



Severe weather preparation tops list of concerns after 2 record hurricane seasons in US Gulf

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SEVERE WEATHER preparedness tops the list of industry concerns in the wake of two historic hurricane seasons. Government and industry are together seeking solutions to improve response and rig stability. This topic, plus a panel discussion on mooring issues, kicked off IADC Drilling Gulf of Mexico 2005 on 30 November in Houston.

The first clear observation is the high degree of efficiency of the offshore E&P industry in safely evacuating personnel from the Gulf of Mexico. Remarked **Don Howard**, Regional Supervisor, Field Operations GOM, US Minerals Management Service, "To my knowledge through these storms, not one person was injured." And are industry evacuation procedures adequate? "Apparently so," he remarked. Mr Howard also noted that offshore pollution was minimal.

Hurricane Katrina hit MMS hard. The agency relocated 150 of its New Orleans-based staff to Houston. Due to water damage to the top floors, MMS is only occupying the building's first 5 floors.

MMS has more questions than answers regarding MODU mooring. Mr Howard asked if current standards for anchors and synthetic mooring and their inspection are adequate. "How do we determine what's an adequate mooring spread for a given site?" he asked. "It's the crest that really impacts the facility if it hits the deck."

Fourteen moored MODUs stood in Katrina's path and 16 in Rita's. Six broke free under Katrina's fury and 13 in Rita's.

The last two hurricane seasons, particularly 2005, hit historic highs. Whether this is the kick off of a cycle of epic-strength hurricanes, as some predict, remains to be seen. What is clear, however, is that the scope of Gulf of Mexico development has intensified over the last 15 years, offering more fodder for inevitable severe storms. More floating and subsea installations

operate in the Gulf, as well as more permanent deepwater operations with higher production rates. There are more deepwater MODUs with taut-leg or pile mooring, compared to the catenary and drag - anchor systems common years ago. Further, MODUs are larger, creating more wave interaction. For example, displacements for deepwater rigs have more than doubled from 2nd to 5th generation MODUs. While a 2nd-generation semi with a 2,500-ft water-depth capability might have displaced 22,000 metric tons, today's 5th-gen semi capable of drilling in 8,000 ft of water can displace more than 45,000 metric tons. Finally, many MODUs stay on a single location for longer periods.

The number of pipelines and hubs offshore have increased dramatically. Since 1995, the length of GOM pipeline has grown 50% to 30,000 miles from 20,000. Also, the Gulf of Mexico is now home to approximately 20 shallow-water and 40 deepwater hubs that did not exist a decade ago, noted **Craig Castille** of **Dominion E&P**, who is chairman of a joint industry project on improving mooring in the Gulf of Mexico. With the current trend of more production moving to deepwater, these numbers will only increase.

These changes have prompted prudent operators and contractors to evaluate mooring options.

"As an operator, I can tell you that we do risk assessments when we moor near pipelines," Mr Castille remarked.

Some of the new mooring technologies coming aiming to mitigate pipeline risk in ultra-deepwater include synthetic mooring systems, suction pile anchors and deep-penetrating anchors.

Some proposals to mitigate mooring failures are simply not feasible, however. For instance, moving rigs out of the path of the storm simply introduces too many unknowns into an already touch-and-go situation.

The mission of the JIP is "to reduce the risk of MODU mooring failure to levels acceptable to all vested parties." The project is now fully funded at approximately \$1.5 million. However, new participants are welcome, Mr Castille said.

The project will verify metocean data, analyze historical mooring performance, conduct a deterministic mooring analysis for different rigs, mooring systems and water depths, and perform reliability and risk assessment, including acceptable design standards. Finally, the JIP will recommend changes to the API Code of Practice.

Not all solutions will be relevant for all rigs, of course. Noted **Darrel Pelley**, Discipline Manager-Marine & Structural Engineering, for **Transocean**, "We need to have the right balance that keeps the oil flowing and keeps the rigs working in the Gulf of Mexico."

An interim guidance on mooring design will be issued in the spring, with completion slated for the 4th quarter of 2006. However, Mr Castille noted that the JIP is eager to accelerate the schedule.

Meanwhile, one drilling contractor is stepping up to achieve an ambitious goal. Noble Corporation has announced a new design objected to achieve a mooring strength equivalent to API RP 2SK permanent mooring standard. The company has dubbed the standard the NC-5, for Noble Category 5. NC-5 is based on the API RP 2SK permanent mooring standard for floating production systems.

NC-5 signifies a mooring line strength rating expected to survive a Category 5 level hurricane wind speed, combined with associated wave and current conditions, explained **Jitendra Prasad**, Vice President-Technical Engineering for Noble.

"For year round MODU operations in the Gulf of Mexico, including hurricane season, mooring failure risks will be reduced if the mobile mooring standards are similar criteria as the permanent mooring standard," he said.

IADC will convene a Mooring Workshop on 23 May at the Omni Houston Hotel Westside. For more information, contact **Leesa Teel** (leesa.teel@iadc.org; 1/713 292 1945).