



[COMPLIANCE TIPS]

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Need is real for risk assessments of energy infrastructure

Damage to fixed and floating structures, pipelines, onshore terminals and refineries during the past few hurricane seasons has reinforced the need to develop accurate risk assessments not only to determine overall risks for particular operators but also to identify the components of that risk so that appropriate mitigations can be undertaken. Losses from hurricane damage are not limited to physical damage; the many interconnections between assets in the product chain mean that production losses can impact even those operators that experience little or no physical damage. The 2004 and 2005 hurricane seasons cost the industry approximately \$10 billion.

These losses should be viewed within the context of the potential for future losses in the short term. The oscillations of the Atlantic Ocean temperatures (which can span decades) coincide with oscillations in the frequency of powerful hurricanes. In the decades of warmer ocean temperatures, the occurrence of Category 3 and higher storms is twice as likely as during periods of cooler temperatures. The current period of warmer temperatures means that damaging storms are more likely to occur now and for

a number of hurricane seasons to come. Therefore, understanding the hurricane risk associated with oil and gas production operations in the Gulf of Mexico is of even greater importance.

Physical damage to offshore assets is generally well understood. The industry has been operating in the Gulf of Mexico for more than 50 years, and there is a wealth of practical experience as well as scientific research to support the way structures are designed and to understand how they'll respond to extreme events. This long history can also be used to help predict the response of facilities based on their age and other available data.

Looking at fixed platforms as one example, there have been relatively clearly defined changes to the design approach for offshore facilities, particularly fixed platforms, over the years. Using what we know about how platforms of a certain vintage were designed, we can predict how they will respond today. Further refining that knowledge with information about the condition of the facility and the height of its deck can greatly improve these vulnerability estimates. Other asset types, such as MODUS

(mobile offshore drilling units), floating facilities and pipelines, can be evaluated in a similar fashion.

Business interruption costs are equally important as part of a risk evaluation as physical damage. The supply chain that links Gulf of Mexico assets has significant interdependency, and the ability to evaluate the performance of the network as a whole greatly enhances the risk assessment.

With probabilistic techniques, the risk assessment is further strengthened. Uncertainties in data can be accounted for, a wide range of possible events can be assessed in a single analysis and one is better able to identify the overall risk distribution across the entire network, not just for a few assets. This enables bottlenecks in the supply chain to be identified and mitigation efforts can then be optimized.

The potential for damaging hurricane events is in a more frequent cycle. And with the heightened importance of Gulf of Mexico oil and gas production to the nation's energy supplies, it is important to get a realistic view of the potential risk to this important supply network. The experience of the industry gives us the input nec-



essary to make full use of existing risk assessment techniques and provide valuable insight into where risks lie and what mitigations are best suited to minimizing them.

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