
Section 12

Lack of information and uncertainties

12 Lack of information and uncertainties

According to the Finnish Decree on Environmental Impact Assessment Procedure (713/2006) (Chapter 3, Section 10, Item 5) an EIA report must describe “any deficiencies in the data used and the main uncertainty factors”. The objective of this chapter is to fulfil this requirement. As such, the chapter will present and discuss the possible data deficiencies as well as the uncertainty factors related to the different assumptions and conclusions made in this assessment, in particular in the chapter on environmental impact assessment (Chapter 8).

There are many reasons for uncertainties and lack of information in an environmental impact assessment. It is important to draw attention to the fact that the nature of the environmental impact assessment is predictive – it is therefore challenging to precisely predict what kind of impacts on the environment will occur and the duration of the impacts. Also, the significance of impacts or certain aspects in relation to each other (e.g., synergism) is sometimes subjective.

In this report ‘lack of information’ and ‘uncertainty factors’ are described as follows:

Lack of information

‘Lack of information’ or ‘data deficiency’ is understood to mean data and information that is missing in the baseline description or in the assessments, which otherwise could have made them more comprehensive and solid.

Uncertainties

‘Uncertainties’ is understood to mean the accuracy of the different data and information used in the report, as well as assumptions and conclusions.

In addition to predicted impacts, impacts that could occur in the event of an accident or unplanned event within the project (e.g., fuel spill, marine traffic accident) are also taken into account. These impacts are called ‘impacts from unplanned events’ and are defined as being a combination of event or incident frequency (probability) and the environmental consequences of the event or incident. These are addressed in Chapter 9.

Preliminary assessments were made at the beginning of the environmental impact assessment to identify the most important data and information needs. Based on this, a number of surveys and data collection activities were initiated. Therefore, data deficiency was already minimised prior to the actual environmental impact assessment.

Furthermore, Chapter 15 of the report includes a proposal for a monitoring programme, the purpose of which is to collect additional data and information in order to verify the predicted impacts of the project. The monitoring programme as such will aim to minimise the uncertainties that result from either lack of data or assumptions made in the impact assessment.

12.1 Lack of information

Impact assessment is based on the current status and the estimated autonomous development of the environment as well as on the technical planning of the project. Sometimes, not all of the critical data for impact assessment are available. For example, the detailed technical design of some parts of the project is still ongoing; therefore, some solutions may not be known at the time of the assessment.

The amount of information needed to describe the current status of the environment is extensive due to the large geographical scope of the project area. Data collection for the Nord Stream project has been carried out by many parties for many years. This can also result in situations in which not all of the acquired data have the same level of detail and therefore not all of it can be used as a basis for impact assessment.

Not all of the long-term monitoring in the Baltic Sea has been carried out to the extent proposed by HELCOM. In addition, some of the existing monitoring data has been difficult to acquire due to authority restrictions. This has resulted in partial inadequacy of certain monitoring information, e.g., contaminants in sediments and in the water column.

Table 12.1 below summarises the assessment of the lack of information for each of the impact categories in Chapter 8. In the first column, reference is made to the individual impact category. Column 2 briefly describes the data and information deficiencies. Column 3 indicates the significance of the lack of data and information in relation to the impact assessment. It also provides a brief explanation of the assessed significance and what has been done or can be done to minimise the lack of information.

Table 12.1. Assessment of lack of information and its influence on the conclusions of the impact assessment.

Topic	Lack of information	Remarks
Seabed	Scarce data on bottom-close currents that determines the extent of the re-suspension and settling of sediments. Scientific data on the actual impact of anchoring and anchor sweeping is very limited and is based on experience (see Chapter 8.1.1).	Assumptions made are assessed to be accurate for the purpose. The lack of information is assessed not to change the overall conclusion.
Water quality	Scarce data on bottom-close currents, internal loads of nutrients, loads of contaminants and particles, as well as normal variations of the concentration of suspended solids in the Finnish project area (see Chapters 5.3.4 and 8.1.2).	Compared with the low significance of the impact, and the fact that the effect is short-term, the available data are assessed to be sufficient to determine the impact on the water quality. Therefore the lack of information is assessed to be of minor significance.
Air quality	Exact fuel consumption of vessels unknown (see Chapters 5.3.6 and 8.1.3).	Assumptions made are assessed to be accurate for the purpose. Therefore the lack of information is assessed to be of minor significance.
Noise	Minor lacks in noise emission values (limited sources of data) (see Chapters 5.3.7 and 8.1.4).	Assumptions made are assessed to be accurate for the purpose. The lack of information is assessed to be insignificant.

