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Solutions for U-864, the submarine wreck outside Fedje in Vestland - summary

Since the wreck of the submarine U-864 was discovered off the coast of Fedje in 2003, there have been ongoing inquiries, assessments and debate about how the wreck and its cargo should best be handled. Three main options have been focused on:

1. covering the wreck including the cargo and the contaminated seabed
2. removing the cargo (mercury) and then covering the wreck and seabed
3. raising the wreck and the cargo and then covering the seabed

All three alternatives have been assessed to be feasible and, assuming successful execution, all will yield a satisfactory environmental result. The option of covering the entire wreck and surrounding seabed has been recommended, because this alternative has been assessed as having the lowest environmental risk and the lowest operational risk in its execution, as well as being the cheapest.

The conclusion on covering the wreck with its cargo and the contaminated sediment has repeatedly been challenged and has not had sufficient political support to be implemented. The current Committee was appointed for the purpose of consulting existing experts in Norway, who have many years of “hands-on” experience from the offshore industry. A main objective was to assess whether existing and new knowledge and technology from the design and installation of platforms, ground surveys, instrumentation, seabed covering and maritime lifting operations might indicate that one of the salvaging alternatives could be implemented with lower environmental risk and operational risk than previously assessed. In addition, the Committee was requested to check whether previous assessments have been adequate to accurately measure the environmental risk.

The Committee has looked at both new and existing solutions and has supplemented its own technological expertise through contact with a number of different expert environments. Although no new methods with mature enough solutions to deal with U-864 have been identified, there is undoubtedly expertise, experience and technology that can be used to improve all three alternatives. This applies to covering, dredging to allow access to the cargo in the keel, carrying out a lifting operation and handling pollution. However, these improvements alone are not enough to change the current ranking of the three alternatives.

The Committee has not identified any factors that change previous assessments of the long-term environmental risk of the various alternatives. All three alternatives will have to end with a covering operation. Covering the wreck in situ is considered a highly effective solution and can be supplemented both now and later on with additional reinforcements and more efficient materials, should the need arise. The leaching potential is so small that in the long term, there are not expected to be any significant differences between the alternatives. The impact of any incidents that might occur during execution will primarily be short-term, and there are tried and tested methods for transport and final disposal, if it is decided to raise the wreck, cargo and masses.

In respect of the short-term environmental risk, as well as the operational risk during execution, the Committee finds that the risk associated with raising both the wreck and its cargo has previously been underestimated. This relates in particular to underestimation of the risk associated with handling the torpedoes and other ammunition in the wreck. In the Committee’s current assessment of this risk, both the short-term environmental risk and the operational risk for crews on surface vessels will therefore be higher for this alternative and will be at an unacceptable level.

In respect of the alternative of removing only the cargo, there are currently experience, methods and technology that indicate that it would be possible to carry out this alternative

more safely (i.e. with lower risk) than suggested in previous assessments. Here, both the environmental risk associated with dredging/upwelling of masses and the operational risk associated with the lifting operation can be reduced. In particular, the potential for dispersal of contaminated masses will be reduced by the fact that significantly smaller masses will need to be dredged to allow access to the keel than previously assumed.

The Committee's goal

A permanent and sustainable solution for U-864.

The solution chosen for U-864 must provide the overall best solution with regard to the environment, life and health, social stability and economy.

Principles

Sustainable development

The Sustainable Development Goals constitute a superstructure for all government policy, both nationally and internationally.

The precautionary principle

The precautionary principle describes how political decision-makers and other social actors can relate to the uncertain effects of their actions.

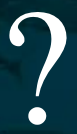
Knowledge-based public administration

The objective of knowledge-based public administration is to ensure better decisions and democratic processes.

Dilemma

How to ensure that the choice of solution ensures that today's needs are met, without destroying the possibilities for future generations to have their needs met?

Is it right to leave pollutants in place for future generations to deal with? And conversely, is it right to try to remove the mercury if a failed lifting operation will result in increased pollution?



How can we make a knowledge-based decision

- when there is so much we do not know?
- when the perceived risk is not the same as the documented risk?

Particularly relevant Sustainable Development Goals

Target 12.4

Achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimise their adverse impacts on human health and the environment.

Excerpt from target 14.1

By 2025, prevent and significantly reduce marine pollution of all kinds.

