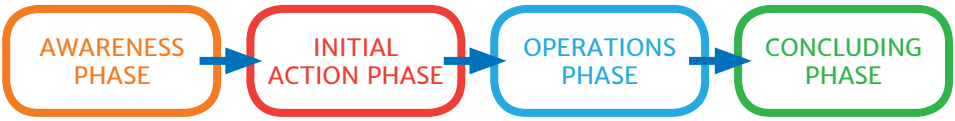
Operational Plan

Operational Plan for Rescue Operation

This operational plan is supplemented by the ChemSAR SOPs and its accompanying attachments (ChemSAR SOP Checklists).

Example of the rescue operation phases:



1. Awareness phase

Needed information

In the early stages of an incident, a challenge in having sufficient situational awareness is one of the issues that can complicate the assessment of the current situation and the planning of rescue operations. Information is needed about the incident type and the substance(s) involved, communication, the weather conditions on-scene and how these will effect the rescue operation. The behaviour of the substance involved and external impact (e.g. temperature, wind, waves, currents, rain) should also be taken into account. Responders' capabilities of working on the distressed vessel (incl. the vessel's stability and possible changes to it) also have a significant impact on the action plans that can be executed.

In the initial stages of an incident, it is not necessarily clear which HNS is in question. Identifying the substance in

the earliest phase possible is important when determining the possible hazards involved, which are effected by both the incident type and the properties of the substance involved. The identification of these hazards is essential for making a situation assessment, selecting an appropriate operating procedure, and choosing the personal protection level and any response procedures. Often first aid instructions are also substance-specific.

Information about an HNS incident may come to the RCC either directly from the distressed vessel, a VTS centre or from some third party such as a nearby vessel that has observed the situation. The information received about the incident may also be an anomaly report by the vessel which the vessel's crew is nevertheless able to handle on their own. This information received must be then confirmed and available additional information collected to execute an effective risk assessment and decision-making process.

More detailed information about the incident (including information about the cargo and its location on board) can be obtained from the following: the vessel's master, the shipping company, the ship agent, the departure or destination harbour, the cargo owner, the agent, the cargo sender and/or receiver, customs, databases, VTS centres or other actors involved in the monitoring and guiding of sea traffic (e.g. National Single Window – NSW). For improving awareness of the situation in the early stages of an incident, additional information is often also available from other sea traffic within the area and also from possible airborne units in area (incl. use of possible Remotely Piloted Aircraft Systems (RPAS)).

Information Gathering

Especially in incidents involving HNS, communication between the relevant rescue coordination centre (RCC) and the distressed vessel (DV) should be based on regularly updated information about planned and executed actions, the situation on board and possible changes in that. In the early stages of an incident, the aim of the communication between the rescue coordination centre and the vessel is to create a common understanding of the situation and situational awareness of the incident. Based on this, the required rescue operation can be planned and resourced efficiently.

Important issues that should be clarified upon first contact between the RCC and the DV include whether immediate

help is needed, the vessel's position, the estimated time for assistance to arrive (ETA) and how significant a threat by the incident is to other persons in the vicinity and the surrounding environment (e.g. sensitive areas). In addition to the above, the following general details needed for a maritime rescue operation are also important for the planning of the rescue operation: vessel type, name and other registration details; number of people on the vessel; number of deceased/missing/injured; and available alternative means of communication.

Individualising the incident

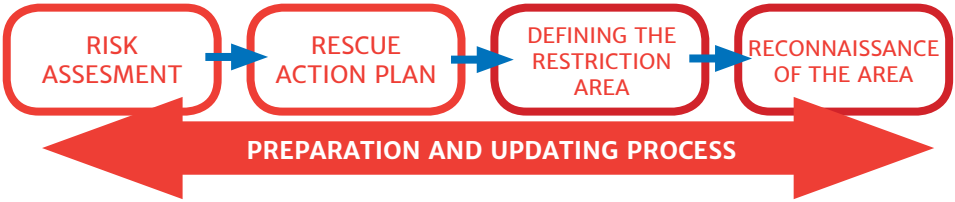
In HNS incidents, the nature of the event is of prime importance (fire, explosion, leakage or other phenomena). This determines the required and applicable rescue measures. In addition, the possibility of malicious damage or a terrorist act must be taken into consideration.

