Oil on Water Norwegian exercise 2011 Submission date: 17.2.2012

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ABSTRACT

The annual NOFO oil-on-water (OOW) exercise 2011 took place in the North Sea on 6-10 June. This years' exercise also had a large international contingent with vessel participation from the Swedish Coast Guard, Hercules dispersant aircraft from OSRL in the UK, as well as surveillance aircraft from Norway, Sweden, France and the U.K. Furthermore, the Norwegian Coastal Administration, the Norwegian Society for Sea Rescue (NSSR) and the Norwegian Coast Guard were also represented.

After a co-ordinated spotter- and dispersant aircraft operation (water spraying only) was conducted successfully, releases of 400L Radiagreen^{TM} palm oil , 30m^3 Balder crude and 20m^3 crude emulsion were initiated. All three releases enabled comparative remote sensing of different sea surface substances using multiple airborne and satellite based sensors. The crude oil slick was free-floating and a target for ship based dispersant application performed by the vessels Stril Mermaid and Stril Power. The emulsion release took place in front of the Coastguard vessel KV Bergen testing mechanical oil recovery equipment.

This paper describes the planning, execution and lessons learned from this type of large scale exercises.

Introduction

NOFO, the Norwegian Clean Seas Association for Operating Companies, was established in 1978, one year after a significant blow-out from the Ekofisk Bravo platform in the North Sea. It is an oil spill response organization owned by all 29 operating companies on the Norwegian continental shelf. While the operator has the overall strategic management of the response, NOFO has the tactical and operational command of all resources. At present NOFO has a wide range of tools at disposal during a response operation. To obtain thorough knowledge of each of these tools is the main objective for the annual NOFO OOW exercise.

An OOW exercise is the final stage of NOFO oil spill equipment testing. Preceding OOW theoretical analysis, model testing, full-scale trials in test facilities and test tanks usually have been performed. The OOW exercise provides testing of oil spill response equipment under realistic off-shore conditions. The crude oil releases require a release permit issued by the Norwegian Climate and Pollution Agency. The application process for a release permit is extensive, including a hearing round to a high number of parties/bodies entitled to comment.

The 2011 Oil-On-Water exercise program constituted of:

- Dispersants test from vessels M/V Stril Power and M/V Stril Mermaid.
  A total of 30 m^3 of Balder Crude oil was to be released as a free floating slick.
- Operational test of NO 800R boom together with a Norèn skimmer. This equipment was situated on-board the KV Bergen. A total of 20 m^3 of emulsion to be released into the boom of KV Bergen.

- Release of 400 litres of Radiagreen™ palm oil for comparative studies by use of Synthetic Aperture Radar sensors and visual images taken from various satellites.
- Practical test of the Norwegian Surveillance aircraft as a spotter for the OSRL dispersant aircraft. Water was used to test application accuracy on drifting buoys.

During all releases comparative testing of satellite and airborne remote sensing was performed using multiple sensors on aircraft from France, Norway and England. Performance and comparative testing of ship based remote sensors like the IR cameras and OSD (Oil-Spill-Detection) radars were also performed.

Figure 1. All the participating vessels in port before the NOFO Oil-On-Water 2011.

In addition to equipment testing and verifications, NOFO also focus on On-Scene-Commander training as well as communication procedures between operational oil spill response units onshore and offshore.

7 of June 2011 Day 1 Oil-On-Water 2011

Trial 1:

For some time, NOFO has been collaborating with Oil Spill Response Limited (OSRL) in streamlining Hercules dispersants application operations in Norway. During the OOW 2011 the whole process from notification of OSRL to mobilisation and dispersants application was demonstrated using Stavanger Sola Airport as base.

Figure 2. OSRL Hercules dispersant application. Guidance was provided by the Norwegian surveillance Beech 200 aircraft LN-TRG.

LN-TRG provided guidance to the Hercules in applying dispersants on the sea surface defined by four drifters (buoys). The Hercules made 5 runs over the area demonstrating a high degree of precision. In the post-exercise briefing both aircraft crew agreed that the operation was very realistic and useful for establishing procedures for co-ordination of On-scene Commander, spotter aircraft and Hercules tasks and communications.

Trial 2:

The release permit contains weather requirements for each type of release. Due to unfavourable weather, the free-drifting oil release for dispersant application was postponed. Instead, testing NO 800R oil boom and Norèn skimmer were initiated.

Figure 3. M/V Stril Mermaid releasing emulsion into the boom of Coastguard vessel Bergen. Backup system of M/V Stril Power seen aft.

A total of 20 m^3 of emulsion was released into KV Bergen oil boom. Some leakage was observed behind the boom. Hence Stril Power served as the backup system collecting the escaped emulsion. Recovering this particular emulsion brush skimming was more efficient than disc skimming. 19 m^3 of the release was collected by the two recovery systems.

Eight of June 2011 – Day 2 on Oil-On-Water exercise 2011

Trial 3:

On the morning of Wednesday June 8, 400 litres of Radiagreen^{TM} palm oil was released for comparative studies by use of satellite and aircraft remote sensing. There were also remnants from the oil released the previous day. By having palm oil and crude oil inside the same area, the important issue of “look-alikes” in satellite Synthetic Aperture Radar images was addressed. By comparing satellite images with ground data (sampling) and air surveillance data it was possible for a PhD student to collect data for developing methods to distinguish crude oil from "look-alikes" such as palm oil. Preliminary results are promising, and as a regular user of satellite remote sensing data NOFO look forward to an enhanced satellite oil spill detection service.

Trial 4:

A free floating slick of 30 m^3 of Balder Crude was released on the 2nd day of the exercise. New dispersants application systems on-board Stril Power and Stril Mermaid were used to disperse the slick by guidance from surveillance aircraft and Search & Rescue helicopter from the Oseberg field. The helicopter provided live IR and daylight video to the vessels by use of a lone-of-sight down-link system. Hence the helicopter crew were able to guide the vessels towards the" true colour" parts of the slick.

After dispersants application, some areas of "true colour" oil thicknesses were observed by the command vessel M/V Normand Jarls. This oil was recovered by the Swedish Coastguard Lamor system.

Figure 4. M/V Stril Power during dispersants application.

Summary

The Norwegian Climate and Pollution Agency conducted a revision of the 2011 OOW exercise. NOFO passed this formal inspection with no remarks. The exercise was also conducted without any injury to personnel and equipment.