Base Load Power Hub (BLPH)

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None

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

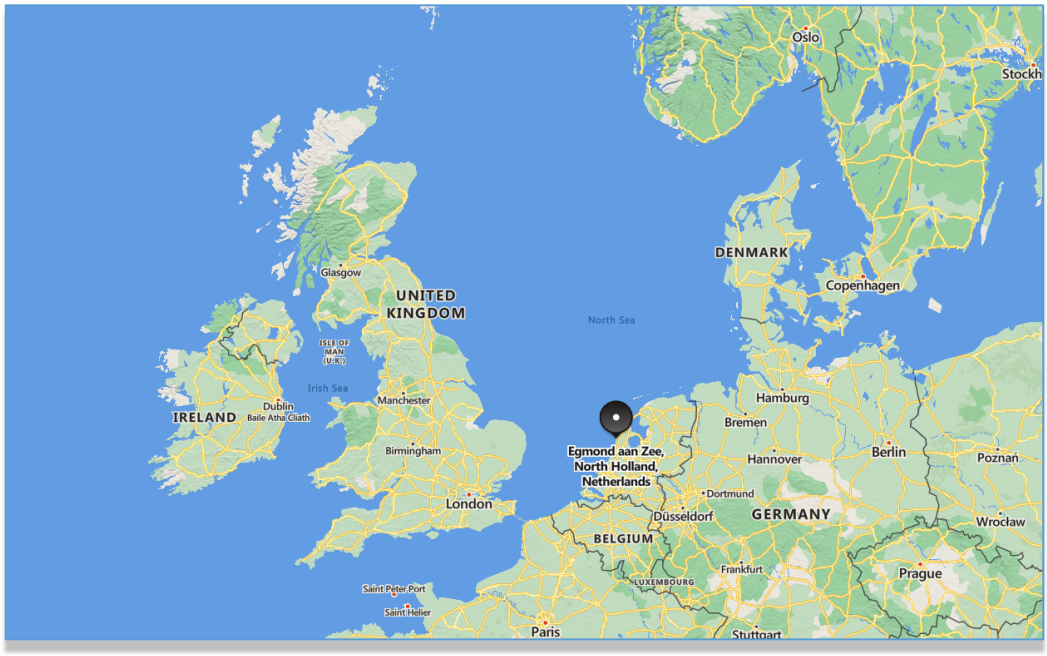


Figure 1 - HOLLANDSE KUST NOORD WIND PARK Location Map

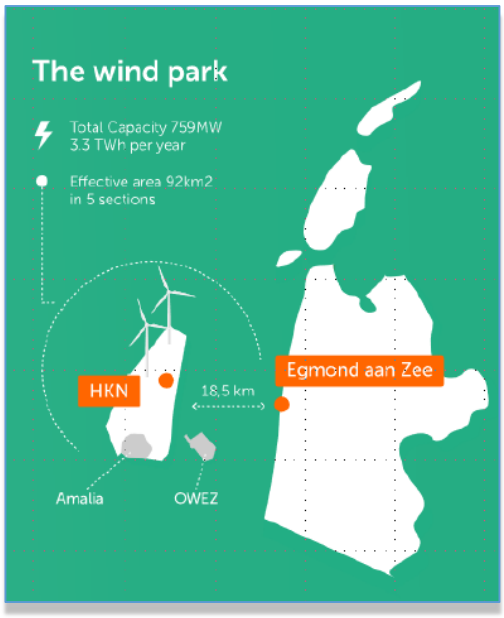


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile is located on coordinates E 590719.1, N 5841602.3 and is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

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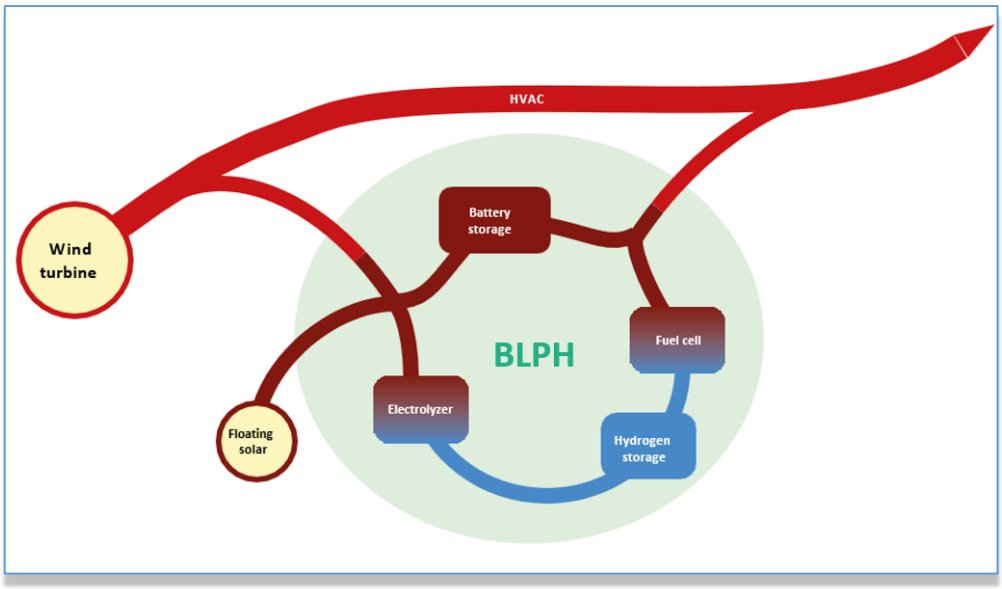


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH is to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

The purpose of this Execution Plan is to describe the methodology and the strategy that CONTRACTOR will adopt to perform the activities of Engineering, Procurement, Construction, Transportation, Installation and Commissioning of the Project and to provide sufficient detail to enable newcomers to understand the SCOPE and its execution details.

CONTRACTOR reserves the right and following possible suggestions by COMPANY, to modify, implement, review such execution strategy in order to perform the Scope of Work in the best professional manner possible, according to COMPANY's requirements.

2.1 REFERENCES

Doc. No.	Description
CONTRACT - SECTION V	Scope Description

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY)	CrossWind C.V.
CONTRACTOR (CTR)	ROSETTI MARINO S.p.A.
PROJECT	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

2.3 PROJECT OBJECTIVES AND STRATEGIES

CONTRACTOR's objectives for the implementation of the WORK are based on the following main drivers:

- Implement a common and effective HSE approach throughout the duration of the Project from design phase to installation and commissioning.
- Ensure the implementation of a robust QA-QC approach for the duration of the Project.
- Ensure an honest relationship and good integration with COMPANY Project Management Team and have others potential contractors and SUBCONTRACTORs adhere to an effective interface management.
- Management of the lump sum contract such that the work is fit for purpose while achieving compliance with project specifications, schedule and budget with an aim of realizing a profit.
- Develop and implement a schedule to reach CONTRACT Milestones and Target Dates.

To achieve its objectives, CONTRACTOR's sees key features within its execution strategy that should assist with a smooth and efficient execution of the Project. Key features being:

- Implement an earliest engineering effort focusing on critical path activities.

- Build up and implement one single project document control system.
- Ensure long lead items earliest availability.
- Ensure a reliable and fast communication process for document approval with COMPANY.
- Minimize the number of SUBCONTRACTOR's and interfaces to the extent practical and therefore optimize their management. The same Quality Management System is used for controlling all VENDORs and SUBCONTRACTORs products and services.
- Use previous project experiences on similar projects for developing the most appropriate design, fabrication and installation methods as well as for evaluating and selecting the most appropriate VENDORs and SUBCONTRACTORs for each item.
- Set up a task force organization to allow efficient communication and to optimize team members' involvement in the Project.
- Set up a suitable Project Control System utilizing state-of-art software tools in line with CLIENT requirements to ensure proper project monitoring and achievement of Target dates.

3 SCOPE OF WORK AND HIGH-LEVEL STRATEGY

The required scope of WORK can be briefly summarize as the performance of all activities and the provision of all personnel (including management and supervision), equipment, MATERIALS, facilities (including temporary facilities), plant, consumables, marine vessels, services, documentation, insurance and any other items mentioned, shown, stated, required or reasonably implied, to safely and efficiently execute the design, engineering, procurement, fabrication, inspection and testing, storage, materials storage, commissioning, preservation, weighing, load out and sea fastening, offshore hook-up of the transition piece and topsides and commissioning of the PERMANENT WORK to achieve COMPLETION, in accordance with the provisions of the CONTRACT and in particular in accordance with document: Section V – SCOPE DESCRIPTION.

3.1 HIGH LEVEL STRATEGY

CONTRACTOR is presenting in the following picture the High Level Project Execution Strategy, showing that Rosetti Marino will lead and will be responsible for all the activities in the project execution.

The picture shows also the main subcontracts foreseen. With the aim of providing the best services for the 'BLPH Project', Rosetti Marino' strategy IN FACT, is to involve specialised partners with extensive experience in their field of expertise, namely ABB AS in electrification and automation and DEME GROUP for offshore installation activities.

ABB's primary support will be on the power system studies during the initial stages of the project and a preferred supplier in the execution stage of the project.

Rosetti Marino will coordinate the activities taking advantage of the experience of each of these companies in their respective core business.

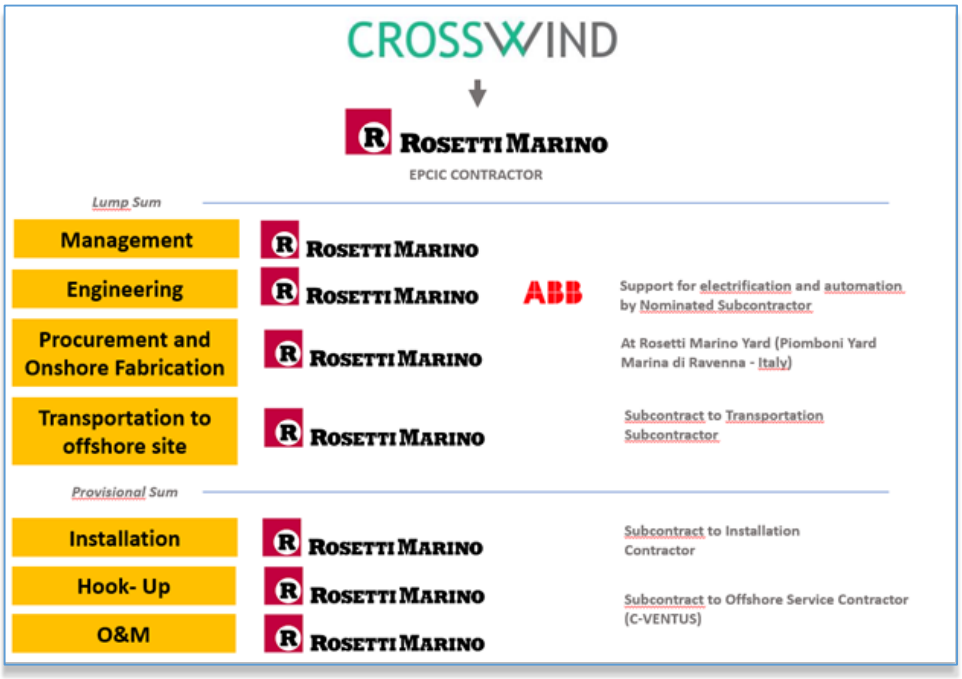


Figure 4 - Rosetti Marino's High Level Project Execution Strategy

With the aim of providing the best services for the 'BLPH Project', Rosetti Marino' strategy is to involve specialised partners with extensive experience in their field of expertise, namely ABB in electrification and automation and DEME GROUP for offshore installation activities.

ABB's primary support will be on the power system studies during the initial stages of the project and a preferred supplier in the execution stage of the project.

Rosetti Marino will coordinate the activities taking advantage of the experience of each of these companies in their respective core business.

3.2 WORKSITE LOCATIONS

CONTRACTOR will manage and execute the WORK at its premises located in Milan and in Ravenna offices, as summarised below:

- Engineering Center: Rosetti Marino's Engineering Offices located in Milan (Italy).
- Procurement Tagged Item: Rosetti Marino's HQ Engineering Offices located in Milan (Italy).
- Procurement Bulk Materials: Rosetti Marino's HQ Offices located in Ravenna (Italy).
- Construction Topside: Rosetti Marino's Piomboni Yard located in Marina di Ravenna (Italy).

Rosetti Marino's HQ Offices – Ravenna (ITALY)



Figure 5 - Rosetti Marino's HQ Offices – Ravenna (ITALY)

Rosetti Marino's HQ is located in Italy in the city of Ravenna about 90km far from the international airport of Bologna and 10 km distance from the Adriatic sea. The Rosetti Marino's HQ offices are very close to its own Piomboni's Yard that is 10km far (hereinafter – YPB).

The Rosetti Marino's HQ Offices includes an office building on four levels with office space of about 2,000 m2 for each floor, no. 20 videoconference rooms with Air Conditioning/Heating system, telecom and LAN network systems, printers, scanners, E-Fax and Faxbox systems. Dedicated connections to ICT systems may be provided to Clients' staff.

The Rosetti Marino's HQ is also equipped with a canteen offering an international menu.

The Rosetti Marino's HQ includes a parking area of 10,000 m2. Dedicated parking area is usually assigned to Client's staff.

The access to the offices is controlled by magnetic badge as well as reception for visitors. The Rosetti Marino's HQ has a 24h and 7/7 days security service.

Engineering Centres Involved

Engineering activities will be carried out by an integrated engineering team in CONTRACTOR's Engineering Offices located in Assago (Milan – Italy).

Project's locations where CONTRACTOR will carry out its works are shown in the below pictures.

Fully furnished office services are provided, based upon offices for managers and task force areas for other staff. Each employee has a dedicated workstation for the duration of his/her work.



Figure 6 - Rosetti Marino's engineering office in Milan (Italy)

Rosetti Marino's Piomboni Yard – Marina di Ravenna (ITALY)

The Rosetti Marino's fabrication yard allows erection and load out on barges of large size structures, modules, P.A.U.s., vessels, columns, cranes or plant components destined to offshore or overseas sites. It is located in Marina di Ravenna, on the Piomboni Canal, which is part of the port of Ravenna.

It covers an area of almost 104,000 m^2 and it has a 450-metre long quay equipped for marine works and is able to bear heavy loads. The water depth at the quay edge is 9.50 m. The top quay is 2.20 m above the average sea level.

Barges and seagoing vessels can access the Rosetti quay, including deck cargo barges, heavy lift vessels or special cargo ships.

The quay has fire-fighting equipment (water and foam extinguishers), energy supply devices (380/220/24V), and plants for fresh and salt water supply and equipment for the distribution of technical gases as well as a phone network.

The site features steel and piping prefabrication shops, a large assembly hall, covered blasting and painting facilities of 25,00 x 30,00 x 14,00 m (L x W x H), open erection areas, heated warehousing and offices for Rosetti's personnel and CONTRACTOR/CLIENT inspectors (2,400 m^2).



