

# Surveillance of oil pollution on the sea

(A summary)

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**The National Audit Office of Denmark**



## **Introduction, objective, scope and methodology**

1. The report examines the effectiveness of measures taken by the state to discover oil pollution in Denmark's territorial waters, and identifying and prosecuting oil polluters in the period 1995-2000.

Since 1 January 2000 the Ministry of Defence has been solely responsible for surveillance and enforcement of anti-pollution laws at sea, whereas legislative matters continue to fall within the Ministry of Environment and Energy. Before 1 January 2000 the operational tasks were carried out in co-operation between the Danish Environmental Protection Agency and the Chief of Defence Denmark.

2. The primary objective of the examination was to assess whether the surveillance is effective and whether polluters are prosecuted and fined. The purpose has been to assess, whether

- the surveillance effort is organised so that the state's aircrafts and satellite surveillance discover the oil spills,
- the pollution source is identified, and
- offenders are penalized.

3. The examination was primarily based on collected data and meetings held with the authorities concerned.

The Ministry of Defence has supplied figures showing the numbers of discovered oil spills. The Danish Environmental Protection Agency and the Ministry of Defence provided information regarding identification of oil polluters. Correspondence has taken place and meetings have been held with the Danish Environmental Protection Agency regarding sanctions. Furthermore, meetings have been held with the Chief of Defence Denmark regarding the surveillance and the legal prosecution of the polluters.

## **Readiness for discovering oil spills**

4. Law number 476 of June 1993 concerning sea protection (sea environmental protection law) covers the protection of nature and environment, and shall prevent and limit pollution of the sea environment. In addition, the law shall ensure maintenance of a system of readiness for combating pollution at sea, in the coastal areas and in harbours.

5. It is prohibited to empty oil in Danish territorial waters, that is, 12 nautical miles from the coast.

Since 1983, it has been prohibited to empty oil in the Baltic Sea, as the sea was declared a special sea area by the UN. A similar prohibition has been in effect in the North Sea since February 1, 1999.

In June 1996, an exclusive financial zone was introduced around Denmark. Therefore, the international environmental protection rules also may be enforced on foreign ships up to 200 nautical miles from land.

6. The strategy, purpose and goals of the sea environmental surveillance of the Defence, and the effort against oil pollution at sea, are described in the directive for sea environment of the Chief of Defence Denmark from January 2000. The overall objective of the task is to ensure a preventive effect by surveillance, enforcement and securing evidence. The Ministry of Defence informed that focus is on surveillance and securing evidence, as it is necessary to make a thorough surveillance in order to discover oil spills and in order to identify the polluter. Identification is, at the end of the day, necessary in order to get a polluter convicted.

7. The Ministry of Defence informed that the main pollution source of the Danish waters is illegal leakage from ships passing through the Skagerrak, the North Sea and in the Feme Belt. The oil discharges stem from ships' illegal discharging of tanks, engine rooms or slop tank and are considered to be "operational waste".

8. The NAOD examination showed that in the period 1995-2000 there was increased ship borne traffic in Danish waters and that the future establishment of a major oil disembarkation terminal in Primorsk in Russia calls for a well functioning readiness against oil pollution.

9. With the aim of meeting the recommendations of the Helsingfors convention, and in order to generally improve the oil pollution control; the Danish Environmental Protection Agency launched a three-year trial period with aircraft surveillance in 1989. Initially, the surveillance included 300 propeller hours annually, in 1995, the number increased to 450 propeller hours. As responsible for the flying hours needed, the Danish Environmental Protection Agency increased its flight hours by 100 % to 1000 propeller hours, equivalent to 500 jet hours. The Ministry of Defence did not change the level of flying hours when taking over the responsibility for the surveillance.

10. The NAOD has found that the Defence has planned a quarterly equal distribution of flying hours, but that actual hours delivered in 1999 and 2000 deviated significantly from the planned. In 2000, about 53 % of the flying hours were carried out in the 4<sup>th</sup> quarter.

11. Satellite surveillance has, on an experimental basis, been used for marine environment surveillance since October 1998, and from 2001 it became a permanent part of the Defence's oil pollution surveillance.