Topic	Lack of information	Remarks
Munitions	Anchor-corridor survey is planned to be performed during 2008 and 2009 (beginning November 2008), which means that the amount of munitions in the anchor corridor (2 km) is unknown at the present time (see 5.6.5).	This information deficiency is significant but it will be addressed: Results from anchor-corridor survey will be incorporated in anchoring plan and taken into account in the construction phase. Mitigating measures will be taken to avoid problems.
Planktonic environment	Planktonic organisms are very mobile, and only general information about the pelagic environment is available (see Chapters 5.4.2 and 8.2.2).	The impact is assessed to be of low significance, and it will not be possible to isolate this impact from the impact of other activities in the area. The available data and information therefore is assessed to be sufficient for the purpose.
Benthic environment	There is a general lack of information on how organisms on deep sea bottoms are adapted to unstable living conditions, which might have some influence on the impact assessment (see Chapters 5.4.1 and 8.2.1).	The impact is very short-term and only affects a limited area. The impact is assessed to be insignificant. However, the monitoring programme in the operation phase will include benthic fauna and as such be used to verify the assessment of the impact. Therefore this lack of information is assessed to be insignificant.
Fish and fish stocks	There is little data and information on the fish communities at the depth of the pipelines (see Chapters 5.4.3 and 8.2.3).	No influence on the impact assessment, as there are not many fish in the impact zone due to the water depth in the pipeline route (see chapter 5.43). However, the monitoring programme will include monitoring of the fish community around the pipelines before, during and after the construction phase. Therefore this lack of information is assessed to be insignificant.
Birds	When, where and in which numbers seabirds are feeding or resting in the Finnish EEZ and territorial waters is poorly known. PeterGaz published the only survey, but it was carried out during the wrong season. There is no information showing how far from breeding colonies for example Razorbill or Lesser Black Backed Gulls are feeding (see Chapters 5.4.5 and 8.2.5).	<p>When, where and in which numbers seabirds are feeding or resting in the Finnish EEZ and territorial waters is poorly known. PeterGaz published the only survey, but it was carried out during the wrong season. There is no information showing how far from breeding colonies for example Razorbill or Lesser Black Backed Gulls are feeding (see Chapters 5.4.5 and 8.2.5). Probably only small numbers of birds, if any, are feeding in the pipeline area in the Finnish EEZ. Birds can temporarily change their feeding areas if necessary.</p> <p>Possible impacts are at a considerable distance from birds' nesting areas (> 10 km) and habitats. Impact occurs during short-term construction phase, not through the entire operational lifetime of the pipelines. Therefore this lack of information is assessed to be insignificant.</p>
Marine mammals	When, where and in what number ringed seals are present in the Finnish EEZ and territorial waters is poorly documented. The number of pups born in the area is also unknown (see Chapters 5.4.4 and 8.2.4).	Marine mammals can be affected by munitions clearance activities if they are near the area. However, the monitoring programme includes the proposal of stationing a biologist on the munitions clearance vessel to ensure there are no mammals in the area of activity (to drive the mammals away with loud noise signal). There will be no construction during the period of ice cover in the Finnish EEZ. The lack of information is assessed to be of minor significance.