Note! In a situation where the substance involved is unknown, an assessment of the situation should be considered dangerous.

Determining the HNS and its behaviour in the current circumstances is often critical information when assessing the incident. In relation to the above, it must be found out whether the crew of the distressed vessel have the capacity to manage the situation on board and the capability to organise an evacuation or if there is any possibility of an uncontrolled abandoning of the vessel. It is important to consider the possibility of the situation to get worse and to prepare for consequences from an uncontrolled situation that can lead to secondary damages, stability problems or possible sinking of the vessel.

The most important results of the data-gathering process are information on the distressed vessel's safety status (regarding the people on board and other facts), an understanding of the situation's development based on factors already identified, different possible results and scenarios (including the worst-case scenario), and the probability of these possibilities taking place.

2. Initial action phase



During HNS rescue operations, the primary goal is to rescue persons that are in danger. A secondary goal is to prevent damage to the environment and to property. The most important tasks when making a situational assessment are to determine the appropriate and available resources and operating procedures to carry out these goals.

Risk assessment

HNS incidents often demand immediate action for rescuing persons. In situations where the crew and passengers have already abandoned the distressed vessel and are no longer facing immediate risk to life and health by the leaked HNS, the possibilities for rescuing these persons increase. In such situations, the effect of the HNS is reduced, and there might not be a need for special HNS protective measures when saving human lives. In these situations, detection and monitoring should be established in order to get an early warning if the situation gets worse, e.g. by a gas cloud spreading to the area where the casualties are present.

One aid when making situational assessments is the Vessel Triage system, in which the situation is assessed using the same criteria by both the RCC and the DV.

The following information is relevant in maritime rescue operations involving HNS and also generally in rescue operations. Taking into account these issues may help in assessing an incident's impacts and making a risk assessment:

- Determining the plan of action, including task prioritisation and specifying the nature of the danger;
- Finding out the sufficiency of the personnel, equipment and special equipment for the situation in question and for the planned tasks;

- Determining the appropriate measures for the situation involves clarifying the operational possibilities. For example, the need for immediate rescue measures on board the distressed vessel, the possibility of monitoring and isolating the area, or the need for additional information about the substance or substances in question and their behaviour in the current circumstances.

It should be noted that HNS incidents are often dynamic, with new factors emerging as the situation develops, which means that the situation can change rapidly. It is of prime importance that backup plans are developed alongside the main rescue plan already in the early stages of the incident. For example, one factor that could limit operational capabilities would be the evaporation of a very flammable HNS that has leaked into the sea. In such a situation, it should be considered whether vessels are able to operate in the area at all. Another issue to take into account is the maximum time period that the rescue team can operate in the hazardous atmosphere area with SCBAs. That is often limited between 10 to 20 minutes, depending on the time taken for the transfer phase to get on board the DV or the specific location on board and off and the required personal protection level.

In an HNS incident, the rescue operation on-scene should begin only after the situational assessment and risk assessment have been completed, and only with the use of the protective and special equipment required for the situation. The SRU arriving on-scene should have relevant and updated information about the leaked substance and its hazardous properties to establish effective decontamination and first aid facilities. In addition, information should be obtained about the quantity of the substance on board the distressed vessel, the prevailing conditions and an estimate of the velocity of evaporation of possible floating chemicals and the concentration of the vapours or gas clouds. When assessing the situation, attention must be paid especially to the impact of the weather conditions on-scene and its development (sea state, wind, tide and most recent weather forecasts).