Defence has contracted for a fixed number of pictures to be supplied every year. For 2001, the Defence plans to receive 90 satellite pictures. The advantage of using satellite surveillance is according to the Ministry of Defence that one picture (150 nautical miles times nautical 150 miles) covers almost the entire Danish exclusive financial zone in the North Sea, which converted into flight surveillance hours, would be equivalent to 10 flight hours. The disadvantage of using satellite surveillance is that the observations must be verified visually, which in turn requires aircrafts or ships and takes time.

In addition to surveillance by aircraft and satellite, environmental surveillance is carried out by ships. This surveillance is not systematic but implemented in connection with other tasks of the Defence and other state-owned ships.

12. The number of observations varied in the period of 1995-2000. In 1999, it was at its highest with 220 substantiated oil observations, whereas the lowest number – 150 observations – was made in 1997, and in 2000 the number of observations was 151. In the period of 1995-1997, the marine environmental surveillance discovered between 0 and 6 oil spills. In 1998, the share of aircraft and satellite surveillance increased significantly to 54, where after the level increased to 87 in 2000. In conclusion, in the period 1998-1999, the state's aircraft and satellite surveillance discovered an increasingly number of oil spills, but it was not until 2000 that aircrafts and satellites discovered more than half of the number of oil spills.

13. The NAOD examination showed that the effect of aircraft surveillance was very modest in the period 1995-1997. In 1998, the number of discovered oil spills increased significantly, which among other things were due to a 100 % increase in the number of flying hours. In 1999, the number of actual oil observations increased additionally, as a consequence of satellite based surveil-

lance. In 2000, the marine environmental surveillance discovered more oil spills with aircrafts and satellites than other sources; however, other sources still discover a significant proportion of the number of oil pollutions.

The NAOD examination has shown that the surveillance effort – as other sources still discover a significant proportion of oil spills – is not able to ensure, that the state's aircraft and satellite surveillance system discover the oil spills.

### **Polluter Identification**

14. According to the marine environmental law, the Defence and the police may with a court order obtain access to a ship and take samples in order to determine whether the provisions of the law are kept (search). A search may, however, also be carried out without a court order, if the momentum would be lost, because a court order had to be awaited.

The Chief of Defence Denmark has informed that the Defence made 2 searches in 2000.

15. In order to use the flight surveillance observations as evidence at legal proceedings, it is necessary that there are various forms of surveillance equipment systems on board the environmental aircraft. The aircraft is consequently equipped with "Sideway Looking Airborne Radar" (SLAR).

The Defence informed that that the radar may detect oil spills at seas when they are being discharged and afterwards once they have been discharged. However, weather conditions – in particular wind velocity and wave heights – may have a negative influence on the radar's detection possibilities. The aircraft may identify ships from the air at night, if the flights have readable names, numbers or other significant characteristics. The aircraft is equipped with projectors which may be aimed at the ship, if the ship is too badly lit to identify. In poor weather with low visibility, it is possible to ask for identification assistance, for instance, fighter aircrafts and helicopters, equipped with infrared search and recording equipment. Once the sensor equipment for the aircraft type Challenger is implemented this will include equivalent infrared search and recording equipment so that the surveillance aircrafts themselves may identify ships in poor weather with low visibility.

The satellite is also equipped with SLAR.

16. Various analyses are used for establishing evidence: lab tests of oil samples, databases of oil types, and various calculation models of oil slick movements at the sea. Analyses of the oil samples are made according to the North-test methodology, which the National Environment Research Institute of Denmark has participated in developing.

The North-test methodology is based on analysing samples from the pollution source as well as from the suspected source, and by comparing these analyses, it may be determined whether the samples are identical or not. On the basis of this, the polluter may be identified.

The Danish Environmental Protection Agency and the Defence have been involved in experiments with e.g. backtracking, which seeks to determine where the oil slick has taken place. Backtracking is a tool, which may be used, combined with meteorological data on wind, current and tide conditions. By using backtracking, it may be possible to predict where the oil slick was at a certain time and hereby predict where the oil discharge took place. Backtracking has not been used in recent years.

