

FACTS

NEWSLETTER ABOUT THE NATURAL GAS PIPELINE THROUGH THE BALTIC SEA

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The last pipes were delivered to the laybarge Castoro Sei on April 16, 2012. This is the pipe-supplying vessel Normand Carrier leaving the port of Slite.

Nord Stream's Award Winning Logistics Program Proves Successful in Practice

With completion of the pipelay work, the logistics program is also drawing to a close

Approximately 200,000 steel pipes were required during construction of the Nord Stream Pipeline. Progress in the construction work was largely dependent on always having sufficient numbers of pipes available in the right locations. It's no walk in the park when you're dealing with such a large number of pipes and a pipeline that stretches some 1,224 kilometres. Yet Nord Stream logistics experts topped off the requirements with this: The pipeline logistics should be not only flexible and reliable, but also as environmentally friendly as possible.

It was a rather ambitious requirement, yet it was one that Nord Stream has successfully managed to realise. On April 18, the last pipe segment was welded onto Line 2 of the Nord Stream Pipeline, thus ending the pipelay work a number of weeks earlier than had originally been planned. This also brings the logistics

programme to an end, and the results have been positive. "Our logistics programme allowed us to react flexibly to changing requirements when operating with up to three laybarges and even in adverse winter conditions," says Werner Rott, Deputy Project Director Engineering for Nord Stream AG. "From the start there were only 24 hours out of a total of approximately 20,000 project hours when pipes could not be delivered. This happened during the exceptionally cold winter of 2010-2011," he added.

Finding the Shortest Routes

Nord Stream logistics are all about finding the shortest routes. The five logistics locations were never situated any further than 100 nautical miles from the pipeline route. Moreover, the decision was taken to establish two new concrete coating plants near the pipeline's route, rather than relying on existing facilities that were situated further away. Coating the steel pipes with concrete

doubles their weight, thereby increasing their stability and security once on the seafloor.

A total of 140,000 steel pipes were produced in Germany, another 50,000 units were made in Russia, and 10,000 were produced in Japan. Whenever possible, the project took advantage of low-emission transport options: Some 96 percent of all transport requirements were handled by either ship or rail. This focus on the environment made it possible to achieve savings not only ecologically, but from an economic perspective as well. In total, there was a reduction in CO₂ emissions of 200,000 tonnes, and savings in transport costs amounting to 60 million euros.

Nord Stream's customised green logistical plan was recognised in 2010 with the German Logistics Award. This was no premature praise since two years later, following the end of the pipelay

work, the assessment is a positive one. "Transporting on time and maintaining the quality of masses of pipes has been a real challenge," says Henning Kothe, Project Director for Nord Stream AG. "Our coating and logistics partner EUPEC, the harbours and stevedores in Finland, Sweden and Germany, and the shipping contractors all performed remarkably well."

Pipes Stored for Repairs

The final pipes for the pipeline were delivered to the pipelay vessel Castoro Sei from the port of Slite on the Swedish island of Gotland. The remaining pipes were then transported back to the German port of Mukran, from where a small supply will be transhipped onward to Lubmin. There, the pipes will be stored in a warehouse, which is currently under construction, in case pipeline repairs ever need to be conducted during the planned 50-year operational lifetime of the pipeline.



In the early morning of April 18, 2012, workers on the laybarge Castoro Sei celebrated having welded pipe number 99,953, the last pipe of Line 2, onto the pipeline. The Castoro Sei has laid about 70 percent, or 853.5 kilometres of each of the two pipelines of the Nord Stream Pipeline system.

Milestone: Final Section of Line 2 Laid on the Seabed Ahead of Schedule

On the morning of April 18, 2012, pipe number 99,953 – the last pipe of Line 2 – was welded onto the pipeline



A PIG (Pipeline Inspection Gauge) launcher is welded onto the last pipe of Line 2. The PIGs will later be used to clean and gauge the pipeline sections.

Following welding, the final section of Line 2 was lowered onto the seabed off the coast of the Island of Gotland, Sweden by the laybarge Castoro Sei. "Saipem's Castoro Sei has done an excellent job for us. We are very pleased to have completed pipelay for Line 2 well in advance of the planned schedule. It is another major milestone for Nord Stream," said Deputy Project Director Construction, Ruurd Hoekstra.

