NOGEPA
NETHERLANDS OIL AND GAS EXPLORATION AND PRODUCTION ASSOCIATION

INDUSTRY STANDARD NO. 34

Rescue at sea

17 March 2021

Copyright NOGEPA. All rights reserved

NETHERLANDS OIL AND GAS EXPLORATION AND PRODUCTION ASSOCIATION

Index

Copyright NOGEPA. All rights reserved

NETHERLANDS OIL AND GAS EXPLORATION AND PRODUCTION ASSOCIATION

Document Control Sheet

Control Sheet	
Responsible Committee	HSECOM
Title Document (UK)	Rescue at sea
Type Document (UK)	Industry Standard
Control Number:	34
Control Status:	Controlled / Uncontrolled when printed
Issue Status	[draft]

Document update timeframe	C3	
C1 - 12 Months	C2 - 24 Months	C3 – 36 Months

Endorsed by		
	Date:	
Health,Safety and Environment Committee	Name	Eric Dorenbos
	Date:	
Legal Committee	Name	Saskia Tates
	Date:	
Operations Committee	Name	Bart Smits
	Date:	
Approved by		
Executive Committee	Name	
	Date:	

Revision History					
Rev	Date	Description	Author	Reviewed	Approved
0		1st Issue - This standard is a conversion of the old Guideline No. 7			
1.1	15-02-2021	Regular review (36 months)	---	WG Emergency Response/ HSECOM	

This document will be controlled in accordance with the NOGEPA Industry Standard No. 80 on Standards and Document Control.

Copyright NOGEPA. All rights reserved

Terms and definitions

Acceptance Criteria	The limits within which the risk are acceptable (Arbo Regulations Article 3.2)
FRC	Fast Rescue Craft
LSA	Life Saving Equipment
KNRM	Royal Netherlands Sea Rescue Institution (Koninklijke Nederlandse Redding Maatschappij)
GPS	Global Positioning System
KWC	The Dutch Coastguard in Den Helder (in Dutch: Kustwachtcentrum – www.kustwacht.nl); responsible for coordination of the Search and Rescue-service in the Dutch continental shelf of the North Sea. This entails search and rescue of crew and passengers that are or will be in severe danger and who are travelling by aircraft or ship; including persons working on offshore mining installations in the Dutch sector of the Continental Shelf, the Dutch territorial waters and inland waterways (see Rules regarding the SAR-service 1994 - https://puc.overheid.nl/nsi/doc/PUC_69984_14/20080701)
MOB	Man Over Board
OPPLAN-SAR	Operational Plan Search-and-Rescue; an operational plan drawn up by the Coastguard (KWC) in which the procedures are laid down for search and rescue at sea
Over the side work	Work that takes place over water or outside the perimeter of the platform
PFEER	Prevention of Fire and Explosion and Emergency Response (UK legislation)
PLB	Personal Locator Beacon
POB	Persons on Board
POS	Place of Safety, any onshore or safe offshore location or vessel (also a merchant vessel in the vicinity) where medical treatment and other facilities for the care of survivors are available. (Manned) platforms and shore based rescue craft, SAR helicopters and KNRM vessels are considered places of safety.
Rescue Analysis	A systematic method according to which it can be ascertained whether the measures and means described in the emergency plan of the mining installation are adequate and sufficient for the prevention of persons falling overboard and possible loss of life. In other words: are the risks within the acceptance criteria?

Copyright NOGEPA. All rights reserved

Rescue Means	The rescue means incorporates: 1. Dutch Coastguard SAR 2. SAR of neighbouring countries (best effort) 3. Dutch military marine helicopters (best effort) 4. Offshore Dutch civil helicopters (best effort) 5. KNRM (near shore) 6. All ships (best effort)
Risk	A combination of the chance that a specified undesired event will occur and the severity of the consequences of that event (ISO 15544)
TIG	Thermal Insulated Garment

Legal Requirements

Article 3:37v	Working Conditions Decree (Arbo besluit)
Article 3.2	Working Conditions Regulation (Arbo Regeling)

