



Performance audit report

Management of and responsibilities for oil spills from vessels in the Gulf of Finland

National Audit Office of Finland
Translation of performance audit report 2/2014



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**Management of and responsibilities
for oil spills from vessels
in the Gulf of Finland**

Edita Prima Oy
Helsinki 2014

Translation of performance audit report 2/2014 of the National Audit Office

Registry no. 183/54/2011

As part of its audit plan, the National Audit Office has conducted an audit on the management of and responsibilities for oil spills from vessels in the Gulf of Finland. The audit has been carried out in accordance with the performance audit guidelines issued by the National Audit Office.

Based on the audit, the National Audit Office has issued an audit report, which will be submitted to the Ministry of the Environment. Copies of the report will also be submitted to the Parliamentary Audit Committee, Ministry of Finance and the Government financial controller's function.

Before the audit report was issued, the following parties had the opportunity to check that the report does not contain any factual errors and to give their views concerning the opinions of the National Audit Office presented in the report: Ministry of the Environment, Finnish Oil Pollution Compensation Fund, Finnish Environment Institute, Centre for Economic Development, Transport and the Environment for Uusimaa, Centre for Economic Development, Transport and the Environment for Southeast Finland, Ministry of Transport and Communications, Finnish Transport Agency, Finnish Transport Safety Agency, Ministry of the Interior, Finnish Border Guard, Ministry of Employment and the Economy, National Emergency Supply Agency and the Ministry of Finance.

In the audit follow-up, the National Audit Office will examine, which measures have been taken on the basis of the opinions contained in the audit report. The follow-up will take place in 2016.

Helsinki, 7 March 2014

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Ministry of Transport and Communications

Ministry of the Interior

Keywords:

oil spill response, shipping safety, management of oil waste from vessels, state responsibilities, liabilities

Contents

Main findings and opinions of the National Audit Office	9
1 Background to the audit	19
2 Audit framework	25
2.1 Description of the audited subject: system of managing oil spills from vessels	25
2.1.1 Overall management system	25
2.1.2 Main provisions of the management system	26
2.1.3 National actors	26
2.1.4 International actors	31
2.1.5 System for compensating for oil spills from vessels and funding of oil spill response preparedness	32
2.2 Geographic scope, audit questions, audit criteria, methods and material	36
3 Audit findings	39
3.1 The Gulf of Finland is a challenging environment for shipping and oil spill response	39
3.2 Prevention of oil spills and risk management	41
3.2.1 Oil spill response is part of the maritime safety policy	41
3.2.2 Pilotage and vessel inspections help to prevent accidents	42
3.2.3 Systems steering vessel traffic are a cost-effective way of reducing accidents	46
3.2.4 Aerial surveillance is technologically up to date and functions in a cost-effective manner	53
3.2.5 There is room for improvement in the preparation and content of the oil spill response plans	55
3.2.6 SÖKÖ projects have created operating models for coastal oil spill response and waste management but they have not been tested in practice	61
3.2.7 Cooperation between maritime authorities is functioning smoothly but there is friction between state-owned companies and the authorities	63
3.2.8 Finnish Environmental Institute develops oil spill response training	66
3.3 First response	67
3.3.1 In Finland's oil spill response strategy, priority is given to off-shore response	67
3.3.2 The preparedness of Estonia, Russia and EMSA are also relevant in off-shore response	71
3.3.3 The focus of purchases is shifting towards equipment used in the area between the archipelago and the open sea.	72

3.3.4	Purchasing a new oil spill response vessel is not always the most cost-effective option	79
3.3.5	There are no grounds for changing the existing stationing of the multi-purpose vessels	80
3.3.6	Oil spill response exercises are held on a regular basis	82
3.3.7	Oil spill response is well-organised and properly managed. However, SYKE has limited personnel resources	84
3.3.8	BORIS situation awareness system has been developed to support response operations	91
3.3.9	Research information on the risk management of oil spills from vessels is not relayed to the authorities in an effective manner	92
3.3.10	There is a need for response technology for winter conditions	94
3.4	Oil spill recovery	99
3.4.1	Municipalities have only limited resources for oil spill recovery.	99
3.4.2	Volunteers are an important resource	100
3.5	Management of oil waste from vessels	103
3.5.1	A major oil spill from a vessel generates large amounts of waste	103
3.5.2	Responsibilities in waste management are not clear	105
3.5.3	There are no concrete plans on the transport of oil waste from vessels	106
3.5.4	There are no adequate plans for the intermediate storage of oil waste	109
3.5.5	Mobile thermal desorption units would be quickest way to treat oil waste	110
3.5.6	Costs depend on the way in which oil waste from vessels is sorted	114
3.5.7	Legal provisions do not clearly differentiate between environmental clean-up and restoration procedures	115
3.6	Finnish Oil Pollution Compensation Fund	117
3.6.1	The fund has provided guarantees for purchases of oil spill response equipment and maintenance of response preparedness	117
3.6.2	Consideration has been given to the broadening of the financing base of the Finnish Oil Pollution Compensation Fund though the matter has not been discussed thoroughly enough.	120
3.6.3	The steering and activities of the Finnish Oil Pollution Compensation Fund could be improved	123
3.7	Overall costs and liability for damages in an oil spill from a vessel	127
3.7.1	The total costs of an oil spill can be high	127
3.7.2	International compensation system does not cover all costs	132
3.7.3	Municipalities do not have enough information on how to file claims	137
3.7.4	In major oil spills from vessels, help would also have to be sought from supplementary state budgets	139

Appendices	142
Sources	148

Main findings and opinions of the National Audit Office

Management of and responsibilities for oil spills from vessels in the Gulf of Finland

The volume of oil tanker traffic in the Gulf of Finland has increased in recent years, as Russia has built new oil ports in the far reaches of the sea area. It is estimated that the volume of oil shipments in the Gulf of Finland will increase from the current 160 million tonnes to 170–200 million tonnes in 2020. This coincides with a growth in other types of maritime transport, in particular passenger services between Helsinki and Tallinn. In the circumstances, there is a high risk of a major oil spill from a vessel, especially since the Gulf of Finland poses a number of challenges as an environment for shipping.

The state may end up funding the costs of a major oil spill from a vessel, at least on a temporary basis. The hidden risk lies in that all costs of oil spill response and damages may not be recovered, and ultimately the state may be left to foot the bill. At worst, a major oil spill may result in costs amounting to billions of euros.

The main question on which the audit focused was the following: *Is the system for managing oil spills from vessels in the Gulf of Finland efficient?*

The system for managing off-shore oil spills from vessels comprises a number of actors. The Ministry of the Environment is in charge of the general steering, monitoring and development of actions to combat oil and chemical spills from vessels. The principal authority in charge of combating oil spills from vessels is the Finnish Environment Institute, which directs the off-shore oil spill response efforts and appoints the person in charge of them. The Finnish Defence Forces and the Finnish Border Guard also take part in combating oil spills from vessels. Coastal and archipelago oil spill response is within the remit of the rescue services in the relevant area whereas the local authorities are responsible for oil spill recovery and the management of vessel oil waste in their areas.

Shipping safety and vessel traffic control as part of the oil spill management system are within the remit of the Ministry of Transport and Communications. The Finnish Transport Agency's Vehicle Traffic Service is a key actor in the prevention of oil spills from vessels. The Finnish Transport Safety Agency supervises ship safety, which plays a major role

in preventing shipping accidents. Pilotage services, which the state enterprise Finnpiilot Pilotage Ltd is authorised to provide in the Finnish territorial waters, also contribute to shipping safety.

The financial component of the management system for oil spills from vessels consists of the Finnish Oil Pollution Compensation Fund, insurance taken out by shipowners and international compensations funds (funding for preparedness and damages). The Finnish Oil Pollution Compensation Fund pays regional rescue services compensation for expenses due to the acquisition of oil response equipment and the maintenance of oil spill response preparedness. The state may also be granted discretionary compensation for costs incurred by the acquisition of equipment for responding to oil spills caused by vessels, and for the costs of maintaining response preparedness. The fund may also pay compensation to parties who have sustained losses or taken part in oil response efforts.

In order to ensure their ability to pay damages, shipowners have the obligation to insure their vessels against oil spills when the gross tonnage of the vessel exceeds 2,000 tonnes. In most cases, the policy-holder is the shipping company that owns the vessel. International Oil Pollution Compensation Funds pay compensation for oil spills from tankers in cases where the shipowner's liability does not cover the damages, the damages exceed the maximum liability of the shipowner, or the shipowner is not solvent.

The oil spill management system is relatively efficient

The audit results highlight many positive features in the management of oil spills from vessels in the Gulf of Finland. Oil spill response preparedness has been systematically developed, and it is based on off-shore response which, when successful, reduces the need for expensive onshore clean-up operations. Regular oil response exercises also take place. Finland has acquired a reasonably large oil spill response fleet, especially compared to Estonia and Russia. The fact that the fleet consists of multi-purpose vessels is positive in terms of cost-effective resource use, as the vessels can discharge several types of duties. However, interoperability with such state-owned enterprises as Meritaito Ltd and Arctia Shipping Ltd could be developed further.

The audit results indicate that what is called METO cooperation between the maritime authorities is highly successful and cost-effective. The systems aiming to prevent the risk of shipping accidents, including the Vessel Traffic Service and aerial surveillance, have also proven cost-effective.

A number of cooperation projects relevant to preparedness for oil spills from vessels and oil spill response are under way with parties outside the public administration. The ENSI navigation service has been funded by the John Nurminen Foundation, and the World Wildlife Fund (WWF) has trained volunteers for oil spill response duties. Oil spill response volunteers are an important resource and a way of channelling people's willingness to help.

Not all damages are covered by the International Oil Pollution Compensation Funds

While an international compensation fund system is in place for oil spills from vessels, it only applies to oil tanker accidents. Estimates produced in the course of the audit indicate that the costs of an oil spill from a vessel may be high. Tanker insurance policies and the international funds have a ceiling (859 million euros), which is not necessarily adequate to compensate for all costs caused by a major oil tanker accident. The international compensation system thus does not implement the 'polluter pays' principle.

The compensation processes are also lengthy, and a major oil spill would thus be a burden for local and central government finances in any case. At worst, the state may ultimately end up footing the bill. As the international funds only pay compensation for material, reasonable, appropriate and well-documented costs, it would be important to complement the current guidelines on the financial management of damages for authorities in charge of oil spill response with a guideline on how reasonable and appropriate oil response is assessed in different situations.

The Finnish Oil Pollution Compensation Fund's funding base should still be considered

The Finnish Oil Pollution Compensation Fund has enabled the regional rescue services to purchase adequate oil spill response equipment. It has also funded certain acquisitions of oil spill response equipment by the state. In 2009, the Parliament called for the Government to examine the chances to extend the funding base of the Finnish Oil Pollution Compensation Fund. The Ministry of the Environment examined the issue. However, no effective and financially significant solution for extending the funding base could be found.

An excise duty type fee is collected in Finland to support the security of supply. This security of supply fee is collected by the Customs, and it is

entered as an income for the National Emergency Supply Fund. According to the audit, when extending the funding base of the Finnish Oil Pollution Compensation Fund was considered, for one reason or another the option of introducing a "security of supply fee for oil spill response" was not examined in detail. While the fee would extend the funding base, it would also widen our perspective on the causes of risk. The audit results indicate that there is still a need to examine the option of introducing a fee of this type. The acceptability of the fee to the citizens should also be assessed.

Room for improvement in the Finnish Oil Pollution Compensation Fund

The activities of the Finnish Oil Pollution Compensation Fund could be improved. It does not have a funding strategy, nor does it conclude a performance agreement with the Ministry of the Environment. The fund should consider a new division of duties with the Centres for Economic Development, Transport and the Environment and the option of service agreements. The instructions for submitting applications and the way in which the supervisory tasks of an authority administering government grants related to discretionary compensation and grants are carried out have room for improvement.

Contents of oil spill response plans could be improved

The most recent plan for developing the response capability in case of oil spills from vessels (comprehensive report) dates back to 2009. The audit results indicate that a new plan, or more precisely a strategy, should be drawn up. This document should evaluate if responding to an oil spill of 30,000 tonnes together with the neighbouring countries is still a relevant target. The actual level of our neighbours' preparedness in the Gulf of Finland should also be examined. To support decision-making, the strategy should contain an estimate of the costs of preparedness, and calculations of the total costs of oil spills, for example relying on regional scenarios. Different options should also be subjected to an extensive cross-administrative evaluation, including whether reducing spills or risks would be more cost-effective than investments in oil spill response capability. Any proposals on further procurements of equipment for off-shore vessels should be carefully considered, and a comparison of cost-effectiveness should also be carried out in terms of how state-owned companies operating off shore could be better exploited in oil spill response. In the light of the audit results, it appears that the "bottleneck"

of off-shore oil response, and also an obstacle to efficient action, is the lack of intermediate off-shore storage capacity.

The contents of the national contingency plan for oil spills from vessels could be improved by determining the priority of sites to be protected and the criteria for discontinuing the response efforts. The joint operating plan for shipping accidents in the Gulf of Finland should be updated, and it should be developed into an instrument that steers the oil spill response plans of regional rescue services. The rescue services should be directed to prepare response plans that allow the consideration of coordinated equipment purchases. The drafting of a decree on oil spill response steering the contents of oil response and cooperation plans in the Ministry of the Environment has taken a long time.

The management of vessel oil waste has not been properly planned. This issue is referred to, but not discussed in detail, in the oil spill response plans of regional rescue services and in the joint cooperation plan for the Gulf of Finland. There are no concrete plans for transporting oil waste from vessels and organising the logistics for it.

In the light of the audit results, it appears that the circle of those taking part in oil spill response exercises should be extended by strengthening the involvement of those municipalities that are willing to take part. The exercises would allow the municipalities to assess their chances to assign personnel to oil spill response duties and the impacts of this on the other activities of the municipality, or the financial administration and accounting related to oil spill recovery operations. The experiences gained during the exercises could promote the development of preparedness planning in the municipalities.

Oil spill recovery and waste management following oil spills from vessels are major challenges

The audit results indicate that the oil spill recovery and waste management after oil spills from vessels are a serious problem that the municipalities will have to resolve. In the course of the audit, it came to light that small municipalities do not have the resources and capabilities for oil spill recovery, and that all oil spill response plans of the regional rescue service do not contain an agreement on oil spill recovery carried out by the rescue services. According to the audit, the municipalities are not fully aware of the requirements and significance of their responsibility for oil spill recovery.

In the context of the audit, the Association of Finnish Local and Regional Authorities proposed that a municipality should at no stage become the owner of the vessel oil waste even if, under the statutes, once

oil from a vessel comes to land, it becomes a waste and the municipality is responsible for its disposal and treatment. The responsibilities concerning the management of oil waste from vessels should be clarified in practice, even if they are specified in legislation.

The waste management capacity restricts the processing of oil waste from vessels. It takes several years to process the waste from a major oil spill from a vessel if a mobile thermal desorption unit is not available. Equipment of this type offers large processing capacity, but their availability depends on where the equipment is currently placed and the way in which it is used. The equipment may be used for waste treatment in several municipalities under environmental permits granted to waste treatment plants. Problem waste plants already have such permits. Treatment in power plants and industrial furnaces, on the other hand, would in most cases require amendments to the plants' environmental permits, which would be time-consuming. Subject to a notification referred to in sections 62–64 of the Environmental Protection Act and a subsequent decision made by the authorities (Centre for Economic Development, Transport and the Environment), the treatment of exceptional vessel oil waste could begin without an environmental permit, but no consensus exists on the interpretation of whether or not these sections can be applied to processing waste produced by an oil spill from a vessel. The auditors find it important to examine any necessary legislative amendments concerning the environmental permit procedures for storing and processing oil waste from vessels produced in exceptional situations.

The legal basis of restoration is ambiguous

A need to develop legislation may also be relevant to the relationship between the cleaning and restoration procedures referred to in the Waste Act and the Environmental Protection Act. As the parties assuming primary responsibility are not the same under these statutes, the National Audit Office is of the opinion that the situation should be clarified by adopting provisions that define what restoration means in the context of oil spill recovery and after it. The obligations of various actors should be more accurately defined so that the definition of oil spill recovery, for example, would specify where the cleaning of soil, ground water and shorelines contaminated by oil ends and the cleaning procedures for contaminated soil and ground water under the Environmental Protection Act begin. Such specifications would make it possible to clarify the responsibilities of the authorities in charge of oil spill recovery for restoring the site of the spill.

A need for an interadministrative cooperation forum

A cooperation forum for the different branches of administration is clearly needed in the management of risks of oil spills from vessels. This forum would bring together actors engaged in maritime safety, or the prevention of accidents, and in oil spill response. An inter-administrative group could be helpful in seeing the entity formed by the prevention of oil spills from vessels and oil spill response preparedness in a more consistent manner. As the audit revealed some friction between the authorities and state-owned companies, the state-owned off-shore companies should also be represented in this group.

Arrangements for directing oil spill response should not be changed without weighty grounds

The administrative sector of the Ministry of the Interior has proposed a rearrangement of responsibilities for oil spill response. The audit results indicate that the current oil spill response organisation has been effective and well managed, even if the activities have not been tested in practice in a major oil spill from a vessel. The organisation is also well trained. However, the resources of the environmental damage team of the Finnish Environment Institute, the unit currently in charge of oil spill response, have been cut back. They will not be adequate for directing oil spill response efforts in the future, unless the resources are improved and the continuity of oil spill response competence is ensured.

The National Audit Office notes that in addition to harmful impacts on the environment, errors of judgement and inadequate action in the organisation and management of oil spill response efforts may also result in substantial financial costs, which the central government may ultimately end up paying. An extensive transfer of the management of oil spill response efforts to the administrative sector of the Ministry of the Interior should not be undertaken without weighty grounds and financial calculations. The Office stresses that the time span for developing the oil spill response organisation must be sufficiently long, and the development must be based on not only technical management of the activities but also ensuring that competence in the substance of oil spills remains available. Neither may any restructuring of the organisation undermine the current level of environmental protection in Finland.

Recommendations of the National Audit Office

1. The Ministry of the Environment should still assess the chances to introduce a fee that would expand the funding base of the Finnish Oil Pollution Compensation Fund and widen the perspective on causes of risk. The acceptability of the fee to the citizens should also be assessed.
2. The Ministry of the Environment should, together with the Finnish Oil Pollution Compensation Fund, create a funding strategy for the fund. In order to ensure the efficiency of the fund, the Ministry should also steer its operations by means of a performance agreement. The fund's division of labour with the Centres for Economic Development, Transport and the Environment should also be developed, and its activities as an authority administrating government transfers should be improved. The fund should also consider chances to conclude service contracts on oil spill response.
3. In order to build up our capability for responding to oil spills from vessels, a new strategy should be drawn up to replace the comprehensive report from 2009. To support decision-making, this strategy should address the following: whether or not the current oil spill response target of 30,000 tonnes is still relevant, the costs of preparedness, the total cost scenarios of a potential oil spill, the cost-effectiveness of various methods as the basis for investment decisions, the actual level of oil spill response preparedness in the neighbouring countries and bottlenecks of oil spill response.
4. The contents of the national contingency plan for oil spills from vessels should be developed, for example by determining the order of priority of the sites to be protected and the criteria for discontinuing response efforts.
5. The joint operating plan for shipping accidents in the Gulf of Finland should be updated, and it should be developed into an instrument that steers the oil spill response plans of regional rescue services.
6. The Centres for Economic Development, Transport and the Environment should direct the rescue services to prepare response plans that allow the consideration of coordinated equipment purchases.

7. To complement the current guidelines on financial management of damages, the environmental administration should draw up a guideline for the oil spill response authorities on how reasonable and appropriate oil response measures are evaluated in different situations.
8. Responsibilities for the management of oil waste from vessels should be clarified, even if they are laid down in legislation. The Ministry of the Environment should also examine any legislative amendments required in the environmental permit procedures for storing and processing oil waste from vessels produced in exceptional circumstances. This also applies to the relationship between cleaning and restoration procedures under the Waste Act and the Environmental Protection Act.
9. The Ministry of the Environment should consider setting up an extensive cooperation forum on managing the risks of oil spills from vessels.

1 Background to the audit

Management of environmental risks and environmental changes from the economic perspective has been one of the thematic areas of the National Audit Office's strategic priorities.¹ When a risk of a major environmental accident is realised, the resulting economic losses may be substantial. From the perspective of central government finances, the essential questions are whether preparations have been made for environmental risks, whether the preparations are cost-effective and who will compensate for the costs.

The Baltic Sea accounts for about 15 per cent of the world's maritime traffic. There has been a substantial increase in oil shipments² from the Russian ports in the Gulf of Finland. In the year 2010, a total of 160 million tonnes of oil was transported through the Gulf of Finland, which was four times more than in the year 2007 (43.7 million tonnes).³ About half of all Russian oil exports transported by sea is shipped through the Gulf of Finland.

An increase in oil transports in the Gulf of Finland is a result of the construction of new oil ports in Russia. The oil port of Primorsk, which was opened in 2002, is the biggest in the Gulf of Finland and it exported a total of about 78 million tonnes of oil in 2010. The port of Vysotsk, which is located near Viipuri, exported a total of about 12 million tonnes of oil in 2007. In addition to the above two facilities, there is also an oil port in Ust-Luga, which was opened in 2012. Even though it has only become operational recently, the oil port is very important because it marks the end point of Russia's BPS2 oil pipe network, which serves as a replacement for the pipelines running through Belarus. A total of 14 million tonnes of oil was also exported from the port of St. Petersburg. Furthermore, most of the oil shipped from Estonian ports is Russian oil transited through Estonia.

The busiest oil port in Finland is located at Kilpilahti in Porvoo where Neste Oil Corporation processes Russian crude oil. In 2010, about 14.1 million tonnes of crude oil was imported to Finland and about eight million tonnes of this total was processed for domestic use and about six

¹ *Strategy of the National Audit Office for 2009-2012.*

² *Oil refers to mineral oil in all its forms. Oil products include liquid gases, kerosenes, diesel oil, light fuel oil, heavy fuel oils and bitumens.*

³ *Brunila and Storgård (2012), Brunila (2012).*

million tonnes for export. In 2010, the value of crude oil and oil products totalled 5.2 billion euros and exports totalled 3.2 billion euros.⁴

It is estimated that the volume of oil shipments in the Gulf of Finland will increase from the current 160 million tonnes even though the growth is likely to be moderate. Both a slow-growth (170 million tonnes) and a stronger-growth scenario (201 million tonnes) for 2020 are presented in the studies.⁵ The estimates for 2030 are forecasting slower growth. This is partially because the dependency on oil will be reduced and Arctic areas will become more important, in both oil production and transports. It has also been suggested that oil shipments will be reduced because Russia aims to process a larger proportion of its crude oil on its own soil.⁶

Every day, about twenty oil tankers of different sizes are plying the Gulf of Finland. One vessel may carry up to 150,000 tonnes of oil. This coincides with a growth in other types of maritime transport, in particular passenger services between Helsinki and Tallinn (Figure 1).

⁴ *Finnish Petroleum Federation (2011).*

⁵ *Brunila and Storgårds (2012).*

⁶ *In early summer 2013, the oil shipments from Primorsk, Russia's biggest oil port, were about 30 per cent below the five-year average (Bloomberg 2013). Start of oil shipments from the oil port of Ust-Luga may also be one reason for the decline.*

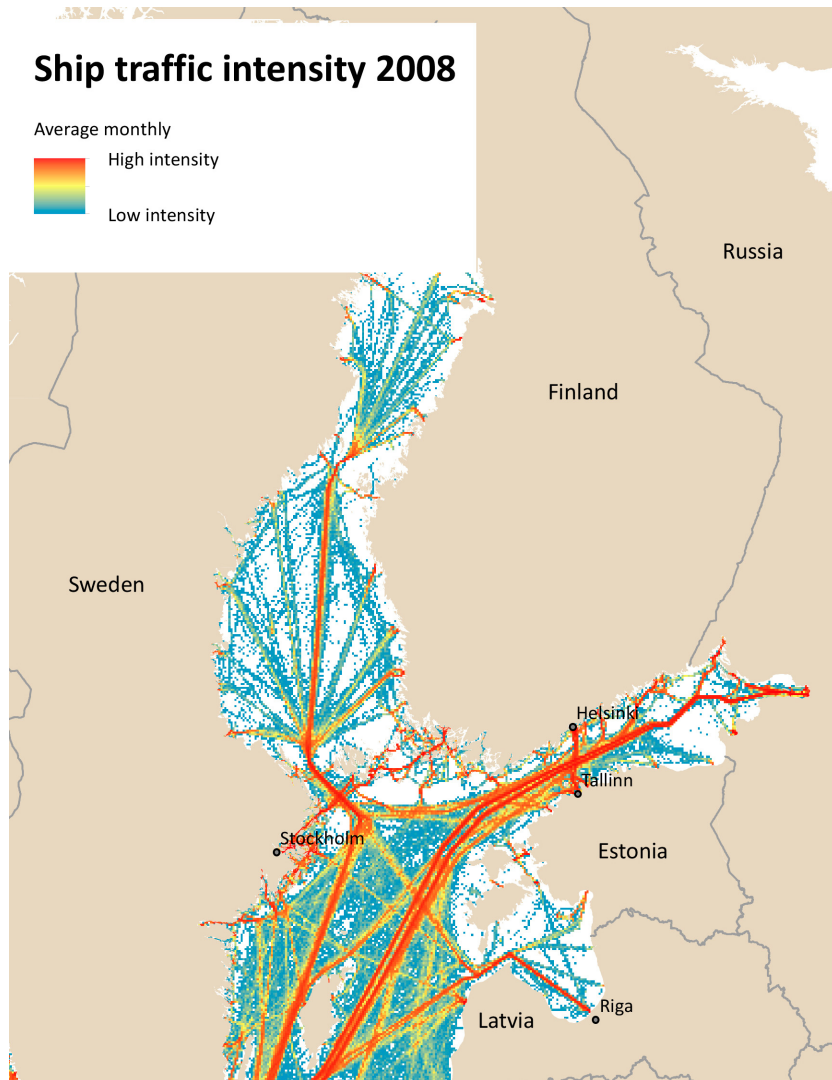


Figure 1. Volume of vessel traffic (HELCOM).

In these circumstances, there is high risk of a major oil spill from a vessel. The accident risk is heightened by increasing traffic, changing routes, changes in ice conditions and extreme weather phenomena resulting from climate change and a more frequent use of international crews, which may be unfamiliar with such issues as ice conditions (Figure 2).

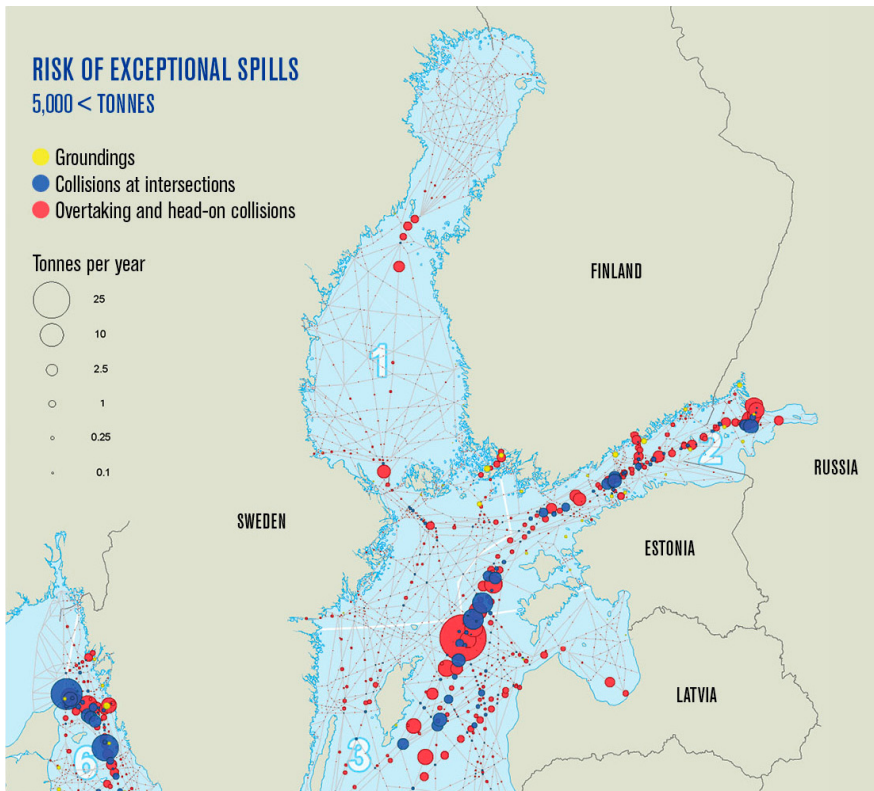


Figure 2. Risk of exceptional oil spills (more than 5,000 tonnes) (HELCOM).

At the same time, new technological applications help to reduce the risk.⁷ A collision between a tanker and a passenger vessel also involves the risk of injuries and deaths.

In other areas adjacent to Finland, the risk of oil spills from vessels is lower than in the Gulf of Finland, when estimated on the basis of the number of ships and the volumes carried. The number of vessels in the Gulf of Bothnia is less than half of the number of ships plying in the Gulf of Finland. The risk of accidents is at its highest in the area between Helsinki and Tallinn as in that part of the Gulf of Finland the routes of oil transports cross the north-south path of the busy passenger vessel traffic.

The eastern part of the Gulf of Finland is the area with the biggest risk of tanker accidents. This is because of the growth of traffic from the ports of St. Petersburg and Vysotsk.⁸ According to one survey, a tanker accident

⁷ Kujala, P. (2012).

⁸ Hänninen et al. (2012).

might occur in the Gulf of Finland as frequently as once every six years.⁹ According to another study, one oil tanker accident in 20-24 will cause an oil spill of more than 30,000 tonnes.¹⁰

So far, there have not been any major oil spills from vessels in Finland. At the same time, however, there are between 30 and 40 other shipping accidents each year. The most common of them are groundings, bottom contacts, collisions between vessels and collisions between vessels and permanent structures. Human error is the most common cause of accidents.¹¹ On average, there has been an oil spill from a vessel once every four years in Finland. However, the amount of oil released into the sea in these accidents has been less than 150 tonnes.¹² On average, there have been 1–2 oil spills from vessels of more than 35 tonnes in the Baltic Sea each year.

In addition to accidents, there may also be intentional releases of oil.¹³ In 2012, Finnish authorities detected a total of 54 releases of oil in the Baltic Sea. Estonian authorities also detected three releases of oil in Finnish territorial waters. Releases of oil may be the result of the oil carried by the ship as cargo or the bunker oil, which powers the vessel or which is located inside the machinery. The fuel tanks may contain hundreds of tonnes of oil.¹⁴ Discharges may also originate from bilge water (water mixed with oil that has accumulated at the bottom of the ship) or waste oil.

A major oil spill would have an impact on industries (such as fishing and fish farming, tourism, operations at ports, and power plants) and recreational values. The marine environment would also be negatively affected in many ways: oil suffocates physiological activities and the chemical toxicity of oil destroys cells and causes cellular malfunction. Ecosystems will change, particularly when key species disappear. An oil spill will have indirect impacts by destroying habitats and shelters of species.¹⁵

The state may end up funding the costs of a major oil spill from a vessel, at least on a temporary basis. The amounts depend on the rate of

⁹ Hänninen *et al.* (2012).

¹⁰ Hänninen *et al.* (2011).