Figure 7 - Rosetti Marino's Piomboni Yard

4 PROJECT ORGANISATION

The CONTRACTOR will formally initiate the Project in a kick-off meeting called by the CONTRACTOR's Project Sponsor and attended by Functional Managers and Project Manager.

In such kick-off meeting, the Project Sponsor will officially and formally communicate the objectives of the Project, the CLIENT needs, the key milestones, the major risks/opportunities and key resources required to successfully perform the CONTRACT.

The Project Management Team will be integrated according to the actual needs, with the required personnel for management, coordination, control of all the activities and smooth transfer of information during Project Execution.

The success of the project will be directly related to the performance of the project team and the individuals within that team. All team members will be engaged in achieving the project goals and objectives as this will directly contribute to the success of the project.

These goals and objectives will be achieved with the full support and enrolment of all members of the project team. As such, the senior members of the Project Management Team are the key personnel to encourage a project environment where team members:

- Support each other to work together and succeed as a team.
- Understand the over-riding requirement to perform all work safely.
- Respect each other's abilities, experience and point of view.
- Maintain open and clear lines of communication.
- Accept and respond to constructive criticism.
- Are always looking for new, more efficient ways to do things.
- Work to an agreed deliverables preparation schedule.
- Do things only once – right!
- Act with integrity – deliver on our promises.
- Seek to pro-actively build long term relationships with other stakeholders.

All resources appointed to the Project are vital to the success of the CONTRACT and the cooperation within the team is a key element to establish a safe environment to gain outstanding results.

At this stage, the Project's key resources have been identified as follows:

- Project Manager (PM)
- Project Interface Manager (PIM)
- Project Control Manager (PCM)
- Project Quality Manager (PQM)
- Project HSE Manager (PHSE)
- Project Engineering Manager (PEM)

- Project Procurement Manager (PPM)
- Project Construction Manager (PCM)
- Project Commissioning Manager (PCOM)

Refer to Appendix 1 for the Preliminary Project Organization Chart for Base Load Power Hub (BLPH) – CrossWind Project.

4.1 ROLES AND RESPONSIBILITIES

The CONTRACTOR herein identifies the Project's key persons that will be part of the Project Management Team (hereinafter PMT)and that will be the principal responsible for the success of the Project.

4.1.1 Project Manager

The CONTRACTOR's Project Manager has direct line responsibility for the safe and timely performance of all WORKS under the Contract in accordance with the applicable specifications.

The Project Manager responsibilities include but are not limited to:

- Continuous management, reporting and control of the Works in accordance with the
- Project Execution Plan and all other requirements of the Contract.
- Interface with the other Company's contractors involved in the Project.
- Contractor internal coordination between Contractor departments involved in the Project execution.
- Contractor management and coordination of all its subcontractors and vendors providing services and/or materials for the Project.
- Implementation of an effective Quality Management System in accordance with the requirements of the Contract.
- Implementation of an effective Health, Safety & Environmental Management System in accordance with the requirements of the Contract.
- Encourages co-operation organization within his organization and towards the other functions and Group Companies.

4.1.2 Project Control Manager

The CONTRACTOR's Project Control Manager is responsible to guarantee a high level of Project Control by way of effective planning using various established techniques, proper monitoring of the various activities through controlled feedback and predefined communication procedures, with the purpose of improving the latest development techniques.

The aim of the Project Control function is to monitor all identified Project targets within pre-defined limits of the schedule, budget costs and quality and inform the management about its current status and expected development.

The mission and responsibilities of the Project Control Manager are, but not limited to:

- Draw Project weekly and monthly reports

- Collect progress documents related subcontracting activities
- Control work progress status reports
- Take part and co-operate with the Project Manager in the arrangement of the Kick-off meeting
- Co-operate with the Project Manager as to the preparation of Project initial plans, as far as the following is concerned:
- Initial planning;
- Procurement Plan;
- Take part in the most significant project meetings
- Propose and arrange possible re-scheduling upon instruction of the Project Manager
- Co-operate with the Project Manager in preparing the Close-Out Report
- Prepare the Work Packages considering the relevant physical quantities involved, and gather the progress data to fill in Work Packages.

A dedicated Project Control Plan will be issued in order to define a consistent method of planning, measuring and reporting work progress in line with CLIENT project control management.

4.1.3 Project Quality Manager

The CONTRACTOR's Project Quality Manager and its Team are fully committed to:

- Ensure that the Quality System procedures and all the documents issued are in compliance with the project;
- Ensure that the organization on-site complies with the Quality System and the project;
- Prepare the Project Quality Plan and the quality related project procedures and work instructions.
- Liaise with the Client and subcontractors, together with the Project Manager as to all quality-related aspects.
- Prepare and/or to verify the quality-related documents to be included in the material requisition of supply.
- Verify, comment and approve supplier's quality-related documents.
- Develop an internal audits plan as well as a plan of eventual audits to be carried out on the main Project Processes and at subcontractors' and vendors' premises.
- Verify that the Quality Plan is implemented and effective in all the work sites.
- Request any possible corrective actions; follow the relevant implementation by cooperating with the Project Manager (PM) and the Project Engineering Manager (PEM) in the resolution of contractual nonconformities, deviation and concession requests.
- Handle the project quality control reporting to the PM, highlighting criticalities whenever quality-related problems arise.
- Verify, during the different work phases, the execution of inspections as required by the ITP.

- Interface with and supervise the quality control inspectors' activities both at yard and at vendors' and subcontractors' premises.
- Co-ordinate, all the activities needed for products final testing.
- Liaise with the Client Quality Rep, Inspectors, the CVA (Certified Verification Agent) as to all Quality Assurance and Quality Control-related activities.
- Ensure that Client's Inspectors, the CVA Representatives are duly notified in advance to witness those specific operations and test according to the approved Inspection and Test Plans.
- Make sure that the quality record books and the final dossier are prepared in compliance with the project requirements and the corporate standard.

4.1.4 Project HSE Manager

The CONTRACTOR's Project HSE Manager and its Team are fully committed to:

- Facilitate implementation of the Project HSE plans, project specific procedures and to revise them when necessary.
- Identify and evaluate risks and propose preventive measures.
- Review and approve Subcontractors HSE plans when such plans must comply with the Project HSE plan; perform Subcontractors HSE audits and inspections.
- Ensure HSE program is comprehensive and effective in communication of hazards and preventive measures to be taken to ensure safe construction and actions to be taken in an emergency.
- Review the organization and implementation of information and training on HSE relative to the site activities (such as toolbox talks, work permits etc.).
- Supervise the installation in respect of all safety and environmental protection measures.
- Ensure regular monitoring and inspections to detect potential hazards.
- Stop any work whose execution is deemed dangerous or likely to imperil the health and safety of personnel.
- Perform reporting and investigation (or assist with) of accidents, incidents and near misses and ensure that all accidents, incidents, and near misses are reported.
- Maintain records of all accident reports and investigations on site and monitor remedial actions being implemented because of accident investigation.
- Participate in the weekly coordination meetings with all construction supervisory staff and subcontractors representatives to discuss safety.
- Conduct the induction meeting for all new employees (including subcontractors).

4.1.5 Project Engineering Manager

The CONTRACTOR's Project Engineering Manager will be responsible of the design of the Project.

Project Engineering Manager will be responsible to ensure all project needs are effectively and timely and result in a pro-active and added value cooperation to confirm an integrated engineering team.

Unless agreed otherwise, Project Engineering Manager is the point of contact for CLIENT and all other contractors and/or third parties selected by CLIENT for all kind of engineering support is may needed.

The CONTRACTOR's Project Engineering Manager and its Team are fully committed to:

- Manage the scope of contract relevant to Engineering, ensuring the performance of the activities in compliance with contractual and legal requirements, engineering best practices, timing, QHSE requirements and budget.
- Ensure the respect of the global engineering budget, to manage with the support of Engineering Project Controlling, the definition of the estimation to completion and to verify the correct structure of the engineering team workforce; to report promptly any potential gap from the budget, suggesting corrective actions to the Project Manager.
- To promote alternative technical solutions that can generate advantages for both CLIENT and CONTRACTOR.
- Co-ordinate the resources in the execution of the Engineering and to manage the relationship with Client and other external parties; to ensure the integration with other services/department involved to the Project;
- Ensure the management and the approval of incoming and outgoing engineering documentation, and to co-ordinate the Document Controller in filing, communication and transmission to the personnel involved, keeping proper records through documents lists;
- Ensure and co-ordinate design review, verification and validation CONTRACTOR's Project Engineering Manager liaise with CONTRACTOR's Construction Manager and CONTRACTOR's Q-HSE Manager to guarantee the best in class services in full respect of the Q-HSE rules.

The Project Engineering Team shall support the Construction Team during fabrication, construction, mechanical completion and commissioning phases.

The main objectives of the Project Engineering Teams are:

- Assess CLIENT documentation and/or perform a site survey to understand the existing scenario
- Define the engineering requirements prior to commencing the fabrication works
- Define the assembly areas, assembly sequences, lifting and handling Engineering, load out studies, and erection
- Develop the standards, procedures, and method statements to perform the fabrication Activities
- Develop all documentation to perform the fabrication activities, i.e.
  - Workshop spools drawings, structural drawings, piping supports, shop drawings, piping isometrics
  - calculations; structural analyses; stress analyses
  - pre-fabrication feasibility and piping assembly;
  - Constructability and erection sequence

  - Load-out and transportation and installation requirements;
- Issue as-built documentation
- Support the Project Team during the process for selection of the best sub-contractors for fabrication activities
- Support the Project Manager, the PQM, and the Construction Manager in solving nonconformities identified during the construction phase proposing and carrying out suitable actions for their resolution
- Encourage cooperation and teamwork within his organization and towards the other functions and Group Companies

The CONTRACTOR's Project Engineering Manager shall also manage changes and shall be involved timely in the decision-making process.

4.1.6 Project Procurement Manager

The CONTRACTOR's Project Procurement Manager and its Team will be responsible of the Procurement activities for the Project.

The CONTRACTOR's Project Procurement Manager and its Team are fully committed to:

- Collaborate with the Project Manager based on contractual requirements of the Clients, in elaborating the project procedures and project documents (Purchase Order and other forms) that are needed to manage the procurement activities, in compliance with the project requirements;
- Prepare the project's vendor list, interacting with the Suppliers Qualification & Evaluation Function, starting from the contractual vendor list. Submit it to the Project Manager and to the Procurement Manager for approval;
- Ensure the execution of the criticality rating process for materials by collaborating with the Project Team Members according to their responsibilities;
- Collaborate with the Project Team in defining the strategy and planning of the procurement activities taking part in the compiling of the relative works program (Project Procurement Plan and Contract Master Schedule). Prepare, with the collaboration of functional responsible, the estimation of necessary man-hours for procurement, subcontracting, expediting and logistic activities, submitting them to Procurement & Logistics Service Director;
- Collaborate in the elaboration of the Subcontracting Plan supporting the Project Team (especially PEM and CM) in the definition of the main subcontracts and acting as an interface with the Subcontract Responsible with regard to PO issuing, criticalities and budgets.
- Collaborate with the Project Manager and PCM in defining the Project Budget for material purchasing and Procurement, subcontracting, expediting and logistics activities (manhours).
- Act as interface, within the Project Team, with the Procurement & Logistics Service and the relative Functions, for the coordination of all procurement activities (from the issue of Material Requisition up to the delivery at site) notifying the Project Manager about possible criticalities and proposing alternative solutions;

- Monitor and approve the issuing of the project Request for Quotation on Athena and sign the final Economical Bid Evaluation, before submitting them to the PM for approval;
- Support the Project Manager during Project Coordination Meetings with the Client acting as an interface for all the aspects related to Procurement;
- Giving priority to the management activities, can cover also the role of buyer. In this case, the final EBE relevant to those bids that have been followed by him, shall be signed by the Procurement Manager.
- Collaborate with the Project Manager in compiling claims and/or formulating proposals relevant to the variations to be submitted to the Client, for all the aspects that concern procurements, subcontracting, expediting and logistic, in collaboration with the Procurement & Logistics Service Functional Managers, if needed;
- Collaborate with the Procurement Manager and Project Manager in defining strategies to manage the relationship with project suppliers in terms of changes to the order, penalties on deliveries, possible charges to supplies, resolution of controversies.
- Ensure the updating of the Project Procurement Plan/Subcontracting Plan by collecting information about criticalities and delays from suppliers and other Team Members;
- Monitor and solicit the progress of the bidding phase, ensuring the transmission of the information to the Project Team and helping in re-planning the activities when needed;
- Monitor and solicit the expediting activities, ensuring the transmission of the information to the Project Team and helping in re-planning the activities when needed;
- Revise the estimation for the Procurement & Logistic Service man-hours, submitting them to the Procurement & Logistic Director and to the PM and PCM, on monthly bases;
- Support the Project Manager in the compilation of the Close Out Report.

4.1.7 Construction Manager

The CONTRACTOR's Construction Manager will direct, coordinate and control all construction activities related to the project, according to CLIENT rules, corporate standards and contractual conditions as far as Quality and HSE are concerned and to ensure that scheduled targets relevant to delivery terms and costs are met.

