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## An Independent Remote Monitoring System for Gulf of Mexico Deepwater Floating Production Systems

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### Abstract

BP has a comprehensive Integrity Management program in place to ensure safe operations of its Gulf of Mexico (GoM) deepwater assets. As part of its integrity management efforts, BP has installed permanent Integrated Marine Monitoring Systems (IMMS) on each of its seven Gulf of Mexico deepwater floating systems. The IMMS system monitors critical environmental and floating system response parameters and archives and transmits data to shore in “near real time.” In addition to the permanent IMMS system, a back-up system called the Independent Remote Monitoring System (IRMS) has also been installed on these floating systems, and is the subject of this paper.

The IRMS is not a full back-up of the IMMS system. Rather, it is a back-up system with limited capabilities designed to transmit vital information onshore, in near real time, in the event of a platform evacuation during hurricane conditions. The IRMS is fully independent from the primary IMMS system in terms of sensors, power sources, data acquisition and transmission systems.

The IRMS sensors include: Differential Global Positioning System for platform offsets; inertial 6 degree-of-freedom motion package to measure platform roll, pitch and heave; ultrasonic wind anemometer to measure wind speed and direction; air temperature, humidity and barometric pressure sensors; and three or four video cameras. The IRMS system is self-powered (batteries recharged by solar panels) and does not rely on any platform power supply for operation. The IRMS system has an independent (different from the primary IMMS system) satellite link to enable near real-time data and video transmission back to shore throughout a hurricane event,

as well as internal storage to provide “black box” type forensic analysis capability.

This paper describes the components and sub-systems that make up the IRMS, the data acquisition and transmission methods, the operational modes, and information retrieval process that provides the near real-time indications of environmental conditions and platform behavior during periods of evacuation. Also, the paper presents some of the requirements that dictated the system design.

### Introduction

During the 2004 and 2005 hurricane seasons, many deepwater floating facilities in the Gulf of Mexico (GoM) either lost power or lost communications to shore. During Hurricane Rita, onshore facilities in Houston were also impacted by adverse weather conditions, which resulted in lost communication from shore to offshore facilities.

Loss of power or communications renders platforms invisible to the existing conventional shore-based monitoring. BP recognized the need for reliable back-up remote marine monitoring of its offshore floating facilities when evacuated. A goal was set to achieve this prior to the 2006 hurricane season.

The Independent Remote Monitoring System (IRMS) provides this back-up solution for maintaining communications with each of the offshore facilities and transferring critical marine data during periods of evacuation.

The IRMS is a totally independent marine monitoring system that does not rely on any platform service for it to operate. The IRMS has its own measuring instruments for gathering weather, position and vessel motion data. In addition, the system has its own onboard computer complete with hard drive, satellite communications, video surveillance, and power system including solar panels for recharging the primary power supply. The design is such that the only connection the IRMS has with the platform is through the foundation it sits on.

The system’s satellite link enables near real-time data and video transmission back to shore throughout an evacuated