¹¹ Finnish Maritime Administration (2008).

¹² Finnish Maritime Administration (2008).

¹³ According to Finnish experts, a terrorist strike on oil tankers in the Gulf of Finland is, however, highly unlikely.

¹⁴ Partio (2009).

¹⁵ ITOPF (2012a).

accumulation of the response costs, the amount of compensation paid to the injured parties and the urgency of the payments, and on how quickly the compensation process under the responsibility of the P&I Club representing the vessel involved (the insurance companies of the vessel) and the international compensation fund will start. From the state perspective, the risk is that all costs of oil spill response and damages may not be recovered, and ultimately the state may be left to foot the bill. It is difficult to estimate the overall costs of a major oil spill from a vessel. In the worst case, they may amount to billions of euros.

The audit examines the economic efficiency and effectiveness of the methods for managing the risks of oil spills for vessels and oil spill response preparedness in the Gulf of Finland and the costs incurred by the state as a result of oil spills from vessels.

2 Audit framework

2.1 Description of the audited subject: system of managing oil spills from vessels

2.1.1 Overall management system

In this audit, the system for managing oil spills from vessels means all those methods, instruments, resources, management and supervision that aim to prevent oil spills from vessels and, after an accident has occurred, to effectively contain its harmful impacts. The management system consists of the following parts:

1. ex-ante regulation
2. first response: off-shore oil spill response and archipelago and coastal and oil spill response
3. oil spill recovery
4. management of the oil waste resulting from the accident
5. ex post law: provisions on costs and compensation.

Ex ante regulation contains all those national measures that are aimed at reducing the risk of oil spills (such as vessel notification and surveillance procedure, vessel inspections and response plans).

The purpose of the first response is to contain the spread of oil and the oil spill from a vessel (for example, by preventing the spread of oil by means of booms) and to gather the oil from water areas.

After the first response, the head of the response operations will order the start of the oil spill recovery, which does not necessarily require quick measures and may continue for a long period. This oil spill recovery means the combating of the oil spill undertaken in order to clean up and restore the soil, ground water and shoreline contaminated by the oil.

Oil spill recovery will be followed by the organisation of the waste management of the oil-contaminated material: intermediate storage and transport and final disposal of the oil waste.

Ex post law contain provisions on the liabilities concerning compensation and restoration in accidents within the framework of national, EU and international law.

2.1.2 Main provisions of the management system

In Finland, provisions on the combating of oil and chemical spills from vessels are laid out in the Act on Oil Pollution Response (1673/2009) and the Oil Pollution Decree, which is currently on a consultation round. The two pieces of legislation contain provisions on such matters as the responsibilities and tasks of the response authorities. Other major pieces of legislation concerning oil spill response are the Act on the Oil Pollution Compensation Fund (1406/2004), which contains provisions on the funding of and compensation for the costs of oil spill response and the Maritime Act (674/1994), which contains provisions on the oil spill liabilities of vessels. The provisions on the monitoring of illegal releases from vessels are contained in the Act on Environmental Protection in Maritime Transport (1672/2009). The Rescue Act (379/2011) and the Maritime Search and Rescue Act (1145/2001) are essential in the coordination of the response and search and rescue operations.

The Waste Act (646/2011) and the Environmental Protection Act (86/2000) lay down provisions on the handling of the oil waste from vessels after the completion of the response operations.

The Vessel Traffic Service Act (623/2005) plays a major role in the prevention of the risks of oil spills from vessels as it lays down provisions on controlling vessel traffic and on providing vessels with information. At the same time, the Pilotage Act (940/2003) lays down provisions on pilotage operations, which means the activities in which the pilot acts as an advisor to the master of the vessel in the navigation of the vessel. The purpose of the vessel inspections is to prevent the use of vessels that are in poor condition. Provisions on the inspections are contained in the Ship Safety Control Act (370/1995) and the Government Decree on Inspecting Foreign Ships in Finland (1241/2010).

2.1.3 National actors

Ex-ante regulation

The Ministry of Transport and Communications is responsible for maritime safety. The Vessel Traffic Service (VTS) of the Finnish Transport Agency is an important instrument in the prevention of oil spills from vessels. VTS is a service aimed at improving maritime safety, promoting the smoothness and efficiency of vessel traffic and preventing accidents and any environmental damage that they cause.

Vessel safety control is also an essential element in the prevention of the risk of vessel accidents. The Finnish Transport Safety Agency (Trafi), which comes under the Ministry of Transport and Communications acts as the statutory control authority.

Pilotage service is also important to maritime safety. Only Finnpiilot Pilotage, a company owned by the State of Finland, may provide pilotage services in Finnish territorial waters. The company charges the shipowner a fee for its services.¹⁶ The purpose of the activities is to promote the safety of vessel traffic and to prevent the environmental damage resulting from vessel traffic. The company comes under the ownership steering of the Prime Minister's Office.

First response: off-shore oil spill response

Response to oil and chemical spills is the responsibility of the environmental administration and the Ministry of the Environment is responsible for the overall steering, monitoring and development of the oil spill response. In practice, the most important tasks of the ministry are associated with the development of legislation and the steering of its implementation, coordination of the international treaties and conventions on oil and chemical spill response and amendments to them, ensuring of the necessary resources and flow of information within the Government.

Under the Act on Oil Pollution Response (1673/2009), the principal authorities in charge of combating oil spills from vessels are the Finnish Environment Institute (SYKE). SYKE is responsible for the response to oil spills from vessels and appoints the head of the response operations if the oil spill from a vessel has occurred or is at risk of occurring in Finnish waters, either in the high seas or within Finland's exclusive economic zone (off-shore oil spill response).¹⁷ SYKE is responsible for acquiring and maintaining adequate national response preparedness for oil and chemical spills from vessels. It is also responsible for the organisation of vocational post-graduate and supplementary education in the sector.

The Finnish Defence Forces and the Finnish Border Guard also take part in the combating of oil and chemical spills from vessels. Once they have

¹⁶ *Pilotage Act (940/2003).*

¹⁷ *Under a Government proposal (248/2009), high seas traditionally mean the water area where operations with the largest rescue boats (length of about 15 metres) are not possible on account of actual maritime conditions. In general, the high seas mean the open sea and outer archipelago but they can also refer to other wide areas of the open sea. Thus, oil spill response can be divided into off-shore oil spill response and coastal oil spill response.*

detected or obtained knowledge of an oil or chemical spill, they must take urgent action to respond as necessitated by their level of preparedness, unless performing such tasks would significantly hinder their performance of any other important statutory task. If necessary, all above-mentioned authorities may immediately start the response operations and use the powers of response authorities without waiting for a request for executive assistance from the Finnish Environment Institute.

In the Finnish Defence Forces, the Navy has the status of a response authority. Otherwise the Finnish Defence Forces primarily provide executive assistance in oil spill response in transport and supply tasks, in reconnaissance concerning oil damage on the shores and the cleaning of the shoreline.

Under the Maritime Search and Rescue Act (1145/2001) and the Act on Oil Pollution Response (1673/2009), the authorities must give priority to saving human lives in maritime accidents and the overall management of the operations is the responsibility of the Finnish Border Guard. Likewise, all resources must be subordinated to this task, if necessary. To the extent that the resources are not needed for saving human lives, they are available to other activities, such as the combating of oil and chemical spills from vessels, which can be started at the same time with search and rescue operations. After the end of the urgent efforts to save human lives, of which the Finnish Border Guard provides notification, overall management of the operations is transferred to the authority responsible for oil and chemical spill response (SYKE), the SYKE-appointed head of the response operations or (in oil spills from vessels) to the regional rescue services if SYKE has not appointed any person to head the response operations.

In its capacity as the VTS authority, the Finnish Transport Agency will, on request, provide the operational management of the response operations with executive assistance and will assist in the maintenance of the situation awareness. The VTS authority is responsible for the steering of vessel traffic and for the coordination of decisions concerning places of refuge.¹⁸

¹⁸ *Finding a place of refuge may become necessary if the vessel has suffered damage in a maritime accident or as a result of engine malfunction, cargo shifting or freezing. The situation starts when the master of the vessel, the shipping company or the representative of the vessel submits a request for a place of refuge for the vessel in Finland or when in a maritime accident the authorities order the vessel to enter a place of refuge on the Finnish coast. The request for a place of refuge may also come from the authorities in a neighbouring country. The VTS authority (Finnish Transport Agency) makes the decision on taking a*

All central government authorities are obliged to provide the response authorities with the executive assistance within their powers, when requested to do so. The obligation also applies to the pilotage company Finnpilot Pilotage Ltd. The state-owned company Meritaito Ltd takes part in off-shore oil spill response operations with its fairway maintenance vessels and in accordance with its service agreement in the same way as the Finnish Border Guard and the Finnish Navy. The state-owned company Arctia Shipping Ltd has concluded an oil spill response service agreement with the European Maritime Safety Agency (EMSA). Similar arrangements can also be considered between SYKE and private companies.

If an oil or chemical spill from a vessel, or the risk thereof, or if the possibility that the damage will spread, is so great that the staff or the equipment available to the accident response authority is not sufficient for effective response to the incident or prevention of damage, the accident response authority has the right to order a port operator, facility operator, person in charge of oil storage or anyone else in possession of prevention or response equipment, or anyone who has staff familiar with the use of such equipment, to make such equipment or staff available to the accident response authority, unless this would cause unreasonable harm to the operator.

First response: coastal and archipelago oil spill response

Coastal and archipelago oil spill response is within the remit of the rescue services in the relevant area. It is also in charge of the oil spill response preparedness. At the request of the head of the response operations, the regional rescue service must also outside its own region make its response equipment and supplies and the personnel need for operating them available to the head of the response operations. The rescue services must have a response plan for oil spills from vessels if it is necessary considering the local conditions.

The Centre for Economic Development, Transport and the Environment (ELY Centre) steers and supervises the organisation of oil spill response in the area coming under it and approves the oil spill response plans for

vessel in distress to a place of refuge under section 20 c of the Vessel Traffic Service Act (523/2005) in collaboration with the Finnish Border Guard, Finnish Environment Institute and other maritime search and rescue authorities. The decision is made on the basis of a situational assessment made in accordance with the plan referred to in section 20 b of the act.

the rescue service regions in the area coming under it. The authorities responsible for responses to oil and chemical spills from vessels must also, under the auspices of the ELY Centre, prepare a plan on cooperation in the combating of oil and chemical spills from vessels. The plans are approved by the Ministry of the Environment.

Oil spill recovery

Municipalities are responsible for oil spill recovery in their areas. Under section 21 of the Act on Oil Pollution Response (1673/2009), oil spill recovery operations are managed by an authority designated for the task by the municipality in question. Recovery means the non-urgent response operations that are carried out after the spread of oil on the shores has been contained. Where necessary, municipal authorities and institutions must also participate in the first response operations.

Non-profit and non-governmental organisations play a major role in the safeguarding of functions vital to society: they provide and maintain resources and expertise supplementing the work of the authorities in such areas as rescue operations. It is typical for the voluntary activities of the organisations that, if necessary, the operations can be initiated quickly and without the steering of the authorities.¹⁹ World Wildlife Fund (WWF) Finland, Voluntary rescue service (Vapepa)²⁰ and, as part of Vapepa, the Finnish Red Cross (SPR). For example, WWF's oil response teams assist authorities in the oil spill recovery operations and look after oiled animals.

Regional units were established under the Act on Voluntary National Defence (556/2007). Chapter 5 of the act lays down provisions on the executive assistance provided by the Finnish Defence Forces and other voluntary activities connected with the assistance to the authorities. Under the Government proposal (HE 172/2006), voluntary regional units could also be used for such tasks as oil spill response operations.

Management of oil waste from vessels

The head of the response operations decides when the first response operations are concluded. After the conclusion of the first response operations, the waste generated through oil spill becomes waste under the Waste Act (646/2011).

¹⁹ *Security Strategy for Society (2010)*.

²⁰ *Vapepa has about 50 organisations and about 20,000 volunteers as members.*

Under the Waste Act, the municipality is the holder of waste generated through oil spill. When acting as a waste holder, the municipality is an operator that is responsible for preparing administrative notifications concerning waste generated through oil spill and permit applications, selection of the methods for handling waste generated through oil spill, supervision of the intermediate storage and (partially) of the handling of waste generated through oil spill and the definition of the need to restore the contaminated soil and the implementation of the restoration.²¹

2.1.4 International actors

There are a number of international agreements and conventions on cooperation that are connected with the national preparedness to combat damage to marine environment. Finland is party to the Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area (Finnish Treaty Series 2/2000) and the Copenhagen Convention between the Nordic countries (Finnish Treaty Series 72/1998). Finland has also concluded bilateral agreements with Estonia (Finnish Treaty Series 31/1995) and Russia (Finnish Treaty Series 54/1990). There are also similar cooperation agreements between European Union Member States. The obligation to provide and the right to receive assistance are among the central principles laid down in the Helsinki Convention, the Copenhagen Convention and the agreements that Finland has concluded with Estonia and Russia. The provision of assistance is based on a formal request submitted by a competent authority of the other state. The party requesting the assistance is responsible for the costs incurred by the party providing the assistance.

The most important actor at global level is the International Maritime Organization (IMO), which comes under the United Nations. Its conventions form the basis for international regulation. Important international conventions include SOLAS (*International Convention for the Safety of Life at Sea*), MARPOL (*International Convention for the Prevention of Pollution from Ships*) and OPRC (*Oil Pollution Preparedness, Response and Co-operation*).²² IMO Resolutions are incorporated in the Finnish legislation by means of Presidential or Government decrees. The European Union (EU) is also an important

²¹ *Environmental Centre for Southeast Finland (2009), Särkkä and Tuomainen (2013).*

²² *Finland has also signed the agreement on cooperation in oil spill response in the Arctic, which was concluded in 2013.*

normative actor. For example, the third maritime safety package of the EU adopted in 2008 contains directives on such matters as port state control, vessel traffic control and flag state responsibility.

The European Union established its own maritime safety agency (European Maritime Safety Agency; EMSA) in 2002 following the accidents involving the vessels Erika and Prestige. EMSA has oil spill response vessels in EU waters and it maintains oil spill response expertise and the CleanSeaNet satellite monitoring system, which supports the monitoring and combating of oil spills in oil accidents.

The Baltic Marine Environment Protection Commission (HELCOM) is an important forum for international cooperation in the protection of the Baltic Sea. The commission adopts the recommendations that the member countries should incorporate in their legislation. For example, there are a total of 12 oil spill response recommendations in effect at the moment. They cover such issues as cooperation in response operations in coastal areas, response preparedness, aerial surveillance and restrictions to the use of chemical response agents in the Baltic Sea.

2.1.5 System for compensating for oil spills from vessels and funding of oil spill response preparedness

Finnish Oil Pollution Compensation Fund

The Finnish Oil Pollution Compensation Fund (ÖSRA) is an off-budget fund managed by the Ministry of the Environment. Provisions on the activities of the fund are laid down in the Act (1406/2004) and Decree (1409/2004) on the Oil Pollution Compensation Fund. Under the act, ÖSRA pays compensation for the costs resulting from oil spills, oil spill response operations and environmental restoration. The fund also reimburses for the cost arising from the development and maintenance of national response preparedness. ÖSRA's operations are funded through accumulation of oil protection fees and transfers from the state budget.

The oil protection fee is collected for oil that is imported or transported through Finland. The fee was tripled in 2009; the new fee was 1.50 euros for each tonne of oil. The increase was in force until 31 December 2012. After that, the Government decided that the increased fee would be collected for another three years, until the end of 2015.

The collection of the oil protection fee will end at the end of calendar month following the calendar month in which the capital of the Finnish Oil Pollution Compensation Fund has reached 50 million euros. The collection will start again after the end of the calendar month in which the

capital of the fund has dropped below 25 million euros. The increase is a response to the higher risk of an oil spill in the Baltic Sea, particularly in the Gulf of Finland.

The fund provides reimbursement for the costs incurred by a regional rescue service from the purchase of the oil spill response equipment and the maintenance of the response preparedness that are in accordance with the oil spill response plan referred to in the Act on Oil Pollution Response (1673/2009) (statutory compensation). If under the approved response plan, the oil spill response equipment is not solely intended to be used for oil spill response, reimbursement is only provided for the costs arising from the purchase and use of the equipment in question for oil spill response under the response plan. However, the fund may also provide reimbursement for a proportion of the purchasing costs that is higher than the response utilisation rate if this is justified on the basis of achieving adequate response preparedness.

The fund may provide grants to a regional rescue service or municipality for building or leasing a storage facility for oil spill response equipment, to an owner of a port or a facility for purchasing oil spill response equipment and for other activities necessary for oil spill response and for maintaining response preparedness. ÖSRA may also provide discretionary compensation to the state for costs arising from the purchase of response equipment for oil spills from vessels and maintenance of response preparedness, as referred to in the Act on Oil Pollution Response.

Under the Act on Oil Pollution Compensation Fund (1406/2004), the fund may pay compensation to injured parties and to parties that have taken part in the response operations. After a major oil spill from a vessel, the fund may pay compensation as what are called advance compensations, provisions on which are laid down in section 11 of the act. The definite compensation is paid after the claimant has provided details of the cost that it has incurred. More detailed provisions on the damage to be compensated for and the response and restoration costs for which reimbursement is paid are contained in sections 12 and 13 of the act. Provisions on the application for compensation and the content of the application for compensation are laid down in the Decree on the Oil Pollution Compensation Fund. The right of the party that has received compensation from the fund to receive compensation from a party obliged to pay compensation is transferred to the Finnish Oil Pollution Compensation Fund to the extent that compensation has been paid from the fund.

Under the Act on the Oil Pollution Compensation Fund (1406/2004), the Centre for Economic Development, Transport and the Environment must

be appoint a review board to examine the compensation issues concerning the oil spill and other preparatory reports if the estimated damage or response costs exceed 20,000 euros and if the examination of the damage requires that a review board is appointed. The review board must also be appointed if the Board of the Finnish Oil Pollution Compensation Fund so requests. Following the oil spill, the board must conduct a review in which the damage and the cause of the damage are determined and the compensation to be paid as a result of damage is estimated. The opinion issued by the review board must be submitted to the Board of the Finnish Oil Pollution Compensation Fund. The parties concerned must be provided with an opportunity to be heard during the review. The review board is chaired by a person appointed by the Centre for Economic Development, Transport and the Environment for the task and it must also have at least two other members. One of the members must possess expertise in the field of natural sciences and the other must be familiar with damage assessment.

International system of compensation

An international system has been developed for paying compensation in major oil spills. The system is based on two international conventions signed under IMO: *Civil Liability Convention* (Finnish Treaty Series 43/1996) and *Fund Convention* (Finnish Treaty Series 42/1996). The International Oil Pollution Compensation Funds (IOPCF) have been established under the Fund Convention. Finland is a party to both conventions and started observing the current provisions in 1996.

The financial liability of the vessel's owner is laid down in the 1992 Civil Liability Convention, the provisions of which have been implemented in Finland by means of Chapter 10 of the Maritime Act (674/1994). In legal terms, the liability is of strict nature and thus it does not require deliberateness or negligence. The liability is based on oil tankers' gross tonnage but is not unlimited.

The upper limits of the compensation are given as Special Drawing Rights (SDR).²³ Under Article 5 of the 1992 Civil Liability Convention, the compensation limits are 4.51 million SDR (5.16 million euros) - 89.77

²³ SDR is a unit created by the International Monetary Fund. Its value is determined on the basis of a basket of the major world currencies. The values of the compensation limits vary in accordance with the exchange rates at the time.

million SDR (102.79 million euros), depending on the vessel's gross tonnage.²⁴

In order to ensure the payment of damages, shipowners have the obligation to insure their vessels against oil spills (liability insurance) when the gross tonnage of the vessel is more than 2,000 tonnes. In most cases, the policy-holder is the shipping company that owns the vessel. Mutual insurance associations of shipping companies (P&I Clubs) provide their members with P&I insurance (Protection and Indemnity Insurance).

The International Oil Pollution Compensation Funds (IOPCF) pay compensation for oil spills from tankers in cases where the shipowner's liability does not cover the damages, the damages exceed the maximum liability of the shipowner, or the shipowner is not solvent. The funds thus supplement the liability of the polluter.

The IOPC Fund system has two compensation funds: the 1992 Fund and the Supplementary Fund.²⁵ The funds will only pay compensation for oil spills from oil tankers that occur in the territory, territorial sea or the exclusive economic zone of the contracting states.²⁶ The compensation regime only applies to persistent oils.

The states collect the funds for the IOPCF system from the parties that have received more than 150,000 tonnes of crude oil or heavy fuel oil by sea to a port of a contracting state. The biggest contributors to the IOPC Fund system are Japan (15%), India (11%), South Korea (8%) and Italy (8%). According to its own announcement, Neste Oil Corporation accounts for about one per cent of the IOPC Fund system.

There are differences between the funds as regards compensation limits and contracting states. The maximum compensation payable from the 1992 Fund is 203 million SDR (232.46 million euros) for an oil spill from a tanker. The compensation does not depend on the size of the vessel. The compensation paid by the shipowner or his insurance company under the 1992 Civil Liability Convention are also included in this total. At the same time, the maximum compensation payable from the Supplementary Fund for an oil spill from a tanker is 750 million SDR (858.75 million

²⁴ According to the exchange rate between SDR and euro on 30 August 2013.

²⁵ The international convention on the original fund of 1971 expired on 24 May 2002. However, the fund will continue to examine oil spills that occurred in the contracting states before that date. In practice, it is possible to receive compensation for oil spills from vessels occurring in the future from the 1992 Fund and the Supplementary Fund, which have uniform compensation practices.

²⁶ Finland's exclusive economic zone is a sea area that is located outside Finland's territorial waters but where the State of Finland has the right to explore and exploit the abiotic and biotic natural resources.

euros) and this total includes both the compensations paid from the 1992 Fund and those paid by the shipowner.²⁷ If the grand total of the valid claims exceeds this upper limit, the amount of the compensations must be reduced by the number of recipients and in the proportion of the compensation received by them.

As Finland has signed the protocol on the Supplementary Fund, compensation for damage affecting Finland may, under the Fund Convention, be sought from the 1992 Fund and the Supplementary Fund. When the maximum compensation payable from the fund is added to the liability insurance of the vessel, the primary source of compensation, the maximum compensation is thus about 859 million euros.

2.2 Geographic scope, audit questions, audit criteria, methods and material

The Gulf of Finland is the area with the biggest risk of major oil spills from vessels and the resulting economic impact. For this reason the audit only covers this area (high seas, the coast and shores).

The main question on which the audit focused was the following: *Is the system for managing oil spills from vessels in the Gulf of Finland efficient?* Efficiency means that

1. there are no serious oil spills from vessels because preventive measures and risk management are in place and the arrangements are cost-effective
2. however, if an oil spill occurs, the damage can be contained quickly and in a cost-effective manner (adequate response capability)
3. the consequences of the damage can be dealt with so that the economic and environmental damage is minimised
4. the 'party causing the risk pays' and the 'polluter pays' principles ensure the payment of costs arising from response maintenance and the payment of compensation so that the state does not need to incur any hidden liabilities.

From the perspective of cost-effectiveness and the allocation of costs, the main question can be determined as follows:

²⁷ According to the exchange rate between SDR and euro on 30 August 2013.

- Are the investments in systems preventing oil spills from vessels on the one hand and in response equipment on the other based on cost-effectiveness comparisons?
- Is the Finnish Oil Pollution Compensation Fund an appropriate and effective solution in the combating of oil spills from vessels?
- Are the municipalities in a position to manage the oil spill recovery?
- Are the municipalities in a position to manage the waste management in connection with oil spills from vessels?
- Can compensation be paid for all costs and claims arising from oil spills from vessels?

The audit criteria are presented in Annex 1. The criteria are both quantitative and qualitative. Provisions, agreements, conventions, treaties and guidelines have been used as sources for the criteria.

As part of the audit, administrative documents and the material of the International Oil Pollution Compensation Funds were analysed. A total of 16 semi-structures thematic interviews with different parties were conducted. The interviews were analysed in a qualitative manner. As part of the audit, representatives of municipalities on the Gulf of Finland were also interviewed by telephone. The officials were asked how the municipalities' financial administrations were prepared for major oil spills from vessels. The Finnish Border Guard and the Finnish Environment Institute were asked to provide written responses to a question on the arrangements concerning the management and steering structures in oil spill response operations. The material obtained was cross-reflected so that the problems could be identified. The audit method consisted of material and methodical triangulation (quantitative and qualitative audit approach).

The auditors took part as observers in the international Balex Delta exercise and the national exercise off Helsinki preceding it (28 - 30 August 2012). They also made observations of the operations of the crisis centre in the Finnish Environment Institute. The auditors also attended as observes “Puhas Meri”, a joint Finnish-Estonian exercise held off Tallinn on 29 May 2013. The auditors familiarised themselves with the operations of the VTS Centre and made audit visits to the oil spill response equipment storage facilities at Upinniemi and Hakuninmaa in Helsinki. Visits were also made to three oil spill response vessels (Halli, Hylje and Louhi).

The auditors familiarised themselves with oil spill response technology at the Oilspill exhibition in London (12–13 March 2012) and took part in a training session on international oil accident compensation held during the event. Information was also obtained by taking part in seminars on oil

spills from vessels and conferences attended by different authorities held in Finland. A judicial report on the liability issues concerning the waste generated in a vessel accident was also commissioned as part of the audit.²⁸

²⁸ *Särkkä and Tuomainen (2013).*

3 Audit findings

3.1 The Gulf of Finland is a challenging environment for shipping and oil spill response

From the perspective of shipping, the Gulf of Finland is characterised by a large number of reefs, narrow fairways and harsh winter conditions. There is a great deal of annual variation in the ice conditions in the Gulf of Finland. The eastern parts of the Gulf of Finland freeze every winter and normally the entire sea area is covered by ice during the winter months. As the winds frequently move ice masses in the Gulf of Finland, mild winters and winters with changing weather patterns may also become difficult for maritime traffic. New ice is quickly formed during long periods of sub-zero temperatures and when temperatures rise and winds become stronger, the new ice moves to the edge of drift ice, resulting in windrows. Such windrows and accumulations of ice also slow down the movements of reinforced vessels more than flat ice of moderate thickness.²⁹

The Gulf of Finland has a number of limnological and ecological characteristics making it sensitive to the impacts of oil spills. The brackish water of the Baltic Sea has lower salinity than seawater and the amount of water is low and the turnover of water slow. The organisms of the Baltic Sea cannot withstand stress in the same manner as organisms in oceans or fresh water, as they have to tolerate low salinity and cold winters. The water is cold, which slows down the decomposition of oil. Moreover, oil does not occur naturally in the Gulf of Finland, which means that unlike such areas as the Gulf of Mexico, it is not home to oil-eating bacteria. The International Maritime Organization (IMO) has granted the Baltic Sea (excluding Russian territorial waters) the status of a Particularly Sensitive Sea Area.

The Gulf of Finland is fairly shallow and narrow, which means that any oil spills would quickly reach the shores and the reaction time in off-shore response would be short. Moreover, the winds in the Gulf of Finland blow

²⁹ *Silen (2013)*.

from the south and south-west, which means that the oil spills would usually move towards the Finnish coast.

The shoreline of the Gulf of Finland on the Finnish side is jagged and there is a large number of islands. The length of the shoreline from the tip of Hanko to the Russian border is about 1,700 kilometres and the total length of the shoreline of the islands on the Gulf of Finland is about 6,500 kilometres. The clean-up of oil reaching the shores in a major oil spill from a vessel would take a long time and require a large number of personnel. In other words, it would be expensive.

Oil spill response in ice conditions is a particular challenge in the Gulf of Finland. In such a situation, the speed of off-shore response is not as important as in open water as oil spreads more slowly in ice conditions as in open water. The oil only starts moving from below fast ice when the flow speed of the water is high. Ice may also prevent the oil from reaching the shores. The problem is, however, that as the water freezes the oil covers the pieces of ice and penetrates the pores of the ice. If the oil spreads over a large area, the concentrations of oil become so low that recovery it is not economically feasible. The oil that has not been recovered washes ashore with melting ice.

The effectiveness of oil spill response depends on the evaporation of oil and mixing of oil with water. The way in which oil behaves in the sea and how much of it evaporates or is mixed with water depends on the composition of the oil, weather conditions and the quality of the sea water. Oils are usually lighter than sea water but some of the heavy oils may fall under the surface. The spread of oil depends on the size of the spill and the viscosity of the oil. The composition of the oil changes after it has been in the water for a while. The fact that Russian crude oil³⁰ is mixed with large amounts of water and its volume increases must be taken into account in oil spill response in the Gulf of Finland.³¹

The tendency of oil to spread and fragment quickly makes response operations challenging. Different methods have been developed for off-shore oil spill response. In global terms, the most commonly used of them are the dispersing of oil using chemicals (dispersing agents), mechanical recovery and burning of oil. In the Baltic Sea and in Finland, oil spill

³⁰ *The oil shipped from Russia through the Gulf of Finland is Urals grade or REBCO (Russia Export Blend Crude Oil). It is a mixture of heavy oil from the Urals and the Volga region and the lighter oil of Western Siberia. As the oil is a mixture, its precise composition may change on a daily basis. For example, the Brent grade of the North Sea, West Texas Intermediate and the Dubai Crude are lighter than REBCO.*

³¹ *EC (2009).*

response is based on mechanical recovery. In this method, the spread of oil in the sea is contained or guided using booms and the aim is to recover the oil from the sea. In the view of HELCOM, burning and dispersing agents should only be used in exceptional circumstances.

3.2 Prevention of oil spills and risk management

3.2.1 Oil spill response is part of the maritime safety policy

In the autumn of 2007, the Parliamentary Foreign Affairs Committee issued the report *Baltic Sea and the Northern Dimension* (UaVM 7/2007 vp). The report highlighted the Baltic Sea as an environmental issue. The focus in the debate in the Parliament was also on themes concerning the environment and maritime safety.

In March 2009, the Ministry of Transport and Communications published the *Baltic Sea Maritime Safety Programme*.³² The programme had the more effective prevention of accidents as its basis and it examined maritime safety from the perspective of four main themes: 1) preventing and reducing accidents; 2) saving of human lives; 3) preventing hazardous substances from getting into water; and 4) investigating accidents and dangerous situations and utilising the investigation data in accident prevention.

In June 2009, the Government issued the report *Challenges of the Baltic Sea and Baltic Sea Policy*.³³ The report focused on improving shipping safety and the state of the marine environment in the Baltic Sea and closer economic cooperation. According to the follow-up report published in May 2011, most of the measures set out in the report have been initiated.³⁴ The only area where no progress has been achieved is the establishment of the centre of excellence focusing on oil spill response.

The purpose of the centre would have been to manage the storage, maintenance and development of response equipment and the tasks concerning training and exercises in the field of oil spill response. Lamor Corporation, a global supplier of oil spill response equipment was

³² *Ministry of Transport and Communications (2009)*.

³³ *Government Report (2009)*.

³⁴ *Government Secretariat for EU Affairs (2011)*.

involved in the project. According to a one-man committee examining the issue, there are no grounds for making a limited company part of the activities carried out by the authorities, particularly because most of the municipalities and rescue services were unwilling to provide funding for the project. Instead, the committee proposed the establishment of a state-run oil spill response centre or depot that would come under the Finnish Environment Institute and that would provide an additional resource for the authorities in their work to combat environmental damage.³⁵ Even though a total of 600,000 euros was allocated for the establishment of the centre in the 2009 state budget, the project has not made any progress.³⁶

Oil spill response is also discussed in the *Internal Security Programme* of 2008³⁷ as part of the prevention of major accidents and environmental destruction. The theme is no longer discussed in the 2012 programme,³⁸ which focuses on everyday security.