The mission and responsibilities of the Construction Manager are but not limited to:

- Liaise with CLIENT's organization at yard as to aspects related to construction activities and to keep the PM informed
- Supervise the construction activities, carried out both from internal staff and subcontractors, ensuring the coordination among prefabrication, erection, commissioning, yard logistic, guaranteeing an efficient and effective use of human resources and equipment given to him;
- Verify that workers employed by both the Company and any Subcontractor are informed and trained in order to carry out the jobs in a safety way

- Monitor the Construction progress, informing permanently the Project Manager upon it, upon the possible problems detected and to propose preventive, corrective and improvement actions
- Support the Project Manager and the PQM in solving non-conformities identified during construction phase proposing and carrying out suitable actions for their resolution
- Co-operate with Company HSE Function in the implementation of Company HSE-related rules
- Implementation of an effective Quality Management System in accordance with the requirements of the Contract
- Implementation of an effective Health, Safety & Environmental Management System in accordance with the requirements of the Contract

4.1.8 Project Commissioning Manager

The CONTRACTOR's Project Commissioning Manager and its Team, are fully committed to:

- Take part, during the Project Execution Plan drafting phase, in the definition of the Project strategy, by becoming the reference as to all the aspects related to Mechanical Completion, Precommissioning and Commissioning activities;
- Arrange, together with the Project Team, the Project overall planning as to every aspect dealing with Mechanical Completion, Precommissioning and Commissioning activities;
- Prepare, together with Project Specialist Leaders, subcontract specifications by defining the scope of work of the different companies as to Mechanical Completion, Precommissioning and Commissioning activities;
- Prepare, together with the Project Engineering Manager, the Design Documents List of documents related to Mechanical Completion and Commissioning activities, including the definition of the relevant milestones;
- Define the plan and sequences of commissioning activities, by identifying internal and/or external resources (contracting companies and Vendors' personnel) and/or assets necessary for the execution of activities in compliance with contractual requirements and with the project plan;
- Define, together with the Project Engineering Manager, the list of critical supplies for which the Commissioning Manager is required to witness the Factory Acceptance Test;
- Take part in engineering, either developed internally or supplied by Client, from the very first steps, by liaising with the Project Engineering Manager and the Engineering Service as to explanations, changes and/or optimizations aimed at the definition of increasingly correct commissioning sequences;
- Take part in Constructability Meetings so as to highlight, since the very first stages of the Project up to the construction phase, the obligations to be fulfilled as to commissioning activities, in order to optimize activities themselves, prevent any operational problems and foster a safe execution; said obligations shall be acknowledged starting from the engineering phases;

- Define, together with Project Specialist Leaders, the list of materials needed for the execution of commissioning activities, and to prepare the relevant purchase request in accordance with the commissioning activities schedule;
- Support, from a technical/operational and HSE point of view, the Construction Manager during Mechanical Completion, Pre-commissioning and Commissioning activities, by previously notifying any possible criticalities;
- Keep informed, with the support of the Construction Manager, the Project Engineering Manager and/or the Project Specialist Leader of the Engineering Service as to any technical issues possibly arising;
- Co-operate with the Project Quality Manager in liaising with the Client, by becoming the main technical reference as to all Commissioning-related and product performance problems;
- Prepare the Close Out Report, with reference to the Mechanical Completion,
- Pre-commissioning and Commissioning sections, by cooperating with the Project Quality Manager and the Construction Manager.

4.1.9 Project Interface Manager

The CONTRACTOR will appoint a Project Interface Manager to facilitate and improve the communication with Client and all other Contractors selected by Client as well as third parties involved into the Project.

The mission and responsibilities of the Project Interface Manager are but not limited to:

- Develop the Project Interface Management Plan
- Play an active role in managing and keeping updated the interface management tools
- Support the Project Manager to identify the map of the stakeholders and the associated communication workflow
- Define, communicate and monitor the communication work process and tools to the CONTRACTOR's Project Team and the Project's stakeholders to ensure a fair, active and effective communication
- Avoid potential disputes between various project stakeholders.
- Provide an escalation route for issues that cannot be closed between the direct parties involved.
- Highlight any potential implications of interface issues such as schedule delays etc. to the Project Management team.
- Reduce risk by minimizing the possibility of miscommunication along with use of incorrect data and assumptions.
- Provide a tracking and recording mechanism for Issues occurs and help ensure a robust audit trail for the Project.

4.2 ONBOARDING NEW PROJECT TEAM MEMBERS

The integration process of new project team members is considered of primary importance to the CONTRACTOR. CONTRACTOR shall implement a new team member induction program for each execution site and phase. The induction program is an important process for bringing staff into an organization.

Personnel introduction includes information on the working environment and the set-up of the employee within the organization and will include the following:

- A safety briefing, including: office layout and facilities local to place of work, Medical emergency, evacuation, environmental and Hazard and near miss reporting;
- introduction to project team members – CONTRACTOR's, Principle Subcontractor's and Company personnel as necessary;
- Project briefing: Scope of Work, project status, IT systems, etc.

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5 SUBCONTRACTING STRATEGY

All CONTRACTOR' subcontractors are qualified according to the internal system procedure for suppliers/subcontractors: qualification procedure evaluates suppliers/subcontractors both on the quality and the HSE aspects.

Table below provides the work execution overview; in particular, it defines the Subcontractor strategy for the development of the Project specifying which activities are performed directly by CONTRACTOR and which activities are performed by its Subcontractors.

Discipline/Activities	CONTRACTOR	Subcontractor	Note
Detail Engineering	X	Specialized consultant (ABB)	
Construction Engineering	X		
Procurement	X		
Expediting	X		
Fabrication	X	X	Fabrication activities can be partially subcontracted
Erection			
Structures	Lead and Supervision	X	Erection in RM's Yard
Piping	Lead and Supervision	X	Erection in RM's Yard
Mechanical	Lead and Supervision	X	Erection in RM's Yard
Architectural	Lead and Supervision	X	Erection in RM's Yard
HVAC	Lead and Supervision	X	Erection in RM's Yard
E&I System	Lead and Supervision	X	Erection in RM's Yard
NDT	Lead and Supervision	X	Erection in RM's Yard
Painting/Insulation/PFP	Lead and Supervision	X	Erection in RM's Yard
Load Out	Lead and Supervision	X	Erection in RM's Yard
Onshore Mechanical Completion	Lead and Supervision	X	Erection in RM's Yard
Onshore Precommissioning	X		
Onshore Commissioning	X		
Mechanical Hook-Up	Lead and Supervision	X	C-Ventus
Offshore Completion	Lead and Supervision	X	C-Ventus
Offshore Commissioning	X		
Transportation	Lead and Supervision	X	Hebo Maritime Service

Discipline/Activities	CONTRACTOR	Subcontractor	Note
Installation	Lead and Supervision	X	Deme Offshore NL B.V.

Table 3 - TOPSIDES SUBCONTRACTING STRATEGY

For the erection activities, the subcontracting strategy relies upon the involvement of specialized Subcontractors, qualified according to CONTRACTOR's internal procedure, who are familiar with CONTRACTOR's approach and standards thanks to a long-term relationship. Thanks to these approaches, CONTRACTOR has a prompt, efficient and reliable availability of qualified Subcontractors covering all the construction phases of CONTRACTOR's tasks.

This assures the following benefits:

- prompt mobilization;
- in-depth knowledge of Energy and CONTRACTOR's standards in terms of HSE, Quality, management of the activities (e.g. planning, controlling, reporting);
- a proactive approach especially in the case of any critical conditions (e.g. manpower peaks, SIMOPS).

During Project execution, Subcontractors will comply with CONTRACTOR's QHSE procedures and work instructions. To ensure compliance with CONTRACTOR QHSE management system, periodical inspections and audits will be carried out. Moreover, a Quality and HSE coordination meeting will be held once a week involving the supervisors of each Subcontractor.

CONTRACTOR will complete Subcontractors' Audits on defined basis and will follow up on audits to confirm the closing of Audit observations. COMPANY can attend these Audit.

CONTRACTOR retains the responsibility of clearly defining and monitoring the various Subcontractors' Scopes of Work, including but not limited to:

- battery limits & interfaces;
- Quality and HSE requirements;
- project and/or yard operating procedures;
- overall planning and control.

CONTRACTOR remains the only party responsible for undertaking these relevant items of the SoW, in order to assure Subcontractors or Suppliers will conduct their activities properly, in their own area of expertise and always under CONTRACTOR's supervision and responsibility.

5.1 T&I SUBCONTRACTORS

T&I is a key activity of the Project and for this reason, CONTRACTOR has selected high qualified subcontractors (one for Transportation and one for Installation) with experience both in this type of activities and in the region of the SITE.

T&I Subcontractor's Project Managers are coordinated by CONTRACTOR's T&I Manager.

The interfaces and communications are managed with an integrated interface management system (refer to Section 6).

Interface philosophy is based on the following key elements of the responsibility matrix:

Item	Description	Conceptual Design	Detail Design	Review	Procurement Supply	Onshore activity	Offshore activity	Notes
1	Structural detail design of BLPH including: – Load out structural analysis – Transportation structural analysis – Lifting structural analysis – Transportation fatigue analysis	-	RM	CPY	-	-	-	
2	Load-out procedures / Load-out manuals	RM	RM	MWS	-	RM	-	
3	Load-out upper & lower grillages	RM	RM	MWS / CPY	RM	RM		T&I for information
4	Transportation barge delivery	RM	RM	T&I / MWS / CPY	RM		RM	
6	Transportation barge layout (including Safe grillage and sea-fastening cutting and removal facilities	T&I / RM	RM	T&I / MWS / CPY	-	-	-	
7	Grillage and sea-fastening design	RM	RM	T&I / MWS / CPY	RM	RM	-	
8	Barge stability check / Transport motion analysis / Towing Manual	RM	RM	MWS / CPY	-	-	-	
9	Barge structural integrity check for transportation loads	RM	RM	MWS / CPY	-	-	-	
10	TP lifting procedure	T&I	T&I	RM / MWS / CPY	T&I		T&I	Part of OIM
11	TP lifting pad-eyes/Trunnions	T&I / RM	RM	T&I / MWS / CPY	RM	RM	-	
12	TP stabbing (Primary + secondary)	T&I / RM	RM	T&I / MWS	RM	RM	-	CPY for information
13	TP rigging	T&I	T&I	RM / MWS	T&I	RM(1)	-	CPY for information
14	TP installation aids	T&I / RM	RM	T&I / MWS	RM	RM		Linked to point 12.
15	TP completion work – Rigging Removal and loose items lift on/off	T&I	T&I	MWS / RM	-	-	T&I	
16	TP completion work – Bolting of TP to MP foundation	T&I / RM	RM	T&I / MWS / CPY	RM		T&I	Bolts to be preinstalled on TP
17	Caissons lifting procedure	T&I	T&I	RM / MWS / CPY	T&I		T&I	Part of OIM

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Item	Description	Conceptual Design	Detail Design	Review	Procurement Supply	Onshore activity	Offshore activity	Notes
18	Caissons lifting pad-eye	T&I / RM	RM	T&I / MWS / CPY	RM	RM	-	
19	Caissons stabbing (Primary + secondary)	T&I / RM	RM	T&I / MWS	RM	RM	-	CPY for information
20	Caissons rigging	T&I	T&I	RM / MWS	T&I	RM(1)	-	CPY for information
21	Caissons installation aids	T&I / RM	RM	T&I / MWS	RM	RM		Linked to point 19
22	Caissons completion work – Rigging Removal	T&I	T&I	MWS / RM	-	-	T&I	
23	TOPSIDE lifting procedure	T&I	T&I	RM / MWS / CPY	T&I		T&I	Part of OIM
24	TOPSIDE lifting pad-eyes/Trunnions	T&I / RM	RM	T&I / MWS / CPY	RM	RM	-	
25	TOPSIDE stabbing (Primary + secondary)	T&I / RM	RM	T&I / MWS	RM	RM	-	CPY for information
26	TOPSIDE rigging including Lifting beam	T&I	T&I	RM / MWS	T&I	RM(1)(2)	-	CPY for information
27	TOPSIDE installation aids	T&I / RM	RM	T&I / MWS	RM	RM		
28	TOPSIDE completion work – Rigging Removal and loose items lift on/off	T&I	T&I	MWS / RM	-	-	T&I	
29	TOPSIDE completion work – welding and NDE of Topside to TP	T&I / RM	RM	T&I / MWS / CPY	T&I		T&I	

Table 4 - Responsibilities between CONTRACTOR and T&I subcontractors

6 INTERFACE MANAGEMENT

Interfaces for this project will be managed considering the indication described in the Section V – Scope Description (5.3 INTERFACES)

The Interface Management Plan provides guidelines and instructions for the identification and management of the following types of interfaces for the Project:

- Management interfaces between COMPANY, CONTRACTOR & Subcontractors;
- Technical interfaces based on the battery limits and boundaries of its scope of work in accordance with its developed design;
- Organization Interfaces across project departmental boundaries;

The objective is to identify all technical interfaces, define deadlines for resolution in accordance with the overall project plan and monitor, control and follow up the interfaces in an effective manner.

Management of interfaces is essentially the role of the Project Manager which includes planning, coordination and control of the work of the project task force.

There are several tools that the Project Manager uses in order to control the Interfaces management, which are:

- Weekly department / discipline reports and meetings;
- Project Schedule;
- Actions Management Register (based on MOMs);
- Safety Action Register;
- TQ Register;
- Risk Register;
- Management of Change Register;
- Master Document Register;
- Document Distribution Register;

The Project Manager is supported in this function by the Interface Manager, who is responsible for the management of these registers and for expediting closure actions to: improve efficiency, drive better project performance and thus minimize the possibility of impacts to the project schedule.

With the aim of keeping the entire interface management system on the Project under control, CONTRACTOR is used to put in place the following Interface related documents:

- An INTERFACE MANAGEMENT PROCEDURE which will include an interface matrix (and associated drawings defining areas of overlap and interference) detailing the exact information/clarification required and which will explain the method and tools that will allow the proper organization, screening and monitoring of interface issues;
- An INTERFACE MANAGEMENT SCHEDULE that will be used to determine and monitor the deliverables time frames;

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- An INTERFACE REGISTER/ACTION LIST to follow, at detailed level, all the interface queries from the beginning of the Project

As far as internal interfaces are concerned, they mainly refer to the following and are usually managed according to all the corporate procedures and tools of the Rosetti Marino system which is ISO 9001 certified:

- interface between discipline and department within Contractor's Organization (i.e. Engineering, Construction, Procurement, etc.);
- interface between Contractor and its Vendors and Subcontractors.

6.1 LIST OF KEY INTERFACES

6.1.1 External Interfaces

Table below provides an overview of the other main contracts to be placed by COMPANY associated with the SCOPE:

CONTRACT	SCOPE	SELECTION AND MANAGEMENT
Marine Warranty Surveyor (MWS)	Provides Marine Warranty Services for the project scope.	COMPANY'S OTHER CONTRACTOR selected and managed by COMPANY. CONTRACTOR shall support MWS as required by COMPANY.
Certifying Body	Provides Certification services for the project scope	COMPANY'S OTHER CONTRACTOR selected and managed by COMPANY. CONTRACTOR shall support Certifying Body as required by COMPANY.
Fuel Cell Package Contract	Design (including support with integrated Topsides design), procurement, fabrication, testing, support with integration and commissioning of the Fuel Cell package into the Topsides.	COMPANY'S OTHER CONTRACTOR selected and managed by COMPANY. CONTRACTOR shall support COMPANY's OTHER CONTRACTOR, as required, to enable smooth integration of the package into PERMANT WORK.
Electrolyser Package Contract	Design (including support with integrated Topsides design), procurement, fabrication, testing, support with integration and commissioning of the Electrolyser package into the Topsides.	COMPANY'S OTHER CONTRACTOR selected and managed by COMPANY. CONTRACTOR shall support COMPANY's OTHER CONTRACTOR, as required, to enable smooth integration of the package into PERMANT WORK.
BESS Package Contract	Design (including support with integrated Topsides design), procurement, fabrication, testing, support with integration and commissioning of the BESS package into the Topsides.	COMPANY'S OTHER CONTRACTOR selected and managed by COMPANY. CONTRACTOR shall support COMPANY's OTHER CONTRACTOR, as required, to enable smooth integration of the package into PERMANT WORK.
Floating Solar Package Contract	Design (including support with integrated Topsides design, if required), procurement, fabrication, offshore installation and offshore commissioning of the Floating Solar package from the Topsides.	COMPANY'S OTHER CONTRACTOR selected and managed by COMPANY. CONTRACTOR shall support COMPANY's OTHER CONTRACTOR, as required, to enable smooth integration of the package into PERMANT WORK.