Related Standards

Standard 1	Training for oil and gas industry
Standard 31	Emergency Response Plans
Standard 83	Report on Major Hazards for Production Installations

Reference

OTO 95038	Offshore Technology Report OTO 95038, Review of probable survival times for immersion into the North Seas, HSE 1995
J R Nav Med Serv	Cold water survival – An evidence-based update, House C. *J R Nav Med Serv* 2017; 103(3):189–193

Copyright NOGEPA. All rights reserved

www.nogepa.nl

Important Nomenclature used in this Standard

In the context of this Standard and when so used to describe a method or practice:	
'shall'	means that such method or practice reflects a mandatory provision of law (in Dutch: *dwingend recht*). Such method or practice is mandatory for those who are the addressees of such provision (mostly the operators). A Standard can describe or quote, but not amend, mandatory provisions. When an operator in exceptional cases for technical, operational or HSE reasons cannot comply, exceptions shall be documented and reported, and risks mitigated. Please note that this does not release the operator from the obligation to comply with the law. *
'should'	means that such method or practice reflects a Good Operating Practice. An operator is generally expected to apply such method or practice, but a specific situation may require a specific alternative. In other words: the operator complies or explains, and documents the explanation. *
'could'	means that such method or practice is of an advisory nature or mentioned by way of example. An operator is not obliged to comply and is not obliged to explain if he does not comply.
* Please refer to paragraph 2.3 of Standard 80 (Standards and Document Control), for further explanation on an exception of a 'shall' provision, or on a comply-or-explain of a 'should' provision.	

Copyright NOGEPA. All rights reserved

1. Executive Summary

For mining installations located inside the territorial waters and on the Dutch Continental Shelf, an effective emergency response plan shall be in place.

This NOGEPA Industry Standard offers guidance to evaluate for each offshore mining installation, whether the rescue means and measures mentioned in the emergency plan are sufficient for all activities and reasonable foreseeable events where people could end up in the water, despite all measures taken to prevent such an event.

This NOGEPA Industry Standard describes the reasonable foreseeable events, performance standards and operational controls. With this information and training of its personnel, a mining company is able to assess and ensure that the performance standards are met and that there are an effective emergency response arrangements in place in line with article 3.37 of the Arbo Decree.

Copyright NOGEPA. All rights reserved

2. Scope and application

2.1 Scope

A major part of the Dutch oil and gas exploration and production takes place inside the territorial waters and on the Dutch Continental Shelf. Referring to article 3.37v of the Arbo Decree, an effective emergency response plan shall be in place for mining installations located in these waters. This plan shall demonstrate an effective emergency response, meeting set performance standards for defined reasonable foreseeable events.

This NOGEPA Industry Standard offers guidance to evaluate for each offshore mining installation, whether the arrangements described in the emergency plan are sufficient for all activities and reasonable foreseeable events where people could end-up in the water, as mentioned in the Report on Major Hazards of the concerned installation. A typical table of contents can be found in Annex I.

2.2 Application

This NOGEPA Industry Standard is applicable to all mining installations inside the territorial waters and on the Dutch Continental Shelf.

Copyright NOGEPA. All rights reserved

3. Reasonable foreseeable events

The reasonable foreseeable events that have been derived from reviewing the hazards and event development scenarios in the Report on Major Hazards or to identify those for which it is reasonably foreseeable that people will end up in the water are as follows;

1. Man Over Board (while working over the side)
2. Helicopter emergency; ditching at sea
3. Fire/explosion on the installation
4. Well Blow Out
5. Ship Collision

Each reasonably foreseeable event is described in detail in Annex III. It includes a statement of the maximum number of people who could end up in the water and their respective clothing/survival equipment assembly.

Copyright NOGEPA. All rights reserved

4. Performance Standards

Performance standards have been prepared to ensure acceptable performance from the rescue and recovery facilities, i.e. to ensure personnel entering the water have a fair prospect of rescue and recovery.