Rescue Action Plan

Sufficient information concerning the incident and its special features is important when assessing the rescue action plan. To alert and consult an HNS expert or specialist group (as well as other

necessary officials and departments, e.g. SAR, maritime safety, environmental and safety officials, rescue and medical services and special units such as MIRG) as early phase as possible enables the timely execution of the correct rescue and response measures. In addition to this, national resources available and the possible need for international assistance have to be re-evaluated.

Measures initiated before the substances in question have been identified can significantly worsen the situation. Depending on the substance(s) in question, possible incorrect measures can include the use of water when it is not applicable by HNS characteristics, use of an inappropriate absorbing material, or a lack of decontamination measures. Executing the rescue operation in a situation when there is doubt about the substance in question, the maximum level of protection procedures and equipment must be assured. Safe working conditions on-scene for both the crew of the distressed vessel and other rescue personnel participating in the rescue operations must always be ensured by the use of gas detection devices, sampling equipment or other appropriate means.

Depending on the nature of the incident, rescue and possible response actions on board a distressed vessel are primarily to be carried out through the crew's own actions and only secondarily with the external assistance. The former would include situations in which the vessel's own crew can get the situation under control through their own actions by rescuing the persons who are in danger and stopping or reducing the identified leakage. The latter would include situations where external assistance has an impact to get the situation under control, for example by changing the heading of the vessel by using emergency towing or by sending a rescue team to the vessel to assist the rescue operation on board. Depending on weather conditions and other circumstances, the vessel can be emergency towed to a sheltered position. There the needed rescue operations can be effectively carried out on board or people can be safely evacuated.

Defining the restriction area

The situation assessment also includes determining the restriction area for other traffic. This area includes both the zone of immediate danger (hot zone), the danger zone (warm zone), and the safe working area for rescue operations (cold

zone). The purpose of determining this restriction area is to set a safe area for other maritime traffic and at the same time to ensure an isolated area for the rescue operation on-scene.

The dangerous area (hot and warm zones) is generally defined around the distressed vessel; but depending on the substance, its quantity or other information that may emerge later on, the area may be set or later reduced to only part of the distressed vessel. In the early stages of the incident, when no detailed information about the incident is available yet, the dangerous area (i.e. the restriction area), should be made sufficiently large.

If there is no detailed information about the incident and HNS leakage, a sufficient restriction area should be set already at the limits of the possible dangerous area. If the substance in question or the size of the leakage is not known and it is not possible to take any measurements, the possibility of larger risks should be taken into consideration when determining the restriction area. In a large leakage of liquefied toxic gases, the restricted area, based on the gas concentration, can extend up to 20 km from the spillage location. When setting the restriction area limits, attention must be paid especially to the weather conditions and any expected changes to them. Any maritime traffic (and air traffic), other than those vessels involved in the rescue operations, is to be directed to stay clear at a sufficient distance, and rescue units must maintain upwind at a distance assessed to be adequate. If necessary, preparations must be made for warning the population about possible explosion hazards or the threat of spreading toxic gases.

The following table no. 6 can be used as an aid in estimating the spread of gas clouds when assessing the situation. This should be based on the information already received.

Note! Estimations are not a substitute for detection and monitoring processes.

When assessing the consequences of a release, information should be available on the gas concentrations on-scene. There are computer models and modelling systems based on the substances' physiochemical parameters, but the results derived from these models cannot be completely trusted. Inaccurate results can be caused by wrong values or the parameters may be deficient. The reliability of these results also depends on the model's internal structure and how valid the system is.