3.2.2 Pilotage and vessel inspections help to prevent accidents

There are many shipping safety activities that also reduce the risk of oil spills. For example, pilotage operations are important for maritime safety. Under the Pilotage Act (940/2003), the purpose of the pilotage activities is to promote the safety of vessel traffic and to prevent environmental damage generated by vessel traffic.

In Finland, pilotage is the exclusive right of Finnpilot Pilotage Ltd, which is a state-owned special assignment company operating in the administrative sector of the Ministry of Transport and Communications. It charges a fee for pilotage operations. The volume of pilotage depends on the foreign trade situation and the pilotage carried out by shipping companies. Pilotage by Finnpilot Pilotage Ltd has declined as more and

³⁵ Lampela (2008), Ministry of the Environment (2005).

³⁶ In 2013, the Ministry of Employment and the Economy, Ministry of Transport and Communications, Ministry of the Interior and the Ministry of the Environment decided to fund the work to examine the establishment of an oil spill response centre in the Arctic. A consultant will submit a report to a steering group comprising representatives of ministries and experts by the end of April 2014 in which the area of operations, actors, business concepts and funding solutions of the centre are described.

³⁷ Ministry of the Interior (2008).

³⁸ Ministry of the Interior (2012).

more ships have masters with pilotage exemption certificates.³⁹ At moment, about 35 per cent of all maritime traffic use pilotage services.

Finnpilot has been developing its activities by for example carrying out a project on the effectiveness of pilotage in which it was calculated that one euro invested in pilotage will generate safety worth between 5 and 10 euros.⁴⁰ Finnpiilot has also developed the Mobpia mobile system which guides the pilotage process.

According to Finnpiilot, the Gulf of Finland is a challenging environment for shipping on account of its twisting and narrow fairways and rocky bottom and especially because of harsh winter conditions. Ice conditions are a particular challenge to many foreign crews.

At the moment, Finnpiilot is not participating in oil spill response exercises or in the planning of response measures. In the interviews conducted for the audit, the company expressed its interest in participating in the oil response support measures.

In addition to pilotage, vessel inspections also help to prevent accidents. For example ISM (International Safety Management Code) audits are connected with the assessment of safety management arrangements. The ISM Code concerns safe vessel operations and its aim is to prevent environmental pollution. Safety inspections are deemed to make an important contribution to safety and environmental protection.⁴¹ At the same time, Host State Controls (HSC) target high-speed crafts and ro-ro passenger vessels. Port State Controls are examined in more detail below.

Finland signed the Paris Memorandum of Understanding on Port State Control (Paris MoU) in 1982 and carries out inspections in accordance with the methods set out in the document. A total of 27 countries have signed the Paris MoU. The purpose of the Paris Memorandum of Understanding is to reduce the use of substandard ships in the waters coming under the jurisdiction of the Member States and in this way improve maritime safety, protection of the marine environment and make the improvement of safety measures more effective. Port State Control is based on the Directive of the European Parliament and of the Council on port State control (2009/16/EC), which has been implemented in Finland by means of the Ship Safety Control Act (370/1995).

The Finnish Transport Safety Agency (Trafi), which comes under the Ministry of Transport and Communications, carries out the PSC inspections under the Ship Safety Control Act (370/1995) and the

³⁹ *A pilotage exemption certificate exempts the vessel from compulsory pilotage.*

⁴⁰ *Ahonen and Kosonen (2013), Finnpiilot (2012).*

⁴¹ *Schirokoff (2013).*

Government Decree on Inspecting Foreign Ships in Finland (1241/2010). Selection of ships for PSC inspections is in accordance with their risk profile. The criteria for determining the profile are laid down in the Annexes to the PSC Directive. The website of Paris MoU has a calculator for determining the risk profile. According to the interviews conducted for the audit, representatives of the Finnish Transport Safety Agency considered the risk assessment criteria appropriate.

In the risk assessment, ships are classified as Priority I and Priority II vessels. Vessels with Priority I status must always undergo mandatory inspection, while on vessels with Priority II status, the authorities decide what will be inspected.⁴² The types of inspection are initial inspection, more detailed inspection and expanded inspection. For example, a vessel with Priority I status, must undergo an expanded inspection if, according to its risk profile, it is a high risk vessel and has not been inspected during the past six months. PSC inspections are entered in the international Thetis system.⁴³ The information system can produce lists of the vessels which may be subjected to inspections.

The control authority in PSC inspections can make a written decision to detain a vessel if the deficiency in vessel safety is of such nature than operating the vessel poses a risk to human life or a substantial health risk or a substantial risk for the vessel, other traffic or the marine environment.

Table 1 shows the three-year total of PSC inspections carried out by the Paris MoU organisation, the inspection target for Finland, the number of inspections carried out by the Finnish Transport Safety Agency and their proportion of the total number of inspections and the performance target set out for the agency concerning the inspections. A substantial reduction in the total number of inspections in 2011 was a result of the new inspection guidelines adopted at the start of 2011. The purpose of the

⁴² *The supervisory authority may also inspect vessels other than those with Priority I and II status.*

⁴³ *The exchange of information between authorities at EU levels is based on the Vessel Traffic Monitoring Directive (2002/59/EC) and the directive amending it (2009/17/EC). An EU-level information exchange system (SafeNet) has been established under the directives. Its purpose is to promote safety of vessel traffic and environmental protection and it allows the exchange of information on port calls, locations and hazardous cargo of vessels and dangerous situations and accidents involving vessels. The SafeNet system comprises the central system maintained by the European Maritime Safety Agency (EMSA) and national systems. Finland's national shipping information management system is known as Portnet.*

guidelines was to ensure than more inspections are carried out on high risk vessels.⁴⁴

Table 1. Targets for PSC inspections and the number of inspections.⁴⁵

	2010	2011	2012
Total number of inspections	24,058	19,058	18,308
Target for Finland	342	344	274
Number of inspections carried out in Finland	376	316	259
Finnish percentage	1.56	1.70	1.50
Agency's performance target	340	340	98.8% of the inspection plan

The table shows that in 2010, during the old inspection regime, the Finnish Transport Safety Agency achieved both the international and its own performance targets for PSC inspections. However, in 2011, after the introduction of the new system, Finland has not achieved its inspection targets. In the 2011 final accounts of the Finnish Transport Safety Agency the matter is explained as follows: “*Under the new inspection system, the total number of inspectable vessels did not allow the Agency to inspect the targeted number of vessels.*” In the opinion on the final accounts issued by the Ministry of Transport and Communications, this change is not discussed. However, it cannot be disputed that the new inspection system has played a role in the inability of the Finnish Transport Safety Agency to achieve its inspection targets because according to the annual reports of the Paris MoU,⁴⁶ in 2008 and 2009 Finland achieved the inspection targets set out for it.

The number of PSC inspections was no longer set out as a performance target indicator in the 2012 performance agreement for the Finnish Transport Safety Agency as an aggregative implementation of the inspection plan was used as the indicator. PSC inspections are only part of

⁴⁴ Paris MoU (2012). Changes were made to such items as the inspection frequency based on vessel risk assessment and the factors influencing the risk assessment.

⁴⁵ Annual reports of the Paris MoU and performance guidance agreements and final accounts of the Finnish Transport Safety Agency have been used as sources.

⁴⁶ Paris MoU (2009), (2010).

this total. Carrying out at least 90 per cent of the control measures was laid out as the target level in the plan. This was also achieved. The changing of the performance target indicator is not discussed in the planning documents (performance agreements, final accounts and opinions on final accounts) of the Ministry of Transport and Communications and the Finnish Transport Safety Agency.

Finland did not achieve the international target for PSC inspections in 2012 either. However, the conclusion of the audit is that all vessels with Priority I status (mandatory inspection) have been inspected.

A seemingly small deficiency that nevertheless may limit the number of PSC inspections or slow down the work emerged in the audit. It was suggested in the interviews conducted for the audit that the inadequacy of the funds allocated for travel may have contributed to the non-achievement of the inspection targets. It would be easier to achieve the inspection targets more effectively if the agency had, in addition to an overall travel expenses framework, also a separate budget for inspection trips. When conducting inspections, the agency charges fees for the work that it carries out (EUR/hour), and the travel expenses are also included in the invoices. However, the payments are only received with delay.⁴⁷

3.2.3 Systems steering vessel traffic are a cost-effective way of reducing accidents

Vessel Traffic Service (VTS)

Under the Vessel Traffic Service Act (623/2005), vessels of 24 metres in length or more are obliged to participate in Vessel Traffic Service (VTS) by continuously listening to the working channel in the VTS area. The purpose of Vessel Traffic Service is to promote the safety and efficiency of vessel traffic and to prevent environmental damage generated by vessel traffic. The service is maintained by the Finnish Transport Agency. The Finnish coast has been divided into six VTS areas. In the Gulf of Finland they are as follows: Hanko VTS, Helsinki VTS and Kotka VTS, which are

⁴⁷ PSC inspections are part of the chargeable activities carried out by the Finnish Transport Safety Agency. The size of the fees is laid down in the Ministry of Transport and Communications Decree on the Commercial Services of the Finnish Transport Safety Agency (722/2012).

all located in the premises of the Gulf of Finland Vessel Traffic Centre in Helsinki.⁴⁸

A total of 75 vessel traffic operators work at the Vessel Traffic Centre and most of them are master mariners.

Under the Vessel Traffic Service Act, vessel traffic services comprise information, navigational assistance and traffic organisation. Vessels are provided with information as required (when they report and when they request information). Information is provided on matters that have an impact on safe navigation and smooth flow of traffic. Such information includes details of other vessels in the VTS area, information on conditions, and information on the state of the safety equipment and fairways. The Vessel Traffic Centre follows the movements of the ships and provides them with information on dangers threatening them, as necessary.

Navigational assistance may be provided to an identified vessel on request or when the Vessel Traffic Centre considers it necessary to provide the vessel with assistance. Navigational assistance is only target-oriented and on an advisory basis and the ship's master remains responsible for the navigation of the vessel. Navigational assistance may include information on the vessel's position and the giving of directions relative to the bottom to such locations as the middle of the fairway or the pilot boarding area. The information may also be provided so that the vessel can safely pass a danger to shipping such as a shallow area. The information provided is based on radar information and AIS information available to the Vessel Traffic Centre. AIS (Automatic Identification System) is a system used to identify and determine the position of vessels.

⁴⁸ *The Maritime Rescue Sub-Centre of the Finnish Border Guard is located in the same building (at the Katajanokka district of Helsinki), which provides a good basis for efficient cooperation.*



Figure 3. The radar located behind the Utö lighthouse monitors maritime traffic. © Thomas Erlund.

Vessel traffic is organised so that traffic can flow more smoothly and safety can be improved. The aim is to prevent dangerous meetings and passings and congestion. In special situations, such as exceptional weather conditions, during a search and rescue operation or other factor restricting or endangering traffic, the Vessel Traffic Centre may temporarily close a fairway or part of it. In special situations, the centre may also order vessels to anchorage or impose speed limits.

In the opinion of seafarers, VTS helps to improve maritime safety.⁴⁹ Vessel Traffic Centres play a major role in the prevention of oil spills from vessels. There has been little research on the impact of Vessel Traffic Service on safety and the environment. According to one study, VTS operations reduce the accident risk by between 20 and 80 per cent, depending on geographic conditions, traffic frequency and VTS resources.⁵⁰ According to the interviews conducted for the audit, the Vessel Traffic Centre deals with more than 100 traffic deviations each week.⁵¹ Excluding telematics, Vessel Traffic Service had a budget of slightly more than eight million euros in 2013. A major oil spill from a vessel may cost hundreds of millions of euros. When these costs are compared with the budget of the Vessel Traffic Service, it becomes clear

⁴⁹ *Tuomala (2010).*

⁵⁰ *Schirokoff (2013).*

⁵¹ *See also HS (2012).*

that investing in proactive systems that prevent accidents is highly cost-effective.

It was found out in the audit that there have been problems in the cooperation between the VTS operations of the Finnish Transport Agency and Finnpilot, the company providing pilotage services. The problems have mainly concerned communications and situations in which the other party should be informed on events.⁵² As high-quality pilotage operations help to improve maritime safety and prevent accidents, it can be considered a positive development that in 2012 Finnpilot and VTS operations agreed on joint practices to put the cooperation on a better basis.

Gulf of Finland Mandatory Ship Reporting System (GOFREP)

Finland, Estonia and Russia have prepared a joint plan on the establishment and maintenance of a mandatory ship reporting system (GOFREP) in the Gulf of Finland. The system has been approved by the International Maritime Organization (IMO) and it became operational in 2004. The purpose of the system is to improve maritime safety in the area, put the protection of the marine environment on a better basis and to monitor compliance with the regulations concerning shipping routes in the area. Ships with a gross tonnage of at least 300 GT are required to participate in the reporting system.⁵³

A vessel must report to the Vessel Traffic Centre whose area it is entering. A vessel must also submit a report when it enters the GOFREP area or crosses the Central Reporting Line in the middle of the Gulf of Finland. In exceptional situations, vessels with a gross tonnage of less than 300 GT must also submit a report (for example when a vessel cannot be navigated).

Under the system, the southern part of the Gulf of Finland is monitored by Estonia, the northern part by Finland and the eastern end by Russia. When entering the reporting system, vessels must report to the Vessel Traffic Centre whose area they are entering. Eastbound vessels must report to the Tallinn Vessel Traffic Centre, while westbound ships must report to the Gulf of Finland Vessel Traffic Centre, which is located in Helsinki. This means that GOFREP and VTS are located in the same

⁵² See also Tuomala (2010).

⁵³ Gross tonnage (GT) refers to the vessel's overall internal volume and it comprises practically the entire volume of the vessel.

place. There are always two persons monitoring the traffic at the same time.



Figure 4. VTS operators at work. © Finnish Transport Agency.

Monitoring of the vessels is based on radar, camera and AIS systems. AIS provides an instrument for electronic exchange of vessel information (such as identification data, position, direction and speed) between ships and VTS Centres. This information can be viewed on the equipment display or on ECDIS display.⁵⁴ Under IMO's SOLAS provisions, AIS must be installed on all vessels with a gross tonnage of at least 300 GT and that are used in international traffic and on all passenger vessels of all sizes. It has been found out that the introduction of the ECDIS system is particularly cost-effective as a risk-management tool on oil tankers.⁵⁵

As the vessel progresses, the Gulf of Finland Vessel Traffic Centre informs the vessel on any factors that are relevant to safety or smooth flow of traffic. Violations of the route divisions are monitored and, if necessary, the vessels are requested to observe shipping route rules. A standard-form deviation report is prepared of all observed violations. The

⁵⁴ *Using ECDIS, a vessel can navigate using electronic charts.*

⁵⁵ *Vanem et al. (2007), Det Norske Veritas (2008). However, it has been noted that with the introduction of the ECDIS system, there is a danger that navigational skills might disappear (Schirokoff 2013).*

authorities of the vessels' flag states will be notified if the vessels violate against the rules of the reporting system or shipping route rules in which case the authorities in question may press charges against the ships' masters.

In October 2012, there was a near-miss situation close to the Finnish border. The Helsinki Vessel Traffic Centre noticed an oil tanker loaded with 100,216 tonnes of crude oil that was proceeding towards a shallow area in the neighbouring country's VTS area. The draught of the vessel was 15.2 metres while the depth of the shallow area was 13.6 metres. Seven minutes before any accident the Helsinki Vessel Traffic Centre contacted the St. Petersburg Vessel Traffic Centre and quick action helped to correct the situation.

According to the Helsinki Vessel Traffic Centre, the vessel was proceeding at a speed of 12 knots and had it hit the shallow area, half of the ship would have been torn open despite the fact that it was equipped with a double hull. The persons interviewed for the audit estimated that in that case, between 50,000 and 60,000 tonnes of crude oil could have been released into the sea. In view of the weather conditions at the time, the oil would have spread to the Kotka-Hamina archipelago and possibly also to the Helsinki archipelago. Such an oil spill would have been twice as large as Finland is prepared to handle. If the average response and clean-up costs of an oil spill are put at 10,800 euros/tonne⁵⁶, the accident would have cost about 650 million euros. The sum does not include such items as the liabilities that would have arisen as a result of the oil spill.

ENSI navigation service

The John Nurminen Foundation has contributed to the prevention of oil spills from vessels by developing the ENSI navigation service. The project was prompted by an incident in the Gulf of Finland in 2007 in which a tanker loaded with 100,000 tonnes of oil ran aground. In cooperation with the Finnish Transport Agency, Finnish Transport Safety Agency and Neste Oil Corporation, the foundation started developing the ENSI service to supplement the VTS and GOFREP services.⁵⁷

⁵⁶ The figure is presented in the national oil spill contingency plan (Ministry of the Environment (2011)).

⁵⁷ As the development of the ENSI service began, the Finnish Maritime Administration was a partner in the project. As part of an administrative reform it became part of the Finnish Transport Agency in 2010 and some of its functions were also transferred to the Finnish Transport Safety Agency.

The idea of the ENSI service is to encourage oil tankers to send their route plans to the Vessel Traffic Centre in advance so that the system of the centre can automatically check the plans.⁵⁸ The aim of ENSI is to improve the flow of information and reduce the chances of misunderstanding between ships and VTS operators.

Vessels can benefit from their participation so that the service provides them with the necessary navigation information in electronic form. The route-specific information supplied to the vessels helps them to navigate in a safe manner. ENSI service also provides the vessels with up-to-date and route-specific information on such matters as the weather, ice conditions, route locations recommended by ice breakers and ice warnings.⁵⁹ This helps to improve shipping safety and reduce the risk of oil spills.

According to the information obtained in the audit, John Nurminen Foundation has spent about 900,000 euros on the development of the service (situation at the time of the interview on 29 November 2012). The Finnish Transport Agency would incur costs of about 300,000 euros, which would allow the system to be connected with the VTS system. On the basis of the interviews, the technology of the service has been successfully incorporated in the VTS system and it generates added value.

The Finnipilot company, which is responsible for pilotage services, considered the ENSI project excellent as it can be used for providing information on the availability of pilots and for ordering a pilot. However, in the audit interviews, a number of authorities expressed displeasure over the fact that a privately funded project has received so much publicity. Their opinion was that the long-term efforts of the authorities do not receive similar recognition and that the public may get the impression that the state does not do anything about the matter.

In the view of the Finnish Transport Agency, the involvement of a private provider of funding and the publicity given to the project are a positive factor as they have helped to establish better links with businesses and made shipping companies more willing to take part in the project.

According to the audit, channelling of private funding into the development of new preparedness technology can be considered a good practice from the perspective of central government finances.

⁵⁸ *Providing advance notification of the route plans is not compulsory.*

⁵⁹ *According to the interviews conducted for the audit, the John Nurminen Foundation has also promised to purchase iPads for oil tankers.*

3.2.4 Aerial surveillance is technologically up to date and functions in a cost-effective manner

According to the recommendations of the Baltic Marine Environment Protection Commission (HELCOM), member countries should carry out aerial surveillance on their shipping routes at least twice a week. In Finland, aerial surveillance is carried out jointly by the Finnish Environment Institute and the Finnish Border Guard. Surveillance of oil spills accounts for most of the aerial environmental surveillance. However, at the same time, it is also possible to keep an eye on matters concerning blue-green algae and freezing of the sea and carry out bird and seal counts. According to the Air Patrol Squadron of the Finnish Border Guard, environmental surveillance fits well into its operational structure.

The Finnish Border Guard has 12 helicopters and two aeroplanes for aerial surveillance. Helicopters have a short response time, while the aeroplanes are used for extensive patrolling. Even though flying helicopters is more expensive, they can be used for taking oil samples.

The Finnish Environment Institute trains pilots for identifying oil spills. According to the Finnish Border Guard, it would also be possible to coordinate oil spill response operations from the air in an efficient manner. This is because from the air it is possible to assist in the efforts to locate the accident site and in the work to estimate the amount and spread of the spill.

Surveillance flights are flown almost on a daily basis and environmental surveillance is also carried out on each flight. Thus, Finland exceeds HELCOM's recommendations concerning flight hours. Environmental surveillance is carried out as part of other maritime surveillance tasks. For this reason, the extent of environmental surveillance and the flight hours spent on it are primarily determined on the basis of other maritime surveillance tasks. The flights are planned so that the Clean Sea Net satellite images supplied by the European Maritime Safety Agency (EMSA) can be used in the selection of the routes of the surveillance flights. In 2011, less than ten oil spills visible in satellite images were detected in the Finnish territorial waters.

The Dornier aeroplanes are equipped with environmental surveillance equipment costing about 11 million euros. The equipment was updated in 2009 with an appropriation of five million euros. Equipment such as IR/UV scanner allows the determination of the thickest point of the oil spill in which the response operations can be concentrated. With a side-looking radar, it is possible to detect oil spills over a wide area. Most of

the funding for the equipment has come from the Finnish Environment Institute and the Finnish Oil Pollution Compensation Fund.



Figure 5. The Dornier Do-228 surveillance plane of the Finnish Border Guard has a range of 1,250 kilometres. © Finnish Border Guard.

The role of aerial surveillance is highlighted in the monitoring of less serious oil spills that may be accidental or intentional. At the same time, aerial surveillance allows the charging of costs from the party causing the spill by means of an administrative oil spill charge, which is a punitive administrative sanction.⁶⁰ The charge is imposed by the Finnish Border Guard in an administrative procedure, which means that it is quicker and more effective than a penalty under criminal law. The size of the charge is determined by the size of the oil spill and the vessel. On certain conditions, the Finnish Border Guard may also detain a vessel, if there are grounds for doing so in order to secure the payment of the charge. In 2012, the Finnish Border Guard started oil spill charge investigations in two cases, which was 11 cases fewer than in 2007.

Even though aerial surveillance is connected with the identification of oil spills that have already occurred, more effective surveillance has led to a reduction in the number of intentional releases of oil in the Baltic Sea. In 2012, Finnish authorities detected a total of 54 releases of oil and 47 of

⁶⁰ *Act amending the Act on the Prevention of Pollution from Ships (1163/2005).*

them occurred in the Finnish territorial waters. As recently as 2007 and 2008, there were more than one hundred oil spills each year. The size of the spills has also decreased: in 2012, the average volume of an oil spill was about 25 litres, whereas in 2008 it had been 170 litres.⁶¹ People working in aerial surveillance considered the addition of the exclusive economic zone to the territorial waters as a major change as it extended Finnish jurisdiction to the zone and led to a reduction in the number of intentional oil spills.

From the perspective of the Finnish Environment Institute, the current aerial surveillance hours are adequate. Finland logs more flying hours in the Baltic Sea area than any other country, except Sweden. Both in the view of the Finnish Environment Institute and the Finnish Border Guard, there are no problems in aerial surveillance cooperation between the two.

There is aerial surveillance cooperation between Finland, Sweden and Estonia. Continuous aerial surveillance helps to maintain national and international preparedness to quickly launch aerial reconnaissance as part of oil spill response operations.

3.2.5 There is room for improvement in the preparation and content of the oil spill response plans

National contingency plan for oil spills from vessels

There are no provisions in our environmental legislation that would oblige Finland to prepare a national contingency plan for oil spills from vessels even though this is recommended by HELCOM.⁶² In fact, the report compiled by the audit offices of the countries in the Baltic region in 2005, it was noted that Finland did not have any national plan.⁶³ Under section 12 of the Emergency Powers Act (1552/2011), the authorities must, however, ensure that they can also carry out their tasks with maximum effectiveness in emergencies, such as during major accidents. When assessed on the basis of the consequences, an oil spill from a vessel of

⁶¹ Ministry of the Environment (2013a).

⁶² Under the Act on Oil Pollution Response (1673/2009), the authorities responsible for the response to oil and chemical spills from vessels must, under the auspices of the Centre for Economic Development, Transport and the Environment, draw up a joint cooperation plan for oil and chemical spill response. Cooperation plans have been prepared for the Gulf of Finland, Gulf of Bothnia, the Archipelago Sea and Lake Saimaa.

⁶³ Pollution from ships in the Baltic Sea (2005).

more than 5,000 tonnes that occurs in the areas adjacent to Finland can be considered a major accident. However, a less serious oil spill (such as an incident of more than 500 tonnes) could also contain the essential elements of a major accident.⁶⁴

Overseeing and coordinating the preparedness of Finland's environmental administration for emergency situations is the responsibility of the Ministry of the Environment. In 2009, the Ministry of the Environment appointed a working group to draw up a contingency plan for the organisation and direction of response operations in large-scale and prolonged oil spills from vessels and for communication arrangements during them. The ministry approved the plan in 2011. The plan contains a description of the aims concerning the prevention of major oil spills from vessels, risk assessment and accident scenarios, parties taking part in the response operations and the response activities and resources that they are responsible for, most important agreements and conventions and pieces of relevant legislation, emergency on-duty monitoring and alarm systems, flow of information and communications, examples of costs and reimbursement of costs and a description of the different stages of an operation carried out in response to a major accident.

The aim of the contingency plan is to ensure that all parties involved in the response operations and response support are committed to the joint aims concerning the response, the operating models used in the response, management arrangements and the communications plan. According to the audit findings, the plan serves as a response preparedness manual but its operational usefulness could be improved by including more descriptions as annexes. This model has been used in such publications as the national oil spill contingency plan of the United Kingdom.⁶⁵

We noticed that when discussing oil spill recovery and the management of oil waste from vessels (which are both municipal responsibilities) the plan only describes the situation. The plan does not present any concrete proposals on what should be done. No municipal representatives took part in the drawing up of the plan. In the interviews carried out for the audit, representatives of the Association of Finnish Local and Regional Authorities also expressed the view that no consideration has been given in the plan on how municipalities are provided with information during accidents.

⁶⁴ *Ministry of the Environment (2011).*

⁶⁵ *Maritime and Coastguard Agency (2006).*

When the contingency plan is compared with international guidelines,⁶⁶ a number of suggestions concerning the contents can be made. For example, the plan does not discuss the post-assessment of the response process of an oil spill from a vessel. However, from the perspective of learning from experience, it would be important to define who assesses and in what manner the success of the response process after the accident.

Likewise, the contingency plan does not even present a framework for assessing the consequences of an accident or for arranging the environmental follow-up. The national action plan discussing the ecological effects of an oil spill in the Baltic Sea was, however, drawn up in 2012, after the completion of the work on the contingency plan.⁶⁷ The plan lays out the tasks of the different actors (such as the Finnish Environment Institute, Finnish Food Safety Authority and WWF Finland), the equipment used and the reporting procedures. The ecological accident preparedness group (EVA), which is part of the Finnish Environment Institute (SYKE), starts the examination of the effects of the oil spill simultaneously with the start of the response operations. The environmental accident official on duty in the Finnish Environment Institute notifies the EVA coordinator of the accident.

In accordance with the Act on Oil Pollution Response (1673/2009), it is proposed in the contingency plan that the head of the response operations decides when the operations should be ended. At the same time, under international guidelines, the criteria for ending the response operations should be included in the plan in advance. Likewise, it is proposed in the guidelines that the order of priority of the protected sites (economic and environmental) should be included in the plan. Under the Finnish national plan, the head of the response operations uses the situation awareness information as a basis for deciding what should be protected. Even though the situation awareness information is based on sites determined in advance, the head of the response operations may have to make difficult value-based decisions on whether economic or environmental values should be protected.

There are a number of issues in the national contingency plan that should be clarified. The plan gives a clear description of how Finland's leaders are notified of an oil spill from vessel. However, it remains unclear at which point the meetings of the ministries' permanent secretaries and preparedness directors, which are important in terms of the coordination of crisis management, are convened. More detailed

⁶⁶ *ITOPF (2012b), IPIECA (2000), Australian Maritime Safety Authority (2013).*

⁶⁷ *Rousi and Kankaanpää (2012).*

information on the compensation process should also be provided. Currently the plan only makes references to international compensation manuals. For example, it remains open whether the Finnish Environment Institute would act as the coordinator of the compensation claims. However, in the compensation and cost-reporting guidelines for oil spills from vessels prepared by the Finnish Environment Institute⁶⁸ it is stated that: “*The claims submitted by other authorities should be compatible with the claims model of the Finnish Environment Institute as it collects the compensations it has paid to them from the parties liable to pay compensation or from compensation funds.*”

The contingency plan has not been tested in practice in its entirety. However, on 30 August 2012, in connection with the international Balex Delta response exercise, it was applied within the framework of the environmental administration. The plan has the status of a plan of the Ministry of the Environment.

Regional oil spill response plans

Under the Act on Oil Pollution Response (1673/2009), regional rescue services must have a response plan for land-based oil spills. The rescue services must also have a response plan for oil spills from vessels if it is necessary considering the local conditions. The oil spill response plan adopted by the regional rescue service is approved by the Centre for Economic Development, Transport and the Environment (ELY Centre). Under the approved plans, rescue services have the right to receive compensation for equipment and preparedness costs from the Finnish Oil Pollution Compensation Fund. The oil spill response plans must contain information on the different oil spill response authorities and their tasks, a statement on the level of preparedness and the organisation of the response and prevention operations and information on the oil spill response and prevention equipment.

The authorities responsible for response to oil spills from vessels must also, under the auspices of the ELY Centre, prepare a plan on joint cooperation for the combating of oil spills from vessels. The plans are approved by the Ministry of the Environment. The joint cooperation plans must contain information on the different oil spill response authorities and their tasks, a statement on the level of prevention and response and the organisation of the response and prevention operations and information on the oil spill response and prevention equipment.

⁶⁸ *Jolma (2010).*

Under the Act on Oil Pollution Response (1673/2009), more detailed provisions on the contents, preparation, approval and review of the oil spill response plan and on the territorial division followed in the planning are issued by Government decree. However, there is no such decree in force at the moment. The Decree on the Combating of Oil and Chemical Spills (636/1993) was repealed in connection with the entry into force of the Act on Oil Pollution Response at the start of 2010. This means that the situation remains unclear as the old decree has been repealed and no replacement has been introduced. The Ministry of the Environment can thus be criticized for its slowness in the introduction of a new decree on oil spill response. Drafts of the decree have, however, been presented at the what are called environmental accident days of different authorities and one of the drafts was submitted for consultation in July 2013.

Response plans for oil spills (from vessels) in the Gulf of Finland have been prepared by the Helsinki City Rescue Department, Eastern Uusimaa Regional Rescue Service, Kymenlaakso Regional Rescue Service and the Western Uusimaa Regional Rescue Service.⁶⁹ The plans have been drawn up and updated at different times. The equipment purchase and cost plans, which are important when compensation is sought from the Finnish Oil Pollution Compensation Fund, have been made for the period 2010–2014 (Eastern and Western Uusimaa) or for 2009–2013 (Helsinki and Kymenlaakso). The contents of the response plans are in accordance with the requirements laid out in the repealed decree but of highly general nature. However, the equipment and equipment purchases and costs have been presented in detail as the compensation from the Finnish Oil Pollution Compensation Fund is received on this basis.

