

## BACKGROUND INFORMATION

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### Safely Dealing with Munitions in the Baltic Sea

#### Planning a secure Baltic route for the Nord Stream pipeline

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#### 1) Introduction

**It is a known fact that chemical and conventional munitions were disposed of in the Baltic Sea after the First and Second World Wars, and as late as the 1960s. Marine scientists possess a wealth of information about the type and amount of these dump sites. With regards to the proposed pipeline route, one of Nord Stream's top priorities is avoidance, and, where this is not possible, the safe and secure handling of potential finds prior to and during pipeline construction.**

Therefore, Nord Stream is conducting what is likely to be the most extensive survey of a defined path ever across the Baltic Sea, employing the most modern, state-of-the-art equipment. The results of its survey will add considerably to what is known about the state of munitions in the Baltic Sea, thereby improving the chances for informed handling of the issue in the future.

It is important to note that Nord Stream will work with all the appropriate national and international authorities to ensure its activities are safe and produce minimal environmental effect.

#### 2) Munitions in the Baltic Sea: what is known?

Mines were laid in the Baltic Sea during the First World War and munitions were dumped there shortly after the end of the conflict. In the Second World War, the Baltic Sea was strategically very important. It represented a frontier between the opposing forces, and so was heavily mined. After the war, Allied countries took

munitions confiscated from Germany and dumped them in the Baltic Sea, which at the time was considered the best means of disposal.

Of the munitions remaining in the Baltic today, two broad categories are of primary concern for Nord Stream in the construction and operation of its pipeline:

- Chemical munitions
- Conventional munitions

A number of organisations and authorities regularly sweep discreet areas of the Baltic Sea for munitions and evaluate the impact of these munitions on the Baltic Sea. Among those are authorities and institutions that have accumulated vast knowledge in many years of dealing with the issue regularly, mostly in connection with fishing, and the combined navies of NATO members. HELCOM (the Helsinki Commission) has produced several reports on dumped munitions and stresses the need to continue researching the subject. HELCOM also reports that no munitions found in the Baltic have ever been unintentionally detonated. Nor has there been any accident during the handling of found munitions.<sup>1</sup>

In this context, Nord Stream views its rigorous surveys as a considerable contribution to what is known about munitions in the Baltic Sea. The proposed route, including the 15 metre wide installation corridor, has been planned to avoid known dump sites, and detailed surveys are being conducted to verify that it is safe to use.

### **3) Nord Stream's Activities for Monitoring Munitions in the Baltic Sea**

The company approaches the issue of munitions in the Baltic Sea with no preconceptions, except that the issue cannot be dealt with lightly, and is therefore gathering all available information and opinions on the subject. This includes consultation of statutory authorities.

Nord Stream is researching the sea bed in a step by step approach in order to retrieve the most detailed data on the exact corridor where the pipeline will be laid whilst, at the same time, ensuring that no threatening objects are in the immediate surroundings of the pipeline route. The survey began with a 2 km corridor that was screened for large objects and then progressively narrowed down to a 15 m corridor, where even objects as small as 10 cm can be identified.

Although there are no international regulations for dealing with munitions, Nord Stream aims to set the highest standards and follow strict procedures defined by the leading survey specialists in the Baltic region. Survey work associated with the Nord Stream project has been divided into three phases: surveys in 2005 and

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<sup>1</sup> *3rd Periodic Assessment of the State of the Marine Environment of the Baltic Sea*. HELCOM 1996. HELCOM is the Baltic Marine Environment Protection Commission, an independent regional body that works to combat pollution of all types: it is the authority on dumped chemical munitions in the Baltic.

2006, as well as a current, rigorous examination of the recently defined installation corridor in 2007.

### **3a) 2005 Survey**

Surveying the pipeline route is one of Nord Stream's major preparatory tasks, and construction will not begin until it is entirely confident about the chosen route. North Transgas conducted the first survey of the seabed in 1998. This looked at possible routes across the Baltic seabed and covered many parts of the currently proposed route.

The first detailed screening of Nord Stream's provisional route was carried out by PeterGaz in 2005. This was principally a geophysical survey to check the condition of the seabed across a 2 km corridor and to look for obstacles such as wrecks, large boulders and trenches.

### **3b) 2006 Survey**

On the basis of the 2005 survey data, two potential pipeline routes were selected. These were investigated in 2006 during a second seabed survey which covered a 180 m-wide corridor along the entire length of the proposed pipeline. This was a detailed geophysical survey that provided both engineering data and the image resolution required to identify munitions. The instruments used were the best available at the time, and all "targets" (objects that might possibly be munitions) were carefully recorded and added to the existing database of targets from the 2005 survey.

Nord Stream then deployed a remotely-operated vehicle (ROV) to inspect each target within 20 m of the route in detail. In Swedish waters – one of the territories closest to the dump sites – there were over a thousand targets. Yet only one was potentially munitions-related (believed to be a mine release mechanism). In the Gulf of Finland, Nord Stream found several suspect targets, including two mines (one deliberately sunk). A few potential targets were located near the known chemical dumping area off Bornholm, but none were positively identified as related to chemical munitions. Nord Stream recorded the locations of these unresolved targets and passed the information on to the appropriate authorities for further investigation.

