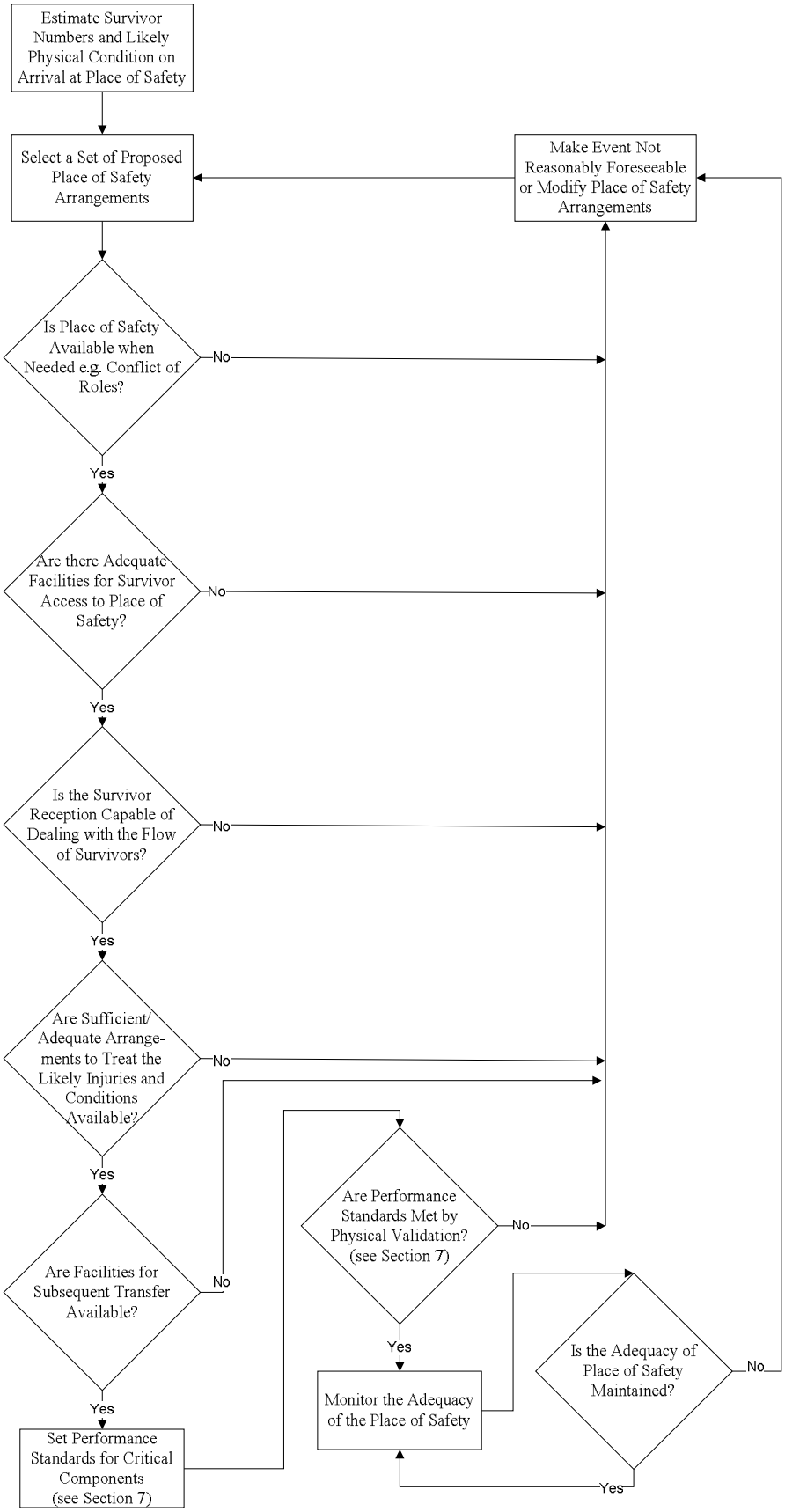


Figure 4.2: Assessment and Development of Place of Safety



DETAILED GUIDANCE

4.1 Assessment Methodology

The arrangements for rescue and recovery clearly form part of the overall arrangements for emergency response and as such should form part of the assessment required by Regulation 5 of PFEER for major accidents. For non-major accidents (such as incidents from working over the side) the risk assessment required by Regulation 3 of the Management of Health and Safety at Work Regulations is relevant.

Also called for by PFEER Regulation 5, and reiterated in part in the ACOP associated with Regulation 17, is the establishment of performance standards to be attained by "anything provided by measures for ensuring effective evacuation, escape, recovery and rescue."

Clearly, the particular methodology employed to assess the adequacy of the emergency response arrangements is for Duty Holders to select and justify. However, there are some key elements in the approach and these are summarised schematically in Figure 4 and should be incorporated in the assessment of the rescue and recovery arrangements.

A consideration of these key elements represents a minimum standard for the approach to be considered satisfactory.

These key elements are as follows:

- All events that could give rise to personnel having to evacuate or escape from an installation or that could result in people entering the sea near an installation should be identified.
- These events should be judged to ascertain if they are reasonably foreseeable.
- Realistic estimates should be made of the survival time for individuals under the anticipated conditions for each of the identified reasonably foreseeable events.
- The overall time for the rescue and recovery of all individuals involved in such events should be estimated for each event.
- Demonstration of the effectiveness of the arrangements to provide a 'good prospect' of being recovered, rescued and taken to a Place of Safety.
- Assessment of the Place of Safety.

4.2 Reasonably Foreseeable Events

Regulation 17 of PFEER is not subject to the principle that risks should be reduced to as low as is reasonably practicable (ALARP). Instead, effective rescue and recovery arrangements are required to respond to all reasonably foreseeable events.

If an approach based on a requirement to reduce risks to ALARP was used to determine what should be provided for the rescue and recovery of personnel in emergencies, then it is possible that only fairly basic arrangements could be justified. This is because, although the risk of death to personnel during the rescue and recovery phase of an emergency is often relatively high, the frequency of circumstances arising in which personnel will require rescue and

recovery is usually quite low. This low frequency means that in risk terms the scope for achieving benefits by enhancing the rescue and recovery arrangements may be fairly limited. To avoid the possibility of personnel accidentally entering the sea without effective arrangements being made for their rescue and recovery, this alternative approach based on reasonable foreseeability was embodied in the ACOP.

Although there may be some uncertainty and therefore debate about what is or is not reasonably foreseeable, it is clear that a requirement to provide effective arrangements for all reasonably foreseeable events would normally go beyond what would be required solely from a consideration of overall risk to an individual and the need to reduce this risk to ALARP.

The ACOP associated with Regulation 17 of PFEER calls for rescue and recovery arrangements to be able to cope with all reasonably foreseeable events. A number of examples of what would constitute a reasonably foreseeable event are quoted in the interpretative guidance and these include a catastrophic failure, a ship collision, a helicopter ditching or crash near the installation and a person falling during overside working.

There is a considerable body of legal precedent surrounding the meaning of the term reasonably foreseeable and the test usually applied is whether an event would be so regarded by the "intelligent lay person". In deciding what is reasonably foreseeable it is material to consider both the behaviour of persons and the performance of equipment.

An important feature of this application of reasonable foreseeability is that it can not be argued that arrangements are unnecessary for an event solely on the grounds of low frequency, even against the background of the high cost of providing some of these arrangements. What determines if arrangements are required is a judgement as to whether an intelligent lay person would perceive the event to be reasonably foreseeable. If so then arrangements must be made that are effective**,** taking account of the hazards faced by persons once they have entered the water.

Initially any event should be approached with a view to making it 'not reasonably foreseeable' either by modifications or additions to plant or equipment or by the introduction of procedures thereby eliminating the need for rescue and recovery for that event.

Although the term 'reasonably foreseeable' is used in the ACOP with some examples, any judgement of these events can only be undertaken on an installation by installation basis and any justification on whether events could be considered not reasonably foreseeable would only be considered acceptable if it took into account installation specific situations.

Any justification, which considers an event not reasonably foreseeable, should be adequately recorded and documented.

4.3 Factors Relevant to Survival Time Estimation

Survival time in the sea is dependent on a wide variety of factors and is not amenable to precise quantification. The principal cause of death due to immersion in the sea is of course drowning although a considerable amount of the work that has been carried out in this area has focused solely on the effect of the cold and death from hypothermia. Although not the main cause of death,

the effects of cold are debilitating and increase the probability of drowning. Due to this contributory effect, data on the early stages of hypothermia are important in the overall estimation of survival times in cold water.

While many of the factors which influence survival time are fairly obvious, the sensitivity to these factors of an individual's prospect of survival is less so, particularly when a number of factors are present in combination. Thus, it is clear that an individual's size, level of fitness, state of dress, physiological and psychological state, etc. all have a bearing on survival time as will the water temperature and sea state. The suitability and compatibility of protective clothing and equipment should also be considered. (see Appendix 2, Reference 8)

However, exactly how significant the effect of each of these factors is and what their influence might be in combination is more a matter of conjecture.

A considerable body of work has been performed on this subject, which reveals survival times across a wide range from a few minutes to several hours depending upon circumstances. This work has been summarised in a report commissioned by the HSE (see Appendix 2, Reference 6) and is available as a source of reference to Duty Holders carrying out assessments of their arrangements. As a guide a summary of the report's main findings on drowning times is given in Appendix 3.

Of particular concern in relation to survival time estimation is the MOB event in which an individual enters the sea in normal work clothes, i.e., thermally unprotected. In these circumstances there is a possibility of 'cold shock'. The initial involuntary gasp it causes on entering the water and the subsequent increase in breathing rate greatly increase the risk of inhaling water. There is also a danger that some individuals may suffer rapid cardiac arrest. The most likely outcome is permanent brain damage and perhaps death if not rescued within 4 or 5 minutes. This concern was particularly highlighted in evidence to the Cullen Inquiry. (see Cullen Report, paragraph 20.47)

Undergarments to prevent 'cold shock' and provide some thermal protection have been developed for overside workers.

4.4 Factors Relevant to Rescue and Recovery Time Estimation

The key feature of assessing the time for rescue and recovery is the use of realistic estimates for the time necessary to perform all the required tasks from raising an alarm to arrival at a Place of Safety, under the worst weather conditions in which it is intended to operate these arrangements.

Evacuation from an installation will involve rescue and recovery activities, which will need to be carefully planned and thoroughly assessed. Performance standards will also need to be set for the safety critical arrangements for such operations. However, the most onerous rescue and recovery operations will usually be those intended to respond to helicopter ditches, man overboard events and escape from the installation, in short those events that lead directly to individuals entering the sea.

Although the time taken to perform all the tasks in the operation should be considered, generally the three main contributors to the overall response time, particularly in severe weather, will be the time taken to:

- Get resources to the scene.
- Locate and retrieve all the personnel involved.
- Transfer all personnel to a Place of Safety.

The location time and the time to transfer personnel to a Place of Safety will both depend critically on the number of people needing to be rescued. Assessments must, therefore, take account of realistic estimates of these numbers in reasonably foreseeable events.

The assessment process must also take account of any areas inaccessible to the rescue arrangements from whence it is reasonably foreseeable that persons will have to be rescued. In these circumstances alternative arrangements may have to be provided.

4.5 Adverse Weather

The speed and manoeuvrability of rescue and recovery resources decrease significantly as the weather and sea-state worsen. Estimates of response time should, therefore, take account of this impaired performance at the extreme end of the weather window in which such events are regarded as reasonably foreseeable. The time taken to locate individuals in the water will also increase with worsening weather and sea-state and again account must be taken of this.

Events that can result in personnel entering the sea in these poor conditions will be very difficult to manage both from the point of view of increased recovery times and reduced survival times. Accordingly, serious consideration should be given by Duty Holders to taking operational steps either to reduce the frequency of such events or eliminate them altogether. In short, rather than struggle to enhance and justify the rescue and recovery arrangements in such poor weather, it may be more effective to take operational steps (e.g., restrict helicopter flights, stop all hot work, restrict maintenance activities, etc.) which render such events no longer reasonably foreseeable in these conditions.

The guidance to Regulation 17 interprets the term "good prospect" as meaning arrangements that are designed to give a good probability of survival in all but the most severe storm conditions and sea states. These severe conditions referred to in guidance are those in which no safe and effective rescue and recovery operation is feasible. Under these special circumstances operational steps should be taken to ensure that there are no reasonably foreseeable events that could require mounting such rescue operations.

