

08TH MARCH 2017

FRONTIER DEEPWATER APPRAISAL SOLUTIONS LLC
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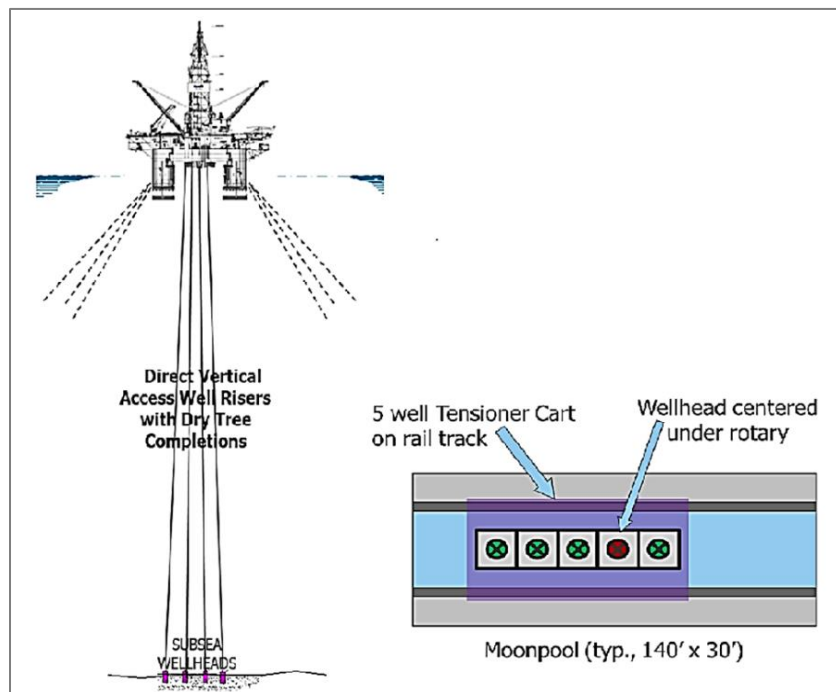
Subject: **ABS (Concept) Approval in Principle for:
Ultra-Deepwater Appraisal Production System (APS)**

Dear [Mr. Roy Shilling / Mr. Chuck White](#),

We have your submitted copies of documentation as listed in Appendix A, and requesting ABS *Approval-in-Principle* for the subject concept design.

ABS review of the concept design (as shown in [figure 1](#)) is based on the submitted drawings and documents, and our current scope of work:

- Use of Moon pool Tensioner Cart philosophy to align wellheads beneath center of drilling derrick
- Tensioner Cart sliding and Locking Philosophy
- Impact of Tensioner Cart and well/riser tieback system loads on the MODU's deck and column structures, especially on Moon pool structure (Well Systems interface to MODU)
- Riser Design Philosophy (Riser Stretch and Slack)
- Impact of additional equipment added on MODU structure
- Use of Taut Leg Polyester Mooring System



[Figure 1: APS Concept](#)

The purpose of this high level review with focus on safety is to investigate the feasibility of the subject design and identify any major deficiencies that would prove problematic in a full ABS review of the design for classification of the subject APS system. At this point ABS do not foresee any major engineering roadblocks to grant "Approval-in-Principial (Concept)" to

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the Frontier Deepwater APS Concept design provided following are addressed during subsequent stages of the technology maturation process:

1. ABS design requirements per following ABS Rules and Guide are addressed during subsequent design and engineering phases.
 - ABS 2012 (Updated Dec 2015) Guide for Classification of Drilling Systems (ABS CDS)
 - ABS Guidance Notes on Review and Approval of Novel Concepts (June 2003)
 - 2016 ABS Rules for Building and Classing Mobile Offshore Drilling Units (2016 MODU Rules)
 - ABS Rules for Building and Classing Offshore Installations
 - ABS 2015 Guidance Notes on Failure Mode and Effects Analysis (FMEA) for Classification
2. ABS Preliminary Review Observations and Comments as identified in Appendix B (Roadmap to Approval) are addressed during subsequent design and engineering phases.
3. Subsequent safety studies (i.e. HazID, HazOP, FMEA etc.) is performed.

Please be advised that we have not carried out any calculations, analysis or strength assessment as part of this review and the design may be subject to modifications based on such calculations and/or advanced analyses which are to be performed during subsequent design and engineering phases.

ABS reserves the right to make further comments and amendments due to submittal of additional information or drawing revisions as the design progresses.

If we may be of further assistance, please feel free to contact Sohail Mohammed at 281-877-6213 (somohammed@eagle.org), Harish N. Patel at 281-877- 6035 (HPatel@eagle.org) or the under sign at 281-877-6374 (MChakala@eagle.org).

Very Truly Yours ,

Roy H. Bleiberg

Vice President Of Engineering
ABS AMERICAS

By _____

Mathew Chakala
Manager,
Engineering Services Department (ESD)

CC: Roy H. Bleiberg
Mathew M. Chakala
Harish N. Patel
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