

PROJECT

PROVISION OF UMBILICALS

WP5 - Umbilical - EPC SoW

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HOLD RECORD

HOLD 1	Sections 4.2.8, 4.2.14, 4.2.16.2, 4.2.16.3, 5.1 – Document number of Contract Coordination Procedure (CONTRACT Appendix G).
HOLD 2	Sections 4.2.10, 5.1, 7.2 – CONTRACT Appendix E.
HOLD 3	Section 7.3 – CONTRACT Appendix B.
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1.0 INTRODUCTION

1.1 Project Background

1.1.1 Development

The discovery is located in the West Ganai PSC, (Gas Company Op. 40%, Pertamina 30%, Neptune 30%) operated by Gas Company, within the Kutai basin, offshore East Kalimantan area in Borneo island - Indonesia. West Ganai PSC was awarded in 22nd August 2019 with gross-split PSC terms, however the effective date is 26th January 2020.

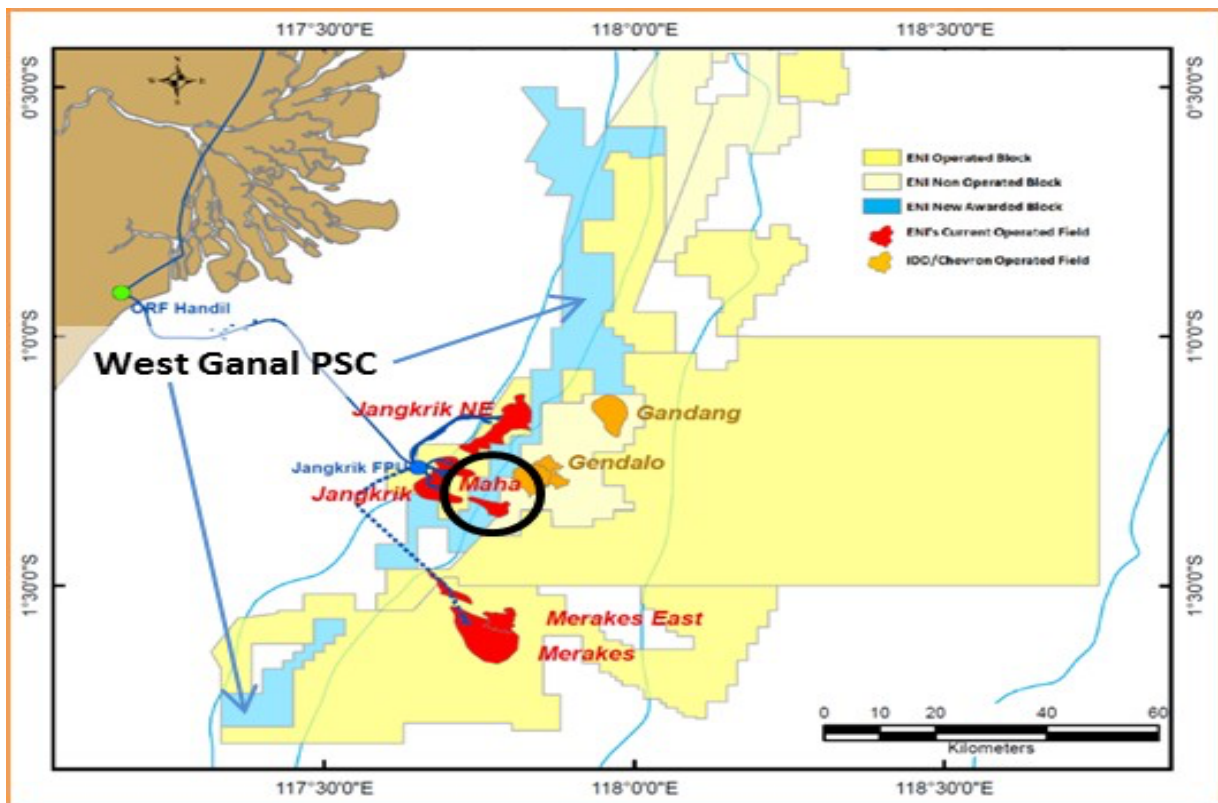


Figure 1-1 - Location Map

Project-1 well, operated by Chevron, was spud on 21st May 2002 in water depth of -2,436 ft. The well reached a TD of 13,441 ftMD (-13,100 ftTVDSS) on 7th June 2002.

The discovery was already successfully explored by the Gendalo-4 operated by Unocal in 2001. Both wells lie to the SW of Gendalo structure from which discovery is separated by a saddle.

1.2 Development Strategy

The development concept of is subsea tie-in to the current existing Jangkrik facilities considering the available ullage at the late life of Jangkrik and the location in vicinity of Jangkrik Main Clusters.

2.0 DEFINITIONS, ABBREVIATIONS AND REFERENCES

2.1 Abbreviations

AFC	:	Approved for Construction
AIM	:	Asset Integrity Management system
ALARP	:	As Low As Reasonable Practicable
API	:	American Petroleum Institute
ASTM	:	American Society for Testing and Materials
AWS	:	American Welding Institute
BBLS	:	Barrels
BOM	:	Bill Of Materials
BOPD	:	Barrels of Oil Per Day
BWPD	:	Barrels of Water Per Day
CA	:	Certifying Authority
CIU	:	Chemical Injection Unit
CMMS	:	Computerised Maintenance and Material Management System
CPI	:	COMPANY Provided Item
DMA	:	Dead Man Anchor
DCS	:	Distributed Control System
DP	:	Dynamic Positioning
DSV	:	Diving Support Vessel
DWT	:	Deadweight of the Vessel
ECA	:	Engineering Critical Assessment
EFL	:	Electrical Flying Lead
EJB	:	Electrical Junction Box
ESIA	:	Environmental Social Impact Assessment
EPCI	:	Engineering Procurement Construction and Installation
ESD	:	Emergency Shutdown System
FDB	:	Final Data Book
FEED	:	Front End Engineering and Design
FEA	:	Finite Elements Analysis
FGS	:	Fire and Gas System
FLOT	:	Flying Lead Orientation Tool
FPU	:	Floating Production Unit
GMDSS	:	Global Maritime Distress & Safety System
HAZID	:	Hazard Identification
HAZOP	:	Hazard and Operability Study
HFL	:	Hydraulic Flying Lead
HMI	:	Human Machine Interface
HSE	:	Health, Safety and Environment
HVAC	:	Heating, Ventilation and Air Conditioning system
ICSS	:	Integrated Control and Safety System
IMO	:	International Maritime Organisation
IMR	:	Inspection Maintenance and Repair
ISM	:	Item Subject to Maintenance
ISO	:	International Standard Organization

ITB	: Instruction to Bidder
JKK	: Jangkrik
JNE	: Jangkrik North East
KPI	: Key Performance Indicator
MSV	: Multi Services Vessel
LCC	: Life Cycle Cost
LCI	: Life Cycle Information
LCP	: Local Control Panel
MDR	: Master Document register
MFWA	: Master Frame Work Agreement
Metoccean	: Meteorological and Oceanographic
MMSCFD	: Millions of standard cubic feet of gas per day
MODU	: Mobile Drilling Unit
MPFM	: Multi-Phase Flow Meter
MRB	: Manufacturing Record Book
MWS	: Marine Warranty Surveyor
MS	: Method Statement
MSL	: Mean Sea Level
MTO	: Material Take Off
NDT/NDE	: Non Destructive Test/Non Destructive Examination
OCIMF	: Oil Companies International Marine Forum
OEM	: Original Equipment Manufacturer
OFL	: Optical Flying Lead
OJB	: Optical Junction Boxes
ORF	: Onshore Receiving Facilities
PLET	: Pipeline End Termination
PLR	: Pig Launcher and Receiver
PO	: Purchase Order
PSD	: Production Shut Down
PFD	: Process Flow Diagram
QA/QC	: Quality Assurance / Quality Control
QRA	: Quantitative Risk Assessment
RAC	: Reliability Analysis Center
RAM	: Reliability Availability and Maintainability
RAO	: Response Amplitude Operator
RBI	: Risk Based Inspection
RCM	: Reliability Centred Maintenance
RFI	: Riser, Flowline, Installation
ROV	: Remote Operated Vehicle
RRM	: Risk Reducing Measures
RVP	: Reid Vapour Pressure
SDU	: Subsea Distribution Unit
SOW	: Scope of Work
SIT	: System Integration Test
SIMOPS	: Simultaneous Operations
SPS	: Subsea Production System
SRM	: Subsea Router Module
SRT	: Site Receipt Test
SSIV	: Subsea Safety Isolation Valve
ALOHA	: Subsea Umbilical Riser Flowline
TBC	: To Be Confirmed

UTA	:	Umbilical Termination Assembly
TUTU	:	Topside Umbilical Termination Unit
XT	:	X-mas Tree
WH	:	Well Head

2.2 Rules, Codes and Standards

CONTRACTOR shall strictly comply with the local and applicable international rules and regulations. CONTRACTOR shall comply with national and international rules concerning the navigation and offshore activities. CONTRACTOR shall apply all codes and standards as defined in ref. [3], List of Applicable Codes and Standards.

In case of conflict between the documents contained herein and the reference rules, codes and standards, the following order of priority shall apply:

1. Rules and Regulations (Local and Applicable International);
2. COMPANY's Technical Specifications;
3. COMPANY's General Specifications;
4. Codes and Standards.

In case of conflict, the Contract document will prevail over Bullet Point items 2, 3 and 4.

The reference codes and standards for each activity are listed in the relevant specifications. Unless otherwise specified, reference shall be made to the latest edition of the relevant rules and standards.

2.3 Terms

For the purpose of the present document, definitions of terms as listed in the GENERAL and SPECIAL CONDITIONS OF CONTRACT shall apply.

ANCILLARY EQUIPMENT	means components assembled directly or indirectly to the umbilicals, lines required for transportation, tie-in, and integrity purposes, such as connectors (electrical, hydraulic, optical), bend restrictors, bend stiffeners, pull-in heads, hang-off collars, buoyancies, clamps, etc.
CENTRAL OFFICE	means the location at which the PROJECT Management, Engineering and Procurement are meant to be performed.
CERTIFYING AUTHORITY	means any certifying authority(ies) which COMPANY may notify to the CONTRACTOR in writing as being required to certify the WORK.
COMMISSIONING	means those activities which follow PRE-COMMISSIONING and are carried out to prove the functional operation of the UMBILICAL SYSTEM fully connected to the Subsea Production System.

COMPANY:

COMPANY'S REPRESENTATIVE: means the person appointed by COMPANY in accordance with Article "Representatives of the parties";

CONTRACTOR: means the legal entity designated as such in the FORM OF AGREEMENT.

CONTRACTUAL DOCUMENTS: Documents issued by the COMPANY (reports, specifications, data sheets, drawings) to define the specific requirements relevant to the work to be carried out by the CONTRACTOR;

DETAILED DESIGN means the further development of the PROJECT technical documentation and requirements by CONTRACTOR, in order to complete fully, fit for purpose, all ENGINEERING activities necessary to PROCUREMENT, FABRICATION, INSPECTION, TESTING, LOAD-OUT, INSTALLATION, PRE-COMMISSIONING, COMMISSIONING, and ASSISTANCE TO COMPANY.

ENGINEERING means all the design and service activities necessary to the completion of the WORK.

FABRICATION means all manufacturing and assembling activities necessary to the completion of the WORK.

FACILITY: means the facility, associated utilities, machinery, apparatus, articles, and supporting infrastructure to be designed, constructed and warranted in accordance with this CONTRACT, as is more fully specified in the applicable Appendix;

GOVERNING REGULATORY AUTHORITY: National authority or any other international authority to be involved during the execution of the work;

INSPECTION means all the inspection activities necessary to the completion of the WORK

INSTALLATION means those activities, like laying, monitoring, tie-in, hook-up and pull-in, which are performed to install the UMBILICAL SYSTEM in such a way that PRE-COMMISSIONING activities may commence.

LOAD-OUT means the handling of umbilicals, components, structures and loose items from their worksites position to the transportation barge or installation vessel.

MARINE WARRANTY SURVEYOR:	The party appointed by COMPANY for the purpose of reviewing marine operations and procedures and issue appropriate certificates of compliance with the relevant insurance policies;
OPTION:	WORKS which are not part of firm CONTRACTOR Scope of Work or WORKS and which can be exercised in line with APPENDIX A. In case the option is not listed in the APPENDIX A, it will be performed by CONTRACTOR on the basis of a VARIATION ORDER on case to case basis.
PARTY	Means either COMPANY or CONTRACTOR and the expression "PARTIES" shall be construed accordingly.
PRE-COMMISSIONING	means those activities which follow INSTALLATION and are carried out to perform functional and operational checks (i.e. electric, optic and hydraulic) of the UMBILICAL SYSTEM, without the introduction of the selected fluids.
PROCUREMENT	means all procurement activities necessary to the completion of the WORK.
PROJECT MANAGEMENT	means all PROJECT management activities necessary to the completion of the WORK.
PROJECT:	Project;
START-UP	means the phase following the COMMISSIONING during which production is started. The duration of this phase shall be considered 72 hours, unless otherwise advised by COMPANY.
SUBCONTRACTOR / SUBVENDOR:	means any person, including any vendor or supplier, with whom CONTRACTOR has entered into any contract to provide any part of the scope of work, including any person at any tier with whom any SUBCONTRACTOR has further contracted any part of the scope of work, and their legal successor and assigns including, unless expressly excluded, any ANCILLARY SUBCONTRACTOR
TECHNICAL ASSISTANCE TO COMPANY	means the involvement of CONTRACTOR personnel and materials to assist COMPANY during all PROJECT phases, including, but not limited to, ENGINEERING, TESTING, LOAD-OUT, INSTALLATION, PRE-COMMISSIONING, COMMISSIONING and START-UP., and after the HANDOVER, which is governed by the CONTRACT.

TESTING	means all testing activities necessary to the completion of the WORK.
UMBILICAL SYSTEM	means all umbilicals (main and infield sections), completed with end terminations, and all associated ANCILLARY EQUIPMENT.
WORKS	means all of the works and services to be performed by CONTRACTOR under this CONTRACT as are more fully described in the CONTRACT including but not limited to the provision of all labour, facilities, equipment, services and works as may be reasonably inferred therefrom, as necessary for the stability, completion and safe, reliable and efficient operation of the FACILITY.

The following terms are to be intended in the specified meaning:

- "Will" indicates a COMPANY action / provision
- "May" indicates a discretionary provision
- "Should" indicates an advisory provision
- "Shall" indicates a mandatory provision.
- "Must" indicates a statutory provision.

2.4 References

2.4.1 Project documents

[ref.] Document Name	Document number
[1] Subsea Block Diagram	220814BGRB00036
[2] Subsea Block Diagram Battery Limits	220814BGFB00038
[3] International Codes and Company Standards	220814BGES00006
[4] External Interface and Responsibility Matrix	220814BGEQ00005
[5] Field General Layout and Details	220814BGDP00039
[6] DELETED	DELETED
[7] DELETED	DELETED
[8] DELETED	DELETED
[9] DELETED	DELETED
[10] SCS (Subsea Control System) Data Sheet	220814BUGA00056
[11] Umbilicals Data Sheet	220814BUGA00057
[12] Umbilical Master Equipment List (Scope of Supply)	220814BUEA00062
[13] UTA P&ID	220814BUFM00052
[14] Control System Block Diagram	220814BGFB00037
[15] Corrosion Control and Material Selection	220814BXR000026
[16] Completion and Commissioning Strategy	220814BWR00034

Table 2-1 – List of Project references

2.4.2 Project documents RELY UPON INFORMATION

The following references are Project Documents to be considered as RELY UPON INFORMATION.

[ref.]	Document Name	Document number
[17]	Basis of Design	220814BGRB00002
[18]	Jangkrik Development Metocean Desk Study Review	A13343R1r4
[19]	Metocean Criteria for the Jangkrik NE Development (Makassar Strait)	RP_A11111_2_v1
[20]	Project Geophysical & Geotechnical Survey, Preliminary Report	TBD

Table 2-2 – List of Project references RELY UPON INFORMATION

2.4.3 COMPANY standards

The Company standard applicable are listed in ref. [3]; however, for sake of clarity of the present Scope of Work the following documents are listed as references:

[ref.]	Document Name	Document number
[21]	Document Numbering Procedure	20189.VAR.LCI.STD
[22]	Facilities Life Cycle Information Management	28080.VAR.LCI.STD
[23]	Information Submission	06219.VAR.LCI.STD
[24]	Facilities Completion	27950.COS.QUA.STD
[25]	Facilities Construction Quality Control and Mechanical Completion Specification	27951.COS.QUA.STD
[26]	Facilities Commissioning Specification	27952.COS.AVV.STD
[27]	Life Cycle Information Management System Module: CMMS (Computerised Maintenance Management Sysyem) Data Collection	27954.ENG.MNU.STD
[28]	SUPPLEMENTARY REQUIREMENTS TO API SPEC 17E SPECIFICATION FOR SUBSEA UMBILICAL	18012.ENG.SSE.STD

Table 2-3 – List of Company Standards (not exhaustive)

2.4.4 International references

The International standards and codes applicable are listed in ref.[3]. Unless otherwise specified, reference shall be made to the latest edition of the relevant rules and standards at the EFFECTIVE DATE of the CONTRACT.

2.5 Language

All the technical documents relating to the activities covered by this document shall be in English language. Other languages requirement for particular documentation related to Legal, Permitting and Certification will be advised by COMPANY as required.

2.6 Unit of Measurement

The units of measurements shall be the S.I. System. Imperial units of measurements are allowed for nominal pipeline diameters only. S.I Units are used throughout this document unless noted otherwise.

3.0 EXECUTIVE SUMMARY OF THE WORKS

3.1 Summary of Scope of Work

The CONTRACTOR's Scope of Work and services includes the activities described in the following paragraphs in accordance with the CONTRACT.

CONTRACTOR shall provide all personnel and supervision; engineering and computer services; CONTRACTOR's supplied materials, consumables, equipment, tools, labor, vessels, utilities, transportation and; all other services and facilities required for the performance of the WORKS.

The Scope of Work and Services for the provision of WP5 shall include but not be limited to the performance of the following activities:

- a) Project management and project control;
- b) Detailed engineering;
- c) Procurement of materials, equipment and consumables including expediting, packing, transportation, delivery and storage;
- d) Fabrication;
- e) Quality Management;
- f) System integration and testing;
- g) Transportation to point of DELIVERY according to the COMPANY PLAN;
- h) Assistance to offshore installation, pre-commissioning and integrated commissioning (as and where applicable).
- i) Minor repairs on the umbilical system if required during installation, including outer sheath repair

CONTRACTOR shall assume complete responsibility for the execution and timely completion of the Scope of Work and Services as set forth herein. CONTRACTOR shall furnish all management, labour, supervision, storage, handling, plant, facilities, security services, equipment, tools, testing and inspection equipment, consumables, protective materials and all other miscellaneous materials and services necessary for execution of the WORKS. All such WORKS shall be carried out in accordance with the Offshore Industry State of the Art and in full compliance with good offshore oilfield and marine practice.

3.2 CONTRACTOR Battery Limits

For the definition of the prospected interfaces between the PARTIES involved in Project and determination of their responsibilities, reference shall be made to the Project Responsibility and Interface Matrix in ref. [4].

3.3 COMPANY Plan

Refer to CONTRACT COMPANY PLAN.

4.0 MANAGEMENT, ADMINISTRATION AND CONTROL

4.1 General

CONTRACTOR shall provide a dedicated management and supervisory team for the proper, continuous supervision and control of the SOW activities and all relevant interfaces during the PROJECT, both at CENTRAL OFFICE and at Main Fabrications sites including SUBCONTRACTOR's facilities.

CONTRACTOR shall confirm the nominated key personnel.

CONTRACTOR shall ensure that it has the necessary management, supervision, support and

overall experience necessary to provide effective management of the Scope of Work and Services and that sufficient corporate resources shall be made available in the number of management personnel having the levels of corporate authority necessary to exercise such management, coordination and direction over its work force, SUBVENDORS, SUBCONTRACTORS and the constituent members of any consortium or joint venture, in order to achieve the CONTRACT requirements for quality, safety and program deadlines. In particular, the CONTRACTOR shall be responsible for and provide the management and team necessary for:

- The management and control for all interfaces, to allow the correct transition among the consecutive elements of the WORKS, among the various site locations and the constituent member companies, be it corporate, consortium or joint venture.
- The control of the offshore activities and the interfaces between these activities and the constituent members be it corporate, consortium or joint venture or SUBCONTRACTORS involved on these elements of the WORKS.