4.6 'Good Prospect'

The estimate of survival time should exceed the estimate of recovery time for all reasonably foreseeable events. The margin between the two should be sufficiently large to give confidence that the effects of uncertainty will not invalidate the conclusion that a good prospect of survival is being provided. Although not specified either by the regulation or the ACOP, a factor of safety between the survival and recovery times of about 1.5 is considered appropriate to give sufficient confidence in this conclusion.

Where a good prospect of survival is not clearly indicated, steps should be taken either to render the event no longer reasonably foreseeable or to reduce the recovery time and/or extend the survival time. Ideally, preference should be given to the former.

The ultimate conclusion of such an assessment should be that a good prospect of survival would be secured for all reasonably foreseeable events without the need for additional measures. It should be clear how this conclusion has been reached and it should be robust with respect to uncertainty.

4.7 Verification of Performance Standards

Duty Holders should be able to demonstrate that their performance standards for rescue and recovery are appropriate, in terms of being capable of delivering a good prospect of survival for all reasonably foreseeable events and achievable under the conditions in which the arrangements may be required to operate. The appropriateness of the standards should be determined by the assessment and their capability to be achieved should be shown by physical validation. A programme of verification should be implemented to monitor that the adequacy of the arrangements is being maintained.

Guidance on the limitations imposed by the operational weather window on any trials and any extrapolation required for the verification of rescue and recovery arrangements is given in Sub-Section 7.4 and in Appendix 4.

4.8 Place of Safety

4.8.1 Introduction

"Place of Safety," means an onshore or safe offshore location or vessel where medical treatment and other facilities for the care of survivors are available.

As with the assessment of any of the ER arrangements the particular methodology employed to assess the adequacy of the Place of Safety is for Duty Holders to select and justify. It will be for the Duty Holder to identify the events which may require rescue and recovery arrangements including a Place of Safety and justify which events are considered to be reasonably foreseeable for their particular installation in all anticipated operational circumstances.

However, there are some key elements in the approach that should be incorporated in the assessment, or equally the development, of the Place of Safety. The purpose of this section is to provide guidance for Duty Holders when assessing the adequacy of an existing Place of Safety or when planning and developing a proposed Place of Safety and assist with any integration into the ER Plan.

A Place of Safety must have adequate facilities and competent personnel in sufficient numbers to manage the challenges arising from reasonably foreseeable events on or near offshore installations.

Primarily a Place of Safety has to be capable of providing:

- Access for survivors.
- Reception for survivors.
- Initial medical diagnosis.

- Initial treatment and stabilisation.
- Facilities for subsequent transfer.

4.8.2 Assessment Principles

The Place of Safety is an integral part of the Rescue and Recovery arrangements and as such should be included in the PFEER Regulation 5 Assessment.

A key feature in the whole process of planning and establishing a Place of Safety is the assessment of what is required in relation to the range of reasonably foreseeable events associated with a particular installation. Central to satisfying these requirements is the setting of performance standards and the effective ongoing monitoring of those standards to ensure the required level of performance is maintained.

The purpose of the assessment is to establish that the characteristics of the Place of Safety required for dealing with those rescued or recovered from these events are being provided, taking into account the circumstances in which the Place of Safety is intended to operate.

Any assessment should consider the following:

- Impact on availability from internal and external factors.
- Facilities for access, such as transfer from initial means of rescue.
- Survivor numbers and likely conditions on arrival.
- Reception systems including administration.
- Triage requirements, i.e., prioritisation of casualties.
- Likely treatment requirements for injuries typically sustained during offshore incidents.
- Onward transfer facilities.
- Communication requirements.

4.8.3 General Requirements

4.8.3.1 Availability

The operational envelope and capability of the Place of Safety arising from both external and internal factors needs to be defined to enable the Emergency Response Plan to take account of any restrictions. Any consequential constraints that may be necessary in the operational regime of the installation may then be identified and implemented to ensure that rescue and recovery activities and any associated Place of Safety will not be required when the Place of Safety is considered unavailable taking account of the likely duration of the unavailability. Constraints may include stopping helicopter flights, no overside working, limiting hydrocarbon intervention work, etc.

4.8.3.2 External Factors

The external factors, which should be considered, include:

- Exceptional weather conditions such as any which would put those persons within the Place of Safety at an unacceptable risk.
- Incident hazards such as gas clouds, smoke, fire, etc.

- Personnel restrictions such as crew sickness or lack of competence.
- Equipment limitations such as engine or communications failure.
- Conflict of roles such as engagement in collision risk management.

4.8.3.3 Internal Factors

Any internal functional conflicts and their effect on the operation of the Place of Safety will need to be assessed and where necessary either designed out or overcome by management of the operational system. The internal factors, which should be considered, include:

- Survivor capacity and throughput capability, i.e., how many survivors can be dealt with at once.
- Disruption caused by interaction between functions such as receipt and treatment activities
- Conflicting roles such as the Place of Safety undertaking rescue directly.
- Internal communication overload.
- Sensitive arrangements for dealing with non-survivors.

4.8.4 Basic Requirements

As well as the specific requirements within the Place of Safety the following are some examples of basic requirements which may also need to be considered:

- Protection from the extremes of weather.
- Adequate heating, lighting and ventilation.
- Any other welfare and sanitary facilities.
- Access within the Place of Safety.

4.8.5 Competence Assurance Schemes

The competence of key personnel offshore plays a crucial part in the operation of the Place of Safety. In providing assurance that the competence is adequate the Duty Holder should consider:

- Identification of the differing roles and the definition of the necessary competence for each.
- How personnel are selected for these roles.
- What training may be required and how its effectiveness is assessed.
- How any achieved competencies are monitored and maintained.
- Availability of any back up personnel, e.g., offshore doctor.

4.8.6 Communications

Effective communications play a vital role in all rescue and recovery operations. The assessment should address what minimum facilities need to be provided in a Place of Safety, what if any redundancy and diversity is appropriate and what operational competencies are necessary.

4.8.6.1 External Communications

When assessing the adequacy and suitability of any communications with an external organisation consideration should be given to the following:

- What information needs to be transmitted, e.g., survivor numbers, treatment or condition, etc.
- Which mode of communication would be most effective, e.g., voice, images, etc.
- Which organisation needs to be contacted, e.g., rescuers, installation, Coastguard, hospitals, etc.
- What procedures are relevant, e.g., who should communicate with whom, dedicated or general frequencies, etc.

4.8.6.2 Internal Communication

The assessment of internal communications should consider the following:

- Overcoming background noise levels, e.g., are headsets necessary?
- Avoiding confusion and conflicting messages.
- General versus specific such as 'Tannoy' and telephones.
- Privacy for communications between key personnel such as medical conditions.
- Procedures, e.g., who communicates what to whom.
- Information for survivors.

4.8.7 Sequence of Events

The Place of Safety will need to take account of all the various phases from arrival to successful departure. The phases listed in this section are indicative of the majority of events, which may need to be considered, but there may be others.

4.8.7.1 Accessing the Place of Safety

In determining what arrangements should be made to accommodate this phase, account should be taken of:

- Mode of transfer from initial rescue device including rescue direct from the sea to the Place of Safety.
- The numbers of survivors.
- The likely physical and psychological state of the survivors.
- The environmental conditions under which the transfer is to be effected.
- Trauma arising from the type and number of transfers.

4.8.7.2 Reception at the Place of Safety

One of the key aspects of this phase is to divide the survivors into two groups. Those requiring no or relatively minor medical treatment together with care and comfort and those more severely injured requiring urgent stabilisation possibly in preparation for their timely transfer to more sophisticated facilities. The assessment should consider the effectiveness of the survivor reception facilities and the competence in receiving casualties and triage of those who staff these facilities.

Any reception phase should at least take account of:

- The number of individuals likely to need rescue and recovery.
- Their likely condition.

- Triage methodologies including competency of triage staff.
- Necessary administration such as recording and identification systems.
- Procedures and arrangements for dealing with non-survivors.

4.8.7.3 Treatment in the Place of Safety

Arrangements should be made to treat the survivors, taking account of the anticipated number of casualties and the likely nature of their injuries.

The assessment should consider the requirement for equipment and competencies to treat conditions likely to arise from incidents on or near offshore installations which may include the following:

- Near drowning and secondary drowning
- Post immersion collapse
- Hypothermia
- Burns - thermal and chemical
- Fractures
- Head and/or spinal injuries
- Internal injuries
- Cuts, abrasions
- Contamination

Consideration should also be given to relieving any stress survivors may be experiencing either directly or indirectly from the incident.

4.8.7.4 Transfer from the Place of Safety

The assessment should consider the provision of facilities for the timely onward transfer of survivors from the Place of Safety. Any arrangements made for transfers should at least take into account the following:

- Those survivors who need further medical care.
- Facilities for medical personnel to access the Place of Safety.
- Likely numbers involved.
- Any special requirements associated with the mode of transfer.
- Flexibility to accommodate a degree of personal preference on the part of the survivor.
- Interface with other specific onshore procedures, e.g., Duty Holder's next of kin notification procedures.

5. Formulation and Assessment of ER Plans

SUMMARY

S5.1 Introduction

The ER Plan should set out the management and procedural part of the arrangements by laying down who does what, where, when, how and to what effect. It is a working tool that will be used and accessed regularly for training and exercises and will be the basis on which a real emergency will be handled. It needs to be clearly written with the emphasis on ease-of-use and practical information that would be required in an emergency.

S5.2 Organisation

In preparing the plan, the various emergency scenarios requiring a response will need to be considered and the appropriate organisation to deal with these scenarios put in place.

The organisation should take account of the existing or proposed command structure for non-emergency operations. The organisation should also consider the structure of the command team and what support the OIM will need, taking care not to assign more than one key role to any individual. There should be sufficient competent personnel present on the installation at all times to carry out the required emergency duties. The plan should also include what external resources are available and the functions they can perform. The organisation should be flexible enough to respond quickly and not be overly complex. There should be a degree of redundancy to allow for personnel, facilities or equipment becoming unavailable.

S5.3 Communications and Information Flow

The following factors should be considered when developing procedures for incidents.

- What information needs relaying?
- Who is going to acquire it?
- Who needs this information?
- When is the information required?
- How long will communications be required?
- Prevention of information overload from non-essential information.

S5.4 Implementation

The plan should be user friendly to assist understanding and enable confidence in demanding circumstances. Guidance should be provided in the plan on the criteria for choosing particular courses of action, e.g., when to instigate downmanning, when to inform the Coastguard, etc. It may be useful to prepare a series schematic diagrams for use by the command team in major accident events with information on the incident and status of any available support and weather conditions.