Topic	Lack of information	Remarks
Protected areas	There is no precise information on the location of birds or seals when they are outside the protected areas (see Chapters 5.5 and 8.3).	As mentioned above, the impact is assessed to be insignificant and will be short-term. The pipeline is at a significant distance from the protected areas (more than 9 km). Therefore this lack of information is assessed to be insignificant.
Ship traffic	The ship traffic intensity is well-described, but diversions from the usual routes cannot be avoided (see Chapters 5.6.1 and 8.4.1).	The Nord Stream fleet will follow international and Finnish maritime rules. The risk of collision is also limited due to detailed planning and scheduling as well as close cooperation with maritime authorities. Therefore this lack of information is assessed to be insignificant.
Fishery	<p>The amount of necessary restriction zones for bottom trawling.</p> <p>Embedment of the pipeline in the bottom conditions of the Finnish EEZ is not yet fully known.</p>	<p>Determination of inevitable restriction zones based on present design and risk assessments, including the results of the scale models test.</p> <p>Embedment assessment to reduce restriction zones.</p> <p>Investigation of potential fishing method and gear adjustments to reduce restriction zones.</p> <p>Determination of least number of unavoidable restriction zones based on the results of the previous steps.</p>
Tourism and recreation	No new statistical information available for all of the used statistics/surveys (see Chapter 5.6.3 and 8.4.7).	The impact on tourism is assessed to be of very low significance. Therefore this lack of information is assessed to be insignificant.
Military areas	No missing information.	
Cultural heritage	The number of cultural heritage sites in the anchor corridor is currently unknown. An anchor-corridor survey will be performed in 2009 (see Chapters 5.6.8 and 8.4.5).	This lack of information is significant, but will be addressed. Results from the anchor-corridor survey will be implemented in anchoring plan, and wrecks will be avoided during the anchoring operations.
Social impact	No missing information.	
Impacts on human health	No data about contaminant desorption and bioactive proportion of desorbed contaminants is available. No fish species specific bioaccumulation data is available. No data about fish catches along the pipeline routes and delivery area of these catches is available (see Chapter 8.4.6).	<p>The impact is assessed to be very marginal, if at all. Furthermore, it is difficult to distinguish the impacts on human health from this project from other sources.</p> <p>This lack of information is assessed to be of minor significance.</p>
Infrastructure	Two unidentified cables detected during surveys. Status or owner of the cables was impossible to identify (see Chapters 5.6.7 and 8.4.4).	These cables are neither in use nor holding any known permit. Therefore this lack of information is assessed to be insignificant.

12.2 Uncertainties related to impact assessments

Even with a very precise baseline and technical data, impacts are difficult to predict with certainty. Predictions can be made using varying means, ranging from qualitative assessment and expert judgement to quantitative techniques like modelling. Use of these quantitative techniques allows a reasonable degree of accuracy in predicting changes to the existing environmental and socioeconomic conditions and in making comparisons with relevant quality standards. However, not all of the assessed impacts are easy to measure or quantify, and expert assumptions are needed.

Uncertainties can also arise as a result of the status of the technical design process at the time of preparation of an EIA report. If a project design is still in the process of being finalised, some level of uncertainty in assessing the resultant impacts is inevitable. Where this uncertainty is material to the findings of the EIA, it is clearly stated. The general approach then is to take a conservative view of the likely residual impacts and propose various mitigation measures accordingly (see Chapter 13: Prevention and mitigation measures).

Table 12.2 below summarises the assessment of uncertainties related to each of the impact categories in Chapter 8. In the first column, reference is made to the individual impact category. Column 2 briefly describes the potential uncertainty regarding the data used. Column 3 indicates the significance of the uncertainty in relation to the impact assessment. It also provides a brief explanation of the assessed significance of the uncertainty and what has been done or can be done to minimise the uncertainty.

Table 12.2. Assessment of uncertainties and their influence on the conclusions of the impact assessment.

Topic	Uncertainty	Remarks
Seabed	The models used to describe sediment spreading are representations of reality, and therefore certain assumptions are made regarding parameters. As a consequence, the predictions generated by the models contain a degree of uncertainty. (see Chapters 5.3 and 8.1.1)	The sensitivity analyses show that varying the assumptions (input data) will not change the conclusions. Therefore this uncertainty is assessed to be insignificant.
Water quality	The models used to describe the spreading of sediment, nutrients and other substances are representations of reality, and therefore assumptions are made regarding certain parameters. As a consequence, the predictions generated by the models contain a degree of uncertainty. The amount of contaminant dissolved in the spreading scenarios is defined as 100% and no decay is accounted. These assumptions result in concentration estimates that are likely to be overly conservative. (see Chapter 5.3.4 and 8.1.2).	The sensitivity analyses show that varying the assumptions (input data) will not change the conclusions. Therefore this uncertainty is assessed to be insignificant.