There are references to the cooperation and response assistance between the rescue services in the preparedness plans but they are not discussed in any great detail.⁷⁰ The response plans have not been prepared in such a manner that they would allow discussions on joint and coordinated equipment purchases. Closer cooperation could help in the coordination of the oil spill response equipment, which is considered necessary.⁷¹ In the view of some regional rescue services, there are major deficiencies in equipment compatibility and there have been calls for more

⁶⁹ *City of Helsinki (2005) and (2008), Eastern Uusimaa Regional Rescue Service (2011), Western Uusimaa Regional Rescue Service (2006) and (2010), Kymenlaakso Regional Rescue Service (2010).*

⁷⁰ *Regional rescue services on the Gulf of Finland have a cooperation network (partnership network) and oil spill response coordinators meet from time to time.*

⁷¹ *Lampela (2008).*

standardisation. For example, the low level of boom compatibility makes joint operations and exchange of equipment between rescue services difficult.⁷² From the perspective of administrative efficiency, it would also have been better if the plans had been prepared in a coordinated manner.

In the response plans, there are references to the facilities for processing oil waste from vessels but no mention of any intermediate storages of the waste. Judging from the interviews conducted for the audit, this is because the public would be very critical of them.

The response plans do not serve as operational guidelines as the rescue services have separate instructions guiding their operations.⁷³

Under the Act on Oil Pollution Response (1673/2009), oil spill recovery is the responsibility of the municipalities. However, under the Kymenlaakso oil spill response plan, the rescue service is responsible for the oil spill recovery. According to its own response plan, the Helsinki City Rescue Department may take part in the oil spill recovery operations. Under the present practice, the Rescue Department is in charge of the clean-up operations and other city agencies, and departments and voluntary fire brigades provide response teams with a maximum strength of 22 companies. In the response plans for Eastern and Western Uusimaa, there are no references to the participation of the rescue services in the oil spill recovery operations.

The joint cooperation plan for response operations in oil spills from vessels in the Gulf of Finland was drawn up in 2007.⁷⁴ The plan has not been updated since. It is stated in the plan that it remains in effect until further notice and that, as a rule, it will be reviewed every five years or otherwise when necessary. The updating of the plan has been delayed by the slow preparation of the new oil spill response decree.⁷⁵

The content of the joint cooperation plan is in accordance with the requirements laid down in the old decree. In addition, the annexes also present assessments of the boom equipment and oil spill response boats that are proposed to be purchased under the oil spill response plans and their costs. No detailed assessments of the need for or costs of the equipment are given. The cooperation plan describes the response

⁷² *The differences in the size of the archipelago in the areas coming under the rescue services on the Gulf of Finland is one reason for the differences in equipment.*

⁷³ *For example, Kymenlaakso Regional Rescue Service (2011).*

⁷⁴ *Environmental Centre for Uusimaa and Environmental Centre for Southeast Finland (2007).*

⁷⁵ *Ministry of the Environment (2013b).*

activities and the roles and tasks of the parties at general level. However, the plan is not an operational tool for regional oil spill response operations. It can be characterised as a background paper for regional response services and it only plays a minor steering role: it does not guide the planning of the rescue services' oil spill response. The cooperation plan has not been updated even though it is five years old.

3.2.6 SÖKÖ projects have created operating models for coastal oil spill response and waste management but they have not been tested in practice

An operating model for the region of the Kymenlaakso Rescue Service was drawn up in 2007. It was prepared for the eventuality of a major oil spill in the eastern parts of the Gulf of Finland and is intended for the authorities responsible for oil spill response operations. The operating model is described in an operating manual.⁷⁶ It discusses how the funding of the response to a major oil spill is arranged and how the personnel matters, transport and the intermediate storage of oil waste are organised. The operating model is based on a situation where attempts to contain an off-shore oil spill of 30,000 tonnes have failed and the oil washes ashore.

The preparation of the operating model and the manual was the responsibility of the SÖKÖ project of the Kymenlaakso University of Applied Sciences.⁷⁷ Project partners included the regional rescue service, Ministry of the Environment, the Environmental Centre for Southeast Finland, Finnish Border Guard, Finnish Defence Forces, the four municipalities in the region, and the World Wildlife Fund (WWF) in Finland. Regional waste management bodies and insurance companies also took part in the project.

Development of the SÖKÖ operating guidelines continued with the SÖKÖ II project in 2007–2011. The project was carried out in the field of seafaring and logistics of the Kymenlaakso University of Applied Sciences in Kotka. The following parties were represented in the working group of authorities appointed for the project: regional rescue services of Eastern Uusimaa, Western Uusimaa, Central Uusimaa and Kymenlaakso, Helsinki City Rescue Department, Centres for Economic Development, Transport and the Environment for Uusimaa and Southeast Finland and the Finnish Environment Institute.

⁷⁶ Halonen (2007).

⁷⁷ *Toimintamalli suuren öljyntorjuntaoperaation koordinoointiin rannikon öljyntorjunnasta vastaaville viranomaisille.*

The operating models were implemented as 20 work packages. The results of the reports were compiled and made into a more detailed operating manual.⁷⁸ The manual serves as a guide in an oil spill polluting the shores. In addition to the public manual, files intended for the authorities in each rescue service region containing geographic information were also prepared. Manual-based training material was also produced in collaboration with regional rescue services, ELY Centres and other project partners, such as the HAAGA-HELIA University of Applied Sciences and WWF.

The SÖKÖ operating models supplement the joint oil spill response cooperation plan for the Gulf of Finland and the oil spill response plans of the regional rescue services. The models are more detailed and practical than the response plans. The guidelines apply to the establishment of the coastal oil spill response organisation, planning of the financing and administration of the response operations, formation and maintenance of situation awareness information, recovery personnel, occupational health and safety, internal and external communications, transport of oil waste, intermediate storage and waste processing methods. One of the work packages of the SÖKÖ II manual contains guidelines for organising the financial administration of the response operations. Smooth and well-organised financial administration is important for ensuring that all compensations are paid.

April 2013 saw the start of the TalviSÖKÖ project, in which the chances of shoreline response operations after an oil spill from a vessel in winter conditions (during ice and snow cover and sub-zero temperatures) are examined in cooperation with authorities and experts. The following authorities responsible for oil spill response in the coastal areas of the Gulf of Finland are taking part in the project: Regional rescue services of Kymenlaakso, Eastern Uusimaa and Western Uusimaa, Helsinki City Rescue Department, ELY Centres for Southeast Finland and Uusimaa, and the Finnish Environment Institute. The project is expected to produce a report on shoreline response to oil spills from vessels in winter conditions. Funding has come from the European Regional Development Fund (Regional Council of Päijät-Häme) and regional rescue services.

On the basis of the audit findings, it can be said that the SÖKÖ manuals contain extensive, detailed and unified guidelines for shoreline oil spill response and waste management. The preparation of the guidelines has been a collaborative process involving a large number of parties, which has provided a discussion forum for different parties. WWF has been

⁷⁸ *SÖKÖ II -manual (2011)*.

cooperating with the authorities and the Finnish Defence Forces has included shoreline reconnaissance in its training. Even though the regional rescue services are familiar with the content of the SÖKÖ manuals, it could not be established in the audit that the operating models have been adopted and incorporated in day-to-day work. At least no extensive training on them has been carried out. It would be particularly important for municipalities to become familiar with the guidelines for the financial administration of waste management and oil spills from vessels as the municipalities are responsible for oil spill recovery and the management of oil waste from vessels.

3.2.7 Cooperation between maritime authorities is functioning smoothly but there is friction between state-owned companies and the authorities

There has been cooperation between maritime authorities since 1994. The cooperation, known as METO cooperation, is not based on legislation but on an agreement between the parties. The Finnish Defence Forces, the Finnish Border Guard, the Finnish Transport Agency and the Finnish Transport Safety Agency have taken part in the cooperation. METO cooperation has involved joint investments in such matters as the submarine cable network, data transmission systems and joint premises. In practical terms, the Finnish Environment Institute is a party to the cooperation because the new oil combating vessel was transferred to the Finnish Navy after its completion.⁷⁹

From the perspective of oil spill response, the surveillance aircraft of the Finnish Border Guard are another cost-effective example of cooperation. They are equipped with environmental surveillance equipment allowing both border surveillance and the monitoring of oil spills to be carried out.

It has been estimated that METO cooperation has saved between 35 and 40 million euros in investments and 2.5 million euros in maintenance costs each year.⁸⁰ Based on the interviews conducted for the audit, METO cooperation is considered a unique approach internationally and a model for cooperation at European level. There are countries where the relations between different actors are characterised by rivalry rather than cooperation.

⁷⁹ *However, the formal joining should be by means of an agreement involving all parties to the cooperation.*

⁸⁰ *Hassinen (2012).*

All parties to METO cooperation were of the opinion that the approach has been successful. Based on the audit findings, the cooperation between maritime authorities can be considered as one of the best practices.

However, based on the audit findings, smooth maritime cooperation would seem to be limited to METO actors. State-owned maritime companies, such as Meritaito, Finnpiilot and Arctic Shipping, are not parties to METO cooperation and they are also clearly dissatisfied with their role in oil spill response cooperation. In an interview, a Finnpiilot representative expressed his astonishment that the company has not been invited to join oil spill response exercises even though pilots are constantly operating at sea. In its own opinion, Finnpiilot could provide assistance in such matters as the laying of oil booms. The pilots are also the actors with the shortest response times and pilots are at sea in all weather conditions.

In the opinion of Finnpiilot, its operations could be combined with VTS services and the operations could be made into a company. In Finnpiilot's view, this could generate savings of one million euros each year. However, according to the Ministry of Transport and Communications, this is not possible as VTS has a large number of official tasks, such as the decisions concerning the places of refuge.

Based on the interviews, Meritaito Ltd, which carries out fairway maintenance, is also interested in increasing its role in oil pollution response and is critical of the way in which oil pollution response is organised in Finland. The company criticised the purchase of new vessels, which the Finnish Oil Pollution Compensation Fund is financing like a “funding automate”. In Meritaito's opinion, a much more cost-effective approach would be to equip existing vessels with oil pollution response capability.

In the interviews, Meritaito's representatives also criticised the fact that they have not been taught how to use the BORIS information system (see Chapter 3.3.8). However, the Finnish Environment Institute notes that Meritaito's staff members have taken part in the training organised by the institute (including BORIS training).

In Meritaito's view, the development work of oil spill response equipment by the Finnish Environment Institute is also a problem because the institute also issues opinions on equipment purchases for which the Finnish Oil Pollution Compensation Fund provides compensation. According to the Finnish Environment Institute, development of mechanical oil spill response equipment has been necessary because no off-the-shelf equipment is available. The equipment and systems created as a result of joint development work by the institute and “innovators”

have been finalised during the product development process. Equipment suppliers are responsible for manufacturing and marketing them.

In Meritaito's view, the focus in oil spill response should be on the procurement of services, rather than on the purchase of equipment. Meritaito is also of the opinion that its views have not been considered in such matters as the preparation of the TOJO report.⁸¹ In the areas outside oil spill response, Meritaito is critical of the fact that, in its own view, it cannot carry out the maintenance tasks of other authorities when at sea, a result of competitive neutrality. According to Meritaito's own calculations, synergy benefits in such areas as transport services could amount to hundreds of millions of euros.

It was found out in the audit that after the Finnish Maritime Administration had been transformed into a company, synergy benefits may have been lost as company actors that are actively involved in off-shore operations feel that they are not playing any role in such work as oil spill response. Changes in the transport administration, which involved the transformation of some of the operations into companies, are behind this situation. Such changes as the bringing of different modes of transport under the Finnish Transport Safety Agency have also played a role.

However, in a positive development, as aviation and maritime matters now come under the same unit, maritime actors have a chance to learn from aviation actors, as aviation safety is at a fairly high level, compared with maritime safety. However, according to the interviewees, the division of the Finnish Maritime Administration into the Finnish Transport Agency and the Finnish Transport Safety Agency has created a situation where it is more difficult to get information. It was also found out in the audit that it is difficult to obtain information from the Ministry of Transport and Communications on which parties are responsible for maritime safety in oil spills from vessels.

It was highlighted in the interviews conducted for the audit that regional rescue services should also be included in the cooperation between maritime authorities. In that case, it should be decided, which of the regional rescue services would serve as the representative of the services as there are differences between the services concerning the operational objectives and activities concerning oil spill response.

⁸¹ *Ministry of the Environment (2010).*

3.2.8 Finnish Environmental Institute develops oil spill response training

The Act on Oil Pollution Response (1673/2009), which came into force in 2009, contains for the first time provisions on the obligation to provide and develop vocational post-graduate and supplementary education for oil and chemical spills from vessels. Under the act, the training is the responsibility of the Finnish Environment Institute (SYKE). SYKE had already provided some training before the introduction of the act. Under the Government proposal, SYKE would, in its capacity as an expert authority, be responsible for guiding service providers in the arrangement of adequate and high-quality training.

Basic training in oil spill response is provided in the courses held at the Emergency Services College, Finnish Navy and the Border and Coast Guard Academy. However, the courses organised at the Emergency Services College that lead to a diploma do not contain any separate study module on oil spill response. Oil spill response training given as part of the firefighter training is included in the hazardous substances study module, which amounts to six study credits. In oil spills from vessels, the Emergency Services College purchases a one-day training course from Northern Savo Regional Rescue Service.

The following customers purchase training from SYKE: personnel of the oil spill response vessels of the Finnish Navy, Finnish Border Guard and Meritaito Ltd, personnel of the vessels of the Finnish Navy and the Finnish Border Guard that are capable of carrying out chemical spill response operations, principal instructors of rescue service regions, persons responsible for oil spill response in ELY Centres and the crews of the Finnish Border Guard's Air Patrol Squadron. In the view of the Emergency Services College, there should be more cooperation between SYKE and the Emergency Services College. In their responses to the questionnaire survey carried out in 2012, representatives of the regional rescue services also stated that there should be more training.⁸²

SYKE has designed training packages for response vessels, regional rescue services, ELY Centres and the Air Patrol Squadron and defined their content. When necessary, separate training is also provided in the form of seminars and courses tailored to the customers' needs. Manuals, guidelines and plans prepared in Finland and by such actors as IMO can be used as training material.⁸³

⁸² *Kujala, L.C. (2012).*

⁸³ *Jolma (2012).*

Training for the crews of response vessels is also purchased from equipment manufacturers. At the proposal of SYKE, crew members of the vessels may be sent to courses outside Finland. According to SYKE, exercises play an important role in the training for response to environmental accidents.⁸⁴ In the view of the Emergency Services College, SYKE's central role as a provider of training is particularly justified in these exercises where large oil spill response vessels are used.

SYKE has commissioned material for the vocational post-graduate and supplementary education in the sector. The material has been prepared as consultancy work and processed for further use. No specific training programme for oil spill response has been prepared yet but a programme draft has been drawn up.

3.3 First response

3.3.1 In Finland's oil spill response strategy, priority is given to off-shore response

Finland started developing its oil spill response capability after the oil tanker *Palva* had ran aground at Utö in 1969. The first storage for oil spill response equipment was established after the accident. The Finnish Oil Pollution Compensation Fund was established in 1974, the first oil spill response vessel (*Hylje*) was put into service in 1981 and the multi-purpose vessel *Halli* followed in 1987. In 1983, responsibility for oil spill response was transferred from the Finnish Maritime Administration to the Ministry of the Environment and later to the Finnish Environment Institute.⁸⁵ The weaknesses of Finland's oil spill response preparedness became clear in 1987 when the oil tanker *Antonio Gramsci* ran aground in ice in the fairway leading to Kilpilahti in Porvoo. The same year saw the introduction of environmental accident on-duty monitoring and Finland submitted a proposal to IMO that double hulls should be made obligatory in oil transports.

In 1980, the Baltic Marine Environment Protection Commission (HELCOM) had adopted a recommendation that the target level for national oil spill response preparedness should be set at containing an oil

⁸⁴ See also Kujala, L.C. (2012).

⁸⁵ Lahtonen (2004).

spill of 10,000 tonnes within ten days.⁸⁶ In 1988, Finnish authorities concluded that such a preparedness level would require the purchasing of new vessels.

According to Lahtonen (2004), Finland achieved a fairly high off-shore oil response capability in the 1990s, particularly when compared with its neighbours. Finland's oil spill response equipment was put to test off Tallinn in 1993 in a situation where Estonia did not possess any oil spill response equipment or off-shore booms. At the onset of the 2000s, it was asked whether the oil response capability in the Gulf of Finland rests on Finnish shoulders.

Finland's oil spill response strategy has been largely formulated during the 2000s. A ten-year plan for combating environmental accidents was drawn up in 1999.⁸⁷ Under the plan, the response operations should primarily be carried out in the open sea and mechanical recovery should be the method used.

In a memorandum drawn up by the Finnish Environment Institute in 2003⁸⁸ attention was drawn to the increasing traffic in the Gulf of Finland. According to the memorandum, not even a joint response by all Baltic Rim countries would be enough to deal with an oil spill of over 10,000 tonnes. It was also noted that in a collision, the contents of two tanks could end up in the sea, in which case an oil spill of about 30,000 tonnes would be possible.

An oil spill of 30,000 tonnes, which could result from a collision between an oil tanker and a vessel of other type, was defined as the “*largest realistically envisaged damage*” in 2007 as the ÖTVA working group examined the targeted level for adequate oil spill response preparedness, particularly in the area of response vessels and equipment.⁸⁹ According to the report, Finland's oil spill response preparedness should primarily be based on cooperation between different central government actors and multi-purpose vessels.

The working group made a development proposal, which was based on the reduction of the deficit in response capability (vessel recovery tank capacity) in the Gulf of Finland to between 2,000 and 3,500 cubic metres by 2015. The proposal would have a cost impact of between 110 and 140 million euros between 2008 and 2017. Concerning the funding for the

⁸⁶ Lahtonen (2004). *At the moment, HELCOM's target level is set at containing an oil spill of 1,000–5,000 tonnes in three days.*

⁸⁷ Jolma (1999).

⁸⁸ Jolma (2003).

⁸⁹ Hietala and Lampela (2007).

plan, the working group noted that the programme prepared for achieving the targeted response level should be funded through state budget. The state could receive discretionary compensation for some of the costs from the Finnish Oil Pollution Compensation Fund. At the same time, Finland's oil spill response strategy was finalised. It is based on off-shore response, multi-purpose vessels and an increase in the vessels' recovery tank capacity. The central role of the off-shore response was justified with the fact that the costs of off-shore oil spill response are lower than the costs arising from response operations in the archipelago and on the shores.⁹⁰ The response target of 30,000 tonnes was later approved at political level as part of the Internal Security Programme and the Government's Baltic Sea Report in 2009.⁹¹

The next step in Finland's oil spill response policy was taken by the SRÖTVA working group⁹² in 2008. The working group proposed that the oil spill response preparedness in the coastal areas of the Gulf of Finland should be made more effective. Concerning funding, the working group noted that regional rescue services⁹³ need 80 million euros worth of new oil spill response equipment. A total of 20 million euros would be needed for preparedness maintenance and training during the next ten years in addition to existing funding. A total of ten million euros of state funding would be needed for response preparedness in the coastal areas of the Gulf of Finland and the overall requirement would be 100 million euros between 2008 and 2018. In this manner, regional rescue services were linked with oil spill response, while at the same time, funding criteria were set for effective coastal response operations.

Against the background of a continuous increase in oil transports in the Gulf of Finland, a comprehensive report⁹⁴ on the development of oil spill response preparedness of the state and the municipalities was drawn up in 2009. The overall report examined the issue using a mathematical oil spread model (Spillmod). If the spread of oil could not be stopped with the help of off-shore booms and oil recovery vessels on account of such factors as excessively difficult weather conditions, stopping the spread of

⁹⁰ For example, Jolma (2009).

⁹¹ Sweden has set its oil spill response target at 10,000 tonnes (Räddningsverket (2004)). Sweden is preparing a new oil spill response strategy.

⁹² Haaga Helia (2008).

⁹³ Regional rescue services started operations in 2004 and the tasks concerning oil spills from vessels were transferred to them from municipalities. However, oil spill recovery remained the responsibility of the municipalities.

⁹⁴ Jolma (2009).

oil deeper into the inner archipelago and coastal areas would primarily be the responsibility of the rescue services. It was also determined in the report, what type of recovery equipment and storage capacity regional rescue units should possess and how the state-owned equipment should be supplemented.

The cost of purchasing and repairing the envisaged vessels in 2009 - 2015 would total between 112 and 132 million euros. Supplementing the state's oil spill response equipment storage facilities would cost seven million euros in 2010. Moreover, a total of one million euros would be needed from 2010 for the operating charges of any new oil spill response vessels of the companies while 0.4 million euros would have to be added to this sum from 2013 onwards. In overall terms, the costs arising from the response preparedness for oil and chemical spills from vessels incurred by the state would total about 206 million euros between 2009 and 2016. The corresponding costs incurred by the rescue services would be about 100 million euros. If we also assume that the costs for 2017 and 2018 would be the same as before (for the state about 26 million euros each year and for rescue services about 12.5 million euros annually), oil spill response preparedness for the period 2009–2018 would cost about 382 million euros.

To sum up the above, it can be concluded that Finland's oil spill response strategy gives priority to off-shore response and requires the purchase of ship-class oil spill response vessels. In economic terms, this is based on the relative cost-effectiveness of off-shore oil spill response compared with the cost of removing oil that has washed ashore. In fact, the implementation of the strategy has speeded up the purchase of seagoing vessels.

Organisation of oil spill response in Finland is also characterised by the following:

- The operations are carried out under the auspices of the environmental authorities.
- Central and local government authorities have primary responsibility for the operations.
- A target level for the response operations has been set (in the Gulf of Finland, 30,000 tonnes in three days, which is substantially higher than the minimum recommendation set by HELCOM).
- The operations are based on cooperation and the use of personnel and equipment in a variety of tasks.
- All maritime authorities are obliged to participate and assist in the operations if necessary.
- There is a separate fund for financing equipment purchases and response operations.

- The response operations are on a mechanical basis. (Because of the sensitivity of the Baltic Sea, such bodies as HELCOM recommend mechanical oil recovery and no chemicals or burning are used in the response operations.⁹⁵ However, under the Act on Oil Pollution Response (1673/2009), chemicals may be used in exceptional cases. The decision on the matter is made by the Finnish Environment Institute.)

3.3.2 The preparedness of Estonia, Russia and EMSA are also relevant in off-shore response

In principle, Finland's oil spill response target in the Gulf of Finland is also based on the oil spill response preparedness and capability of the neighbouring states. Finland concluded an agreement on the combating of oil and chemical spills occurring in the Baltic Sea with the Soviet Union in 1990 and with Estonia in 1995. There is an agreement between the Nordic Countries on the combating of marine pollution caused by oil or other hazardous substances. However, it would take between two and three days before response assistance provided by Sweden would be available.

BRISK (Sub-regional risk of spill of oil and hazardous substances in the Baltic Sea), a joint project of the Baltic Rim countries, was carried out between 2009 and 2012. The purpose was to examine the environmental risks that oil spills from vessels could cause in the Baltic Region and the ways of reducing them. One idea was to draw up a joint investment plan on the basis of which costs could have been shared between different countries.⁹⁶

However, attempts to draw up an investment plan for the Gulf of Finland failed because the view was that preparing it would require more time and that it would require the involvement of high-level decision-makers. However, the *Baltic Sea report follow-up report* prepared by the Government Secretariat for EU Affairs (2011) shows that Russia has officially announced that it plans to acquire 42 oil spill response and maritime rescue vessels, three of which would be stationed in the Baltic Sea by the end of 2015. Estonia has purchased an oil-spill response vessel from Finland, which was completed in 2012.

Achieving the oil spill response preparedness target level laid out by Finland (combating of an oil spill of 30,000 tonnes) also depends on the

⁹⁵ HELCOM (2001).

⁹⁶ Brisk (2012).

oil spill response preparedness of EMSA (European Maritime Safety Agency). In 2010, the icebreaker Kontio of the state-owned company Arctia Shipping Ltd was equipped with oil spill response capability. The funding for the equipment came from EMSA. In 2010, EMSA chartered Kontio for three years and in 2013 for a further three years for oil spill response preparedness in the northern parts of the Baltic Sea. Normally, the vessel operates as an icebreaker during the winter months while in summer it is kept in preparedness at Katajanokka in Helsinki. The equipment of Kontio gave a substantial boost to the oil spill response capability in the Baltic Sea during the winter months as the vessel has an oil recovery capacity of more than 2,000 m³.



Figure 6. Icebreaker Kontio is equipped with oil spill response capability. © Markku Turtiainen.

3.3.3 The focus of purchases is shifting towards equipment used in the area between the archipelago and the open sea.

In 2011, Louhi, a 71-metre-long oil and chemical spill response vessel was completed in Finland. The purchase was based on the 2003 Government Programme but instead of the multi-purpose icebreaker referred to in the programme, the state purchased a multi-purpose vessel equipped for oil and chemical spill response for the use of the Finnish Navy and SYKE. The purchase was based on comparisons drawn up by

SYKE.⁹⁷ Louhi is an icegoing vessel and its oil recovery tank capacity is 1,200 m³. The oil spill response capability of Louhi is based on the brush skimmer technology developed by the Finnish company Lamor. It is also equipped with ice brushes developed by SYKE. The vessel cost 48 million euros.



Figure 7. The oil spill response vessel Louhi is also equipped with chemical spill response capability. © Finnish Border Guard.

At the moment, the State of Finland has 16 oil spill response vessels (this total includes UVL10/Turva).⁹⁸ Three of them belong to the Finnish Navy, four to the Finnish Border Guard and nine to the state-owned company Meritaito Ltd. The vessels have a combined oil recovery capacity of 5,456 m³. Halli, Hylje, Louhi and ULV10/Turva account for about 80 per cent of the capacity. When consideration is given to the icebreaker Kontio chartered by EMSA, the oil recovery capacity reaches 7,489 m³. This

⁹⁷ In addition to oil and chemical spill response, Louhi is also used as a support ship for underwater operations of the Finnish Navy. It can also be used for laying submarine cables. During crises, it can carry 1,000 tonnes of fuel and 100 tonnes of cargo. The vessel can be armed with a main gun, machine guns and naval mines. It can also be used to supply island forts and other naval vessels.

⁹⁸ The Provincial Government of Åland also has an oil spill response vessel (Svårtan). Its tanks have a volume of 52 m³.

means that compared with Estonia and Russia, Finland has a fairly large oil spill response fleet.

The planned icebreaker that will also be capable of carrying out oil spill response operations will strengthen Finland's overall response capability. The SYKE-developed recovery brush that can also be used in ice conditions has helped to make winter oil spill response more effective.

In 2012, the Ministry of the Environment and SYKE reviewed the achievement of the overall oil spill response report and the funding needs for oil spill response until the year 2018.⁹⁹ According to the review, the response preparedness for oil and chemical oil spills must be made more effective, particularly in the Gulf of Finland. It was proposed that in order to achieve the targeted preparedness level, Finland should purchase another multi-purpose oil and chemical spill response vessel capable of operating in difficult wind and ice conditions, at least ten kilometres of heavy off-shore boom, intermediate storage tanks and oil detection equipment for vessels. The target can only be achieved if Estonia and Russia also purchase a total of four vessels capable of off-shore response.



Figure 8. The Estonian oil combating vessel 'Kindral Kurvits', which was put into use in 2012. © Viron Politsein.

⁹⁹ Pajukallio et al. (2012).

In its Baltic Sea policy of 2009, the Government stated that by the year 2015 Finland will purchase two new icegoing multi-purpose vessels of large size that have off-shore capability.

In its situational assessment, the report did not discuss the equipment of the regional rescue services but it was noted that in order to improve their response capability, the rescue services need a total of ten class I oil spill response boats¹⁰⁰ for the Gulf of Finland and the Archipelago Sea. The vessels should be purchased jointly by the state and the rescue services. It also was also stated in the report that more off-shore and coastal intermediate storage capacity is needed for the recovered oil. All this would require purchases and the development of new methods for our special conditions. Moreover, there is not enough emergency towing capacity or capacity for fighting vessel fires in the Gulf of Finland or in the Baltic Region in general. The following projects improving the response capability have been considered:

- oil recovery equipment that can used in ice conditions for large off-shore patrol vessels and for three smaller vessels and possibly also for the new multi-purpose vessel.
- towable intermediate storage tanks (100–200 m³/tank) for 12 vessels.
- night vision equipment for oil detection for eight vessels.¹⁰¹

¹⁰⁰ *Seagoing service vessel for transporting and laying off-shore booms.*

¹⁰¹ *According to the BRISK project, improving night vision capability will significantly enhance response preparedness.*



Figure 9. Towable tanks (“whales”) can be used for intermediate storage in the open sea and in the archipelago. Their capacity is 100 m³ or 200 m³. © Jouko Pirttijärvi.

Under the Government's Baltic Sea policy follow-up (3 May 2011), *“The cost of the oil spill response equipment that the state has already decided to purchase is 144 million euros and according to the proposal submitted to the Finnish Oil Pollution Compensation Fund, the fund should provide a reimbursement of 64.9 million euros for the purchases. At the same time, however, the state budget proposal for 2011 only contains an appropriation of 0.8 million euros for the purchase of off-shore booms even though under the comprehensive report produced by SYKE in 2009, a total of two million euros should have been appropriated for the purpose this year.”*

According to the audit findings, it would seem that if other countries (particularly Russia) increased their own oil spill response capability in the Gulf of Finland, Finland might only need one new off-shore patrol vessel for the Finnish Border Guard or a similar oil spill response vessel. When the purchase of such a response vessel is pondered, consideration should also be given to the option of converting the multi-purpose icebreakers of the state-owned company Arctic Shipping into oil spill response vessels. In the interviews conducted for the audit, Arctia's representatives suggested that not enough consideration has been given to

this alternative in the oil spill response decisions.¹⁰² Arctia is prepared, at its own expense, to convert its multi-purpose icebreakers into icebreakers with oil spill response capability. Depending on the vessel, the conversion would cost between 5 and 10 million euros. Oil spill response operations would require a service agreement with the company.¹⁰³



Figure 10. Danish-made heavy-duty RO-BOOM barriers in evening sun. Designed for off-shore use, air-filled RO-BOOM is made of synthetic rubber and has a diameter of 1.5 metres. © Jouko Pirttijärvi.

According to the audit, the focus of oil spill response is shifting from ship-class vessels to the development and purchase of other off-shore equipment and the improvement of oil spill response capability in outer archipelago. In the Gulf of Finland, the total length of off-shore and coastal booms is 15.4 and 4.3 kilometres, respectively. According to the

¹⁰² SYKE and Arctia have, however, jointly examined the matter.

¹⁰³ Service agreements lay out the type, amount, time and price of the services to be provided (such as the availability of the vessels).

experts of the Finnish Environment Institute, the optimum length of off-shore booms would be 30 kilometres. However, according to the audit, it would seem that no systematic consideration has been given to the purchase of off-shore booms. The deployment of off-shore booms would require agreements with private towing companies or the Finnish Navy (Pansio class minelayers).¹⁰⁴ Off-shore intermediate storage capacity should also be increased.¹⁰⁵

The change in focus would also mean that there is a need to develop oil spill response capability in the area between off-shore response and the response areas coming under the regional rescue services. The Finnish Environment Institute (SYKE) has proposed that a total of ten class I boats should be purchased for the Gulf of Finland and the Archipelago Sea. Each boat would cost 2–3.5 million euros. Not all regional rescue services consider such boats necessary. From the perspective of SYKE, such boats are needed as they would also be able to operate in the high seas. The audit highlighted one obstacle to the purchase: rescue services do not have enough competent operators for such vessels. Moreover, under the Act on Oil Pollution Response (1673/2009), conducting off-shore operations is not a responsibility of regional rescue services. This means that there is no strategic joint view in Finland on the appropriateness of the boats, particularly in the area between the outer archipelago and the high seas. If such boats are purchased, it should be ensured that they can be operated in a multi-purpose manner (maritime search and rescue, cleaning of the archipelago, transport, etc.).

