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Oil Spill Response Exercises
The Way we Fight

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Abstract

In a situation where oil is spilled on the Norwegian Continental Shelf, the operator is responsible for the oil spill response, clean up and restoration. To assist an operator in a cost-effective way, The Norwegian Clean Seas Association for Operating Companies (NOFO) was established by the companies to maintain the oil spill emergency preparedness.

To conduct oil spill response, from an offshore incident to beach clean up and restoration, is a complex task. The organisation put forward to deal with such a task, must be well trained and familiar with contingency plans, available resources and co-operating parties, in order to successfully combat an oil spill.

NOFO is annually conducting a number of large-scale field exercises where the entire organisation is training on oil spill combat operations. These exercises are conducted the way we will fight in a real situation.

A typical large-scale exercise involves some 250 – 500 people from a dozen or so of the co-operating parties (including the private actors, municipalities and governmental agencies), equipment and the establishment of a functional operational centre in the field.

This paper describes the way we fight and the way we conduct our exercises, describing a scenario, mobilisation, responsibilities within and outside the organisation and resources employed, to restoration of the environment, including different tools available for combating an oil spill.

Introduction

The Norwegian Clean Seas Association For Operating Companies (NOFO) is an organisation for oil spill recovery established by the operating companies on the Norwegian continental shelf. NOFO ensures that the authorities oil spill recovery requirements are followed. (Fig 1)

How does NOFO ensure that these requirements are followed and how will resources available through the contingency system be employed in an oil spill response operation and what is the strategy?

NOFO has an exercise schedule that annually includes two large-scale exercises. These exercises involve all co-operating parties according through the NOFO Co-operation Agreements, and are carried out the way we will fight an oil spill. Our philosophy is to train as we fight.
During the last two and a half years, NOFO has conducted such exercises according to the schedule, and a lot of experience and improvement has been achieved.

A typical large-scale exercise involves some 250 – 500 people from a dozen or so of the co-operating parties (including the private actors, municipalities and governmental agencies), equipment and the establishment of a functional operational centre in the field.

The way we fight

The situation

The situation we fear is a full-scale blow out at one of the previously mentioned offshore installations. (Fig 2)
Such a situation will create a lot of activities, including notification to police (through the Joint Rescue Co-ordination Centre) and the Authorities (through Norwegian Petroleum Directorate). At first, the main aim will be to ensure people are not injured, conduct necessary evacuation and protection of life and health to people at the installation.

The mobilisation

In case of an oil spill event, NOFO will mobilise its organisation - or rather - the Oil Spill Combat Regime.
The operator, who is responsible for the activity, which causes the oil spill, will, amongst other, make an emergency call to NOFO Operation Centre. This Centre covers a 24 hours readiness with a Duty Officer from the NOFO Administration. Based on the situation and the requirements of the operator, NOFO will alert or mobilise necessary Oil Recovery Vessels and the NOFO Contingency Groups. Furthermore, the NOFO Mobilisation Centre will be alerted in order to call upon the NOFO bases, On Scene Commanders Sea (OSC) and the necessary units from the NOFO pool of towing vessels etc. Most likely, the Duty Officer will be summoned to the operator's Emergency Reaction Centre as an adviser and/or assist in controlling and fighting the oil spill. (Fig 3)

Situation awareness

One of the first actions to be taken is obtaining the necessary oil drift prediction. This is provided within 30 minutes through an agreement with the Meteorological Institute in Bergen. This prediction indicates, based on the available weather forecast, the oil drift within the next 24-72 hours, including an estimate of the amount of oil on the surface, in the water column, how much has evaporated and the total amount of emulsion, all based on the characteristics of the oil.

Other information about the situation may also be provided from different surveillance sources, such as satellite, aircraft, helicopters etc. (Fig 4)
The aim is to establish an overview of the situation as situation awareness is essential in any combat operation.