Topic	Uncertainty	Remarks
Air quality	Calculations of the emissions of pollutants to the atmosphere are based on general EU emissions factors. Actual emissions from the vessels that will be operating for the Nord Stream project may differ from these general emissions factors (see Chapters 5.3.6 and 8.1.3).	The calculations are conservative, and impacts on air quality are insignificant compared with impacts due to other traffic. Therefore, the conclusions are assumed to be valid, even with some modifications of input data. This uncertainty is assessed to be of minor significance.
Noise	Minor shortcomings in noise emission values. Therefore some values are based on professional judgements. The typical uncertainties in airborne noise assessments are within the range of 2-5 dB (see Chapters 5.3.7 and 8.1.4).	Airborne noise from sources is far from sensitive areas, so the uncertainty of the calculations is assumed to have no influence on the conclusions. Efforts will be made to ensure that marine mammals are not negatively affected by underwater noise from munitions clearance activities. This uncertainty is assessed to be of minor significance.
Munitions	There is some uncertainty regarding the content of the munitions due to the number of years that have passed (50-60 years) (see Chapter 5.6.5).	Even if there is some uncertainty regarding the impact of munitions clearance activities, the amount of munitions that will be cleared is not significant enough to change the conclusion. It should also be emphasised that munitions are cleared from time to time for other reasons. This uncertainty is assessed to be insignificant.
Planktonic environment	Assessment is based on the modelling calculations, as well as on assumptions of uptake of nutrients and contaminants in plankton (see Chapters 5.4.2 and 8.2.2).	The potential impact from the Nord Stream project is limited and temporary, so it will be difficult to distinguish between a potential impact from the Nord Stream project and the impact from other activities. Therefore this uncertainty is assessed to be of minor significance.
Benthic environment	The above-mentioned lack of information results in some uncertainty about how long it will take for macrofauna species to recover after impacts. Information on year-to-year variability of macrozoobenthos living on adjacent areas of the pipeline routes is quite scarce (see Chapters 5.4.1 and 8.2.1).	Due to long-term monitoring data from the authorities, mapping of the routes during preparation of the approval documents and literature survey, the overall data and knowledge basis for the impact assessment is sufficient. Benthic flora and fauna will be monitored during the operations phase, which will make it possible to compensate, if this assessment is incorrect. Therefore this uncertainty is assessed to be of minor significance.
Fish and fish stocks	The exact reaction of fish due to impacts is somewhat uncertain (see Chapters 5.4.3 and 8.2.3).	Impacts on fish are short-term and in general assessed to be of low significance. The monitoring programme includes investigations of fish communities in the vicinity of the pipelines, whereby the uncertainty can be reduced. This uncertainty is assessed to be of minor significance.
Birds	Birds' movements are naturally unpredictable. Therefore, in principle there can be some uncertainty regarding the impact on birds from the operations of the Nord Stream fleet (see Chapters 5.4.5 and 8.2.5).	The operations of the vessels are so far from the coast that few birds, if any, will feed in these areas. Furthermore, the operations are temporary. Therefore this uncertainty is assessed to be of minor significance.
Marine mammals	The movement of marine mammals cannot be foreseen precisely. Therefore, it is difficult to assess impacts (see Chapters 5.4.4 and 8.2.4).	The monitoring programme includes a proposal to station a biologist on the munitions clearance vessel to ensure there are no mammals in the area of activity (to drive the mammals away with loud noise signal). This uncertainty is assessed to be of minor significance.

