

Project Number:	618
Category:	<i>Standards/Regulations</i>
Date:	June 2009
Subject:	<i>Comparative Study of Offshore Wind Turbine Generators (OWTG) Standards</i>
Performing Activity:	MMI Engineering
Principal Investigators:	D. Dolan
Contracting Agency:	Bureau of Safety and Environmental Enforcement
Summary:	MMI Engineering performed an engineering study to determine the requirements for standards suitable for offshore wind turbines in the OCS. A direct comparison was conducted of the American Petroleum Institute (API) RP-2A recommended practice for fixed offshore platforms, and IEC 61400-3, the international design standards for offshore wind turbines. Both standards were compared, in terms of structural reliability, for extreme storm conditions, including specific case studies.
Key Findings:	<ul style="list-style-type: none"> • The relative safety level for either guideline depends on the ratio of the 100- to 50-year load, which is dependent on the variability in metocean conditions. • Greater factors of safety will be needed for either guideline to be suitable for tropical storm conditions. • Either guideline can be modified with adjustments to load and/or resistance factors to achieve a target level of reliability. • The BOEM/industry recognizes that API guidelines, incorporated by reference into 30 CFR Part 585, are not suitable by themselves for offshore wind turbine design. Therefore, a need exists for rulemaking changes.
Recommendations:	<ul style="list-style-type: none"> • The U.S. wind industry should address the definition of a minimum acceptable reliability index to allow the calibration of either API or International Electrochemical (IEC) guidelines to OCS conditions. • Methods for calculating critical loading conditions, such as wave slam forces, need further study, since current standards are inconsistent and incomplete, and wave slam forces can become the critical load case, especially on monopile foundations.
Subsequent Studies/Activities:	<ul style="list-style-type: none"> • TAP 651: <i>Evaluate the Effect of Turbine Period of Vibration Requirements on Structural Design Parameters</i> • TAP 670: <i>Design Standards for Offshore Wind Farms</i> • TAP 672: <i>Development of an Integrated Extreme Wind, Wave, Current, and Water Level Climatology to Support Standards-Based Design of Offshore Wind Projects</i>
Report Link:	AA : Comparative Study of OWTG Standards, June 29, 2009 by MMI Engineering, Inc., Oakland, CA

	<p>AB: "Offshore Wind Turbines: Extreme Wind/Wave Risk and Regulatory Needs" presentation from AWEA's Offshore Wind Project Workshop, Wilmington DE, September 2008.</p>
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