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Specification of Underwater Fiber Optic Connectors for Neutrino Telescope systems

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Connectors for underwater use are an important component of many subsea systems, they make it easier to conduct onshore or offshore testing, easier to manage cabled assemblies and facilitate ease of installation during deployment. Underwater connectors come in a variety of types and configurations, a majority of the underwater connectors are either dry-mate or wet-mate having electrical or optical contacts or a combination of both, typically called hybrid connectors. These underwater connectors are being used for Subsea Neutrino Telescope systems, demonstrating their value to Neutrino detection projects. Currently, Neutrino Telescope systems are typically making use of the commercially available underwater connectors. These commercial connectors have been developed over the past decades for naval acoustic arrays, ocean science observatories and connection of umbilical's and control equipment for offshore oil and gas facilities. As the offshore industry evolves, testing and demonstrating newer Subsea Neutrino Telescope systems, brings more focus on critical technologies required for the system to perform reliably. While, certain underwater connectors are well proven with a good field history and track record, more advanced optically based Neutrino Telescope systems utilizing fiber optic dry-mate and wet-mate underwater connectors become an increased focus on reliability to ensure that these technologies are ready for the market.

Summary

To ensure that these underwater connection technologies are ready for the market much focus is placed on their development. Typical underwater connector development programs include; design and feasibility studies, prototyping, concept reviews, critical design reviews (CDR's), failure mode, effects, and criticality analysis (FMECA's), final design reviews (FDR's), test readiness reviews (TRR's), detailed qualification programs, and pilot project deployments. This paper reviews the processes and considerations in the specification of reliable subsea connectors for use in a Neutrino Telescope type system.

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