4.1 Fair prospect of survival

A person who falls overboard has a fair prospect of survival when he is rescued out of the water and transferred to a place of safety within an acceptable period of time. Extensive research has been carried out in the United Kingdom to the periods of time in which a victim, under a wide range of circumstances, has fallen into the sea and could perish. A summary of the calculated survival times from this research is presented in Annex II.

The Dutch Coastguard uses, beside the UK data which are also mentioned in SOLAS, the CESM (Cold Exposure Survival Model). Parameters can be inserted through which the survival times become more accurate. Parameters include day/night, weather circumstances, etc..

In addition to the above the international standard ISO 15027-3 lists the test method for Immersion Suits. Tests are performed with humans. Tests are done with different types of suits: type A, B, C & D. The suits used in the offshore industry are normally type B. Test persons wear a standard set of underclothing: underwear (short-sleeved, short legged), long-sleeved shirt, trousers (not woollen), woollen socks, appropriate footwear. They get emerged in calm circulated water of 2°C for 4 hours. During that time the body temperature should not drop below 35° C.

NOGEPA has adopted the following terms of performance standards in section 4.2 on the basis of survival times given in Annex II valid for winter conditions.

4.2 Specific Performance Standards

The performance standard for the rescue and recovery of a person (man) overboard from a platform without an immersion suit is to retrieve them from the water within 20 minutes.

The performance standard for rescue and recovery of a helicopter ditch, where in winter time persons wear three layers of clothes and a Thermal Insulated Garments (TIG) under the helicopter transfer suits and lifejackets with an integrated PLB, is that passengers and crew should be rescued and recovered from the water to a place of safety in 120 minutes. This is well below the 4 hours to which persons were tested in 2°C calm water. The performance standard of 120 minutes recovery from the water is therefore more than adequate even during stormy weather during winter in the North Sea.

The performance standard for rescue and recovery of people escaping or evacuating to sea where persons wear normal working clothes, immersion suits and lifejackets with an integrated PLB is that MOB should be rescued and recovered out of the water in 120 minutes. After being

Copyright NOGEPA. All rights reserved
www.nogepa.nl

rescued out of the water, the “persons” requiring medical attention should be transferred to a place of safety within 20 minutes.

Primarily a Place of Safety: SAR helicopter, sickbay on a Mining Installation, Standby-boat, … should be provided. Criteria for a Place of Safety are:

- Shelter for survivors
- Reception facilities
- Initial medical diagnosis
- Initial medical treatment and stabilization
- Facilities for subsequent transfer

4.3 Evaluation

It is noted that:

- **T**he rescue times are determined excluding the assumption of additional injuries, for example collapsed lung, fractures, rupture of veins/organs;
- preventive measures, as mentioned in Annex III are assessed to be much more effective than any mitigation measures.

Copyright NOGEPA. All rights reserved

5. Operational Controls, Continuous Assurance and Verification

5.1 Use of the resources

The rescue of persons can be achieved by using the following equipment that is in control by the mining companies:

1. Deployment of a Fast Rescue Craft or MOB Boat.
2. A Standby vessel / Emergency Response and Rescue Vessel (ERRV) when it is chartered by a mining company.
3. A lifeboat equipped with a “Crew-Saver” (overboard retrieval device).
4. Jason cradle.

Copyright NOGEPA. All rights reserved

It must be noted that the following means are available which are not in control by the mining companies:

- The Dutch Coastguard (KWC) as coordinator of the Search of Rescue activities[1].
- SAR Helicopter with advanced search and rescue facilities, auto hover capabilities, a well-trained and dedicated crew and the use of regular search and rescue exercises.
- Vessels[2] or other installations[3] in the surrounding area of the mining installation.

Note: Inevitably, all means of rescue carry an inherent risk. For example, the crew of an ERRV is exposed to several risks when operating at sea. These risks should be reasonably acceptable in itself, and the expected risk reduction for the personnel on the mining installation should justify the deployment of the means.

5.2 Continuous Assurance of meeting Performance standards

In order to ensure that the performance standards can be met certain training, drills and exercises are being conducted throughout the year. The NOGEPA Industry Standard 1, Training for Oil and Gas Industry, provides guidance for all the aspects of training. Furthermore, regular exercises and drills are conducted offshore. Regular evaluation and audit of the training centres provides an assurance of competence.