Table 5 - Major contracts associated with the Project

The Scheme below provides an overview of the other main interfaces associated with the Offshore SCOPE:

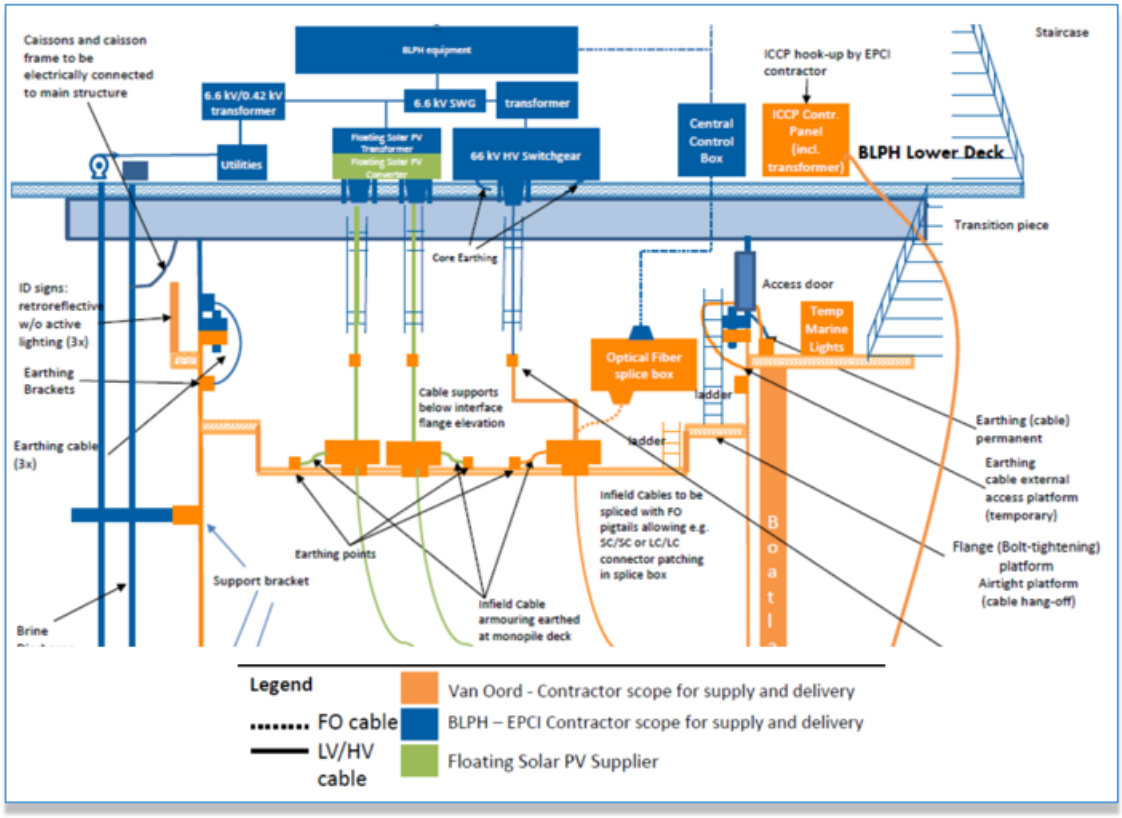


Table 6 - Main interfaces associated with the Offshore SCOPE

6.1.2 Contacts / Interfaces with Company And Authorities

CONTRACTOR will interface with relevant AUTHORITIES, where it is within CONTRACTOR's remit under the SCOPE to do so.

6.1.3 Internal Interfaces

Internal interfaces are typically managed according to the applicable corporate procedures and tools. Project specific requirements, if any, are integrated through dedicated procedures issued for the Project.

Internal interfaces among partners will be managed according to the Partnership Agreement which specifies the definition, role, and lines of communications of the key positions of the Project Teams deployed by the Parties.

6.2 RESPONSIBILITIES FOR MANAGING INTERFACES

A dedicated section of the MASTER DOCUMENT REGISTER may be used for managing the interfaces between the partners.

Internal interfaces with Vendors and Subcontractors will be managed according to Project/corporate procedures and tools.

Internal interfaces with the corporate organization of each partner will be managed according to corporate procedures and tools

Interface philosophy is based on the key elements and responsibility matrixes:

- Early identification of interfaces. Focus on "no surprises" for the project;
- Focus on interface risks for entire project. Not only focusing on "own" scope;
- Clearly defined and communicated roles and responsibilities regarding interface management documented in a responsibility matrix;
- Single point of contact (SPOC) for interface management. Whilst the direct communication between various parties to resolve interface issues are encourage, any formal agreement that can affect other parties needs to be formalized through the SPOC (Single Point of Contact). The Interface Manager is the appointed SPOC by default;
- Thorough review of work scopes to prevent any unwanted effects resulting from uncontrolled interfaces;
- All parties stick to the milestones set for processing and resolution of interfaces. Timetables are agreed and achievable. Key interface activities are integrated into the Project Execution Schedule.
- Non performing interfaces are pro-actively elevated to ensure timely resolution.

Responsibility for preparing, chairing and recording minutes of meeting shall be borne by the Contractor who accommodating the meeting.

6.2.1 Interface Plan

Interface plan identifies List of activities that requires the exchange of specific information or data between Contractors, to permit to progress the CONTRACTOR scope of work in the contractual delivery terms.

During the execution of the project the interface plan will be integrated and continuously updated with new points, finalized to reach and speed up of the goal of the project.

6.2.2 IQ – Interface Query

Interface requests and responses should be easy readable and handled. Interfaces will be documented on Interface Query (IQs) and the overview of all IQs will be stored in the Interface Management System.

IQ should be a limited and well defined interface task that can be closed with a corresponding limited and well defined interface response. It is generally not advisable to submit an interface task as request of a comprehensive document, but rather to define the exact technical query detail that is needed. It is often experienced that complicated interface queries becomes difficult to close because they need further clarifications from both parties and the IQ will develop into a thread of jointly interface queries. Further information such as drawings, documents, etc. can be attached to an interface task.

6.2.3 Interface Register

All IQ sheets shall be listed in a register.

The interface register will contain overview of all IQ open/close status and shall be submitted regularly to the other interface contractor. Review of the interface register will be part of the agenda for most interface meetings.

6.2.4 Interface Comunication

Interface meetings with COMPANY and COMPANY's other Contractors shall normally take place on a monthly basis (this period will be evaluated during the development of the project as to ensure the proper exchange of the information). The normal agenda for an interface meeting is to review all open interfaces and try and settle those. Videoconference meetings are often convenient for going through the interface register and discuss IQ technical details. CONTRACTOR will provide all necessary interface information to external interface partners on the interface task sheet. Also relevant interface documentation shall be identified and issued to other Contractors on request. The interface task register shall be divided into the relevant groups, one sheet for each interface group. The single point of contact for interface issues to external interface partners is the Interface Manager. All the emails from CONTRACTOR lead engineer with technical information regarding the interface task shall sent to the interface manager. Contact regarding interface issues between external interface partners and CONTRACTOR shall be conveyed through the interface manager. Direct technical contact between external interface partners and lead engineers at Contractor is encouraged, but all interface related conclusions must be brought up with interface manager and included in an IQ.

7 RISKS MANAGEMENT

7.1 RISK MANAGEMENT PROCESS

In line with international standards and best practices, the overall CONTRACTOR's Project Management work process is built-up according to the PMBOK Guideline. As part of the PMBOK Guideline, the management of the Risks and Opportunities is one of the area of knowledge where the PMBOK keep high attention to the management of the R/O.

The CONTRACTOR's risks and opportunities process usually begin from the concept stage of the Project up to the Project close-out with an iterative process during all gates of the Project involving all stakeholders identified into the stakeholders map.

CONTRACTOR hereinafter describes the R&O Management process.

Managing of the whole process is performed through regular reporting and review meetings, with the objective of continuously reassessing Risks, anticipating new Risks, following-up mitigation actions.

Risk review meetings will be held, at least, on quarterly basis and particularly after following key events:

- Model Review/Constructability Session;
- Significant project changes of Project scope and/or schedule;
- Major Contractual issues;

The process is managed through the use of a Rosetti spread sheet called "Risk Manager". It allows the users to manage the Risks from the beginning to their closure in terms of Risk Assessment, mitigation plan, etc.

The Risk register is issued after completion of the RAW (risk assessment workshop) and is revised and maintain continuously during the project life. Following completion of the First Risk Assessment, the Project Risk Management process enters a cycle Review and Control Phase.

The mitigation plan is issued after its finalization by the owner and approval by Project Manager.

This risk management process allow:

- to verify and to make sure together with Risk Owners the compliance between the implemented actions and the planned ones;
- to guarantee a deep update of the risk register (new classification, new risks, new opportunity, closed risk, …).

The main report is the Project Risk Register.

The Risk Register is provided to COMPANY on a regular basis, and it will include the list of the most important risks for the remaining work, qualitative analysis, Risk Owner's names and mitigation actions needed to reduce/limit the potential impacts.

This report is an attachment of project reports as report in monthly report.

7.2 RISK & OPPORTUNITY IDENTIFICATION

Before the Risk & Opportunity meeting, the Project Manager (PM) reminds the team members:

- to check the risk sheet of the previous risk analysis meeting in order to assess possible changes to be proposed in the current meeting;
- with reference to CONTRACTOR's RBS (Risk Breakdown Structure, available upon request), which is divided into categories (Customer - Supplier - Engineering -Construction, etc.), to identify new opportunities and/or risks in their own area. For this step the PM or the Tender Manager (TM) can recommend some techniques such as the following:
  - a written list which will then constitute a kind of check list for next joint discussion;
  - a matrix form i.e. the risks/opportunities are previously entered by each participant in an array of High/Low Impact and Low/High Likelihood.

The Risk Manager acts as chairman of the Risk & Opportunity meeting, with objective to foster the creativity of the group letting risks and opportunities emerge and then leading the team to a summary of mitigation actions and associated costs.

The Risk Manager helps the Project Management Team to monitor the risks and opportunities of the method and provides useful feedback from the R&O experiences gained in past projects.

Resources coming from Operation Departments (such as Project Management Office, Engineering, Procurement, Construction, HSE-Q), from Staff (Legal, Finance, Human Resources departments) or even from third parties (Supplier, Subcontractor, Special Advisor and the CLIENT) are invited to join the Risk identification meeting especially when some specific risks, related to their competencies, have to be analysed in depth.

7.3 RISK EVALUATION

The risks and opportunities evaluation stage is generally carried out during the brainstorming

meeting indicated in the R&O process.

Risks and opportunities are identified by defining:

- origin
- cause
- risk
- likelihood
- impact

The likelihood and magnitude of the above-mentioned risks are estimated in a qualitative way, the estimate provides for four possible options:

Likelihood		Impact (as a percentage on the project value)	
Poor	< 2%	Minimum	< 0,5%
Moderate	2 – 10%	Average	0,5% - 2%
High	10 – 25%	Elevated	2% - 5%
Very high	> 25%	Critical	> 5%

Table 7 - Project Risk: magnitude of likelihood – impact

Depending on the likelihood and the magnitude, the exposure is determined as shown in the next picture.

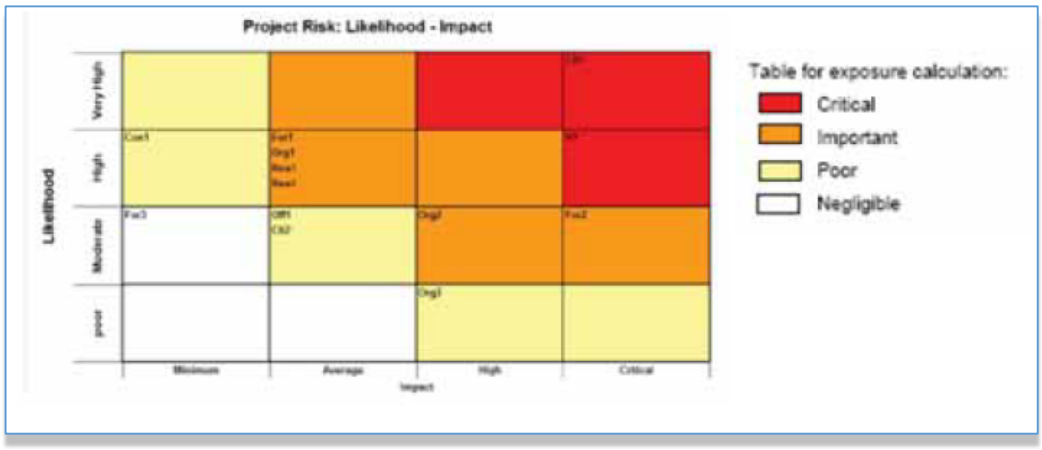


Table 8 - Project Risk: likelihood – Impact

With particular reference to the most important risks and opportunities (those having the most elevated exposure) proposals for possible actions aimed at reducing (increasing) the risk (opportunity) level are formulated (it is not a decision-making moment but a proposal-making one).

7.4 RISK MITIGATION

The last part of the meeting is related to the identification of a risk mitigation action. For every risk possible solutions could be:

- risk elimination;
- risk mitigation;
- risk transfer.

Every mitigation action could have a related cost which is estimated and added to the project budget (if not yet considered). Each mitigation action has a defined owner and deadline. The remaining risk profile is then estimated in order to allocate proper contingencies in the Cost Breakdown Structure (cost estimation in case of risk analysis performed during tendering phase, project budget during job execution).

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7.5 RISK REGISTER

It is the report which provides the general outlook of the Risk Management process and will be produced at least at the end of the First Risk Assessment and after each review. It usually includes:

- an unique identification number for each risk (ID);
- area of the risks (Category)
- the description of each risk and how it will affect the project (Risk Description);
- the assessment of the likelihood related to the risk occurrence and of the possible impact, if it occurs as qualitative analysis (Description of impact)
- the list of proposed mitigation actions (Mitigation Action).
- the criticality index value of each risk according to the risk assessment matrix;
- who is responsible for managing the risk (Risk Owner).

The outcomes of the risk assessment workshop are reported through the relevant updates of the risk register by the Risk Manager, whom acts as chairman of the RAWs meeting.

The evolution of the risks is discussed, by the Project Team, during the regularly RAWs. In case of significant evolution of the risks, the Risk Register is updated accordingly.

Risk manager reviews and controls each risk, with the aim:

- to give support to the Risk Owners for the definition of mitigation actions to be proposed and agreed with the Project Manager;
- to monitor periodically progress on risks status and associated mitigation actions;

During the regular meeting with the Client (daily, weekly and monthly meetings) the risks evolution is shared and discussed.