S5.5 Monitoring

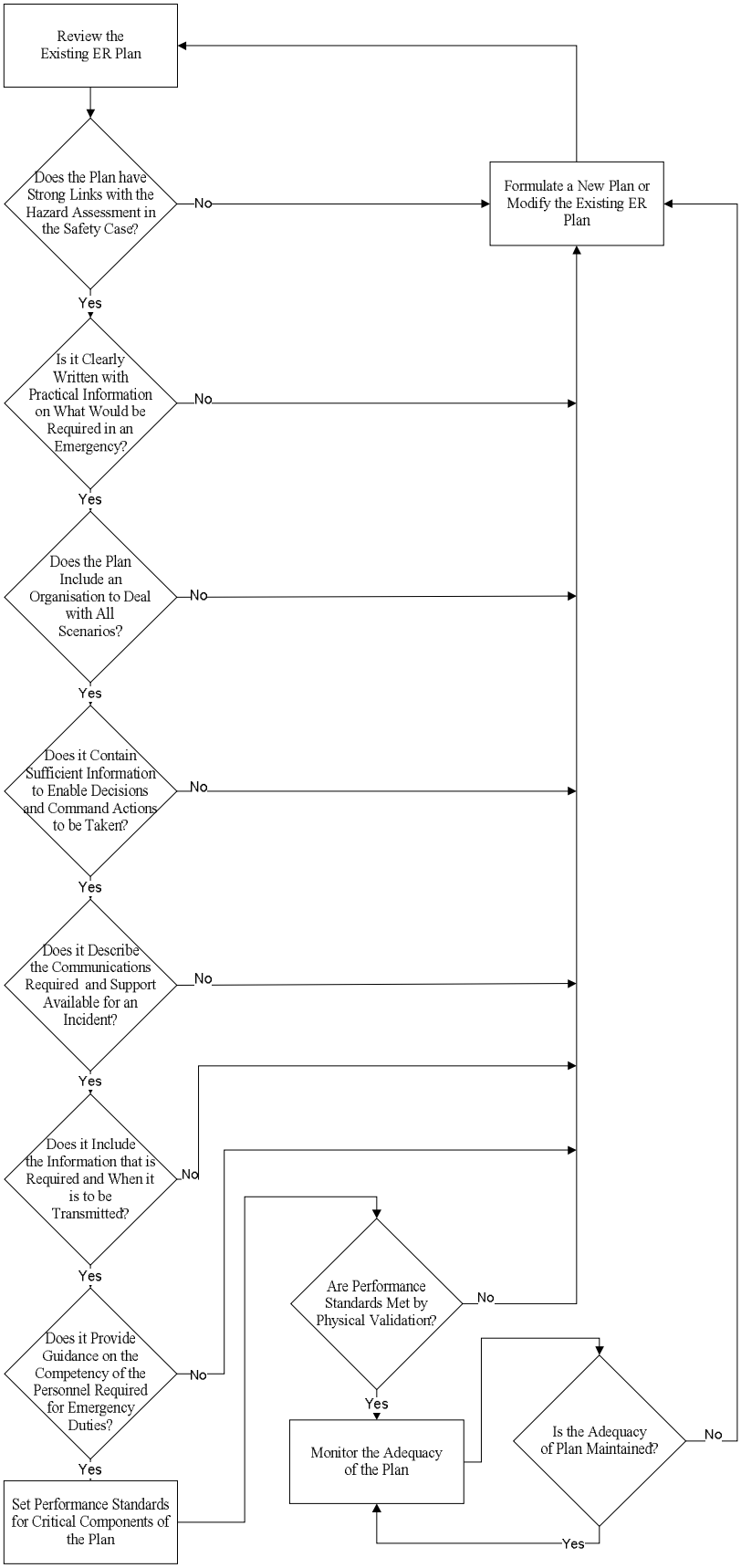
The Plan and associated procedures should be tested to ensure they continue to meet the needs of the installation. Exercises and drills are an important part of this monitoring process and should seek to achieve the following:

- Provide practical experience to all personnel.
- Provide an opportunity to refine the plan in the light of this practical experience.
- Practice the resources referenced in the ER Plan, including external agencies.
- Test all attendant procedures as necessary – pipeline emergency procedures, diving emergency procedures, etc.
- Assessment of competence of individuals and groups.

See Page 53 for the next Summary, “Structure and Assessment of ER Command”.

FLOW DIAGRAMS

Figure 5: Formulation and Assessment Process for the ER Plan



DETAILED GUIDANCE

5.1 Introduction

The ER Plan is part of the ER Arrangements and as such the formulation, assessment and development should follow the same procedures as the arrangements in Section 2. It should set out the management and procedural part of the arrangements by laying down who does what, where, when, how and to what effect. It is a working tool that will be used and accessed regularly for training and exercises and will be the basis on which a real emergency will be handled. It needs to be clearly written with the emphasis on ease-of-use and practical information that would be required in an emergency.

The parameters of the plan should cover all stages of an ER from detection of the emergency until the emergency is over. Note! Guidance on when the emergency "is over" should be included in the plan as this may go further than the incident being over and persons considered to be in a Place of Safety. It usually involves a judgement and may be dependant on others, e.g., Coastguard.

Where onshore facilities are required as part of the plan the interface between the installation's arrangements and the onshore arrangements should dovetail together and be fully integrated.

The plan should be regarded as one of the ER arrangements that should be subjected to the development and assessment process described in Section 2.

5.2 Formulation of the Plan

The ER Plan requires to be installation specific. There should be a demonstrable link between the ER Plan and the hazard assessment in the Safety Case. It should provide instruction and procedures that should be followed in the event of a major incident, other reasonably foreseeable events and minor incidents. These minor incidents may not affect the whole installation, or all personnel, but still require an ER.

Weather conditions have a major impact on the options available during offshore emergencies. The ER Plan should be designed to consider the implications of weather conditions upon the full range of emergency scenarios envisaged.

5.2.1 Organisation

Ensuring effective ER response is a management task requiring a management structure, both offshore and onshore. The ER Plan should be developed with this structure in mind and contain sufficient information to enable decisions and command actions to be taken. In the event of an emergency the prime role of management is to implement the ER Plan with a view to achieving the objectives laid out in the ER strategy (see also Sub-Section 2.2.1). A command structure should be established which can remain effective in an emergency.

In preparing the plan, the various emergency scenarios requiring a response will need to be considered and the appropriate organisation to deal with these scenarios put in place.

The organisation should take account of the existing or proposed command structure for non-emergency operations. All persons required to undertake specific duties during an emergency should be competent to do so, including the operation of equipment specifically provided for emergencies.

Where contractors' employees form part of the organisation there must be an arrangement with the contractors' employer that these personnel will be available and that they are capable of carrying out their designated role. (see also Sub-Section 5.3.3)

The development of an organisation should take account of the following:

5.2.1.1 Command and Control (see also Chapter 6)

Command and control facilities should be developed which take into account the lines of command. The final decision and control on the installation, including communications with other agencies off the installation, should always lie with one clearly defined individual (usually the OIM) with a designated deputy in case of a need for an unplanned transfer of command; e.g., if the OIM is injured. Consideration also needs to be given to the planned transfer of command at a selected point in the ER Plan; such as after all the personnel have left the installation.

5.2.1.2 Flexibility

It may not be possible to accurately predict the actual conditions that will arise during an incident. Therefore the plan should not be overly prescriptive and, where appropriate, should allow sufficient flexibility to ensure the most effective response.

5.2.1.3 Familiarity

The organisation developed, including the chain of command, should follow as closely as possible the day-to-day organisation for normal operations on the installation because in an emergency, personnel may not respond favourably to any unfamiliar approach. This also has the advantage that skills and experience can be directly transferred from the 'normal' role to 'emergency duties'. Suitable ER often relies on quick decisions and actions. It is important that personnel are not only aware of the command structure, but also how their role and actions could affect others.

5.2.1.4 Simplicity

In an emergency, the situation can change rapidly and it is essential that the transmission of information and decisions are effective. An overly complex organisation may not be able to respond quickly and may need to rely on the continued operation of numerous interlinked facilities, any one of which may become unavailable.

5.2.1.5 Redundancy

There must be a degree of redundancy in the system, to allow for personnel or facilities and equipment becoming unavailable. No area of the organisation should rely totally on the availability of any single element. This means that backup systems are required for essential facilities and that personnel should

have designated deputies who can take over their role. Such deputies should have the same level of training.

5.2.1.6 Availability

Personnel must be available to carry out their designated role when required. There should be no conflict during an incident with personnel being assigned to two or more key roles. This also means that sufficient personnel with the required experience and skills should be available on the installation to carry out the roles identified within the organisation.

5.2.2 Human Factors

In formulating the ER Plan, it is important not to concentrate solely on the plant and equipment provisions and assume that the management of the emergency will necessarily run to plan and that people will always respond as required. Realistic assumptions need to be made regarding the likely pattern of human behaviour in an emergency so that, for example, due cognisance is given to the potential effect on human performance levels of factors such as increased stress, reduced visibility, etc., and personnel are not automatically assumed to be both intrinsically capable and reliable in carrying out all duties required of them.

Where a person is required to perform a key task as part of the ER Plan, it is essential that factors relevant to its success (information flows, physical requirements, etc.) are assessed to ensure that the probability of a successful outcome is acceptably high and that the possibility of the situation being made worse by incorrect actions being taken is considered.

The time allowed to complete actions should adequately reflect the possibilities of delays being introduced by stress, physical conditions, etc., and not just be based on times obtained in practices where such performance modifying factors may not be present.

The nature of the emergency may limit the time available for the decision making process. The degree and complexity of the decisions, which are required to be made, should take these time constraints into account.

All personnel who have a significant role to play in the ER Plan (e.g., emergency team members or coxswains) should be identified by role/function. Contingency arrangements should be put in place to accommodate injury or unavailability of key personnel or information sources. The way in which emergency command and control structure will respond to changed circumstances should be included in the ER Plan, e.g., loss of part of the evacuation system.

5.2.3 Consultation

The Offshore Installations (Safety Representatives and Safety Committees) Regulations 1989 (see Appendix 2, Reference 2) require Duty Holders to consult safety representatives with regard to the arrangements for the appointment of persons allocated emergency duties and the organisation for emergencies.

PFEER also requires that those individuals who have specific actions during an emergency or are likely to become involved in emergency response should be

consulted on the Emergency Plan. Apart from the opportunity for those persons to input their expertise and experience into the plan it should ensure that these same persons are familiar with what is required of them during an emergency and what effect their input will have.

Primary external agencies should also be consulted such as the Coastguard who has a statutory responsibility for the co-ordination of all search and rescue (SAR) operations within the UKCS.

5.2.4 Communications

ER relies upon effective and reliable communications between all personnel involved in the response. The ER Plan should describe the communications required and/or available for an incident (both on and off the installation) including detection and alarms, the information that is required and when it is to be transmitted.

The following factors will need to be considered and can be included in the procedures for each type of incident:

- What information needs relaying?
- Who needs this information?
- When is the information required?
- How long will communications be required?
- Information overload from non-essential information.

As well as specific communications concerning the control or handling of the incident between locations on and off the installation, attention should also be paid to personnel on the installation not directly involved in the control aspects of the incident; e.g., those personnel who are only required to muster will need regular information on the progress of the incident. Communication systems should have sufficient redundancy and diversity to enable assistance request communications to be made to both the shore and to other facilities and/or vessels in the area.

5.2.4.1 Alarms

There should be a system to raise the alarm following detection of an incident. The alarm should communicate through audible and/or visual means to the management and personnel on the installation that an emergency has occurred.

The system should remain available during an incident; long enough to ensure that all personnel are warned of the emergency.

The alarm signals used on the installation and their meaning should be described in the ER Plan. The procedures to be followed in the event of an alarm should also be included in the ER Plan. Personnel should be provided with adequate information to allow them to:

- Initiate alarms where necessary.
- Distinguish between alarms.
- Respond to alarms.

Alarms should be supplemented where appropriate by voice communication systems. Regulation 11 of PFEER sets out specific requirements for alarms supplemented by the ACOP and Guidance to the regulations.

5.2.5 External Resources

Information on the external resources that are likely to be available should be identified within the ER Plan. The function, which they can perform, the timescale and mechanism for obtaining use of the resource and their likely availability should all be included in the ER Plan.

5.2.6 Combined Operations

Where installations are involved in combined operations; e.g., during workovers or where a flotel is brought alongside, the ERP for both installations should be reviewed as part of the overall review of the PFEER Regulation 5 assessment and, if necessary, revised. The presence of another installation alongside may impair certain options for evacuation or escape, but may also provide other options via the other installation, e.g., if a bridge link is established. A combined ER strategy should be agreed prior to operations commencing and the arrangements of both installations modified accordingly.

A command structure for the combined operations should be established to define the respective emergency command responsibilities.

Step Change in Safety Publication: "Guidance for Health and Safety Management Systems Interfacing".

5.2.7 Precautionary Evacuation

Circumstances and triggers that may lead to precautionary evacuation of non-essential personnel from an installation should be considered within the ER Plan. Such transfers will minimise the number of personnel exposed to what could become an emergency situation should conditions escalate and make the outcome less assured.

Among others, the following factors may need to be considered and the results documented within the ER Plan:

- Identify all reasonably foreseeable circumstances in which precautionary evacuation of non-essential personnel may be required.
- Depending on the nature of potential emergency situation estimate the number of individuals likely to be involved.
- Determine where the evacuees are to be taken and by what means.
- Ensure appropriate PPE is available for all those being transferred.
- Consider any instruction or training implications related to the selected mode of transfer.
- Make suitable arrangements for the return of all individuals to the installation when the emergency is declared over, or for their transfer ashore if this is not possible.

5.3 Implementation of the Plan

5.3.1 Presentation

Although the topics required to be considered in the ER Plan are wide-ranging, the plan itself should be simple and user-friendly to assist understanding enabling confidence to be built up in the plan itself.

For the above reasons and to assist in decision making it may be useful to prepare a series of schematic diagrams with respect to the control of major incidents and the decisions faced by the OIM with related inputs from:

i) The incident itself, and
ii) Status of support, emergency and environmental conditions.

