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## **Worldflow Flash Report**

# *News from the Front: Gastech 2011, Amsterdam*

March 24, 2011 (Amsterdam, The Netherlands) – This week we are reporting to you from Gastech 2011 in Amsterdam. This is the 25<sup>th</sup> edition of this important show, which is held annually and features many of the largest exploration and production companies in the world. This year's conference, sponsored by Shell, showcases ExxonMobil, Chevron, BP, Saudi Aramco, Adnoc, Petrobras, GazProm, and other oil and gas producers. Some of the engineering companies represented include Fluor, UOP, Framo Engineering, and GL Noble. A number of flowmeter companies also exhibited, including KROHNE, Endress+Hauser, GE, Siemens, ABB, and RMG (part of Honeywell), and FMC Technologies.

One of the most important themes of the show is the importance of liquefied natural gas (LNG), and developing different methods for transporting it, loading it, and offloading it. LNG is cooled to a temperature of about 160 degrees Centigrade, where it assumes a liquid form. This reduces its volume by about 600 times, and makes it much easier to transport. It is typically compressed onshore at an LNG facility, loaded onto tankers, and transported across the ocean to remote regions of the globe. Once it has reached its destination, it typically goes through a regasification process where it is converted back to natural gas and shipped by pipeline to its ultimate destination.

One new concept soon to be a reality is floating LNG (FLNG), which involves offshore production, storage, and offloading of LNG in offshore locations where it is impractical or too expensive to build a pipeline to transfer natural gas onshore. Today, natural gas drilled from an offshore oil and gas well is typically sent by pipeline to an onshore location, where it can be transported to a distribution company. For example, Qatargas operates several platforms offshore from Doha, its capital. Natural gas is sent via pipeline laid underground in the Persian Gulf to Abu Dhabi, where it is received by Dolphin Energy. From here, Dolphin Energy distributes the gas through much of the United Arab Emirates (UAE) and Oman.

With FLNG, gas will be able to be transferred directly from offshore platforms and ships, or from offshore underground gas reservoirs, in locations where it is impractical or too expensive to build a pipeline to transfer to natural gas onshore. Before being transferred onto the ship, the natural gas has to go through a liquefaction process.

FMC, Framo, and other companies are separately developing ways to offload LNG from offshore platforms and ships. Framo is working with a company called Nexans to develop a tandem method for transferring LNG directly from one ship to another even in choppy seas. Using long, flexible Cryodyn pipes, LNG can be transferred in a tandem method from one ship to another. This process has been in development for 13 years, and involves cooperation among five companies: Framo, Nexans, Aker Pusnes, MIB and Seaflex. In a tandem process, the ships are nose to stern, rather than side by side. The problem with side-to-side transfer of LNG with standard, rigid pipes, is that waves can disrupt the process if the weather is turbulent or unstable.

FMC Technologies has also developed a process for tandem ship-to-ship transfer of LNG. FMC's tandem method also allows the transfer of natural gas to a ship directly from underground natural gas reservoirs. Once on the ship, it is liquefied and transferred to LNG storage tanks.



*Belinda Burum with FMC's Articulated Tandem Offshore Loader*

None of the systems developed by Framo or FMC have yet been deployed. We have learned that both Shell and Petrobras plan to announce the deployment of FLNG ships later this year. However, they have not yet announced which technology they plan to use.