An ideal execution of the alternative of removing only the cargo, where most of the mercury is removed without any incidents with negative consequences of significance, could give the best result, in that the “problem” will then largely have been permanently removed. At the same time, the potential for adverse consequences is higher if an incident occurs during a lifting operation. The greatest challenge with the assessments, in the Committee’s opinion, is thus the major uncertainties linked to both the amount of contaminant (mercury) involved, where it is located, and the condition of both the mercury containers and the wreck. There are therefore many possible outcomes in terms of both what can be characterised as successful operations and adverse incidents. This uncertainty affects the assessment of the two salvaging alternatives to a greater extent than covering up the entire site, since the operations are more complex and the risk of adverse incidents is higher. The Committee has sought to obtain information that could help reduce these uncertainties, but recognises that the investigations that it was possible to carry out within the available time frame and with available resources were not sufficient to achieve this. Necessary further clarifications will probably require thorough and comprehensive investigations of the wreck, cargo and seabed, and it will not be possible to clarify some of the uncertainties before work on a solution is underway.

The Committee’s recommendation is based on the information that is currently available, despite the uncertainties.

No one knows how much mercury was originally on board U-864, and the order of 67 tonnes has therefore been used as the starting point. No one knows exactly where or how the containers with mercury were stored on board the submarine, but there is reason to believe that they were stored in the keel compartment. No one knows how much mercury was still on board U-864 after it was torpedoed, or how much is still left in the various sections of the wreck. No one knows how much ammunition there was or still is on board U-864.

In view of these unknown factors, it is difficult to define what will constitute a successful solution with regard to the amount of mercury removed. Can an operation to remove the mercury be counted as successful if:

- sections of the wreck are raised, but none of the mercury containers turn out to be on board?
- dredging is carried out, but stirs up and disperses large amounts of mercury?
- a small amount (say, 3 tonnes) of mercury is removed, assuming that the submarine originally contained 67 tonnes?

Building on an assessment of the environmental risk alone, this Committee would also conclude that covering the site appears to be the safest and least risky alternative for U-864. However, the history in this case, with endless delays and new assessments of the best way to handle the wreck, underscores the need to assess not only whether the question that has been asked has been answered correctly, but also whether the question itself is correct and appropriate. The current Committee finds it very important to identify a

permanent and sustainable solution for U-864. The Norwegian Coastal Administration has previously pointed out that there are aspects other than those included in the existing assessments that ought to be taken into account before a final decision is made. In the Committee's opinion, a broader perspective than environmental risk alone is necessary to reach a solution that is acceptable for most of the stakeholders in the case.

There has been a significant increase in society's focus on sustainability and sustainable development since the Norwegian Coastal Administration's reports in 2011 and 2014. Expectations concerning the permanent management of pollutants in the environment have also changed. Agenda 2030 and the United Nations' Sustainable Development Goals are currently expected to form the basis for assessments of environmental measures and measures that are likely to affect local communities. For example, in previous reports on solutions for U-864, perceived risk among the local population has not been explicitly included in the final assessment. The Committee finds that perceived safety and risk among the local population and any uncertainty for local businesses are important aspects that must be taken into account in a comprehensive assessment of what constitutes a sustainable solution.

If these aspects are included in a broader assessment, the alternative that involves removing the cargo before covering the site becomes more attractive as an alternative. Successful removal of the mercury before covering the wreck and surrounding seabed will, among other things, significantly increase perceived safety and reduce uncertainty for local communities and local businesses. When the Committee also considers that the short-term environmental risk and operational risk associated with removing the cargo can be reduced in the light of current knowledge, experience and technology, these factors together **provide a basis for recommending that the alternative of removing the cargo and then covering the wreck and seabed be planned and implemented.**

As mentioned, there is considerable uncertainty regarding the amount of contaminant (mercury) involved, where it is located, and the condition of both the mercury containers and the wreck. This means that there are a number of preconditions that must be met in order for the upsides of this alternative to be realised with acceptable environmental and operational risk and at a reasonable cost. Building on the assumption that many of these uncertainties and preconditions cannot be clarified until work on the operation has actually started, **it is recommended that a step-by-step approach be used in the implementation of the solution.** In this model, at each stage in the process, a decision is made concerning the implementation of the next step on the basis of an updated assessment of whether the preconditions for successful realisation still exist and whether the risk is still acceptable. At each decision gateway, there must be an opportunity to terminate the attempt to remove the mercury from the site and to switch to covering up.