In the Gulf of Finland, there are oil spill response storage facilities in Hanko, Kirkkonummi, Helsinki, Porvoo and Kotka. During the audit, visits were made to two storage facilities and they were found to be clean and in appropriate condition. The storage facilities contain booms, boom washing equipment, absorption pipes and mats, skimmers and oil recovery tanks.

¹⁰⁴ *The Pansio-class minelayers of the Finnish Navy have a transport capacity of 100 tonnes and they are equipped with a crane with a lifting capacity of 15 tonnes.*

¹⁰⁵ *Under section 20 of the Act on Oil Pollution Response (1673/2009), response authorities may use emergency powers to order operators in possession of commercial vessels to make them available as off-shore intermediate storage facilities in serious oil spills. Voluntary agreements on the use of the vessels as intermediate storage facilities in accidents may also be concluded.*

3.3.4 Purchasing a new oil spill response vessel is not always the most cost-effective option

Finland's oil spill response policy has relied on off-shore response with multi-purpose response vessels. When vessel purchases have been proposed, there has been no cross-administrative examination of whether it would be more cost-effective to spend the resources on accident prevention instead.

In a project carried out by a research group of the University of Helsinki, a cost-benefit analysis model based on the likelihood of vessel accidents and the size of the resulting oil spills was prepared. Using the model, it was possible to compare the costs of the automatic VTS alarm system and the costs of a new oil spill response vessel with their efficiency in the reduction of oil in coastal areas.¹⁰⁶ Both alternatives also had two optional states: VTS alarm system or the introduction or non-introduction of a new vessel.

The research group recommended the automatic VTS alarm system as the economically more justified option. According to the model, if the readiness of the public to shoulder the costs is deemed to reflect all the benefits of the prevention of oil pollution, expansion of the oil spill response fleet is not a profitable alternative.

The model can be applied to oil spills occurring in the Gulf of Finland between March and November. During ice cover, oil recovery effectiveness and the behaviour of oil cannot be assessed on the basis of the existing probability models. The second important limitation is the fact the model only examines leaks in tanks arising from oil tanker accidents and that the only types of accident discussed in the study are collisions between ships and groundings. In other words, oil spills caused by other vessels and other accidents were outside the scope of the study.

Moreover, when the reliability of the results is assessed, consideration must also be given to the fact that the automatic VTS alarm system is not yet operational and its real costs are not known. However, according to the study, even if consideration is given to the uncertainty of the cost estimates (0.3–0.5 million euros), the VTS system would still be more cost-effective than an oil spill response vessel.

In the model, the benefits are described using a variable, which is based on the willingness of the Finnish public to pay for improvements of the oil spill response preparedness in the Gulf of Finland. However, the estimates

¹⁰⁶ *Hyytiäinen and Ollikainen (2012).*

concerning the willingness to pay involve a number of theoretical and practical problems, which means that the findings must be treated with caution. Moreover, it seems that no account is taken of the losses incurred by business operators.

The most important factor affecting the results of the model is that the total purchasing costs of a new response vessel is included in the oil spill response costs. When purchasing oil spill response vessels, Finland relies on the principle of multi-purpose use. Thus, the new response vessel would also carry out other tasks (such as border surveillance). During the audit, this issue was also discussed with the people who constructed the model. However, according to the information available to NAO no sensitivity analyses (assessments on whether the result would be different if the assumption was based on another purchasing cost ratio, such as 50 per cent) concerning vessel costs have been carried out with the model.

However, the research position and findings highlight matters are important from the perspective of the audit:

1. New cost-effective methods for preventing oil spills should be sought.
2. There is no cross-administrative forum in Finland for assessing and comparing the cost-effectiveness of activities preventing vessel accidents with oil spill response methods that could be used as a basis for purchasing decisions.

3.3.5 There are no grounds for changing the existing stationing of the multi-purpose vessels

It was suggested in the interviews conducted for the audit that the stationing of the oil spill response vessels in the Gulf of Finland is not optimal and that too few of them are stationed in the eastern parts of the area. The researchers have examined the optimal stationing of the vessels. The assessment was on the basis of a probability-related examination.¹⁰⁷ The findings are presented in Table 2.

¹⁰⁷ *Lehikoinen et al. (2013).*

Table 2. Current stationing of the oil spill response vessels vs. the optimal situation.

Name of vessel	Present home port	Optimal home port
Louhi	Kirkkonummi	Kotka
Halli	Turku	Kotka
Hylje	Kirkkonummi	Kotka
Merikarhu	Helsinki	Kotka
Tursas	Turku	Kotka
Uisko	Turku	Kotka
Seili	Helsinki	Helsinki
Oili I	Helsinki	Helsinki
Oili II	Turku	Helsinki
Oili III	Kotka	Helsinki
Expected utility (EU)	76.6	77.2

One could easily interpret the figures so that the oil spill response vessels are indeed stationed in wrong ports from the perspective of response effectiveness: six vessels should be relocated to Kotka. There should also be more vessels in Helsinki. Thus, in an absolutely optimal situation, the emphasis of the vessels should be shifted eastwards.

However, it is noted in the study that the stationing of the vessels does not seem to be the central factor in the effectiveness of off-shore response (in other words, there are no big differences in the expected utility values). Instead of the stationing of the vessels, factors beyond human control, such as the type of oil, wave height, stranding time, evaporation and the size of the spill, are, according to the study, more essential factors from the perspective of operational effectiveness. International studies have produced similar findings. For example, recovering light oil with response vessel is ineffective. In strong winds, only the response vessel Louhi is capable of carrying out oil spill response operations when the significant wave height is more than two meters and no vessel can carry out any response operations when the wave height is more than three metres. The stranding time also has an impact on the vessels' ability to carry out oil spill response. Moreover, the amount of the oil spill also affects the effectiveness of the response operations because in large accidents, emptying the contents of the response vessels at ports or to off-shore

intermediate storage facilities (such as tanks and tankers) also takes time.¹⁰⁸

According to the conclusions of the study, even though the stationing of the oil spill response vessels is not optimal in terms of the response effectiveness, relocation would not have any impact on the effectiveness of the response and thus there are no grounds for relocating any of the vessels. It is also noted in the conclusions that there are uncertainties concerning the success of off-shore response operations and for this reason it would also be important to develop accident prevention and examine the cost-effectiveness of the development of both prevention and response.

3.3.6 Oil spill response exercises are held on a regular basis

Several oil spill response exercises are held each year. The Baltic Marine Environment Protection Commission (HELCOM) holds the international Balex Delta exercise each year. The practices observed in the exercise are based on the Commission's oil spill response manual. There are also national exercises in Finland each year and Finland also takes part in the exercises organised by Estonia and Sweden. Moreover, the use of the oil spill response equipment on vessels is practised almost on a monthly basis. Oil spill response equipment for winter conditions has also been tested on different vessels.

Regular exercises and practice are justified as they allow the testing of communications, smoothness of cooperation and such matters as the finding of the right telephone numbers.¹⁰⁹ It was found out in the Balex Delta exercise held off Helsinki in 2012 that there is room for improvement in these matters. The biggest benefit of the exercises is that they force those involved to plan and test the management chain of the response operations, which have an impact on the effectiveness of the response organisation.¹¹⁰

Representatives of NAOF took part in the Balex Delta exercise as observers. The observers concluded that the crisis management group at the Finnish Environment Institute (SYKE) mainly consisted of new people, which can be considered conducive to the efforts to spread experience to as many people as possible. Probably for this reason, there

¹⁰⁸ *Lehikoinen et al. (2013).*

¹⁰⁹ *Rytönen (2012).*

¹¹⁰ *ITOPF (2002c).*

was some uncertainty in the practices of the group. SYKE also made observations about the functioning of the BORIS II system. The system worked well but one vessel had difficulty supplying information because of poor telephone connections. The most important weakness in the updating of the data system thus seems to concern communication links. In on-duty monitoring, SYKE relies on ordinary mobile phones and not on such systems as the Virve network used by the authorities.

In the Balex Delta exercise, there was some confusion concerning inadequate communications between the main command centre in Helsinki and the off-shore command centre. Units operating off shore were not always informed of the latest developments. Communications between regional rescue services were not on a systematic basis and involved delays.¹¹¹ At the same time, on-site command centres coordinated their tasks well and with success.

In addition to the communication problems, the small number and size of the off-shore intermediate storage facilities was also highlighted. In its evaluation of the 2012 Balex Delta exercise, HELCOM concluded that effective maritime response depends on how the vessels can empty their tanks of oil or the mixture of oil and water that they have recovered. According to the evaluation, it remained unclear whether there would be enough such recovery capacity in a real accident situation.¹¹² In fact, according to the audit, intermediate storage tank capacity for recovered oil seems to be one of the bottlenecks of the response operations in the Gulf of Finland.

In overall terms, the Balex Delta exercise was a success, especially because it helped to highlight areas for operational improvements. According to HELCOM's own estimate¹¹³, the results were good.

¹¹¹ Rytönen (2012).

¹¹² HELCOM (2012b), Rytönen (2012).

¹¹³ HELCOM (2012b).



Figure 11. Gathering oil by means of seining. Auxiliary service vessels are towing an oil boom, while the oil recovery boat coming behind them is skimming the oil accumulating at the bottom of the boom through an opening at the bottom. © Jouko Pirttijärvi.

3.3.7 Oil spill response is well-organised and properly managed. However, SYKE has limited personnel resources

During the past twenty years, it has been suggested and proposed in Finland that the overall steering and development of oil spill response operations should be transferred to the Ministry of the Interior and that the Finnish Border Guard should be in charge of the operations. For example, in 1992 the Commander of the Gulf of Finland Coast Guard District proposed that the management structures of oil spill response operations should be changed. In his view, oil spill response operations have been made the responsibility of an organisation that does not have adequate operational resources. The Finnish Defence Forces or the Coast Guard should be in charge of the response operations as, according to the Commander, they possess 24-hour emergency and operational readiness. The response equipment should also be transferred under these authorities.¹¹⁴

¹¹⁴ Lahtonen (2004).

The organisation of oil spill response came up at parliamentary level in 1994 when the Government submitted a proposal to the Parliament on amending the legislation on oil spill response.¹¹⁵

- According to the proposal, the overall management and supervision of land-based oil spill response operations would be transferred from the Ministry of the Environment to the Ministry of the Interior.
- Responsibility for the overall organisation and development of oil spill response would be transferred from the National Board of Waters and the Environment to the Ministry of the Environment.
- Development and coordination in accordance with the international conventions on combating the pollution damage caused by oil and other hazardous substances would be the responsibility of the Ministry of the Interior, which would also act as the competent authority referred to in the conventions.

The purpose of the transfer of the oil spill response tasks to the Ministry of Interior was to promote the unification of the state rescue administration and to put it under a single administrative sector. Oil spill response tasks coming under the environmental administration would be made part of fire and rescue services. In the central administration this would mean their transfer to the Ministry of the Interior and in the regional administration to the (then) State Provincial Offices. Moreover, the steering of oil spill response at municipal level would be transferred to State Provincial Offices. After the transfer, the environmental administration would remain responsible for the expert tasks in the combating of oil spills and other environmental damage. In practical response situations, experts working in the administration would act as advisors to the head of the response operations. The Finnish Environment Centre would be responsible for organising and coordination of the examination of the environmental impact of major oil spills.

The process of preparing the matter concerning the transfer of oil spill response also involved negotiations with personnel representatives, as laid down in the Act on Cooperation within Government Agencies and Public Services. All personnel organisations were against the transfer as, in their view, it would result in inefficient use of personnel resources and would increase personnel expenses by several million marks. The organisations were also of the opinion that combating oil and chemical spills would require scientific special expertise that the water and environmental administration has but the rescue administration does not.

¹¹⁵ HE 334/1994.

The Parliamentary Environment Committee issued its report on the Government proposal.¹¹⁶ In its report the committee noted that there have been no shortcomings in the oil spill response system as such and it has worked well. It was also noted that it remains unclear how oil spill response expertise would be ensured in the future as the training and familiarisation required by the transfer had not been examined.

Moreover, the transfers of the necessary information and other similar support systems, changes required by the transfers in the on-duty monitoring and management systems and the matters concerning the transfer of response equipment and vessels (considering the matter of equal availability of the equipment in all parts of Finland) had not been looked into.

The Environment Committee was of the opinion that the transfer of the oil spill response tasks proposed by the Government would help to rationalise the administrative and operational aspects of the oil spill response. At the same time, however, there is no guarantee that the reform would ensure a high level of oil spill response and it is also unclear what the economic impacts of the reform would be. Based on the information available to it, the committee suspected that costs would increase and the level of response preparedness decline. The committee also considered it important that when consideration is given to the matter, oil spill response should be seen as part of the combating of environmental damage as a whole. The Environment Committee proposed that the legislative proposals contained in the Government proposal should be rejected. The Parliament voted on the Government proposal. The proposal was rejected with 76 votes for and 93 against.

In the last government negotiations, the Ministry of the Interior presented a new proposal on the division of responsibilities in oil spill response. As part of the Government effectiveness and performance programme (VATU), the ministry has also planned to carry out a core activities analysis (YTA) on the reorganisation of the environmental damage response activities. The Finnish Environment Institute (SYKE) also considered carrying out a core activity analysis on the matter. At the end of 2011/start of 2012, the management of SYKE commissioned an interview-based stakeholder report on the organisation of oil spill response in Finland and on the chances to improve it.¹¹⁷ The report was drawn up by a consultant and SYKE produced it independently without the steering of the Ministry of the Environment. Behind the

¹¹⁶ *YmVM 17/1994 vp.*

¹¹⁷ *Rytkölä (2012).*

commissioning of the report would seem to be the willingness of SYKE to emphasise its role as a research institution. However, official oil spill response tasks are in contradiction to this. During the audit, the environmental damage team, which is responsible for oil spill response, was transferred from the Marine Research Centre to the Freshwater Centre, which is responsible for different preparedness tasks. Based on the audit results, the team members are satisfied with a transfer to the 'preparedness environment'.

The National Audit Office requested the Finnish Border Guard (RVL) to give opinions on who should be in charge of oil spill response and to justify its opinions. In the view of the Finnish Border Guard, the responsibilities in the field of oil spill response could be changed so that operational off-shore response and the management of the operations should be transferred to the Finnish Border Guard. The Finnish Border Guard justified its proposal by stating that SYKE does not have any routine off-shore operational management tasks and that the cooperation between the Finnish Border Guard and the regional rescue services responsible for oil spill response in coastal areas is well-established in the area of maritime search and rescue. This would make all oil spill response operations the responsibility of organisations coming under one ministry. The Finnish Border Guard is also of the view that it has better communication connections and management facilities, better access to real-time maritime situation awareness information and more personnel for the management of oil spill response operations than the Finnish Environment Institute. It was not possible to assess in the audit how the adjustment programme of the Finnish Border Guard would affect the management of the tasks in the future.¹¹⁸ Views and issues concerning any transfer of the oil spill response responsibility from the Ministry of the Environment and SYKE to the Ministry of the Interior and the Finnish Border Guard are presented below.

In addition to the oil spill response management tasks, the Finnish Environment Institute also has many oil spill response tasks, such as environmental accident on-duty monitoring (24/7), provision of vocational post-graduate and supplementary education in oil and chemical spills from vessels, acquisition and maintenance of response preparedness, international requests for assistance, maintenance of situation awareness, participation in international cooperation, organisation of exercises, development of activities and keeping records of response costs and

¹¹⁸ *The adjustment programme will mean a cut of 26 million euros in the appropriations for the Finnish Border Guard.*

charging expenses for the operations. Under the Act on Oil Pollution Response (1673/2009), SYKE may assume responsibility for oil spill operations taking place in a rescue region (in practice in a coastal area, on the shores and on land), if it is a question of more than one rescue region, a major hazard or response operations of long duration.

In an extensive transfer of tasks the overall organisation and development of the environmental pollution response, development and maintenance of the response equipment (storage and upkeep), overall response management, international alerts and requests for assistance and the agreements concerning the joint use of response vessels would be transferred from the Finnish Environment Institute to the administrative sector of the Ministry of the Interior. The situation awareness system (BORIS II of the environmental administration) and its development and upkeep should also be transferred to the administrative sector of the Ministry of the Interior. The administrative sector of the Ministry of the Interior should also assume responsibility for the training tasks of SYKE. The transfer of such 'knowledge flow and expertise' would take time unless SYKE's environmental damage team is transferred directly to the Finnish Border Guard.

Even if the actual oil spill response tasks were transferred to the administrative sector of the Ministry of the Interior, SYKE would still remain responsible for expert duties supporting and developing oil spill response, such as modelling, producing environmental information to assist response work, examination and assessment of the environmental impact of the pollution, and tasks concerning the care of oiled animals. Moreover, the environmental accident on-duty monitoring could not be closed down. From the perspective of the environmental administration, the transfer of oil spill response tasks would not generate major resource savings in the administrative sector.

If the responsibility for oil spill response was transferred to the administrative sector of the Ministry of the Interior, the Finnish Border Guard would be appointed to direct off-shore oil spill response operations. The Finnish Border Guard is the leading maritime search and rescue authority. In a vessel accident, the first and the most important task is to save human lives. Likewise, in a multiple accident in which both human lives and the environment are threatened, priority would be given to saving human lives. Because of the urgent task of saving human lives, there may not be enough time to give timely consideration to environmental aspects if one party would be responsible for both tasks. Under the existing system, environmental tasks (response operations, situation awareness and communications) can start under the auspices of

SYKE and simultaneously with the maritime rescue operations. However, they would be subordinated to the maritime search and rescue tasks.¹¹⁹

In major oil or chemical spills from vessels there are several stages: off-shore and coastal response and clean-up of the shores. The stages may be successive but operational efficiency requires that most of the tasks are carried out simultaneously. The role and competence of the Finnish Border Guard are clearly connected with the management of off-shore response only. From this perspective the question arises whether there should be a unit specialising in environmental damage response that would come under the Department for Rescue Services of the Ministry of the Interior and how its resources and personnel would be organised.

If the Ministry of the Interior was responsible for oil spill response, it could not rely on any such research and expert agency as SYKE that could be assigned expert tasks in oil spill response. Without special arrangements allowing the expertise of SYKE to be used in such situations, there may not be enough competence to use the expertise in the field of environmental pollution possessed by the environmental administration. This might lead to a reduction in the level of expertise and it might also mean that the SYKE would give less support to rescue services. Neither would municipalities get enough support from SYKE for their oil spill recovery tasks.

The Ministry of the Environment is in charge of the overall steering, monitoring and development of actions to combat oil and chemical spills from vessels and the legislation concerning the response. The Finnish Oil Pollution Compensation Fund, which plays an essential role in the financing of the oil spill response resources, is managed by the Ministry of the Environment. There are also official and experts tasks concerning environmental pollution in the environmental area of responsibility of the ELY Centres. If the responsibility for oil spill response was transferred to the Ministry of the Interior, consideration should also be given to the organisation of these activities. If the overall management of environmental pollution response were to be transferred from the Ministry of the Environment to the Ministry of the Interior, the ministry should also assume responsibility for the development of the response legislation and international response treaties and conventions. The Finnish Oil Pollution

¹¹⁹ *In a multiple accident in which both human lives and the environment are in danger, the Finnish Border Guard is in overall charge of the operations and gives notice when the saving of human lives is concluded and when the overall off-shore responsibility is transferred to the head of the response operations appointed by SYKE.*

Compensation Fund should be transferred under the Ministry of the Interior, and the ministry would also approve oil spill response cooperation plans. The approval of regional oil spill response plans should also be transferred from the ELY Centres to the administrative sector of the Ministry of the Interior. The Ministry of the Environment would, however, remain responsible for oil spill response tasks, which would mainly concern environmental damage legislation and restoration. Thus, the system would be more complicated than the existing one.

In legislative terms, an extensive transfer of oil spill response responsibilities would require changes in such areas as the provisions concerning oil spill response and the Finnish Oil Pollution Compensation Fund and the provisions and rules of procedure of ministries and agencies (SYKE, RVL and ELY Centres). The bilateral agreements between the Ministry of the Environment and other authorities and parties should be transferred to the Ministry of the Interior.

Even if the responsibility for oil spill response was transferred to the administrative sector of the Ministry of the Interior, from the perspective of performance guidance, the response work would not be the sole responsibility of one party. Regional rescue services are not under the performance guidance of the ministry as they are in the form of joint municipal authorities. It is also questionable whether the transfer of the oil spill response responsibility to the administrative sector of the Ministry of the Interior would produce significant savings in central government finances as the ministry and the Finnish Border Guard coming under it would still require new resources for developing their substance knowledge. Moreover, in such an arrangement, rescue services and the environmental damage response carried out as part of the ensuring of public security might find themselves in a competition for limited resources, which might negatively affect the operations and their credibility in environmental tasks. No economic calculations on the benefits of the extensive transfer have been made.

Under the current practice, SYKE is responsible for the purchasing of response equipment. The purchasing of equipment must specifically have an effect on the oil spill response capability. When it is the question of the purchasing of multi-purpose vessels costing tens of millions of euros, it is important that the process is administered by a party that does not have any direct economic interests at stake and that possesses solid expertise in environmental matters and oil spill response.

Based on the audit results, the existing response organisation has worked well in most respects. The organisation is also well trained. However, there has been a slight reduction in the resources of SYKE's environmental damage team in recent years and the expertise base has

changed as a result of staff turnover. At the moment, SYKE has three experts of its own, who can be appointed as persons in charge of the response operations. These resources are not adequate for managing response operations in the future unless they are strengthened.

An alternative to the extensive transfer of tasks would be to strengthen the oil spill response so that only the operational management of off-shore oil spill response would be transferred to the Finnish Border Guard. The response fleet would come under the Finnish Border Guard. The overall management of the situation would remain the responsibility of SYKE and it would appoint the head of the response operations. As a result, the current situation would remain largely unchanged. In many cases the management of off-shore response operations is already assigned to the most experienced commander of the response vessel. As a result of the change, the task would, as a rule, be the responsibility of the Finnish Border Guard. The overall management of the environmental pollution response would remain in the Ministry of the Environment and SYKE would still be responsible for most of its current response tasks. Both the management expertise and the communications of the Finnish Border Guard could be used in this model. There would only be minor changes to the legislation.

However, the model involves a number of potential problems. Because of the maritime rescue and border surveillance duties, the vessels of the Finnish Border Guard might not be able to stay at the accident site for prolonged periods. Thus, managing off-shore response would tie more resources and operations of the Finnish Border Guard than at present. The second potential problem involves the continuity in the response management expertise. Because of career rotation (transfer to other duties) of the ships' masters, response management expertise may be lost unless the transfer of this expertise is verified.

3.3.8 BORIS situation awareness system has been developed to support response operations

The Finnish Environment Institute has developed a map-based situation awareness system to support oil spill response. The purpose of this Boris system (Baltic Oil Response Information System) is to facilitate the formation and sharing of joint situation awareness (see Appendix 2, Figure 1). The system is based on geographic information and allows different authorities to get clear information and feed information into the system on such matters as contaminated areas and response plans. The BORIS system also allows the presentation of stranding forecasts. In

addition to relying on the geographic information and databases of the environmental administration, BORIS also makes use of the systems of other authorities through interfaces. Thus, information on areas sensitive to oil spills and on weather and ice observations are available.

The development of the BORIS system has proceeded in several stages and the feedback submitted by the users has also been taken into account. The second stage of the system was tested in autumn 2012 in the Balex Delta exercise and the system was officially introduced in 2013. System development has cost 700,000 euros and the funding has come from the Finnish Environment Institute and the Finnish Oil Pollution Compensation Fund. Based on the audit findings, both the ELY Centres and rescue services consider the system well-functioning. However, rescue services have criticised the fact that there is a large number of different information systems and they have also raised the issue of connections between them. The Finnish Transport Agency is of the view that the system should use nautical charts, which give a better picture of the actual state of the water area and its bottom and fairways than basic maps.

The chances to use the system in an effective manner depend on data communication links. For example, it was concluded in the Balex Delta exercise that the testing of the BORIS 2 system involves a number of data communication problems between the vessels and the coast.¹²⁰

3.3.9 Research information on the risk management of oil spills from vessels is not relayed to the authorities in an effective manner

A great deal of research on the risk management and oil spill response in connection with oil spills from vessels has been carried out by the Kotka Maritime Research Centre Merikotka, which also has the Finnish Environment Institute as its partner. The aim of Merikotka is to produce high-quality research adapted to the conditions of the Gulf of Finland in conjunction with partner universities, other institutes of higher learning and other actors. The purpose of the research is to improve shipping safety, help to prevent accidents and provide a better basis for the protection of the marine environment in the Gulf of Finland and the Baltic Sea as a whole. Merikotka has the generation of cross-disciplinary research as its special character and strength. At present, Merikotka forms a researcher network of about 45 persons. The aim is to expand the network in the next few years.

¹²⁰ HELCOM (2012), Rytönen (2012).

The research team on the safety of maritime transport and winter navigation focuses on risk management in maritime traffic and safety of winter navigation. The research of the marine environment team concerns the environmental impacts of maritime traffic (effects of oil spills and hazardous substances, effects on fishing, endangered species and recreational use, traffic emissions) and marine environment (eutrophication, multi-disciplinary risk research).

Most of the research funding has come from the Baltic Sea Region Programme of the EU. The Finnish Transport Safety Agency (Trafi), the Finnish Environment Institute and Neste Oil Corporation have also provided funding for the research. At the same time, however, little funding has come from the Finnish Funding Agency for Innovation (Tekes). The situation may be changing, however, as Tekes is preparing a programme for utilising the maritime industry and Arctic know-how. The aim of the programme is to promote the creation of new business in eco-efficient maritime solutions and in the sustainable use of marine natural resources. The programme has shipbuilding, maritime industry, Arctic and other maritime traffic, off-shore industry and environmental technology as its main business areas.

Research projects of the Merikotka centre have included SAGOF (Evaluation of traffic increase in the Gulf of Finland 2007–2015 and the effect of the increase on the environment and traffic chain activities), which examined the prospects for growth in the maritime traffic in the Gulf of Finland in 2007–2015 and the effects of the growth on the environment and the transport chains. The MIMIC project (Minimizing risks of maritime oil transport by holistic safety strategies) between 1 May 2011 and 31 December 2013, which was funded from the Central Baltic INTERREG IV A programme continued the multi-disciplinary research on accident risks in maritime traffic and its environmental impacts carried out in the project. The aim of the project is to combine growing traffic volumes, technical risk analysis (likelihood of grounding and collision including the human factor) and the environmental impacts of any accident into a comprehensive risk and decision-analysis tool that would allow the examination of risk-management methods in maritime traffic and especially in oil transports from the perspective of companies in the sector and society at large. This model is unique in the world.

The information on the natural values and endangered species in the Gulf of Finland and the Archipelago Sea was assessed in the OILRISK research project (2009–2013) coordinated by Merikotka. The information has been integrated into the BORIS oil spill response situation awareness system. The combination of stranding and sensitive natural values into a map tool helps the oil spill response personnel to make decisions on which

off-shore oil response solutions help to protect natural values and how shoreline response should be organised so that consideration is given to natural values. The projects carried out by Merikotka have also involved the assessment of the background factors of vessel accidents, maritime safety management and comparison between the cost-effectiveness of preventive measures and oil spill response vessels.

The Finnish Environment Institute has drawn up different guidelines for oil spill response sectors (such as guidelines for purchasing oil spill response boats) and prepared reports on oil spill response preparedness and vessel oil waste management capacity. Finland has cooperated with other Baltic Rim countries in the BRISK project (Sub-regional risk of spill of oil and hazardous substances in the Baltic Sea), in which the purpose was to examine the environmental risks of oil spills from vessels in the Baltic Region and the ways of reducing them. SYKE was responsible for Finland's contribution.

According to the researches working at the Merikotka Institute interviewed for the audit, there are information needs, particularly concerning winter conditions of oil spill response. Training in winter navigation should also be developed. In the researchers' view, the biggest problem was not the availability of research funding but the question of relaying research information to decision-makers and IMO (parties responsible for maritime and oil spill response standards) so that they would take it into account. According to the interviewees, more use should be made of automation and smart systems in maritime traffic. Traffic control should be similar to air traffic control, in other words, it should be more imperative than today.

3.3.10 There is a need for response technology for winter conditions

The Finnish company Lamor, which is a major player on the global market, has developed a great deal of practically oriented oil spill response technology. Lamor has developed recovery equipment for Arctic conditions and equipment for recovering oil under ice in collaboration with the Finnish Environment Institute. One of them is the oil recovery bucket (LRB 150-300). Lamor offers oil spill response devices (such as recovery equipment, booms and pumps) and response systems, such as the new-generation mobile recovery system. Lamor was also approved as a provider of international training in 2004. The Lamor Response Team (LRT) has responded to a large number of oil spills around the world in all types of environment, such as Arctic conditions.

Internationally, burning of oil and the use of oil dispersing chemicals have been seen as potential and effective response methods.¹²¹ However, there are factors limiting their use in the Baltic Sea. Experts at the Finnish Environment Institute emphasise a different approach because in Finland it is believed that oil can also be removed mechanically in ice conditions using brush technology.

There are four different devices in use in Finland that can recover oil in ice.¹²² The oldest of the devices is an ice bow installed in the ship's bow. It has mobile brushes that clean the pieces of ice and recover the oil. The ice bow is difficult to use but it works in many different ice conditions. The other device, the oil recovery bucket, was originally developed for cleaning shores but when installed in a vessel's crane it also works off-shore in ice conditions. The bucket has a rotating brush (similar to that used in a sweeper) that cleans the ice. The device has been installed on six oil spill response vessels. However, it is too small for recovering oil over a wide area in off-shore conditions.



Figure 12. The brush recovery device installed in the bow crane of the response vessel Halli skims oil from the surface of the ice. © Jouko Pirttijärvi.

¹²¹ *The Economist* (2012).

¹²² *Jolma* (2013).

The third device, the oil ice separator, is installed on the side of an oil spill response vessel equipped with internal recovery equipment. An oblique vibrating grid is driven over the ice to be cleaned as a result of which the oil is separated from the ice and it can be recovered. The equipment was installed on Seili in 2004, on Tursas in 2005 and on Uisko in 2006. The equipment has also been purchased for the Estonian vessel EVA 316.

The fourth and the latest device is a large (four metres in diameter) rotating brush, which is installed at the stern of a vessel. It is used when the vessel is going backwards in ice. The device, which was jointly developed by the Finnish Environment Institute and the ELY Centre for Ostrobothnia, has been tested on Louhi.¹²³ It should be noted that in difficult ice conditions oil can only be recovered using equipment that has been installed on vessel capable of breaking ice.



Figure 13. Ice oil brushes installed on the oil spill response vessel Louhi. The brushes have been developed by the Finnish Environment Institute. © Jouko Pirttijärvi.