As a result of the 2005 and 2006 surveys, only two targets were clearly identified as mines, and only one is thought to still be intact. The other targets investigated were found to be items naturally occurring on the seabed or man-made items, such as:

- Boulders
- Shopping trolley
- Oil drums
- Rubber hoses
- Peat bags

- Mine release mechanisms (non-explosive)
- A high percentage of the objects found were discarded white goods

Nord Stream approached the 2005 and 2006 surveys without preconceptions about what it might find on the seabed along the proposed route of the pipeline and in adjacent areas. Based on the results of these detailed surveys, it is now confident that munitions do not present a significant obstacle to the construction and safe operation of the pipeline. However, another more detailed survey is currently being conducted to further investigate the installation corridor along the proposed route and ensure this opinion is justified.

### **3c) 2007 Survey**

During the year 2007, Nord Stream has taken measures to optimise the proposed route of the pipelines based on a number of factors. Once the installation corridor was determined, Nord Stream began preparations to survey the exact installation corridor (15m) using the latest investigative tools in the world.

Since July 2007, Nord Stream has been conducting a detailed and targeted third survey, in three distinct stages.

#### **Stage One**

The first stage employs technology such as multi-beam echo sounders (MBES), high-resolution side-scan sonars (SSS), sub-bottom profilers and a magnetometer. Multi-beam echo sounders and side-scan sonars provide a detailed picture of the contours of the sea floor and of objects lying on the seabed. The sub-bottom profiler can penetrate deep into the material at the sea bottom to show a cross-section of the mud, silt and bedrock that make up the seabed. The magnetometer provides information on ferrous (iron-based) materials.

#### **Stage Two**

The second stage uses a 6.7 m wide 12 sensor gradiometer array mounted on a ROV to detect any ferrous (iron-based) metals on the seabed. Whereas the 2006 survey used electromagnetic induction sensors, the gradiometer array will provide better lateral coverage and allow coverage of the full installation corridor in two passes of the ROV. The higher-range capability of the gradiometer array allows the detection of buried objects that may have penetrated the soft sediments. Concurrently with the gradiometer survey, visual coverage of the seabed is also achieved. The gradiometer data are processed within a digital terrain model to allow objects to be located for further visual inspection.

#### **Stage Three**

In the third stage Nord Stream visually inspects the targets located during the previous two stages. This allows experts to examine and identify any questionable objects. Where appropriate, Nord Stream will liaise with experienced navy personnel to help identify them.

The 2007 survey, which has to date covered 15% of the proposed pipeline route, has not produced positive finds as yet. The current survey results are within the central / Southern Baltic and confirm the 2006 survey results. As with this survey, munitions-related objects will most probably be encountered in the Gulf of Finland, which will be surveyed in the last quarter of 2007.

Independent sources confirm that a multi-sensor approach to surveying is best practice. Multi-coverage high-resolution surveys of the seabed and automated data-analysis enable detection, classification and localisation of munitions and similarly-sized objects with a high degree of confidence. Different types of sensor, such as the range that Nord Stream is using, provide a variety of data which can be combined to produce a high-quality picture of the sea floor, regardless of environmental conditions.

The instruments Nord Stream is using represent the most state-of-the-art equipment currently available on the commercial market. These include the newest multibeam systems, side scan sonar systems working at high frequency and the development of a twelve sensor gradiometer array.

#### **4) Sharing the Knowledge Gained**

Once this work is completed, Nord Stream will have examined numerous objects along the route of the designated installation corridor. The results of, and knowledge obtained through, the munitions surveys will be provided to relevant authorities as part of the application process and will also be disseminated to interested organisations involved with research in the Baltic Sea. In addition, the teams that subsequently lay the pipeline will be contractually obliged to install the pipeline within the installation corridor. Installation vessels that use multi-point anchor spreads will be required to perform anchor clearance surveys and inspect all targets that could interfere with the anchor pattern, so checking each seabed location before dropping anchor. An inventory of all suspicious targets and instructions not to disturb any possible finds will be maintained on the installation vessels throughout the contract period.

The scale of Nord Stream's munitions surveys is unprecedented, and the company is doing its utmost to acquire and deploy the most sophisticated survey equipment available. To ensure that its survey techniques follow recommended good practice, Nord Stream has organised a seminar at which experts will have the opportunity to review present and past survey data and to recommend changes to procedures.

#### **5) Conclusion: Comprehensive Surveys with the Best Materials for a Safe Pipeline**

Nord Stream is aware of the multitude of munitions that have been disposed in the Baltic Sea, and it takes the potential threat they pose extremely seriously. It has the capacities, the most current technology and unparalleled expertise at its disposal to manage this sensitive issue. Nord Stream is contributing – through these

extensive examinations – to enhancing current knowledge of munitions finds in key areas of the Baltic Sea. Nord Stream is thereby ensuring that future projects, including future pipelines, are planned with a heightened appreciation of the constraints associated with munitions.

Nord Stream will do all it can to minimise the risk associated with munitions.

For further information please go to [www.nord-stream.com](http://www.nord-stream.com).

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