The information presentation system should take into account the requirements for diagnosis of technical information so that a timely response can be made to the emergency.

5.3.2 Guidance

Guidance should be provided in the plan on the criteria for choosing particular courses of action, for such as when to instigate downmanning, when to inform the Coastguard, etc. In most situations it will be obvious when there is an emergency requiring a response. However there may be some circumstances when the transition from normal operations to an emergency is less obvious and account should be taken of these in deciding when to initiate the plan. Examples could be where a particular operation becomes unstable to the point at which the installation integrity may be threatened or at what point following the detection of a potential Collision Risk would it be appropriate to initiate a muster.

Note: If there are such circumstances they should have been identified in the Risk Assessment carried out in support of the Safety Case.

5.3.3 Training

All persons on the installation or in connected activities should be given the information, instruction and training necessary to enable them to take appropriate action in an emergency. The objective is to ensure that individuals are familiar with their role, any equipment that they may have to operate, emergency procedures and other aspects of the ER Plan relative to them. It is also necessary that they can retain this awareness in demanding circumstances.

Where contractors' employees have specific ER duties and require specific training this should be discussed with the contractor to ensure that such training is provided.

Training should seek to achieve the following:

- Enable persons with command or other specific responsibilities within the ER Plan to achieve and maintain their required competence.
- Enable everyone on the installation to become familiar with what actions are expected of them in an emergency.

- Enable all persons with the requirement to use specific equipment to be fully proficient in the use of this equipment.
- Ensure that all persons new to the platform are given such instruction or training in the aspects of the ER Plan as they may require during their stay on the installation.

The training programme, including refresher training, should be subject to on-going review to ensure that training is maintained in line with the needs of the ER organisation.

Further Guidance: Oil & Gas UK publication "Guidelines for the Management of Competence and Training in Emergency Response for Offshore Installations", 2010.

5.4 Monitoring of the Plan

The ER Plan and associated procedures should be subject to a monitoring programme to test that they continue to meet the needs of the installation and the situations existing on and near the installation. Exercises are an important part of this monitoring process and times to achieve certain aspects of the plan may well form part of the detailed performance standards referred to in Section 7.

Verification of rescue and recovery times is an important part of this monitoring exercise. (see Sub-Section 7.2)

The ER Plan will need to be reviewed and revised as appropriate in line with the findings from exercises and drills and following changes to operations, plant and equipment or personnel.

5.4.1 Drills and Exercises

The ER Plan must be practised by all personnel involved, whether a direct employee or contractor, as frequently as necessary to ensure that everyone is aware of and fully conversant with the Plan. Significant benefit can be gained from involvement of and good liaison with external parties such as, the Coastguard, ERRV and helicopters.

Exercises and Drills should seek to achieve the following:

- Provide practical experience to all personnel.
- Practice and test all aspects of the plan through drills of individual incidents.
- Exercise and practice resources of the installation referenced in the ER Plan, including external agencies.
- Test all attendant procedures as necessary – pipeline emergency procedures, diving emergency procedures, etc.
- Assessment of competence of individuals and groups.
- Provide an opportunity to refine the plan based on practical experience.

Ideally, exercises and drills should endeavour to do more than simply 'test' the adequacy of the ER Plan but be structured in such a way as to place it, as a whole and in part, under pressure to confirm suitability. In this respect, while periodic drills or exercises may cover individual components, consideration

should be given to activating the entire Plan to ensure concurrent or consecutive aspects can function without impediment.

Safety should be a prime consideration when carrying out these exercises and there should be effective management judgement to ensure that unnecessary risks are avoided. Guidance on the balance between safety and realism during an exercise is contained in the HSE document "Training for Hazardous Occupations", Occasional Paper Series OP8, 1984.

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6. Structure and Assessment of ER Command

SUMMARY

S6.1 Installation ER Command - Structure

The OIM has overall responsibility for the execution of the Plan and leads a command and control team reporting directly to him. The team should be in a position to communicate directly with the OIM in order that a complete picture of the emergency may be built up and maintained in a developing situation.

The ER team on an installation could consist of several key personnel such as Muster Co-ordinator, Production Supervisor, Radio Operator. However all of these may not be required for non-major accident events.

S6.2 Installation ER Command - Assessment

The OPITO approved basic training, assessments and further practice requirements for the OIM and ER team members should be considered the minimum baseline for assessment purposes.

S6.3 Rescue and Recovery Command - Structure

The Duty Holder's rescue and recovery command structure involves the following key persons:

i) On Scene Co-ordinator (OSC)

This role is usually undertaken by the OIM. The need to nominate an alternate OSC should be discussed with the Coastguard. If necessary the installation's ER Plan should indicate the person who can assume the duties of OSC from the OIM.

ii) Search Team Co-ordinator (STC)

If necessary the OSC could nominate a STC. The choice will depend on resources available to the OSC, but pre-arranged procedures could indicate the preferred option.

iii) Onshore Emergency Response Centre Controller

The Duty Holder should assess the arrangements needed to support an OIM in the event of an offshore emergency (see Sub-Section 6S5 below).

Additionally, in many emergency situations a number of statutory roles will have to interact closely with the Duty Holder's personnel. Most important among these are:

iv) Search and Rescue Mission Co-ordinator (SMC)

The SMC is the official temporarily assigned to co-ordinate response to an actual or apparent distress situation. Within the context of offshore emergency response the role would usually be undertaken by a Coastguard based at the Maritime Rescue Co-ordination Centre (MRCC) dealing with the response.

v) Aircraft Co-ordinator (ACO)

The ACO is a person, or team, that co-ordinates the involvement of multiple aircraft SAR operations in support of the SMC and OSC.

S6.4 Rescue and Recovery Command - Assessment

Having established a command structure it should be assessed as to the adequacy and audited as to its continued suitability.

S6.5 Onshore ER Centre

Experience has demonstrated the benefits of setting aside an incident centre with systems to facilitate a dialogue with the installation, the Coastguard, helicopter and marine support facilities, other operators, major contractors, the police, next of kin, the media.

The Coastguard should be consulted when detailed procedures covering the onshore support element of the ER Plan are being prepared as the local MRCC may duplicate some of the Duty Holder's own systems. Duty Holders may, by prior arrangement, elect to utilise these facilities during a major accident, or vice versa.

See Page 63 for the next Summary, "Monitoring and Review".

DETAILED GUIDANCE

6.1 Introduction

This section seeks to identify specific areas of responsibilities for those with a command and control role during an offshore emergency.

Foremost, it is reiterated that the Coastguard has a statutory responsibility for the co-ordination of all SAR operations within the UKCS and, in doing so, they are guided by the principles and definitions of the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR).

At the earliest practicable stage during an emergency on an installation, which has the potential to escalate into an EER scenario, the Coastguard needs to be informed. Once advised of the situation the initial SAR response is for the Coastguard to ask whether the installation requires assistance. If confirmation is received that it does then procedures are to assess which Emergency Phase the installation is in. This will be done in consultation with the OIM who will adopt the role of On Scene Co-ordinator (OSC). If the situation is declared as 'Distress Phase' or 'Alert Phase' the Search and Rescue Mission Co-ordinator (SMC) will assume overall responsibility for SAR action. In such cases national SAR assets are likely to be tasked by the SMC in addition to the assets provided by the Duty Holder under the PFEER regulations.

In the case of a marine or aircraft emergency within the vicinity of an installation, these persons will assume similar roles even if the installation is not directly threatened.

It is essential for the effective resolution of the emergency and for the safety of all these assets working in close proximity, that those participating work together in an integrated and coherent response. In particular, the invaluable assistance provided by airborne assets needs careful co-ordination and management. In this respect all stakeholders (BP – Jigsaw Management, CAA, EERTAG, EPOL, ERRVA, Grampian Police, HSE – OSD, OGUK, RAF, MCA, etc.) introduced revised procedures (Co-ordination of Multiple Airborne Assets During a Major Offshore Incident) stemming from lessons learned from several SAR responses during 2009. The procedures will be implemented initially in the Central and Northern North Sea with the aim being to:

- Improve air to air and air to surface communications during a major offshore incident.
- Improve flight safety through a more robust system of deconfliction.
- Make greater use of the experience and capability of Aberdeen Air Traffic Service Unit (ATSU).

6.2 Installation ER Command - Structure

6.2.1 Offshore Installation Manager (OIM)

The key elements of ER, and the ER Plan, have been discussed in earlier sections of this document (see Sub-Sections 3.2.1.2 and 5). The OIM has overall responsibility for the execution of the Plan in the event of an emergency, as far as the plan affects personnel who are on board the installation.

6.2.2 ER Team

The OIM leads a command and control team reporting directly to him. The team should be in a position to communicate with the OIM in order that a complete picture of the emergency, along with other relevant information, may be built up and maintained in a developing situation. Depending on the type of event and the number of persons involved the ER team on an installation could consist of several key personnel such as: Muster Co-ordinator, Production Supervisor and Radio-Operator.

6.3 Installation ER Command - Assessment

Having established a command structure it should be assessed as to its adequacy and effectiveness to ensure it can be relied upon in an emergency. Installation specific command assessment programmes may have to rely on exercises and drills on the installation. When deciding on the depth and frequency of such exercises the assessment programme should ensure that all the different personnel involved are assessed taking account of relevant tours of duty. All exercises and drills should be based on the various events identified in the PFEER Regulation 5 assessment or the reasonably foreseeable events identified for Regulation 17.

The OPITO approved basic training, assessments and further practice requirements should be considered the minimum baseline for generic assessment of the OIM and ER team members.

6.4 Rescue and Recovery Command - Structure

The Duty Holder's rescue and recovery command structure involves the following key persons:

i) On Scene Co-ordinator (OSC)
ii) Search Team Co-ordinator (STC)
iii) Onshore Emergency Response Centre Controller (ERCC)

In addition, after consultation between the OIM and Coastguard it may be decided that the situation should be declared as being in either the 'Distress' or 'Alert' phases, in which case the following statutory roles may take effect:

iv) Search and Rescue Mission Co-ordinator (SMC)
v) Aircraft Co-ordinator (ACO)

Other authorities that are likely to be involved may include:

vi) Maritime Rescue Co-ordination Centre (MRCC)
vii) Aeronautical Rescue Co-ordination Centre (ARCC)
viii) Aberdeen Air Traffic Service Unit (ATSU)

6.4.1 On Scene Co-ordinator (OSC)

This role is usually undertaken by the OIM though it is suggested that contact between the OSC and Coastguard MRCC is established at the earliest opportunity to confirm this arrangement. If the nature of the incident develops such that the OIM or any recognised deputies are not in a position to discharge

their duties with respect to this role, then the Emergency Response Plan may require another person to undertake a local co-ordinating role.

This person should be identified in the ER Plan and would normally be the most suitable senior person who has the necessary communication equipment at his disposal and the relevant knowledge and ability to co-ordinate the rescue or recovery of persons who have evacuated or escaped the installation.

He will continue as OSC until responsibility is formally handed over, generally at the express direction of the Coastguard if the SMC considers it would be more effective to do so.

6.4.1.1 Nomination of Alternate OSC

The need to nominate an alternate OSC should be discussed with the Coastguard. If necessary the installation's ER Plan should indicate the person who can assume the duties of OSC from the OIM. In a controlled situation the process of handing over OSC must be approved by the SMC whereas in a catastrophic situation the alternate OSC could assume the role but must then have that role agreed or confirmed by the SMC.

The choice of an alternate OSC relating to an incident on a remote-sited installation will probably be limited, initially to those persons with the necessary communication with which to liaise with the Coastguard. The Master of an ERRV may well be the most appropriate person, having been trained in this role.

In the case where a number of installations are close together, the alternate OSC could be the OIM of an adjacent installation. He will be in a position to communicate with rescue agencies and have his own specialist personnel and a communications network to assist him in dealing with the management of the emergency.

The emergency response plans of both installations will need to be harmonised to reflect this role.

6.4.2 Search Team Co-ordinator (STC)

If necessary the OSC could nominate a STC. The choice will depend on resources available to the OSC, but pre-arranged procedures could indicate the preferred option. The STC should be competent to undertake the STC role and have the relevant communication facilities. Again the need to nominate a STC should be discussed with the Coastguard who may wish to include them in their overall co-ordination role.