Oil can also be recovered in fast ice. Using pressurised air, the oil is moved under the ice and lifted on the ice through cracks or channelled to the fairway and is then recovered using the equipment installed on the

¹²³ *The tests clearly showed the major impact of operating the vessel and of its navigation on the effectiveness of the recovery. On tests, the brush recovery device cleaned the pieces of ice with a high degree of effectiveness and operated reliably. The oil also adhered well on the thick and long brushes. The comb cleaned the brushes fairly well after tightening but it requires further development (ILS Oy (2007)).*

vessels. The oil under the ice can be located using underwater robots and their cameras. Equipment has also been developed for sawing ice and the oil lifted on the surface can be recovered using a variety of methods.¹²⁴

In 2013, the Finnish Environment Institute, Lamor and Aker Arctic took part in the compilation of an international report on developing oil spill response in ice conditions. The customer consortium, Oil and Gas Producers Association, commissioned three reports on the subject. These were mechanical recovery, oil ice separation at the accident site and new vessel concepts for ice conditions. In 2013–2014, the Finnish Environment Institute, the Finnish Meteorological Institute and the Technical Research Centre of Finland have, on the commission of the Finnish Ministry for Foreign Affairs, considered new service concepts aimed at improving the competitiveness of Finnish expertise and innovation technology. In fact, the Finnish Environment Institute is of the view that in terms of R&D and in cooperation with domestic and foreign manufacturers it is in a position to develop new service concepts and products that help to promote the competitiveness of Finnish companies in Arctic areas, for example.

The state-owned company Meritaito Ltd has developed the business concept 'SeaHow'. The concept is based on the idea that Finnish oil spill response vessels are not able to operate in rocky waters and in the archipelago outside the high seas and fairways. It is possible that in an off-shore oil spill, a large proportion of the oil released into the sea drifts to the archipelago and the to coast.

¹²⁴ *Based on the audit findings, it seems that as international interest in the Arctic areas is growing there is great demand for the development of and research on oil spill response technology for winter conditions. For example in Finland's new Arctic strategy it is noted that the implementation of the oil spill response agreement of the Arctic Council offers opportunities for Finnish expertise in oil spill response and that Finnish companies are world leaders in mechanical oil spill response in ice conditions (Government resolution (2013)).*



Figure 14. MiniBagger can be installed on all service boats with a length of more than six metres. The picture shows the newest boat of the Satakunta Regional Rescue Service. © Meritaito Ltd.

The purpose of Meritaito's new SeaHow oil response products is to allow the recovery of oil in the shallow waters of the archipelago before it washes ashore. The idea is that SeaHow Minibagger and MaxiBagger side collectors can easily be installed on existing service, maritime search and rescue, firefighting and fairway maintenance vessels. In this way they allow a significant increase in oil spill response capability without new investments in boats. Moreover, it is not necessary to stop the recovery when the recovery tank is full as the recovered oil is put into sacks, which are released into the sea and picked later (catch and release principle) In this solution, boats and vessels with integrated recovery tanks may also continue the response operations without interruption when the recovery tank is full. For example, a service boat equipped with two MaxiBagger side collectors can recover a total of 40 m³ of oil per hour.

3.4 Oil spill recovery

3.4.1 Municipalities have only limited resources for oil spill recovery.

The Act on Oil Pollution Response (1673/2009), which entered into force at the start of 2010 defines oil spill recovery and lays down that it is the responsibility of municipalities. Oil spill recovery means oil spill response operations that are carried out after the spread of oil on the soil, ground water, surface water and the shoreline has been contained. The urgent tasks carried out as part of the first response are followed by the oil spill recovery, which does not require quick measures and may continue for a long period.

The head of the oil spill response operations determines and decides when the oil spill recovery should start. According to the Government's proposal (248/2009), before making any decisions, the head of the oil spill response operations must specifically ensure that the municipal authorities are adequately prepared to carry out the oil spill recovery after the accident.

In the course of the audit, it came to light that small municipalities do not have the resources and capabilities to carry out the oil spill recovery and that not all oil spill response plans contain an agreement under which regional rescue services would also carry out the oil spill recovery. It was pointed out in the interviews conducted for the audit that carrying out the oil spill recovery would tie the resources of the rescue services for a long period and that these resources would be unavailable to rescue operations.

According to the audit, the municipalities are not fully aware of the requirements and significance of their oil spill recovery responsibilities. As many municipalities have organised their building and maintenance services by means of outsourcing, there is a growing possibility that in such cases nobody takes responsibility for completing the oil spill response process.

The oil spill recovery is managed by the authority designated for the task by the municipality in question. If the oil spill recovery of a major oil spill is carried out in the areas of more than one municipality, the competent Centre for Economic Development, Transport and the Environment should steer and coordinate the work so that it will be carried out in accordance with the same principles in the entire spill area. There are no such plans steering the operations. The chapter *Oil spill recovery, shoreline clean-up and oil spill waste management* contained in the 2007 cooperation plan for oil spills from vessels cannot be considered

an operational plan as it only refers to the shoreline oil spill response manual issued by the Finnish Environment Institute and the SÖKÖ project. Both the repealed and the new oil spill response decree (which is now undergoing consultation) require that the cooperation plan sets out a oil spill recovery plan or a plan for arranging response on the shores. The audit has also revealed that ELY Centres have only limited personnel resources in oil spill response matters.

3.4.2 Volunteers are an important resource

In a major oil spill and as the news images spread information about oiled birds, citizens may be willing to help in practical response efforts. However, uncoordinated involvement of volunteers may be detrimental to the progress of the response operations and dangerous to the participants themselves. In some international accidents, large masses of volunteers have actually interfered with the response operations and the health of the volunteers has also been affected as they have inhaled oil-containing vapours and slipped on cliffs stained by oil. In fact, one of the challenges of oil spill recovery is the management of the voluntary helpers.

WWF Finland set up its own oil response team in 2003. A total of 6,500 Finns have registered as team members and 1,300 of them have received training.¹²⁵ The oil response teams assist in shoreline clean-up and care for oiled animals at the request of the authorities. WWF's first response unit arrives at the site on the day following the accident and the full strength (100-150 persons) is reached in 1–3 days.

A number of other voluntary organisations have also expressed their interest in the participation in oil spill response and the development of the response preparedness.¹²⁶ For this reason, the Ministry of the

¹²⁵ Basic training is in the form of team leader and unit leader training and training in the treatment and care of oiled birds. The units have an equipment container (jointly purchased by WWF and the Port of Hamina in 2008). The container serves as the base, registry point, shelter and supply storage of the volunteers in field conditions. WWF also has three additional equipment containers of similar type for which funding was provided by Muuttopalvelu Niemi Oy. WWF has equipment for about one hundred shoreline response volunteers. This equipment allows the shoreline response operations to get started. The equipment kit includes personal protection equipment and the necessary tools.

¹²⁶ Voluntary defence organisations are a new and a growing resource in oil spill response. The Finnish Environment Institute carries out different types of training

Environment has considered the participation of voluntary organisations and commissioned a questionnaire on the matter to the organisations. The tasks suited for voluntary organisations listed in the ministry's memorandum include

- taking part in shoreline clean-up
- treatment of birds (chasing away, catching, cleaning or putting down)
- guarding of equipment
- assisting in transports
- monitoring of environmental damage (such as the taking of samples).¹²⁷



Figure 15. WWF volunteers training for the clean-up of oil-polluted shores. © Anna-Stiina Lundqvist, WWF Finland.

It is emphasised in the memorandum that voluntary organisations are an important additional resource, which should, however, be used in a manner that does not mean extra work for the persons in charge of the response operations. This requires that the parties prepare for the cooperation in advance. In the conclusions of the memorandum it is stated that any tasks assigned to the voluntary organisations must be taken into account in the response plans, different voluntary organisations could

periods with the organisations. For example, reservists took part in the Balex Delta exercise, providing logistics assistance.

¹²⁷ Nyström (2012).

cooperate in training and exercises, compensation practices and occupational safety procedures should be harmonised and that the indemnity and liability insurance arrangements should be determined.¹²⁸

Voluntary cooperation with non-professional pilots has been tested in the aerial surveillance of oil spills as part of the 'Lentävä mereneito' (Flying mermaid) project. However, the activities have now been cut back and one major problem is the risk of a large number of false observations as such phenomena as algae discharges are easily confused with oil releases and no training for oil spills has been given.

The memorandum of the Ministry of the Environment also discusses the funding of the voluntary work because under the Act on Oil Pollution Response (1673/2009), the regional rescue services, the Finnish Environment Institute or the municipality must, from their own funds, pay a reasonable remuneration to any person that has participated as a volunteer in the oil spill response operations and whose role has been approved by the accident response authority. These costs may be claimed from international compensation funds. Voluntary organisations may apply for discretionary grants for oil spill response preparedness from the Finnish Oil Pollution Compensation Fund. For example, WWF has received such grants from the fund.

Paying compensation for voluntary work encourages people to join the work through organised parties, helps to improve occupational safety and makes it easier to claim refunds from international compensation funds. However, as it is a question of voluntary work, the sums paid as compensation should only be reasonable.

Based on the audit findings, there are differences in the attitudes towards voluntary work between regional rescue services. For example, the City of Helsinki is in a position to use its own personnel in oil pollution response and any volunteers would be in employment relationship. During the audit, a number of authorities were sceptical about volunteers and questioned whether it would be possible to employ volunteers, especially if the accident occurred during a cold time of the year. Some authorities also seemed to be irritated by the positive publicity received by the teams - as if the authorities did not act effectively in accident situations.

Voluntary work should also be examined from the perspective of society at large. A major oil spill and the resulting shoreline pollution and oiled animals arouse anxiety and willingness to help among the public. Teams that have been trained and organised in advance may effectively channel

¹²⁸ Nyström (2012).

people's willingness to help in a way that benefits the rescue work and prevents self-initiated activity that is dangerous to health and that may also interfere with the response operations. Voluntary teams also provide people with an opportunity to get involved, which may reduce the feeling of frustration and powerlessness when an accident occurs. Such 'soft' factors also have indirect effects on central government finances and they have an impact on the way people trust the public authorities. For this reason, the voluntary work carried out by WWF can, on the basis of the audit results, be considered a good practice. Moreover, it is a unique initiative in the worldwide context that has also aroused interest in other countries. It is clear, however, that the safety and well-being of every person taking part in the response operations must be ensured at all times. Those taking part in the response operations must be at least 18 years old and the volunteers must work under the auspices of the response authority.

3.5 Management of oil waste from vessels

3.5.1 A major oil spill from a vessel generates large amounts of waste

Definition of a substance or material as waste or hazardous¹²⁹ waste is important from the legal and economic point of view. Definition of waste as hazardous waste means that the special provisions concerning the transport, storage, handling and disposal of such waste must be observed. These provisions are stricter than the provisions on other types of waste. Handling of hazardous waste is also more expensive than the handling of ordinary waste. In the classification of oil waste, consideration must be given to the amounts and concentrations of oil compounds and the concentrations of other hazardous substances. For example, Russian crude oil has a relatively high mercury content, which also affects the manner in which it is processed.

Large amounts of oil-contaminated earth material are generated in the clean-up of the shores. It is classified as hazardous waste if the concentrations of hazardous substances laid down in the law are exceeded. Oil content in earth material may be substantial during the early stages of the recovery but as the shoreline clean-up progresses, the oil content usually declines.

¹²⁹ *In the past, the word "problem waste" was used.*

Oil spill response operations also result in oil-containing mixed waste (such as clothing stained by oil and oil absorption material). This is classified as hazardous waste and it must always be incinerated in hazardous waste treatment plants operating in accordance with an environmental permit.

Oiled animal carcasses and waste generated in mobile bird containers are classified as risk waste. This is because birds often contain a large number of harmful bacteria, viruses and other potential pathogens. Risk waste must be kept separated from other waste components to the extent possible and incinerated in a hazardous waste treatment plant.

Small amounts of oil-water mixture is generated on the shores as the oil is recovered with brushes and suction hoses. Most the mixture is generated on the accident site at sea. Water can be separated from oil gravitationally in special facilities. After that the oil can be used as fuel in combustion plants. Over time, the separation process also results in oil-containing sludge, which must be treated in a hazardous waste treatment plant.

It is difficult to make any valid estimates of the amount and type of the oil waste as there are many different factors influencing them. Only two assessments of the amount of oil waste generated in oil spills from vessels have been made in Finland. In connection with the preparation of the waste plan for Southern and Western Finland it was estimated how much oil waste from vessels would be generated if an off-shore oil spill of 30,000 tonnes¹³⁰ could not be successfully contained and the oil will wash ashore. The result was 542,500 tonnes of oil spill waste if the oil spread over a shoreline of 400 kilometres.¹³¹ Thus, the amount of waste would be 18 times higher than the amount of oil released into the sea.

However, the estimate may be too cautious. In the SÖKÖ project (2007), it was estimated that after a vessel oil spill of 30,000 tonnes, the amount of oil spill waste would be as much as 3.45 million cubic metres.¹³² The calculation was based on a situation where the oil spreads on the coast over a considerably wider area than what is presented in the

¹³⁰ *The calculation was based on an assumption that about 6,000 tonnes of oil would evaporate or sink in the sea.*

¹³¹ *Environmental Centre for Southeast Finland (2009).*

¹³² *The density of heavy fuel oil varies between 0.9 and 1.0 kg/dm³. Thus, 3.45 million cubic metres of heavy fuel oil would have a weight of between 3.45 and 3.11 million tonnes.*

example above and the amount of waste includes all earth material that theoretically requires cleaning.¹³³



Figure 16. Shoreline polluted by oil. © Jouko Pirttijärvi.

3.5.2 Responsibilities in waste management are not clear

The handling of oil waste mostly occurs after the first response at which point waste management legislation also becomes applicable and the oil waste resulting from a vessel oil spill washed ashore gets waste status. Under the general rule laid down in section 28 of the Waste Act (646/2011), waste management is the responsibility of the waste holder. In section 6(1)(5) of the act, waste holder is referred to as the waste producer, property holder or anyone in possession of the waste. When oil waste progresses in the waste treatment chain, the waste recipient also becomes the waste holder and the responsibility for the waste is transferred to the recipient. As off-shore oil spill response in Finland is the

¹³³ *Even though the calculations are not entirely fully comparable, the results are not mutually exclusive either.*

responsibility of the authorities, the logical conclusion is that the authorities are also responsible for the treatment of waste generated in connection with oil spills from vessels and response operations.¹³⁴ Thus, municipal responsibility for the management of vessel oil spill waste and organisation of waste management is derived from the status of the oil spill recovery authority. This means that, as a rule, the ultimate holder of vessel oil spill waste is thus the municipality and not such parties as the party in possession of the site. This is also the case in situations where the waste is temporarily placed in intermediate storage for later treatment. This thinking is justified under section 23 of the Act on Oil Pollution Response (1673/2009), which states that an intermediate storage unit can, on the decision of the head of the response operations, be established without the consent of the holder of the property of the location, in which case the secondary waste management responsibility based on the consent of the property holder is not relevant.¹³⁵

In the interviews conducted for the audit, representatives of the Association of Finnish Local and Regional Authorities were, however, of the view that the municipality does not become the waste holder at any stage. However, under the act, the oil originating from the vessel become waste when it ends up on land and the municipality is responsible for its removal and treatment. Thus, it seems that the responsibilities concerning the vessel oil waste management should be clarified, even if they are fairly well specified in the law.

3.5.3 There are no concrete plans on the transport of oil waste from vessels

The transport of oil spill waste generated in a vessel oil spill from the recovery areas on the coast to intermediate storage units, directly to treatment or from an intermediate storage unit to treatment requires a large amount of transport capacity. It has been estimated that transporting a waste consignment of 100,000 tonnes would require between 7,000 and 12,000 lorry loads, depending on the specific weight of the waste.¹³⁶ As a vessel oil spill of 30,000 tonnes may result in more than 500,000 tonnes of oil waste, the transport requirement may be as much as 60,000 lorry loads. This would mean quite a lorry traffic in the accident areas.

¹³⁴ *Tanskanen (2007).*

¹³⁵ *Särkkä and Tuomainen (2013).*

¹³⁶ *Environmental Centre for Southeast Finland (2009).*

The load beds of lorries transporting oily waste must meet special tightness requirements because the oil content of the waste loaded on the bed may be so high that the oil seeps through the earth material. The transport of oil-containing waste must be in accordance with the Act on the Transport of Dangerous Goods (719/1994) and the Government Decree on the Transport of Dangerous Goods by Road (194/2002).

Appropriate transfer documents ensuring that the waste will be treated properly must accompany the waste or hazardous waste to be transported.¹³⁷ The lorry driver must possess ADR licence (*European Agreement concerning the International Carriage of Dangerous Goods by Road*).¹³⁸ A holder of an ADR licence may transport hazardous substances in amounts that exceed the permitted minimum.¹³⁹ Obtaining an ADR licence requires training and the passing of a test. The licence is valid for five years and the renewal requires the passing of a test taken in connection with a supplementary course. In spring 2012, there were about 32,000 ADR licence holders in Finland.¹⁴⁰

Road transport is only one part of the vessel oil waste transport chain. The jagged coast of the Gulf of Finland, different types of terrain and (particularly outside urban areas) an inadequate road network mean that there are special requirements for waste logistics. The audit also highlighted that oil waste may have to be temporarily stored on islands and the transport of these waste consignments to mainland areas requires transport by sea. Transport of mobile machinery, response personnel, observers and media representatives also requires planning. In vessel oil spills, organisation of logistics also involves such matters as supply transports (spare parts, fuel, equipment and food provisions) on land and by sea, personnel matters (accommodation, food provisions, first aid,

¹³⁷ *In its operations, a waste transport contractor must meet the normal requirements concerning the transport of hazardous waste and contaminated soil, including registration into the environmental administration's waste database.*

¹³⁸ *Decree on the Driving Licence of Persons transporting Hazardous Substances (401/2011).*

¹³⁹ *In transports exceeding the licence-free limit, the vehicle must have an appropriately completed bill of consignment, written safety instructions and an ADR approval certificate. Each member of the crew must also have a personal ID with a photo. Moreover, each member of the crew must have safety vests, a separate light fixture, protective gloves and protective eyewear. The transport unit must be marked with orange-coloured pictograms in the front and in the rear.*

¹⁴⁰ *Ministry of Transport and Communications (2012), Herrala (2012).*

sanitary matters), loading and unloading, different forms of storage and supervision of storage.

Organising logistics in a vessel oil spill requires competent personnel. The personnel resources should consist of¹⁴¹

- logistics manager
- supply manager
- coordinator of sea transport
- coordinator of land transport
- if necessary, coordinator of air transport (flight operations coordinator)
- loading and unloading expert, separate coordinators for operations in the archipelago and the mainland
- site supervisor
- administrative personnel (reception and relaying of transport requests, reception and relaying of supply requests)
- vehicle drivers, ship masters and aircraft pilots.

The response operations may be slowed down or even interrupted by the lack of a workable logistics system planned in advance. Based on the audit results it can be concluded that there is no advance planning in Finland concerning the organisation of the transport and logistics of oil waste from vessels.¹⁴² The transport of oil waste is not discussed at all in the oil spill response plans of Western and Eastern Uusimaa. According to the plan for Kymenlaakso, the transports are carried out in accordance with the SÖKÖ operating model but no concrete plan is presented. Even though the oil spill response plan for Helsinki does not contain any specific transport plan either it has a map showing the oil spill transport companies and the transport restrictions. There are no references to the transport of oil waste from vessels in the joint cooperation plan concerning the vessel oil and chemical spill response in the Gulf of Finland.

It should be noted that vessel oil waste management is the responsibility of the municipalities. The audit findings did not indicate that municipalities have prepared any concrete transport plans for oil waste from vessels.

¹⁴¹ SÖKÖ Manual 10 (2011).

¹⁴² However, the SÖKÖ project provides a model for the transport and logistics of oil waste from vessels.

3.5.4 There are no adequate plans for the intermediate storage of oil waste

To the extent possible, the vessel oil spill waste is primarily transported to the reception points set out in the environmental permits for treatment or for intermediate storage immediately after the spill.¹⁴³ However, a major oil spill from a vessel would result in such large amounts of oil spill waste that the capacity of the existing reception points would be quickly exhausted. For this reason, other intermediate storage units must be set up for oil spill waste that cannot be transported to treatment or to an authorised intermediate storage unit.

The aim of intermediate storage is to store oil spill waste in such a manner that it does not cause any harm or danger to humans or the environment. Well-organised intermediate storage gives the parties responsible for waste treatment time to decide on effective and safe treatment of oil spill waste.

There are no standard practices or guidelines concerning the location or construction of intermediate storage units for oil spill waste. In the oil spill response plans and joint cooperation plan for the sea area of the Gulf of Finland, it is only generally stated that the intermediate storage units for oil spill waste should primarily be located at the sites of municipal and private waste treatment plants. Locations that are otherwise suitable for the purpose in terms of logistics and terrain would be the secondary option. The audit findings indicate that in their land use, municipalities have not given adequate consideration to the intermediate storage of oil-containing waste that would allow them to prepare for major oil spills from vessels. This may generate a bottleneck in waste management operations and increase costs as intermediate storage units must be quickly established after an oil spill from a vessel.

The National Emergency Supply Agency, the Construction Pool and the Western Uusimaa Regional Rescue Service have carried out a pilot project (see Appendix 3, Figure 1), in which the structures of an intermediate storage unit were designed and the location criteria and traffic arrangements for the units drawn up.¹⁴⁴ One aim of the pilot project was also to estimate the construction timetable. The conclusion was that the building of two basins of 5,000 m³ in an area of about one hectare in late winter in less than two weeks would cost between 700,000 and 800,000

¹⁴³ *Environmental Centre for Southeast Finland (2009).*

¹⁴⁴ *Saarinen (2013).*

euros. Thus, based on the information acquired in the pilot project, it can be concluded that constructing intermediate storage basins for vessel oil waste amounting to 100,000 m³ would cost between 7 and 8 million euros (provided that there are no benefits of scale). Thus, constructing intermediate storage units for 500,000 tonnes of vessel oil waste could cost almost 40 million euros.

3.5.5 Mobile thermal desorption units would be quickest way to treat oil waste

Waste treatment methods and capacity are usually designed for the amount of waste generated in normal conditions. The capacity may be inadequate for treating waste in emergencies. The final disposal of large amounts of exceptional waste (such as oil waste generated in a vessel accident) may be difficult, if no plans have been drawn up in advance.

The method of treating oil waste from vessels depends on the type of the waste component. For example, biological composting is based on the ability of microbes to decompose organic contaminants in the soil. Composting will only succeed when the oil content of the earth material is less than two per cent. However, the oil content of oil spill waste may vary between oil-stained earth material and near oil. Treatment methods, in which the contaminant (oil) can be destroyed as quickly and as safely as possible, are suited for the treatment of waste with high oil content. Of the existing treatment methods, only thermal methods (incineration) meet these conditions. Fluidised bed treatment used in power plants, grate boilers used in waste treatment plants or thermal desorption are the methods available. Thermal desorption may also be used in mobile units. They consist of separate sections that are made into a unit suitable for the disposal of the contaminant in question. The thermal desorption unit may be erected in the vicinity of the intermediate storage unit of the waste or contaminated soil to be treated, which means that treating earth material with a mobile thermal desorption unit will reduce the need for moving the masses. At the end of 2010, there were three privately owned mobile units in Finland.¹⁴⁵ According to the new information obtained during the audit, apparently only one company, which possesses two units, offers such waste management service.

For example, in the United States, Astec markets a mobile thermal desorption unit (Astec Portable Direct-Fired Thermal Treatment Plant),

¹⁴⁵ *It was not established in the audit whether the units are in Finland at the moment.*

which has a treatment capacity of 30 tonnes/hour and has a price of 4.4 million dollars (about 3.3 million euros). However, according to the information obtained in the audit, the treatment of atmospheric emissions in the US-made equipment may not, as such, meet the requirements laid down in the EU legislation. According to a Finnish expert estimate, the planning and construction of a mobile thermal desorption unit meeting the requirements would cost about 6.5 million euros. The construction would take about six months.

In 2011, commissioned by the waste sector emergency supply committee working under the National Emergency Supply Agency, the Finnish Environment Institute examined whether thermal treatment could be applied to oil-contaminated earth material generated in an oil tanker accident in Finland.¹⁴⁶ The amount of oil waste used as a basis was the estimated figure of 542,500 tonnes, produced for the waste plan for Southern and Western Finland.

Mobile thermal desorption units that have the decontamination of earth material as their main purpose have by far the biggest capacity to treat oil-contaminated earth material. They can be used for about eight months each year (excluding the winter months) and large plants have an annual capacity of 115,000–350,000 tonnes/plant (estimated utilisation 4,560 hours/year). Thermal desorption units have the advantage of being mobile, which allows the earth material to be treated in the vicinity of the storage site. Thermal treatment using mobile equipment requires an environmental permit for the treatment site and a notification concerning the start of the treatment. Permits for treating oil-contaminated earth material using mobile plants had been granted in the areas of eight waste centres.¹⁴⁷

¹⁴⁶ *Saarinen and Suoheimo (2011).*

¹⁴⁷ *Saarinen and Suoheimo (2011).*



Figure 17. Mobile thermal desorption unit. © Savaterra Oy.

Of the industrial plants continuously operating in Finland, two cement plants have a substantial waste capacity (about 45,000 tonnes/plant/year), if the waste is fed into a rotary kiln together with the other fuel. If the oil-contaminated earth material can be fed together with the other raw materials, one cement plant might be able to treat about 90,000 tonnes of oil-contaminated earth material each year as part of the raw grinding process. The annual capacity of a light gravel production plant is about 12,000 tonnes. However, there are strict requirements for the particle size of the material used in the process. The advantage of the industrial process is that the earth material could be used in full as part of the product.

At the moment, there are two high temperature furnaces for treating hazardous substances. One of them is operating in full capacity to treat waste generated in normal industrial processes. One of the high temperature furnaces will be withdrawn from active use at the start of 2012. The furnace has a yearly capacity of 100,000 tonnes.

Each of Finland's waste incineration plants is able to process between 3,000 and 8,500 tonnes of oil-contaminated earth material each year. The combined capacity of the three operational plants is estimated at 20,000 tonnes/year. However, no consideration has been given to the treatment of oil-contaminated earth material in the environmental permits of the waste incineration plants.

According to a report¹⁴⁸ compiled by the Finnish Environment Institute, there will be changes in the number of waste incineration plants by the year 2015. One of plants (Turku) will be closed down. Four new plants will be constructed (Vaasa/Mustasaari, Oulu, Vantaa and Riihimäki). This means that the capacity will be tripled from the estimated 20,000 tonnes. The conclusion of the audit was that two new incineration plants have become operational and one is being planned. The annual treatment capacity would be 24,000 tonnes higher than estimated in the report of the Finnish Environment Institute.¹⁴⁹

The technical capacity of co-incineration plants to exclusively treat earth material is fairly limited as they only have an annual treatment capacity of between 700 and 8,000 tonnes. Co-incineration plants do not have environmental permits for treating oil-contaminated earth material.

There are also a small number of power plants in Finland that have the technology to treat small amounts of oil-contaminated earth material. However, they do not have environmental permits for waste incineration. In many cases, the granting of an environmental permit must be preceded by an environmental impact assessment procedure, as laid down in the Act on Environmental Impact Assessment Procedure (468/1994). Between 1995 and 2008, the average duration of this procedure in waste management projects was more than ten months (in normal conditions).¹⁵⁰

There is substantial capacity to treat oil-containing waste in the southwestern coast of Finland and in the southeastern parts of the country.

The conclusion is that the quickest way to deal with vessel oil waste (542,500 tonnes) that pollutes the shores and results from a vessel oil spill of 30,000 tonnes is to deploy two privately owned mobile thermal desorption units for a period of 8-9 months. When consideration is given to the fact that no treatment cannot be carried out during the winter months, at least two years must be allocated for the treatment process.

Mobile thermal desorption units have a substantial treatment capacity but their availability depends on their location and the type of work that they are carrying out.¹⁵¹ The equipment may be used for waste treatment in several municipalities under environmental permits granted to waste treatment plants. Problem waste plants already have such permits. Treatment in power plants and industrial furnaces, on the other hand,

¹⁴⁸ *Saarinen and Suoheimo (2011).*

¹⁴⁹ *Myllymaa (2013).*

¹⁵⁰ *Jantunen and Hokkanen (2010).*

¹⁵¹ *There are about 20 such units in the Nordic countries, Germany, France and Belgium (2011).*

would in most cases require amendments to the plants' environmental permits, which would be time-consuming. Subject to a notification referred to in sections 62–64 of the Environmental Protection Act and a subsequent decision made by the authorities (ELY Centre), the treatment of exceptional oil waste from vessels could begin without an environmental permit, but no consensus exists on the interpretation of whether or not these sections can be applied to processing waste produced by an oil spill from a vessel.

3.5.6 Costs depend on the way in which oil waste from vessels is sorted

The Act on Environmental Impact Assessment of Plans and Programmes of Public Authorities (200/2005) applies to regional waste planning. The effects of the options for intermediate storage and treatment of oil waste from vessels were assessed as part of the preparation of the waste plan for Southern and Western Finland. The economic effects were also assessed but this was done in a fairly general manner and no concrete sums were presented.¹⁵²

The overall costs of different options for the management of oil waste from vessels¹⁵³ have been estimated in a thesis.¹⁵⁴ The estimates were based on a situation where a coastal stretch of 200 kilometres in Kymenlaakso would have to be cleaned up and the amount of oil waste would be 269,500 tonnes.

If the oil waste was treated as non-sorted waste at the problem waste plant of Ekokem Oy in Riihimäki, the total costs would be about 120 million euros. The costs would be the same even if the oil waste was sorted.¹⁵⁵ According to the information used in the survey, it can be calculated that the mere treatment costs¹⁵⁶ of a vessel oil waste consignment of 542,500 tonnes¹⁵⁷ would amount to almost 185 million

¹⁵² *Environmental Centre for Southeast Finland (2009).*

¹⁵³ *Costs arising from recovery, personnel, equipment, containers, protective cases, intermediate storage, transport and treatment.*

¹⁵⁴ *Partila (2010).*

¹⁵⁵ *This is because it was assumed that the sorting would not slow down the recovery work and thus the recovery costs would be the same as in the non-sorted option.*

¹⁵⁶ *If an off-shore oil spill of 30,000 tonnes reaches the shores.*

¹⁵⁷ *This is only part of the overall costs.*

euros. If the entire capacity of the plant would be spent on treating the oil waste from vessels, the process would take seven and half years.

With a mobile thermal desorption unit possessing a waste treatment capacity of 100,000 tonnes, the total cost of non-sorted oil waste would be about 81 million euros. The costs arising from sorted waste would be considerably lower, about 67 million euros. A mobile thermal desorption unit is cheaper than the Ekokem option because the plant is used near the shore, which means lower transport costs.

In the examination, a combination where the sorted oil waste is processed at the Kotka waste-to-energy power plant and at a mobile thermal desorption unit proved to be the cheapest waste management option. In that case, the total costs would be about 64 million euros. The problem would be, however, that the Kotka plant does not possess an environmental permit allowing it to treat all oil waste components.

According to the study, from the perspective of treatment it would be cost-effective to divide the oil waste generated in a vessel accident into three components (in addition to risk waste): oil-water mixture, oil-contaminated earth material and oil-containing mixed waste. The same recommendation was also made in the SÖKÖ project.¹⁵⁸ Recovery operations carried out as part of the shoreline clean-up should be planned in advance.