5.2.1 Training of FRC/MOB Crew

Those selected for rescue and recovery duties shall receive training once every 2 years in the use of rescue and recovery equipment at a recognised training centre onshore in The Netherlands. The specific training aims to exercise the skills of handling the FRC/MOB, search and rescue, handling the casualties, using the GPS, the crew finder etc. Offshore training/exercises should only be performed when appropriate risk assessment has been done and resulting mitigating measures have been taken.

5.2.2 Drills and exercises

To retain readiness in the event of an emergency, the on-shift crew conduct regular timed exercises and drills.

[1] The means available at the Coastguard for Search and Rescue purposes are contained in the OPPLAN-SAR
[2] A general international duty exits for all ships to provide assistance to anyone in life danger at sea
[3] Companies are advised to conclude agreements and procedures on mutual assistance in case of an emergency

Copyright NOGEPA. All rights reserved
www.nogepa.nl

Annex I Documenting the assessment of rescue-times

The assessment should be properly documented. A typical table of contents for the assessment report is:

1	**Describe the platform and its facilities**
	• Location • Function (operations) • Manning • Evacuation means • Personal survival equipment • Other
2	**Describe rescue facilities**
	• Lifeboat (with rescue cradle), including available LSA • Rescue craft/MOB • Adjacent platform • Infield helicopter • Standby vessel • Coast guard, SAR Neighboring Countries • Other
3	**Assess the scenarios**
	• Minimum the 5 reasonably foreseeable events of section 3
4	**Assessment and discussion of the resulting rescue times**
	• Is there a “Fair prospect of Survival”
5	**Conclusions**
	• Sum-up the outcome of the assessment of rescue times. Does it meet the set performance standards and provide statement of fitness? • Where any remedial measures/recommendations required and have they been executed or by date they will be completed? • Are the results ALARP?
	Appendices
	• Geographical location of platform • Facilities on board of Rescue • Results of calculations • Etc.

Copyright NOGEPA. All rights reserved

Annex II Survival in The North Sea

Immersion and survival in cold water

Survival at sea is dependent upon a wide range of variable factors and predictions cannot be based upon a rigorous scientific analysis. During 1995, a study has been carried out to identify the primary threats to life and reviewing relevant data for applying appropriate factors to derive realistic times when it can be expected that survivors will begin to succumb to the prevailing conditions[4]. This section summarizes some of the findings of this study.

The dominant threat to an immersed person is drowning. However, much of the past effort has focused upon death from hypothermia. This is not relevant when the victim is unable to breath due to the inhalation of water. Nevertheless, the effects of cold weaken the victim's position and increase the probability of drowning.

Another threat to a person who has been immersed for a prolonged period and is recovered from the water is the loss of hydrostatic assistance to circulation, leading to collapse of blood pressure and consequential reduced cardiac output. A rescue involves lifting a victim in a vertical position from the water, which may compound the seriousness of the situation. This is due to the sudden loss of hydrostatic pressure on the lower limbs of the body.

The table below and the notes to the table are taken from the study and relate the level of protection to the expected drowning/survival times:

Clothing Assembly worn With Lifejacket	**Wind Force Beaufort**	**Times within which the most vulnerable individuals are likely to drown**	
		Winter (water temp 5°C)	**Summer (water temp 13° C)**
Working clothes No immersion suit	0 – 2	Within ¾ hour	Within 1 ¼ hours
	3 – 4	Within ½ hour	Within ½ hour
	≥ 5	Within significantly less than ½ an hour	Within significantly less than ½ an hour
Dry membrane suit Worn over working clothes No leakage into suit	0 – 2	Within 2 hours	> 3 hours
	3 – 4	Within 1 hour	Within 2 ¾ hours
	≥ 5	Within significantly less than 1 hour	Within significantly less than 2 ¾ hours