The nightmare is oil spill reaching the shores, polluting and damaging the environment, killing birds, fish and mammals and leaving the shoreline useless for public access. This must be avoided! (Fig 5)
Based on the evaluation of the situation and as a result of a dialog between the operating company and NOFO Duty Officer, the necessary actions will be taken and the oil spill combat organisation will be established.

The Oil Spill Combat Organisation

The responsible operator will have the overall responsibility for the operation, including information and public relation.
The detailed and normally local, tactical management of the operation may be executed by the NOFO "Fire Brigade". Establishing a "Forward Operation Centre" at a suitable location, this centre will be manned by personnel from the different contingency groups. (Fig 6)
From this Operation Centre the actual Combat Strategy and Operation Plan will be developed and implemented.
The Execution of this Plan will be through the Maritime Co-ordinator and the OSC Sea, responsible for the employment of the heavy, ocean-going NOFO systems and other resources made available for fighting the oil spill at sea, and the Coastal Co-ordinator who will actually act as the main co-ordinator between the Operation Centre and units employed in the land, shore and near-coast battle, figuratively speaking. The idea is to employ the near-coast and shore organisation already in-place, without changing their internal chain of command and modus operandi. This is the essence in the expansion of NOFO responsibility and the New Regional Oil Spill Response Plan.

The Operations Management Group may be established and employed to a forward location.
Even if modern means of communications enables an operation to be remotely controlled, it is essential to visualise to the public that responsibility is taken, hence operate in the vicinity of a threatened area.
The individuals, called upon from the contingency groups, will get together and decide on the tactical approach to counter the oil spill. The overall strategies, however, remain vested in the operating company.

Offshore Employment

Pending on the location of the blow out, the availability of oil recovery vessels and the nearest base, operators are mobilised in order to prepare for the deployment of equipment and personnel.
The logistics co-ordinator – or the NOFO Duty Officer – may start mobilising necessary resources, such as oil recovery vessels (OR), towing vessels, NOFO equipment and operators in order to fight the situation offshore, as close to the source as possible.
The operators will also be responsible for loading the heavy equipment onboard the vessels, and make sure it is safely secured. The NOFO Standard on the ships ensures the effectively embarkation.
The idea and main strategy is, of course, to prepare and deploy NOFO systems offshore, as close to the source, in order to prevent the oil spill from reaching the coastal areas and the shores.
Therefore, the oil boom will be deployed and put in action in order to restrict the movement of the oil spill by manoeuvring into different formations pending on the situation. (Fig 7)

If, through a thorough analysis and consideration, the conclusion is that the use of chemical dispersions will provide a Net Environmental Benefit, the helicopter and bucket may be employed in the operation. The bucket can be refilled from the OR vessel carrying a large amount of chemicals.
This option, however, should be considered at a very early stage of the operation, as the oil normally will become resistant to chemical dispersion after a relatively short time at sea.

Assistance in aerial surveillance by aircraft and/or helicopters in order to track the oil spill and get an overall picture of the situation is crucial.
Through different sensors onboard the aircraft or helicopter, such as Ultraviolet or Infrared sensors, tracking can be achieved regardless of light or visibility.
On board the employed oil recovery vessels, monitors are available in order to receive the surveillance information from the airborne assets. (Fig 8)
The On-Scene Commander, being deployed on board one of the vessels, will use this information in order to conduct tactical directions of assets employed offshore in the oil spill response operation.
By employing an oceanographic buoy, the On-Scene Commander is capable of obtaining information on wave height and direction, ocean current speed and direction, hence giving the possibility to conduct short time oil drift prediction in the local area. Information is transmitted from the buoy via satellite to a shore-based computer and obtained via Internet on board the OR-vessel. On board the vessel, the data is downloaded into a laptop providing information – and prediction – on the oil drift in the local area.