CONTRACTOR's management, execution and administration of the WORKS shall be carried out in accordance with the COMPANY's standards and ISO 9001:2008. CONTRACTOR, including its SUBCONTRACTOR's and SUBVENDOR's, is not specifically required to have ISO 9001 Certification but shall demonstrate having in place a quality system equivalent to ISO 9001:2008 or other internationally recognized standards (i.e. APIQ1, TQM etc)

CONTRACTOR shall organize periodical meetings with COMPANY and SUBCONTRACTOR's / SUBVENDOR's regarding the progress or execution of the WORKS (weekly, every two weeks or monthly basis). With 3 working days notice, COMPANY may request attendance to attend and participate in discussions between CONTRACTOR and his SUBCONTRACTOR's / SUBVENDOR's.

4.2 Management

4.2.1 Establishment of the Management Team

CONTRACTOR's management team shall include, but not be limited to, the following key personnel:

- Project manager;
- Project engineering manager;
- Project control manager;
- Project QA-QC Manager & QC coordinator
- Interface manager;
- HSE manager;
- Offshore installation manager;
- Onshore construction manager;
- Project procurement manager (including expediting);
- Logistic coordinator.

The CONTRACTOR shall mobilize the management team within fourteen (14) days from EPC CONTRACT AWARD.

The CONTRACTOR's management team shall be headed by the project manager who, as CONTRACTOR's Representative(s), shall have full authority to represent and act on behalf of CONTRACTOR on all matters and shall act as the first point of contact between CONTRACTOR and COMPANY's Representative(s).

The project manager and all the other key personnel who are designated members of CONTRACTOR's management team shall be approved by COMPANY prior to the commencement of the WORKS and once approved shall not be removed from the Contract without the prior approval of COMPANY.

CONTRACTOR shall ensure that CONTRACTOR's team is at all time adequately staffed for Project activities and needs.

4.2.2 Management Support

The CONTRACTOR's management team shall provide to COMPANY the following support facilities and services as and when required by COMPANY:

- The services of technical, secretarial and administrative staff.
- The provision of a fully furnished office accommodation and logistical support for COMPANY's Representative(s) at the central office. Central office means the location at which the PROJECT Management, Engineering and Procurement are meant to be performed.
- The provision of management systems at the central office including computer services (hardware, software and operators), documents reproduction equipment, stationery, paper and all consumables, postage, couriers, telephone, facsimile, radio, Internet connection, email and other communications.
- Transportation or travelling facilities for members of COMPANY's management team and their support staff between the central office and the WORKSITE.

4.2.3 Responsibilities of the Management and Project Control Team

Throughout the duration of the WORKS, CONTRACTOR's Management and Project Control Team shall perform the following services:

- CONTRACTOR shall be responsible for all management, administration planning, scheduling, control, qualification, verification and reporting related to the proper and complete execution of the SOW.
- A dedicated Project Management Team shall be nominated and provided by CONTRACTOR for the constant supervision and control of the WORKS.
- CONTRACTOR shall consolidate and provide a detailed Project Execution Plan defining its intended method to execute and control all the required Project activities.
- Act as prime contact point with COMPANY on all matters relating to the CONTRACT, in particular with regard to the monitoring of documentation, in accordance with COMPANY's submission and review requirements.
- Selection and mobilisation of approved CONTRACTOR's personnel, establishment of working criteria and provision of management and direction to the various site locations.
- Ensure the effective mobilisation of all of CONTRACTOR's facilities including, but not limited to, the site, resources, plant, equipment, craneage, offices, storage, vehicles, and logistic support.
- Provision of management of engineering.
- Provision of management of procurement/logistics and expediting.
- Ensure that all COMPANY approved working procedures, safety procedures and project control procedures are delivered to the relevant personnel and are being adhered to by those personnel.
- Provision of CONTRACTOR's Quality Plan for COMPANY approval and setting up of an homogenous quality system to be used throughout the duration of the CONTRACT.
- Ensure that the requirements of COMPANY and the CONTRACT are met and that the minimum standard requirements of quality system is implemented and monitored by all functions and disciplines within CONTRACTOR's organisation and by all SUBVENDORS and SUBCONTRACTORS,
- Perform a review and audit of the quality system at appropriate intervals to ensure its continuing suitability and effectiveness.
- Attendance at all meetings as required by COMPANY.
- Ensure that copies of all reports, minutes of meetings, operational procedures and any other documentation concerning engineering, procurement, fabrication and testing activities are issued to COMPANY as specified elsewhere within this SCOPE OF WORKS

AND SERVICES.

- Ensure that COMPANY is kept fully informed of all progress, activities and critical areas during the course of the WORKS.

4.2.4 Management Interface Control

The CONTRACTOR's management team shall be responsible to identify and exercise control, coordination and direction of all interfaces and at any transition point of the WORKS, to ensure the effective and seamless working between all parties as following, but not limited to:

- CONTRACTOR shall appoint a dedicated SGas Companyor Interface Coordinator to oversee, promote and act on the Interface Management process and coordinate an effective interaction within the SIGEP web-based tool for interface management, with COMPANY and other contractors, and internally within CONTRATOR's organization.
- Identify, define and manage interfaces that are internal to CONTRACTOR's organisation that may have an impact on the successful execution of the Project.
- Identify and manage technical / operational / organisational interfaces with COMPANY and / or other CONTRACTORS.
- Effectively participate in the interface Management Team.
- Promote, participate and chair (as and when appropriate) interface coordination meetings with COMPANY, other CONTRACTOR's, SUBCONTRACTOR's, SUBVENDORS and other Organisations in order to manage the interfaces in a proper, effective and timely manner.
- Actively work with other CONTRACTORS under COMPANY control and management to define and concur on interface deliverables and deadlines.
- Actively work with COMPANY and other CONTRACTORS to identify and solve potential interface issues before they impact any of the Project activity.
- Promptly identify and raise non-performing interfaces and relevant issues to COMPANY for resolution.
- CONTRACTOR shall identify any applicable interface and bring it to a COMPANY attention at the earliest stage of the Project in order to allow COMPANY to review such interface requests and reply / act appropriately.
- Generate Project specific request for interface information and interface data sheet for all external interfaces.

4.2.5 Site Management

CONTRACTOR shall establish at each site location a Site Management team which shall provide, under the overall responsibility of the Central Office Management, the day to day management, co-ordination and supervision during all the phases of the WORKS.

Each site management team shall be headed by a CONTRACTOR's Representative(s) who shall be responsible for all activities at the specific site location and shall report directly to the COMPANY Site Representative.

COMPANY will generally have a representative at site locations and the CONTRACTOR's Representative(s) shall liaise with COMPANY's Representative(s) willingly and appropriately for the satisfactory resolution of any day by day working matter.

Each Site Management team shall be responsible for constantly liaising and taking direction from CONTRACTOR's Central Office Management team in order to fully and timely implement the latter's Contractual responsibilities at its site location.

4.2.6 Main Management Tasks

The CONTRACTOR shall be responsible through the action of the Central Office Management, to

continuously support and monitor CONTRACTOR's site management and supervisory team on his responsibility for the overall task in hand and on any day by day specific matter relevant to the WORKS and Contract administration for all management, co-ordination and direction including, but not limited to:

- Engineering,
- Procurement including Logistics and expediting;
- Fabrication;
- Onshore ,Offshore and marine activities;
- Quality assurance / quality control;
- CONTRACT and SUBCONTRACTS administration;
- Project services.

4.2.7 Engineering

CONTRACTOR shall provide overall management, coordination and direction for all engineering activities, throughout all phases of the WORKS as follows:

- Review and endorse all COMPANY provided documentation related with CONTRACTOR's scope of WORKS.
- Based on the FEED Package documentation, perform the detailed design of Umbilical system including required ancillaries, but not limited to these activities. Reference shall be made to Project Responsibility and Interface Matrix ref. [4].
- Perform detail engineering activities as requested and stated in Project Responsibility and Interface Matrix ref. [4].
- Full compliance with COMPANY system completion and pre-commissioning strategy ref. [16].
- Preparation of hazard identification and risk assessment session for all SOW operation.
- Maintain design integrity throughout all phases of the WORKS.
- Collate all as-built and as-installed data and submit completed dossiers to COMPANY with reference to the approved Master Document Register.
- CONTRACTOR shall prepare all necessary engineering documentation, including formulation of drawings, reports, data sheets, calculation notes, specifications, registers, studies, detailed procedures, technical manuals, fabrication drawings and any other associated document required for the completion of the WORKS.
- CONTRACTOR shall ensure all documents are made available to COMPANY on a timely base as per mutually agreed cycles for review and acknowledgment / approval.
- All engineering documentation shall be prepared and issued in accordance with COMPANY's requirements and shall include the appropriate heading and be numbered in accordance with COMPANY's numbering procedures (ref. [21]).
- Whenever engineering documents and drawing are produced by a SUBCONTRACTOR, CONTRACTOR shall review, check and approve the documentation prior to submit it to COMPANY for review and acknowledgment.
- Project documents and drawings copies shall be made available at CONTRACTOR Central Office and at each CONTRACTOR's offshore and onshore site and shall be accessible to COMPANY at all times. These documents and drawings shall be updated on a regular basis in order to incorporate any changes, modifications made during the performance of the WORKS.

At each site location, CONTRACTOR shall ensure that site based CONTRACTOR engineering personnel:

- Implement and carry out all site engineering;
- Check Approved For Construction (AFC) drawings provided by the central office;
- Advise COMPANY of all changes or amendments to AFC drawings;
- Implement Change Control Procedure to control and administer all technical queries or record the effect of COMPANY issued VARIATION ORDERS;

- Liaise with construction and all other technical or administrative disciplines employed upon the site;
- Liaise with all other locations of the site to ensure compatibility of engineering;
- Prepare as built drawings, reports and all project documentation with reference to the approved Master Document Register;
- Ensure that all drawings, revisions, site queries or other documentation are passed to the management.

4.2.8 Company Documentation Review

CONTRACTOR shall formally verify and endorse COMPANY Project documents, specifications and drawings contained within the ITT package and notify COMPANY of any discrepancy or change required to ensure a safe and effective execution of the SOW.

CONTRACTOR shall follow the guidance and rules of the Interface Management procedure during the interface process.

COMPANY shall redeliver the CONTRACTOR documentation with appropriate comments but regardless of any comment or lack of by COMPANY this shall not relieve CONTRACTOR from any of his responsibilities and obligations under the Contract.

CONTRACTOR and COMPANY will work proactively on a case by case basis to minimize schedule impact and streamline project execution. For base case review cycle CONTRACTOR shall comply with APPENDIX G of the CONTRACT (HOLD 1).

4.2.9 Supplementary Information

Whenever deemed necessary, COMPANY will issue formally supplementary or revised information to CONTRACTOR. CONTRACTOR shall promptly review all the information and advise COMPANY within 10 (ten) days from receipt of notification. CONTRACTOR shall identify and recommend solutions to any of the issues that may affect CONTRACTOR' ability to successfully and properly complete the WORKS within the agreed Project Schedule.

4.2.10 Procurement and Logistic (Purchasing, Services, Expediting, Transportation, Storage)

CONTRACTOR shall provide for overall detailed management and co-ordination of all procurement and logistic activities including, but not limited to, the following:

- Provision of the necessary professional overview and control to ensure that the highest levels of professional and ethical integrity are maintained throughout the WORKS.
- Ensure that all requisitions, orders and SUBCONTRACTS are identified, tendered and awarded within the appropriate procedures, programmes and schedules.
- Purchase all equipment, materials and services specified by the CONTRACT and/or being part of CONTRACTOR's Battery Limits as per ref. [4] with the only exception of those provided by COMPANY.
- Implementation of an effective expediting program for all procured items to ensure the timely delivery of all materials or equipment to site including the provision of all necessary transportation.
- Support COMPANY and other contractors with Custom clearance and constant traceability of all CONTRACTOR materials, components, marine spread and equipment brought in / out of the Country (Indonesia) continental shelf/economical area.
- Support COMPANY and other contractors providing inputs/comments to Transportation of all CONTRACTOR's supplied equipment and materials and COMPANY Provided Items (CPI) to/or between work sites (offshore-onshore) including monitoring of their integrity during transportation and handling at all times.
- CONTRACTOR shall ensure that independent inspector is available in order to meet the

requirements of material certificate (type 3.2 when required) during the manufacturing/fabrication period. The presence of independent inspector does not release CONTRACTOR for their responsibilities to ensure the quality of the products and services. (see Note 1)

- Monitoring the activities of materials controllers at site.
- Monitoring the co-ordination and close-out of all procurement activities.
- Ensure that all materials or equipment delivered to site are properly received, unloaded, checked, taken to store, protected and stored in proper areas, including the provision of covered or environmentally controlled storage areas as appropriate. Any item found either not compliant with PO specifications or showing signs of transport/handling damage shall be segregated, inspected and a detailed non conformity and/or overage, shortage and damage report shall be promptly issued and notified to all parties for immediate remedial action.
- CONTRACTOR shall provide for COMPANY's APPROVAL a suitable storage facility for all the fully assembled and tested equipment (after FAT and EFAT as applicable) according to the requirement defined below for a period of up to 180 days at CONTRACTOR's manufacturing facility, including adequate preservation and tests required as per ISO 13628-5 prior to load-out, at no additional costs for the COMPANY.
- Prior to acceptance of COMPANY Provided Items (CPI) receipt, CONTRACTOR is responsible for inspecting and verifying the correct quantities, dimensions, markings and good acceptable conditions.

Note 1: As a minimum the following equipment shall be certified to ISO 10474:2013, Certificate 3.2.:

- Umbilicals: Umbilicals steel tubes.

In the event that any apparent damage / defect in a CPI is identified prior to completion of handover or at any subsequent moment, CONTRACTOR shall communicate it immediately to COMPANY, evaluate the extent of the defects and support COMPANY for the remedial actions. Any remedial action entrusted by COMPANY to CONTRACTOR shall be agreed by COMPANY prior of the commencement of any work.

CONTRACTOR shall ensure that all items to be supplied under this SOW including CPI's are protected and stored in a secure location and under environmental conditions that do not affect their performance characteristics. Whenever exposed to direct sunlight, from manufacturing to transportation inclusively, umbilicals, electrical cables and connectors shall be protected with UV rated cover i.e. tarpaulin.

Inspections of stored items shall be foreseen, and respective inspection program shall be submitted to and agreed with COMPANY. All inspection reports shall be provided to COMPANY in accordance with APPENDIX E of the CONTRACT (HOLD 2).

Any repairs that may need to be carried out during the storage period shall be executed under permanent or temporary cover along with the environmental control facilities used during manufacture. Any work carried out in the storage area shall be strictly controlled and performed in such a manner to not cause damage or contamination to the stored products.

- Ensure that all materials are available on WORKSITE when and where required for inclusion in the WORKS.
- Maintenance of all records necessary to provide a full technical audit of materials and their location in the WORKS.
- Arrangement for material waste disposal upon completion including traceability records in full compliance with applicable Law and local regulations. This includes all items during manufacturing up to handover, e.g. prototypes, samples and lengths of tubes and umbilical section disposed after final cut-to-length as well as returned items to

CONTRACTOR's facilities following completion of installation campaign.

While CPI is under CONTRACTOR's custody and use and up to its return to COMPANY / other contractors, CONTRACTOR is responsible to adhere to and execute the manufacturer's Preservation and Storage Maintenance (PSM) procedure.

4.2.11 Fabrication

CONTRACTOR shall provide for overall detailed management and co-ordination of all fabrication activities to assure that the necessary liaison and interface control takes place among fabrication, engineering, procurement and all offshore, onshore and marine activities.

For each site location, CONTRACTOR shall:

- Provide administration and control, on a daily basis, of all aspects of fabrication.
- Ensure the correct execution and completion of all the necessary activities for the execution of the WORKS including storage, protection, fabrication, erection, fitting out, testing, mechanical completion, pre-commissioning and commissioning.
- Ensure the efficient and economical use of materials.
- Ensure that all weight controls and dimensional controls are properly carried out.
- Implement all VARIATION's authorised by COMPANY during the construction phase of the WORKS.

4.2.12 Offshore and Marine Activities

CONTRACTOR shall provide assistance to COMPANY and other contractors during transportation and installation phases, including, but not limited to:

- All pre-planning and planning of the marine activities, advising COMPANY of all required consents, notifications and other relevant.
- Coordination and control of all activities necessary for the commissioning, testing activities, advising COMPANY of all operations.
- Liaison with COMPANY on all aspects of giving notices or obtaining approvals to or from Government Authority, other authorities and other involved SUBCONTRACTOR's.
- Implementation of all anti-pollution or environment protection measures in compliance with the CONTRACT, local regulations and laws.

4.2.13 Onshore Activities

CONTRACTOR shall provide for experienced onshore management personnel with specialist skill and knowledge to cover any supervision required during fabrication, construction and testing phases, including, but not limited to:

- All pre-planning and planning of the onshore activities, advising COMPANY of all required consents, notifications and other relevant.
- Mobilisation of all onshore spreads properly equipped and crewed, at the times and locations necessary for the WORKS.
- Provide assistance to coordination and control of all activities necessary for the pre-commissioning, testing activities, advising COMPANY of all operations.
- Liaison with COMPANY on all aspects of giving notices or obtaining approvals to or from Government Authority, other authorities and other involved SUBCONTRACTOR's.
- Proper and safe working of all ALOHAace equipment. Where applicable valid calibration certificates of equipment shall accompany the equipment at the testing site.
- Implementation of all anti-pollution or environment protection measures in accordance with the CONTRACT.
- Develop operating and maintenance procedures;
- Support COMPANY and other contractors to reinstate the area affected by WORKS in line with the environmental agency recommendations and dispose spoiled materials/contaminated ground and refuse in general in a safe and traceable manner in

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- line with applicable law and regulations insuring full safeguard of local communities.
- Liaison with COMPANY for any local community aspects.

4.2.14 Quality Assurance / Quality Control

CONTRACTOR shall maintain a documented, functionally quality management system and ensure its SUBCONTRACTOR's and SUBVENDOR's maintain a documented, functional quality management system to ensure the quality of the WORK and FACILITY.

CONTRACTOR shall ensure that a quality management system, in compliance with an internationally recognized quality standard such as ISO 9001:2015 or ISO 29001:2010, and the requirements stipulated in the Appendix F of the CONTRACT, is in place at the sites and subject to COMPANY's approval for its use. CONTRACTOR shall ensure that all quality assurance & control procedures and system are developed and properly implemented and that the whole of the WORKS is performed to the quantity and standards as required by COMPANY.

CONTRACTOR shall submit the following to COMPANY, but not limited to:

- CONTRACTOR's PROJECT specific quality management plan (i.e. as per ISO 10005) & quality control management plan for review & approval.
- Individual quality plans of CONTRACTOR's VENDORS Category I and II criticality¹ material or equipment and its design SUBCONTRACTOR for approval after reviewing & signing off by CONTRACTOR-self by first issuing;
- Inspection and Test Plans (ITPs) of CONTRACTOR and CONTRACTOR's VENDORS Category I and II criticality material or equipment and its design SUBCONTRACTOR for APPROVAL.
- Criticality rating Worksheets prepared by CONTRACTOR for approval. CONTRACTOR shall obtain COMPANY's approval or criticality rating Worksheet prior to CONTRACT issuing inquiries for the associated equipment or materials. CONTRACTOR are also required to conduct a "Construction Criticality Workshop"
- Control procedures necessary for the effective implementation of the PROJECT specific quality plan for review and comment. CONTRACTOR shall obtain COMPANY's determination as to its selection of control procedure requiring submittal.
- Quality audit procedure, programme & schedule within timeframe specified in Appendix F of the CONTRACT for review and comment. CONTRACTOR's quality audit schedule shall include audit of SUBVENDORS/Sub CONTRACTORs of Category I and II criticality material or equipment, design CONTRACTOR, and CONTRACTOR as a minimum.
- CONTRACTOR's statistic on the result of engineering, procurement and construction surveillance;
- Quality Non-conformity management procedure, Non-conformity Log/Register, Quality NC trend analysis and as per 27951.ICO.AVV.SDS (Chapt. 11);
- Project Monitoring and measurement procedure, Log, records and quality reporting, project Quality KPIs;
- Project Documentation management procedure (i.e. archiving, control of document, records) as well as project final dossiers and final data book management programme;
- Project Preservation of product procedure and log (i.e. for method for handling, storing, preservation, packing, delivering of the supplied equipment/item);
- Project Lessons Learned Procedure and LL register.

CONTRACTOR shall prepare and implement its Project Specific Quality Plan that, in combination with CONTRACTOR's existing quality management system, complies with the detail requirements stipulated in the Appendix F of the CONTRACT, Quality Management Specification Requirements for Supply Typology: EPC/EPCI.