Table 6. Example of forecasting the spread of gas clouds in air can be estimated very roughly for the Groups G and GD.
Source: HELCOM Manual on Co-operation in Response to Marine Pollution Volume 2

Release	Health risk		Fire / explosion risk
	Ammonia, vinyl chloride, chlorine	Methane (LNG), propane (LPG), butane (LPG), ethylene, butylene-butadiene	Ammonia, vinyl chloride, methane (LNG), propane (LPG), butane (LPG), ethylene, butylene-butadiene
Tonnes	metres / nautical miles downwind	metres / nautical miles downwind	metres / nautical miles downwind
0.1	1,000 / 0.62	200 / 0.12	200 / 0.12
1	2,000 / 1.24	400 / 0.25	400 / 0.25
10	5,000 / 3.11	1,000 / 0.62	1,000 / 0.62
100	10,000 / 6.21	2,000 / 1.24	2,000 / 1.24
1,000	20,000 / 12.43	4,000 / 2.49	4,000 / 2.49

The actual concentration levels for making the hazard assessment can only be made by using measurements. Detecting and analysing the substance(s) in the incident's early stages is essential in order to clarify its properties and potential hazards as well as to define the restriction area and its form. These prediction models are nevertheless effective tools in estimating the size of gas clouds or the danger zone prior to the detection or measurements.

Reconnaissance of the area

Measurements taken during reconnaissance can be used to assess the danger of explosion or toxicity and the safety limits associated with these. The concentrations in the air and water of any substances that have already leaked out are also possible to detect by measurements. Personnel carrying out monitoring and measurement tasks should be equipped with the appropriate PPE and have appropriate training in the measurement equipment as well as the equipment functionality. Based on the first detections, the limits of the danger zone are set (warm zone). Approaching the location of the leakage and observing the rise in concentration levels to hazardous levels, the limits of the hot zone can be set. Based on the measurement taken, it is also possible to estimate the personal protection level required for the task at different distances. With more detailed information obtained through reconnaissance, measurements and expert help, the danger zone can if necessary be reduced or increased in size. In practice, however, the limit of the area is set at the measuring points where the most distant readings have been observed. The areas should be made large enough to take into account the fact that gases and vapours do not spread or move evenly in the atmosphere. Alongside devices for measuring the risk of toxicity and explosion, the devices' measuring oxygen content should also be used.

Preparation and updating process

The continuance of rescue operations should be ensured by organising effective decontamination measures and confirming the availability of extra personnel, materials and any required specialist equipment. Reports on the situation should also be provided at a sufficient interval to other authorities and to any other people within the incident's area of influence.

In the early stages of the incident, the decisions made should be assessed and updated as the situation develops. This means that the plans should be updated based on the latest available information received, thus enabling a continual process of reassessment and situation updates.

3. Operations phase

Crew actions taken on the distressed vessel:

In the situation's early stages, the persons with the best opportunities to affect the HNS incident and minimize the threats it poses are the distressed vessel's own crew. Once the authorities receive information about the incident or event, the vessel's crew may already have affected the situation through actions taken, or may have planned measures for taking the situation under control.

The vessel's master is responsible for rescue operations on board the distressed vessel, and these operations on board are supported by the rescue organisation. The vessel's crew should nevertheless understand the hazards concerning the cargo, such that in the event of an incident the operational plan made for emergency situations can be executed. For example, the IMO's Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS) lists emergency procedures for a vessel's crew during incidents at sea. When the incident takes place, this should be reported to the responsible authorities as soon as possible after it has been detected, even if the situation can be taken under control by the crew's actions. This enables and speeds up the task of getting assistance on-scene if a need for external assistance should arise later on. Through the RCC it is also possible to have expert help on the HNS in question, including information of its behaviour and drifting estimations.

In HNS incidents, knowing the facts about the matters mentioned above helps authorities to make preparations and provide the right kind of assistance. These include the nature of the event (incident/criminal act/ terrorism), whether the situation is static or dynamic,

and the actions planned or already initiated on the vessel.

The required measures are often easier to execute in the initial stages of the incident than in cases where the situation or possible HNS leakage has continued for some time. In HNS incidents, the crew's timely and sufficient initial actions handling the situation are essential. Possibilities for carrying out rescue and response operations on the distressed vessel are nevertheless greatly dependent on the nature and scope of the prevailing conditions.

External assistance:

Assistance from rescue authorities always takes time to get on-scene, and in certain weather conditions help may take a long time to arrive. Note that external assistance in HNS incidents at sea may in some situations be limited or the time required for such help to arrive may be substantial, due for example to the great distance or other prevailing circumstances.