Given all relevant information, the OSC can employ the NOFO system according to best chosen tactic. Different tactics and procedures are available.
The initial Combat Strategy is to employ an Oil Recovery Class carrying a complete package of NOFO oil spill recovery equipment in order to conduct mechanical oil spill recovery as close to the source as possible.
The recovery equipment and the vessels are, as mentioned, designated a “NOFO System”.
When employing the NOFO Systems, the formation will normally be a so-called J-formation. This formation is used to concentrate the oil spill into a relatively small area allowing maximum effect of the Transrec system. (Fig 9)

After obtaining the proper formation, the booms will be manoeuvred in position in order to collect the oil spill.

After concentrating the oil spill in the boom-area, the skimmers will be employed to recover the oil, a work that must be considered as ”dirty” work.

The oil recovery vessels themselves have a storage capacity of at least 1.000 m3. In case of a large oil spill, the need for other storage facilities is imminent. Through the agreement with Navion, shuttle tankers with a capacity of between 100.000 and 200.000 m3 may be employed in the operation. The recovered oil may then be transferred from the oil recovery vessel to the shuttle tanker, hence allowing the OR vessel to continue its operation without having to leave the operating area. (Fig 10)

Coastal employment

As time goes by, oil spill may drift towards the coast threatening vulnerable areas. The oil drift predictions will be received continuously in order to take necessary precautions. The environmental adviser attached to the Operations Management Group, will advice on areas to be protected and where to concentrate the effort.

A planning team, in order to issue necessary orders and plan for the way ahead, will assist the Operations Manager in carrying out his tasks helping him in making the ”right” decisions as to which protective areas must be given priority and tactics to be used.

NOFO has also developed a data tool that provides a lot of information to be used in the oil spill response operation. This tool, adding up oil drift predictions, beach information, maps etc is proven valuable for the planning team.

As the oil spill approach the coast, other resources more suitable to operate in the inner waters may be needed and the Coast Guard may be drawn upon through the agreement with Norwegian Coastal Administration (NCA) and actively employed in oil spill response operations.

Smaller vessels and booms suited for shallow waters will be drawn upon from the local oil spill combat groups, as the municipalities will be mobilised to assist in the operation.
When employing the coastal units, that is, the local oil spill combat groups from the municipalities, NOFO will employ not only the equipment and personnel, but the entire organisation including their own operational management group and oil spill response plan.
By doing so, the local knowledge to the area will be fully utilised and the units will fight the way they themselves are trained and prepared. (Fig 11)

The local combat groups can draw upon the availability of small vessels from the community in order to help them with different tasks, like employing coastal booms, protecting the shores and forming the last offshore barrier in order to prevent the oil spill reaching the shore.
With resources employed offshore, ranging from heavy NOFO equipment to lighter municipality owned equipment, the Maritime Co-ordinator will perform an important role in advising the Operations Manager in how to employ and tactically direct these assets.

Beach employment

The Beach Cleaning Teams, also from the local groups, will protect the beaches and encircle oil slicks in order to prevent further drifting polluting other areas. (Fig 12)

If oil reaches the shore – hopefully being only a very limited amount of oil from the spill – the local combat groups from the municipalities will form beach-cleaning teams working in close co-ordination with the Operations Management Group through the Coastal Co-ordinator.

Having a lot of resources and units employed in an operation place a lot of burden on the communication. The Operations Management Group ensures this by issuing and maintaining a current Communication Plan. This is one of the main tasks to the Communication Co-ordinator. He will also be responsible for ensuring that the deployable Local Area Network and Communication Unit NOFO has is established and woks properly. He is also responsible for the main logbook, ensuring the necessary documentation of the events and actions taken.

Of course, cleaning beaches is a long and complicated process.
Pending on the consistence of the oil, the characteristic of the beach, availability of personnel and equipment, the Operation Management Group may have to assist in calling up extra personnel, heavy equipment and so forth. (Fig 13)

Cleaning the beach is by far the final step in an oil spill combat operation. When oil and waste is collected at the beach, it has to be transported to facilities suitable for receiving, storing and destroying the waste.