Topic	Uncertainty	Remarks
Ship traffic	The AIS records of maritime traffic in the open sea will not guarantee that the vessels will always use exactly these routes. How the traffic in the EZZ will develop in the future and the exact volume and location of ships during the construction period is unknown (see Chapters 5.6.1 and 8.4.1).	The impacts on ship traffic have been assessed for three main sailing routes that cross the pipeline corridor or are very near to it. Therefore this uncertainty is assessed to be of minor significance.
Fishery	<p>There are some uncertainties regarding long-term impacts on fishery and the use of fishing gear (see Chapters 5.6.2 and 8.4.2).</p> <p>The requirement of logbooks for all EU fishing vessels is restricted to boats of 10 m or more. Catch data for vessels smaller than 10 m are based on estimations by various fishery authorities in the Baltic Sea countries. Fishing boats that begin trawling in one ICES square and recover their gear in another will often report all of the catch from the last ICES square.</p> <p>Young herring are sometimes mistaken for sprat and reported as such. Further there is an uncertainty of how the fishery will develop in the future.</p>	<p>The potential impact on fishery is assessed to be moderate. However, Nord Stream AG will maintain close contact with fishery associations during the construction phase in order to manage potential conflicts.</p> <p>Impacts cannot be predicted in a reliable manner for a long-term period because allowed catches for fishermen are established on a yearly basis.</p> <p>This uncertainty is assessed to be of minor significance.</p> <p>In the future fishing methods may differ from today due to salt water inflows allowing cod presence in the northern parts of the Baltic Sea.</p>
Tourism and recreation	<p>The main uncertainties are related to human behaviour. It is impossible to tell exactly how people will spend their leisure time in the future, and how they will react to the project (see Chapter 5.6.3 and 8.4.7).</p> <p>The main uncertainty is related to not knowing how people actually will react in the future.</p>	The impact is assessed to be insignificant, and the uncertainty will not change this conclusion.
Military areas	No uncertainties.	
Cultural heritage	<p>Assessments of age and archaeological significance of wrecks are based on ROV video footage and sidescan sonar data. Estimated age of wrecks has not been confirmed by dendrochronological analysis (see Chapters 5.6.8 and 8.4.5).</p> <p>Sub-alternative 1a/2a and its possible cultural heritage sites have not yet been fully assessed by the Finnish National Board of Antiquities.</p>	Assessments have been made by experts of the Finnish National Board of Antiquities. If there is doubt regarding the age and significance of a wreck site, the site will be treated as if it were protected and of archaeological value. Therefore this uncertainty is assessed to be insignificant.
Social impact	The main uncertainty about the social impact is the interpretation of people's expressions of concerns about security (see chapter 8.4.8). The results from the social impacts are based on a survey and have to be considered as a sample. Further, it is difficult to foresee the social impact of what will happen in the future and people's concern.	<p>No threshold values or other clear-cut criteria for social impact assessment exist. Therefore, it is probably difficult to reduce the uncertainty in this regard. There are also uncertainties due to the nature of the impacts (depending on individual, subjective experiences). However, a continued open dialogue about the Nord Stream project can reduce the uncertainty people feel.</p> <p>This uncertainty is assessed to be of minor significance.</p>

Topic	Uncertainty	Remarks
Impacts on human health	Several sources of uncertainty in the modelled concentrations, including estimation of the amount of suspended sediment, estimation of desorption, estimation of the bioactive proportion and modelling of contaminant dispersion (see Chapter 8.4.6).	<p>The impact on human health is assessed to be non-existent and difficult to distinguish from the impacts on human health due to other activities. Collection of further information and data will probably reduce the uncertainty.</p> <p>This uncertainty is assessed to be of minor significance.</p>
Infrastructure	Whether the existing raw material extraction areas will be in use during the construction phase of pipelines is unknown. It is possible that they will be in use. It is likely that the extraction of raw materials in the Gulf of Finland will increase in the future. The locations of the future raw material extraction areas cannot be identified at the present time. There are some studies showing that there may be usable raw materials in the Finnish EEZ. However, it is uncertain if there are usable raw materials under the pipelines (see Chapters 5.6.7 and 8.4.4).	<p>The operations of the Nord Stream project will be well- documented, and thereby it will be possible to plan future infrastructure facilities and projects in relation to this. However, the uncertainty about the presence of usable raw materials under the pipelines cannot be reduced until investigations are made.</p> <p>This uncertainty is assessed to be insignificant.</p>

12.3 Conclusions

The aim of this chapter has been to take uncertainty and lack of information into account in the impact assessment. Uncertainties related to, e.g., technical design, have been minimised through ongoing dialogue between the Nord Stream technical team, the relevant authorities and other parties of interest.

A 'safety principle' is applied throughout the assessment, meaning that the risk estimates represent the worst-case scenarios. Therefore, uncertainties with regard to the data and methods used have no significant influence on the conclusions of the environmental impact assessment. However, there is a need to monitor certain impacts during construction and operation (see Chapter 15).