The combination of CONTRACTOR's existing quality management system and its PROJECT specific quality plan shall:

- Ensure that CONTRACTOR and its SUBCONTRACTOR's and SUBVENDOR's comply with PROJECT quality requirements.
- Ensure that required quality controlling documents (e.g. drawings, specifications, procedures, specification, inspection and test plan) are in place with all required comments resolved and approved or endorsed as applicable prior to allowing the corresponding WORK to commence;
- Ensure that early identification, reporting, resolution and approved disposition of quality management system failures and hardware nonconformity. CONTRACTOR shall require follow-up to confirm acceptable results.
- Require the provision of documentation that confirms compliance with PROJECT requirements.
- Provide quality metrics for gauging quality status and performance and report them at a frequency to be specified by COMPANY, but not less than monthly.

The performance of any quality management activities (i.e. reviews, audits) by COMPANY shall not relieve CONTRACTOR of its overall responsibility for quality of WORK and FACILITY

4.2.14.1 Non Conformance

If drawings, specifications, testing results, dimensional checks, QA/QC process & procedure/plan or any data related to the WORK show any deviations from the CONTRACT requirements, CONTRACTOR shall identify and describe such deviations in time to allow any clear analysis by COMPANY in a letter or transmittal and submitted to COMPANY. If CONTRACTOR fails to identify such deviation, it shall not be relieved of the responsibility for executing the WORK in accordance with the CONTRACT, even though such drawings have been reviewed by COMPANY and MWS and Certifying Authorities. Any delay in communication is under CONTRACTOR responsibility and COMPANY reserves the right to be entitled to compensation.

4.2.15 Contract and Subcontract Administration

CONTRACTOR shall provide for the necessary professional overview and control of all CONTRACT and SUBCONTRACT's administration activities to ensure that the highest levels of professional and ethical integrity are maintained throughout the WORKS. CONTRACTOR shall, without limitation:

- Ensure that the CONTRACT and all SUBCONTRACT's are properly administered throughout the duration of the CONTRACT.
- Ensure that all requests of VARIATION ORDER's are priced and submitted for COMPANY approval in accordance with the CONTRACT.
- Co-ordinate the preparation of all payment applications and invoices.
- Co-ordinate requests for the issue of all relevant certificates by COMPANY.
- Expedite the contractual/commercial close-out of the CONTRACT.
- Ensure that all SUBVENDOR's invoices are available and that all required substantiating documentation is available to support VARIATION ORDERS or invoices as appropriate,
- Prepare the final account in a timely manner after receipt of the Provisional Acceptance Certificate.

4.2.16 Project Services

4.2.16.1 Procedures and Systems

The CONTRACTOR shall develop and implement detailed project control procedures and systems for the management and control of the WORKS. All procedures shall be subject to COMPANY's review and approval.

4.2.16.2 Planning and reporting

The CONTRACTOR shall ensure that the required levels of planning documentation are produced through a coding system structured in accordance with COMPANY's Work Breakdown Structure and Cost Breakdown Structure.

The CONTRACTOR shall prepare three levels of planning documentation for each major element or component of the WORKS and shall incorporate:

- Level 2 - CONTRACT Master Schedule;
- Level 3 - CONTRACT Control Schedule;
- Level 4 - WORKS Element Schedules.

The planning documentation at Levels 2, 3 and 4 shall be incorporated into the CONTRACT Execution Plan. Any changes or revisions to the planning and schedules within the CONTRACT execution plan shall also be subject to agreement with and to approval by COMPANY.

CONTRACTOR's planning activities shall be computer based and the detailed schedules shall identify the activities and time scales of each individual milestone activity schedule and in accordance with the Contract Execution Plan prepared by CONTRACTOR.

For further indication on planning and reporting please refer to APPENDIX G - Contract Coordination Procedure (HOLD 1).

4.2.16.3 Cost Control

The CONTRACTOR shall implement tight and effective cost control and cost monitoring activities throughout the course of the WORK. These activities shall include:

- Cost Reporting, relating to the CONTRACT Execution Plan structured in accordance with COMPANY's WORK Breakdown Structure (WBS) and Cost Breakdown Structure (CBS).
- Cost Forecasting, examining performance of the WORK at any specific date and predicting costs to completion.

For further indication on cost control please refer to APPENDIX G - Contract Coordination Procedure (HOLD 1).

5.0 HEALTH, SAFETY AND ENVIRONMENT (HSE)

5.1 General

During the execution of the CONTRACT activities, CONTRACTOR shall meet and implement, as a minimum acceptable standard, the requirements for Health, Safety, Environment, Public Safety, Quality and Radiation Protection set out in APPENDIX E of the CONTRACT.

It is the CONTRACTOR's responsibility to ensure that all its personnel and SUBCONTRACTOR's adhere to these requirements and continuously strive to meet the highest HSE standards.

It is CONTRACTOR's duty to observe and implement the requirements for Quality, Safety and Environmental contained in the Contractual Documents and any Management Specifications, indicated by COMPANY, to be adopted according to the specific characteristics of the work to be developed by CONTRACTOR. The CONTRACTOR shall prepare and implement an HSE Management for the CONTRACT, based on CONTRACTOR's HSE Management System. The HSE Plan shall be subjected to COMPANY and governing regulatory Authority approvals.

The CONTRACTOR shall have an HSE Management System which satisfies the following general requirements:

- CONTRACTOR shall have an HSE Policy formally in place, signed and dated by the Chairman and be actively using a formal HSE MS which demonstrates commitment to continuous improvement and excellence in HSE issues and which satisfies all the appropriate elements of ISO standards.
- CONTRACTOR shall have a system to manage hazards in the workplace, which are associated with the execution of the contracted activities, inclusive of SUBCONTRACTOR activities.
- CONTRACTOR shall have a system to manage environmental and health impacts of the activities (including SUBCONTRACTOR activities) to be undertaken within the contract framework.
- CONTRACTOR shall have controls implemented against the above hazards/impacts and, when working at COMPANY controlled sites, those controls which are requested against hazards/impacts identified already by the COMPANY and duly passed on to the CONTRACTOR.
- CONTRACTOR shall ensure the use of trained personnel including HSE matters.
- CONTRACTOR shall advise COMPANY of any revision or amendment to CONTRACTOR's HSE MS issued during the term of the CONTRACT.
- CONTRACTOR shall review its HSE MS at least annually and update it as necessary. CONTRACTORS shall be complying with HSE requirements in all contract phases.

CONTRACTOR shall comply with best practice and diligence in all HSE aspects. For a complete understanding of activities to be considered as HSE Requirements, CONTRACTOR shall adhere to APPENDIX E and APPENDIX G of the CONTRACT (HOLD 1) (HOLD 2). Such activity includes, but not limited to:

- HSE Policy.
- CONTRACTOR HSE Management System Requirements.
- HSE Plan.
- Audits/Reporting.
- Updating and Recording Responsibilities.
- HSE Close-out Report.

5.2 Risk Analysis and Safe Working Practices

CONTRACTOR shall ensure that all potential hazards associated with the WORK activities, being them hazard to the public, to the environment or to any person from whatever entity involved in the work, are systematically identified, analysed and evaluated in accordance with the criteria indicated by COMPANY Standards and adequate avoidance measures, risk elimination/mitigation are identified at the earliest stage of design phase and implemented accordingly.

Risk elimination/mitigation measures worked out by CONTRACTOR shall be strictly and diligently followed up and the implementation shall be continuously monitored and controlled with appropriate maintenance criteria.

CONTRACTOR shall plan and apply suitable HAZID and HAZOP analysis to all work phases and carry out a periodical review and update as required.

Risk to people and to the environment shall be eliminated or reduced to ALARP level through proper measures for elimination, control, minimization of hazards and associated risks.

CONTRACTOR shall put in place safe working procedures to prevent and mitigate potential hazard based on the following, but not limited to:

- Implementation of a controlled "permit to work system".
- Systematic review and update of the hazard register.
- Preparation of non-routines procedures.
- Conducting COSHH (Control Substances Hazardous to Health), or equivalent assessment

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- when working, or exposed to chemicals.
- Adoption of specialized and adequate safety equipment, warning devices, notices.
- Adoption of other measures as may be recommended by the COMPANY HSE. Management.

Hazard identification, risk evaluation, measures adopted and respective application shall be systematically recorded by CONTRACTOR.

Before starting the work, CONTRACTOR shall submit to COMPANY Approval an HSE Operative Plan for the assigned specific tasks which shall include the program for their execution and shall account for the interaction between activities of different SUBCONTRACTORS operating at the Site.

COMPANY reserve the right to request any modification or amendment to the proposed HSE Operative Plan as deemed necessary. CONTRACTOR shall not commence the work before the COMPANY Approval of the HSE operative Plan.

6.0 APPLICATION FOR PERMIT AND CERTIFICATION

6.1 General

CONTRACTOR shall be responsible for obtaining all relevant permits, licenses, notifications, authorizations, approvals, agreements, and any other documentation, required for the WORK. However, COMPANY may choose to identify for each contract specific permits, licenses, approvals, that COMPANY may obtain.

CONTRACTOR and COMPANY shall submit in a timely manner all documentation required for the application of permit, licences, and certificate, and proactively follow up with Indonesian authorities to obtain the permit, licence and certificate in a timely manner.

Sufficient time shall be accounted for to obtain such permit, licences and certificates in due time to the execution of the WORK.

In general, CONTRACTOR is responsible for:

1. Licenses, permits, and approvals related to employment of CONTRACTOR's and SUBCONTRACTOR's personnel, including visas and work permits.
2. Licenses, permits, and approval related to radioactive importation, transportation, and transfer permit to COMPANY.
3. Licenses, permits and approvals related to the importation of equipment and to the movement of personnel and equipment within Indonesia, and to be in compliance with Energy and Mineral Resources Ministerial Regulation No. 017/Year 2018.
4. Licences, permits, and approvals related to design and construction requirements and obligations as applicable to their scope of work.
5. Licenses, permits and approvals for CONTRACTOR and its SUBCONTRACTOR's specific communication equipment and networks.

In general, COMPANY shall obtain the major licenses or permit which may set conditions for ongoing operations required by COMPANY after completion and commissioning.

Periodic coordination meeting shall be held between COMPANY and CONTRACTOR to ensure the alignment regarding responsibilities for specified regulatory requirements and obligations. CONTRACTOR shall be responsible for identifying, monitoring and tracking compliance with applicable regulatory requirements and obligations and shall be subject to regulatory compliance assessment by COMPANY.

CONTRACTOR shall assist COMPANY as required for all permitting requirements related to discharge of chemicals to sea during the following pre-commissioning activities, which are under COMPANY responsibilities:

- Discharge of chemically treated water during flooding, cleaning, gauging and hydrotest activities.
- Discharge of MEG during flushing and MEG swabbing activities.

CONTRACTOR shall supply all relevant MSDS to assist COMPANY in applying for discharge permits.

Following table listed the permits/certifications/approvals required for this PROJECT, including the responsible party. CONTRACTOR shall review and advise if any other permits and certifications are required to undertake and complete the WORK. Such permits shall fall under CONTRACTOR SOW and responsibility.

No.	Permit / Certification / Approval	Type	PIC
1	AMDAL	Document & License	Company
2	UKL/UPL Exploratory Drilling	Document & License	Company
3	Produced water discharge permit	Permit	Company
4	Metering permit for Custody Transfer		Company
	a. Metering type permit	Permit	Company
	b. Metering Calibration / Certification		Company
	c. Metering System Utilization		Company
5	Prohibited and Restricted Zone Permit	Permit	Company
6	Lifting Equipment Certificate		EP or EPCI Contractor
7	Occupational safety inspection:		
	a. COI (Certificate of Inspection)		Company supported by PI
	b. PLO (Peretujuan Layak Operasi)		Company supported by PI
8	Paramedic Certification		Company- EP or EPCI Contractor
9	Socialization to Community		Company - EP or EPCI Contractor
10	Vessel Certificate Requirement as per Hubla New Regulation PM 29 Tahun 2014		EP or EPCI Contractor
11	B3 Waste Permit (Waste Stewardship)	Permit	EP or EPCI Contractor
12	B3 Waste Permit (Transporter, Collector and Processor)	Permit	EP or EPCI Contractor
13	B3 Waste Permit (for Lubricate oil waster)	Permit	EP or EPCI Contractor
14	Permit of Barge (construction, material, etc.) and Boat (crew supply, tug boat, etc.)	Permit	EP or EPCI Contractor
15	Permit related to maintain safe marine clearance distance during pre-deployment of pipeline	Permit	EP or EPCI Contractor
16	Permit addresses chemical materials that are used in the oil and gas industries	Permit	EP or EPCI Contractor
17	Liaison officer (LO) for Vessel Construction	Permit	EP or EPCI Contractor
18	Security Clearance for Pipeline Pre-Deployment Vessel	Permit	EP or EPCI Contractor
19	Underwater work (salvage) operation permit	Permit	EP or EPCI Contractor
20	WPS/PQR approval	Certificate	EP or EPCI Contractor
21	Welder Certificate	Certificate	EP or EPCI Contractor
22	Radio Telecommunication permit (special telecommunication arrangement)	Permit	EP or EPCI Contractor
23	Permit of Trunking Radio	Permit	EP or EPCI Contractor
24	Permit of quarry and use natural in the form of clay, sand, gravel, and other materials	Permit	EP or EPCI Contractor
25	Road transportation safety and road use dispensation (heavy load exemption)	Permit	EP or EPCI Contractor
26	Transportation recommendation for mobilization and demobilization	Document	EP or EPCI Contractor
27	Catering Provider Certificate	Certificate	EP or EPCI Contractor
28	Dispensation Letter for using Overseas ships	Approval	EP or EPCI Contractor
29	Cabotage - usage of foreign vessel permit	Approval	EP or EPCI Contractor
30	Importation permit	Document	EP or EPCI Contractor
31	Radioactive Permit		
	a. Importation Permit	Permit	EP or EPCI Contractor
	b. Importation Approval	Approval	EPCI Contractor
	c. Transportation Approval	Approval	EPCI Contractor
	d. Transfer/handover to Company Permit	Permit	EPCI Contractor
	e. Utilization Permit	Permit	Company

Table 6-1 – List of Permits, Certifications and Approvals for PROJECT

7.0 COMPANY ACCOMODATION AND FACILITIES

7.1 COMPANY's Dedicated Accommodation and Facilities

CONTRACTOR shall provide the facilities, equipment and services detailed here below for the exclusive use of COMPANY's personnel and the organisation necessary to effectively manage and maintain the facilities, equipment and services, throughout the duration of the CONTRACT.

Where specific and /or dedicated office human resources are mentioned, CONTRACTOR shall provide such resources at all times and maintain an adequate employment force to guarantee that COMPANY's requirements are fully covered at all times also during holidays and sickness. CONTRACTOR shall provide for the general maintenance and repair of the facilities, equipment and services provided for the exclusive use of COMPANY including the outright replacement of any item that may become damaged or unserviceable in the course of normal use throughout entire Contract duration.

In case of WORKSITE(s) outside Indonesia, CONTRATOR has to provide full support to COMPANY personnel as Invitation Entity in order to get VISA, Work Permits, and similar at COMPANY's own costs and/or fees, if any incurred by the third party.

7.1.1 COMPANY's Accommodation and Main Fabrication sites:

7.1.1.1 General

CONTRACTOR shall provide lockable office accommodation for the exclusive use of COMPANY's Staff at each of the fabrication site locations. The offices shall be fitted with air conditioning.

CONTRACTOR shall provide sufficient office furniture, consumables and facilities for the use of the COMPANY in each of the offices provided under the CONTRACT.

Number of COMPANY's Staff at Main Fabrication sites will be up to Two (2) representative personnel.

It is expected that COMPANY's personnel will have to be accommodated in a separate dedicated office space area of one (1) fully furnished office rooms as base case and one (1) optional fully furnished room each with an approximate area of not less than twelve (12) square meters and conference / meeting room(s) with a fit up for a minimum of twenty (20) person fully furnished and fitted with digital telephone and modern video-conference facilities, digital projector completed with projector screen, digital white board and Personal Computer connectable printing facilities.

All offices and conference room(s) shall be lockable and provided with adequate safety equipment such as fire extinguishers, hose reels, fire alarms, and the like.

The accommodation, which shall be appropriate for the performance of the WORKS and efficiently arranged, shall be supplied with all utilities and services such as electricity, ventilation, air conditioning, toilet facilities (for exclusive use of COMPANY personnel) and Local Area Network (LAN) connected to the high-speed Internet connection. CONTRACTOR shall provide full coffee machine (including espresso), tea services, microwave oven and water dispenser (Hot and Cold).

7.1.1.2 Office Equipment

CONTRACTOR shall make all arrangements for the installation, operation and utilisation and for regular maintenance of Office Equipment in the offices provided at each of the onshore site locations for COMPANY use as detailed below. The equipment is to be available for the exclusive use by the COMPANY throughout the duration of the CONTRACT. CONTRACTOR shall ensure that all equipment provided for the COMPANY is regularly serviced and maintained.

In the event of breakdown of the Office Equipment provided by the CONTRACTOR, the CONTRACTOR shall ensure that all repairs are carried out within twenty-four (24) hours. The CONTRACTOR will also ensure that, in the event of breakdown of the above Office Equipment, alternative facilities shall be made available for the use of the COMPANY.

Computer Equipment

CONTRACTOR shall provide and install at his expense for exclusive use of COMPANY the following equipment and shall ensure proper maintenance support (hardware and software) through CONTRACTOR's own computer support group.

- a) For each COMPANY office listed in section 7.1.1.1:
 - Branded apparatus / docking station, compliant with the specification of COMPANY's owned laptops, as required to install COMPANY owned laptops and to connect them directly to COMPANY's LAN;
 - Bluetooth / USB optical mouse + mat;
 - Bluetooth / USB QWERTY keyboard;
 - 27" Full HD LED monitor;
 - Bluetooth / USB integrated headphones and microphone;
- b) One (1) new Wireless router with minimum features as follows:
 - LAN Interface (Built In): Four (4) 10/100/1000 Mbps Gigabit LAN ports with managed switch.
 - WAN Interface (Built In): One (1) 10/100/1000 Mbps Gigabit WAN port.
 - Protocol Supported: IEEE 802.11n, 802.11g, 802.11b, 802.3, 802.3u, 802.1D, 802.1p, 802.11e, 802.11w (Rapid Spanning Tree) 802.1X (security authentication), 802.1Q (VLAN), 802.11i (Wi-Fi Protected Access [WPA2] security), 802.11e (wireless QoS), IPv4 (RFC 791), IPv6 (RFC 2460), Routing Information Protocol (RIP) v1 (RFC 1058), RIP v2 (RFC 1723).
 - Built-in 4-port Gigabit managed switch delivers faster data transfer for bandwidth-intensive applications.
 - Wireless-N (2.4 GHz) support provides enhanced wireless throughput and coverage.
 - Client bridge mode lets you expand your network by connecting your secure wireless connection to a second Ethernet network - without cabling and installation.
 - IPSec Virtual Private Network (VPN) tunneling support lets you extend highly secure network connectivity to remote offices and users using advanced encryption and authentication.
 - Sophisticated QoS prioritizes network traffic for demanding voice, video, and data applications.
 - Separate virtual network support helps enable secure guest access and helps safeguard sensitive data.
 - Secure guest access helps enable safe wireless connectivity for visitors.
 - IPv6 support lets you employ future networking applications and operating systems without costly upgrades.
 - Browser-based setup and configuration wizards help enable fast, simple deployment
 - Smooth, tested interoperability with other Cisco networking products makes it

easy to add switches, phone and voice, and video surveillance.
Minimum two (2) additional cables for each room (Office and Conference), PCs and wireless router shall be connected to the Local Area NetWORKS (LAN) and shall connect to the high-speed Internet connection. The high-speed Internet connection / provider with minimum speed is 10 Mbps with minimum.

All charges and expenses for connection, including use and access to Internet for all stations are for CONTRACTOR's account.

For ease of data / reports transfers between CONTRACTOR and COMPANY, CONTRACTOR shall endeavour to use the same software applications as will be used by COMPANY (defined above).

Printer, Fax Machine

A current generation A3 laser type printer (effective print resolution 1200x1200 dpi, minimum 40/40 ppm BW/Colour, 3 input tray, Windows OS compatibility) & fax machine (Laser Fax Machine, 600 x 600dpi Print, 19 ppm Print, 33.6Kbps Modem Fax, Memory for 450 pages (7.2 MB), USB) is to be located at each of the fabrication site locations.