The Castoro Sei has been working on the Nord Stream project since April 2010, laying 70 percent, or 853.5 kilometres, of each of the two pipelines.

"The vessel has been working 24/7 on this project for two years, with its crew of 330 persons with only a one month planned maintenance break in May 2011," explains Hoekstra. "Her average lay-rate has been significantly faster than expected, the quality of welds has been exceptionally high, and the safety record is outstanding."

Built in Sections

The twin pipelines were laid in three sections. On April 18, the Castoro Sei completed the southern section of Line 2, which runs from Kilometre Point (KP) 675 to the landing point at the German landfall. The pipelines were built in three

sections as the pressure is at its highest at the start in Russia, and lowest in Germany. As the pressure in the pipelines reduces, so too does the wall thickness of the pipes used. Tapering the wall thickness of the pipelines saved not only vast amounts of steel, it also enabled Nord Stream to maintain its strict construction schedule, allowing for three lay vessels to simultaneously work on the pipelines back in 2010.

The pipelines were laid along an agreed, carefully-planned route on the seabed of the Baltic Sea by Saipem's Castoro Sei and Castoro Dieci, and the Allseas' Solitaire. "The fact that

we were able to complete our complex construction schedule involving three pipelay vessels working simultaneously on different sections of the pipeline was made possible by years of detailed and careful planning. The expertise of our staff and contractors – technical, logistics, safety, environmental and operational – allowed for a smooth-running construction programme that met all environmental and safety considerations," Hoekstra explains.

Many Vessels Used

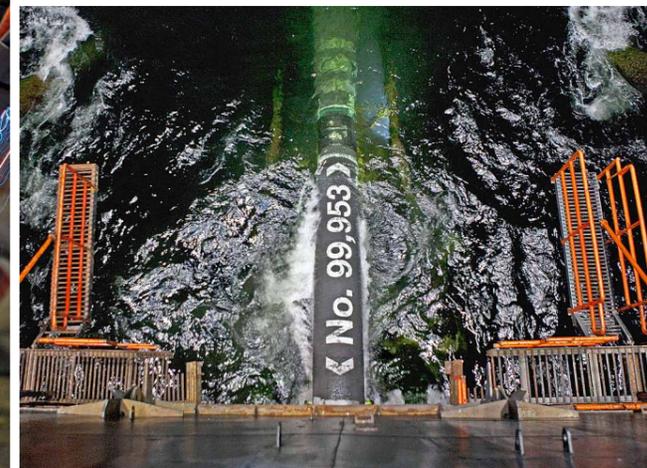
At any one time, a minimum of 12 ships worked on the project in different parts of the Baltic Sea. Nord Stream's construc-



A worker supervises the last welding process. Altogether, some 138,850 welds were performed in order to connect all the pipes laid by the Castoro Sei.



A cable is attached to the end of the PIG launcher. With its help, the pipeline is lowered to the seabed. Once the pipeline is positioned, the cable is released.



The last section of Line 2 disappears into the waters off the coast of Gotland. The three sections will be welded together on the seafloor in May and June.

tion plans proved to be resilient enough to cope with periods of enforced downtime due to some very adverse weather conditions in the Baltic Sea. A total fleet of 148 vessels were deployed for Nord Stream, and used in surveys, construction and logistics operations.

The two pipelines consist of 199,755 steel pipes. Each is 12 metres long, concrete weight-coated, and weighs about 24 tonnes. Altogether, some 138,850 welds were performed for both lines in order to join together the pipes laid by the Castoro Sei. The last of the 99,953 steel pipes used in Line 2 was made in Germany

by Europipe, concrete weight-coated at EUPEC's plant in Mukran, shipped to the Slite marshalling yard on the Island of Gotland and transported by a pipe-carrying vessel to the Castoro Sei, where it was welded onto the pipeline and lowered to the seabed on April 18. The completion of Line 2 also marked the completion of the logistics activities for the Nord Stream Project. Line 1 started transporting gas in November, 2011. Line 2 is scheduled to begin transporting gas towards the end of 2012. Together, the twin pipelines have the capacity to transport 55 billion cubic metres of gas a year from Russia to the European Union.

