**August 2017**

**Tests Confirm that New Patented Buoyancy Design Eliminates VIV in High Currents and Minimizes Drag**

A major milestone is successfully completed under the joint development agreement between Diamond Offshore, Inc. and Trelleborg that focuses on creation of a helically grooved buoyancy design with enhanced performance for drilling riser operations in high current conditions. Test results revealed that, when using the patented design, Vortex Induced Vibration (VIV) is effectively eliminated in high currents, with the added bonus that drag loading on the riser is also reduced to a level comparable with fairings.

In June of this year, tow tank testing on the patented helically grooved design was performed with the high Reynolds number VIV test rig at SINTEF Ocean’s Marine Technology Laboratories in Trondheim, Norway. The joint facility, under SINTEF and the Norwegian University of Science and Technology (NTNU), is one of the premier hydrodynamic research facilities in the world, allowing testing of the new buoyancy design in the supercritical flow regime representative of offshore current conditions.

Antony Croston, Business Group Director with Trelleborg’s offshore operation in Houston says: “Based on the extensive modelling performed by both Diamond Offshore and ourselves, we were very confident that the design would be fully validated by testing. In reality, the results exceeded even our own expectations.

“For many years, fairings have been accepted as the best technical solution for drag and VIV reduction on drilling risers. Their use has come with an operational penalty in the form of increased running and retrieval time, as well as handling issues, especially in harsh weather. We now have an integral concept, which has been proven to match the performance of fairings, without any issues in drilling riser handling and running methodologies.”

The extensive test program provided valuable hydrodynamic data confirming the design’s drag reduction and VIV suppression performance. Fixed and dynamic drag coefficients of the new design were recorded during separate fixed and free vibration tow testing. Drag coefficients at an average of 0.65 were observed for relevant flow regimes, which is comparable to the performance of riser fairings. This is achieved through the highly successful VIV suppression of the design, effectively eliminating VIV response and subsequent drag amplification in the high excitation response range of offshore drilling risers.

Forced motion testing of the helically grooved design was also performed to better understand excitation of the riser under high current conditions and for the development of lift coefficient data for use in analytical fatigue damage prediction programs.

The helical drag reduction and VIV suppression performance shows strong independence of current speed, which is consistent with the behavior of an external helical strake. However, the underlying flow physics causing the suppression are quite different, leading to the suitability of the helically grooved design for large diameter drill riser buoyancy.

Both Diamond Offshore and Trelleborg are delighted with the success of the joint development, which has resulted in the validation of the design through tow tank testing. In addition, Trelleborg has manufactured and delivered two complete strings to Diamond Offshore that have been recently deployed in the Gulf of Mexico. The two companies look forward to making this technology available to the offshore drilling industry to enhance safety and efficiency of operations in environmentally challenging locations around the globe.

 **~ENDS~**

**For press information:**

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**Notes to Editors:**

**About Diamond Offshore**

Diamond Offshore is a leader in offshore drilling, providing contract drilling services to the energy industry around the globe. Additional information and access to the Company’s SEC filings are available at www.diamondoffshore.com. Diamond Offshore is owned 53% by Loews Corporation (NYSE: L).

**Trelleborg’s offshore operation and Trelleborg Group**

Using advanced polymer material technology, Trelleborg’s offshore operation provides high integrity solutions for the harshest and most demanding offshore environments. As part of the Trelleborg Offshore & Construction Business Area of Trelleborg Group, **Trelleborg’s offshore operation** specializes in the development and production of polymer and syntactic foam based seismic, marine, buoyancy, cable protection and thermal insulation products, as well as rubber-based passive and active fire protection solutions for the offshore industry. Within its portfolio are some long established and respected brands including, CRP, OCP, Viking and Emerson & Cuming. Trelleborg’s offshore operation has been providing innovative solutions to the industry for over 30 years. [www.trelleborg.com/offshore](http://www.trelleborg.com/offshore)

**Trelleborg** is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way. The Trelleborg Group has annual sales of SEK 31 billion (EUR 3.23 billion, USD 3.60 billion) and operations in about 50 countries. The Group comprises five business areas: Trelleborg Coated Systems, Trelleborg Industrial Solutions, Trelleborg Offshore & Construction, Trelleborg Sealing Solutions and Trelleborg Wheel Systems, and the operations of Rubena and Savatech. The Trelleborg share has been listed on the Stock Exchange since 1964 and is listed on Nasdaq Stockholm, Large Cap. www.trelleborg.com.