In addition to the risk owner, the PM focuses his attention in the monitoring of the evolution of critical risks. In case the Project Manger identifies that some risks might impact any contractual condition (for example: project milestones) he will propose to Company the mitigation actions for joint discussion.

In case of contract changes originated by COMPANY, they will be evaluated by CONTRACTOR, also considering the current status of the RAWs, according to the contract provision for variation.

7.6 TOP KEY RISKS

As per CONTRACTOR's R/O process described in the above paragraphs, the CONTRACTOR made an R/O assessment to identify the risks as well as opportunities envisaged during the bidding stage. The list is reported here as follows and it will be the starting point for the R/O process during the execution phase.

ID	Risk category	Risk	Description of Risk	Description of Impact	Mitigation action	Area impacted
1	Engineering	Novel Project	Novel Project with potential unforeseeable	Impact in the development of the	COMPANY will provide main critical Equipment	Project

ID	Risk category	Risk	Description of Risk	Description of Impact	Mitigation action	Area impacted
			(at this stage) issues	engineering, issues in obtain the performance required	CPI. Involving in the project of ABB (high experiences in electrification and automation)	
2	Interface Management	Interface with CLIENT's and its Contractors	Several External Stakeholders	Project Delays, Cost over runs	Timely cooperation with EMPLOYER and its Contractors for the definition of interfaces & Contractor's Interface Manager included in Project Team	Entire Project
3	Design	Novel Project and Design	Missing experience	Not correct estimation of the activities	Involving of specialists	Entire Project
4	Procurement	Lead time material delivery (very long)	Lead time is strongly affected by the current market situation	Impacts on the project schedule	Suppliers have been enquired	Project schedule
5	Procurement	Price Fluctuation	Material price is strongly affected by the current market situation	Impacts on the project budget	Suppliers have been enquired	Project Budget
6	Construction	Delay in construction progress	Delay in construction progress due to unforeseeable reason.	Delay in construction progress can impact the completion onshore and the subsequential commissioning	Project schedule has been developed not considering working in double shift, working during weekend and/or other recovery plan	Project schedule and Budget
7	Commissioning	Delay in Onshore Commissioning progress	Delay in commissioning progress due to unforeseeable reason.	Platform cannot be sailed away before completion of the onshore commissioning	Contingency in the schedule	Project schedule and Budget

ID	Risk category	Risk	Description of Risk	Description of Impact	Mitigation action	Area impacted
8	HSE	Safety requirements for the onshore commissiong	Safety requirements for the onshore commission are under investigation	Cost increasing due to more requirements can be required and more time to obtain the permits	TENDERER has investigated with the authorities the requirements.	Project schedule and Budget
9	T&I	T&I availability	T&I availability shall be better investigated during second bidding phase	T&I availability impact the project schedule	TENDERER has investigated the market, discussing all the possibility with several T&I contractors	Project

Table 9 - Risks detected during bidding phase

CONTRACTOR during execution phase will cooperate with COMPANY seeking to reduce the number of, likelihood and potential impact of all risks for the lifetime of the Contract and the Risk register will be implemented.

With the aim to initiate a trail of risk resolution, to encourage cooperation and avoid disputes arising between the COMPANY and the Contractor, an Early Warning Notice mechanism will be applied.

8 PROJECT CONTROL MANAGEMENT

CONTRACTOR's objective is to execute the Base Load Power Hub Projects in a safe, transparent, predictable and competitive manner in order to deliver it on budget, on time and at the agreed level of quality. The fulfilment of this goal is based on the capability to identify, quantify and plan the various activities to be developed, to assign the responsibilities for their execution to the appropriate functions and to control the execution of the activities.

8.1 PROJECT CONTROLS PLAN

The management's goal is to achieve a high level of Project Control by way of effective planning using various established techniques, proper monitoring of the various activities through controlled feedback and predefined communication procedures, with the purpose of improving the latest development techniques.

The aim of the Project Control function is to monitor all identified Project targets within pre-defined limits of the schedule, budget costs and quality and inform the management, as well as the COMPANY, about its current status and expected development.

As per Section VII B of the CONTRACT, CONTRACTOR shall issue for approval thirty (30) days after the EFFECTIVE DATE a Baseline Schedule (level 3 not resourced) and a Project Controls Plan (PCP) in order to define a consistent method of planning, measurement and reporting of works progress.

8.2 PLANNING & REPORTING

The fabrication (prefabrication, erection, painting and mechanical completion) sequence is the main driver in the schedule and hence determines all other areas of the schedule, i.e. working from end back to start with enough float to maintain construction critical path (engineering documents issued and materials/ equipment delivered on time for construction).

Detailed planning will be issued according to the CONTRACT requirements for the entire EPCIC scope. The Project Schedule will be developed in different level of details, based on contractual scope of work and milestones, and organized by the agreed WBS. The software for producing planning documentation is Primavera P6 Version R18 or a more recent version.

A particular focus will be on engineering planning and control since the engineering phase is a key factor for the timely placement of the main equipment purchase orders in particular the Long Lead Items (LLI) and consequently for the Project success. Dedicated Key Performance Indicators (KPI) will be prepared to strictly monitor the engineering activities and the relevant deliverables.

CONTRACTOR will organize a planning and reporting system that will allow to gather all necessary information to analyze and take management decisions to address the Project and regularly keep informed the COMPANY about the progress of work.

The reporting system will include Monthly Project Management Reports, Weekly Reports and Daily Reports (during fabrication phase) as per clause 3.0, section VII B of the Contract.

CONTRACTOR will provide more details in the Project Controls Plan (PCP) procedure.

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8.3 COST MANAGEMENT

The aim of the cost management is to monitor the performance of the Project in terms of adherence to the budget and to anticipate possible deviation to the initial schedule of payments.

To better manage and control the budget of the Project the whole scope of work has been divided into manageable packages following a Work Breakdown Structure (WBS) agreed by the Parties.

A constant monitoring of the invoicing schedule will be ensured by updating and exchanging with the COMPANY of the invoicing plan, which will allow to manage in time deviations from the initial plan.

8.4 PROJECT CALENDAR

The Project Calendar will be agreed prior to the start of the works and will be the basis for the planning and progress, it will also defying the cut-off of the project reporting and the relevant submission date to the COMPANY.

Attached to the Project Execution Plan is CONTRACTOR's proposal for the Project Calendar.

8.5 RISK MANAGEMENT

The Project Risk management process consists of four Sub-processes: Identification; Evaluation; Mitigation (in case of Risk) and Management.

Risk management process will be carried out by CONTRACTOR that shall keep periodically updated and shared on monthly basis with COMPANY a qualitative risk register which shall contain as a minimum a description of risks / opportunities, the reason why are present on the Project, the probability of happening, the impact on the Project schedule and budget, the risk owner and a risk assessment matrix in line with the standard proposed by COMPANY during the Kick off Meeting.

CONTRACTOR will provide more details in the Project Controls Plan (PCP) procedure.

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9 HEALTH, SAFETY, AND ENVIRONMENTAL (HSE) MANAGEMENT SUMMARY

CONTRACTOR's HSE Policy, Objectives and Strategy for the Project execution will ensure the commitment, organization, systems, and resources necessary to meet the COMPANY's HSE Expectations, to comply with the CONTRACTOR HSE system and to ensure full compliance with current HSE legislation.

The project HSE system will also support project critical activities during construction, commissioning load out and T&I in which most of the risks and hazards are concentrated.

CONTACTOR, together with the support of COMPANY, will develop a SAFE LIFE program aimed to consolidate a shared safety culture through all project team member and reinforce the commitment to the elimination of all incidents, injuries. This commitment is not a merely commitment to a reduction of accidents but is a commitment about dignity and respect for people and for the environment.

9.1 CONSTRUCTION HSSE PLAN

To endorse contractual HSE requirements stated in SECTION VIII - HSSE REQUIREMENTS, CONTACTOR will issue the Contract HSSE Plan.

This Plan defines the health, safety, and environmental protection program to be implemented by CONTACTOR and Subcontractors during the Project, in order to ensure full integration with CONTRACTOR's HSE Policy and SAFE LIFE program.

The rules and programs outlined in the Contract HSSE Plan also aim to ensure both compliance with International Standard IOGP report n.577 and the contractual and legislative HSSE standards during the various phases of the project.

When contractual requirements differ from CONTRACTOR standards, the more stringent HSE requirements (if reasonable and applicable) shall be applied.

The Contract HSSE Plan defines:

- Principal roles involved in the management of health, safety, and environmental aspects during project activities.
- The CONTACTOR's policy on health, safety, and environmental protection.
- Project Goals;
- The infrastructures and equipment for the project;
- The regulation of contracting and subcontracting activities;
- Coordination of activities and SIMOPS risks management;
- Education, Information and Training Program;
- HSSE Key Performance Indicator;
- Audit and inspections program;
- Safe System of Work;
- Welfare;

- Emergency and management of unplanned events.

CONTACTOR will ensure through periodic verification that the Contract HSSE Plan is being implemented as planned, is effective and continually improving.

Wherever feasible, the benefits of HSE auditing are taken to combine and rationalize the arrangements required.

10 QUALITY MANAGEMENT SUMMARY

10.1 INTRODUCTION

The Scope of Work is executed under a Project Quality Management System that is based on CONTRACTOR's Quality Management System and aligned with COMPANY's Quality expectations. The Project Quality Management System is certified according to the following standards:

- 1. ISO 9000: Quality management systems – Fundamentals and vocabulary.
- 2. ISO 9001: Quality management systems – Requirements.
- 3. ISO 9004: Quality management – Quality of an organization – Guidance to achieve sustained success

which means CONTRACTOR aims to increase COMPANY satisfaction by fulfilling their requirements through a process approach that ensures Project objectives and value creation.

The Project Quality Manager (PQM) of CONTRACTOR is responsible for overseeing all quality aspects of the project, covering engineering, procurement, construction, and commissioning phases. The PQM communicates with COMPANY, Project Team and any other Parties on all quality-related matters and serves as the main point of contact for Project quality issues.

10.2 PROJECT QUALITY PLAN

The CONTRACTOR prepares a Project Quality Plan (PQP) that encompasses the entire Scope of Work, including ENGINEERING, PROCUREMENT, CONSTRUCTION, and COMMISSIONING.

The quality plan is conforming to:

- ISO 10006:2017 "Guidelines to Quality Management in Projects"
- ISO 10005:2018 "Guidelines for Quality Plans"

The Project Quality Plan aims to effectively manage Quality throughout the Project's execution, satisfying COMPANY's requirements and specifications and aligning with the principles and rules of the CONTRACTOR's Quality System.

The Project Quality Plan will consider CONTRACTOR's applicable specifications/procedures for the Project. It will also address Suppliers and Subcontractors with specific procedures based on the relevance and criticality of their scope of supply or subcontracted work. This approach ensures a systematic and coordinated approach to quality management across all parties involved.

The objective is to establish a well-organized and methodical approach to ensure effective project quality management, facilitating QA/QC processes and optimizing overall performance through the following key measures:

1. Compliance with Project Standards and Quality Criteria: Ensuring strict adherence to specified Project Standards and meeting specific quality criteria to uphold the desired level of quality throughout the project's lifecycle.
2. Development of Plans, Procedures, Methods, Resources, and Tools: Implementing comprehensive plans, well-defined procedures, appropriate methods, and deploying suitable resources and tools to streamline and enhance quality management practices.

3. Periodical Reviews and Monitoring of Quality Performance: Conduct regular and systematic reviews and assessments of quality performance to identify areas for improvement and to maintain consistent quality standards.
4. Promotion, Collection, and Communication of Best Practices and Lessons Learned: Encouraging the adoption of best practices and actively collecting insights and lessons learned from project activities to foster continuous improvement. Effective communication of these lessons to relevant stakeholders will contribute to future project enhancements.

By employing this structured approach, the project will be better equipped to achieve and sustain a high level of quality, meet project objectives, and deliver successful outcomes.

10.3 PROJECT QUALITY ASSURANCE

The CONTRACTOR shall conduct Project quality assurance activities to ensure the complete adherence and fulfilment of Project quality requirements throughout its execution. The standard CONTRACTOR's Project quality assurance process encompasses the following essential steps:

1. Definition of Quality Procedures, Work Instructions, Inspection, and Test Plans: Establishing clear and well-defined quality procedures, work instructions, and inspection and test plans that outline the specific processes and criteria to be followed during the Project.
2. Quality Reporting: Regularly generating comprehensive quality reports that provide a transparent overview of quality performance, highlighting achievements, identifying areas for improvement, and tracking progress against predefined quality metrics.
3. Quality Audits and Reviews: Conduct thorough quality audits and reviews to assess compliance with established quality procedures and standards, identify deviations or gaps, and initiate appropriate corrective measures.
4. Non-conformances and Corrective Actions Management: Effectively managing non-conformances, deviations, and discrepancies encountered during the Project, promptly initiating corrective actions, and verifying their successful resolution to maintain quality standards.
5. Quality Training Program: Implementing a structured quality training program to equip project personnel with the necessary knowledge and skills required to maintain high-quality standards and foster a culture of quality consciousness.
6. Performance Monitoring: Regularly monitoring and evaluating the performance of quality-related activities to ensure they align with the defined quality procedures and objectives and taking corrective action where necessary.
7. Final Dossier Preparation, Verification, and Handover: Ensuring a comprehensive and accurate final dossier is prepared, reviewed, and verified, containing all relevant quality documentation and records, and facilitating a smooth handover of the Project.

10.3.1 Definition of the quality procedures, work instructions, inspection and test plans

As per contractual milestones, the Project Quality Team, led by the PQM, is responsible for preparing all necessary quality documentation. The Project Quality documents include, but are not limited to:

a. Project Quality Plan: A comprehensive plan that outlines the overall approach to quality management for the entire project, including strategies, processes, and responsibilities to ensure compliance with quality requirements.
b. Project Quality Audit Plan: A plan detailing the schedule and scope of quality audits to be conducted during the project's execution to assess adherence to quality standards and identify areas for improvement.
c. Quality Control Plans / Inspection and Test Plans: These plans are developed either by discipline (e.g., Structure, Piping, Coating, Electrical & Instrumentation) or to cover specific item/subassembly (e.g., pressure vessels, actuated valves, process packages, risers, local electrical rooms, etc.). They outline the specific procedures and criteria for inspections and tests to ensure the quality of each aspect of the project.
d. Welding Management and Control Procedures: Procedures that establish guidelines for welding processes, qualification of welders, and inspection techniques to ensure the integrity of welded components.
e. Non-Destructive Testing Procedures: Guidelines for non-destructive testing methods like ultrasonic testing, radiography, etc., used to detect flaws or defects in materials without causing damage.
f. Surface Treatment Procedures: Procedures specifying the appropriate methods for surface preparation and coating applications to protect materials and extend their lifespan.
g. Dimensional Control Procedure: A procedure to ensure accurate and precise measurement and control of dimensions during construction and assembly processes.
h. Material Identification and Traceability Procedure: A procedure that outlines how materials are identified, tracked, and traced throughout the project to ensure compliance with material specifications.
i. Final Dossier Procedure: A procedure for compiling all relevant quality documentation and records at the completion of the project to create a comprehensive final dossier for handover and future reference.