6.4.3 Search and Rescue Mission Co-ordinator (SMC)

The SMC is the official temporarily assigned to co-ordinate response to an actual or apparent distress situation including requesting airborne assistance through the ARCC. Within the context of offshore emergency response the role would usually be undertaken by a Coastguard based at the MRCC dealing with the response. The duties of the SMC are varied and many and are described in detail in the IAMSAR Manual - Volume III. The SMC will request airborne assistance through the ARCC and, if multiple air assets are likely to be required, ARCC and MRCC should identify and appoint a suitable asset as Aircraft Co-ordinator (ACO) at the earliest opportunity. The SMC may delegate

the management of the search plan on scene to either the OSC or ACO depending on circumstances and available search units.

6.4.4 Aircraft Co-ordinator (ACO)

If multiple air assets are likely to be required the ARCC and MRCC will identify and appoint an ACO to co-ordinate the air SAR operations in support of the SMC and OSC. In doing so the ACO maintains flight safety, prioritises and allocates tasks for aircraft assets and ensures search area coverage is co-ordinated.

6.4.5 Maritime Rescue Co-ordination Centre (MRCC)

A network of centres in the UK, suitably equipped and manned by HM Coastguard, to co-ordinate maritime rescues. The nature of the incident, as well as location, will determine which MRCC takes overall responsibility. For the Northern and Central North Sea the coordinating MRCC is likely to be either MRCC Aberdeen or MRCC Shetland.

6.4.6 Aeronautical Rescue Co-ordination Centre (ARCC)

For the United Kingdom the ARCC is the RAF operated RCC located at RAF Kinloss.

6.4.7 Aberdeen Air Traffic Service Unit (ATSU)

Based at Aberdeen Airport and provides air traffic services to helicopters working with the offshore oil and gas industry in the Northern, Central and Southern North Sea and also West of Shetland. ATSU have Radio Telephony (R/T) and radar coverage in the majority of the North Sea from a combination of land and offshore based radars and R/T sites. In a significant part of the Central North Sea there is no radar coverage and only a Basic Service is provided.

6.5 Rescue and Recovery Command - Assessment

Having established a command structure it should be assessed as to the adequacy and audited as to its continued suitability.

This can be partly undertaken by monitoring exercises involving the installation and the immediate rescue and recovery facilities. However exercises involving all the relevant agencies and co-ordinators usually requires a lot of planning and may best be undertaken when other exercises are taking place.

6.6 Onshore ER Centre Controller

The arrangements to be in place with regard to supporting an OIM in the event of an offshore emergency should be assessed by the Duty Holder.

In order for the necessary communications and information networks to be satisfactorily accessed during an offshore emergency, experience has demonstrated the benefits of setting aside an incident room for such contingencies. Such a room should be equipped with information and communication facilities.

The facilities to support the ERCC may include:

Communication Arrangements

- Verbally with the installation and with the emergency and support organisations.
- Other Operators, Users, Partners who may be affected by the nature of the incident, e.g., common pipeline systems, etc.

Information

- Telephone numbers of key personnel, including 24-hour emergency contacts.
- Weather conditions and forecast.
- Availability of reception and support facilities for survivors.
- Recording details such as times, name of casualties, facilities on scene, etc.

Support

- Medical, diving, helicopter, marine support.

Internal Enquiries

- Personnel department, for POB and next of kin.

The Duty Holder's internal operating procedures could require the ERCC to liaise with senior management with respect to the incident itself and any impact it may have on the Company as a whole.

External Enquiries

- Public affairs for handling of media, enquiries from members of the public, etc.

The level of public and media interest during a major incident cannot be over-emphasised. One effect is that the Duty Holder's normal telephone system may become jammed from callers looking for information, thus hindering the ERCC and the team making telephone calls which are essential for the efficiency of the support function. Arrangements should be considered for the maintenance of a secure telephone system during an emergency and for handling high volume of telephone enquiries.

The local Coastguard MRCC may duplicate some of the systems described above specifically, but not limited to, medical, helicopter and marine support. By prior arrangement an Operator may elect to utilise these facilities during a major accident, or vice versa.

It is unlikely that prior (i.e. before the incident) arrangements will have been made and so essential that close co-operation exists between the ERRC and the MRCC to ensure that duplication of effort is avoided. This is particularly important when helicopters are being sourced or tasked. In a distress situation the SMC, working with the ACO, may impose a Temporary Restriction of Flying Regulations (TRFR) zone around the incident in order to manage safe separation of aircraft (see Appendix 7). TRFR zones are normally expressed laterally as a radius in nautical miles from a fixed point with vertical limits given in feet and take into account casualty location, installations likely to participate as receptor or refuelling platforms, the potential search area, impact on routine

traffic, etc. The ACO will manage all air traffic within the TRFR zone in conjunction with the overall SAR plan as defined by the SMC. The internationally recognised aeronautical on-scene frequency 123.1 MHz will be used by all airborne assets within the TRFR. Further information about the use of 123.1 MHz frequency is contained in Appendices 5 and 6.

6.6.1 Liaison with Other Organisations

The ERCC will also need to liaise with other organisations including:

6.6.1.1 Coastguard

The Coastguard should be consulted when detailed procedures covering the onshore support element of the ER Plan are being prepared. The Coastguard has a statutory responsibility for all SAR operations: for example, it is the Coastguard who have the responsibility for co-ordinating national SAR helicopters in response to an offshore incident. These aircraft will be tasked via the ARCC.

It is therefore essential to liaise closely with the Coastguard during a major incident and links should be established between the ER Centre and the Coastguard local Operations Centre. Wherever possible the ER Centre should despatch a Maritime Incident Communications Officer (MICO) to the co-ordinating MRCC to facilitate communications between the two. The MICO should ideally have previous knowledge or experience of the role, have a reasonable degree of authority within their own organisation and a good knowledge of both the installation involved and their organisation's infrastructure.

Further Guidance: Maritime and Coastguard Agency website "Search and Rescue Framework for the United Kingdom of Great Britain and Northern Ireland" (http://www.mcga.gov.uk/c4mca/mcga07-home)

International Maritime Organisation (IMO) publications "IAMSAR Manual Volume II", ISBN 978-92-801-1489-8 and "IAMSAR Manual Volume III", ISBN 978-92-801-1490-4

6.6.1.2 Police

The Police have certain responsibilities in serious occurrences and are required to be notified in the event of a serious offshore incident, including sudden death.

Pro-forma for fatalities offshore, etc. can be accessed from the Emergency Preparedness Offshore Liaison Group (EPOL) web page within the Stepchange in Safety web site. (http://stepchangeinsafety.net/stepchange/)

The Police will notify next of kin in cases of serious injury or fatalities. Also, the Police should be notified of any movement of survivors from the installation. Unless unavoidable, fatalities should not be moved without police permission.

For major offshore incidents, the Police will activate their own major incident room. Depending on the severity of the offshore incident, it may be advantageous to invite a Police representative to attend the ER Centre, thus providing a firm communications link.

6.6.1.3 Key Contractors

Duty Holders should consult with their key contractors during the formulation of the onshore support elements of the ER Plan to ensure a suitable dialogue can be set up in the event of any of the contractor's staff being involved in an incident.

6.6.1.4 Other Agencies

Following a major incident there are a number of other agencies that, in due course, may need to be advised depending on the nature of the incident. Some of those to be notified are contacted by the co-ordinating MRCC whereas others need to be informed by the Duty Holder. In general, the MRCC will take responsibility for notifying other branches of the MCA including the duty Counter Pollution and Salvage Officer (CPSO) if appropriate, for example, if a vessel is involved in a collision or potential collision. The duty CPSO, in turn, is responsible for notifying the Secretary of State's Representative (SOSREP). In the case of an incident to the installation the Duty Holder should inform the Health and Safety Executive and the Department of Energy and Climate Change (DECC). The DECC will then notify the SOSREP.

A comprehensive list of who to contact and by what means should be maintained in the ER Centre.

Further Guidance: HSE publication HSG142, "Dealing with Offshore Emergencies: A Guide to the Roles and Responsibilities of Government Departments and Agencies that May Become Involved in Emergencies in the Offshore Oil and Gas Industry", 2003 (ISBN 0717626849)

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7. Monitoring and Review

SUMMARY

A key feature in the development and assessment of offshore ER arrangements is the initial validation and then the effective ongoing verification of performance standards.

S7.1 Performance Standards

Performance standards may relate to systems, subsystems or individual components within systems. However, whatever items are selected, two key characteristics should always apply:

i) The selected items should make a significant contribution to the overall acceptability of the ER arrangements, and
ii) The performance standard should be capable of expression in terms of parameters that are directly measurable.

S7.1.1 Identification of Significant Components

In the setting of the detailed performance standards it may be helpful to consider them in hierarchical terms.

1. Identify those major systems whose overall performance is particularly important in the achievement of the overall strategic objectives.
2. Identify from the analysis the most important factors contributing to the success of those major systems.
3. Identify the key components or subsystems within the major systems, the performance of which strongly influence and essentially determine the overall system performance.

S7.1.2 Setting Performance Standards

Having identified these key components and sub systems, the next task is to characterise their desired performance in terms of parameters that are directly measurable.

It would be desirable to include in a performance standard the key elements of functionality, survivability, reliability and availability.

S7.2 Validation of Performance Standards

Validation is the term given to the initial trial or trials to demonstrate that the selected performance standards can physically achieved prior to being implemented.

S7.3 Verification

Verification should ensure that each performance is monitored against its standard at an appropriate frequency to ensure that the adequacy of the arrangements is maintained and if anything has changed that remedial action is initiated.

S7.4 Extrapolation of Rescue and Recovery Verification

A programme of verification trials exercising the rescue and recovery arrangements in all possible weather conditions is not a viable proposition given the risks to which personnel might be exposed. In these instances trials should be carried out in weather sufficiently severe to allow credible extrapolation of the results. (see Appendix 4)

S7.5 Reviewing the ER Assessment

The assessment of the ER arrangements should be reviewed to reflect changes in such things as operational activities, advances in technology, new equipment or work practices and new systems to ensure that any effects on the ER arrangements are adequately taken into account. (see Appendix 4)