This is a complicated process and the Operation Management Group will have to co-operate closely with the Pollution Control Authorities, the County Governor, the Municipalities and the Industry in order to deal with this challenge.
The co-operation between State, Municipality and Private Industry is vital, not only during the active combat operation, but also in the follow-up process.

Restoration

Finally, when the oil is recovered, both at sea and shore, and the environmental conditions are normalised, the operation will be terminated. (Fig 14)
Terminating an oil spill operation will be based on an agreement between the Pollution Control Authorities and the polluter.
The agreements, however, includes mechanisms in order to monitor the affected areas for as long as it takes to ensure no substantial damage has been made.
And of course, equipment involved in the operation shall be cleaned and possible damages repaired.

The bill for the entire operation will then be presented to the respective operator.

Conclusion

Through the large-scale exercises conducted by NOFO, all the mechanisms, co-operations and agreements described are trained and considered.
NOFO firmly believe that the only way to maintain an efficient and trustworthy oil spill contingency regime is to train and exercise on a regular basis.
NOFO will continue with these exercises under the motto "*Usus est Optimus Magister*", or training is the best teacher, and we will exercise the way we will fight.

Acknowledgement

I will like to thank all the personnel forming NOFO Contingency Groups and the operators at our bases. These people form the back-bound of the Contingency System, and voluntarily participate in exercises and training. These people make us ready to fight if ever such a situation should occur – and we will win!

References

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4. Skeie, G.M., Rødal, J. et al. A Web based system for regional oil spill contingency and emergency response planning. SPE Conference in Stavanger, Norway, 26 – 28 June 2000

Principles and structure

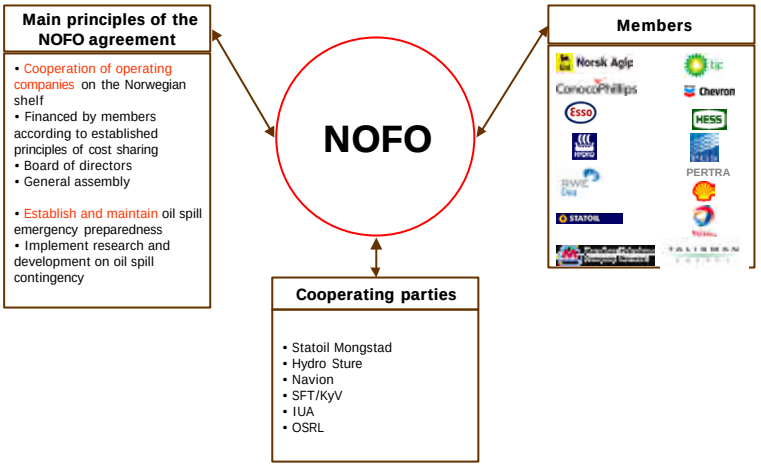


Figure 1: NOFO Structure

Blow out

Figure 2: Blow - Out situation
(Ill. Ixtoc I, Mexico, 1979)

Mobilisation

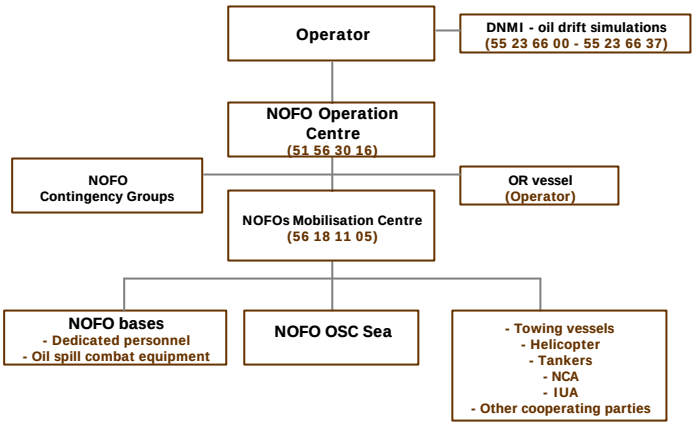
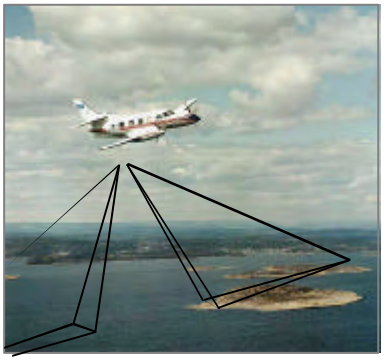


