DEP SPECIFICATION

DEEPWATER JUMPER DESIGN, MEASUREMENT, FABRICATION AND TESTING

DEP 37.80.00.38-Gen.

February 2017

ECCN EAR99

DESIGN AND ENGINEERING PRACTICE

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The objective is to set the standard for good design and engineering practice to be applied by Shell companies in oil and gas production, oil refining, gas handling, gasification, chemical processing, or any other such facility, and thereby to help achieve maximum technical and economic benefit from standardization.

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2) Other parties who are authorised to use DEPs subject to appropriate contractual arrangements (whether as part of a Service Agreement or otherwise).

3) Contractors/subcontractors and Manufacturers/Suppliers under a contract with users referred to under 1) or 2) which requires that tenders for projects, materials supplied or - generally - work performed on behalf of the said users comply with the relevant standards.

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1. INTRODUCTION

1.1 SCOPE

This DEP specifies minimum requirements and gives recommendations for the design, fabrication, and testing of a deepwater subsea jumper system, used to make subsea connections establishing a flow-path between trees, manifolds, and/or flow-lines. It also specifies minimum requirements for making the subsea and onshore measurements required for jumper fabrication.

This is a revision of the DEP of the same number dated September 2011; see (1.5) regarding the changes.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by Shell GSI, the distribution of this DEP is confined to Shell companies and, where necessary, to Contractors and Manufacturers/Suppliers nominated by them. Any authorised access to DEPs does not for that reason constitute an authorisation to any documents, data or information to which the DEPs may refer.

This DEP is intended for use in facilities related to subsea oil and gas production. This DEP may also be applied in other similar facilities.

When DEPs are applied, a Management of Change (MOC) process shall be implemented; this is of particular importance when existing facilities are to be modified.

If national and/or local regulations exist in which some of the requirements could be more stringent than in this DEP, the Contractor shall determine by careful scrutiny which of the requirements are the more stringent and which combination of requirements will be acceptable with regards to the safety, environmental, economic and legal aspects. In all cases, the Contractor shall inform the Principal of any deviation from the requirements of this DEP which is considered to be necessary in order to comply with national and/or local regulations. The Principal may then negotiate with the Authorities concerned, the objective being to obtain agreement to follow this DEP as closely as possible.

1.3 DEFINITIONS

1.3.1 General definitions

The **Contractor** is the party that carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility. The Principal may undertake all or part of the duties of the Contractor.

The **Manufacturer/Supplier** is the party that manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The **Principal** is the party that initiates the project and ultimately pays for it. The Principal may also include an agent or consultant authorised to act for, and on behalf of, the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

The word **may** indicates a permitted option.

1.3.2 Specific definitions

Term	Definition
Metrology	The measurement process to define the spatial relationship between two subsea connector hubs that are to be joined by a jumper.

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1.3.3 Abbreviations

Term	Definition
AFC	Approved For Construction
AWS	American Welding Society
CTD	Conductivity, Temperature, and Depth
FAT	Factory Acceptance Test
FEA	Finite Element Analysis
FIV	Flow Induced Vibration
ITP	Inspection and Test Plan
JSA	Job Safety Analysis
MAOP	Maximum Allowable Operating Pressure
PDF	Portable document format
PLET	Pipeline End Termination
ROV	Remotely Operated Vehicle
SIT	System Integration Test
VIV	Vortex Induced Vibration

1.4 CROSS-REFERENCES

Where cross-references to other parts of this DEP are made, the referenced section or clause number is shown in brackets ( ). Other documents referenced by this DEP are listed in (7).

1.5 SUMMARY OF MAIN CHANGES

This DEP is a full revision of the DEP of the same number dated September 2011. The following are the main, non-editorial changes.

Section/Clause	Change
4.1, 4.3, 4.4, 4.7	Addition of flow induced vibration (FIV) as a design case
5.2.9	Requirement for Principal to approve the Contractor's proposed lifting specification

1.6 COMMENTS ON THIS DEP

Comments on this DEP may be submitted to the Administrator using one of the following options:

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DEP Feedback System (Users with access to Shell Wide Web)	Enter comments directly in the DEP Feedback System which is accessible from the Technical Standards Portal http://sww.shell.com/standards. Select "Submit DEP Feedback", fill in the online form and submit.
DEP Standard Form (other users)	Use DEP Standard Form 00.00.05.80-Gen. to record feedback and email the form to the Administrator at standards@shell.com.

Feedback that has been registered in the DEP Feedback System by using one of the above options will be reviewed by the DEP Custodian for potential improvements to the DEP.

1.7 DUAL UNITS

This DEP contains both the International System (SI) units, as well as the corresponding US Customary (USC) units, which are given following the SI units in brackets. When agreed by the Principal, the indicated USC values/units may be used.

1.8 NON NORMATIVE TEXT (COMMENTARY)

Text shown in italic style in this DEP indicates text that is non-normative and is provided as explanation or background information only.

Non-normative text is normally indented slightly to the right of the relevant DEP clause.

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2. GENERAL AND FUNCTIONAL REQUIREMENTS

2.1 GENERAL

1. The Contractor shall carry out the following activities:
   a. Perform the appropriate engineering, design, and analysis of the jumper system to meet the requirements of this specification, including the structural analysis, piping analysis, a complete stack-up tolerance analysis, and a ROV access analysis.
   b. Prepare all fabrication and assembly drawings, bills of materials, specifications assembly and test instructions, and installation and Operation & Maintenance procedures.
   c. Fabricate and assemble the jumper system.
   d. Perform testing of the jumper system, including Factory Acceptance Testing (FAT), and System Integration Testing (SIT), as required.
   e. Prepare the jumper system for shipment, including all necessary clean up and refurbishment of the equipment after the FAT and SIT, including preservation fluids, coatings, handling, and interim storage.
   f. Coordinate all interface information concerning the jumper system.
2. The jumper system shall work in conjunction with, and interface with other mating equipment systems, installation equipment, and vessels.

2.2 FUNCTIONAL

The Contractor will be supplied with a data sheet providing project specific information required in the execution of the work.

1. The jumper system shall include end connectors in accordance with DEP 37.81.40.35-Gen.
   a. The male connector hubs shall be located on the subsea infrastructure connection points.
   b. The female connector assemblies shall be part of the jumper spool.
2. The jumper shall meet the following functional requirements:
   a. Provide the means to connect production, gas or water injection wells, flow-lines, gas lift lines, manifolds or PLETs as required by project field architecture, based on measurements taken of the subsea tie-in points, as described in (3.3).
   b. Be capable of accommodating all applicable design loads, including those resulting from initial misalignment of the tie-in points and subsequent settlement and operational movement of the tie-in points.
   c. Be capable of retrieval with the relevant “worst case” loads and misalignments applied.
   d. Convey process fluids as defined in the data sheet, including all relevant chemicals and produced solids.
   e. Be suitable for remote ROV assisted installation and retrieval without the need for a guideline.
3. All equipment installed on the seabed, including any non-metallic components and anodes, shall be suitable for the specified operating life without the need for planned maintenance.
4. The jumper shall be able to withstand all loads incurred during construction activities, including fabrication, testing, loadout, transport and offshore installation.

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