FLOW DIAGRAMS

Figure 7.1: Equipment Performance Standards

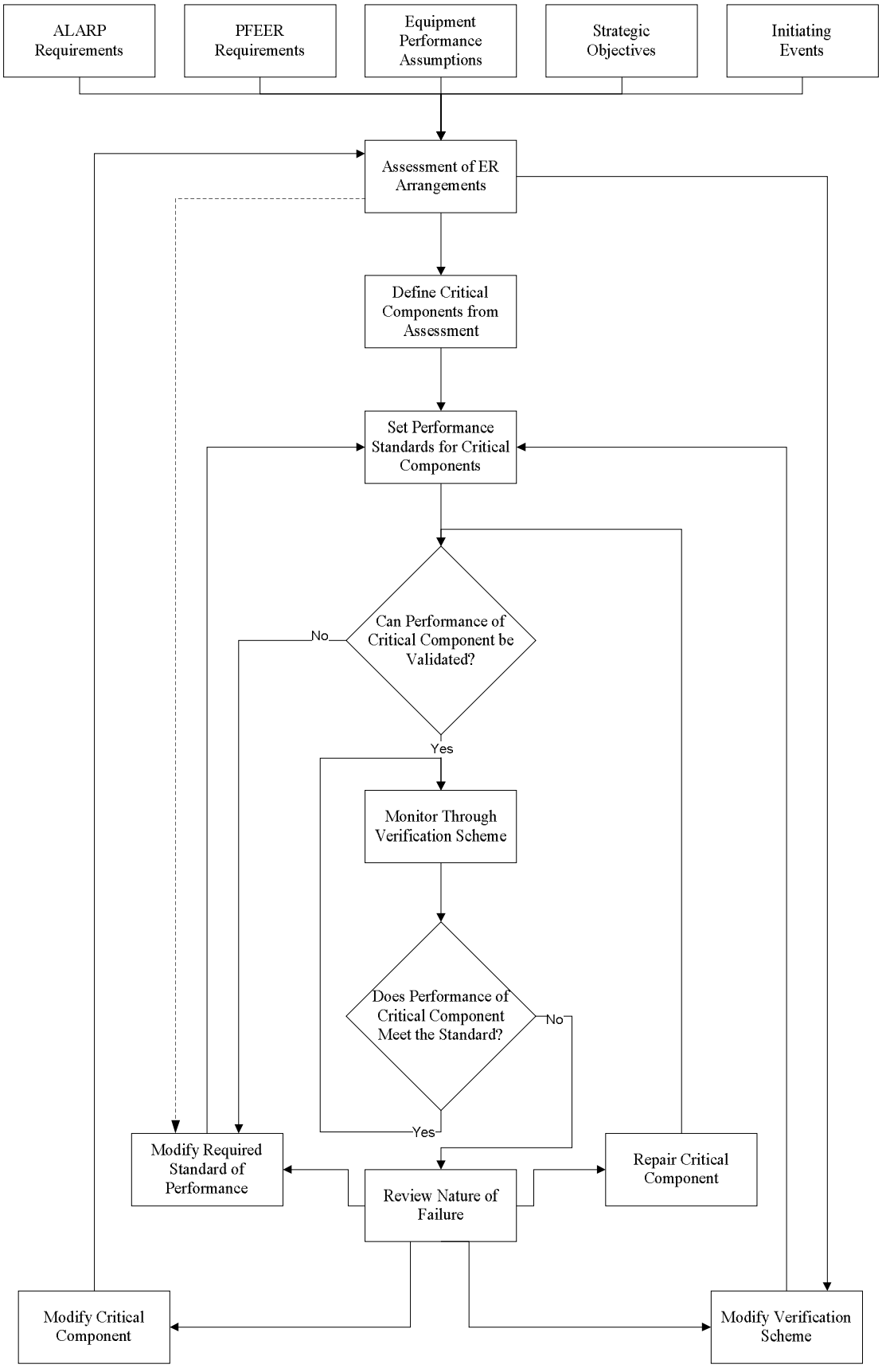
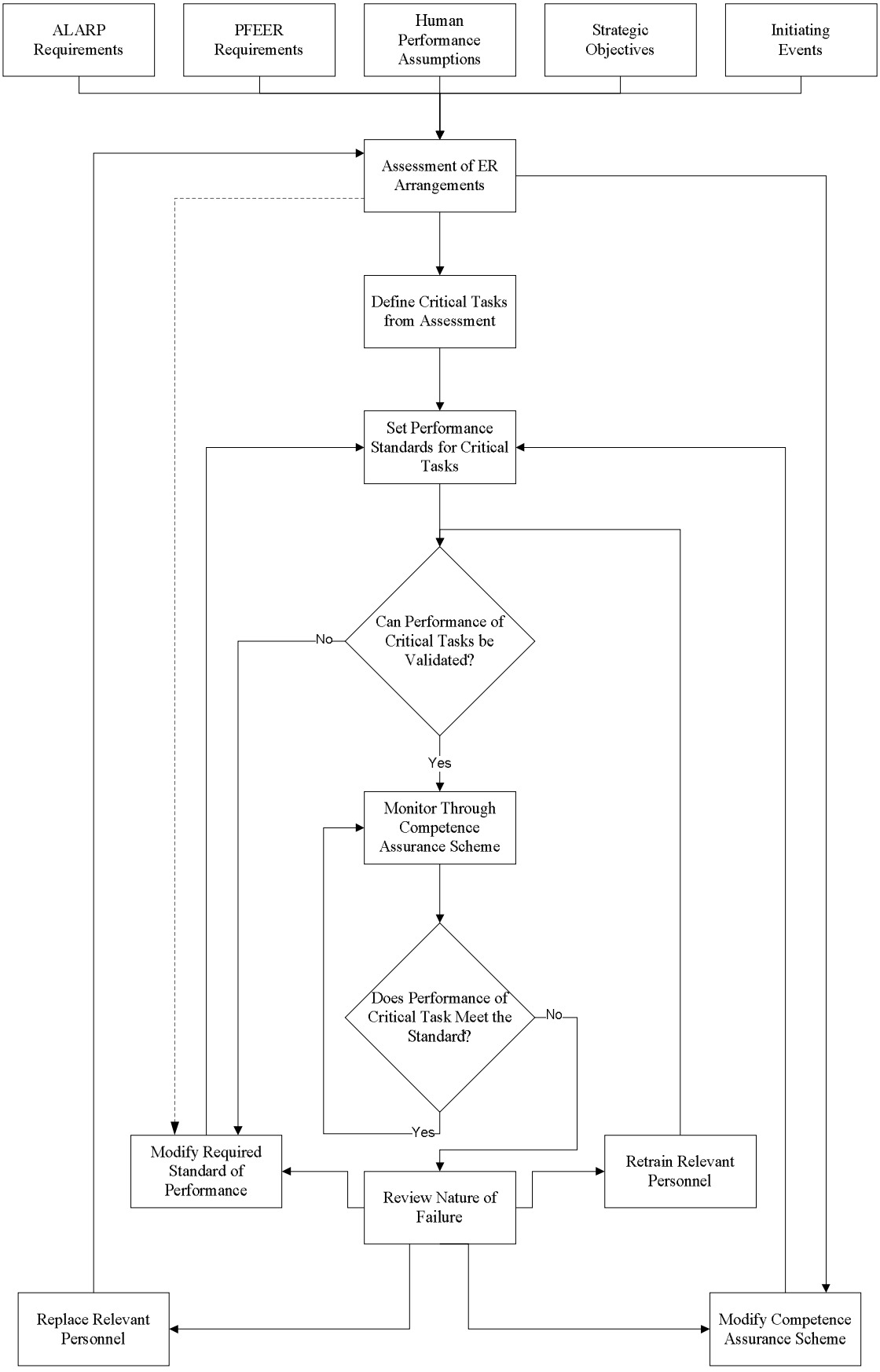


Figure 7.2: Human Performance Standards



DETAILED GUIDANCE

A key feature in the whole process of the development and assessment of offshore ER arrangements is the setting of performance standards, their physical validation and then the effective ongoing verification of those standards to ensure the required level of performance is maintained.

Further Guidance: HSE publication HSG 65, "Successful Health and Safety Management", 1997 (ISBN 0717612767)

7.1 Performance Standards

The principle behind the 'goal setting' legislative approach is that for any goal or objective it is usually possible to define one or more measures whose performance will be a reasonable indicator of how successfully a goal is being achieved.

These can be described as performance standards and are explained in the HSE publication L65 (see Appendix 2, Reference 3) as follows:

"A performance standard is a statement which can be expressed in qualitative or quantitative terms, of the performance required of a system, item of equipment, person or procedure and which is used as the basis for managing the hazard - e.g., planning, measuring, control or audit - through the life cycle of the installation."

An important principle that should be adopted in the setting of performance standards is that their number and level of detail should be commensurate with the risk associated with the systems to which they are assigned. Assigning performance standards to systems, subsystems, components or tasks within systems whose malfunction would contribute little to the overall risks should be avoided.

Performance standards may relate to systems, subsystems or individual components within systems. However, whatever items are selected, two key characteristics should always apply:

i) The selected items should make a significant contribution to the overall acceptability of the ER arrangements, and
ii) The performance standard should be capable of expression in terms of parameters that are directly measurable.

Normally, it would only be possible to set detailed performance standards after the process of assessment and development of the ER arrangements is complete.

7.1.1 Identification of Critical Components

It is necessary to identify those items whose performance, if deviated significantly from what had been anticipated in the analysis, would jeopardise the arrangements to the extent that the strategic objectives or legislative requirements set for the installation would not be satisfied.

In the setting of the detailed performance standards it may be helpful to consider them in hierarchical terms.

1. Identify those major systems whose overall performance is particularly important in the achievement of the overall strategic objectives should be identified.
2. Identify from the analysis the key factors contributing to the success of those major systems.
3. Identify the critical components, tasks or combined subsystems within the major systems, the performance of which strongly influence and essentially determine the overall system performance.

Thus, by setting detailed performance standards for these critical components and subsystems and monitoring to check that they are being met, it should be possible to ensure that the overall system performance standard will be met and the strategic objective of the ER arrangements as a whole achieved.

Example:

If the strategic objectives are to be met during certain types of emergency for a particular installation then the successful use of the overall TEMPSC evacuation system is deemed to be crucial.

Moving down the hierarchy, the analysis of the ER arrangements for this installation indicates that the most important factors contributing to the successful use of that evacuation system is the success rate of launching the TEMPSC and moving them away from the installation.

The assessment of the overall success rate of the launch and departure is dominated by the performance of the launch mechanism, the survival craft engine and the competence of the crew.

Therefore in this case the performance of the overall evacuation system can be monitored by selecting and monitoring performance standards for the launch mechanism the TEMPSC engine and the crew's competence.

7.1.2 Setting Performance Standards

Having identified these key critical components and tasks, the next step is to characterise their desired performance in terms of parameters that are directly measurable.

Again the choice of parameters and their justification is for the Duty Holder, but wherever possible it would be desirable to include in a performance standard the key elements of functionality, reliability and availability including survivability from the initiating event.

7.2 Validation of Performance Standards

Once the critical components and tasks have been identified and the performance standards set the next step is to validate them.

In this context validation is the term given to the initial tests or trials prior to any new or modified arrangements being implemented to demonstrate that the performance standards are actually achievable.

If the performance of the critical components or tasks do not meet the standards set then the standard of performance will need to be modified.

Modifications to any of the performance standards can not be undertaken in isolation and will need to take account of the sensitivity of these standards in the context of the overall assessment of the ER arrangements.

If the performance standards can be demonstrated to be achievable then the next phase will be verification.

7.3 Verification of Performance Standards

In addition to the identification of critical components and tasks to which performance standards may be assigned and the definition of the way in which the performances are to be measured, it is necessary to establish appropriate verification procedures. These procedures should ensure that each performance is monitored against its standard at an appropriate frequency. This should ensure that the adequacy of the arrangements is maintained or that remedial action is initiated if a significant deterioration in performance occurs.

This ongoing monitoring and review of the performance standards is usually referred to as verification.

7.4 Extrapolation of Rescue and Recovery Validation or Verification

Clearly a programme of tests or trials to validate or verify the rescue and recovery arrangements for all reasonably foreseeable events in all possible weather conditions is not a viable proposition, both in terms of the effort involved and the risks to which personnel might be exposed. However, Duty Holders should devise physical validation trials and an ongoing programme of verification trials that is sufficiently representative of anticipated emergencies to establish confidence that all reasonable foreseeable events can be accommodated. Furthermore, trials should be carried out in weather sufficiently severe to allow credible extrapolation of the results to the limit of the operational weather window while avoiding putting personnel at unreasonable risk. (see also Appendix 4)

7.5 ER Assessment Review

The assessment of the ER arrangements should be reviewed to reflect changes in such things as operational activities, advances in technology, new equipment or work practices, new systems and new personnel. It should also take account of updates to any other risk assessments that may affect its assumptions, e.g., fire and explosion assessment. Even relatively small changes may affect the assessment of the ER arrangements and the Duty Holder should ensure that a procedure is clearly laid down for identifying these changes and ensuring that any effects on the ER arrangements are adequately taken into account. The procedures in place to review the Safety Case for the installation could be mirrored for reviewing the assessment of the ER arrangements.

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Appendix 1
Abbreviations and Glossary of Terms

ACO	Aircraft Co-ordinator
ACOP	Approved Code of Practice
ALARP	As Low As Reasonably Practicable
ARCC	Aeronautical Rescue Co-ordination Centre
ATSU	Air Traffic Service Unit
EER	Evacuation, Escape and Rescue
EPOL	Emergency Preparedness Offshore Liaison
ER	Emergency Response
ERRV	Emergency Response and Rescue Vessel
HSE	Health and Safety Executive
IAMSAR	International Aeronautical and Maritime Search and Rescue Manual
IMCA	International Marine Contractors Association
IMO	International Maritime Organization
MCA	Maritime and Coastguard Agency
MICO	Maritime Incident Communications Officer
MOB	Man Overboard
MRCC	Maritime Rescue Co-ordination Centre
OIM	Offshore Installation Manager
OSC	On-Scene Co-ordinator
PFEER	Offshore Installations (Prevention of Fire and Explosion and Emergency Response) Regulations 1995
R&R	Rescue and Recovery
RCC	Rescue Co-ordination Centre
SMC	Search and Rescue Mission Co-ordinator
TRFR	Temporary Restriction of Flying Regulations
UKCS	UK Continental Shelf

Alert Phase is a situation wherein apprehension exists as to the safety of an aircraft or marine vessel and of the persons on board. (from IAMSAR)

Distress Phase is a situation wherein there is reasonable certainty that a vessel or other craft, including an aircraft or person, is threatened by grave and imminent danger and requires immediate assistance. (from IAMSAR)

Emergency Phase is a generic term meaning, as the case may be, Uncertainty Phase, Alert Phase or Distress Phase. (from IAMSAR)

ER Arrangements refers to those arrangements in place to provide warning of and accounting for evacuation, escape, recovery or rescue for all personnel on or near an installation and to take them to a Place of Safety.