3.5.7 Legal provisions do not clearly differentiate between environmental clean-up and restoration procedures

Unless otherwise agreed, the municipality acts as the oil spill recovery authority. Oil spill recovery comprises the removal of oil and oil spill waste, waste treatment and the restoration of the accident site and other final measures after the spread of oil has been contained.¹⁵⁹ Under the Act on Oil Pollution Response (1673/2009), oil spill recovery can be initiated when the oil does no longer cause any danger of additional damage. One aim of the Act on Oil Pollution Response (section 1) is to remedy the impacts oil spills so that any harm caused to people, property and the environment can be minimised. Under the Government proposal

¹⁵⁸ According to Saarinen and Suoheimo (2011), oil waste from vessels should be sorted on the basis of which type of plant will treat them. For example, oil-containing mixed waste is suitable for the processes of cement plants. Thermal desorption units are best suited for treating inorganic earth material.

¹⁵⁹ SÖKÖ II 8 (2011).

(248/2009), this means in practice that the oil is recovered, the shores and land areas are cleaned and the polluted environment is restored to its prior condition to the extent possible. The definition of oil spill recovery laid down in the act also includes different environmental restoration measures. Thus, oil spill recovery includes, to the extent possible, the restoration of the environment to its condition before the vessel oil spill.

It is unclear, however, when the oil spill recovery ends and when the restoration of the contaminated land areas, as laid down in the Environmental Protection Act (86/2000), starts.¹⁶⁰ Sometimes the contamination may be so serious or extensive or the response conditions may be so difficult that the results of environmental restoration will remain unsatisfactory even though the spread oil could be contained. In such cases, the municipal oil spill recovery authority will have to stop response operations after the damage has been contained even though not all of the oil has been recovered. After that, the restoration work will continue under the provisions on the obligation to treat soil and ground water, laid down in the Environmental Protection Act. This will also be the case if in connection with a vessel oil spill, signs of an earlier spill are detected.¹⁶¹

Under section 75 of the Environmental Protection Act, the restoration of contaminated soil or ground water is primarily the responsibility of the operator causing the contamination. The secondary responsibility lies with the holder of the contaminated area and the ultimate responsibility with the municipality. However, under Act on Oil Pollution Response, primary responsibility for the environmental restoration lies with the oil spill recovery authority (the municipality). Moreover, there are differences in the target levels for the clean-up laid down in the two acts. As the parties assuming primary responsibility are not the same in these situations, the National Audit Office is, after examining an expert report commissioned as part of the audit, of the opinion that the situation should be clarified by adopting provisions that define what restoration means in the context of oil spill recovery and after its completion.¹⁶²

¹⁶⁰ *Partila (2010).*

¹⁶¹ *Government proposal (248/2009).*

¹⁶² *Särkkä and Tuomainen (2013).*

3.6 Finnish Oil Pollution Compensation Fund

3.6.1 The fund has provided guarantees for purchases of oil spill response equipment and maintenance of response preparedness

The Finnish Oil Pollution Compensation Fund was established in 1974. Relying on the fund's resources, municipalities and regional rescue services have been able to purchase oil spill response equipment and material. Under a legislative amendment introduced in 1985, the state can also claim compensation from the fund for the costs arising from oil spill response vessels and equipment. The Finnish Oil Pollution Compensation Fund is fairly unique because, in addition to providing compensation for damage, it can also provide financing for the purchase of oil spill response equipment and preparedness maintenance.¹⁶³

¹⁶³ *The Canadian SOPF fund (Ship-source Oil Pollution Fund) collects money from oil companies and heavy industrial companies, which import or export more than 300 tonnes of oil by sea each year. The fund has a capital of about 380 million dollars (about 280 million euros). Under the polluter pays principle applied by the fund, the aim is to recover the sums paid as compensation from the polluters. The fund also provides protection for situations where the polluter is not known. The maximum liability of the fund is slightly more than 110 million euros/accident. Compensation can be granted if the international IOPCF system does not provide adequate compensation. Unlike the international compensation funds, SOPF provides compensation for both oil spills arising from oil tanker accidents and for oil spills arising from other vessels.*

The United States Oil Spill Liability Trust Fund was established in 1986. Compensation for claims concerning third parties and natural resources, clean-up costs incurred by the Federal Government and the annual expenditure of the Coast Guard is provided from the Principal Fund. The Emergency Fund can make 50 million dollars available for oil spill response each year. If necessary, this sum can be increased to 100 million dollars. The main source of revenue for the fund is the per-barrel oil product tax (0.05 dollars/barrel). It is collected from oil products produced or imported to the United States. In 2008, the tax was raised to 0.08 dollars per barrel. The fund has accumulated a capital of about 1.6 billion dollars (about 1.2 billion euros). In 2010, the maximum compensation per accident payable by the fund is one billion dollars. In 2007, GAO (the supreme external audit institution of the United States) drew attention to the limit of liability of the oil fund. Following the Deepwater Horizon spill in 2010, GAO highlighted the issue of the maximum limit of the compensation provided by the fund, after the accident clean-up costs had exceeded one billion dollars. The agency was of the view that the fund's capital base should be increased.

Regional rescue services have the right to receive compensation from the Finnish Oil Pollution Compensation Fund for the purchase of equipment and maintenance of response preparedness that is in accordance with the oil spill response plan approved by the Centre for Economic Development, Transport and the Environment. The fund may also provide the state with discretionary compensation for costs arising from the purchase of response equipment for oil spills from vessels and maintenance of response preparedness. During the past few years, the state has received substantially larger sums as compensation for equipment and preparedness than the rescue services (Table 3). The gap is even wider when comparisons are only made between compensations for the costs arising from equipment purchases (Table 4).

The audit showed that the rescue services have not considered this compensation ratio between rescue services and the state as a problem because the rescue services have received the compensations that they have sought. The compensation ratio has been based on the importance of off-shore oil spill response and there will probably be changes to the ratio in the future. This has allowed the Finnish Oil Pollution Compensation Fund to guarantee the development of the equipment and preparedness of the rescue services and to support the state in its purchases of oil spill response equipment and response preparedness.

Table 3. The costs paid by the Finnish Oil Pollution Compensation Fund to regional rescue services and the state for equipment purchases and preparedness (million euros).¹⁶⁴

Year	Regional rescue services	State
2009	3.76	5.00
2010	3.56	3.31
2011	5.51	19.20
2012	7.94	10.95

¹⁶⁴ *Final accounts of the Finnish Oil Pollution Compensation Fund 2009–2012. In addition to these sums, the fund has also provided a total of 1.88 million euros for training for rescue services in 2009–2012.*

Table 4. Equipment compensation paid by the Finnish Oil Pollution Compensation Fund (million euros).¹⁶⁵

Year	Regional rescue services	State
2009	1.67	5.00
2010	2.24	3.26
2011	3.94	19.20
2012	6.79	9.00



Figure 18. F-class oil spill response boat of the Helsinki City Rescue Department. The boat is equipped with integrated oil recovery systems. © Jouko Pirttijärvi.

¹⁶⁵ *Final accounts of the Finnish Oil Pollution Compensation Fund 2009–2012.*

3.6.2 Consideration has been given to the broadening of the financing base of the Finnish Oil Pollution Compensation Fund though the matter has not been discussed thoroughly enough.

The oil protection fee is a funding tax the purpose of which is to collect funds for the Finnish Oil Pollution Compensation Fund. The fee is collected for oil that is imported to or transported through Finland. The assets of the fund can be used for compensating for costs resulting from oil spills and costs arising from oil spill response preparedness. During the past few years, most of the compensations paid from the fund have been for costs arising from preparedness. Higher sums have been paid as discretionary preparedness compensations to the state than to regional rescue services. The raising of the oil protection fee has been justified by arguing that it would partially ensure the response preparedness of the state in a situation where the risk of oil spills in the Gulf of Finland is increasing. The higher risk is a result of the increase in Russian oil shipments.

The Finnish Oil Pollution Compensation Fund collected a total of between 20 and 25 million euros in oil protection fees each year in 2010–2012.¹⁶⁶ Based on the audit findings, Neste Oil Corporation is almost solely responsible for the accumulation of the fund's assets. In addition, the company is also burdened by the one-per cent contribution to the International Oil Pollution Compensation Funds (IOPCF). The profit of the Neste Group in the 2011 and 2012 financial years was about 160 million euros,¹⁶⁷ which means that the oil protection fee of about 20 million euros that it pays is fairly high relative to the profit. This has an impact on the company's competitive situation. Based on the audit findings, the oil sector approves the existing “basic oil protection fee” (50 cents/tonne) and is of the view that it is in accordance with the polluter pays principle. The oil sector is of the opinion that the higher fee (1.5 euros/tonne) is in violation of the principle as the growth in oil tanker traffic in the Gulf of Finland is the result of the increased traffic to and from the new oil ports in Russia. Finland's oil sector is of the view that it has to shoulder responsibility for a risk that it has not caused.

Under the Government proposal on the raising of the oil protection fee (HE 120/2012), no fixed-term increase will be proposed after 2015. When

¹⁶⁶ *The fund's balance sheet total for 2012 was 23.3 million euros. On 31 December 2012, the cash in hand totalled about 17 million euros.*

¹⁶⁷ *Neste Oil (2013).*

approving the Government proposal on amending the Act on Oil Pollution Compensation Fund on 7 December 2009, the Parliament called for the Government to examine the chances of broadening the financing base of the fund. The Ministry of the Environment examined the issue. However, no workable or economically sound solution for broadening the financing base was found.

In its report (YmVM 7/2012), the Parliamentary Environment Committee expressed the opinion that the existing system and the higher oil protection fee can *“as such be considered to be in accordance with the polluter pays principle even though the fee is based on oil imports and thus in practice only burdens a single company.”* In other words, one transport company was considered to be the sole cause of the risk. At the same time, however, the committee also emphasised that *“the need for preparedness by all Baltic Rim countries for the environmental accident risk arising from an oil spill and for combating it should be emphasised and international models for improving response preparedness should be promoted.”*

However, when the oil protection fee was raised for the first time in 2009, the Environmental Committee expressed the opinion that the costs that mainly arise from the increasing vessel traffic to and from Russia should not be made the responsibility of Finnish oil importers in their entirety. According to the committee's view *“securing adequate funding primarily by charging fees from oil importers is questionable in terms of the pollution pays principle.”*

In oil spill response preparedness, it is always the question of what kind of a risk society at large is prepared to accept. The political decision to maintain preparedness for a vessel oil spill of 30,000 tonnes gives an idea of the risk of preparedness in Finland. The accepted risk level determines the need for measures aimed at preventing the accidents and the need for response equipment and their costs. For example, if the Finnish level of vessel oil spill preparedness was 10,000 tonnes instead of 30,000 tonnes, the costs arising from the preparedness were also lower. In that case, the fees collected from the parties causing the risk would also be lower.

In principle, all preparedness costs should be directed at the parties causing the risk, which is the case with nuclear power plants. However, this is not possible in oil spills from vessels. The parties causing the oil risk on the Finnish coast and in the sea areas around Finland are mostly international operators and it is impossible or at least difficult to collect Finnish preparedness costs from them. From this perspective, Finland is facing an external threat that the state should be prepared for. Thus, the risk of an oil spill will remain even if no oil was imported to Finland.

It is also unclear whether the maritime transporters can be considered as the only domestic operators causing the risk or do such parties as end users of oil also contribute to the risk. For such reasons, it may be justified to cover at least part of the preparedness costs through taxes or to broaden the group of contributors. It is probably difficult to have any definite solution concerning the size of the proportion to be covered by taxes. It is important, however, that aspects that in terms of principle and in practical terms have an influence on the situation would be clearly presented so that it would be possible to make political decisions on the basis of publicly known arguments.

The Finnish Petroleum Federation has proposed that the payment grounds for the oil protection fee should be changed so that it would be directed at fuels delivered for consumption in Finland and would be levied in connection with domestic excise taxation. However, in its opinion on raising the oil protection fee,¹⁶⁸ the Ministry of Finance has concluded that the existing system of collecting the oil protection fee is workable and that the excise duties are universal taxes. In accordance with the budget principles, it is not practicable to earmark them for oil spill response in the state budget.

However, an excise duty type fee is already collected in Finland to support the security of supply.¹⁶⁹ Security of supply means the ensuring of the economic functions essential to the livelihood of the population, country's economy and national defence in all circumstances. This security of supply fee is collected by the Customs, and it is entered as an income for the National Emergency Supply Fund. The fee is levied on liquid fuels in connection with excise taxation.¹⁷⁰

According to the audit, when broadening the funding base of the Finnish Oil Pollution Compensation Fund was considered, for one reason or another the option of introducing a 'security of supply fee for oil spill response' was not examined in detail. The fee would broaden the funding base and it would also widen our perspective on the causes of risk. The acceptability of the fee to the citizens should also be assessed. The public might be quite willing to pay for improvements in oil spill response. According to one survey, it would be 55 euros/person (in 2011 money).¹⁷¹

¹⁶⁸ *Ministry of Finance (2012).*

¹⁶⁹ *On the website of the Ministry of Finance, the security of supply fee is not given as an excise duty on the list of duties and fees collected by the Finnish Customs.*

¹⁷⁰ *Customer Bulletin of the Finnish Customs no. 16, January 2013.*

¹⁷¹ *Hyytiäinen and Ollikainen (2012).*

3.6.3 The steering and activities of the Finnish Oil Pollution Compensation Fund could be improved

Decisions on the compensations paid from the Finnish Oil Pollution Compensation Fund are made by the fund's board. The board comprises representatives of the Ministry of the Interior, Ministry of Finance, Ministry of the Environment, nature conservation and environmental protection organisations, the oil sector and the Association of Finnish Local and Regional Authorities. The board chair is impartial and does not represent any of the parties involved in oil spill matters. The board decisions are drafted by a working division. Preliminary decisions are made on purchases exceeding 85,000 euros. Representatives of the Finnish Environment Institute and regional rescue services act as experts in the fund.

The Finnish Oil Pollution Compensation Fund has very limited resources (normally less than two person years). Operating expenses are also small. For example, according to the fund's final accounts they totalled 133,000 euros in 2012. Between 2010 and 2012, the fund's liquid assets varied between 15 and 22 million euros.

The way in which the Finnish Oil Pollution Compensation Fund is organised has the following advantages:

- Different stakeholders and their oil sector expertise are available to the fund.
- The chair is independent of the stakeholders.
- Experts representing regional rescue services also provide the fund with expertise in local matters.
- Administrative costs are small.

There is a potential shortcoming in the composition of the fund's work division: it does not have any representatives of non-governmental organisations as members. According to the audit findings, this means that the board member representing a non-governmental organisation does not always have as much time to examine the decision-making material as the other members.

In the interviews conducted for the audit, representatives of the regional rescue services criticised the slowness of the decision-making in the Finnish Oil Pollution Compensation Fund. According to the criticism, there is a backlog of decisions and the rescue services are not notified of the preliminary decisions on time. Even though the Ministry of the Environment does not conclude a performance agreement with the fund, in its opinion on the fund's final accounts (on years 2010, 2011 and 2012) it has laid out that the fund “*should process the compensation claims in*

an average of nine months and in half of the cases, in six months.” This target was reached in 2011 even though in nearly 20 per cent of the claims, the processing took more than 12 months. The target set was also achieved in 2012. Moreover, there was a reduction in the number of claims received during the year that were not processed. However, in ten per cent of the claims, the processing took more than 12 months.

In its audit on the steering system of the administrative sector of the Ministry of the Environment,¹⁷² the National Audit Office drew attention to the low level of steering of the Finnish Oil Pollution Compensation Fund. This creates a risk that less attention is paid to the fund assets than to the appropriations in the state budget and the use of the assets may not, in terms of performance, be controlled as efficiently as the appropriations in the state budget. In its opinions in the steering system audits, the National Audit Office concluded that the fund should have clear and measurable performance targets and that the ministry responsible for the steering of the fund should conclude a performance agreement with it.

The Finnish Oil Pollution Compensation Fund measures the economic efficiency and productivity of its operations. Moreover, the quality of the decisions has been measured on the basis of the rectification requests concerning the decisions. Based on the key figures on economic efficiency and productivity, the conclusion is that the fund's efficiency improved between 2010 and 2012.¹⁷³ This means that at least the information on performance measurements would not prevent the Ministry of the Environment from taking a stronger steering approach.

In its opinion on the Finnish Oil Pollution Compensation Fund's 2009 final accounts, the Ministry of the Environment drew attention to the development of the management of the fund's cash flow. The management and planning of the fund's cash flow is a problem because the exact accumulation of fees cannot always be known in advance and neither is it always clear whether the approved response plans can be put into effect.

The audit has highlighted that the Finnish Oil Pollution Compensation Fund does not have any financing strategy but that the decisions are made on a case-by-case basis. The Ministry of the Environment has also drawn attention to this in its opinions on the 2010 and 2011 final accounts. However, the fund has planned how the revenue generated by the raised oil protection fee for 2010-2012 can be allocated to purchases by the state

¹⁷² *NAOF (2011).*

¹⁷³ *Final accounts of the Finnish Oil Pollution Compensation Fund 2010, 2011 and 2012.*

and which proportion of the revenue is used for paying compensations to regional rescue services.¹⁷⁴ The fund has presented a number of priorities in its financial planning and operational and financial plans.

From time to time, the board of the Finnish Oil Pollution Compensation Fund has issued resolutions on such matters as purchases for which compensation is paid and purchases for which no reimbursement is provided. This also means that the fund has defined what is meant by oil spill response. According to the regional rescue services, the problem is that compensation is not always paid for logistics systems. However, the development of logistics can speed up the start of the response operations, which is the principle guiding Finland's oil spill response policy.

The audit highlighted the issue of whether the funding for the Finnish Oil Pollution Compensation Fund could also be used for concluding service contracts covering response for oil spills from vessels. This would mean the chance to “book” Arctia Shipping's multi-purpose ice breakers that are equipped with oil spill response equipment for oil spill response tasks¹⁷⁵ or to conclude a service agreement with a private company on the use of a mobile thermal desorption unit (see chapter 3.5.5). The negative opinion of the fund on the basis of the audit is based on the fact that the fund is not able to guarantee such agreements in terms of their duration. The matter also involves the issue of organising the tendering process.

Parkki is a claim administration system used by the Finnish Oil Pollution Compensation Fund. The system processes the applications for preliminary decisions and claims for compensation arising from the cost of oil spill response and oil spill preparedness and the cost of cleaning oil-contaminated soil that are submitted to the Finnish Oil Pollution Compensation Fund. The decision documents prepared on the applications and claims are also generated through the Parkki system. In addition to the Finnish Oil Pollution Compensation Fund, the Parkki system is also used by regional rescue services and ELY Centres. However, municipalities do not use the system. Based on the interviews conducted for the audit, the Parkki system does function as a transfer instrument in payments traffic but does not serve planning. No electronic system based on approved response plans has been created for the Finnish Oil Pollution Compensation Fund as each plan is drawn up separately on paper.

¹⁷⁴ *Final accounts of the Finnish Oil Pollution Compensation Fund for 2011 and 2012.*

¹⁷⁵ *In the interviews conducted for the audit, Arctia representatives proposed that the companies would be responsible for the equipment costs.*

The compensation claims are processed in the fund on a rescue-service basis and in accordance with the oil spill response plans prepared at different times. According to the audit observations, this means that there are only limited chances for efficient joint use of the equipment of different rescue services. A requirement that the equipment for which compensation is provided must be used jointly by regional rescue services would provide a cost-effective solution.

The Finnish Oil Pollution Compensation Fund has been working on the development of its activities. In 2010, a senior inspector was employed for the development work on a fixed-term basis. In 2011, the fund was planning to prepare a guide on its activities and the compensations that it pays. In the report on operations included in the 2011 final accounts, it was stated that “*work on the guide was all but completed*”. However, it was noted in this audit that the guide has not been published. The persons interviewed for the audit expressed the hope that the Finnish Oil Pollution Compensation Fund would develop its guidelines concerning the compensation claims.

As the fund has only limited personnel resources, division of labour with ELY Centres should be considered. The current division of roles could be described as follows: The Finnish Oil Pollution Compensation Fund provides the funding and makes the decisions, while the ELY Centres assess risks and determine the compensation rates but do not make any decisions. One option would be to give the ELY Centres more decision-making powers concerning the claims submitted by 'small' rescue services, in which case the board of the Finnish Oil Pollution Compensation Fund would only make decisions on major projects. As part of this, raising of the current limit for preliminary decisions (85,000 euros) should be considered. Transferring decision-making powers to ELY Centres would require training for their staff. At the same time, the audit revealed that the personnel resources allocated to oil spill response at ELY Centres are also limited.

The Act on Discretionary Government Transfers (688/2001) contains provisions on the grounds and procedures observed in the granting of discretionary government transfers. Discretionary government transfers mean support funding for assisting specific activities or a specific project. The act is also applied to discretionary government transfers granted from the funds of an off-budget state fund. Section 15 of the act lays down provisions on the supervisory duties of the state aid authorities. The authorities must ensure appropriate and adequate supervision of the discretionary government transfers by obtaining information on their use and monitoring and other information as well as carrying out inspections as necessary. It was revealed in the audit that the Finnish Oil Pollution

Compensation Fund does not collect such information or carry out inspections. The fund has, however, made a small number of recovery decisions each year.¹⁷⁶

As regards the external communications of the fund, it can be noted that the Finnish Oil Pollution Compensation Fund published its final accounts. In the report on final central government accounts (2011) and the Government's annual report (2012), the Ministry of the Environment only describes the expenditure and revenue of the fund and does not discuss its operations from the perspective of their effectiveness, for example.

3.7 Overall costs and liability for damages in an oil spill from a vessel

3.7.1 The total costs of an oil spill can be high

The costs resulting from an oil spill from a vessel are usually divided into three categories. They are response and clean-up costs, socio-economic costs and intangible environmental and other costs. The response and clean-up costs include the costs arising from the accident-related services provided by the authorities, towing, oil spill response and oil recovery. The response and clean-up costs also include the investigation costs resulting from the accident, which may be quite high as they arise as a result of many years of follow-up. The costs arising from the transport, intermediate storage and disposal costs of oil waste from vessels are often treated separately from the recovery and clean-up costs. However, they are an essential part of the overall costs of an oil spill from a vessel.

Oil has an impact on nature in the area and thus also on recreational opportunities and industries based on natural resources, especially fishing and fish farming (lost catches and smaller fish populations) and on tourism (reduced volumes). Oil-stained beaches may also temporarily lower property values. An oil spill may also have an impact on the operations of power plants (especially on the cooling water of nuclear power plants), maritime traffic and ports.¹⁷⁷ Any costs arising from injuries and deaths and loss of cargo should also be taken into account. Socio-economic costs mean such costs that have a market price.

¹⁷⁶ Under the Act on the Oil Pollution Compensation Fund (1406/2004), the Act on Discretionary Government Transfers is applied to the discretionary compensations and grants paid from the fund.

¹⁷⁷ ITOPF (2012d).

Intangible environmental costs (such as the non-availability of the areas for recreational use and negative ecological impacts) do not have any market price but they can nevertheless be estimated on the basis of different environmental-economic methods. Such costs may be significantly higher than the response and clean-up costs or the socio-economic costs. For example, according to a Norwegian study, intangible costs arising from an environmental accident are twice as high as the response and clean-up costs.¹⁷⁸ It has also been suggested that the socio-economic and intangible environmental costs are two and a half times higher than the response and clean-up costs.¹⁷⁹ It has been estimated that the overall long-term costs of the accident involving the oil tanker Prestige were eight and a half times higher than the costs arising from the response and clean-up operations.¹⁸⁰

There are many factors impacting the costs of an oil spill from a vessel. The most important of them are the amount and type of the oil released into sea and the time that it takes before the oil washes ashore - the size of the oil spill is the most important of these factors.¹⁸¹ Naturally, the sensitivity of the area affected by the oil spill and the economic and environmental importance of the contaminated areas are also essential factors.¹⁸² Even a small accident may have disastrous consequences if it occurs in a particularly sensitive area and during a sensitive time of the year. Spring is the most difficult season as in cold water oil evaporates and is dispersed only slowly and in that case it may spread over a wide area. Moreover, the impacts on the ecosystem may be substantial as many organisms spawn and breed in spring.¹⁸³

Ice can be both an advantage and a disadvantage; it may keep the oil in one place for long periods of time but locating and recovering oil from beneath the ice may be difficult. The costs of an oil spill from a vessel also depend on the degree of cloudiness (which has an impact on the evaporation of oil) and the type of the accident. Other factors are the level of preparedness, speed of operations and the workability of the management arrangements.¹⁸⁴

¹⁷⁸ *Jean-Hansen (2003).*

¹⁷⁹ *Kontovas et al. (2011).*

¹⁸⁰ *Liu and Wirtz (2006).*

¹⁸¹ *Weckström (2012).*

¹⁸² *Hasselström et al. (2012).*

¹⁸³ *Finnish Maritime Administration (2008).*

¹⁸⁴ *For example, Etkin (1999) and (2000), Kontovas and Psaraftis (2008), Shahrian and Frost (2008), Liu and Wirtz (2009).*

A report produced by the Finnish Maritime Administration in 2008 put the average costs of oil spill response and clean-up at 10,000 euros/tonne of released oil.¹⁸⁵ This was also the conclusion of the working group examining the preparedness planning of the management of the response to major oil spills from vessels. The estimate is based on the response costs of an oil spill of 30,000 tonnes and consideration has been given to the operational equipment and personnel costs incurred by the state and the rescue services but no consideration has been given to such matters as waste transport and handling costs. According to the estimate, wages and salaries of the personnel required for the shoreline clean-up would be the largest cost item. If it is assumed that the shoreline response operations last for a total of seven months, the mere personnel costs arising from the shoreline clean-up would be about 285 million euros. Overall response costs would be 323 million euros or about 10,800 euros/tonne of released oil.¹⁸⁶

The per tonne cost of 10,000 euros is in line with the results of a number of international surveys.¹⁸⁷ In most of the surveys, the response costs for 5,000 tonnes of medium oil are put at between 35 and 47 million euros or between 7,000 and 9,400 euros/tonne. According to most estimates, the costs of a crude oil spill of 30,000 tonnes, which is also the basis for Finland's preparedness plans, would be between 100 and 300 million euros or between 3,500 and 10,000 euros/tonne.¹⁸⁸ According to Norwegian and Danish studies, the response and clean-up costs of an oil spill of 30,000 tonnes would be between 272 and 504 million euros (at current prices) or between 9,000 and 17,000 euros/tonne.¹⁸⁹

At the same time, however, it has been estimated in the SÖKÖ project¹⁹⁰ that if the off-shore response operations were a complete failure, an oil spill of 30,000 tonnes occurring in the Kymenlaakso region would result in 1,600 kilometres of polluted shoreline and 2.2 million litres of oil-

¹⁸⁵ *Finnish Maritime Administration (2008).*

¹⁸⁶ *Ministry of the Environment (2011).*

¹⁸⁷ *Weckström (2012).*

¹⁸⁸ *For the destruction caused by the oil tanker Erika stricken in 1999, about 10,600 euros/tonne were sought as compensation from the international compensation funds. However, as a result of the accident involving the oil tanker Prestige off the Spanish coast, about 18,800 euros/tonne were sought as compensation (if the leaked amount was 60,000 tonnes) or 28,300 euros/tonne (if the leaked amount was 40,000 tonnes).*

¹⁸⁹ *Søfartsstyrelsen og Farvandsvæsener (2002), Jean-Hansen (2003), Skjong et al. (2007).*

¹⁹⁰ *Halonen (2007).*

containing waste per kilometre. The mere clean-up of the oil recovered from the shores would cost about 1.5 billion euros.

From the perspective of response operations it can be concluded that off-shore response is much cheaper than the clean-up of shores. According to a Finnish rule of thumb, shoreline clean-up is at least ten times more expensive than off-shore response.¹⁹¹ According to the theoretical calculations made as part of the national oil spill response preparedness plan, the use of oil spill response vessels and aircraft in a vessel spill of 30,000 tonnes would cost about 4.2 million euros, the use of rescue boats about 2.4 million euros and the mere personnel costs of the shoreline clean-up about 285 million euros.¹⁹²

Studies have shown that the estimates of the total cost of oil spills are highly dependent on situation-specific factors, such as the nature of the recreational use and the extent of commercial fishing.¹⁹³ The large number of holiday homes on the shores can be considered a factor typical of Finland, which means that the harmful impacts will affect a large number of private households.

Different mathematical models have been developed for assessing the total costs of oil spills from vessels. There are differences between them in such areas as the basic material used and the linear proposition between the costs and the size of the oil spill.¹⁹⁴ Many of the models suffer from the limitation that the material used in them is based on the material of the International Oil Pollution Compensation Funds (IOPCF), which in fact only describes the compensation paid. Thus, intangible losses of wellbeing that do not have any market price are not included in the calculations. In other words, the models underestimate the overall costs affecting society at large.¹⁹⁵

The size of the overall costs of an oil spill from a vessel can also be approached by examining what would be rational cost of preventing the oil spill. Using this CATS (cost of averting a tonne of oil spilt), it has been suggested that the cost impact estimate of one tonne of oil would be

¹⁹¹ *Finnish Maritime Administration (2008).*

¹⁹² *Ministry of the Environment (2011).*

¹⁹³ *Hasselström et al. (2012).*

¹⁹⁴ *For example, Gucma and Goryczko (2008), Yamada (2009), Kontovas et al. (2010), Yamada and Kaneko (2011), Kontovas et al. (2011).*

¹⁹⁵ *In an extreme but real-life example, the sums paid as compensation for the damage caused by the accident involving the oil tanker Prestige off the Spanish coast in 2002, only covered 2 per cent of the estimated long-term costs of 8.5 billion euros (Liu and Wirtz (2006)).*

54,000 euros.¹⁹⁶ Thus, up to this limit it is profitable for the party transporting the oil to invest in the prevention of oil spills when the matter is analysed on a cost-benefit basis.¹⁹⁷ In the estimates, consideration is also given to a “safety coefficient”, which describes the willingness of society at large to pay for the prevention of an oil spill from a vessel.¹⁹⁸ From this perspective, an oil spill of 30,000 tonnes (to which Finland has prepared in its vessel oil spill strategy) could result in total costs of 1.62 billion euros. This is much more than the maximum compensation (about 859 million euros) that could be claimed from the international compensation funds (IOPCF).

One way of presenting concrete cost information to decision-makers is to produce regional cost scenarios. They are based on the fact that a vessel accident occurs in a specific region in specific scale. Assumptions can also be made of the success of off-shore response or the amount of oil washing ashore. Using this information, different types of costs can be realistically calculated on the basis of information collected from different regions and overall costs produced. Regional scenarios are also important in the management of the response operations as decisions on the targeting of the operations can be made on their basis. However, based on the audit findings, no such regional cost scenarios have been made in Finland.

In 2007, SSPA Sweden AB produced a scenario assessment¹⁹⁹ in which the assumption was that a total of 30,000 tonnes of oil would be released into the sea in a collision between a Russian oil tanker carrying 30,000 tonnes of crude oil and a cargo vessel off Stockholm. A total of 10,000 tonnes of this amount could be contained, while 20,000 tonnes would pollute the coast and the archipelago. Only some of the socio-economic costs could be estimated in the report. They were put at 880 million crowns (94 million euros).²⁰⁰

¹⁹⁶ Vanem et al. (2008) and Psarros et al. (2011).

¹⁹⁷ This is in accordance with the optimising marginal cost-marginal benefit principle described in economics.

¹⁹⁸ The problem with the models is that the general willingness to pay for risks, for which it is difficult to give an objective definition, is used as the coefficient. The figure depends on the level of risks acceptable to society at large and on how society at large values intangible values. Thus it must be defined at political level and not by experts.