[4] Robertson, D.H. and Simpson, M.E., Offshore Technology report OTO 95038: Review of probable survival times for immersion in the North Sea, HSE, 1995 and House C. *J R Nav Med Serv* 2017; 103(3):189–193 Cold Water Survival – an evidence-based update

Copyright NOGEPA. All rights reserved
www.nogepa.nl

Clothing Assembly worn With Lifejacket	Wind Force Beaufort	Times within which the most vulnerable individuals are likely to drown	
		Winter (water temp 5°C)	Summer (water temp 13° C)
Membrane suit Worn over working clothes With 1 liter leakage into suit	0 – 2	Within 1 ¼ hour	Within 2 ½ hours
	3 – 4	Within ½ hour	Within 1 hour
	≥ 5	Within significantly less than ½ an hour	Within significantly less than 1 hour
Dry insulated suit Worn over working clothes No leakage into suit	0 – 2	> 3 hours	> 3 hours
	3 – 4	> 3 hours	> 3 hours
	≥ 5	≥ 3 hours	> 3 hours
Insulated suit Worn over working clothes 1 liter leakage into suit	0 – 2	> 3 hours	> 3 hours
	3 - 4	Within 2 ¾ hours	> 3 hours
	≥ 5	Within significantly less than 2 ¾ hours. May well succeed 1 hour	> 3 hours

Note

The table describes “times for which there is a fair prospect of survival for persons entering the water, before individuals begin to succumb to the prevailing conditions. It is not the objective of the paper to consider maximum likely survival times”.

Acceptance criteria

Basically all listed survival times are acceptance criteria. Alternatively, they can be expressed in statements like: “Arrangements shall be available to secure afair prospect of rescue of any person falling into the sea, within 20 minutes after notification, provided the person is suitably protected.

N.B. The table shows a clear relationship between the seasonal effect of the sea water temperature and the prospect of survival. This factor should be taken into consideration when planning and executing offshore activities.

Annex III Key aspects of events to be evaluated

This Annex contains the basic description of the scenario and the control elements of the five listed scenarios. For each scenario, attention should be given to aspects as:

- Various wind and weather conditions
- Behaviour of personnel and victim (e.g. panic)
- Performance of safety equipment (e.g. leakage of survival suits)
- Other deviations

Copyright NOGEPA. All rights reserved
www.nogepa.nl

In reality, these deviations will particularly happen when during an escape situation, injuries or damage occur due to accident conditions.

1. Working over the side/MOB

- *Activity*

Working outside the perimeter of the production platform occurs during exceptional activities such as rigging up/down scaffolding structures, or while using working baskets in combination with cranes. Under normal day to day working circumstances on a producing platform man overboard is not a credible scenario.
On a drilling rig there can be an increased risk when (dis-)connection wells, working on “Texas deck”

- *Number of personnel*

The number of persons involved in these activities is relatively limited. A maximum of 2 to 3 persons for scaffolding activities is realistic.

- *Hazard*

As the persons involved in the activity are already working outside the platform boundaries, the platform protection afforded by hand-railing and other existing structures are not available. This necessitates the use of additional preventive measures to manage the risk. In case these measures are not effective or have failed, people may fall into the sea.

- *Preventive measures*

Additional measures include aspects such as:

  - Permit to Work system
  - Fall protection
  - Adverse weather policy (restricting the activity to favorable weather and sea conditions)
  - Trained and competent personnel (i.e. IRATA training)
  - Assure integrity of temporary structures by design, construction and inspections (e.g. fit additional railing but preferably optimize design)

- *Incident*

When one up to three persons fall into the sea and, due to the fall height, injuries can be expected.

- *Mitigation measures such as:*
  - Contact with radio-room and exposed personnel
  - FRC or lifeboat capable of retrieving people from the water available to take immediate action
  - Additional personal protective/survival equipment such as a work vest and in some instances Personal Locator Beacons
  - Supervision and watch (fast alarm)
  - Tracking of victims by throwing lifebuoys with lights or smoke signals

Copyright NOGEPA. All rights reserved
www.nogepa.nl

- Emergency preparedness systems of platform and companies
-
- Support vessels e.g. standby vessels and supply vessels
- Coastguard measures and facilities

During special work on production installations or drilling operations on a rig a standby boat is chartered. During periods of increased risk of falling into the sea the FRC of the standby boat could be requested to be deployed to speed-up possibly recovery if required.