It does not include the arrangements to deal with such incidents as medical emergencies, etc.

Escape is the process of leaving an installation in the event of part or all of the evacuation systems failing or not being accessible.

Evacuation is the process by which personnel leave an installation and its immediate vicinity in a systematic manner and in accordance with the ER plan without directly entering the sea.

On Scene Co-ordinator was formerly known as the On Scene Commander. Although the role has not changed the title of co-ordinator is considered more appropriate as those undertaking this role do not necessarily have 'command' powers over others.

Recovery is the retrieval of persons to a Place of Safety from a means of evacuation, e.g., TEMPSC.

Rescue is the retrieval of persons to a Place of Safety from the sea or from a means of escape, e.g., liferaft.

Uncertainty Phase is a situation wherein doubt exists as to the safety of an aircraft or a maritime vessel and of the persons on board. (from IAMSAR)

Validation is an initial test or trial to demonstrate that the performance standards set for the ER arrangements can be achieved.

Verification is the ongoing monitoring and review of the performance standards to ensure that the adequacy of the arrangements is maintained or if anything has changed.

Appendix 2
Further Guidance

HSE Publications:

1. HSG 65, "Successful Health and Safety Management", 1997 (ISBN 0717612767)
2. L110, "A Guide to the Offshore Installations (Safety Representatives and Safety Committees) Regulations 1989", Second Edition 1998 (ISBN 0717615499)
3. L65, "Prevention of Fire and Explosion and Emergency Response on Offshore Installations" Offshore Installations (Prevention of Fire and Explosion and Emergency Response) Regulations 1995, Approved Code of Practice and Guidance", Second Edition 1997 (ISBN 0717613860)
4. L30, "A Guide to the Offshore Installations (Safety Case) Regulations 2005", Second Edition 2006 (ISBN 0717661849)
5. Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996
6. Offshore Technology Report OTO 95 038, "Review of Probable Survival Times for Immersion in the North Sea"
7. HSG 142, "Dealing with Offshore Emergencies: A Guide to the Roles and Responsibilities of Government Departments and Agencies that May Become Involved in Emergencies in the Offshore Oil and Gas Industry", 2003 (ISBN 0717626849)
8. Offshore Technology Report OTO 2002 021, "Compatibility Test Protocol for Lifejackets and Immersion Suits on Offshore Installations"
9. OP 8, "Training for Hazardous Occupations"

Oil & Gas UK Publications:

10. "Guidelines for the Management of Competence and Training in Emergency Response for Offshore Installations", 2010
11. "Emergency Response & Rescue Vessel Management Guidelines", Issue 4, 2008
12. "Emergency Response & Rescue Vessel Survey Guidelines", Issue 5, 2008
13. "Health and Safety Management Systems Interfacing Guidance"
14. "Industry Guidelines on a Framework for Risk Related Decision Support", 1999
15. "Safety Related Telecommunications Systems on Fixed Offshore Installations", 2005

IMCA Publications:

16. Diving Division Guidance Note No. IMCA D 025, “Evacuation of Divers from Installations", April 2001

BSI Publications:

17. “Petroleum and Natural Gas Industries -- Control and Mitigation of Fires and Explosions on Offshore Production Installations - Requirements and Guidelines”, BS EN ISO 13702:1999
18. “Petroleum and Natural Gas Industries – Offshore Production Installations - Requirements and Guidelines for Emergency Response”, BS ISO 15544:2000, as amended by “Amd 1:2009”

OPITO Publications:

19. OPITO Industry Training & Competence Standards (http://www.opito.com)

Other Government Publications:

20. “Search and Rescue Framework for the United Kingdom of Great Britain and Northern Ireland”, MCA/187, published by the Maritime and Coastguard Agency, April 2008 (http://www.mcga.gov.uk/c4mca/mcga07-home)

Other Publications:

21. “IAMSAR Manual Volume II”, published by the International Maritime Organisation, ISBN-978-92-801-1489-8
22. “IAMSAR Manual Volume III”, published by the International Maritime Organisation, ISBN-978-92-801-1490-4
23. “Co-ordination of Multiple Airborne Assets During a Major Offshore Incident”, Final Draft, Maritime and Coastguard Agency, December 2009

Appendix 3

Indication of Timescales within which the 'Standard Man' is Likely to Succumb to Drowning

This table only provides an indication and assumes adequate buoyancy from a suitable and compatible lifejacket. One of the key factors is whether spume is blown off the crest of waves into a survivor's face and assessors will need to refer to the whole report (OTO 95 038) when undertaking the part of the PFEER Regulation 5 Assessment dealing with survival.

ESTIMATED CLO VALUE	CLOTHING ASSEMBLY (WORN WITH LIFEJACKET)	WIND FORCE (BEAUFORT)	WINTER (WATER TEMP 5°C)	SUMMER (WATER TEMP 13°C)	COMMENTS
0.06	Working Clothes (NO immersion suit)	0-2 3-4 5 and above	< ¾ hour < ½ an hour significantly less than ½ an hour	<1¼ hours <½ an hour significantly less than ½ an hour	Cold shock could reduce these times to a few minutes. See main HSE report (OTO 95 038)
0.16	Membrane Suit Worn Over Working Clothes (with 1 litre leakage inside suit)	0-2 3-4 5 and above	< 1¼ hours < ½ an hour significantly less than ½ an hour	< 2½ hours <1 hour significantly less than 1 hour	Depending on the type and condition of suit
0.33	Dry Membrane Suit Worn Over Working Clothes (NO leakage into suit)	0-2 3-4 5 and above	< 2 hours < 1 hour significantly less than 1 hour	>3 hours < 2¾ hours significantly less than 2¾ hours	No leakage means no more than 200 grams
0.5	Insulated Suit Worn Over Working Clothes (with 1 litre leakage inside suit)	0-2 3-4 5 and above	>3 hours < 2¾ hours significantly less than 2¾ hours (may be >1 hour)	>3 hours >3 hours >3 hours	Depending on the type and condition of the suit
0.7	Dry Insulated Suit Worn Over Working Clothes (NO leakage into suit)	0-2 3-4 5 and above	>3 hours >3 hours ≥3 hours	>3 hours >3 hours >3 hours	No leakage means no more than 200 grams

This summary of the findings refers to estimated Clo values, which are thermal insulating values for the Clothing Assemblies. Thermal insulated garments (TIGs) worn under membrane type suits are equivalent to an insulated survival suit and with good sealing equate to approximately 0.7 Clo. It is important to note that membrane suits, such as those provided for helicopter passengers, are designed to keep the underclothing dry. It is the quality of the clothing under the membrane suit that provides the thermal insulation to reduce cooling rates.

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Appendix 4

Guidelines on the Use of Trials Data to Determine Overall Rescue Performance and Confirm Regulatory Compliance

Summary

1. It is important, for both rescuers and survivors, that both rescue equipment and personnel are trialed in conditions somewhat similar to those in which they are expected to provide cover. Rescuers need to develop skills to enable them to perform successfully the necessary tasks to rescue survivors without endangering themselves or the survivors. Rescue arrangements should have their performance verified by valid methods to demonstrate, in all but exceptional weather conditions, their compliance with regulatory requirements. Duty holders should ensure that the personnel involved in rescue and recovery are appropriately trained and experienced to do this. Such trials should not expose rescue personnel to unacceptable risks.
2. This document provides guidance regarding the planning and execution of rescue performance trials to determine overall performance of rescue arrangements.

Compliance with Regulations

3. Under the Offshore Installations (Prevention of Fire and Explosion and Emergency Response) Regulations 1995 (PFEER), Regulation 5 requires, inter alia, that an assessment be conducted which should include the setting of appropriate performance standards to ensure effective evacuation, escape, recovery and rescue; and for the selection of appropriate measures. The Approved Code of Practice (ACOP) to the regulations states that the assessment should address the performance of the rescue and recovery facilities, including their function, capacity and availability in relation to weather conditions. The ACOP to Regulation 17 further states that: '*Performance standards should be set to achieve this* [a good prospect] *for the weather and sea conditions likely to be encountered. However, it should be recognised that there is a possibility of exceptional conditions in which normal emergency response arrangements may no longer be effective'*.
4. It is the responsibility of the duty holder to demonstrate that the specified rescue and recovery arrangements can meet the set performance standards; however for such demonstration to be credible, both the data and method of interpretation need to be valid.

Scope of this Guidance

5. This guidance is applicable to trials conducted by all facilities and devices used for effecting rescue and recovery

Appropriateness of Trials

6. Duty holders seeking to demonstrate the performance of their rescue arrangements should ensure that any trials used as evidence are appropriate to the installation's location or have been conducted in that

area. Trials conducted in areas with significantly more benign environmental conditions would not be sufficient to demonstrate validity of the arrangements.

7. Trials data should be specific to the rescue arrangements involved in the trial and should not be used as evidence to demonstrate validity with different arrangements.
8. Consideration should also be given to the period of time necessary to establish the performance characteristics of rescue arrangements new to the area in which it is to operate. This should facilitate an incremental approach to exercising in more challenging conditions, thereby avoiding exposing the rescue personnel to unnecessary risks. The precise period of time should be a matter of negotiation between the duty holder and the regulator but typically one year would afford a reasonable opportunity of exercising in a sufficiently representative range of environmental conditions.

Required Level of Performance

9. In order to demonstrate compliance with the PFEER Regulation 17 requirement of 'good prospect', the performance standard should be set to indicate the achievement of 'good prospect' of rescue in at least 95% of annual sea states for that specific area. The following table shows, for the eight areas of the United Kingdom Continental Shelf (UKCS), the significant wave heights (swh) that have an annual exceedence of 5% (indicating that wave heights will be at or less than this figure for 95% of the time). As can be seen from Table 1 below, the wave heights and required level of performance vary according to the area.

Table 1: Significant Wave Heights (swh) that have 5% Annual Exceedence for UKCS Areas and Worst Months Exceedences for that Condition

	Area Average Wave Heights with a 5% Annual Exceedence in meters (swh)	Winter Months Area Average % Exceedence at 5% Annual Exceedence with Worst Month Indicated			Wave height (m swh) that Actual Trials Need to be Conducted up to: Allowing for Extrapolation to 50% Above the Data Range	% Annual Exceedence for Actual Trial Wave Height
		Jan	Feb	Dec		
WoS	6.01	16.99	11.58	8.92	4.0	19.38
NNS	5.20	13.91	11.19	10.64	3.5	18.53
CNS	4.16	13.11	11.52	11.07	2.8	17.90
SNS	2.89	11.50	9.13	11.69	1.9	19.26
EC	3.69	13.05	10.65	16.59	2.5	16.91
CS	5.21	12.71	11.60	16.46	3.5	18.33
IS	3.01	13.40	9.61	13.66	2.0	18.02
HS	6.68	16.58	11.02	8.18	4.5	18.58

Note: WoS - West of Shetland, NNS - Northern North Sea, CNS - Central North Sea, SNS - Southern North Sea, EC - English Channel, CS - Celtic Sea, IS - Irish Sea, HS - Hebrides Shelf

Ref: OTO 2001 030 – 'Wind and Wave Frequency Distributions Around the UKCS'. (Based on NEXT Hindcast Model)

Extrapolation

10. Though duty holders need to demonstrate rescue capability in 95% of annual sea states, it is recognised that actual trials may not be conducted in 95% of the sea conditions that prevail in a particular area of the UKCS and that the remaining demonstration may be made by extrapolation. Extrapolation of trials results can be a useful tool to determine rescue performance in conditions beyond those in which trials have been conducted. However, extrapolation of performance times for weather conditions significantly worse than those recorded during actual trials can invalidate the results and for this reason the extrapolation of trials results should be limited to 1.5 times the actual trial condition. Therefore, if arrangements consistently trial in 3m swh seas, extrapolation of the arrangement's performance would remain valid up to 4.5m swh; with such validation the arrangements could operate in the CNS, SNS, EC and IS.
11. For example: from the table above, when operating in the NNS, the sea states for 95% of the time would be at or less than 5.2m swh. Allowing extrapolation to 50% above actual trial conditions would indicate that trials need to be conducted in up to 3.5m swh.