Figure 3: Notification and Mobilisation

Surveillance



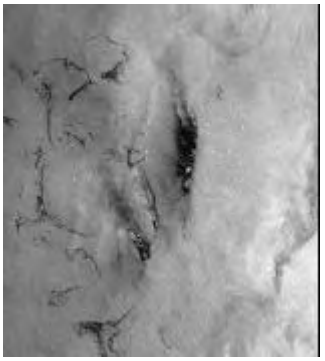


Figure 4: Surveillance

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The ”nightmare”

Figure 5: Oil Pollution Nightmare

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Organisation during a combat operation

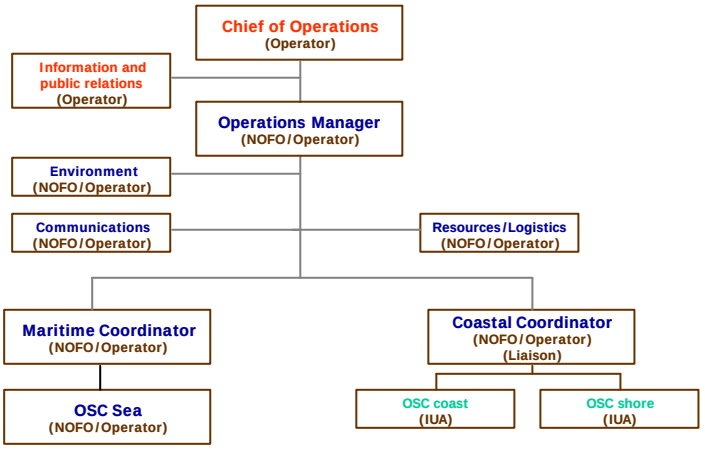

Figure 6: NOFO Combat Organisation

Deploying oil boom

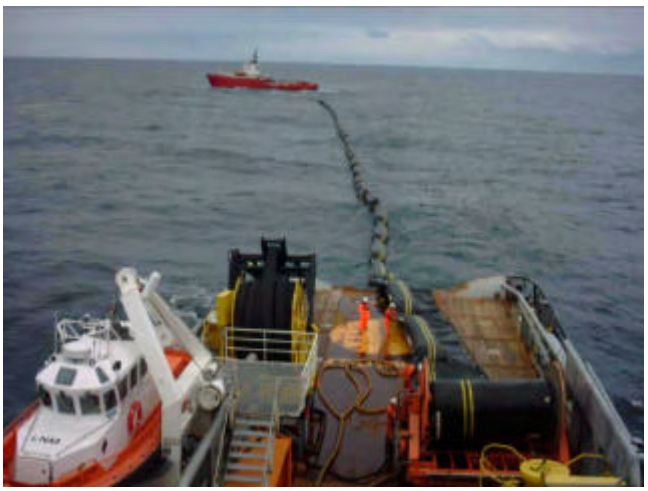

Figure 7: Deploying the boom

On Scene Commander

Figure 8: Receiving surveillance information

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Combat strategy

Figure 9: Combat formation

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Transfering oil

Figure 10: Transferring recovered oil

Employing coastal units

Figure 11: Employing Local Units

Beach Cleaning Team

Figure 12: Beach protection

Figure 13: Employing heavy equipment
(Ill. Grønsund, Baltic Carrier 2001)

Figure 14: Restoration
(Ill. Reine, Lofoten and Latvian Beaches)