2. Helicopter emergency

- *Activity*

In this standard we focus on a helicopter emergency within a radius of 500 meter from an offshore mining installation.

- *Number of personnel*

The number of personnel varies from 2 (pilots only) to 18 (H-175)

- *Hazard*

A helicopter emergency can be divided into:

1. Helicopter crash
   It is impossible to exercise any control over the helicopter during its descent. The large amount of energy released when entering the sea may result in projectiles and extensive damage to the helicopter. Personnel inside the helicopter will be affected by the crash and may have difficulty in escaping.
2. Helicopter ditch
   The helicopter will make an emergency landing on the sea surface after a relatively controlled descent. Personnel inside the helicopter will not suffer from injuries and have a fair prospect of leaving the helicopter safely.

In both cases rescue efforts should be undertaken, yet the consequences of 1 will normally be more serious.

- *Preventive measures*

Some of the preventive measures that are used for flight safety are:

- Helicopter design and equipment (e.g. dual engine concept, facilitate easy escape)
- Training of helicopter passengers/pilots
- Adverse weather policy
- Instruction of passengers
- Maintenance system

Copyright NOGEPA. All rights reserved
www.nogepa.nl

- *Incident*

After an incident the full complement of the helicopter will have entered the water, directly or in one of the helicopter's life rafts

- *Mitigating measures such as:*
  - Rescue equipment on board of the helicopter
  - Requirements on helicopter transfer suits and multiple (up to 3) insulation layers
  - Lifejacket with air bottle and Personal Locater Beacon (PLB)
  - Helicopter beacon
  - Coastguard measures and facilities
  - Emergency preparedness of platform and company
  - Communication procedures
  - Rescue activities from neighbouring installations, when no putting in danger other personnel
  - Support vessels e.g. standby vessels and supply vessels

3. Fire/explosion on the installation

- *Activity*

This encompasses all operational processes such as drilling, maintenance, production, construction and abandonment.

- *Number of personnel*

Normally the number of persons on manned production installations is limited. There are a few central production installations with may have up to 65 people on board, with one exception which can accommodate more people for exceptional circumstances. The number of people on board of a drilling rig can vary between 40 to 50 to a maximum of around 120 people, during peak activities.

- *Hazard*

The majority of the fires are small and will not result in platform abandonment. The severe and fast escalating fire/explosion scenarios necessitating platform abandonment are thus rather limited. The size and duration of the fire/explosion are directly related to the platform design, layout (e.g. integrated or separate accommodation unit) and platform function (production/compression/wellhead etc.).

An escalating fire or severe explosion is characterized by severe damage to the platform and in the extreme scenario platform collapse, severe heat radiation impairing several functions of the platform (including escape routes) and injured personnel. In case of rapid escalation and or sever accident conditions, it is very likely that personnel working in the area will directly enter the sea.

Copyright NOGEPA. All rights reserved
www.nogepa.nl

- *Preventive/mitigating measures*

An extensive list of preventive measures exists which are to be documented in the Report on Major Hazards. Some examples:

  - Platform layout (firewalls, blast walls, partitioning)
  - Process system design
  - Fire and gas detection systems
  - Deluge and Firefighting systems
  - Maintenance systems and monitoring
  - Housekeeping procedures
  - Emergency Shutdown and Depressurizing systems

- *Incident*

Controlled evacuation for the majority (80%) of the personnel. Some personnel (20%) may have escaped and have directly entered the sea (protected and unprotected). Some of the personnel may be injured. In case the configuration of an installation, e.g. bridge linked platforms, number of POB on parts of the platform, etc. justifies another division of evacuation vs escape, it should be clearly demonstrated.

