

2005 Hurricane Readiness and Recovery Conference

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**Riser Management in Severe Environments
Managing Risk**

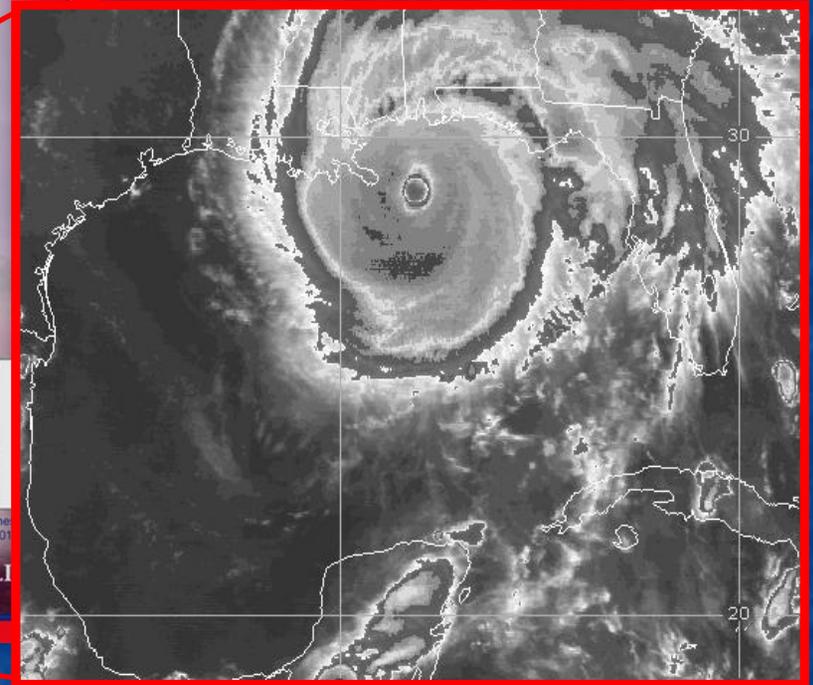
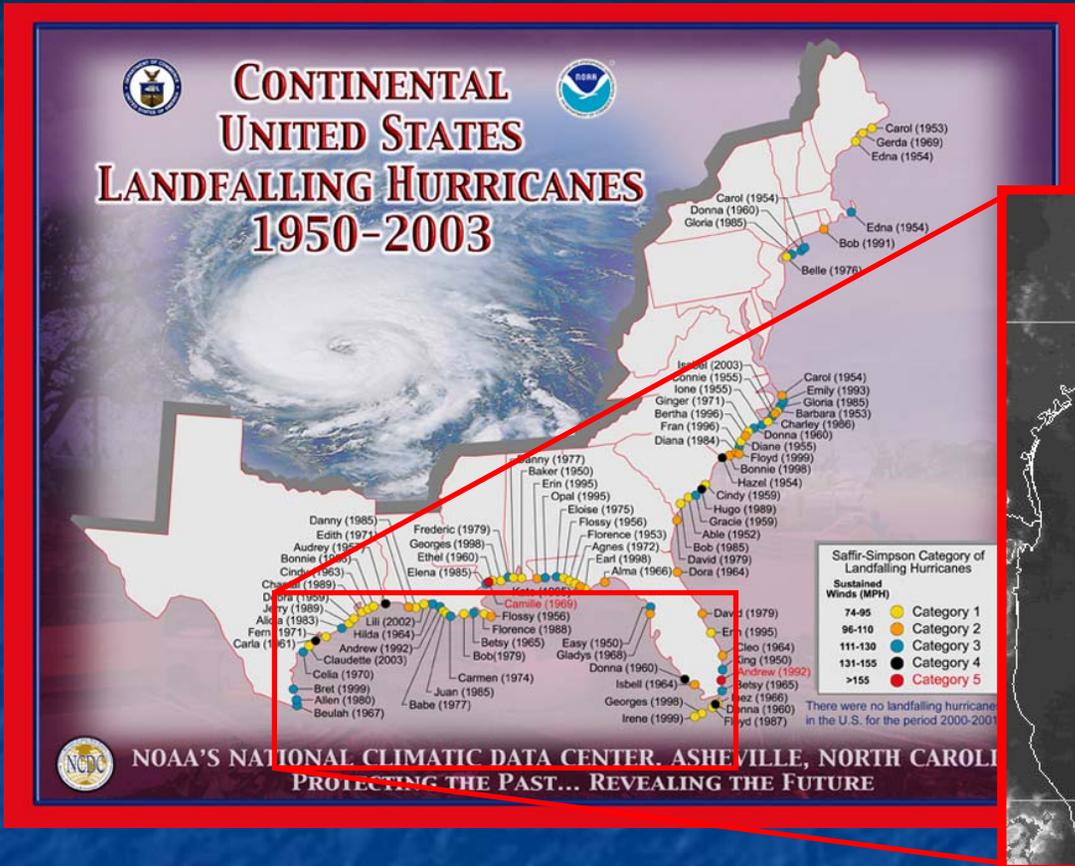
Riser Management in Severe Environments