Photocopying and Scanner Machines

Capacity in excess of 50 and scanner per minute, Laser Type, Colour and B&W (A4, Letter, A3, 1200 x 600 dpi, 24/22 (BW/Color) ppm Print, 1200 x 1200 dpi Scan, 24/22 (BW/Color) cpm Copy, Fax 250 sheets, Duplex, USB), multi copies to collator, double sided copying from single or double sided originals, enlargements and reduction facilities. All features are to be provided for both A4, Letter and A3 originals/output. Machines shall have paper stock trays for all functions ready for use. One set machine is to be located at each of the fabrication site locations provided under the CONTRACT.

CONTRACTOR shall provide all photocopy paper required by the COMPANY for use throughout the duration of the CONTRACT.

Stationery

CONTRACTOR shall provide all stationery required by the COMPANY for WORKS. This stationery is to be delivered to the COMPANY within 24 hours of being requested.

CONTRACTOR shall provide all print materials, including paper/transparency films, together with all Toners required by the COMPANY for the operation of photocopiers and computer printers.

CONTRACTOR shall provide all stationery required by the COMPANY.

CONTRACTOR shall provide a dedicated document shredder.

Communications

CONTRACTOR shall make all arrangements for the installation, operation and utilisation of the telephone and Internet facilities in the offices provided in the each of the CONTRACTOR's fabrication site locations for COMPANY's use.

CONTRACTOR shall provide the following telecommunications services for the sole use of COMPANY:

- a) One telephone (with speaker & microphone for conference calls) with access to domestic and international network through CONTRACTOR's central switchboard shall be provided

- on each of the COMPANY's allocated desks, in addition to which CONTRACTOR shall provide one (1) direct line independent of CONTRACTOR switchboard;
- b) All telephone installation, communication and utilisation charges are included in the Contract Value. Copies of COMPANY's telephone invoices will be provided monthly for COMPANY representative information.

A detailed quarterly review report of the actual expenses shall be made by CONTRACTOR with results provided to COMPANY. These facilities are to be available for use throughout the duration of the CONTRACT. The CONTRACTOR shall bear all costs and charges for this connection and for business related calls only.

7.1.1.3 Welfare Facilities

CONTRACTOR is to allow COMPANY personnel at site to make full use of the site canteen and welfare facilities throughout the duration of the CONTRACT.

7.1.1.4 Engineering Tools and Equipment

CONTRACTOR shall:

- Provide all engineering tools and equipment documents necessary for the efficient fabrication/manufacturing of the WORKS;
- Control and coordinate all interfaces that affect fabrication and manufacture;
- Respond to site queries;
- Design and coordinate FAT and SIT tests; and undertake quality surveillance activities to assure satisfactory quality performance by the CONTRACTOR and SUBCONTRACTOR's;
- All calibrated engineering tools and equipment (such as theodolites, levels, callipers, micrometres, tapes etc), required for the exclusive use of COMPANY's personnel during the supervision of the WORKS. Provide all safe and certified scaffolding access necessary for the CONTRACT. Where necessary, the CONTRACTOR shall provide all additional scaffolding as reasonably required by the COMPANY for the inspection of the WORKS.
- When, at any time, the CONTRACTOR proposes to remove any scaffolding, temporary scaffolds or other temporary access to the structure CONTRACTOR shall timely inform COMPANY before the removal.

7.1.1.5 Security

The CONTRACTOR shall make all necessary provision for the security of the site to the satisfaction of the COMPANY.

The provision of security should include, but not be limited to, the following:

- A security guard, twenty-four (24) hours per day and seven (7) days per week (including with weekend and Public Holidays), throughout each CONTRACTOR site location.
- The issue and control of identification passes to all persons, both COMPANY and CONTRACTOR, authorised to access the site.
- The control of entry and exit of all persons and vehicles to the site.
- Checking the contents of vehicles entering and leaving the site.
- Informing the COMPANY site Representative of all radioactive sources, including their strength, entering and leaving the site, whether for use on COMPANY work or otherwise.
- Initiating and maintaining a signatory record of all bona fide visitors entering and leaving the site,
- Removal from site and its confines of all undesirable/unauthorized personnel,
- Keeping site secure and properly lighted (night watch).

Security cover will be required 7 days per week, 24 hours per day.

7.1.1.6 Site Cleaning

The CONTRACTOR shall keep the site clean and tidy at all times throughout the duration of the CONTRACT and shall ensure that all waste and dangerous materials are removed from site on a regular basis (daily and/or weekly) to the satisfaction of the COMPANY and disposed safely maintaining a traceability records.

7.1.1.7 COMPANY Safety Equipment/Clothing

The CONTRACTOR shall provide and maintain sufficient sets of boots, gloves, safety glasses and helmets for each of the yards and shall meet to the COMPANY minimum requirements for the use of COMPANY's personnel and COMPANY's authorised visitors.

7.1.1.8 Car and Car Parking

The CONTRACTOR shall provide sufficient car parking spaces within a secure compound adjacent to the offices allocated to the COMPANY at each location sites authorised under the CONTRACT, adjacent to the actual location Areas within the location sites, for the use of COMPANY's personnel.

7.2 COMPANY's Medivac

CONTRACTOR shall prepare an Emergency Response Plan and submitted to COMPANY for review and acceptance prior to commencing Service. Please refer to the Contract, Appendix E, Article 14, Emergency Preparedness (HOLD 2). CONTRACTOR shall be responsible to medivac of CONTRACTOR personnel for Onshore and Offshore activities (COMPANY will assist CONTRACTOR for Helicopter transportation to shore).

7.3 Others

For all types of services listed in this section COMPANY ACCOMODATION AND FACILITIES, CONTRACTOR shall provide as part of CONTRACT APPENDIX B (HOLD 3) a comprehensive list of unit rates. This aims at allowing COMPANY to request additional services not captured herein (e.g. mobilization of additional COMPANY staff at sites).

8.0 WORKS BY COMPANY

8.1 Equipment, Materials and Services

COMPANY will supply equipment, materials and services as further described in the Project Responsibility and Interface Matrix (ref. [4]). CONTRACTOR is required to verify in detail such documentation with the purpose to point out any non-conformity or potential problems to fulfil the assigned Scope of Work.

In case of non-conformities/problems are found, CONTRACTOR is requested to propose the technical solution and/or any impact he might have to fulfil the assigned Scope of Work.

Deviations or other qualification requests from CONTRACTOR on COMPANY PROVIDED ITEMS specification may be accepted by COMPANY only during the execution phase and before materials delivery and managed through proper interface process. Any additional deviation and/or qualification made by CONTRACTOR after material delivery will be CONTRACTOR's responsibility if caused by CONTRACTOR's negligence.

Notwithstanding the above, COMPANY shall hold CONTRACTOR harmless from any cost and/or schedule impact resulting from any additional deviation and/or qualification raised by CONTRACTOR after material delivery if CONTRACTOR can demonstrate that it has acted with due diligence during the interface process.

8.1.1 Materials Provided by COMPANY

In this section COMPANY highlights the main CPI, but other details can be found in COMPANY PLAN and inside the interface and responsibility matrix.

Quantity	Description of CPI	Notes
1 set	Tensioner's Tracks/pads from Installation Contractor	
1 set	Electrical Test connectors (onshore and subsea types) to connect to UTA for access to electrical cables	Items required to perform tests on terminated umbilical at manufacturing facility, during transit, deployment and commissioning.
2-off	Test and flush stab plates to connect to UTA for access to internals of steel tubes	Items required to perform tests/flush on terminated umbilical at manufacturing facility, during load-out, transit and deployment
2 set	Electrical and hydraulic LTPC enough for UTA	If OPTION is exercised, then same quantity of CPI will be provided for OPTION.

Quantity	Description of CPI	Notes
2-off	Umbilical Termination Head (UTH) C/W hydraulic/chemical stab plates and electrical connectors.	If OPTION is exercised, then same quantity of CPI will be provided for OPTION.
1 set	Set of rigging, lifting equipment and installation equipment for UTA onshore handling	Design to be defined during detailed engineering. CONTRACTOR shall keep in custody, store and maintain in accordance with manufacture's procedure until delivery.
1 set	Samples of steel tube, all sizes, used in the UTH (section from interface with umbilical steel tube and stab plate) for welding qualification to be performed by Umbilical contractor.	

Table 8-1 – COMPANY provided items for the delivery of the Umbilical Scope of Supply

All the above components will be free issued by COMPANY to CONTRACTOR in the correct quantities for final integration with the UMBILICAL SYSTEM and for TESTING purposes. CONTRACTOR shall define the latest delivery dates to receive such COMPANY PROVIDED ITEMS in order to integrate, tests and verify the assembled system without affecting contractual DELIVERY DATES. Such dates must be included in the Contract Execution Plan and BASELINE Schedule as milestones.

For returnable Company Provided Items, CONTRACTOR shall perform Preservation Storage Management (PSM) before items are returned to COMPANY.

In addition, CONTRACTOR shall witness Pre-Load Out and Post-Load Out tests of COMPANY Provided Items.

In addition to the above, COMPANY will provide on the Offshore SITE:

- a. Water, air, steam, drains, condensate return, fuel, hydraulic fluid and electrical power for CONTRACTOR's equipment on the Offshore SITE, to be defined during execution if available;
- b. welding down of equipment skids, containers to rig deck and necessary scaffolding where applicable.
- c. COMPANY will ensure that CONTRACTOR's personnel offshore will be given access to an office with sufficient communication network capacity to support the WORK and access to telephone, copy machine etc.
- d. COMPANY will provide accommodation and all meals for CONTRACTOR personnel on installation vessels and drilling rig.

8.1.2 Services, engineering, data, information supplied by COMPANY

CONTRACTOR shall review design, data, information supplied by COMPANY related to CONTRACTOR's scope of work for its own use to fulfil the scope of work. CONTRACTOR shall carry out the Detail Design taking into account the data supplied by COMPANY.

CONTRACTOR shall highlight to COMPANY and agree on the way forward in the case of inconsistency, conflicting or insufficient input data to complete the WORK. In line with applicable contract management procedure, a Technical Query (TQ) shall be submitted by CONTRACTOR to seek COMPANY clarification if needed.

8.2 Site Representation

COMPANY will provide site management teams or representatives as outlined in the CONTRACT, including, but not limited to, review of CONTRACTOR's design documents, fabrication and QA/QC procedures and execution of any changes and inspection of the WORKS.

9.0 INTERFACES AND RESPONSIBILITIES

In the Project Responsibility and Interface Matrix (ref. [4]), CONTRACTOR will find an overview of the envisaged interfaces of the WORKS to allow the full consideration of all direct and indirect impacts on the CONTRACTOR's Scope of Work and Services, programs and CONTRACT execution plan.

CONTRACTOR shall be responsible for the overall WORKS as defined herein and in the Contractual Documents. In particular, the responsibility of CONTRACTOR concerns the following, but not limited to:

- Quality and quantity of engineering and construction works related to the Scope of Work;
- Quality and quantity of umbilicals c/w appurtenances;
- Obtain all the required permits for the completion of the Scope of Work;
- Assistance to Offshore Testing, Installation, Pre-Commissioning, Commissioning and

- Start-Up of the umbilical system;
- Pre-assembly, handling, transportation and stockpiling of all materials;
- Hold certificates issued by Recognized Register of Shipping;
- Provide the necessary spread(s), personnel and all other items, materials and equipment to complete the Work in accordance with the provisions of the Contract;
- Recording of acquired data on adequate magnetic support;
- Preparation of the technical reports.

CONTRACTOR shall be responsible for managing the project interfaces in collaboration with COMPANY and COMPANY's other Contractors.

The compliance with all the interfaces between CONTRACTOR's SoW/responsibilities and the SoWs/Responsibilities relevant to the other parties' involved in the project shall be guaranteed. COMPANY has developed the Interfaces and Responsibility Matrix (ref. [4]) identifying the interfaces between CONTRACTOR's SoW/responsibilities and the SoWs/Responsibilities relevant to the other parties (i.e. COMPANY and COMPANY'S other Contractors) involved in the project execution. However, CONTRACTOR shall be responsible for identifying any additional interface and communicate to COMPANY at the early stage of the Project. COMPANY will review the request for a new Interface and will identify the appropriate involved Parties.

CONTRACTOR shall refer to the COMPANY Interface Management Procedure for guidance and rules on management of interfaces. CONTRACTOR shall be responsible for the following activities:

- Identify, define and manage technical, execution, and organizational interfaces with COMPANY and COMPANY's other Contractors;
- Identify, define, and manage interfaces that are internal to CONTRACTOR's organization that may have impact on successful execution of the Project;
- Generate Project Specific Request for Interface Information (RFII) and Interface Data Sheet for all External Interfaces;
- Participate in the Interface Management Team;
- Schedule, participate in, and chair (when appropriate) interface coordination meetings with COMPANY, other contractors, subcontractors, vendors, and other organizations, as required, to properly manage interfaces;
- Actively work with the other Contractors under COMPANY control and management to agree on interface deliverables and dates;
- Actively work with COMPANY and COMPANY's other Contractors to identify and solve potential interface issues before they impact any Project activity;
- Promptly raise non-performing interfaces and interface issues to COMPANY for resolution;
- Appoint an Interface Coordinator to act on behalf of CONTRACTOR to oversee the Interface Management process and coordinate the interaction with the Project-Wide Interface System.

10.0 SCOPE OF SUPPLY

10.1 General

This section defines the Scope of Supply of Equipment for the PROJECT as defined in the Basis of Design (ref. [17]).

COMPANY preference is to ensure standardization of product such that the possible addition of other fields to the PROJECT can be achieved using equipment based on the same design. This possibility will be verified once final information for these optional fields are available.

Some of the information specified hereafter assumes specific equipment design and therefore it may change as equipment definition is subsequently revised. Scope and quantities shall be

agreed upon CONTRACT AWARD between CONTRACTOR and COMPANY. It is CONTRACTOR responsibility, subject to COMPANY APPROVAL, to modify this agreed Scope of Supply as the design matures, to ensure the provision of the necessary equipment in correct quantities in order to satisfy the project requirements and achieve the specified operational system. CONTRACTOR shall ensure that all equipment/tooling required to satisfy contractual requirements (in particular to comply with EXTERNAL INTERFACE AND RESPONSIBILITIES MATRIX ref. [4]) and achieve a fully operational system are identified before CONTRACT AWARD, added to this Scope of Supply and Scope of Work and quoted in the commercial offer.

Items missed from the Master Equipment List and required for the system to be functional shall be provided by the CONTRACTOR at its own expense. Changes in the Scope of Supply due to additional/reduced quantities or items due to COMPANY INSTRUCTIONS or new requirements will be handled by VARIATION ORDER mechanism. Any VARIATION ORDER arising from CONTRACTOR's failure to individuate such items will not be accepted by COMPANY being considered an omission from CONTRACTOR to achieve the contractual requirements.

In addition, CONTRACTOR shall be responsible for the supply of all special tools (meaning related to CONTRACTOR's proprietary products and technologies and not available from other suppliers) that are required for the successful completion of the WORK.

It is the responsibility of the CONTRACTOR to include in the Supply the necessary fabrication spares needed to ensure no delay in the delivery of the equipment in case of problems during manufacturing (in particular equipment with a long lead delivery time from placement of order and which could thus have significant impacts on the project schedule).

10.2 Equipment Qualification requirements

CONTRACTOR shall use field proven equipment. In case some components need to be qualified for the purpose of the PROJECT, CONTRACTOR shall clearly identify them during the bidding phase within the initial technology assessment and submit a thorough qualification plan as required.

A detailed evaluation of the Technology Readiness Level (TRL) and the Technical Risk Categorization (TRC) of the equipment shall be conducted for the subsea system covering all critical subsea equipment and submitted to COMPANY within a dedicated report for COMPANY review and APPROVAL. Furthermore, the evaluation shall cover the following items and shall be agreed prior to CONTRACT AWARD:

- Agreed level of testing and analysis for the equipment to be qualified and the relevant acceptance criteria based on project requirements.
- Submission of a technology assessment report covering all proposed critical equipment in the subsea system; such report(s) shall provide substantial evidence to justify any proposed TRL or TRC and shall cover the project requirements as specified by COMPANY.
- Qualification plan for equipment that is assessed as below TRL 4 where the scope of testing and analysis to be conducted during project execution shall be approved by COMPANY.
- Integration testing plan and evidence of testing and analysis conducted to date (PR2, endurance testing, computational analysis, fatigue, etc.) for equipment that is assessed as TRL 4 or 5 but not yet field proven.

Where equipment is considered by CONTRACTOR to be field proven, suitable evidence shall be provided upon request by COMPANY for items identified in the initial technology assessment as TRL 6 and 7. Evidence shall cover as a minimum but is not limited to the following items:

- Project reference and installation/operation dates

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- Design Pressure, temperature and water depth of development / qualified equipment
- Certified qualification report reference and scope of PR2/endurance testing (report should be available for review upon COMPANY request)

Where evidence is not available or CONTRACTOR cannot substantiate claims of field proven technology then a suitable qualification plan shall be provided as a contingency within the Bid proposal submitted to COMPANY. A review and follow-up discussion based on the initial technology assessment shall be made during the bid phase and approved by COMPANY prior to any contracts being awarded.

Based on the analysis of risks associated to the proposed qualification process, COMPANY can have the right to reject the supply of not field proven design or technologies especially during projects where schedule is a key driver.

10.3 Equipment List

Hereinafter the main components of the system are described in the following order:

1. Umbilical System

10.3.1 Umbilical System

The Umbilical System to be supplied by CONTRACTOR will be composed of (ref. [12]):

Description	Article ref.
Umbilical sections	10.3.1.1
Ancillary Equipment	10.3.1.2
Other items and equipment	10.3.1.3
Reels / Carousels	10.3.1.4
Spare parts and spare umbilical	10.3.1.5
Operational spares	10.3.1.6
OPTION	10.3.1.7

Table 10-1 –Umbilical System

CONTRACTOR shall provide COMPANY, within the Price List of the CONTRACT, with an optional quotation for the storage of the umbilical system at CONTRACTOR's base located in the area of the DELIVERY POINT.

Requirements for the Umbilical System are provided in, but not limited to, ref. [17], [20] [11], [12], [13], [14].

10.3.1.1 Umbilical sections

The umbilical system shall consist of 1-off static umbilical section as follows:

Preliminary Length	Description	Notes/Remarks

8549 m	Static infield Umbilical Umbilical 1	Length to be defined by Installation Contractor in accordance to field layout
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Table 10-2 –Scope of Supply: Umbilical System

Final umbilical cut-lengths shall comply with the results of the detailed routing and installation analysis performed by Installation Contractor. Length presented in Table 10-2 is essentially the 2D length which does not represent the final purchase lengths, manufacture lengths, installation lengths, furthermore does not include for seabed topography or geohazards on the route. CONTRACTOR shall consider the COMPANY Geophysical & Geotechnical survey data. CONTRACTOR shall provide the final lengths to comply with its detailed routing assessment and installation analysis as performed by the installation contractor or subcontractor.

During the detail design, the proposed Umbilical cross-section could be optimized by CONTRACTOR, subject to COMPANY APPROVAL, based on the specific power, communication, hydraulic and chemical analyses and based on the subsea architecture.

CONTRACTOR shall procure the umbilical electrical cables and steel tubes based on the design requirements provided on the basis of the SPS system analyses performed.

The cross-sectional arrangement of each umbilical may be designed in a way to optimize the manufacturing process (i.e. reducing the set-up of the laying-up and extrusion machines) by the use of additional components (i.e. PVC or PE fillers).

10.3.1.2 Ancillary Equipment

As part of the Umbilical system, CONTRACTOR shall provide all the ANCILLARY EQUIPMENT related to and to be attached directly and / or indirectly to the umbilicals in order to achieve an operational system in accordance with the requirements of the CONTRACT.

The following table provides a non-exhaustive list of the static umbilicals ANCILLARY EQUIPMENT, which shall be reviewed, completed and updated by CONTRACTOR on the basis of CONTRACTOR design, and in order to achieve a fully operational Umbilical system as per PROJECT and CONTRACT requirements:

Quantity	Description	Notes/Remarks
2	Subsea end terminations/interface equipment (STI for UTA)	
As required	End fittings, plugs, couplings, adaptors	
As required	Bend Limiters / Restrictors Assemblies at subsea end terminations	
As required	Set of bolts, nuts, washers, gaskets, fasteners, seal rings / fixing elements	
As required	Crossing protection	CONTRACTOR to define quantity in accordance to field layout
As required	Escarpment protection	CONTRACTOR to define quantity in accordance to field layout & dedicated geophysical survey performed in the next project phases.
As required	VIV breakers	
As required	Earthing Straps	

As required	Anchoring / collar / tethers	As required by installation methodology
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Table 10-3 – Scope of Supply: Umbilical System Ancillary Equipment

All protections required for the umbilical system which shall be mounted to the umbilical cross-section shall be designed and procured by CONTRACTOR, in accordance with inputs and requirement from Installation contractor, and installed by Installation Contractor

Installation Contractor will design, procure and install intervention works relevant to the umbilical system. e.g. not limited to grout bags / sleepers / bitumen mattresses / sand bags.