Considering the scope of work and the characteristics of the Project, in the execution of Instrumentation and Electrical (I/E) activities, several specific documents (that are not strictly quality documents but are related to the quality matter) play a crucial role in ensuring the integrity, safety, and compliance of the installation. Some (the list is not exhaustive) of the key documents related to I/E activities are:

j. Instrument Index: A document that provides a list of all instruments used on the offshore platform, along with their specifications, location, and function.
k. Instrument Data Sheets: Detailed sheets containing technical information for each instrument, including its model, manufacturer, range, accuracy, and installation requirements.
l. Instrument Loop Diagrams: Diagrams illustrating the complete instrument control loops, including transmitters, controllers, and final control elements.
m. Electrical Single Line Diagram: A single-line diagram representing the electrical power distribution system on the offshore platform, including main switchboards, distribution panels, transformers, and key electrical equipment.
n. Instrument Installation Drawings: Detailed drawings showing the installation locations and mounting arrangements of instruments and associated equipment.

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o. **Electrical Installation Drawings:** Drawings indicating the layout and installation of electrical equipment, cable trays, and cable routes throughout the platform.
p. **Cable Schedules:** A comprehensive schedule listing all cables used on the platform, including cable type, size, length, and termination points.
q. **Instrumentation Hook-up Drawings**: Drawings that illustrate how instruments are connected to process lines, including tubing, fittings, and valves.
r. **Instrument Loop Testing Procedures:** Procedures for conducting loop tests to verify the proper functioning and communication of instrument control loops.
s. **Electrical Testing and Commissioning Procedures:** Procedures for testing and commissioning electrical systems and equipment to ensure their proper functioning and compliance with safety standards.
t. **Hazardous Area Classification Documents:** Documentation specifying the hazardous areas on the offshore platform and the appropriate electrical and instrumentation equipment suitable for each zone.
u. **Factory Acceptance Test (FAT) and Site Acceptance Test (SAT) Procedures:** Procedures for conducting FATs and SATs to ensure that instruments and electrical equipment meet specified requirements and function as intended.

By preparing these quality documents, the Project Quality Team establishes a structured framework for managing and assuring the quality of the project, promoting adherence to standards, and delivering successful outcomes that meet the client's expectations.

10.3.2 Quality Reporting

Quality reporting is an essential aspect of effective project quality management. It involves the regular generation of internal and external monthly reports to monitor and track quality issues throughout the project's lifecycle.

Internally, the project team utilizes these reports to gain a comprehensive understanding of ongoing quality activities, highlighting areas of concern and improvement. This enables them to take proactive measures and implement corrective actions promptly to ensure that quality objectives are met.

Externally, these reports serve as a means of transparent communication with the Company. Sharing the status of the project's quality management system fosters trust and confidence in the project's execution and commitment to maintaining high-quality standards.

Quality reporting involves the monitoring of identified and COMPANY agreed Key Performance Indicators (KPIs) to measure the project's performance against predetermined quality targets. The analysis of trends over time helps in identifying patterns and areas of focus, allowing the project team to make data-driven decisions and continuously improve quality processes.

10.3.3 Audit plan

CONTRACTOR performs audits during the duration of the project. Audits are carried out according to the recommendation of ISO 19011: "Guidelines for auditing management systems."

An audit plan is developed and put into action to conduct thorough quality audits. The audit plan outlines the objectives, scope, schedule, and specific criteria for the audits, and it serves as a roadmap for the systematic and structured assessment of various aspects of the project's quality management system.

The audit plan identifies the key areas and processes that require evaluation, ensuring that all critical components are thoroughly examined.

The implementation of the audit plan involves conducting audits at defined intervals throughout the project lifecycle. The audit team will carry out the audits based on the predetermined criteria and methodologies.

The findings of the audits are documented in a comprehensive report, highlighting areas of compliance and non-compliance. In cases where non-conformities are identified, corrective actions will be proposed to address the issues and improve the overall quality management approach.

Company representatives will be invited to attend the audits as observers and, in any case, will be involved in the preparation of the checklist.

10.3.4 Non-conformances and Corrective Actions Management

Non-conformity refers to the failure to meet a specified requirement, while Corrective action is a systematic response taken to address the root cause of a non-conformity. When a non-conformity is identified, the CONTRACTOR implements corrective actions to rectify the issue, ensuring that it does not happen again in the future.

The Non-Conformities Control system encompasses the management of non-conforming products and activities that are detected during the project execution. These non-conformities may be identified by the Quality Control Supervisor and Quality Control Inspectors or by other workers involved in the project.

The Non-Conformities Control system plays a crucial role in maintaining the overall quality of the project. It involves the identification, documentation, evaluation, and resolution of non-conformities through appropriate corrective actions. Non-conformities are managed using a CONTRACTOR database.

10.3.5 Quality Training Program

The Project Quality Manager, along with dedicated staff, takes responsibility for developing and executing a comprehensive quality training program. The primary objectives of this program are to ensure that all Project Personnel are fully aware of the quality requirements specified in Statutory Regulations, the Contract & Exhibits, Technical Specification, and relevant codes. Additionally, the program aims to effectively communicate, apply, and instil a clear understanding of all applicable quality-related procedures and work instructions specifically tailored for the project.

To achieve these goals, the quality training program employs various methods, including toolbox talks and quality induction meetings. These sessions are scheduled, with particular emphasis placed on conducting them at the commencement of critical activities.

During toolbox talks and quality induction meetings, essential information and guidelines are conveyed to project personnel. This interactive approach fosters engagement and allows for questions and clarifications, ensuring that everyone has a clear understanding of their roles and responsibilities regarding quality management.

Reports are compiled, capturing the details of each quality induction meeting, toolbox talk, and other training sessions. This systematic documentation ensures accountability, facilitates tracking of personnel training progress, and serves as a valuable reference for future assessments and improvements.

10.3.6 Performance Monitoring

The Project Quality Manager assumes the responsibility of monitoring the Project Quality Key Performance Indicators (KPIs). This entails measuring, collecting, and analysing relevant data to assess the project's quality performance.

The KPI's definition is jointly established by CONTRACTOR with COMPANY. Should any deviations or areas for improvement be identified, prompt corrective actions will be initiated to address them effectively.

These essential KPIs are then incorporated into the periodical Project Reporting, providing a comprehensive overview of the project's quality status.

10.3.7 Final Dossier Preparation, Verification, and Handover

The Project Quality Manager undertakes the preparation of the Final Documentation in accordance with the Contract and Applicable Specifications. A dedicated "Project Final Dossier Procedure" will be developed and adhered to throughout the documentation process. This procedure serves as a comprehensive guideline to ensure that all necessary documentation is systematically compiled and organized.

Upon completion, the finalized dossier will be submitted for COMPANY approval.

10.4 PROJECT QUALITY CONTROL

Project Quality Control plays a pivotal role in supporting Project Quality Management to ensure that the product's quality adheres to the specified requirements and applicable guidelines as defined in the contract. The Quality Control Department operates to verify that the product meets all the stipulated specifications and industry standards.

By closely collaborating with the Project Quality Management, the Quality Control Department actively engages in inspection, testing, and monitoring processes throughout the project's execution.

The main activities carried out by the Quality Control consist of:

10.4.1 Inspection and Testing Execution

The Inspection and Test Plans (ITP) allow for defining the inspections to be carried out during the Project's phases, the specifications, the relevant procedures, the extension of testing and the acceptability criteria.

Inspections and tests are carried out by qualified, experienced operators, certified according to applicable international schemes and standards, under the coordination of the Quality Control Department.

Typical inspections, quality control activities and tests are, but not limited to:

- Dimensional Surveys
- Visual Inspections (VT)
- Non-destructive testing:
- Flange Management Control

- E&I Tests
- Coating and Surface Treatment Inspections
- Pressure and Leak Testing

10.4.2 Quality Records

All quality records are issued and reviewed as per the applicable quality procedures, work instructions, Inspection and Test Plans; the original records are filed at Quality Control Department.

The aim of the quality records is to provide evidence of conformity to requirements and the effectiveness of the quality management system.

Quality records management is carried out in accordance with the Contract and Applicable Specifications.

The quality records (including the intermediate records evidencing non-conforming items, which have been eventually brought up to conformity by corrective actions) are part of the Project's final documentation that the Contractor will prepare and transmit to COMPANY.

10.4.3 Mechanical Completion, Pre-commissioning, and Commissioning

During the project execution, the Contractor carries out activities of Mechanical Completion, Pre-commissioning, and Commissioning.

The foundation for these activities lies in the systematic use of Check Sheets (CS).

The Check Sheets serve as tools, providing a structured approach to verify that systems and subsystems are designed and constructed in accordance with the project's requirements and specifications. These documents serve as detailed guidelines, outlining the specific checks and tests required for each system, sub-system, and tagged item.

Throughout the execution process, the Contractor actively manages the check sheets database, organising it by systems, sub-systems, tags, and disciplines. Each tagged item receives dedicated check sheets that pertain to the relevant disciplines applicable to the specific item.

As the activities progress, the check sheets database becomes a comprehensive repository, tracking the completion status of checks and tests. In the event of any punch items being raised during inspections, they are promptly recorded in the CONTRACTOR database, ensuring thorough follow-up and resolution.

Upon successful completion of all check sheets for a system, sub-system, or discipline, a Completion certificate is issued, bearing the signatures of all involved parties. These certificates mark the readiness to proceed with subsequent Pre-commissioning and Commissioning phases.

The management of check sheets and inspection reports fosters transparency, traceability, and accountability. Throughout the project, detailed reports provide clear visibility of all tests carried out and the status of punch items, facilitating effective project management.

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11 DESIGN AND ENGINEERING MANAGEMENT

11.1 INTRODUCTION

Engineering activities are carried out by an integrated engineering team located at CONTRACTOR Engineering Division offices in Milan (Italy).

The engineering organization is usually subdivided into four main areas:

- Detail Design Engineering, whose scope is to provide all the general aims and goals of the project design and lists the major deliverables and milestones;
- Construction Engineering, whose scope is to develop all the information provided by the detail design phase into a suitable shape in order to allow the fabrication process to proceed with the construction activities;
- Transportation and Installation Engineering, whose scope is to develop all the information, drawings and documents necessary to allow the load out, transportation and installation of the platforms;
- Document Control system, whose scope is to control the receiving and distribution of all internal and external documents pertaining to the project, in order to ensure they are made available under applicable revision to all the parts involved basing on the project distribution matrix.

At the project start, the engineering team will be promptly mobilized to guarantee a smooth start of the engineering activities and the targets of the project schedule.

A dedicated Project Team will be mobilized according to project requirements so to have all the key persons for the project activities in charge from the early phase of Detail Engineering Design.

The Project Engineering Team is under the responsibility and coordination of the Project Engineering Manager, who is the interface with the COMPANY Representative.

The Project Engineering Manager, will attend the envisaged meetings (i.e. Design review, HAZID, HAZOP, etc.) with COMPANY during which the major and critical aspects of the Project will be identified. Then these issues will be transferred and analyzed with the Project Engineering Team.

The Project Engineering Team, will be integrated according to the current project needs, with the required personnel for management, coordination, and control of all the activities and for a smooth Project Execution.

According to the Planning and Project Control Activities, a weekly and monthly report, will be issued to give to COMPANY Representatives a clear picture of the status of the Project, with emphasis on any outstanding issue and the solutions envisaged to settle them.

The BLPH detailed engineering, Construction engineering and load out engineering will be carried out by CONTRACTOR Group. The T&I detail engineering, will be performed by SUBCONTRACTORS, under the control of PEM and with support of T&I Interface Manager.

The T&I Interface Manager assists the Project Engineering Manager and has also the responsibility of controlling the interfaces for T&I.

Daily contacts between the focal point as well as weekly progress meetings guarantee the required level of integration and interface, already successfully experienced on previous projects.

Throughout the engineering phase, safety, quality management, interface management, suitability for construction and installation are key design drivers and involve the responsible HSE, Quality and Construction / Installation managers throughout the design.

11.2 ENGINEERING SCOPE

With reference to the requirements of the Project mainly referring to *SECTION V of contract – Scope Description*, it is the responsibility of CONTRACTOR to ensure that the detailed design addresses all aspects of the detailed materials and equipment and piping layout/elevations including requirements for slopes, even distribution of flow, absence of pockets, effect of pressure drops, heat transfer, elevation changes, maintenance volumes, laydown volumes etc. and the impact of those on the location and/or sizing/specification of equipment.

CONTRACTOR will complete all engineering and design in compliance with the CONTRACT. This will include, but not be limited to, the following:

- Engineering, design, drawing production and planning sufficient for full verification, construction, transportation, installation, MECHANICAL COMPLETION and COMMISSIONING of the PERMANENT WORK;
- Engineering, design and drawing production for temporary platforms and access required to the PERMANENT WORK;
- Design reviews and THIRD PARTY structural design verification to ensure the design satisfies CONTRACTOR's procedures for performing the construction, transportation, installation, MECHANICAL COMPLETION and COMMISSIONING work;
- Design reviews and THIRD PARTY structural design verification to ensure the design satisfies COMPANY's JOB SPECIFICATION and the CONTRACT;
- Engineering, design and production of 3-D model, including strategically timed model reviews with COMPANY ensure the design satisfies COMPANY's JOB SPECIFICATION;
- Undertake PID reviews, HAZOPS, HAZIDs etc. as required and close out of actions;
- Coordination and input to Human Factor Engineering activities for all disciplines;
- Support, input and supervision to any subcontracts for all disciplines;
- Development, review and approval of any Factory Acceptance Test (FAT) and Site Acceptance Test (SAT) procedures, as applicable.
- Development of an ATEX strategy, in native format, for design procurement construction and COMMISSIONING;
- Further development of the Functional Safety Management Plan and Safety Requirement Specification(s).

CONTRACTOR will develop all necessary design briefs, philosophies, specifications and procedures for the construction, transportation, installation, MECHANICAL COMPLETION and COMMISSIONING of the PERMANENT WORK. CONTRACTOR will prepare and submit to COMPANY all documents as required to demonstrate that the PERMANENT WORK design will meet recognized standards and is compatible with

CONTRACTOR's construction, transportation, installation and COMMISSIONING methods and procedures in order to obtain all necessary THIRD PARTY approvals.