A successful rescue operation requires well-organised and effective command and coordination, functioning communications, efficient information flow and professional rescue operations on-scene. Reconnaissance, rescue and evacuation tasks should be carried out as quickly as possible to ensure both successful rescue operations and occupational safety. An important initial action to be taken in HNS incidents is the safety risk assessment. When making a risk assessment, the special characteristics of the HNS incident should be assessed. These include time-related critical factors, such as an itemised and clear situational picture and situation awareness for the purpose of initiating the correct rescue action plan and getting assistance on-scene on time and the identification of the leaked substances. In addition to these, the dangers and consequences involved should be assessed in order to find out possible ways that the situation could deteriorate. The information given to the rescue personnel should be verified to ensure the correct choice of equipment and procedures. In addition, preliminary preparations should also be made for mass decontamination measures.

Information on the personnel participating in the operation, equipment used and other relevant data should be collected and documented. These other issues include the specific rescue processes carried out, any realised or possible exposure to dangerous substances, and medical procedures undertaken. Any

health and casualty-related information should also be documented and stored.

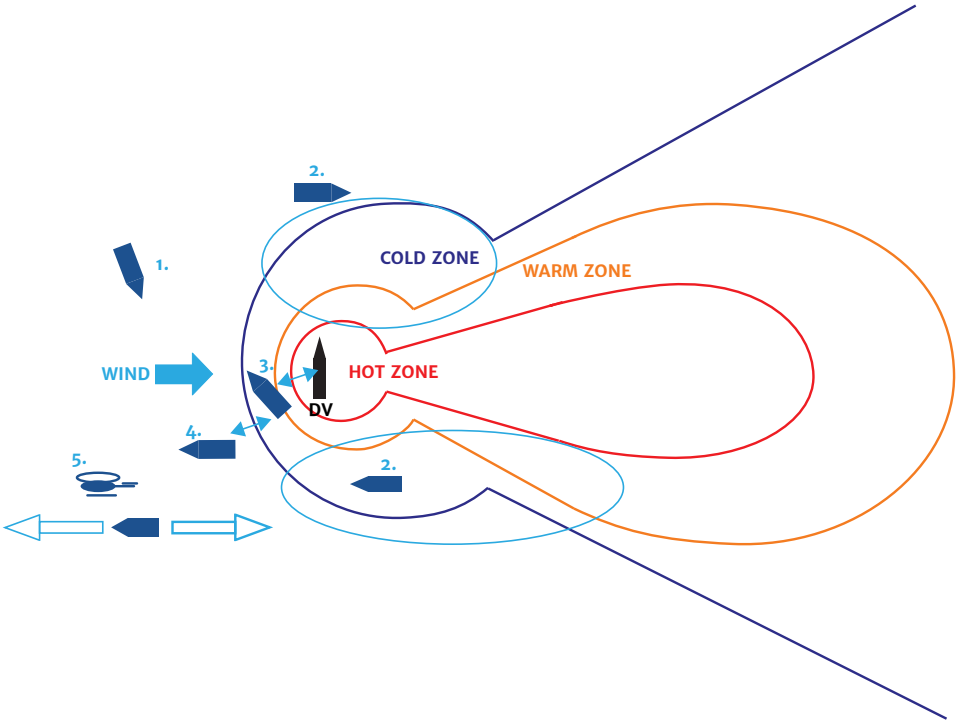
When planning rescue operations during HNS incidents, the role of initial information and initial reconnaissance is essential. The information obtained from the distressed vessel is supplemented with information and risk assessments from other sources, such as the shipping company's Designated Person Ashore (DPA) and chemical or rescue operations experts. In the early stages, it is important to clarify the situation regarding casualties, the number of injured and the symptoms of those who have been injured and/or exposed to the hazardous substances. In HNS incident, information and identification of the HNS in question, the amount of the HNS, possible other substances in the vessel, the type and scope of the incident and it's possible consequences are essential in order to assess the impact and risks for inhabitants and in the area.