10.3.1.3 Other items and equipment

Quantity	Description	Notes/Remarks
1	Field Repair kit/joint: major repair It shall contain all materials, consumables and tooling for repairing	When integrity and functionality of the umbilical section is compromised, and full cross- sectional cut is required.
	the UMBILICAL SYSTEM to be carried out offshore without compromising umbilicals' performance and integrity	Repair kit shall be provided with enough splices, consumables, joints etc to join the unterminated spare umbilical into the umbilical section (terminate both ends of the major repair kit) CONTRACTOR shall submit respective umbilical offshore repair procedures to COMPANY for APPROVAL.
1	Outer Sheath repair kit	
2 set	Dummy bend stiffener flange	
1	Lifting equipment	Lifting umbilical ends on manufacturing site, during load- out and for umbilical system manoeuvre onboard installation vessel (including UTA) All the lifting equipment required to lift the Reel both for onshore and offshore use.
1	Emergency abandonment kit	Including abandonment cap with pad-eye for recovery

1 set	Packaging equipment (Including UV Protection)	Includes: - provision of Tarpaulin for storage and transportation to installation site of umbilical sections - packing for loose items, suitable for offshore commercial shipping
As required	Test equipment	Rental basis
1	Umbilical Monitoring Kit (it shall allow also umbilical pressurization, monitoring and re-pressurization during transit, installation)	- Purchased - Includes manifold arrangement fitted with a dedicated gauge, pressure relief valve, discharge line and discharge tank. -
1	Umbilical monitoring kit For spare umbilical section	- Purchased - Includes manifold arrangement fitted with a dedicated gauge, pressure relief valve, discharge line and discharge tank.
As required	Repairing and maintenance equipment	
As required	Loose Items	- Box/container shall be suitable for offshore transportation and shall include lifting slings C/W certificate for the duration of the installation campaign until return to DELIVERY site and shall meet Installation contractor's requirements.
As required	Installation and Commissioning Spares	- Box/container shall be suitable for offshore transportation and shall include lifting slings C/W certificate for the duration of the installation campaign until return to DELIVERY site and shall meet Installation contractor's requirements.
1	Hold Back clamp – For emergency temporary hold-back operation	-
TBD	Umbilical Flat Desk Samples	-
TBD	Umbilical Telescopic Desk Sample	-
As required	Earthing Straps	-
1 off	Umbilical cross-section Prototype for Installation Contractor	Length 50 meter. Terminated for load test and on reel - To be available for collection by Installation Contractor in advance of main consignment load-out.

Table 10-4 – Scope of Supply: Other items and equipment

10.3.1.4 F

reels /

carousel

Reels are not anticipated to be required for Umbilical 1; due to the product's volume required, the umbilical section Umbilical 1 will be transpoiled into installation vessel's carousel. For

responsibilities associated with delivery terms, load-out, transportation and installation refer to ref [4].

OPTIONAL scope umbilical section and spare umbilical sections shall be delivered in reels, each umbilical section on its individual reel.

CONTRACTOR shall supply the certified rigging necessary for the packaging of the umbilicals on the reels or on the carousels. CONTRACTOR shall ensure that the rigging use on the reels is inspected during operations and re-certified as required. Reels shall be provided with cradles, spreader bars, rigging, and UV protections (tarpaulin). Reels and cradles shall be suitable for offshore installation operations and, in particular, the reels shall be suitable for installation via both standard offshore industry under-rollers or reel hub drive units.

Proper partitions and side windows shall be provided on the reels to allow easy access to the umbilical terminations for checking umbilical electric, optic and hydraulic integrity during transportation and installation, and to allow coiling of multiple umbilicals if necessary.

The installation reels, if required, will remain CONTRACTOR property and shall be provided to COMPANY for the duration of the PROJECT.

10.3.1.5 Spare parts and spare umbilical

CONTRACTOR, based on this Scope of Work minimum requirements, shall propose and submit for COMPANY APPROVAL a comprehensive list of all recommended spare parts and repair kits for the overall Umbilical system, which shall also encompass the following phases:

- Offshore Installation,
- Testing
- Hook-Up
- Pre-Commissioning

Within the above spare parts COMPANY specifically requests the following:

Quantity	Description	Notes/Remarks
10% of Project umbilical 1 case length	Spare umbilical section	Delivered in Reel. Unterminated with corrosion resistant caps, seals and monitoring kit provided: suitable for long term storage and for maintaining fluid cleanliness level. Electrical lines capped with water ingress resistant potted resin caps.
10% of the quantity expected to be installed on the umbilical subsea ends	Spare bend restrictors	
As required	Loose items spare	For small loose items (such as washers, bolts, nuts, fittings, etc.) COMPANY requests 100% spare parts

Table 10-5 – Scope of Supply: Umbilical System Spares

The spare umbilicals shall be delivered on dedicated storage reel(s), suitable for usage with under rollers during spooling and transpooling operation, completed with cradles, rigging and spreader bar (certified).

Each reel shall be provided with a tarpaulin or similar, adequate to protect all the umbilicals spooled on it.

Each spare umbilical shall be provided with a suitable pressure monitoring system.

Following COMPANY acceptance of CONTRACTOR recommended spare parts inventory, the INSTALLATION, TESTING, HOOK-UP, PRE-COMMISSIONING spare parts shall be delivered simultaneously with the delivery of the equipment for which they are intended.

Proper partitions and side windows shall be provided on the reels to allow easy access to the umbilical terminations for checking umbilical electric, optic and hydraulic integrity.

10.3.1.6 Operational spares

No Operational Spare item are required, as the Umbilical system is considered a system made of equipment not requiring routine maintenance and change of parts during the design life. It is assumed that the Umbilical system, including all ANCILLARY EQUIPMENT, designed for the whole specified design life and that during this period of time there is no requirement for spares or repairs. Should CONTRACTOR recommend operational spares, CONTRACTOR shall provide the operational spares with no variation to the Lump-Sum price.

10.3.1.7 OPTION

CONTRACTOR shall consider as option to deliver the following umbilical system

Preliminary Length	Description	Notes/Remarks	OPTION confirmation date
2572 m	Static infield Umbilical Umbilical 2	Length to be defined by Installation Contractor in accordance to field layout	TBD

Table 10-6 – OPTION Scope of Supply: Umbilical System

This scope shall follow the requirement in the section 10.3.1.1. CONTRACTOR to include also all required ancillary equipment and other equipment listed in sections 10.3.1.2, necessary to for the umbilical installation and operation.

CONTRACTOR to advice if the items supplied on section 10.3.1.3 are sufficient to cover requirements for optional Umbilical, if no CONTRACTOR to include the item that are required for Optional Umbilical.

This umbilical section and spare umbilical sections shall be delivered in reels, each umbilical section on its individual reel. The Spare of this optional umbilical to be delivered in same Reel of spare umbilical in section 10.3.1.5 as single umbilical

CONTRACTOR shall supply the certified rigging necessary for the packaging of the umbilicals on the reels or on the carousels. CONTRACTOR shall ensure that the rigging use on the reels is inspected during operations and re-certified as required Reels shall be provided with cradles, spreader bars, rigging, and UV protections (tarpaulin). Reels and cradles shall be suitable for offshore installation operations and, in particular, the reels shall be suitable for installation via both standard offshore industry under-rollers or reel hub drive units.

Proper partitions and side windows shall be provided on the reels to allow easy access to the

umbilical terminations for checking umbilical electric, optic and hydraulic integrity during transportation and installation, and to allow coiling of multiple umbilicals if necessary.

The installation reels will be provided to COMPANY on a rental basis.

CONTRACTOR shall consider the spare for option umbilical as stated in section 10.3.1.5. All requirements applicable for the supply of Umbilical 1 shall apply to OPTION in case it is exercised by COMPANY

11.0 SCOPE OF WORKS AND SERVICES

11.1 General

This section describes in detail the Scope of Work assigned to CONTRACTOR for Project which shall be developed in compliance with the requirements of the Contract, developed FEED, COMPANY's specifications and the appointed governing regulatory authority.

All tasks performed by CONTRACTOR from the engineering up to the dispatch / pre-commissioning / as-built documentation shall be subjected to the inspection and approval by COMPANY.

CONTRACTOR shall refer to Project Responsibility and Interface and Responsibility matrix ref. [4] for details of the Scope of Work not stated in this document.

11.2 Outline Scope of Work

11.2.1 Detailed Engineering Phase

11.2.1.1 General

CONTRACTOR shall prepare all necessary Detailed Design and Installation Engineering documentation for temporary and permanent works as required for completion of the WORK. CONTRACTOR shall perform all detailed engineering and design necessary for

- procurement,
- fabrication,
- testing,
- load-out and sea fastGas Companyng,
- transportation,
- assistance to pre-commissioning,
- assistance to integrated commissioning

of the complete Umbilical System (including equipment supplied by Third Parties if any) and necessary for giving assistance where it is required by COMPANY and as further defined in the Interface and Responsibility Matrix (ref. [4]).

CONTRACTOR shall provide all necessary design and engineering services, facilities and adequate numbers of suitably experienced and qualified personnel for the satisfactory completion of the WORK.

Where engineering is produced by SUBCONTRACTORS, CONTRACTOR shall check, review and approve/endorse documentation prior to submission to COMPANY and MWS for approval. However, due to the fast-track approach for Project, Parties may agree to perform parallel reviews of SUBCONTRACTORS documentation.

CONTRACTOR shall implement a series of periodic design reviews (number to be agreed) to which COMPANY may attend. The CONTRACTOR shall provide notice to COMPANY as defined in

Contract Coordination procedures. All design reviews shall be indicated on CONTRACTOR's schedule.

CONTRACTOR shall at the request of COMPANY review documents prepared by Other Contractors and Third Parties and participate in co-ordination and interface meetings with any or all other Parties.

It is CONTRACTOR's responsibility to hand over to COMPANY a safe fully operating subsea system for the duration of its operational life. It is the responsibility of CONTRACTOR to perform all engineering work necessary to produce safe and serviceable equipment, which performs in the required manner and to the required specifications. CONTRACTOR shall, when requested, demonstrate to COMPANY that equipment has been suitably engineered and shall supply calculations and technical data relevant to the WORK, excluding proprietary information, which can be reviewed at CONTRACTOR's premises, to COMPANY for review and APPROVAL

11.2.1.2 Endorsement of Basic Engineering Package and FEED Package

CONTRACTOR shall, before CONTRACT AWARD, carry out a full review and verification of the Basic Engineering / FEED documentation included in the ITT – Scope of Work, clarify any inconsistencies and obtain any additional information required to complete the WORK. CONTRACTOR shall review and endorse the FEED package provided by COMPANY, except RELY UPON INFORMATION.

Updating with all data received as a result of information obtained from COMPANY or from other sources, shall be the responsibility of CONTRACTOR. CONTRACTOR shall notify COMPANY if updated data received cannot be incorporated during the course of the detailed design and execution and/or if the updated data affects the Contract Price and/or Contract Execution Plan. Way forward shall be mutually agreed between COMPANY and CONTRACTOR.

CONTRACTOR shall produce a Design Verification Report, noting any errors omissions or discrepancies. The Design verification report, incorporating a Basic/FEED "Acceptance Note" shall be submitted to COMPANY for approval. The endorsement shall include, but not be limited to the following:

- Review all the reports, drawings, specifications and data sheets to ensure total consistency between these documents;
- Review hydraulic reports and electrical analysis;
- Review the design to ensure adequate safety equipment/instrumentation is incorporated to meet the necessary statutory and code requirements as well as the safe operations of the facilities;
- Endorse subsea distribution P&ID, and umbilical datasheets, (this excludes flow assurance, hydrate mitigation, and chemicals hydraulic studies);
- Review and confirm the mechanical design conditions of the equipment to ensure they meet the necessary requirements;
- Review the PROJECT and other specifications and documents provided by COMPANY for any inadequacies, discrepancies, conflicts, etc;
- Review the HAZOP action list and HAZID report and include into the WORK any design modification deemed necessary to close out the remaining opened FEED actions (addressed as "to be examined during detailed engineering" or like);
- All endorsed documents shall be integrated into CONTRACTOR's final detailed design documentation.

11.2.1.3 Detailed design of Umbilicals

CONTRACTOR shall perform the detailed design of the umbilicals systems including ancillaries,

necessary to guarantee that the equipment included in the Scope of Supply meets or exceeds all COMPANY requirements and specifications, and the thereby specified standards, norms, laws and regulations.

CONTRACTOR shall submit data concerning the physical characteristics of the umbilical system, for COMPANY APPROVAL. Such data shall include but not be limited to:

- Fatigue analysis and detailed design of VIV breaker, if any (e.g. along escarpment section)
- Inputs for the Detail design of the protections, supports and free span corrections (if any) of the Umbilicals;
- Minimum bend radius (MBR) as a function of tension, in load-controlled and displacement-controlled conditions
- Bend stiffness;
- Overall diameter;
- Maximum allowable free span
- Weight per unit length in air (both empty and with the tubes filled of the shipping fluids);
- Weight per unit length in seawater (with interstices filled of seawater and the tubes filled of the operating fluids);
- Maximum applicable loads.
- Accumulated Plastic Strain (APS) taking into account initial reeling of steel tube from supplier, umbilical manufacturing process, packing, load-out, transportation (incl. eventual required transpooling e.g. vessel-to-vessel) and 1-off recovery and re-installation. The APS nominal value $\leq 15\%$ limit shall be applied. CONTRACTOR shall validate assumptions for the vessel chute radius, reel diameter and deflector radius with Installation Contractor via interface management to ensure alignment with planned installation methodology.

CONTRACTOR shall issue design reports, drawings, memorandums, philosophies, MTO and all Engineering documents as required.

CONTRACTOR shall develop design briefs for umbilicals. Design briefs will contain the following information:

- Inputs required for analyses;
- Design codes, COMPANY Specifications and Standards, and PROJECT specifications to be used in analysis;
- Describe analysis procedures to be used, including modelling techniques, assumptions, and post-processing methods;
- Describe software to be used for analyses.
- Outline methodology to be provided by CONTRACTOR during detailed engineering to COMPANY for APPROVAL prior to the start of the analyses.

Qualification level

CONTRACTOR shall submit a technical report to COMPANY, stating for each hydraulic line, and electrical cable:

- Projects on which the hydraulic line type or cable type has been used before, including date of supply;
- List of qualification tests that have been performed on the hydraulic line type or electrical cable type, stating the test type, the document number and revision of the used procedure, and giving the results of the tests.

A similar report shall be submitted by CONTRACTOR to COMPANY for ancillary equipment, specifically including bend stiffener, bend restrictors, pull-in head, hang-off arrangement and field repair joint. In particular for the assembly of bend restrictors, consideration shall be given

to means to prevent lock and consequent damages during lay and deployment: CONTRACTOR shall demonstrate how the design or assembly instructions will prevent/mitigate this risk; e.g. Perform destructive testing to confirm the behaviour of the BR under load, perform 100% assembly test and pair/mark the elements, test the material properties at different temperatures as experienced in situ.

Where a design is proposed without any history of subsea use, CONTRACTOR shall qualify it following COMPANY approved program and procedures prepared by CONTRACTOR. Procedures for qualification tests and results of all qualification tests shall be made available for inspection and review at manufacturers site as required by COMPANY.

It is reminded that unless authorized by COMPANY, all qualification programs shall be successfully completed prior to the start of the manufacturing phase. CONTRACTOR shall anticipate possible test failure and associated re-engineering and re-testing.

Tubes and hoses sizing

The umbilicals steel tubes wall thickness calculation report and thermoplastic hoses sizing report shall include the description of load cases, the Utilization Factor, and provide a gap analysis being the safety class designation considered by CONTRACTOR and the equivalent safety class designation as per latest revision of applicable standards and codes.

Global strength, fatigue and interference analyses

CONTRACTOR shall analyse the necessary load effect analyses to demonstrate that the Umbilical System is designed to withstand the most onerous load combinations of functional, environmental and accidental loads selected from the extreme design and fatigue environment specified by COMPANY, at all stages of manufacturing, testing, transportation, installation and operation.

safety and risk assessment

If required, CONTRACTOR shall perform, with the assistance of COMPANY and COMPANY's other Contractors, safety and risk assessment activities including investigation of the susceptibility of the Umbilical System to damage due to soil abrasion and wearing, seismic loadings, dropped objects and vessel anchoring and mooring systems, material defects, leaks and all other hazards.

On bottom stability and free spanning analyses

The following analyses shall be performed by Installation Contractor and shall be verified by CONTRACTOR:

- On-bottom stability analysis;
- Free spanning analysis, and free span corrections if any.
- VIV and dynamic analysis, if required e.g. canyon/escarpment crossing, turbidity current etc

CONTRACTOR shall provide all required input data for the aforementioned analyses as part of Interface with Installation Contractor.

Crossings

Umbilicals can be laid in direct contact with other lines provided that:

- The bending radius of the umbilical over the crossing is checked and acceptable;
- Permanent protective material such as polyurethane protection (e.g. URADUCT type) or

- equivalent with adequate thickness and without any protruding piece is assembled around umbilical sections subject to crossing with other lines;
- The protective material thickness placed around the umbilical has been checked with respect to the outer temperature of the line to be crossed, especially in case of a crossing with a non-insulated line;
 - No interferences may occur between the respective cathodic protection systems;
 - Displacement of each line in all directions is investigated and taken into account (notably for calculation of protective material length along umbilical);
 - The umbilical free span before and after the line to be crossed is acceptable;
 - The umbilical in the crossing section (and also for an adequate length before and after the crossing) is absolutely stable, i.e. no relative movement between umbilical and the crossed line is allowed (this is to avoid damage to the crossed line, e.g. coating of a pipeline).

Feasibility of such crossing shall be demonstrated by CONTRACTOR.

Material selection and material compatibility

Material selection shall be compatible with environmental constraints, conveyed fluids, temperature and CONTRACTOR design. Suppliers shall be informed about design constraints. MSDS for MEG, methanol and chemicals will be provided by COMPANY during detailed engineering phase. CONTRACTOR to provide a list of fluids that are compatible with the selected materials.

If a material is not fully qualified for the application, specific qualification test program shall be proposed by CONTRACTOR for COMPANY approval. CONTRACTOR shall supply a list of all fluids that have been tested with the proposed metallic tube and thermoplastic hoses materials. The list shall include all fluids that have passed compatibility tests as well as those that have been deemed to have failed.

CONTRACTOR shall design the umbilical and associated ancillary equipment to be cathodically self-protected for the specified design life.

Deliverables

A set of complete documentation and final Detailed Design report for umbilicals shall be issued by CONTRACTOR, in order to cover as a minimum the scope of the present section.

11.2.1.4 Detailed Design of Foundations (Piles / Mudmats)

CONTRACTOR shall ensure the adequacy of the foundations for all subsea structures, and issue for COMPANY review and approval the following documents:

- Foundation design premises;
- Foundation geotechnical design report;
- Foundation structural design report (incl. foundation loads calculation);
- Foundation drawings.

Being the uncertainty on geotechnical and geophysical data well known by CONTRACTOR since the Tender phase, COMPANY requests that any potential variation due to subsequent foundation re-design (upon receipt of the updated soil data) shall be captured by a set of unit rates as complete as possible (unit rates for steel weight, for steel works, day rates for installation vessels, etc.). No variation order related to engineering re-works (if any) will be accepted by COMPANY.

11.2.1.5 Weight Control

CONTRACTOR shall establish and maintain a system for the control and monitoring of the weight and the centre of gravity of the equipment covered by this CONTRACT and shall provide weight and centre of gravity data to COMPANY on a regular basis.

CONTRACTOR shall ensure the agreed weight limits for the Equipment are not exceeded. CONTRACTOR shall not perform any WORK which would result in exceeding agreed weight limits without obtaining COMPANY's prior APPROVAL.

CONTRACTOR shall perform all weighting activities and shall submit its weighting procedures for COMPANY's review and APPROVAL. CONTRACTOR shall weigh each major item of equipment when the manufacture/fabrication is complete prior to shipping, mark the equipment with this information and retain the data inclusion within the "as-built" documentation.

Weight control activities shall comply with COMPANY's specifications (i.e. 20186.ENG.MET.REL, 20187.ENG.MET.REL) and international recognized standards (i.e. ISO 19901-5).

11.2.1.6 CONTRACTOR's Specifications

CONTRACTOR shall develop a list of all specifications for SUB-CONTRACTORS required for the performance and completion of the WORK and shall provide to COMPANY any specifications required in addition to those included in the CONTRACT documentation.

