Mechanically Connected Pipelines- Joint Industry Project (JIP)

To bring significant cost benefit to the Industry, DNV GL is motivated to facilitate technology qualification using DNV-RP-A203; and thereby develop best practice guidance for the Industry on mechanical connector application for deep-water field developments.

Benefits:

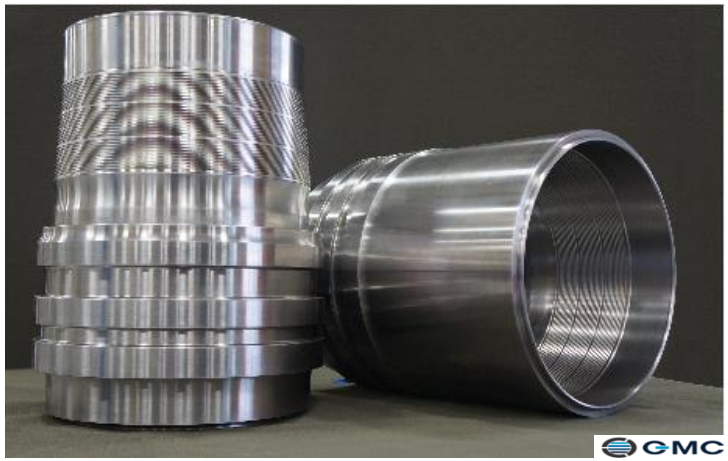
- ✓ Reduced offshore installation time
- ✓ Installation with smaller installation vessels
- ✓ Standardize connected pipeline systems
- ✓ On-shore prefabricated joints for better project control
- ✓ Increased fatigue resistant joints
- ✓ Recoverable, re-usable and repairable systems
- ✓ Simplified installation for large diameter clad lined and non-clad pipelines

Project Attributes:

- ✓ Review test activity performed, identify gaps and develop qualification program in a quick turn around Phase-1 of the JIP (3 Month target)
- ✓ Perform Technology feasibility study and Qualification within 1 year of the JIP launch
- ✓ Join DNV GL experts in developing Connected pipeline guidance

DNV GL shall utilize relevant existing test data to speed up the Qualification process

For the current qualification program GMC Deepwater connectors are considered due to available test data



Value Delivered:

- ➢ Significantly reduce CAPEX expenditure with lower contract lead times, faster installation and the possibility for utilizing locally sourced contractors with smaller installation vessels
- ➢ Application of connected pipelines for your immediate project needs (2018-2019) by utilizing existing test data for a faster JIP qualification program
- ➢ Faster Project schedule with standardized on-shore pre-fabricated joints
- ➢ Increase feasibility of large export line projects with simplified installation of large diameter pipelines; feasibility of deep-water projects with faster installation while maximizing the available weather window

JIP Roadmap

JIP Phase I and Phase II: Qualification Program for GMC Connector (Contingent on in-kind test data/details for DNV GL evaluation)

Phase I: Planning

Overall Scope: Evaluate Connector Qualification Basis (TQ Basis: performance targets); Perform Technology and Threat Assessment, Review existing test data (GMC) for suitability and crediting purposes AND develop JIP qualification plan (TQ Plan).

Deliverable: Technology Gap Report (Current Status of test data and creditability; and what needs to be done).

Qualification Plan (TQ Plan) for Phase-2

Fee: $35,000 USD/ Participant

GOAL

1) Understand the status (quality and validity) of GMC test data; identify if any data could be used for crediting towards a JIP Qualification process.
2) Develop JIP Qualification plan (for execution in Phase II)
3) Target Phase I Time frame: 3 Months

Upon sufficient participation

Phase II: TQ Program Execution

Overall Scope: Activity according to TQ Plan developed in Phase I; Additional study as determined by the steering Committee (e.g. Global performance assessment).

Deliverable: Qualification/ Feasibility Statement

(Contingent on JIP Qualification of the connectors according to criteria set in qualification basis)

Fee: TBD.

GOAL

1) Provide participants with the GMC Connector qualification/ feasibility statement for immediate application.
2) Target mid-2018 completion of qualification program

Subsequent Phases: Guidance

JIP Subsequent Phases: Additional Connector types and Vendors (to facilitate DNV GL to develop guideline for connected pipelines)

TQ Program/ feasibility study **for other connector Vendors**
Develop feasibility/ acceptance criteria- Design through Installation Guideline Report Development

GOAL

Understand and Evaluate/ Develop all parameters/ criteria for a stand-alone **Connected pipeline assessment Guideline**

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