In 1992-1995, the National Environment Research Institute of Denmark participated in a joint Euro-Crude project with 5 European countries; the main purpose was to establish a crude oil database for identification of oil samples. The EuroCrude database has, however, the weakness that it is a crude oil database only. Discharge of crude oil will only take place, when the tank is being discharged. The Danish Environmental Protection Agency informed that the database has only been used once in the period 1997-2000.

The Danish Environmental Protection Agency informed that in the end of the 1970s, a practical test of tagging the tank ships' oil remains with metal particles was carried out. The conclusion was that tagging oil remains with metal particles was possible in the laboratories, but that additional examinations would be necessary before the method could be fully applied in the Baltic area.

17. The examination showed that it was difficult to discover reliable supplementary research methodology. The North-test method is useable for laboratory testing whereas other initiatives/options such as backtracking, tagging and databases of crude oil have shown to be of no practical value.

The share of identified polluters has been between 12-22 % in the period 1995-2000. The share of identification

was 19 % in 2000. The pollution source is only identified in very few cases.

The examination of the NAOD has further shown that the extended expansion of the surveillance system (including the 100 % increase in the number of flight hours) only to a minor extent increased the number of identified polluters. A contributory factor may be that only about 1 % of the flights are carried out as night flights in spite of the Defence's assumption that illegal discharges are often being made in the dark and in low visibility weather. The examination of the NAOD showed that the pollution source has only been identified successfully in a few cases.

### **The Sanction system for discharging oil illegally**

18. The rules for prevention and persecution of sea pollution are included in the sea environmental law and in the law on security at sea.

There is no case law in Denmark for violating the rules of the sea environmental law concerning illegal oil discharges etc.

In the period 1992-1996 Danish authorities in 29 cases attempted to prosecute, but none of these cases were eventually taken to Court.

The Danish Environmental Protection Agency informed that there is no aggregated statistical material of cases brought to Court and ticket fine for the period after 1996. According to the most recent statistics from Statistics Denmark the period 1997-1999 saw three violations of the sea environmental law and these resulted only in minor fines.

19. The NAOD examination showed that the number of penalised oil polluters has not increased in the examined period. The NAOD demonstrated that only very few cases have been presented to the State Prosecuting Attorney, and that cases which have resulted in fines on average stay below 1 every year. Furthermore, the fines are small, and not even one oil pollution case has been brought to the Danish Courts through the years. This demonstrates lack of effectiveness at the Danish authorities both with respect to polluter identification and with law enforcement. The Danish authorities' less effective efforts to stop pollution of the Danish waters are also considered to have a negative preventive effect.

20. By law no 316 of May 5, 2000 concerning law amendments to protection of the sea environment and law on security at sea, the Folketing decided to increase sanctions for illegal discharging oil in the sea. The new rules make it possible to use administrative fines, and grant access to make administrative arrest of suspicious ships however, respecting the rules in the Administration of Justice Act. In the comments to the legislative proposal, it is stated that the level of fines shall be guiding for administration and courts.

21. The NAOD finds that the new rules and procedures have improved conditions for holding polluters accountable faster than previously.

An increase in the number or the level of fines is not yet apparent. Effects of the new system (administrative fines) may therefore not be assessed until it has been in effect for a few years.

22. The NAOD assesses that the total effort in relation to oil pollution at sea is not effective. It has not been a goal to evaluate alternative solutions. However, as long as aircraft and satellite surveillance are the core elements in deterring from oil pollution, it is necessary to increase the effect of these significantly. It is relatively unimportant that more oil polluters are discovered by the Defence's surveillance system, as long as the pollution sources are not identified. This means that the effort has to be targeted so that the oil spills are discovered sufficiently early to identify more polluters and ensure they are punished far more frequently.

**The NAOD examination showed that:**

- the surveillance effort – as other sources still discover a significant proportion of oil spills – is not able to ensure, that the state's aircraft and satellite surveillance system discover the oil spills,
- the source of pollution is only identified in very few cases,
- there are no night flights in spite of the Defence's assumption that illegal discharges are often being made in the dark and in low visibility weather,
- the number of penalised oil polluters has not increased in the examined period, and
- the overall effort to fight oil-pollution at sea is ineffective.