11.2.1.7 Engineering Support

CONTRACTOR shall provide engineering support to COMPANY from CONTRACTOR's base location during all activities after SIT, SRT or pre-commissioning, through to the final commissioning and start-up of equipment. This kind of support shall be considered relevant to engineering phase and it has to be considered part of the CONTRACT and shall not be subject to VARIATION ORDERS.

This support is different from the TECHNICAL ASSISTANCE SERVICES which shall be on reimbursable basis.

Engineering support shall, as a minimum, include for up to 24 months following the EFFECTIVE DATE and on a Lump Sum basis:

- Update of records, including AS-BUILT DRAWINGS;
- Technical investigations;
- Fault Findings and troubleshooting;
- Generation of new documents where necessary;
- Revision of Operation and Maintenance manuals;
- Revision of all the Procedures;
- Support to CONTRACTOR's offshore personnel;
- Above tasks are intended to be performed also during installation and commissioning phases of the Project.

11.2.1.8 Technical Assistance Services

The following TECHNICAL ASSISTANCE SERVICES shall be provided by CONTRACTOR as part of the WORK on a reimbursable basis:

- TECHNICAL ASSISTANCE SERVICES at other contractor's fabrication yards for integration of CONTRACTOR's items
- TECHNICAL ASSISTANCE SERVICES on other contractor's MARINE SPREAD, for assistance to installation, pre-commissioning, commissioning and start-up.

- TECHNICAL ASSISTANCE SERVICES on FPU, for performance of commissioning and start-up.

11.2.1.9 FMEA and RAM analyses

CONTRACTOR shall provide and issue a detailed Failure Mode and Effect Analysis (FMEA) for the items included in the scope of supply, based on the final design of the system with special emphasis on critical components within the system. A criticality risk-based assessment has also to be developed by CONTRACTOR during early detail-engineering in order to identify the criticality level of each equipment belonging to the Scope of Work.

CONTRACTOR to provide all input data required for performance of RAM analysis by others.

RAM analysis will be the basis of the maintenance strategies selection as well as the maintenance plans development and the identification of critical item.

Overall reliability shall be in compliance to what requested in Basis of Design (ref. [17]).

11.2.1.10 HAZIDs and HAZOPs

CONTRACTOR shall arrange internal HAZIDs/HAZOPs and shall give notification to COMPANY in due time to allow its participation.

CONTRACTOR shall issue HAZIDs and HAZOPs Follow-up and Close-Out reports.

11.2.2 Procurement Activities

11.2.2.1 Procurement Management System

CONTRACTOR is responsible for setting up a procurement management system and organization within the Project providing all suitably qualified and experienced personnel and services to purchase, expedite, inspect, transport and deliver all materials and equipment required for the performance of the WORK.

CONTRACTOR shall propose Approved Vendor List as part of Technical proposal and later on during execution for COMPANY approval.

11.2.2.2 Material Take-off

CONTRACTOR shall prepare materials take-offs complete with required delivery to site dates for the procurement of all items including those items to be supplied by COMPANY.

11.2.2.3 Procurement Plan and COMPANY Full Knowledge

CONTRACTOR shall confirm that procurement shall be planned to commence at an adequately early date in order to strictly meet and comply with the overall Project schedule. This includes the preparation of specifications and the selection of prequalified CONTRACTOR, VENDOR and SUBCONTRACTORS but not limited to. In this respect, CONTRACTOR shall issue a Procurement Plan.

CONTRACTOR shall take all proactive actions to ensure that COMPANY is kept up to speed with full knowledge of all materials and equipment incorporated into the WORK for reasons of quality control and certification.

Throughout the procurement phase of the WORK, CONTRACTOR shall be responsible for the supply of all relevant documentation in accordance with the requirements of the CONTRACT, in sufficient time for COMPANY to review, approve and/or provide its comments to CONTRACTOR

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without imposing delay upon CONTRACTOR.

Notwithstanding the fact that COMPANY may approve certain procurement activities, under no circumstances shall such approval be construed as acceptance of responsibility for the materials or equipment by COMPANY or dilution of the overall responsibility for the WORK by CONTRACTOR.

Should COMPANY reject the use of any material or equipment on the grounds of origin, supplier, specification or manufacturing quality and such rejection is reasonable and consistent with the attainment of the quality and standards stipulated within the CONTRACT, then CONTRACTOR shall propose alternative materials or equipment so as to meet the required quality or standard at no extra cost to COMPANY and within the Contract schedule.

COMPANY has the right to inspect any material and/or equipment during all phases of the WORKS at the CONTRACTOR workshop or at his sub vendor plants.

11.2.2.4 Third Party Inspection

COMPANY reserves the right to use third party inspectors to inspect and/or otherwise ensure that the equipment is being fabricated and supplied in accordance with the provisions and requirements of the specification. Accordingly, these inspectors shall have free access to SUB-CONTRACTOR and SUPPLIER facilities at reasonable time to conduct inspections and tests considered necessary.

CONTRACTOR shall make all arrangements and shall give ample written notice (i.e. 10 calendar days) of material, equipment or workmanship readiness for COMPANY inspection whenever COMPANY expresses a requirement for witnessing a test or activity, or for carrying out independent testing and inspections. Such requirement from COMPANY shall be made through the review and mark-up of the Inspection and Test Plans to be issued by CONTRACTOR for COMPANY review and approval.

None part of the WORK shall be covered up or removed without previous notification to COMPANY. Such notification shall be given with sufficient time in order to give to COMPANY the opportunity to inspect or carry out tests on such parts without causing any delays to the progress of the WORK.

CONTRACTOR shall supply all reasonable facilities for COMPANY's safety and convGas Companyence in performing such inspections and testing.

In the event that COMPANY inspection detects any equipment, materials or workmanship non-compliant with the CONTRACT requirements, CONTRACTOR shall:

- remedy the respective performance failure, including the re-design, repair or replacement of the WORK or part of it, as applicable, and shall perform all tests as COMPANY may require in order to ensure that all remedial WORKS and actions have been carried out to the satisfaction of COMPANY and CONTRACT requirements.
- repeat, at its own cost, any tests, checks or examinations of those parts of the system which have undergone the same manufacturing/testing processes, hence with the risk of being affected by similar non-compliances.

11.2.3 Fabrication Activities

11.2.3.1 General

Equipment shall be manufactured in accordance with the requirements of

- this Scope of Work document,
- COMPANY's specifications included in the Basis of Design (ref. [17]),
- specifications, drawings and procedures generated by CONTRACTOR and APPROVED by COMPANY,
- all applicable regulations, codes, and standards.

Materials shall be properly marked for identification and a detailed system for transfer of marks during cutting and manufacture shall be made to assure materials traceability.

CONTRACTOR shall perform the manufacture, including assembly, erection, and testing, which is required for the completion of the WORK. Such WORK shall include but not be limited to the items described as follows.

11.2.3.2 Welding

All welding shall be identified in the design documents (detailed drawings) and referenced to welding specifications to be used. CONTRACTOR shall comply with COMPANY's specification included in paragraph 2.4. CONTRACTOR shall prepare welding procedures to be used in FABRICATION of the equipment and shall submit the same to COMPANY for APPROVAL prior to the start of fabrication as per requirement set in 18003.SSE.GEN.SDS. Pre-qualified procedures may be used at the discretion of COMPANY. COMPANY and CONTRACTOR may agree that only critical WPS and WPQR will be review by COMPANY, others being issued for information. CONTRACTOR is allowed to consider all weld procedures already qualified for Jangkrik and Merakes projects valid for project as well provided that all required tests and examinations as per the latest international and COMPANY standards are included in the qualification or separately carried out on a mock-up to integrate the existing qualification.

All welders employed by the CONTRACTOR or SUPPLIER shall be qualified to the qualified procedure(s).

No repair will be allowed until a repair procedure has been submitted to COMPANY and APPROVAL has been given.

Welding of steel tubes within the UTH, between SPS provided steel tubes and CONTRACTOR's umbilical steel tube is under CONTRACTOR's scope. Welding collar and adaptors, as required, to be supplied by CONTRACTOR.

Due to potential different material being used on the steel tubes (all sizes) provided by CONTRACTOR and SPS contractor, e.g. 25Cr SDSS, 6Mo or Alloy 625. Accordingly, CONTRACTOR shall account for dissimilar metal welding within its scope. In the event that UTH will not be supplied with a transition piece to allow an interface with the same material of the umbilical steel tubes, CONTRACTOR is requested to develop and qualify relevant WPS/PQR for dissimilar weld, which shall be qualified by third party.

11.2.3.3 Assembly

Assembly of components shall be completed in accordance with CONTRACTOR generated assembly drawings and procedure which shall comply with the requirements set within COMPANY's specification.

11.2.3.4 Repairs

CONTRACTOR shall perform and monitor repairs to the WORK on an ongoing basis and shall submit reports on such repairs to COMPANY.

For defect management and repair approval requirement, refer to COMPANY's specification and APPENDIX F of the CONTRACT (HOLD 4).

COMPANY will reply on Major Non-Conformance Report by 2 weeks from NCR issue.

Parallel process of non-conformances made by CONTRACTOR shall be at CONTRACTOR'S risk as COMPANY may reserve the right to reject defective components if remedial work is not compliant with Company Standards.

11.2.3.5 Temporary Protection

CONTRACTOR shall provide temporary protection against the weather, ambient condition and other likely causes of damage of the WORK during storage, FABRICATION, TRANSPORTATION between WORKSITES and to SITE, delivery and LOAD-OUT. Such proposed temporary protection could be subject to COMPANY APPROVAL in case of prolonged storage of the GOODS under potential external and/or environmental damages.

11.2.3.6 Inspection

CONTRACTOR shall develop and implement a comprehensive INSPECTION program and submit to COMPANY for approval. The program shall demonstrate to COMPANY that all systems and component parts of the supplied equipment meet or exceed all specifications, have the correct envelope configuration, interface configuration, required finish and are free from damage.

COMPANY shall reserve the right to inspect all items of equipment and witness INSPECTION activities performed. Adequate notice shall be given to COMPANY. All INSPECTIONS shall be completed and corresponding reports released to COMPANY (and subject to COMPANY APPROVAL when requested by COMPANY) before items can be shipped from CONTRACTOR's or SUBCONTRACTOR's facilities.

CONTRACTOR shall be responsible to ensure that adequate INSPECTION and quality control procedures are performed to verify that the equipment is fabricated in accordance with the provisions of this CONTRACT.

CONTRACTOR shall provide upon request copies of all INSPECTION and test reports to COMPANY for review. COMPANY reserves the right to request any additional INSPECTION and testing as may be considered necessary. CONTRACTOR shall generate an inspection plan, which shall be included in the Quality Assurance Plan and shall be submitted to COMPANY for review and APPROVAL.

11.2.4 Onshore testing

11.2.4.1 General

CONTRACTOR shall perform all testing required to guarantee the integrity and fitness for purpose of all supplied products in accordance with the requirements of ISO 13628-5 and other applicable international codes & standards, PROJECT documentation and referenced specifications, and CONTRACTOR's Detailed Design.

CONTRACTOR shall perform a comprehensive testing programme reports including (but not limited to) all the following testing activities:

- o Material compatibility testing;
- o Umbilical Product Qualification testing;

- o Testing of umbilical components during manufacturing;
- o Umbilical Design Verification Tests;
- o Umbilical and component FAT;
- o Umbilical EFAT program;
- o Pre-Load-out testing;
- o Pressure and electrical monitoring during load-out;
- o Post-Load-out testing;

CONTRACTOR shall demonstrate at each level of testing that the materials, components, sub-components or complete assemblies and systems meet or exceed specified test requirements and acceptance criteria.

11.2.4.2 Umbilical Qualification and design Verification Tests

Umbilical qualification tests are not required, providing historical information provided

Umbilical cross section shall undergo a verification test programs design. All tests shall be in compliance with Company Specifications and international standards Ref. ISO 13628/5. CONTRACTOR shall plan for the provision of additional umbilical product necessary to accommodate CONTRACTOR procedures and test equipment. Umbilical Test lengths shall be specified within CONTRACTOR documents for COMPANY review and approval prior to preparing samples and performing tests.

For list of required verification tests refer to Ref.[11].

11.2.4.3 Factory Acceptance Test (FAT)

All individual components, equipment, and complete systems provided by CONTRACTOR shall undergo a Factory Acceptance Test (FAT) to ensure that the equipment meets or exceeds performance requirements.

CONTRACTOR shall develop and submit to COMPANY review and APPROVAL the ITP, complete FAT program and procedures, including respective acceptance criteria.

COMPANY reserves the right to request complementary testing or modifications to the FAT program and procedures whenever it is considered necessary for the confirmation of supplied products suitability to PROJECT required application. FAT procedures shall be submitted to COMPANY APPROVAL at the required time. No test can be performed without formal APPROVAL of the respective Test Procedure by COMPANY.

All relevant APPROVED test documentation shall be available at the test location prior to any FAT commencement.

CONTRACTOR shall formally notify COMPANY in advance of any FAT planned to be carried out and shall promptly advise COMPANY of any changes to the test schedule. COMPANY will arrange for qualified representative(s) to witness the tests.

All tests and inspections contained within the APPROVED FAT program and procedures shall be completed, and a release note given by COMPANY inspector, before items can be shipped from CONTRACTOR's facilities.

All additional equipment, tools, facilities, fluids, instrumentation, power and consumables required to carry out FAT shall be provided by CONTRACTOR.

11.2.4.4 Extended Factory Acceptance Test (EFAT)

After terminating the umbilical with the end termination assemblies, i.e. UTHs, the Umbilical System shall undergo an Extended Factory Acceptance (EFAT) program.

The Extended Factory Acceptance Test (EFAT) documents and procedures shall be generated by the CONTRACTOR, reviewed and approved by COMPANY in advance of the test programme commencing.

The EFAT will be under the scope of the CONTRACTOR and it will be performed at the Umbilical manufacturer site after completion of the main umbilical FAT program and relating punch list items have been completed and closed out.

As a minimum, the objectives of the EFAT shall be to:

- Fill and flush the hydraulic and chemical injection lines with the correct delivery / shipping fluids in preparation for installation. If flushing fluid is different than Purchaser-designated delivery fluid, then each line shall be emptied, dried with nitrogen, and filled with COMPANY designated delivery fluid(s) after flushing is complete.
- Confirm the continuity and integrity of the connections between each hydraulic line in the umbilical and the Subsea Umbilical Terminations pipework;
- Check that no umbilical functions have been accidentally swapped during fitting the umbilical to the Subsea Umbilical Terminations with respect to the hydraulic couplings and electrical connectors mounted on the external wall of the terminations.
- test in accordance with COMPANY Specification and in accordance with the FAT tests shown in ISO 13628-5 (Annex B), all testing shall best replicate the complete umbilical as configured during operation.
- Confirm that the electrical connector has been properly fitted to the respective cable end. Following cable-FACT termination, CONTRACTOR shall perform a wet-condition IR on terminated cables.
- Verify correct integration of the Umbilical System parts and components;
- Perform any mechanical or structural fit up checks.
- Test fit all umbilical appurtenances incl. bend restrictors, installation aids, rigging and tools. For the bend restrictors, CONTRACTOR shall demonstrate assembly would not be subject to lock during lay.
- Perform pull test with hold back clamp(s) on umbilical sample (incl. destruction test on sample to verify any resulting damage)
- Verify correct operation of the Umbilical System with reference to hydraulic and electrical functions and interfaces, prior to the offshore installation, by performing the following typical set of tests (tests scope in compliance with ISO 13628-5):
- Any addition tests required by COMPANY prior to final packing of umbilical systems on respective reels or carousels.

The COMPANY and other contractor's representatives shall have the opportunity to witness all testing activities and inspect all equipment involved with the program. All EFAT tests and inspections shall be completed and related punch list items completed and closed out before proceeding to the load out program.

11.2.4.5 Fit-Up Tests

All required fit-up and assembly testing of any ancillary equipment shall be carried out at CONTRACTOR premises and shall demonstrate that all components of all equipment supplied by CONTRACTOR fit together.

CONTRACTOR is responsible for identifying and carrying out all required fit-up and assembly testing that may jeopardize either Installation schedule or PROJECT start-up date. Any constraints or delays to the Installation schedule and/or start-up activities caused by CONTRACTOR omission of any fit-up test will be at CONTRACTOR entire responsibility.

Fit-up testing may also involve any installation aid equipment that requires interface checking with subsea umbilicals.

11.2.4.6 Site Integration Test (SIT)

11.2.4.6.1 *Site Integration Tests performed by CONTRACTOR*

CONTRACTOR shall perform Site Integration Tests (SITs) in order to guarantee the correct interface and installation feasibility of umbilical system.

Umbilical SIT

The purpose of these SIT is to ensure that umbilical can be safely installed using the proposed equipment. The WORK shall include, but not be limited to, the following:

- Performing umbilical friction and crush test using the same tensioner pads to be used by CONTRACTOR on the installation vessel
- Performing clamps or bending restrictors installability tests on actual umbilical samples, if applicable.

11.2.4.6.2 *Assistance to Site Integration Tests performed by others*

CONTRACTOR shall also attend any SIT performed by other COMPANY's contractors which involves its own equipment, being represented by qualified personnel and design engineers directly involved in the WORK. Any corrective actions detected from a SIT to be implemented in the detail design of any equipment to be supplied by CONTRACTOR shall be agreed with COMPANY prior to be implemented in the WORK.

When required CONTRACTOR shall provide and ship dummy equipment to the specific location chosen to carry out a SIT for the PROJECT.

11.2.4.7 Pre-load-out tests

If the conditions outlined in ISO 13628-5 related to the necessity of performing pre-load-out testing are met, CONTRACTOR shall perform these tests. These tests shall be witnessed by COMPANY and by the umbilical Installation Contractor and shall be performed according to the requirements and ISO 13628-5.

CONTRACTOR shall prepare and submit a Pre-Load-out Test Procedure document for APPROVAL by COMPANY detailing a set of tests to be performed at the dock site immediately prior to load-out to verify the integrity of the umbilical. On completion and acceptance of the Pre-load test results a release Certificate shall be issued by COMPANY before the umbilical system can be shipped from CONTRACTOR facilities.

11.2.4.8 Post-load-out tests

Upon completion of umbilical transpooling, CONTRACTOR shall perform the umbilical post-load-out tests.

These tests shall demonstrate that no damage occurred after transpooling operations, intermediate and final Load-out operations. The tests shall be witnessed by COMPANY and the installation contractor.

CONTRACTOR shall prepare and submit a Post-Load-out Test Procedure document for APPROVAL by COMPANY, detailing the tests to be performed to verify the integrity of the umbilical. On completion and acceptance of the post load-out test results a release certificate shall be issued by COMPANY before the umbilical system can be shipped from CONTRACTOR facilities.

11.2.4.9 Monitoring umbilical during load-out

CONTRACTOR shall continuously monitor the integrity of the steel tubes and electrical cables in the umbilical system during transpooling operations in accordance with ISO-13628-5. Monitoring shall be made possible by connecting pressure monitoring and electrical monitoring equipment / instrumentation to the first and last end termination of the umbilical and monitoring results in real time from location close to the operator of main facilities carousel. CONTRACTOR shall provide all necessary equipment (manifolds, valves, gauges, transmitters, etc.) to allow continuous monitoring for ALL tubes (incl. spares) and ALL electrical cable cores (incl. spares) during transpooling operations, loadout and onward transportation to work site. Monitoring data during transpooling operations shall be recorded and included as a report in the umbilical manufacturers data book following transpooling operations.

CONTRACTOR shall include provision for personnel assistance and facility during transpooling, lifting, loading out and testing operations according to COMPANY Specification and Industry Standards

11.2.4.10 Handover

Point of custody transfer (or 'Handover') between CONTRACTOR and COMPANY's appointed installation contractor shall be after successful completion of post-loadout test and COMPANY APPROVAL of test results and documentation. Based on that a certificate of delivery shall be issued.

Final custody transfer/handover of umbilical from CONTRACTOR to COMPANY shall be at both parties' written acceptance of pre-loadout or post-loadout testing performed by CONTRACTOR, and acceptance of documentation presented. CONTRACTOR shall notify and allow access for COMPANY representative to witness pre-loadout and post-loadout testing operations.

Transportation/shipping frames and all rigging/installation aids shall be certified for offshore use and vessel-to-vessel transfer in accordance to applicable standards and international rules. CONTRACTOR shall re-certify them prior to HANDOVER to COMPANY and the certification shall have at least 10 months validity at the HANDOVER to COMPANY.