    Alternatively; when conducting trials against a 120 minutes standard for the rescue of twenty-one survivors; arrangements must achieve 80 minutes or better in the most severe trial condition during actual trials.

Number of Trials

12. As a minimum, to provide a level of confidence in the data used and validate any extrapolation, duty holders should ensure that at least ten trials have been conducted at the higher sea states.
13. New trials data should be collated frequently, with an interval not greater than one month.

Distribution of Trials

14. Duty holders should ensure that trials are conducted across the entire range of sea states for the area of operation. As a minimum, the distribution of trials conducted should reflect the actual frequency of occurrence of the various sea states. However, duty holders should endeavour to conduct trials in the higher sea states to populate this critical area and thereby ensure validity of any subsequent extrapolation used.

Risk Assessment

15. Duty holders should undertake a risk assessment prior to carrying out these trials. The aim is to demonstrate the validity of claimed performance standards under the averaged sea states shown in Table 1. This can be achieved by an incremental increase in training conditions for rescue personnel, to improve confidence and hence capability, in these conditions.

Night Trials

16. Duty holders should ensure that rescue trials are conducted in those conditions where it is reasonably foreseeable that rescue might need to be undertaken. This is particularly the case regarding rescue during hours of darkness. Such night trials should be conducted to establish what if any degradation in performance occurs. The trials should be risk assessed and conducted in benign weather conditions to expose the rescue personnel safely to the conditions so that skills can be developed and equipment tested. Trials should be conducted at sufficient frequency to ensure performance is retained.

Winter Months

17. Table 1 (column 3) indicates the higher frequency of occurrence of the exceeding wave heights during the winter months. For example, in the NNS the wave height with an annual 5% exceedence is 5.20m. Annually, wave heights occur at or less than this figure for 95% of the time; however during the winter months the frequency of occurrence of these higher wave heights is greater than 5% and as can be seen from the table occurs for 13.91% of the time in January (worst month). Operational restrictions may be required to minimise the need for rescue during these periods.

Adverse Weather Policies

18. Duty Holders should ensure that the overall rescue performance standard, as derived from trials, is aligned with any corporate adverse weather policy that may apply to the installation.

Existing Codes

19. This guidance regarding rescue and recovery performance validation is also applicable to the UK Oil and Gas “Emergency Response and Rescue Vessel Management Guidelines”.

Record Keeping

20. Duty holders should ensure that records of rescue and recovery trials conducted at an installation are kept for a minimum period of five years. For mobile installations, such records should indicate the position of the installation. Records of trials conducted should, as a minimum include the following information: Wind speed and direction, Significant wave height, Visibility, Time and date, Location and trial details.

Units of Measurement

21. This guidance uses significant wave height as the unit of measurement for assessing the performance of rescue arrangements due to its common usage in the UKCS. It is recognised that there are limitations to the use of this unit and that other units, such as wave steepness may be preferable. It is considered that the use of such other units is acceptable

provided they are demonstrably capable of providing an equal or better level of rescue performance validation than that given by swh.

Local Weather Data

22. These guidelines are based on averaged hindcast weather data for eight areas of the UKCS. However it is recognised that Duty Holders may have more accurate current weather data available, applicable to the specific locations where the rescue arrangements are required and may wish to use this. However it would be expected that the use of 95% exceedance values would continue to be used to indicate good probability.

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Appendix 5

Use of the 123.100 MHz Aeronautical Frequency by Offshore Installations during a Declared Emergency Situation

mca
Maritime and Coastguard Agency

1. Building on lessons learned from the two North Sea helicopter incidents early in 2009, the Maritime and Coastguard Agency (MCA), working closely with the Aeronautical Rescue Co-ordination Centre (ARCC) and Aberdeen Air Traffic Services Unit (ATSU), has developed a plan designed to provide safer management of aircraft and airspace in the vicinity of a major offshore incident.
2. A key element of the plan is the communications structure. It is clearly essential in any incident that those participating in the response are able to communicate with those requiring assistance. It is equally important that all have the ability to communicate on a common frequency.
3. After extensive discussion between the Search & Rescue (SAR) authorities, Aberdeen ATSU, Civil Aviation Authority (CAA), Ofcom, the Oil and Gas Industry and the three main civilian offshore helicopter operators, it is intended that the internationally recognised Air - on scene frequency of 123.100 MHz will be used as the common aeronautical frequency for any future offshore incidents.
4. CAA has approved the use of 123.100 MHz by offshore installations in declared emergency situations and has stated that it can be included within an installation's existing aeronautical licence at no additional cost. However, each installation will have to apply individually to the CAA for this approval.
5. Although it is intended that 123.100 MHz will be the primary Air - on scene frequency during an offshore incident, circumstances may necessitate the simultaneous use of the area traffic frequency.
6. The MCA, as the authority responsible for co-ordinating the national SAR response to a major offshore incident, strongly recommend that offshore operators review their existing aeronautical fit in order to ensure that their installations are capable of operating on this frequency in addition to their existing traffic and log frequencies.
7. Advice and further explanation on the overall aeronautical SAR communications plan can be obtained from:

Pete Thomson
Offshore Energy Liaison Officer
MRCC Aberdeen
20 April 2010

Telephone – 01224 597911
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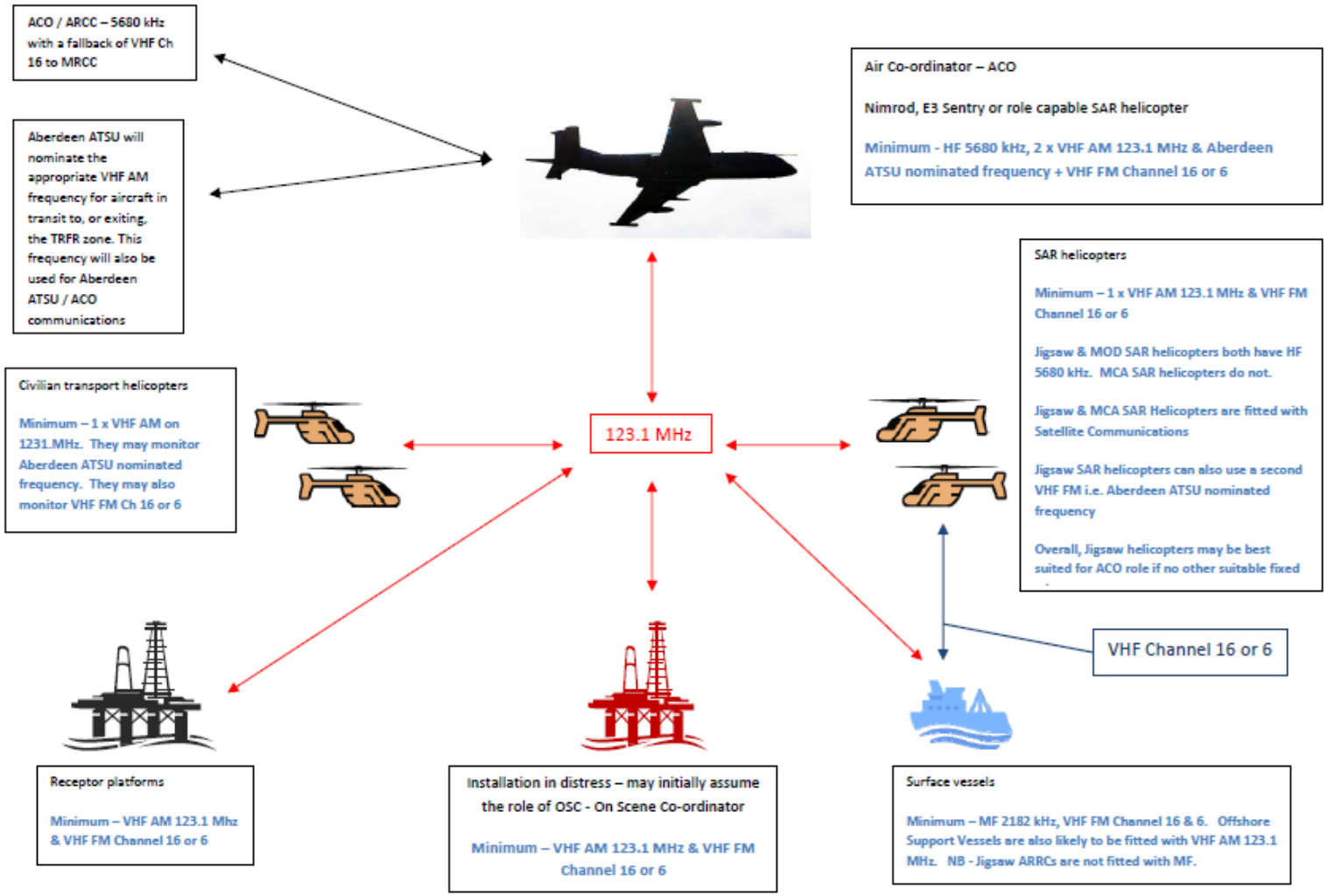
Appendix 6

On Scene Air Communications



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Appendix 7

Implementation of Temporary Restriction of Flying Regulations (TRFR) Zone

ACO will co-ordinate activity of all aircraft within the TRFR zone on the common frequency of 123.1 Mhz

The TRFR will normally be cylindrical based on a radius from the distressed installation expressed in nautical miles and vertical limits in feet. It should include all receptor or refuelling platforms if appropriate

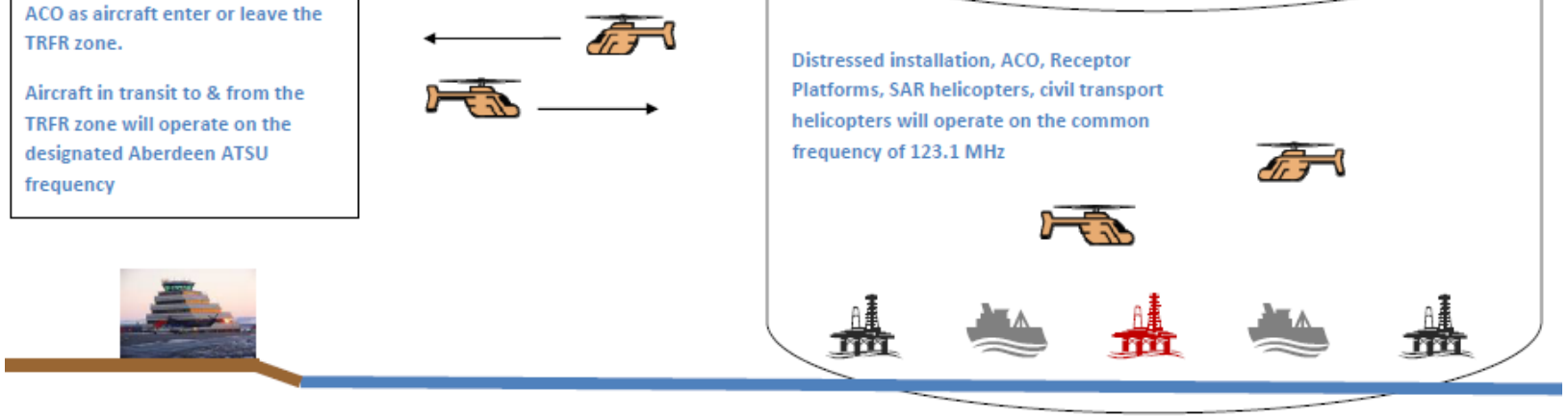
Dimensions – radius and height to be agreed between SMC, ARCC & ATC – Aberdeen ATSU at the earliest opportunity. Dimensions can be revised.

Aberdeen ATSU will co-ordinate the movement of aircraft to and from the TRFR zone.

Aberdeen ATSU will advise aircraft transitting to the TRFR zone of the callsign of the ACO & procedures to be followed prior to entering the TRFR zone.

Aberdeen ATSU will liaise with the ACO as aircraft enter or leave the TRFR zone.

Aircraft in transit to & from the TRFR zone will operate on the designated Aberdeen ATSU frequency



SMC / MRCC – through broadcast action or direct contact – must ensure that all installations and surface vessels are aware of the use of 123.1 MHz within the TRFR zone