¹⁹⁹ SSPA (2007).

²⁰⁰ Calculated on the basis of exchange rates on 1 June 2007.

In another Baltic Sea oil spill scenario the assumption was that the weather conditions would prevent the response vessels from operating.²⁰¹ 'Only' 5,000 tonnes of Russian crude oil would be released into the sea.²⁰² Intangible costs were not examined in the report. The result was that, depending on the region,²⁰³ the response, clean-up and socio-economic costs would be between 100 and 400 million euros (in 2012 prices). Overall costs could be (theoretically) estimated by using the already presented 'safety coefficient' describing the intangible effects. For example, if the coefficient was set at two²⁰⁴ overall costs would be between 300 and 1,200 million euros.

What are the preparedness costs of the management of oil spills from vessels? There is no easy answer to this question. Estimates have been made of the operational costs of the response vessels and the personnel costs arising from shoreline clean-up. However, no calculations on such matters as the costs of the measures preventing oil spills from vessels have been made and the making of such calculations is not simple or clear cut. Such calculations should include some of the costs of the operations of the Vessel Traffic Centre and costs arising from pilotage, vessel inspections and aerial surveillance. In the preparedness costs, consideration should also be given to the costs incurred by rescue services and voluntary organisations. Moreover, overall preparedness costs also include the costs arising from the investment into response vessels and equipment accrued over time. Even though it is not easy to estimate preparedness costs, cost information is important so that the decisions concerning the oil spill response strategy can be made as cost-effectively as possible.

3.7.2 International compensation system does not cover all costs

Primary responsibility for the costs resulting from an oil spill from a vessel and spill response always lies with the owner of the vessel. However, the liability is not unlimited. The P&I Club (insurance companies of the oil tanker) will probably quickly establish a limitation

²⁰¹ SERI (2012).

²⁰² The assumption was that there would be 10,000 tonnes of oil emulsion that will contaminate 500 kilometres of shoreline.

²⁰³ Blekinge and Skåne in Sweden and the Baltic coast of Poland.

²⁰⁴ Thus, intangible costs would be twice as high as the combined response, clean-up and socio-economic costs.

fund at a competent national court, which will limit their liability. The limitation of liability is based on the CLC Convention.²⁰⁵

The vessel oil spills that have occurred in different parts of the world show that initially, the P&I Clubs will only pay the injured parties urgent and essential compensations. The P&I Clubs have usually only started paying more substantial compensations after they have established a limitation fund and after the Executive Committee of the International Compensation Funds (IOPCF) has met and decided in principle that the Fund Convention will be applied to the vessel accident in question.

According to the compensation guidelines of the International Compensation Funds, the claimant must detail the amount of its costs, loss or damage using appropriate documents or other evidence (such as receipts, time lists, reports and photographs).²⁰⁶ This means that the burden of proof rests with the claimant. The loss must also be economically quantifiable. The claimant must also have incurred the losses. Thus, for example, a drop in the price of shoreline plots is not a valid ground for compensation unless the drop in the price can be proven. In practice, no compensation has ever been paid from the funds on the basis of the lowering of the price of land.²⁰⁷ The compensatory measures must also be reasonable and justified. The funds do not pay any compensation for 'excessive response'. If the state or municipalities want to clean up the shores more thoroughly than would be reasonable in the view of the funds, this can be done but it must be at the expense of the state or the municipalities in question.

In order to ensure the payment of compensation and quick processing of the claims, it is important that the expenses concerning oil spill response are thoroughly documented. According to IOPCF, the period of time between the accident and the payment of the compensation may be long and for this reason it is important that the claims are submitted as quickly as possible after the accident. In the funds' view, one cannot overemphasise the importance of documenting the expenses arising as a result of the oil spill.

The claims for compensation received over the years show that the process is arduous for both the claimants and the funds. The funds prefer negotiations when disagreements arise and try to avoid court proceedings.

A large number of organisations may be involved in oil spill response in Finland. As a result, the expenses involve a large number of documents,

²⁰⁵ See chapter 2.1.5.

²⁰⁶ IOPCF (2008).

²⁰⁷ IOPCF (2013).

such as tenders, lease and purchase receipts, agreements and notifications of arrival. According to the compensation funds, it is important that an appropriate system for recording them is established as soon as possible after the accident. This also makes it easier to prepare an estimate of the costs of the response operations.

In major accidents there may be hundreds or thousands of compensation claims. As a result, the time required for processing them may also become longer. According to the compensation funds, most of the claims are processed within a period of three years.

The financial administration of vessel oil spill response operations was discussed as part of the financial administration module of the SÖKÖ project.²⁰⁸ It is emphasised in the manual that good accounting is the key to the payment of compensation. The problem of proving that indirect costs are part of the expenses arising from the vessel oil spill response operations is recognised as a challenge.

Any party (be it individual or a state) that has suffered from an oil spill may submit a compensation claim to the shipowner and its insurance company and to the international compensation funds. In practice, those who are liable are in close cooperation with each other and in major accidents they usually establish a joint office at the site.

The funds pay compensation for costs arising from

- clean-up and the containment of the spread of the spill (including the cleaning of oiled animals)
- damage to property
- indirect losses (effects on business)
- direct economic losses
- environmental damage (reasonable expenses arising from the measures that speed up the recovery of nature from the environmental damage)
- the use of advisors in connection with the claims.²⁰⁹

If the total costs of an oil tanker accident are divided into response costs, socio-economic costs and intangible environmental costs, it can be said that the IOPCF mainly compensates for response costs and, to some extent, business losses coming under socio-economic costs.²¹⁰ The costs to be compensated may include personnel costs, response equipment costs, property costs, economic losses and even such items as tourist advertising

²⁰⁸ SÖKÖ II 6 (2011).

²⁰⁹ IOPCF (2008).

²¹⁰ Liu and Wirtz (2006), Kontovas et al. (2010).

campaigns aimed at restoring the reputation of the area as a tourist destination after the accident.²¹¹

The supreme audit institutions of United Kingdom and the Netherlands have drawn attention to the fact that it has been difficult for governments to get compensation from the international compensation funds.

A great deal of criticism has been levelled at the funds. From the perspective of the audit, attention should at least be drawn to the following.²¹²

- Compensation can be paid for direct costs (such as lost oil and equipment, clean-up costs) and for market-based costs that are dependent on natural resources (fishing, tourism). No compensation is paid for costs with no market price.²¹³ These include the impact on scenery or the inability to enter ecologically important areas and the loss of recreational values dependent on them. In this respect, it may also be a question of temporary losses.²¹⁴
- Payment of the compensation may be a protracted process. In major accidents, the processing of the claims may last up to ten years.
- There is no certainty that all compensations are paid as not all claims are accepted. One reason for this is the principle of 'reasonable' compensation, which is vague.
- In major accidents the maximum compensation limit of the funds may be exceeded.
- The administrative process may last for years after the oil has been removed from the shores.
- The international compensation system only covers crude oil and oil tankers. An oil spill may also be caused by the bunker fuel of a cargo or passenger vessel. Such accidents come under the Bunker Convention (Finnish Treaty Series 3/2009), which has also been signed by Finland. Under the convention, the injured party would only be guaranteed compensation from the vessel owner's P&I Club.

As no compensation is paid for intangible losses, it can be said that the international compensation system favours risk taking in oil transports and

²¹¹ *ITOPF (2012i).*

²¹² *Wren (2000), Faure and Wang (2003), García Negro et al. (2007), Kontovas et al. (2010).*

²¹³ *Even though they do not have any market value, they are nevertheless important in terms of well-being and from the societal perspective they mean less well-being.*

²¹⁴ *Fejes et al. (2011).*

the polluter pays principle does not work.²¹⁵ In a major oil spill from a vessel, the compensation liability of the ship's owner is relatively small in relation to the damage that may be caused by the accident. The main reason for the unworkability of the polluter pays principle is that specific parties involved in the operations of the vessel (such as the charterer and the operator) are, as a rule, exempted from liability unless it is a question of an act causing damage or negligence on their part that results in losses.²¹⁶

The sums paid as compensation in connection with a number of major oil spills from vessels in relation to the claims are shown in Table 5. An extreme example of the ratio of the compensations to the total costs is the oil spill caused by the oil tanker *Prestige*. The tanker was broken in two off the Spanish coast in November 2002 and a total of 63,000 tonnes of its heavy oil cargo was released into the sea. Response and clean-up costs account for most of the total claims shown in the Table 5.²¹⁷ The short-term total cost of the accident was estimated at 2.25 billion euros and the long-term costs at 8.5 billion euros.²¹⁸ A total of 172 million euros were paid in compensation. This is two per cent of the actual long-term total costs.

Table 5. Examples of claims filed with IOPCF and compensations paid (IOPCF 2011).

	Amount of oil released into the sea	Total claims submitted	CLC & Fund limit	Compensations paid (situation in 2011)
Erika 1999	19,800 tonnes	389 million euros	184 million euros	117 million euros (30%)
Prestige 2002	63,200 tonnes	1,150 million euros	172 million euros	114 million euros (10 %)
Hebei Spirit 2007	10,900 tonnes	1,675 million euros	206 million euros	79 million euros (5 %)

²¹⁵ *Garza et al. (2009), Hasselström et al. (2012).*

²¹⁶ *Särkkä and Tuomainen (2013).*

²¹⁷ *Liu and Wirtz (2006).*

²¹⁸ *All costs (including the estimated intangible environmental costs) are contained in the figures.*

One study has examined five oil spills from vessels that occurred between 1978 and 1999 in which between 13,500 and 220,000 tonnes of oil was released into the sea.²¹⁹ The length of shoreline polluted by oil varied between 40 and 400 kilometres. The compensation rate was between 4 and 61 per cent. The differences between compensation rates were explained by the fact that in damage costs the burden of proof lies with the injured party and the IOPCF demands thorough documentation and the presentation of causal relationships.²²⁰

Based on the material obtained from the Finnish Environment Institute, the compensation rates for oil spills from vessels paid to Finland by the parties liable to pay compensation (shipping companies, limitation of liability funds of the shipowners and P&I liability insurers) were calculated for the audit. The Russian tanker Antonio Gramsci caused the most serious oil spill to date in the Finnish waters in 1987. The claim presented by the then National Board of Waters and the Environment was slightly more than 21 million marks (about 3.5 million euros) and the compensation rate was 46 per cent. The compensation claims for the eight oil spills that occurred in the 1990s varied between 270,000 and 2.5 million marks. Depending on the case, the compensations paid have covered three quarters of the damage (70–76 per cent). In all four oil spills that have occurred in the 2000s, the claims have been less than 50,000 euros. In all cases, the compensation rate has been 100 per cent, which means that the sums claimed have also been paid. Thus, so far Finland has been fairly successful in getting compensation in minor oil spills from vessels. At the same time, however, international experience shows that especially in major oil spills from vessels, the compensation rates may remain low.

3.7.3 Municipalities do not have enough information on how to file claims

In addition to the state and regional rescue services, municipalities also incur costs as a result of oil spills from vessels. The Finnish Environment Institute has drawn up cost-calculation guidelines for ensuring the

²¹⁹ *Thebaud (2004).*

²²⁰ *Strategic action by the injured parties in the claims process was important for the payment of compensations. This worked in situations where the injured parties acted collectively (for example, established an association of injured parties or used a joint agent) even though in the end the compensation funds considered the claims of each injured party individually.*

recovery of oil spill response costs.²²¹ It lays out how the costs arising from vessel oil spills should be calculated. The cost-calculation manual intended for municipalities is attached to the guidelines.

According to the guidelines, direct funding of oil spill response costs incurred by regional rescue services and municipalities should come from the Finnish Oil Pollution Compensation Fund when the costs exceed the funds available to them. Rescue services and municipalities may receive advance compensation from the fund. If the funds of the Finnish Oil Pollution Compensation Fund are insufficient for providing temporary compensation for the response costs it should be examined whether the invoices filed by the rescue services and the municipalities could be paid directly from state funds or first from the funds of the rescue services and the municipalities. According to the guidelines, the response costs arising from major oil spills can be so high that they may cause rescue services and municipalities payment problems. In such cases, the Finnish Oil Pollution Compensation Fund could assist municipalities in the covering of the oil spill response costs. Municipalities may also recover costs from the International Compensation Funds. According to the interviews conducted for the audit, the Association of Finnish Local and Regional Authorities is, however, of the view that municipalities would not get help from International Compensation Funds.

In the telephone interviews with representatives of municipalities on the Gulf of Finland made for the audit, it became clear that the financial administrations of the municipalities were not aware of the cost calculation guidelines of the Finnish Environment Institute or the SÖKÖ financial administration guidelines. Neither had the municipalities considered the organisation of financial administration in connection with oil spills from vessels. The setting up of separate accounting for oil spill response was considered easy and it was compared with the separate accounting for EU projects. However, such issues as the entry of person hours on the project could pose problems.

According to the recommendations of the SÖKÖ financial administration guidelines, practising oil spill response operations should also include the preparation of compensation claims and oil spill response accounting. According to the audit results, this has not yet been done. In the light of the audit results, it appears that the circle of those taking part in oil spill response exercises should be extended by strengthening the involvement of those municipalities that are willing to take part. The exercises would allow the municipalities to assess their chances to assign

²²¹ *Jolma (2010)*.

personnel to oil spill response duties and the impacts of this on the other activities of the municipality, or the financial administration and accounting related to oil spill recovery operations. The experiences gained during the exercises could promote the development of preparedness planning in the municipalities.

3.7.4 In major oil spills from vessels, help would also have to be sought from supplementary state budgets

If the total sum payable under the international vessel oil spill compensation system is estimated to exceed the maximum limit payable by the fund in question, the fund will decide that initially the injured parties will only receive a specific part of the approved costs that they have incurred. During the last few years, it has become customary that the states that have incurred damage only file claims for full compensation after it has become clear that private injured parties will receive full compensation from the fund.²²²

In Finland, the injured parties and the parties that have accumulated compensable costs may, depending on their status, submit claims for compensation to the Finnish Oil Pollution Compensation Fund or the Finnish Environment Institute (variable annual appropriation for the prevention of environmental accidents). These two bodies compile claims to the P&I Club and the international compensation funds using the claims that they have received and that have been paid as a basis. In practice, the payment of the compensation from the Finnish Oil Pollution Compensation Fund can start in less than two weeks of the oil spill. In major oil spills from vessels, the Finnish Environment Institute and the Finnish Oil Pollution Compensation Fund need additional resources for processing the claims and for invoicing them.

If the funds of the Finnish Oil Pollution Compensation Fund are inadequate for paying such compensations payable from the fund to which the recipient is entitled, the required funds may under section 25 of the Act on the Oil Pollution Compensation Fund (1406/2004) be transferred from the state budget to the Finnish Oil Pollution Compensation Fund. The transfer from the state budget to the fund requires a budget or supplementary budget procedure. The size of the funding requirement depends on the size of the vessel oil spill costs, accumulation of the response costs, the amount of the compensation to be paid to the injured

²²² *This is also the view of the IOPCF.*

parties, the urgency of the payments, and on how quickly the compensation process managed by the P&I Club representing the vessel and the international compensation funds will start.

Section 7(2) of the State Budget Act (423/1988) contains provisions on the prerequisites for the exceeding of variable annual appropriations. Permission to exceed the variable annual appropriation may be granted if the excess is based on a need laid down in or comparable to a law or other compelling unforeseen need or a need that is difficult to estimate or a higher than estimated rise in the general cost level and the need for an appropriation cannot be covered in any other way. As the response costs of a major oil spill from a vessel consist of the operations laid down in the Act on Oil Pollution Response and the initial cost cannot probably be covered by the insurance company of the vessel or in the international compensation funds, the grounds for granting the permit would probably be met. In such cases, the Finnish Environment Institute would prepare a proposal to the Ministry of the Environment on the need to exceed the variable annual appropriation and the grounds for it. The head of the response operations and the environmental accident unit of the Finnish Environment Institute are responsible for submitting to the Ministry of the Environment the cost estimates and other expert assistance required for the proposal. The Ministry of the Environment grants the permit to exceed the appropriation after the Ministry of Finance or (if the appropriation needs to be exceeded by more than five million euros) the Cabinet Finance Committee has submitted an opinion on the matter.

In major oil spills from vessels, the exceeding of the appropriation would probably be so substantial in relation to the original appropriation allocated for the oil spill response that the additional need would have to be included into a supplementary state budget proposal submitted to the Parliament at a later date. If in the supplementary state budget, the Parliament increases the appropriation in question, the amount approved as part of the earlier authorisation will be included in the higher appropriation approved the Parliament.

Is accelerated supplementary budget procedure possible? An example of the accelerated supplementary budget procedure is the supplementary budget of 1.6 billion euros approved by the Parliament on 12 May 2010, under which Finland prepared to pay its contribution of the three-year financing package for Greece.²²³ The project was initiated after Greece

²²³ *Second supplementary budget for 2010 (349/2010).*

had submitted an official loan request on 23 April 2010 and the finance ministers of the euro area agreed on the activating of the loan programme in their meeting on 2 May 2010. On 3 May the Government submitted a proposal for an appropriation increase of 1.6 billion euros to the Parliament. The intention was that the Parliament would consider the proposal for the second supplementary state budget as quickly as possible. The approval process of the supplementary state budget in the Parliament took only nine days.

There are also provisions on the supplementary budget in the Emergency Powers Act (1552/2011), which contains provisions in the powers of the authorities during emergencies. One emergency referred to in the act is a major disaster and its immediate aftermath. Under section 89 of the act, the Government proposal for a supplementary state budget submitted to the Parliament during an emergency will already be applied before the Parliament has decided on the supplementary state budget if the Parliament agrees to this. It is however, uncertain whether the act would be applied in major oil spills from vessels in the Gulf of Finland as they will probably not involve major losses of human life and the country or a major part of the country would not be affected.

Appendices

Appendix 1. Audit criteria.

1. Ex-ante regulation

A. Aim: Control and supervision of shipping leads to a reduced accident risk and the operations are cost-effective.

Vessel Traffic Service (VTS)

Audit criteria:

- reduction in the number of vessel accidents
- cost-effectiveness: ratio of the probable costs of prevented accidents to operating costs (if calculable).

Vessel safety control

Audit criteria:

- effectiveness: ratio of vessel inspections to the targets set
- cost-effectiveness: ratio of the achievement of the targets to costs (if calculable)

Pilotage

Audit criteria:

- number of accidents (as small as possible) when the pilot is on board
- effectiveness: ratio of the effectiveness of pilotage to costs (if calculable)

B. Aim: Preliminary oil spill response measures are appropriate and effective.

Aerial surveillance

Audit criteria:

- effectiveness: ratio of the aerial surveillance hours to the targets set
- technical level of the equipment and surveillance instruments.

Oil spill response plans

Audit criteria:

- plans have been prepared (yes - no)
- plans are up to date (updates)
- plans are in accordance with guidelines
- plans are appropriately prepared
- steering impact of the plans.

Operating models for different sectors of managing oil spills from vessels

Audit criteria:

- operating models have been prepared (yes - no)
- comprehensive models have been prepared for different sectors and regions.

Oil spill response training

Audit criteria:

- training is on a systematic basis (a programme has been prepared)
- training is adequate.

2. First response

Aim: Plans for first response exist, resources for first response have been allocated and the operations are cost-effective.

Oil spill response strategy

Audit criteria:

- a strategy has been prepared (yes - no)
- a strategy has been approved at political level (yes - no)
- appropriateness of the strategy (compared with guidelines and other similar strategies)
- costs and benefits of operations and equipment purchases have been assessed as part of the strategy
- strategy is up to date (updating).

Response equipment

Audit criteria:

- purchasing equipment in accordance with the oil spill response strategy
- economic efficiency of the equipment purchases (such as joint purchases).

Management of response operations

Audit criteria:

- requirements concerning response management (operational and content-related)
- experience of response management and management tasks in general
- management framework (management environment, communications, etc.)
- management resources
- organisational management requirements.

Situation awareness system supporting management

Audit criteria:

- situation awareness system is in place (yes - no)
- situation awareness system is workable from the perspective of oil spill response management.

Research and development in connection with first response

Audit criteria:

- amount of research and research funding
- effectiveness of research
- number and quality of technological innovations in proportion to practical oil spill response problems.

Response exercises

Audit criteria:

- organising national and international exercises in accordance with the targets set
- reviewing the experiences gathered during the exercises
- taking the experiences gathered during the exercises into account.

3. Oil spill recovery

Aim: Adequate resources are allocated to oil spill recovery and it can be managed in a cost-effective manner.

Municipalities as managers of oil spill recovery

Audit criteria:

- municipal oil spill recovery resources
- division of tasks in relation to regional rescue services.

Employing volunteers in oil spill recovery operations

Audit criteria:

- resources available for managing the operations in cooperation with municipalities
- status of the volunteers and management of their work
- safety.

4. Management of oil waste from vessels

Aim: Waste management arrangements are in place and they can be managed in a cost-effective manner.

Municipalities' waste management responsibility

Audit criteria:

- all aspects of waste management (intermediate storage, transport, disposal) are well-planned
- operational resources
- adequacy of waste management capacity (waste treatment time)
- economic efficiency and cost-effectiveness of waste management
- legislative and institutional obstacles to effective waste management.

5. Cost arising from oil spills from vessels and compensation

Aim: "Polluter and party causing the risk pay" principle is the basis for the costs and the costs resulting from the oil spills can be compensated so that the state does not need to incur any hidden costs.

Assessing the oil spill costs

Audit criteria:

- producing cost estimates (or cost models) for use as a basis for decision-making
- determining any state liabilities and providing information on them.

Finnish Oil Pollution Compensation Fund

Audit criteria:

- systematic nature of financing
- appropriateness of the fund's financing base
- appropriateness of organisation
- economic and operational efficiency of the fund.

Compensation provided by international bodies

Audit criteria:

- compensation principles from the perspective of “polluter pays” and “party causing the risk pays” principles
- awareness of claimants of compensation principles
- providing information on compensation principles
- calculations of hidden liabilities incurred by the state in accident situations and providing information on them to decision-makers.

6. Relations between different actors

Aim: Relations between maritime actors and oil spill response authorities are correct, workable and efficient.

Actors

Audit criteria:

- functioning of cooperation (experiences)
- problems that have arisen in cooperation
- cost-effectiveness of cooperation.

7. Cost-benefit ratios of management of oil spills from vessels

Aim: Alternative approaches have been examined.

Examining alternative approaches

Audit criteria:

- results of cost-benefit or cost-effectiveness assessments of different approaches (prevention - response)
- organisational potential for conducting cross-administrative assessments.

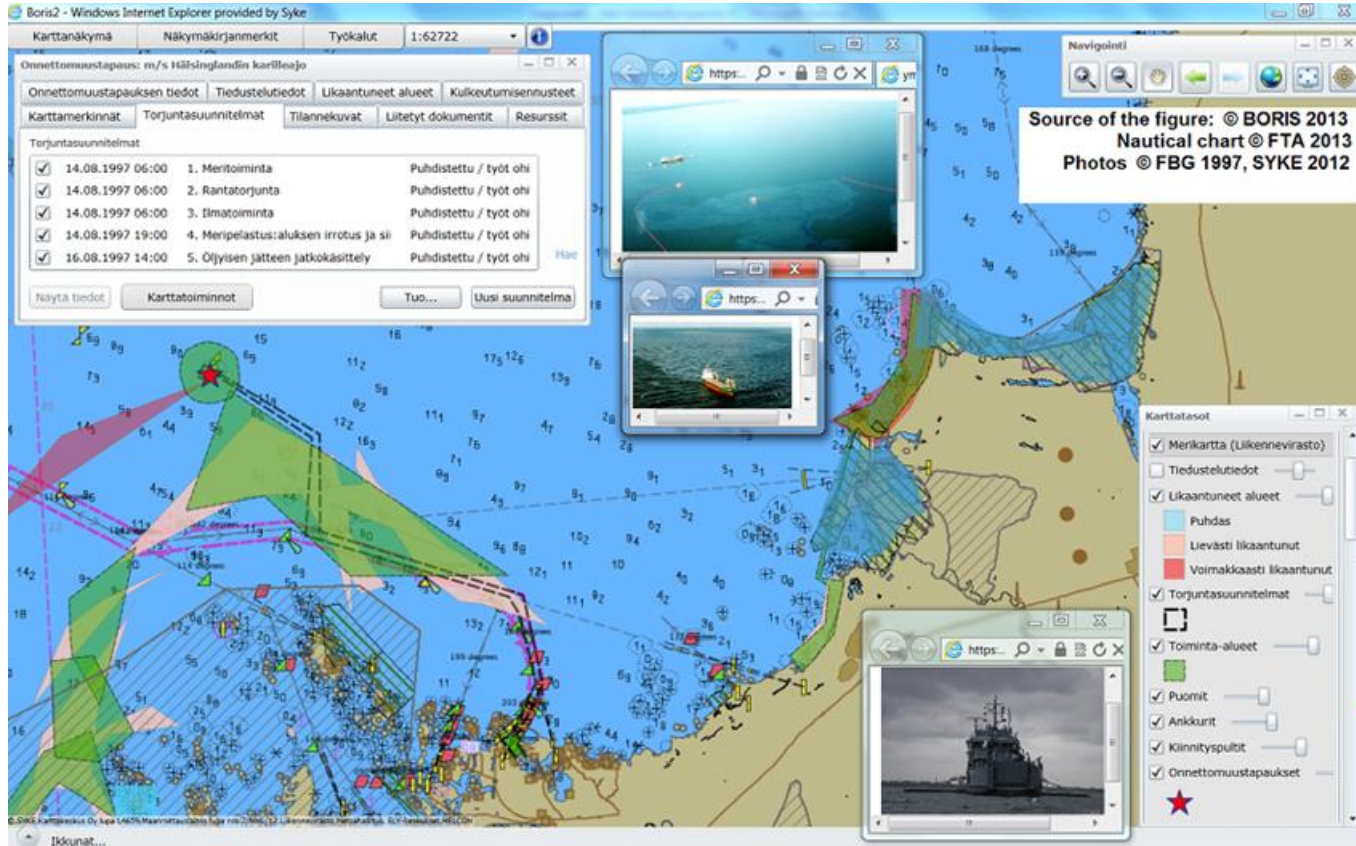
8. Legislation on oil spills from vessels

Aim: Legislation is consistent and can be used for tackling problems.

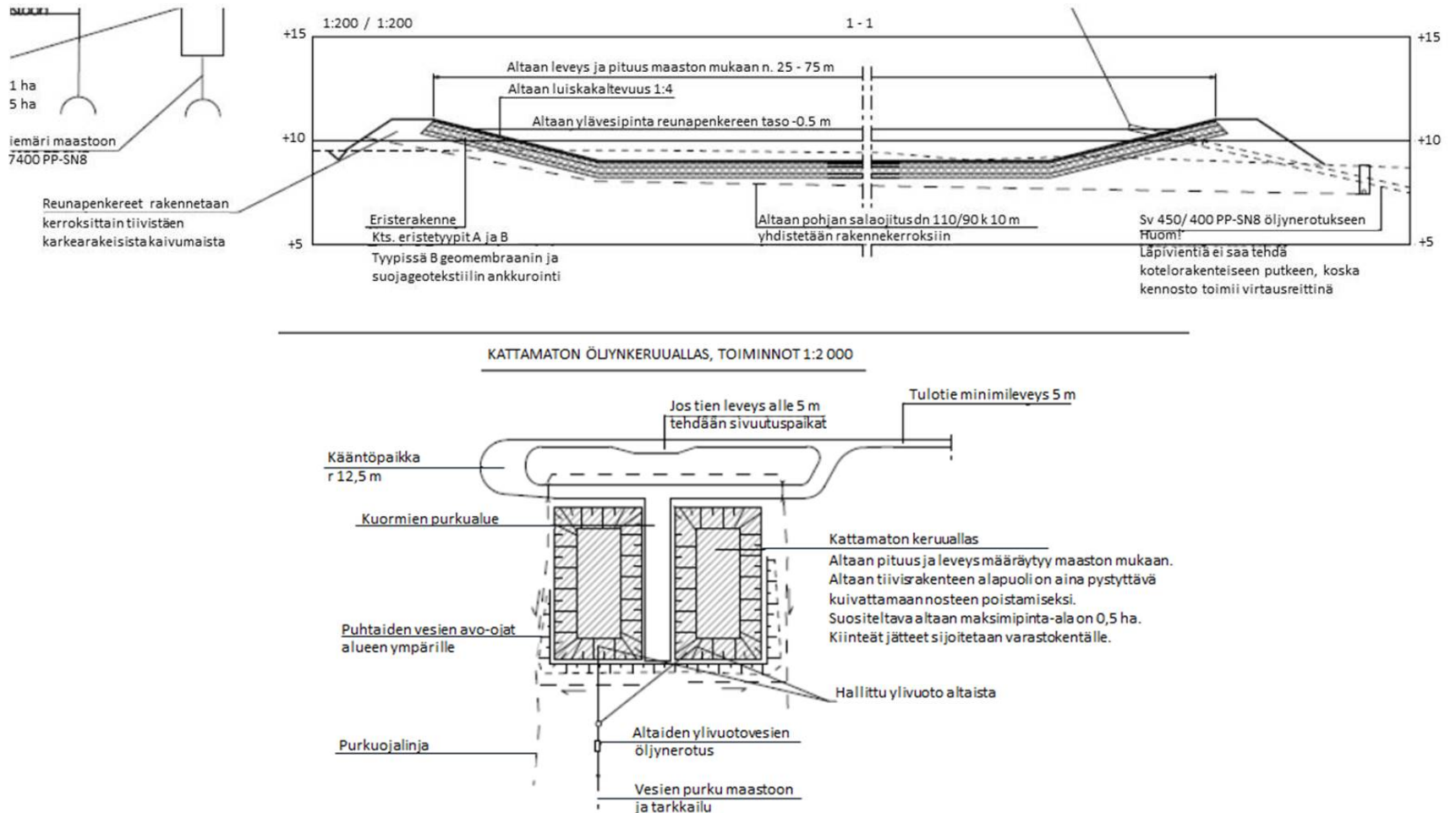
Audit criteria:

- possible problems concerning oil spill response legislation
- consistent relationship between oil spill response legislation and other environmental legislation.

Appendix 2. Figure 1. Situation awareness information produced by the BORIS system. © Finnish Environment Institute.



Appendix 3. Figure 1. Design for intermediate storage unit for oil waste from ships (open oil recovery basin) (Saarinen 2013).



Sources

1. National norms and preparatory work

Vessel Traffic Service Act (623/2005).

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16 February 2012 Kymenlaakso Regional Rescue Service.

21 February 2012 Eastern Uusimaa Regional Rescue Service.

22 February 2012 ELY Centre for Uusimaa.

29 February 2012 Finnish Petroleum Federation.

8 March 2012 Baltic Marine Environment Protection Commission HELCOM.

9 March 2012 Western Uusimaa Regional Rescue Service.

12 - 13 March 2012 Oilspill Conference.

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22 January 2013 Finnish Transport Safety Agency.

28 January 2013 Meritaito Ltd.

6 February 2013 Finnpilot Pilotage Ltd.

7 February 2013 Oilrisk Seminar, Hanasaari.

12 February 2013 Ministry of Transport and Communications.

21 February 2013 Aalto University, Department of Applied Mechanics.

7 February 2013 Familiarisation with oil spill response storage units and response vessels.

12 March 2013 University of Helsinki, Department of Environmental Sciences.

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