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## Disconnectable FPSO—Technology To Reduce Risk in GoM

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### Abstract

The paper describes the Submerged Turret Production System (STP) and a state of the art disconnectable FPSO. The STP technology is well proven in the North Sea, South China Sea and other offshore arenas worldwide for both disconnectable FPSO's and for permanent mooring configuration. Lately it is being used for turret mooring of one of the worlds largest FPSOs located in Mexican waters in Gulf of Mexico on the PEMEX KuMaZa field. The FPSO is scheduled for first oil April 2007 and a short update of this project is presented.

The STP technology is built on the Submerged Turret Loading – STL technology used for Offshore Loading of Crude Oil, which is further developed for Discharge of Natural Gas and is the basis for the world's first Offshore LNG Receiving Terminal, Gulf Gateway - located in US Gulf of Mexico, Block WC 603. The paper presents this turret technology and how this technology can significantly reduce development risks in the Deep Water Fields in GoM and how it subsequently can have a positive impact on insurance premiums for the FPS/FPSO facility due to the ability to safeguard and sail away from Hurricanes.

### Introduction

The ability to easily connect and disconnect a single point mooring and riser system in a safe way is attractive for a number of reasons. The most obvious reason in Gulf of Mexico is to be able to remove the vessel in case of a hurricane. The technology described, has been developed over a period of 15 years, starting in the North Sea with the STL loading system for shuttle tankers and the disconnectable STP mooring and riser system for FPSOs. Basically the technology is the same, utilizing a submerged buoy integrating riser buoy and turret in one compact module which all together is disconnected.

The STP technology was first time used in 1997 to develop the Lufeng 11-2 in the South China Sea, where the FPSO is disconnecting when a typhoon is approaching within a certain distance from the field. This approach will be directly comparable to the Gulf of Mexico.

The STP technology is also used for staying permanently moored in a 100 year weather condition. The system is inherent disconnectable, it is just a matter of how quick the disconnection will be performed.

In the following chapters the STP disconnectable turret system is discussed in more detail. The presentation is followed by references to specific field developments utilizing the STL/STP technology. The first example are the KuMaZa field development in Mexico which is one of the worlds largest FPSO in terms of storage (360,000 DWT) and oil throughput (600,000bopd). The second example is how the STL technology at Gulf Gateway Offshore LNG Terminal handled hurricane Katrina and Rita.

The paper finally describes a State of the Art new generic FPSO fitted with STP System and suitable for GoM regulatory regimes and environmental conditions scheduled for delivery in June 2009.

### STP System

The STP mooring and riser system can be divided into two main parts. The first part is the STP Subsea System, which contains the turret buoy and all mooring, risers and umbilical components that is connected to the seabed. The second part is the Shipboard System which includes all swivel, connector, locking mechanism equipment etc onboard the FPSO and is needed for operating the STP system.