HNS incidents are often consequence of a substance leaked from a container or system which then leads a danger to the surrounding environment. The required actions for HNS incidents rescue operations are carried out in order of priority, but depending on the situation they may be done in sequence or in parallel. When making a rescue plan, consideration must also be given to the possibilities for reducing or stopping the leakage, transferring the dangerous substance back into its containers, neutralising the substance or allowing it to evaporate safely. These kinds of preliminary response measures may significantly facilitate the rescue operations as well as prevent the situation from getting worse, thus making the situation also safer for the rescue tasks of first responders.

On-scene, the primary task of the rescue units is to execute reconnaissance procedures. This should be done from upwind of the actual incident, maintaining a sufficient distance from the distressed vessel. When approaching the DV, one aim is to avoid making the situation worse through the SRU's own actions. The purpose of reconnaissance is to discover the risks posed by the HNS to the rescue operations and the special measures required. In this stabilisation phase, the operational capacity of the rescue units on-scene is limited by the units' capabilities of operating in the HNS' area of influence.

Putting rescue vessels at risk unnecessarily should be avoided, and it is important to monitor the situation using the vessel's

fixed gas warning and measurement systems, mobile measurement devices operated by the detection and monitoring team, or long-range observation and measurement systems (e.g. cameras or other systems fixed to the vessel, an aircraft or a RPAS/unmanned surface vehicle). Real-time detection and monitoring is used to estimate toxicity and danger of fire or explosion, as well as in designating the safe working zones and areas separated from other traffic.



Picture 2. Possible tasks for the SAR units in HNS incident
1. Surveillance, isolation and monitoring
2. Measurement and sampling
3. Command and support - rescue operations
4. Support and transport – casualties, personnel, equipment
5. Transportations to and from the shore (helicopter/vessels)
Source: SYKE Ympäristöopas 94, Henkilökohtaiset suojavarusteet kemikaalipäästötilanteessa merellä"

The measurements taken also determine the required personal protection level (PPE level). HNS release and its effect on changes to the danger zone should be monitored continually using gas detection and other measuring systems.

An HNS incident on a vessel can also lead to the formation of a non-visible or transparent gas clouds or vapours. As these move with the wind, there is a risk, both to persons on board a distressed vessel (vapour or gas entering accommodations) and to vessels involved in the rescue operation.

Only vessels that have the capacity for operating in a hazardous environment caused by the leaked HNS can operate in the established (calculated or measured) warm and hot zones. Operating in these danger areas – where there is a risk of contamination by the leaked HNS – requires significant protective measures from both the crew of the rescue vessel and the protection procedures of the vessel itself entering the area. The rescue personnel should be aware of the risks related to the task and have the necessary skills for executing the task. The vessel's systems must be sufficient for enabling safe operations carried out on-scene, e.g. decontamination and first aid facilities, and if necessary also nearby the distressed vessel (possible hot zone). The methods to be used for limiting the possible spread of HNS as well as to control or decrease the area's danger level (explosiveness, toxicity) includes 'guiding' or 'dropping down' gas clouds by using water spray and foaming or recovering floating substances.

Action options

1. Emergency towing

Using emergency towing procedures, the vessel's position and heading can be altered in order to direct vapours or gases away from the accommodation. In some situations, the vessel must be shifted by emergency towing to a more sheltered location, e.g. to enable evacuation or to shift the DV to position further away from the vicinity of an inhabited or otherwise risk-sensitive area to reduce the HNS impact on these surrounding areas.