A Number of Steps Remain

Pre-commissioning activities for Line 2 have already started. Each of the three sections will be flooded with seawater, cleaned and gauged, and thoroughly pressure tested. This entire process for all three sections of the pipeline will take about two months. Following the completion of the pressure testing, these three sections will be connected by underwater hyperbaric tie-ins in May and June off the coasts of Finland and Sweden, where the design pressure changes from 220 to 200 bar and from 200 to 177.5 bar respectively. The process is largely automated, but will be completed with the assistance of specialised divers. There are only about 30 divers in the world trained to carry out this type of work. Once the pipeline is welded together, it will be de-watered and dried. Following this process, the completed pipeline will then be linked to the landfalls in Russia and Germany and put into operation toward the end of the year as part of Nord Stream's fully-automated twin pipeline system.

IN BRIEF

A FRESH LOOK AT MONITORING



Many people take an interest in the impacts the Nord Stream Pipeline has on the Baltic Sea

environment. Yet for most, the regular annual monitoring reports might be too detailed for their purposes.

Therefore, Nord Stream is publishing a new brochure which presents an outline of its monitoring activities from a more personal point of view. It contains numerous interviews with experts who have carried out the actual surveys, adding a fascinating, first-hand account of the work being done.

While the first chapter explains the overall monitoring process, the following five chapters offer a closer look at monitored subjects, from water quality all the way to the potential impacts on commercial fishery and shipping operations. Each chapter cites the findings to date and explains how and why the parameter in question is being monitored.

The brochure can be downloaded or ordered on the Nord Stream website as of mid-June.

www.nord-stream.com

Safe Completion of Construction

The accident frequency rate is lower than the European average

The completion of pipelay work offers a good opportunity to take a look back at the construction phase from a health and safety perspective. Generally speaking, it can be said that the work on the two pipelines has proceeded safely. "There have been no work-related fatalities or permanent disabling injuries," says Chris Preston, HSE Manager for Nord Stream AG. "The statistics show that this is a remarkable achievement for a project of this scale, and the huge number of man hours involved." For two years, pipe segments weighing over 20 tonnes apiece were loaded and unloaded, transported, and welded. The chances of an accident occurring

under these complex circumstances had to be minimised. A key statistical figure used to measure the safety of an operation is the LTIF, or Lost Time Injury Frequency. It reflects how many lost time injuries occur per million hours worked.

Offshore construction work for Line 1 and Line 2 of the Nord Stream Pipeline totalled 6.2 million man hours. There were seven accidents offshore that resulted in lost time injuries. This yields a Lost Time Incident Frequency (LTIF) of 1.13. "We learned from our experience with Line 1. During the offshore pipelay work on Line 2, there was a single accident resulting in lost time injury – consequently the

Line 2 LTIF was a lot lower than that for Line 1," says Preston. The overall LTIF for the entire offshore pipelay work on both lines of the Nord Stream Pipeline compares favourably with those from the rest of the European oil and gas industry. According to figures published by the Oil and Gas Producers Association, the LTIF rate for offshore construction in Europe in 2010 averaged a value of 1.46. The next big steps that lie ahead are the pre-commissioning activities and the underwater welding works on Line 2. Preston states: "We will continue to be vigilant. And the record from Line 1 shows that the experts that we have contracted to do this high-risk work have proved it can be done safely."

A Fresh Start to the Classics

The Baltic Youth Philharmonic sets sail on this year's tour

The Baltic Youth Philharmonic is now tuning up for its fifth season. Every year, the orchestra provides approximately 90 highly talented conservatory students with the opportunity to gain valuable concert experience. This year's tour was launched in Dresden at the end of May. The young musicians will be performing works by famous composers such as Beethoven and Rachmaninov, and also lesser-known pieces from the Baltic region, as well as the premiere of "Never



Conductor Christian Järvi applauds his young musicians.

Ignore the Cosmic Ocean" by 26-year-old Lithuanian composer Gediminas Gelgotas. Another highlight is the concert at the Usedom Music Festival, where the orchestra will perform Mussorgsky's hugely popular

"Pictures at an Exhibition". Those who missed the start of the tour still have a few opportunities to experience the orchestra live and in person:

11.08. Berlin,

Young Euro Classics

16.08. Copenhagen,

Koncerthuset

17.08. Göteborg, Open Air

Concert at the Culture Festival

31.08. Stockholm,

Baltic Sea Festival

15.09. Peenemünde, Opening

Concert Usedom Music Festival,

Conductor: Kurt Masur

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