11.2.5 Storage and Transportation Activities

11.2.5.1 Storage

CONTRACTOR shall provide for COMPANY's APPROVAL a suitable storage facility for all the fully assembled and tested equipment according to the requirement defined below for a period of up to 180 days at CONTRACTOR's manufacturing facility prior to load-out, at no additional costs for the COMPANY.

CONTRACTOR shall re-test equipment to an agreed procedure on removal from storage and prior to delivery to verify that equipment has retained its "as tested" performance. CONTRACTOR shall prepare a packing and preservation document specific for every equipment. In this document the requirement for inspection, special maintenance, checks and preservation activities to be performed by CONTRACTOR during storage have to be clearly addressed. In case lifting devices need to be re-certified during storage period this has to be taken into account by CONTRACTOR.

CONTRACTOR storage shall provide a suitable controlled and secure environment and adequate protection and preservation to ensure the maximum life and integrity of the stored items.

CONTRACTOR shall verify the performance characteristics and perform integrity verifications of all stored items to ensure they are maintained in a satisfactory condition for operation or use.

CONTRACTOR shall generate storage and testing procedures for COMPANY's review and APPROVAL, which shall as a minimum address the following:

- Weather and ambient protection
- Equipment storage maintenance
- Periodical inspection
- Periodical maintenance
- Notice required for equipment usage
- Corrosion protection and application of temporary coatings.
- Storage conditions including temperature range and humidity.

Exceeded the 180 days of storage period, CONTRACTOR shall have the facility to store equipment at COMPANY's request and at the agreed cost for an additional period of up to two (2) years from equipment actual delivery date. Where instructions to store have been given by COMPANY this will be reimbursed in accordance with Compensation section of the CONTRACT.

11.2.5.2 Equipment release process

Before items can be shipped from CONTRACTOR's facilities, an Inspection Release Note (IRN) shall be signed by CONTRACTOR and COMPANY REPRESENTATIVE or other designated COMPANY staff.

The IRN shall include a checklist to verify that the item has undergone all necessary TEST and INSPECTION steps during manufacturing and meets all the relevant requirements of the CONTRACT.

Notwithstanding IRN signature by COMPANY staff, CONTRACTOR shall remain responsible of the shipped items.

11.2.5.3 Packaging

Following the period of CONTRACTOR storage and the final agreement by COMPANY for equipment to be delivered, CONTRACTOR shall deliver the GOODS as indicated in this Scope of Work.

Requirements for packaging are detailed as part of ref. [3].

Rental tools shall be packed in re-usable metallic boxes or frame. CONTRACTOR shall provide baskets for offshore transportation of the tools.

Reel requirements:

As a minimum the following shall be clearly marked on reel or transportation carousel where applicable:

- Reel gross weight (flooded and empty);
- Direction of reeling;
- Respective packing drawing number;
- Identification e.g. umbilical ID number, manufacture date.

The reels shall be designed suitable for offshore installation use in accordance with the laying system interfaces and for use with a standard hub drive system. Reels shall be suitable for

installation via both standard offshore industry under-rollers or reel hub drive units

Reel systems shall be provided with cradle and rigging (incl. spreader bar complete with lifting slings) and shall be fitted with heavy duty laced tarpaulins covering the umbilical, designed for protection of the outer sheath and UV degradation and suitable for high seas transportation. Tarpaulin covers for product stored on transportation carousels shall be assessed by COMPANY during packing design, covers to be provided and fitted by CONTRACTOR.

Welding direct to the reels when loaded with umbilical product shall not be allowed. All sea-fastGas Companyng shall be designed to connect by mechanical means to pre-installed 'D' rings, dog plates or pad eyes. Sea FastGas Companyng plates, clips and rings are to be affixed when the reel is empty or welded direct to reel ancillary items such as cradles. Major reel modification shall not be allowed unless over seen by a 3rd Party independent verification Organisation.

Reel hub interface templates shall be fabricated and issued by CONTRACTOR if requested by COMPANY.

CONTRACTOR to supply recent reel inspection report performed by a 3rd party company. CONTRACTOR shall make sure all "critical" welds are checked prior to use (100% MPI & 100% visual).

The design of the transportation reels or carousels shall be approved by an independent verification body (i.e. DNV, ABS, etc).

CONTRACTOR shall ensure that sufficient tension is applied during reeling of umbilicals to final packaging reel, in order to prevent umbilical from slacking and from creating residual torsion during installation campaign.

Packaging reels shall be provided with compatible cradles, spreader bars, riggings and UV protections.

CONTRACTOR shall submit to COMPANY APPROVAL shipping lists containing the description, dimensions, weight and quantities of all equipment to be loaded on board the Installation / Transportation vessel.

11.2.5.4 Load-Out, Transportation and Delivery

LOAD-OUT starts immediately prior to lifting of CONTRACTOR supplied equipment and/or transpooling of umbilicals into Installation Contractor nominated vessel, and ends immediately after the Installation Contractor nominated vessel leaves the quayside.

Any delays to the LOAD-OUT caused by circumstances that shall be wholly-controlled and wholly-managed by CONTRACTOR shall be at CONTRACTOR account and shall be limited to CONTRACTOR incurred costs only.

CONTRACTOR shall transport and deliver the items to other COMPANY's contractors' WORKSITES.

In this purpose, CONTRACTOR shall perform the load-out of the Umbilical Systems, supply all equipment personnel, procedures and engineering analyses to ensure a safe load-out of them, provide all necessary documentation required by the COMPANY to review and approve the load-out activities.

CONTRACTOR shall supply all temporary steelwork required to transfer the equipment from the logistic Workshop facilities onto the sea fastGas Companyng grillages on the transportation

vessel.

Prior to the load-out, CONTRACTOR shall perform pre-load-out test.

For the Load-out, the GOODS shall be positioned close enough to the quayside edge to be reached by vessel crane. The exact type and class of transportation vessel shall be identified following the detailed engineering.

For the entire load-out activities CONTRACTOR shall provide sufficient shore base support, facility, equipment and assistance to the COMPANY and installation contractor in order to cover all load-out activities on 24-hour, 7-day basis.

All GOODS and equipment shall be visually inspected for condition and completeness prior to load-out. Inspection shall be carried out by CONTRACTOR, COMPANY, Installation Contractor and Third Parties. The inspection shall be documented and signed off by all the above Parties prior to commencing with load-out. Verification of packaged quantities against the COMPANY approved equipment shipping list shall be performed.

During trans-spooling design and operations CONTRACTOR shall assist the Installation Contractor to plan and execute the trans-pooling program with respect to safety, security, schedule and technical requirement. CONTRACTOR shall provide all onshore equipment, including: utilities and services required for onshore & quayside trans-pooling operations (i.e. rollers boxes, caterpillar tensioners C/W tower, walkways, lighting, etc.). CONTRACTOR shall ensure first end termination is positioned on the quayside such that it can be lifted using the Installation Contractor's crane. CONTRACTOR shall provide adequate communication systems and protocol for of all personnel involved in trans-pooling operations allowing dialogue between Installation Contractor, CONTRACTOR, vessel and quayside controller. The above communication system and protocol shall be discussed and agreed between parties prior to starting any load-out operation. CONTRACTOR shall be responsible for continuously monitor the integrity of the umbilical product in accordance with COMPANY requirements, closely working with the Installation Contractor throughout the trans-pooling program in providing communication and reference to ensure the umbilical condition and integrity is proved to both parties and to COMPANY. CONTRACTOR shall provide equipment and perform monitoring of the umbilical as per ISO 13628/5. Following trans-pooling activities CONTRACTOR shall ensure the last end termination is positioned on the quayside such that it can be lifted using the Installation Contractor's crane. Following the completion of trans-pooling activities CONTRACTOR shall perform post-loadout testing and handover the GOODS.

CONTRACTOR shall provide office accommodation to COMPANY representatives, to Installation Contractor supervisor and Third Parties representatives at the loadout facility or quayside, as required by COMPANY if the loadout facility is away from the CONTRACTOR's main facility.

Lifting equipment shall be planned in advance and coordinated between quayside and vessel, particularly vessel bridge shall be aware of all loading operations.

CONTRACTOR shall issue all the relevant documentation to COMPANY required to complete the handover process and relevant Handover Certificate.

Umbilical sections shall be provided with steel tubes pressurized up to water depth equivalent pressure. Final value will be defined during CONTRACT execution and will be subject to installation loads, installation sequence relevant to joint make-up, load-out and packing assessment. Consideration shall be given to the impacts of variation in temperature during transporation and deployment through the water column to ensure maximum efficiency against

sea water ingress into the steel tubes

CONTRACTOR is responsible and liable for the GOODS up to handover. Handover of the trans-pooled umbilical is not achieved before successful completion of post-load-out test. For more details relevant to CONTRACTOR's and installation contractor's responsibilities see ref. [4].

CONTRACTOR shall provide all required equipment for lifting operations. Lashing and sea fastGas Companyng works are part of Installation Contractor scope of work.

11.2.5.5 Sea-fastGas Companyng study

As per of the deliverables for the CONTRACT, CONTRACTOR shall issue a sea-fastGas Companyng study, including but not limited to the following:

- procedures;
- design premises;
- sizing reports;
- drawings;

for COMPANY APPROVAL.

This sea-fastGas Companyng study shall cover each item included in CONTRACTOR's Scope of Supply under this CONTRACT and shall be complete and suitable for use by COMPANY as during subsequent offshore transportation of the GOODS supplied under this CONTRACT.

11.2.5.6 Assistance to COMPANY after HANDOVER

In order to assist COMPANY during COMPANY Commissioning and Start-up, any related services will be provided by CONTRACTOR upon COMPANY instruction.

CONTRACTOR shall provide daily 24 (twenty-four) hours assistance on-board the Installation Vessel and on-board the HOST FACILITY, throughout offshore operations involving the UMBILICAL SYSTEM, which include, but shall not be limited to the following:

- On-board Installation Vessel:
 - Transportation of UMBILICAL SYSTEM to offshore site.
 - UMBILICAL SYSTEM monitoring and offshore testing.
 - Preparation activities to start UMBILICAL SYSTEM deployment.
 - Throughout UMBILICAL SYSTEM deployment and subsequent subsea tie-ins to subsea structures.
 - UMBILICAL SYSTEM abandonment on sea bed and future recovery (if any).
 - UMBILICAL SYSTEM pull-in and hook-up to CONTROL PLATFORM.
 - PRE-COMMISSIONING, COMMISSIONING and START-UP of UMBILICAL SYSTEM.
- On-board HOST FACILITY
 - UMBILICAL SYSTEM pull-in and hook-up to HOST FACILITY.
 - PRE-COMMISSIONING, COMMISSIONING and START-UP of UMBILICAL SYSTEM.

The above offshore assistance will be reimbursed in accordance with APPENDIX A of the CONTRACT for personnel and equipment.

CONTRACTOR representatives on-board the Installation vessel and on-board the HOST FACILITY shall verify that the UMBILICAL SYSTEM is handled, installed and tested as per recommended guidelines and endorsed procedures, shall be familiar with the work equipment they will be operating, and shall be fully qualified for carrying out repairs to the umbilicals outer sheath in the event of damages during offshore operations.

CONTRACTOR shall carry out calculations and confirm to Installation Contractor, through COMPANY Interface Management Procedure (Ref.\21\), the quantity\volume of hydraulic

shipping fluid required for monitoring, re-filling & carry out all offshore testing of the overall UMBILICAL SYSTEM.

CONTRACTOR shall provide, on a rental basis, all equipment and installation and testing tools required for INSTALLATION, PRE-COMMISSIONING and COMMISSIONING of the UMBILICAL SYSTEM, including tools to install/connect umbilicals' topside terminations to the HOST FACILITY.

CONTRACTOR shall set a team of qualified personnel, with all necessary equipment and tools, ready to be mobilized in-country for major UMBILICAL SYSTEM repairs (such as dynamic section replacement and splicing/jointing of static umbilicals), throughout the PROJECT offshore campaign, and until the successful completion of all UMBILICAL SYSTEM COMMISSIONING and START-UP.

CONTRACTOR shall ensure that all selected personnel for the above-mentioned offshore assistance is provided with suitable PPE, meet mandatory Health, Safety and Offshore requirements, and fulfil all immigration requirements, including passports, visas, medical examinations, vaccinations, personal custom duties and personnel work permits.

11.2.5.7 Daily Progress Reports

All CONTRACTOR's Offshore Assistance team, Offshore Logistic support Bases and Onshore Fabrication Yards and Sites shall issue a detailed Daily Progress Reports that shall include on an as & if required basis COMPANY Rep's comments and observations.

11.2.6 Maintenance and Repair

11.2.6.1 Procedures

CONTRACTOR shall provide comprehensive maintenance/repair procedures for the equipment (detailing the part numbers) during all phases of its life and submit them to COMPANY for review and APPROVAL prior to delivery of the equipment. The information shall include as a minimum the following:

- Type of services to be provided by CONTRACTOR, including personnel, facilities, spare parts etc.
- Detailed maintenance procedures with exploded views.
- Location of workshop/service office.
- Contact personnel with telephone numbers.
- A comprehensive spare parts listing complete with duration of delivery and recommended spares holding.

CONTRACTOR shall continuously update maintenance/repair information during the operational life of the equipment up to the expiring of the relevant WARRANTY PERIOD and provide this information to COMPANY.

Any change or modification to the maintenance program which may have a detrimental effect on the system is subject to COMPANY APPROVAL. COMPANY shall be notified prior to including such modifications or changes in the program.

Maintenance procedures should as a minimum address the following:

- Routine preventative maintenance;
- Short- and long-term storage maintenance;
- Repair or replacement of failed minor equipment;
- Repair of failed major equipment;
- Refurbishment after a period of field operation;
- Paint/ALOHAAce coating field repair;

- Fault finding;
- Maintenance of spare parts and sub-assemblies.

11.2.6.2 Maintenance and Repair Services

Upon delivery by CONTRACTOR of the supplied equipment to COMPANY (in particular for purchased items), CONTRACTOR shall guarantee and execute, in accordance with CONTRACTOR's supplied procedures, continuous preventive and regular post-operation maintenance of the equipment during the entire installation campaign period and repair services during offshore activities and post-operation maintenance of the equipment after use until the expiring of the relevant WARRANTY PERIOD in order to keep equipment ready for use at any time. This service is considered to be performed by the offshore/onshore personnel provided by CONTRACTOR as technical assistance service, and it is considered part of the Lump Sum / Reimbursable cost of CONTRACTOR personnel.

For the execution of extraordinary maintenance and repair works deemed necessary when tools/equipment are demonstrated to be damaged by COMPANY or COMPANY GROUP, the applicable rates included in the Compensation section of the CONTRACT have to be used. Only such extraordinary services will be regulated on a reimbursable basis.

For equipment agreed to be on a rental basis, normal preservation and maintenance service is considered to be included within the rental fee specified in the Price List of the CONTRACT and no subject to any future Variations.

11.2.7 Pre-Commissioning & Commissioning

CONTRACTOR shall support COMPANY and other contractors for the development of procedures for HOOK-UP, PRE-COMMISSIONING, COMMISSIONING and START-UP for the whole SCOPE OF SUPPLY. Systemization of such procedure to be agreed with COMPANY during execution.

CONTRACTOR shall provide comprehensive engineering, services and offshore assistance as required during the HOOK-UP, PRE-COMMISSIONING, COMMISSIONING and START-UP. The offshore services provided by CONTRACTOR's resources will be reimbursable Technical Assistance Services (ref. 11.2.1.8) in accordance with the rates specified in Compensation section of the CONTRACT.

CONTRACTOR supplied personnel shall be fully competent and familiar with the equipment on which they will be operating.

CONTRACTOR shall be responsible for ensuring that all personnel who shall be supplied offshore shall meet the mandatory health and safety requirements of the Health and Safety Executive and of requirements specified in "HSE-R" of the CONTRACT.

11.2.8 CMMS Input Data

On the basis of the Project Master Equipment List and of the maintenance procedure prepared for each equipment/system, CONTRACTOR shall populate and submit for COMPANY approval the CMMS input sheets as detailed in specification [24], [27], [28]. CMMS Input data are one of the LCI data deliverables and shall therefore be part of CONTRACTOR LCI plan. Therefore, CONTRACTOR shall account for sufficient support to COMPANY for the implementation of CMMS with regards to its own scope and shall provide the required input information.

CONTRACTOR shall provide suitable resources for the customization of the CMMS Software and subsequently management of its scope of supply.

The scope of work shall include, but not limited to, the following provision of suitable resources for the:

- a. Customization of CMMS software. CONTRACTOR shall provide full support to COMPANY's Flowline & Installation contractor for the customization of its scope of supply (enough man/hour included in firm scope as part of APPENDIX A of this CONTRACT).
- b. Inspection, Testing and Certification Management (FAT, SIT, SRT) of its own supplied items. CONTRACTOR shall use its own system for the purpose, however, all signed copies for the certification shall be included into the system for traceability purposes.
- c. Item preservation
- d. Punch list management

11.2.9 Spare Parts

CONTRACTOR shall submit to COMPANY a comprehensive priced and coded spare parts and consumables lists for the equipment to be supplied according to the requirements set in the CONTRACT. For this purpose, CONTRACTOR shall fill in the Spare Parts Interchangeability Record (SPIR) form contained in ref. [27].

CONTRACTOR shall try to maximized spare parts sharing with Jangkrik project equipment. These spare lists shall cover the two different types of spare parts described in sections 11.2.9.1 and 11.2.9.2 below. These lists shall be both included within the same SPIR form and shall also include the lead time for the spares and suggested reorder quantity. Spare parts for SUBCONTRACTORS' equipment shall also be included, complete with SUBCONTRACTORS' manufacturing part numbers within the SPIR forms.

11.2.9.1 Spare parts for onshore / offshore TESTING, INSTALLATION, PRE-COMMISSIONING, COMMISSIONING and START-UP periods

As a rule for the definition of the suitable number of such spare parts for onshore / offshore TESTING, INSTALLATION, PRE-COMMISSIONING, COMMISSIONING and START-UP periods, CONTRACTOR shall consider that to achieve the START-UP of Development Project a well is necessary to be drilled and completed (and associated XTs to be installed) and the entire subsea network shall be installed. COMPANY considers CONTRACTOR fully responsible to determine the most suitable type and quantity of spares to be provided by CONTRACTOR in order to avoid any downtime of both rig and installation vessels on the basis of the equipment's installation requirements set by CONTRACTOR and general installation philosophies provided by COMPANY.

This list of recommended spare parts shall be proposed by CONTRACTOR and agreed with COMPANY in terms of type and quantity before the Contract Award and shall be part of the Lump Sum. COMPANY will have the right to review this list during detailed engineering phase in order to verify its completeness.

CONTRACTOR will be responsible to promptly procure these spare parts and make them available in time for each of the above-mentioned Project phases. Unavailability of spare parts which causes delay in operations will be considered under CONTRACTOR responsibility.

Any increase/decrease in spare parts due to additional requests by COMPANY and not attributable to CONTRACTOR's fault in identifying the correct amount or type of spares, will be managed by using the pre-agreed rates specified within the Compensation section of the CONTRACT.

11.2.9.2 Spare parts for Initial two years of operation

Prices and preliminary list for the 2-years operational spare parts shall be defined before CONTRACT award and quoted within the relevant APPENDIX of the CONTRACT. Detailed list of initial 2-years operational spare parts inclusive of types and quantities shall be made available by CONTRACTOR 6 months after CONTRACT Award and approved by COMPANY. Parts will be then purchased by COMPANY on a reimbursable basis based on relevant APPENDIX fixed prices.

12.0 DOCUMENTATION

12.1 General

CONTRACTOR is required to submit technical documentation for the following purposes:

- To demonstrate that the system/equipment is in compliance with agreed specifications/requirements.
- To provide all the information required for the design of the system/equipment and of the interfacing/interacting equipment or systems.
- To provide all information required for procurement, fabrication, testing, Installation, construction, operation and maintenance of the system/equipment.

CONTRACTOR shall submit to COMPANY, for information, every technical document that it or its SUBCONTRACTORS will prepare and issue during the performance of the WORK at times as required by COMPANY even those not included in the agreed Master Document Register. COMPANY reserves the right to review the documentation and revert in case.

Some technical document issued by CONTRACTOR shall be subject to COMPANY APPROVAL. A list of these documents will be provided by COMPANY during Kick-Off meeting according to the requirements set in Appendix D of the CONTRACT.

12.2 Facilities Life Cycle Information

Facility Life Cycle Information (LCI) aims to ensure the availability of all the engineering information during project execution and subsequent operations process. In order to obtain the above objective the design activities shall be developed according to the requirements of technical specification defined in the tender documentation and according to the following COMPANY Standards.

CONTRACTOR shall apply COMPANY Life Cycle Information Management procedure according to the COMPANY Standards.