Detail Design technical disciplines involved in the Project are the following:

Detail Design technical disciplines
Architectural
Electrical
HVAC
Instrumentation & Automation
Mechanical
Material & Corrosion
Piping
Process
Safety & Firefighting
Telecommunication
Structural
Transport and Installation

Table 10 - Engineering Disciplines

11.3 PROJECT REQUIREMENTS

Detail Design Engineering will be performed according to the specifications, standards and international codes as recalled in the CONTRACT or in the applicable specifications, the CONTRACTOR's requirements, the Rosetti Marino Corporate Quality Management System.

Specifications, standards and international codes applicable to the Project are defined in:

- Dutch Standards and Regulatory Requirements
- SECTION V – Scope Description
- K559-2254-PM-PLN-003 - Basic Design Engineering Package
- CONTRACTOR's Construction standards and Manufacturer's standards, provided that these comply with STANDARDS OF PRACTICE.

Deviation from COMPANY specified requirements will be managed through a "Deviation request" form provided by COMPANY, approved both by COMPANY and CONTRACTOR representatives.

CONTRACTOR quality procedures and work instructions for engineering activities are:

- PRO-PRM-01 ENERGY PROJECTS MANAGEMENT
- IDL-QMS-01 DOCUMENTS FILING
- IDL-QMS-02 DOCUMENTS IDENTIFICATION
- MAN-IDOC-01 I-DOC INSTRUCTION FOR PROJECT SPECIALIST/PROJECT SPECIALIST LEADER

- IDL-PMI-01 KICK-OFF MEETING
- PRO-ENG-01 DESIGN CONTROL
- IDL-ENG-01 BASIC DATA REVIEW
- IDL-ENG-05 DESIGN REVIEW AND VERIFICATION
- IDL-ENG-07 INTERDISCIPLINARY VERIFICATION OF TECHNICAL DOCUMENTS
- IDL-ENG-08 DESIGN CHANGES MANAGEMENT
- IDL-ENG-02 PREPARATION, CHECK AND APPROVAL OF TECHNICAL DOCUMENTS
- IDL-ENG-03 CALCULATION DEVELOPMENT AND CHECK
- PRO-QMS-01 DOCUMENTS MANAGEMENT
- IDL-ENG-04 SOFTWARE VALIDATION
- IDL-ENG-06 DESIGN VALIDATION
- PRO-QMS-05 NON CONFORMITIES MANAGEMENT
- PRO-QMS-06 CORRECTIVE ACTIONS
- PRO-QMS-03 QUALITY AUDITS
- PRO-PRO-05 EXPEDITING AND INSPECTION MANAGEMENT
- PRO-ENG-04 HANDLING OF TECHNICAL QUERIES AND DEVIATION REQUESTS
- O-ENG-4B-005 STRUCTURAL SHOP DRAWINGS ISSUE
- O-ENG-4B-007 FIELD MARK UP DRAWINGS MANAGEMENT - STRUCTURES
- O-ENG-4B-008 FIELD MARK UP DRAWINGS MANAGEMENT - PIPING
- O-ENG-4L-002 E&I DOCUMENTS AND MARK-UP MANAGEMENT

11.4 MAJOR HAZARDS MANAGEMENT

CONTRACTOR will assure that applicable safety engineering requirements are embedded in the design, and that the HSE evaluation reflects the actual design.

CONTRACTOR will develop a plan and schedule of Safety and Environmental management activities and deliverables planned for the project to ensure that an overall HSE incident-free ambition is met. The plan will be submitted to COMPANY for approval.

CONTRACTOR will develop and maintain an up-to-date hazard register.

CONTRACTOR will perform safety reviews during detailed design, including the reviews listed below:

- HAZID
- HAZOP
- SIL Allocation and Verification

- Fire and Explosion Risk Analysis (FERA)
- Risk Assessment as QRA, Dropped Object and Ship Impact Assessment
- EERA (Escape, Evacuation and Rescue Analysis
- Hazardous material register and inventory
- ALARP Study
- SECE Identification and Performance Standard
- ESSA Emergency Systems Survivability Assessment
- Human Factor Engineering (during 3D Model Review)
- Noise study
- SIMOPS, COMOPS review
- Emergency Response Plan
- Safety Critical Task Analyses
- Vent Gas Dispersion / and Potential Radiation Study
- SAFOP

Details related to above listed studies and reviews will be included in the Design HSSE Plan developed during detail design.

11.5 ROLES AND RESPONSABILITIES

CONTRACTOR Project Team and Organization are reported in APPENDIX 1 – PRELIMINARY ORGANISATION CHARTof the present document.

Specific function directly involved in Detail Design Engineering are:

PEM Project Engineering Manager

PE Project Engineer

PSL Project Specialist Leader – for each disciplines

DOC Document Controller

PEM is responsible for:

- the preparation of the Project Engineering program with the collaboration of the PE and Project Planner;
- keep under control, during the project execution, the project Master document register (MDR) according to the Project schedule requirements
- with regards to the planning activities, the Project Engineering Manager must guarantee the definition of the distribution matrix, shared with PE;
- document control thorough the operation of DOC

PE is responsible for management and co-ordination under PEM control

PSLs, nominated for each discipline, are responsible for the execution of Detail Design Engineering, in accordance with Project requirements and CORPORATE quality system procedures and work instructions.

11.6 DETAILED ENGINEERING

PEM manages Detail Design activities in accordance to internal procedure PRO-PRM-01 "Energy Projects Management", applicable revision.

In general terms, Detail Design Engineering management is related to relation with COMPANY, resources organization, compliance with contract requirements, distribution of information and documentation, control of documents received by COMPANY, activities progress control, Project documents identification and filing, documents issue to COMPANY, design control and design changes control.

During the project, PSLs respond to PEM for all the management aspects. More specifically, PSLs respond to PEM for the documents issue in compliance with the forecast dates. PSLs are responsible for reporting any problem in planning compliance to PEM.

PEM is the unique contractual technical interface with other internal and external parts such as COMPANY and Verification Authority, in particular PEM manages every communication IN and OUT by means a dedicated email address.

Concerning Client documents, the management is conducted according to work instruction IDL-ING-07 "Customer property control".

11.6.1 Design Control

Design control is managed in accordance to procedure PRO-ING-01 "Design control", applicable revision.

More specifically, PEM manages, during the project, the following internal activities, involving PSLs:

- an internal kick-off meeting at the beginning of the Project, in order to describe the scope of work of the project, as defined in procedure IDL-PMI-01 "Kick-Off Meeting" applicable revision;
- an internal basic design review meeting, in a successively date planned in the internal kick-off, in order to verify the availability of all data to be provided by the Client and information necessary for the design development, as defined instruction IDL-ENG-01 "Basic data review", applicable revision;
- several internal design review and verification meetings, in dates planned in the internal kick-off in order to verify and assure the fulfilment of project requisitions, as defined in instruction IDL-ENG-05 "Design review and verification", applicable revision;
- an internal design validation at the end of the Project in order to analyze the overall outcome of the project, as defined in instruction IDL-ENG-06 "Design validation", applicable revision.
- Concerning design changes, PEM is responsible for their management and PSLs are responsible for the analysis of the impacts on detail design and for subsequent implementation after PEM approval, according to work instruction IDL-ENG-08 "Design Changes Management", applicable revision.

During the project, quality audit can be performed on detail design activities, in accordance with the "Project Quality Audit Schedule".

Requests for Preventive Action, Requests for Corrective Action and Non-Conformity Reports can be issued.

11.6.2 Internal Preparation, Verification and Approval of Technical Documents

Technical documents of the Project are listed on the "Design Document List".

The issue of Master Document Register (MDR) is carried out by a cycle of preparation, verification and approval, as defined in instruction IDL-ENG-02 "Preparation, Check And Approval of Technical Documents", applicable revision.

More specifically, an originator, is responsible for the preparation and self-check of the document. A checker (a person different from the originator) is responsible for a detailed control of the document. Particularly, if there are some Client comments on the previous revision, originator and checker are responsible for the incorporation of the modifications requested by Client.

Once completed the preparation, the originator delivers the document for the PSL verification. Then the document is delivered to PEM for definitive CONTRACTOR approval.

After PEM approval, DOC is responsible for document transmission to Client and communication to project team.

If a document to be prepared includes calculations, it will be executed in accordance with the criteria indicated in the instruction IDL-ING-06 "Preparation and Control of Calculations", applicable revision. If a document to be prepared include calculations obtained through the employment of software, the software will be subjected to validation in accordance instruction IDL-ENG-04 "Software Validation". Besides, if a document includes multidisciplinary contents, interdisciplinary checks shall be undertaken with the criteria described in instruction IDL-ENG-07 "Interdisciplinary Verification of Technical Documents", applicable revision.

11.6.3 3D modelling

3D modelling is an integrated activity of the Detail Design Engineering.

Project requirements for 3D modelling are defined in:

- PRO-CAD3D-01 "3D Modelling"
- IDL-CAD3D-05 "3D Model Review"
- IDL-CAD3D-06 "3D Model Clash Check"
- The 3D model of the Project is developed with E3D software.

3D modelling operators are allocated by CONTRACTOR in order to perform model activities. Besides, a 3D administrator is allocated for data base and files administration.

3D modelling operators are responsible for the correct 3D modelling of the plant as regards as engineering output, while the responsibility of the plant engineering stays on pertinent PSL.

3D model review will be organized by PEM at specific modelling progress. A registration of 3D model review will be kept.

11.6.4 Filing of Project Engineering Documents and Files

Concerning Detail Design paper documents, they are filed according to instructions IDL-GECO-02 "Filing of project paper documents", applicable revision.

DOC is responsible for keeping all technical papers of the projects in an orderly and updated manner. Particularly, DOC is responsible to archive MASTER project documents (the original ones). On the other hand, PSLs are responsible to archive MASTER COPY project documents of their own discipline, received by DC since issued. Besides, PSLs manage CONTROL COPY used for interdisciplinary check.

Concerning electronic format documents, they are distributed and therefore can be consulted by means of the CORPORATE Electronic Management Document Systems (EDMS) called I-Doc, as explained in work instruction MAN-IDOC-01 "I-Doc Instruction for Project Specialist / Project Specialist Leader", applicable revision. Particularly PSLs are responsible for consulting the last revision issued of technical documents through I-Doc, moreover is responsible for archiving draft documents in the project network, guarantying their identification as draft documents and their preservation.

11.7 PROCUREMENT ENGINEERING

During Detail Engineering phase, CONTRACTOR will perform all Procurement Engineering of CONTRACTOR ITEMS including but not limited to:

- Preparation of Material Take Offs (MTOs) and requisitions for all CONTRACTOR ITEMS
- Preparation of Call for Tender packages complete with all attachments such as requisitions, specifications, drawings, Vendor Documentation Requirement Schedule, requirement for certification, shop inspection and testing, spare parts requirements, VENDOR assistance requirements.
- Preparation and performance of Technical Bid Evaluation, including list of all deviations
- Preparation of purchase order documentation complete with all attachments such as purchase requisitions, list of all APPROVED VENDOR deviations, specifications, drawings, requirement for certification, shop inspection and testing, spare parts requirements, VENDOR assistance requirements.

Preparation and issue of Material requisitions and MTO will be performed CONTRACTOR during detail engineering phase.

11.8 CONSTRUCTION ENGINEERING AND METHODS

The Yard and Methods engineering is performed by dedicated team based in the Construction YARD,

under the control and responsibility of the PEM.

The objective of the Construction Engineering and Methods are:

- • develop the construction Engineering (workshop spool, structural drawings, piping supports and equipment) needed for construction;
- • define the assembly areas, assembly sequences, lifting and handling Engineering, load-out studies and erection.

The main activities carried out in this process are:

- assist the internal functions to define the equipment/naval means/equipment/assets;
- assist in the selection of the best sub-CONTRACTORs;

- coordinate the internal resources assigned to the Projects, with the purpose to issue the necessary project's documents;
- calculations;
- load-out and transportability analyses;
- structural analyses;
- installation, workshop, piping spool drawings;
- pre-fabrication feasibility and piping assembly;
- assist the Purchase and Tender Service in managing the technical interface with Bodies and Third parties in order to obtain the permits for embarking, pulling inside the port and at sea;
- assistance in solving technical building problems.

11.9 PRECOMMISSIONING & COMMISSIONING ENGINEERING

The Commissioning Engineering includes the engineering activities needed to prepare the documents for the Mechanical Completion, for the Precommissioning and Commissioning phases. In general the activities can be summarized as follows:

- implement ICAPS sheets,
- prepare the P&ID, reviewing them in Commissioning key;
- subdivide the product and/or system into systems and sub-systems;
- plan the commissioning activities, defining the execution sequences of the activities, based on the systems and/or sub-systems identified;
- prepare the check sheets for the execution of the mechanical completion, precommissioning and commissioning activities;
- identify the equipment and services needed to execute the activities;
- establish the performances of the systems and sub-systems on site.

During the engineering phase, before pre-commissioning operations start, CONTRACTOR will issue the pre-commissioning dossier with the procedures for YARD pre-commissioning of the PLANT.

11.10INSTALLATION AND TRASPORTATION ENGINEERING

With the purpose to have a smooth interface with T&I sub-CONTRACTOR, CONTRACTOR will provide main information and documents to allow the development of its installation engineering.

11.10.1 Load-Out and Sea–Fastening Engineering

All engineering documentation (calculation, drawings, certifications, report, etc.) required to perform load-out and sea fastening, will be carried out at Construction Yard by CONTRACTOR's Yard and Methods engineering under the control and responsibility of the PEM.

This include the following activities:

- Load-out manual including the quay and barge bearing check, the barge ballasting sequence, the auxiliary structures check, the barge mooring check and a check list for the inspection before load-out
- Loaded barge stability check in intact condition
- Design of the grillage and sea fastening for all the structural components to be transported
- All Load-out and Sea Fastening engineering performed by installation sub-CONTRACTOR will be performed with the approval of CONTRACTOR and MWS
- Any other document requested by MARINE WARRANTY SURVEYOR.

11.10.2 Transportation Engineering

CONTRACTOR will provide the fatigue analyses of the Permanent Work items.

T&I sub-CONTRACTORs will prepare the transportation procedures and associated engineering calculations related to the transportation of the Permanent Work items, using the default motion criteria as per DNVGL-STN001 regulations for review of the transportation analysis and design of grillage and sea-fastening.

11.10.3 Installation Engineering

CONTRACTOR will provide the installation aids design, pile make-up design, lift point design and all information and documents can support the T&I subCONTRACTORs to prepare the installation procedures and associated engineering calculations and manuals related to the offshore installation of the Permanent Work

11.11 FINAL ENGINEERING DOCUMENTS

The final Engineering documents mainly consist in dossiers that contain the detailed and construction Engineering documents on how the system was actually built, the operative and maintenance manuals of the product and all systems, the documents that certify the conformity of the product with contract specifications and/or applicable laws. In brief, these consist of:

- Design Dossier
- Quality Record Book
- Production Operation Manual
- Maintenance Dossier
- Native files annex, including model (3D model, structural, electrical…) and instrument data base
- The 3D model access through will be available to COMPANY during all stages of Project execution.