- **What is a Severe Environment?**
 - ✓ **Tropical Revolving Storm (Hurricane, Cyclone)**
 - ✓ **Oceanic, Wind-driven or Eddy Currents**
- **The severity of the environment is directly related to the operations being performed.**
 - ✓ **Drilling**
 - ✓ **Tripping**
 - ✓ **Running Casing**
 - ✓ **Drill Stem testing**
- **Some type of operations have more stringent weather limitations.**
 - ✓ **Drilling ahead is a good example**



Riser Management in Severe Environments

The area affected by the storm is much larger than the path of the eye wall



There are no discernable patterns in the landfall probabilities and intensity of hurricanes affecting the continental United States

Riser Management in Severe Environments

The concept of riser management is such that when properly executed, we don't have to manage marine drilling risers in the storm environment.

Purpose of Riser Management (Why)

To Minimize Risk -

- ✓ of pollution from unplanned discharges
- ✓ of equipment damage
- ✓ of infrastructure damage
- ✓ of personal injury

Key Riser Management Issues relating to Storm Preparedness:

- ✓ Understanding equipment and people limitations
- ✓ Proper planning
- ✓ Timely execution



Managing Risk in Riser Operations Everyday:

- **DO** - obtain credible site-specific data, including metocean and bathymetry.
- **DO** – have a site-specific riser management plan.
- **DO** – minimize differential riser angles.
- **DO** – have a reliable means for sensing currents throughout the water column and for monitoring riser angles during operations.
- **DO NOT** – unlatch BOP in any environmental conditions under which the riser cannot be retrieved.
- **DO NOT** – attempt to run or retrieve BOPs in high surface currents unless reliable current measurements through the water column indicate that riser angles can be managed within recommended limits

Riser Management in Severe Environments

Storm preparedness planning, mitigating risk:

- **DO** – Have a predefined plan for storm preparedness.
- **DO** – Retrieve the LMRP and marine drilling riser prior to encountering tropical storm environments.
- **DO** – Review and update T-time estimates on a routine basis during storm season to reflect changing operating and environmental conditions (such as high currents and well construction operations).
- **DO** – Maintain the ability at all times to manoeuvre a DP installation out of the path of a tropical storm environment to sufficient distance to protect personnel and equipment. This means allotting sufficient time to retrieve and stow the riser system onboard.

Riser Management in Severe Environments

What if a riser cannot be retrieved?

There are situations where well construction operations prevent unlatch and pulling the riser at the best opportunity, resulting in all or part of the riser suspended beneath the unit

While it is always preferable to retrieve and secure the marine riser on deck, riser systems are designed to survive severe storm environments in a suspended state.

This a routine practice in other harsh-environment operating areas

Mitigating Risk while Suspended

- **Pull as much as possible. Shorter riser strings have shorter natural periods and less severe dynamic response**
- **Properly support the marine riser**
 - ✓ **Gimbale Spider**
 - ✓ **Shared Load Path (hook/tensioners or hook/substructure)**
- **Use of a landing joint (when possible) to increase the annulus around the riser in the diverter housing and prevent damage to buoyancy and peripheral lines.**

Conclusions...

- Riser Management is a methodology that we practice every day. Storm preparedness is one aspect of riser management
- The importance of site-specific data can never be underestimated.
 - As an example, simultaneous occurrence of tropical cyclone and eddy current must be considered.
 - Site-specific bathymetry is crucial for DP rigs which may unlatch and drift while retrieving risers
- Consistent application of riser management strategy minimizes exposure to risk associated with severe storms
 - A plan is only useful if it is executed in a timely manner and an organized fashion