- *Mitigating measures such as:*
  - Lifeboat(s) (either TEMPSC or FFLB)
  - Personal survival equipment and in some instances Personal Locator Beacons on selected locations of the offshore installation
  - Emergency preparedness of platform and company
  - Support vessels e.g. standby vessels and supply vessels
  - Coastguard measures and facilities
  - Rescue activities from neighbouring installations

Copyright NOGEPA. All rights reserved

4. Well Blow-out

- *Activity*

A well blow-out may occur during a number of operations but are most likely during well interventions and drilling activities

- *Number of personnel*

This may vary from only a few to a maximum of 65 and in one case 95 persons for producing mining installations and 40 to 50 up to a maximum of 120 persons on a drilling rigs. In case an offshore support jack-up is alongside the number of PoB can also be > 100 during peak activities.

- *Hazard*

A blow-out is an uncontrolled flow of well fluids into the atmosphere. The effects of blow-outs may strongly vary and relate to the physical parameters (pressure, temperature) of the released gas/fluid and its composition (phase, mixtures, components, toxic components). Gasses and combustible fluids may either directly of delayed ignite resulting in jet fires and pool fires on the platform. In particular during unfavorable wind conditions, burning droplets may rain back onto the platform impairing escape routing and other safety systems. In some cases toxic gasses may be released from the well intoxicating the atmosphere.

- *Preventive measures*

An extensive list of preventive measures exits which are to be documented in the Report on Major Hazards. Some examples:

  - Well design
  - Seismic surveys (shallow gas)
  - Training of drilling/workover crew (well control)
  - Well information systems (detection)
  - Integrity and availability of Blow-out Preventers
  - Well contingency planning and equipment (mud chemicals/additives)
  - Maintenance system

- *Incident*

Upon occurrence of a well blow-out, the platform will be evacuated. Similar to the fire/explosion scenario it is foreseeable that some people may have left the platform individually and have entered the sea.

- *Mitigating measures such as:*
  - Lifeboat(s) (either TEMPSC or FFLB)
  - Personal survival equipment
  - Emergency preparedness of platform and company

Copyright NOGEPA. All rights reserved
www.nogepa.nl

- Support vessels e.g. standby vessel and supply vessels
- Coastguard measures and facilities
- Rescue activities from neighbouring installations and facilities, if not putting more persons in danger

5. Ship collision

- *Activity*

Ship collisions can occur at any time to the installation. It is as such not necessarily related to a platform activity.

- *Number of personnel*

The number of personnel involved in such an event is related to the manning on the installation and the colliding vessel (which may lose/has lost stability)

- *Hazard*

Collisions between vessels and mining installations can be divided into two categories:

1. Drifters
   Colliding vessel/barge is not maneuverable and drifts at limited speed.
2. Powered vessels
   These may be vessels of all types. Collisions may result in severe damage to the platform resulting in escalating factors such as releases of hydrocarbons form risers/wells and possible platform collapse.

- *Preventive measures*

An extensive list of preventive measures exits which are to be documented in the Report on Major Hazards. Some examples:

- Presence and use of AIS systems
- Admiral charts and notification of platform positions
- Communication procedures and equipment
- Navigation-equipment and signals

(Please note that an important aspect in this scenario is the notification time (radar setting/performance) and following procedure).

- *Incident*

The situation for rescue can strongly vary and is dependent on the:

- Pre-collision warning time and subsequent actions
- Impact energy of collision and platform design

Copyright NOGEPA. All rights reserved
www.nogepa.nl

Worst case is non or late detected severe collision necessitating an immediate escape and evacuation of the platform.

- *Mitigating measures such as:*
  - Primary
    - Helicopters
    - Walk-to-work vessels
    - Emergency preparedness of platform and company
    - Lifeboats(s) (either TEMPSC or FFLB)
    - Support vessels e.g. standby vessels and supply vessels
  - Rescue activities from neighbouring installations (if not putting more persons in danger)
    - FRC
    - MOB
  - Personal survival equipment
    - Coastguard measures and facilities
    - Liferafts
    - Descend systems
    - Survival Suits, with Life vests and Personal Locator Beacons

Copyright NOGEPA. All rights reserved