2. Place of Refuge

When the vessel in HNS distress or in danger causes remarkable risk for environmental disaster, the coastal state can appoint a place of refuge for the vessel. On the other hand, the request for the place of refuge can also come from the vessel in distress. In that

situation, the coastal state needs to assist the vessel by all means and bring the vessel to a safe area or to the designated place of refuge. A place of refuge may be needed in the situation where a ship has suffered an incident and is damaged. It can be continuation of a search and rescue operation or environmental recovery operation or it can be just a vessel's request for a place of refuge. The procedure starts when the request for the place of refuge is done by the master of the vessel in need of assistance or by the representative of the shipping company or when authorities of the coastal state make the decision to force the vessel to the place of refuge. The request can also come from the authorities of a neighbouring coastal country.

Bringing a ship to a place of refuge near a coast may endanger the coastal state, both economically and from the environmental point of view. Countries have different legislation and responsible authorities, and the process varies among coastal states. Although many countries have plans for a place of refuges included in their maritime emergency plans, the decisions are made case-by-case to minimise the risks and to prevent damage and pollution. In decision-making, many things are taken into consideration, e.g. the condition and features of the vessel, weather conditions, rescue options, environment protection, etc.

3. Evacuation

Evacuation of the distressed vessel should be considered and discussed with the master of the DV already in the initial stages when making the situation assessment. Depending on the severity of the situation, immediate evacuation may be the only option if there is a risk of the HNS situation getting worse on the vessel. The nature of the incident, the prevailing conditions, possible risks posed to evacuees and rescue personnel, and finally the decision of the master of the Search and Rescue Unit (SRU) have an influence on whether rescue actions can be carried out by the SRU on-scene.

In situations where there are HNS vapours or gases are widely spread, evacuation of the vessel can be carried out at a later stage through this hazardous or toxic atmosphere only if the evacuees have the possibility of wearing protective equipment that enables a safe exit (e.g. a filter mask, Emergency Escape Breathing Device (EEBD) or equivalent, and protective clothing). Preparations should be made already in the very early stages to arrange the transport of this clothing and equipment to the rescue vessels in the

area and onwards to the distressed vessel (e.g. by helicopter to a support vessel). In some HNS incidents, the safest place for the crew and passengers is within the distressed vessel's accommodation or in some other compartment of the vessel where the effects of the dangerous substances are not present. This alternative approach, depending on the severity of the situation and assessments of its likely development, is to arrange shelter for the individuals in the vessel's accommodation and to make these spaces hermetically sealed or pressurized if possible.

4. Rescue operations for saving human lives on board distressed vessel (DV)

Rescue operations are led by the RCC responsible for the area in question in cooperation with the master of the distressed vessel.

When assessing a possible rescue plan, consideration must be given to the resources required for executing rescue operations on the distressed vessel. Additional needs arise if the situation is prolonged (e.g. sufficient number of first responders, options for decontaminating a larger number of persons and equipment, and emergency medical care for victims and transport for further treatment).

In general, rescue actions under HNS impact on board a vessel are always challenging and they are high risk activities based on the special characteristics of the operating environment. Before executing the rescue operation on board, decontamination arrangements and clear exit routes have to be ensured for the rescue team operation. To fulfil this requirement, the safe exit routes and spaces must be confirmed beforehand by the crew of the distressed vessel, or at least before the actual operations begin (safety plan, etc.). Furthermore, a decontamination station or emergency decontamination point must be established, set up and tested. First aid capacities and the availability of required personnel must be confirmed.

Transit from the hot zone to the cold zone must always go through the decontamination station. If the decontamination station cannot be set up, a shower/flush point (jet fog and provision of extra air) is the minimum requirement for the first stage emergency decontamination. The purpose of decontamination measures is to remove at least a significant remainder of the contaminants from casualties, rescue personnel, clothing

and equipment in a fast, efficient and safe manner. The decontamination station or decontamination point should be set up (depending on circumstances) outside the hot zone in the space between the warm zone and the cold zone (in situations where the rescue operation work zones can be located on board the distressed vessel). In this way, the decontamination processes form a 'corridor' between the rescue operation zones. Another alternative is to establish the decontamination station on a support vessel that is able to work in the hazardous atmosphere, provided that the rescue unit is equipped for working in this area. In the above situation, the cold zone is the pressurised interior of the vessel. In both cases, first aid and treatment areas must be located in the cold zone.