- 28080.VAR.LCI.STD - Facilities Life Cycle Information Management Procedure
- 06219.VAR.LCI.STD - Information Submission

These documents define COMPANY's requirements in terms of Facilities Life Cycle Information (LCI). They cover all the aspects related to information management in order to ensure efficient traceability and completeness of plant information during the development process and throughout the entire operational life span of the plant for whole life cycle.

Following Project award, an LCI plan describing the implementation of LCI requirements will be issued within 60 (sixty) days of contract award. This shall include allocation of responsibility, reporting, preparation of quality plan and schedule. The LCI Plan shall be coordinated with the Project detail Engineering Schedule and COMPANY's preparation for operations plans.

CONTRACTOR is responsible for the overall LCI requirements including but not limited to quality, consistency and completeness of information prepared for the contract by all its Subcontractors / Vendors and the delivery of that information to COMPANY.

CONTRACTOR shall provide the COMPANY with free access to all written documents, drawings, specifications, graphical materials, photographs, models (including, without limitation, three-dimensional physical models) and all other information (including, without limitation, that stored by electronic means) ("Documents") which are or were acquired or created by or on behalf of the Contractor in connection with its obligations under the Contract including (without limitation) the CONTRACTOR 's Documents.

12.3 Document Management System

12.3.1 Data and Documentation Management

The design activities shall be developed according to the following COMPANY Standards.

The following paragraphs / subsections provide a detailed list of Contract requirements concerning technical document management and facility technical data delivery for COMPANY database.

Each requirement shall be accomplished according to a listed set of COMPANY specifications. The requirements include:

- Technical organization for document and material management;
- Minimum technical data required for typical basic design documents;
- Detailed full life document planning and progress report;
- Document approval management;
- Life Cycle Information management;
- Delivery of model and spare part data for integration with maintenance;
- Guide to implementation of COMPANY proprietary computer programs for CAE (Computer Aided Engineering) or other recommended programs.

The list of COMPANY specification for each requirement is reported as follows Further COMPANY specifications are listed under Contract General Information.

Code	Title
06215.VAR.LCI.STD	Facility Functional Units
20189.VAR.LCI.STD	Document Numbering
20198.VAR.LCI.STD	Item numbering

Table 12-1 – Technical Organization for Document and Material Management

Code	Title
20259.ENG.PRC.STD	P&ID – Piping and Instrumentation Diagram
06222.ENG.PRC.STD	Equipment Summary Preparation
06784.ENG.PRC.STD	Functional Unit List Preparation

Table 12-2 – Minimum Technical Data Required for Typical Basic Design Documents

Code	Title
27608.VAR.LCI.STD	Management of approval of technical documentation

Table 12-3 – Document Approval Management

Code	Title
28080.VAR.LCI.STD	Facilities Life Cycle Information Management Procedure

Table 12-4 – Life Cycle Information Management

Code	Title
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27913.VAR.LCI.STD	Intergraph Application software Implementation and Deliverables Production
20205.VAR.LCI.STD	General procedure for preparation of 3D CAD models and deliverables production

Table 12-5 – Implementation of CAD Programs

Code	Title
20203.VAR.LCI.STD	Data Model of Plant Components Data and Key Products
06219.VAR.LCI.STD	Information Submission

Table 12-6 – Computerized Delivery of Technical Data in COMPANY Database

Tool EDAM	Title
EDAM	Overview of Engineering Document Approval Management (EDAM)

Table 12-7 – Guide to Implementation of COMPANY Computer Programs for CAE (Computer Aided Engineering) or Other Recommended Programs

12.3.2 Contractor Documents Numbering

CONTRACTOR shall number all engineering Drawings and documents in accordance with COMPANY's numbering procedure, except qualification, material and test and inspection certificates produced by CONTRACTOR, SUBCONTRACTORS or SUBVENDORS. For the existing and new documentation, the Master Document Register shall show a cross-reference between the CONTRACTOR's documents identification and the identification according to the COMPANY's numbering procedures.

CONTRACTOR may propose these engineering drawings and documents to indicate two (2) document reference numbers. These document reference numbers constitutes of primary COMPANY numbering system and CONTRACTOR's numbering system.

12.3.3 Document Submission to COMPANY

CONTRACTOR is required to submit documentation to COMPANY for information, review/comment, and approval. For any documents submitted for COMPANY's approval in accordance with the approved Master Document Register, COMPANY shall respond within the time frame specified in Contract Coordination Procedure from such submission. Such a response shall either be in the form of an approval of the submitted documents or in the form of an exhaustive list of comments on the same.

The documentation shall be submitted individually throughout the duration of the project and collated for final handover submissions.

12.3.4 Document Review

All the documentation (specifications, drawings, procedures etc.) required for design, fabrication, testing, installation, pre-commissioning and operation of the umbilicals, whether or not prepared by CONTRACTOR or by their SUBCONTRACTORS and SUBVENDORS, may be subject to COMPANY review and approval, in accordance with the requirements of COMPANY.

Any drawings, specifications and data submitted to the COMPANY by CONTRACTOR for review shall be accompanied by calculations or other relevant information necessary to explain the intended manner of use.

All terms used shall be clearly defined along with the justification for all assumptions made. A summary of results and interpretation of computer outputs shall be included if so required.

The sequence of submission of all drawings, specifications and data shall be such that all information necessary for the review is made available to COMPANY upon receipt of the documents.

COMPANY's review does not relieve CONTRACTOR from full compliance with the CONTRACT. COMPANY shall have no responsibility in case of errors related to assumptions by CONTRACTOR or to errors not identified by COMPANY during the document review cycle.

All drawings, data and specifications requiring review by the Certifying Authority shall be submitted to the Certifying Authority by COMPANY.

Drawings, data or specifications requiring review by Authorities, other than the Certifying Authority, shall be identified by CONTRACTOR and submitted to COMPANY. COMPANY shall then submit the documentation to the relevant Authorities.

COMPANY shall review any comments made by the Authorities and, after such review, shall then transmit the comments to CONTRACTOR for incorporation into the WORKS.

All drawings, data and specifications requiring review by the MARINE WARRANTY SURVEYOR, where applicable, shall be submitted to the MWS by CONTRACTOR. COMPANY shall be copied for review to CONTRACTOR's correspondence with MWS.

12.3.5 Non-conformances in the Documentation

If drawings, specifications or data show variations from the requirements of the CONTRACT, then CONTRACTOR shall identify and describe such variations in a letter or transmittal to COMPANY.

If CONTRACTOR fails to identify such variations, he shall not be relieved of the responsibility for executing the WORKS in accordance with the CONTRACT, even though such drawings have already been reviewed by COMPANY.

12.3.6 Master Document Register

CONTRACTOR shall maintain an engineering document register, recording all revisions to documents. CONTRACTOR shall propose MDR as part of EPCI Execution.

CONTRACTOR's proposed document register will become the Master Document Register when approved by the COMPANY and shall list all drawings, diagrams and other documents generated during the design, fabrication, construction, testing, installation and pre-commissioning. The Register provides a true and accurate record of the WORKS, including any authorized deviations from drawings and specifications throughout the CONTRACT. Such documents shall be available for COMPANY's examination throughout the duration of the CONTRACT.

The complete list of all documents, including SUBCONTRACTOR's documents needed for the performance and completion of the WORKS to the satisfaction of COMPANY and in accordance with the requirements of this CONTRACT, shall be submitted within 15 working days of CONTRACT Award for COMPANY approval. COMPANY will inform CONTRACTOR by denoting documents to be submitted for review and approval or review only. The Register shall clearly show planned dates for issue of all documentation taking due account of any specific requirements laid down by COMPANY.

With respect to the originally submitted Register, inclusion of any additional document by

CONTRACTOR shall be notified to COMPANY by means of a revised Document Register at least 10 working days before relevant issue.

12.3.7 Document Quality

CONTRACTOR's documents shall be of a high standard with a sufficient level of detail to enable satisfactory completion of the WORKS. CONTRACTOR shall ensure the SUBCONTRACTOR's Drawings are of the same standard and level of detail.

12.3.8 Document Size

The Drawings/documents shall be provided in the following sizes:

- A1 - 594mm x 841mm
- A2 - 420mm x 594mm,
- A3 - 297mm x 420mm, (Preferred size of drawings),
- A4 - 210mm x 297mm (Preferred size for all other data).

12.4 Dispatch Dossier

CONTRACTOR shall prepare a DISPATCH DOSSIER for each item shipped to COMPANY. The DISPATCH DOSSIERS shall be printed in 1-off copy, travelling with the item, and burnt on DVD in 2 copies, one travelling with the item and one handed-over to COMPANY REPRESENTATIVE.

Each DISPATCH DOSSIER shall include as a minimum, but not limited to:

- COC - Certificate of Conformity
- Completed & signed Mechanical Completion Check Record
- Completed & signed Mechanical Completion Punch List
- Shipped Loose Items
- Certifications:
 - Weight Certificates
 - Load Test Procedure, Results and signed Certificates
 - Load and Material Certificate for Lifting Equipment
 - Pressure Test and Flushing Procedure, Reports and signed Certificates
 - Material certificate where required
 - EX certificate where required
- Signed FAT, EFAT, SIT and SRT Test reports (where applicable to the equipment)
- IRN - Inspection Release Note
- Safety data sheets (incl. HSE and Chemical Inventory list)
- As built drawings:
 - Technical data sheets
 - GA drawings
 - Interface drawing
- Packing List / Material Movement Ticket with Photos
- Handling, Preservation, Packing and Storage procedures:
 - A document "Data for Material Storage" shall be issued well in advance by CONTRACTOR to list the size / weight / specific storage requirements for:
 - capital spares
 - operational spares (2YSP)
 - leftover material after installation campaign
- Installation, Operation & Maintenance Manuals
- Proforma Invoice (incl. custom clearance papers, if applicable)
- Photographs of the equipment

12.5 Final Documentation Dossier

At project close-out, CONTRACTOR shall prepare a FINAL DOCUMENTATION DOSSIER compiling

in a structured way all the documents produced during the execution phase.

All drawings and documentation contained within this Dossier shall be to an As-Built status. COMPANY considers As-Built documentation mandatory to track all the modifications carried out over the equipment at late stages (after engineering documents have been already approved for construction). As built-documents shall report all the modifications carried out due to unsatisfactory interface tests (addition of grabbing bars, grinding of balance weights, etc.) or carried out during refurbishment works.

The FINAL DOCUMENTATION DOSSIER shall be delivered to COMPANY by the following means:

- 10-off DVD copies
- 1-off printed copy (to be confirmed and agreed with CONTRACTOR early during PROJECT execution phase)

The FINAL DOCUMENTATION DOSSIER INDEX shall be issued by CONTRACTOR within six months following the commencement date of the WORKS, for COMPANY for approval.

The FINAL DOCUMENTATION DOSSIER shall include at least, but not limited to, the following.

12.5.1 Engineering Dossier

An Engineering design dossier shall be compiled to include in its final form a complete record of all documents and drawings involved in the detailed design of the WORKS.

12.5.2 Materials Dossier

Containing a complete record and certificates of all materials procured by CONTRACTOR and incorporated in the WORKS.

12.5.3 Fabrication Dossier

Containing:

- General description of fabrication processes;
- Installation records including pipes electronic log book, Welding and welders qualification records,
- NDT Inspection log and record of all welding repairs including qualification of personnel,
- All fabrication records, drawings (As-Built), reports, procedures, including those relating to materials, manufacturing, quality control, inspections and tests; process and operator qualifications,
- Pre-commissioning and testing, transport and shipping; etc;
- All agreed Technical Clarifications, Deviation Requests, Non-Conformance Reports and Concession Requests.

12.5.4 Load out dossier & installation guidelines

Packing & preservation plans shall be compiled by CONTRACTOR to include all information (procedures, practices, records, drawings) performed during Packing and load-out activities by CONTRACTOR. Installation, transportation and pre-commissioning guidelines shall be provided to allow the installation contractor to develop procedures, drawings and equipment lists for the installation of the GOODS.

The Load Out dossier shall be issued revision 1 to COMPANY for REVIEW 60 days before loadout operations of the GOODS at CONTRACTOR's facility, including records of tests and relevant information available to date. Final revision will be issued after post-load out test and will therefore include tests record.

Installation guidelines shall include project-specific information relevant to torsional force on the umbilical during lay/installation, including allowable rotation, expected turns and direction and contingency plan of ROV rotation for correct UTA landing orientation. Particular attention shall be made to deepwater lay torsional effects and capacity to achieve the successful 2nd end laydown and engagement to subsea receiving structures / equipment without compromising material integrity.

12.5.5 As-Built Dossier

Containing all the documentation, drawings, datasheets, records, certificates reflecting the AS-BUILT status of the Subsea System.

12.5.6 Pre-commissioning Activities Documentation

Compiled to include all documentation, records, certificates and others developed for pre-commissioning of subsea Systems.

12.5.7 Operating Manuals

Containing a compilation of all documents necessary for operating the equipment during routine operations, start-up, shutdown and emergency shutdown of each piece of equipment.

In particular, CONTRACTOR shall issue an emergency procedures manual, including the description of the safety measures and all the actions to be undertaken in case of hazardous events. Copy of the manual (last revised issue) shall be available on board each one of the Marine Spread Units at Logistic Support Bases and Construction and Fabrication Sites for consultancy by CONTRACTOR and COMPANY representatives. For any major deep sea transportation service of structures and critical equipment, CONTRACTOR shall prepare and distribute an ad-hoc Disaster Recovery Plan complete with shore support network contacts.

12.5.8 Inspection, Maintenance and Repair Manuals

Containing a compilation of all documents necessary for the inspection and preventive and corrective maintenance of each piece of equipment.

12.6 Statutory Manuals

If applicable, CONTRACTOR shall provide all necessary inputs in the format specified by COMPANY for updating Project Statutory Operations Manual and Emergency Procedures Manual for the WORK in question.

In pursuance of this, CONTRACTOR shall liaise with COMPANY to ensure compatibility of format and information.

12.7 Documentation for Authorities

CONTRACTOR shall prepare and issue technical reports and all the other technical documents required by COMPANY, by the governing regulatory Authority or by Certifying Authorities.

CONTRACTOR shall be responsible for taking into account any comments or requirements arisen by the governing regulatory Authority or by Certifying Authorities.

12.8 Miscellaneous Requirements

12.8.1 Documents Format and Native Format

CONTRACTOR shall provide COMPANY with native file formats of the following documentation

only:

- P&ID's,
- equipment 3D models (step file or similar) and layout drawings,
- Operation & Maintenance Manuals,
- Master Document Register (MDR),
- Master Equipment List (MEL),
- Cross-reference Lists,
- TAG Lists.

All other documentation submitted to COMPANY will be in Adobe PDF which shall be CONTRACTOR standard delivery format. Tenderer shall provide the above stated documentation files, regardless of native or PDF, as specified in 20189.VAR.LCI.STD.

12.8.2 Stack-Up Drawings and Posters

Illustrative Stack-Up Drawings and Posters shall be produced for as-built status of the following main systems:

- Umbilical System

Details to be agreed with COMPANY during Execution.

12.8.3 Peer Review and Independent Project Review

12.8.3.1 Peer Reviews

Peer Reviews will be requested during execution and will be conducted by two (2) separate sessions based on COMPANY call out notification.

Peer Reviews shall cover all aspects of the project. At the end of each PEER Review, COMPANY will issue a PEER Review Report; CONTRACTOR shall implement all recommendations of the PEER Review Report.

Prior to each PEER Review CONTRACTOR shall have as a minimum performed the following activities:

- Prepare the PEER Review Terms of Reference;
- Prepare and issue to COMPANY PEER Review pre-reading material;
- Present in a plenary session the design subject to the PEER Review;
- Make CONTRACTOR personnel available for interview in single dedicated session.

12.8.3.2 Project Reviews

COMPANY will plan and lead up to five (5) Independent Project Reviews (IPRs) during the performance of WORKS in order to monitor progress and appraise the WORKS to confirm conformance to the Scope of Work as detailed in the Appendix B of the Contract.

The Independent Project Reviews (IPRs) process will consist of CONTRACTOR's key personnel interviews (generally one to two hours per interview) and reviews of selected documents that have been prepared by CONTRACTOR. The document reviews will take maximum two weeks.

CONTRACTOR shall be advised in advance of such reviews to participate in all to the extent they deem necessary. All internal Project Reviews shall be properly documented, findings logged and resolutions appropriately tracked and recorded. Resolution of discrepancies, deficit and non-conformance items shall be in accordance with the Appendix B and shall be approved by COMPANY before proceeding.

13.0 Critical Engineering Documentation

With reference to the article "Liquidated damages" of the Terms and Conditions of the CONTRACT, the following engineering documents/drawings, expected to be prepared and delivered by CONTRACTOR, are considered critical:

nr.	Description	Notes
1	X-section drawings and Cross section calculation	Including mechanical data such as MBR, capacity curves etc.
2	Umbilical Termination Interface data (e.g. including tubes and cables layout, Interface Flange, etc.)	
3	Inspection and Test Plan for UMBILICAL SYSTEM manufacturing	
4	Inspection and Test Plan for LLIs	
5	GA/Reel packing of Reels	
6	Dynamic analysis report	Analysis required to ensure design suitability to PROJECT geohazards
7	Umbilical interface data: Input data for in- place and installation analyses	
8	Maximum Allowable Free span calculation	
9	Crush and friction Test procedures	If it is required, the endorsement by the Installation Contractor
10	Installation guideline	
11	Pull-in and Hang-off guideline	

14.0 COMPLIANCE MATRIXES

14.1 Compliance Matrix for Analysis Requirements

The table below lists the analysis required to be performed by CONTRACTOR for the PROJECT.

Such table is project specific.

CONTRACTOR shall indicate, for each item listed in the table, if it is included or not in its offer, substantiating the response.

Compliance Matrix for Minimum Analysis Requirements - To be finalized						illed on project basis	
Not included in the Offer	N						
Not Applicable	NA						
No	Description	PROJECT req. (Y/N/NA)	Main Umb - Static (Y/N/NA)	Main Umb - Dynamic (Y/N/NA)	Infield Umbilical (Y/N/NA)	Contractor additional response (if any)	
1	Dynamic Analysis						
2	Fatigue Analysis						
3	Free Span Analysis						
4	Global Strength Analysis						
5	Interface Load Analysis						
6	Interference Analysis						
7	On-bottom Stability Analysis						
8	Preliminary Installation Analysis						
9	Pull-in Analysis						
10	Pull-out Analysis						
11	Stress Analysis (Detailed)						
12	Thermal Analysis						

14.2 Compliance Matrix for Testing Requirements

The table below lists the tests required to be performed by CONTRACTOR for the PROJECT.

Such table is project specific.

CONTRACTOR shall indicate, for each item listed in the table, if it is included or not in its offer, substantiating the response.

Compliance Matrix for Minimum Testing Requirements - To be filled on project basis						
			Included in the Offer		Y	
			Not included in the Offer		N	
			Not Applicable		NA	
No	Description	PROJECT req. (Y/N/NA)	Main Umb Static (Y/N/NA)	Main Umb Dynamic (Y/N/NA)	Infield Umbilical (Y/N/NA)	Contractor additional response (if any)
1	Qualification and Verification tests					
1.1	Bend Stiffness test					
1.2	(Umbilical) Bundle Impact Test					
1.3	Combined Tension and Bending Test					
1.4	Combined Torque Balance and Tension Test					
1.5	Crush Test					
1.6	Fatigue Test (dynamic)					
1.7	Free Flooding rate					
1.8	Friction Factor Assessment (internal/external)					
1.9	Hydrostatic diameter reduction and collapse resistance of Cross section Test					
1.10	Lay-up Trial					
1.11	Repair Splice Qualification Test					
1.12	Strength of end terminations (pull-head and subsea termination)					
1.13	Topside and Subsea Termination Interface Test					
2	Integrated Tests					
2.1	Buoyancy Module Fit up Test					
2.2	HOST Pull Tube Interface Test					
3	Interface Tests					
3.1	Functional check of all Interfaces with equipment internal and external to the UMBILICAL SYSTEM					
3.2	ROV/diver access check and operation of all intervention interface parts of the UMBILICAL SYSTEM					
4	Final Tests					
4.1	FAT, including communication test inclusive of sensitivity test					
4.2	EFAT					
4.3	Pre LOAD-OUT Test					
4.4	Post LOAD-OUT Test					
5	Others					
5.1	Monitoring of Umbilical Integrity during Installation (Umbilical prepared for)					

14.3 Compliance Matrixes Templates

CONTRACTOR shall use the attached templates to provide the information requested in section 14.1 and 14.2, and submit them as part of the bid documentation, for COMPANY evaluation and APPROVAL.

Once APPROVED, these matrixes will be considered part of the CONTRACT documentation