The decontamination point or station should be as close as possible to the scene of operations to prevent the spread of HNS to a wider area. In some situations, it is possible to set up the decontamination point on board the distressed vessel if the weather condition, other circumstances and the nature of the incident permit this. In any case, efforts should be made to at least set up on board the distressed vessel 'a flush point' that meets the minimum emergency decontamination requirements. Also, if the leakage is small and localised, the decontamination station may, depending of the circumstances, be set up by using transportable decontamination equipment on board the distressed vessel instead of on board the SRU. A basic requirement is that this can be done outside of the hot zone. Attention must be paid to the distance set between the hot zone and the decontamination point, taking into account the spread of the substance, to prevent the HNS from also spreading with secondary contamination.

The first unit arriving on-scene that is capable of operating in the hazardous zone at the assessed risk level should transport the rescue teams. During rescue operations on board the DV, the tasks of the rescue team are connected to different rescue and first response actions. These can be, for example, supporting the communication between the DV and RCC, risk assessment on board, supporting the master of the vessel for decision-making, preventive response measures and detection, minimizing the influence of the HNS (e.g. by restricting or stopping the leakage, neutralising the substance), emergency medical service, medical evacuation, emergency decontamination procedures and preparations for abandoning the

ship. In addition to those, the rescue team should also take measurements and carry out other preventative measures, if needed, to support the rescue operations. Planning should also include measures to transport casualties from the dangerous area to the decontamination points and onwards from there. Special attention must be paid to working on contaminated and affected areas where there is danger of secondary contamination.

A second team to arrive should be ready at the hot zone entry point before rescue operations on board will be executed. This team, referred to as the backup team, confirms the safety of the entry team as well as the decontamination measures for the casualties and their transit for further treatment and onward transport. Based on the situation, the backup team sets up an emergency decontamination point close to the entry point, unless the crew of the distressed vessel have already established this. The minimum requirement for that is an emergency decontamination point, which includes an emergency decontamination shower and provision of extra air. The backup team's other activities may include decontamination and emergency first aid for casualties, actions for isolating the danger zone, and taking measurements.

The above-mentioned rescue team tasks are highly dependent on the national, organisational and especially the unit-based procedures.

A safety briefing should be held for all those participating in the rescue operation before executing the rescue operation on-scene. This should be based on the updated risk assessment, and those participating in the operations should understand the task, risks, initial action plan and emergency plan. After the briefing and before the practical execution, all rescue personnel should be registered. During the work on-scene, all relevant actions are recorded; and after the operation, possible personal contamination, injuries, etc., are written down.

Transporting the rescue teams and equipment to the distressed vessel is often a challenging and time-consuming phase. The available options, including boarding the DV, should be discussed and agreed with the master of the DV. Initial transport measures (which can be by helicopter, rescue craft or other capable Search and Rescue Unit (SRU), for example) should also be clarified.

4. Concluding phase

The rescue operation is at the concluding phase when all lifesaving activities are completed and the situation on-scene has been stabilised. In an HNS incident, it is important to note that preventative operations will continue after the actual rescue operation has been completed. Depending on the national guidelines being followed, this may involve a change in command or the arranging of these responsibilities once the rescue operations have been completed. Tasks and operations given to participating units related to the HNS incident as well as the completed HNS rescue operations should be documented for further purposes.

Once the rescue operation is completed, particular attention must be paid to the decontamination of contaminated clothes and equipment and to record the actions carried out in the HNS zone of influence. In a situation where the SRU has been totally or partly contaminated, special attention has to put on safe and effective decontamination processes by professionals.

Other tasks related to the conclusion of rescue operations include reporting on the event and its impacts to different authorities and the media, the removal of any restrictions that have been put in place, carrying out a debriefing for all those involved, and measures to prevent subsequent damages.

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