PEM is responsible to coordinate the preparation of AS BUILT dossier.

Final dossier will collect all documents according project information deliverable requirements.

12 INFORMATION MANAGEMENT AND INFORMATION TECHNOLOGY

With the specific requirements set forth in Section V of the Contract, CONTRACTOR shall adopt the necessary measure for the provision of the technological supports.

CONTRACTOR shall provide a consolidated plan for the management of the CONTRACTOR multidisciplinary information and data related to the Project, in order to make sure they are managed and maintained throughout the full life of the Project according to the contractual requirements, which are herewith acknowledged and implemented.

This plan will guarantee also the availability and compatibility of information for subsequent operational requirements.

Please refer to the following document, which deals with the subject matter in a comprehensive manner:

Document Title: INFORMATION TECHNOLOGY PLAN & PROCEDURES.

Document Number: 123A90- PML-PM-PL-00002.

13 PROCUREMENT MANAGEMENT

13.1 GENERAL PREMISES

The procurement activities will be performed by the Procurement Department at CONTRACTOR Offices in Assago (Milan-Italy), for engineering sub-contracts and procurement of critical tagged items, and Ravenna (Italy), for construction sub-contracts and procurement of bulk materials, under the coordination of the Project Procurement Coordinator (PPC).

CONTRACTOR's procurement organization is based on resources deployed within the Project Team who are supported by CONTRACTOR's Procurement Department staff.

All the procurement activities associated to a specific project are coordinated by a PPC assigned to Base Load Power Hub (BLPH) Project. He reports directly to the PM and serves the Project Management Team.

PPC coordinates the Procurement Team, which is composed by Buyers (for materials and sub-contracts), Expediters/Inspectors, Logistic & Custom Coordinator and Warehouse Manager for material management. The Procurement Team is responsible for the procurement activities from enquiry stage up to the final delivery and warehousing of the goods at site.

Procurement activities are performed in accordance with CONTRACTOR's procurement processes, procedures and contractual requirements.

Draft of Procurement Plan will be issued at the very early phase of the Project.

The procurement activities are a key issue of any project because of the risks associated to possible delays in material delivery and/or material quality issues. Therefore, the procurement activities plan is fully linked to the Project Master Schedule and the Procurement Team regularly interfaces and coordinates with the Engineering Team coordinated by PEM and Construction Team coordinated by CM, in order to ensure that procurement activities are carried out according to the project requirements and schedule.

The Procurement Department will have the administrative task to issue the purchase order and/or subcontract according to the milestone dates planned in the Project Master Schedule.

The PMT will monitor that the scheduled dates, stated in the Procurement Plan, are achieved, and shall propose alternative solutions or corrective actions if any dates should deviate from the original plans.

The expediting team, made available by the Procurement, Engineering and QC Departments, will organize both surveys and tests at Vendors' premises. Aim of the surveys is to assess the Quality of the materials, the compliance with contractual requirements and the implementation of all applicable project regulations.

The basis for a successful procurement activity are:

- Agreed Project Vendor List.
- Fast and effective market inquiries.
- Procurement & Subcontract Reports with all the expected dates starting with Request for Quotation up to the required delivery of each item at the fabrication yard.
- Continuous expediting in terms of material delivery, certification and delivery at the fabrication yard.

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy.

- Transport with identification of traffic constraints and relevant solutions before purchase order or subcontract award;
- Material delivery and receipt reports.

In addition to the points above, Procurement Team is also responsible for supervision and control of construction subcontractor's procurement service, which is a main CONTRACTOR's focus, in order to achieve that all activities will be performed in conformity with CONTRACTOR's guidelines / procedures and in compliance with COMPANY's requirements.

It is briefly described below the main phases of procurement process that respect the CONTRACTOR's system procedures and COMPANY's requirements.

13.2 PROCUREMENT PROCESS

CONTRACTOR's procurement process is made up of the following phases:

- Preparation of project specific procedures and schedules to meet the procurement requirements
- Preparation of Contracting and Procurement plan, which is part of present Project Execution Plan, to be issued within 60 days from Contract Award.
- Procurement & Subcontract Plan with all the expected dates starting with Request for Quotation up to the required delivery of each item at the fabrication yard;
- Preparation of RFQ for all MATERIAL AND EQUIPMENT including any spare parts requirements;
- Follow up of RFQ, resolving any queries, communicating technical and commercial responses and expediting bids/from SUBCONTRACTORS and vendors;
- Analysis and clarification of bids, both technically and commercially, including spare parts;
- Preparation and award of purchase orders and SUBCONTRACTS to selected SUBCONTRACTORS
- Follow up and review of order acknowledgements;
- Continuous expediting in terms of material delivery, certification and delivery at the fabrication yard;
- Co-ordination of inspection activities for all MATERIAL AND EQUIPMENT ensuring adequate notification of pre-inspection and pre-manufacturing meetings;
- Ensuring that adequate insurance cover is arranged from time of SUBCONTRACTORS delivery of all MATERIAL AND EQUIPMENT;
- Transport with identification of traffic constraints and relevant solutions before purchase order or subcontract award;
- Material delivery and receipt reports.
- Packing, preservation and protection of MATERIAL AND EQUIPMENT during transportation and storage;
- Preservation and protection of MATERIAL AND EQUIPMENT during fabrication, construction, up to and including COMMISSIONING;
- Verification, certification and payment of SUBCONTRACTOR invoices;

- Carrying out the complete importation formalities in accordance with applicable regulations and practices, including provision of all required documentation to ensure delivery of MATERIAL AND EQUIPMENT to the WORKSITE(s);
- Receipt of MATERIAL AND EQUIPMENT, including the cataloguing and storage of certification;
- Control, storage and issue of all MATERIAL AND EQUIPMENT;
- Organising weekly procurement status review meetings that may be attended by COMPANY;
- Preparation and issue of monthly material progress status report to indicate forecast/planned/actual key dates for procurement activity

The procurement process is supported by a further activity consisting in suppliers qualification and control (Supply Chain & Vendor Data Base Management), handled in compliance with internal procedures, which define the processes used to evaluate, qualify, monitor and rate the sub-suppliers and the subcontractors.

Suppliers are evaluated and, if qualified, they are included in CONTRACTOR's database for qualified suppliers.

Suppliers' performances are recorded and evaluated and they contribute to keep valid or suspend the qualification.

The QHSE function supports, through auditing activities, the Supply Chain & Vendor Data Base Manager in the initial qualification phases.

In order to allow the follow-up of the Supplier's "rating", the QHSE Control and the other functions having any relations with the Suppliers, forward to the Supply Chain & Vendor Data Base Manager the information related to their performances.

The responsibilities and methods adopted for handling purchase activities, starting from the Purchase Requisition preparation up to the receiving of conforming materials at the installation site are indicated in the internal procedures (refer to Attachment 16.2 – Procurement Procedures):

- PRO-PRO-01 – Suppliers / Contractors Qualification
- PRO-PRO-02 – Purchase Management;
- PRO-PRO-07 – Vendor Rating (to be revised as it refers to GIANO, no longer in use);
- PRO-LOG-04 – Outbound Transport Management;
- O-PRO-4B-002 – Materials Receiving;
- SPC-ACQ-01 – Instructions For Marking, Packing And Filling Out Transportation Note For Ferrous Materials And Welding Consumables;

Information needed for defining technical requirements of products / services to be purchased are indicated in Supply Specifications and/or Purchase Requisitions.

The Supply Specification includes, at least, the following information (applicable depending on the type of supply required):

- product description;

- reference specifications, rules and codes;
- Quality provisions, Quality Plans, reference procedures and documents;
- provisions as to work organization and HSE;
- execution schedule (planning);
- Special conditions such as extraordinary charges for the parties, scope limits, possible availability of materials, means, equipment or deviations to standard conditions;
- definition of tests and inspections, through Inspections Data Sheets (IDS), or requests for Inspection and Tests Plans issue by the Supplier;
- definition and schedule of documents required through the Required Documents List (procedures, personnel qualifications, inspection and tests plans, drawings, etc.);
- HSE requirements for possible material installation by Supplier at Rosetti yard;
- provisions for packing and/or transport;
- spare parts for start-up pre-commissioning and commissioning, special tools, Capital/Insurance and two years operational spares, as applicable.;
- certification typology;
- warranties.

Supply Specifications and Material Requisitions are prepared by the Project Specialist (PS), verified by Project Specialist Leader (PSL) and approved by the PEM.

Purchase Orders transmitted to Suppliers (OdA) either indicates or recalls information defined in above mentioned documents.

13.3 REQUEST FOR QUOTATION

Request for Quotation (RfQ) are prepared by the Buyers on the basis of the Purchase Requisitions (and relevant attached documents) and according to project vendors list.

Priced spare parts quotations will be obtained together with the original material and equipment quotation, and will include recommended parts normally required during commissioning, pre-commissioning, start-up, first 2 years of operation, capital/insurance (as applicable).

13.4 BIDS EVALUATION

The evaluation model, approved by the Project Manager, is usually split in a commercial and a technical evaluation that are executed by two independent teams.

The technical evaluation is performed by the PEM and the PSL, interfacing with the involved Suppliers, until the technical freezing of relevant bid(s) to be reflected in the Technical Bids Evaluation (TBE) form.

The contractual appraisal of the bids is performed with the Suppliers by the Buyer, based on the project specific terms and conditions, in parallel with the technical evaluation process.

The commercial negotiation and final supplier selection is carried out by a commission made up of the Buyer, the PPC and, in case of strategic orders, the Procurement Director and the PM.

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy.

The Buyer prepares the Purchase Order (PO) and submits it to the Project Procurement Coordinator.

13.5 PURCHASE ORDER EMISSIONS

All purchase orders will be issued in CONTRACTOR's name and shall be sent directly to the selected Vendor/ SUBCONTRACTOR, complete with relevant documentation and specifications.

Each purchase order clearly indicates whether material is subject to inspection by its own independent representative/inspection agency and/or is subject to the requirements of statutory local regulations.

All purchase orders will include a statement that the MATERIAL AND EQUIPMENT may be subject to inspection by COMPANY at Vendor/SUBCONTRACTOR premises during all stages of manufacturing and testing. The technical documentation, being part of the contract documents, shall identify which drawings, e.g. cross sectional drawings, fabrication drawings, calculations, QA records/certificates, data instruction books, operating/maintenance manuals, any electronic data and computer software, spare parts lists and special tools and other documents that are required from the Vendor / SUBCONTRACTOR and the date by which they shall be sent to CONTRACTOR. Purchase order will detail optional manpower rates for specialist site personnel, including any mobilisation/demobilisation costs, for the provision of specialist supervision require during erection, COMMISSIONING and START-UP of the equipment.

13.6 EXPEDITING, INSPECTIONS AND TESTS

At procurement planning stage a "criticality rating" is assigned to the different supplies/services based on technical criticality (complexity and operational) of the item/service to be purchased.

The material and equipment criticality rating defines the intensity of the overall quality surveillance plan. The inspection level evaluation is conducted by an assessment of the role of the equipment within the process, the potential schedule impact on the project execution and the supplier past performance.

Supply Criticality level is defined by Procurement Service in accordance with risk analysis carried out in cooperation with Project Management, Project Engineering Management and Project Quality Management.

CONTRACTOR foresees 4 criticality levels (not critical-low-medium-high) and these levels are combined with surveillance requirements that have to be committed at supplier during periodical and/or final visit.

The Surveillance requirements will be indicated in the Supply specification taking into consideration what indicated in the CONTRACTOR procedure no. IDL-PRO-01 'Criticality Rating Calculation':

In order to assure the Quality (including identification and traceability) of the supplies, when issuing a Purchase Order the Expediting Coordinator, together with PQM, appoints a QC Inspector. QC inspector is responsible to perform the Quality Control (QC) activities according to the criticality rating of the supply and associated Inspection and Test Plan (ITP). The QC Inspector reports functionally to the PPC and to the PQM.

For each supply, the Expediting Coordinator also appoints an Expediter that, depending on the supply classification and criticality, performs expediting activities in order to ensure that the delivery of material and associated required documentation complies with the PO requirements. The Expediter reports to the PPC.

Inspections and tests carried out at the Supplier's facilities are controlled by CONTRACTOR's Suppliers Management Department in compliance with internal procedure "Expediting & Inspection Management", where are specified the activities to be implemented and the responsibilities of personnel in charge at

Expediting Department, during the procurement of materials and the construction of equipment, needed to realize the jobs to be manufactured by CONTRACTOR.

Whenever special technical skills are required, the Expediters/QC Inspectors ask the PEM/PSL for the necessary support during the inspection, testing and receiving stages.

The proactive Expediting will enable the following:

- prior anticipation of problems rather than the reporting of problems;
- exert pressure as necessary to ensure the keeping of the schedule;
- continuously review the status of all orders from the placement date until delivery to the work site;
- prepare and continuously update material status report and issue the same to Company.

The expediting activity will also include expediting of common carriers (shipment tracing) to prevent the delays of shipments in transit to the work site.

The expediter will report unavoidable delays so that the construction schedule can be modified in time to minimise the effects of such delays and regular meetings will be arranged with Client for review of expending status.

Once the final inspection has been completed, a "Release Note" relevant to the product will be issued.

13.7 FAT AND SIT OF EQUIPMENT SKIDS / PACKAGES

A FAT program will be issued to COMPANY for review. The program will indicate which items will be subject to FAT and for each FAT there will be details of the test procedure, performance standard to be demonstrated, punch list process plus other relevant information. CONTRACTOR will inform COMPANY in advance before the exact dates of any FAT.

13.8 TRANSPORTS REQUISITION

Ordinary transports are managed by the Procurement Dept. through frame agreements.

For possible oversize transports, the project staff (PEM and Construction Manager) develops a dedicated Purchase Requisition which is then used by the Transports and Logistics Dept.

13.9 MATERIAL HANDLING PROCESS AND PLAN

Packing, handling, storage and preservation of all MATERIAL AND EQUIPMENT, including spares, consumables, and line pipe will be done in such a manner to prevent them from deterioration.

CONTRACTOR has extensive experience with material management in multiple industries.

Material management system provides the following benefits:

- Integrated procurement, expediting, receiving, inventory tracking, preventive maintenance and issuing processes;
- Material resource planning and work in progress capability;
- Enhanced data import, interface and export capability;

CONTRACTOR's main targets are:

- Avoid any material and equipment damage due an inappropriate handle and movement;
- Guarantee safety conditions;
- Keep materials and equipment traceable.

After contract award CONTRACTOR will issue a packing, handling, storage and preservation and maintenance procedures/instructions taking into account:

- The environmental and local conditions at the WORKSITE;
- The need to provide customs authorities the access for opening and inspection, without compromising the preservation;
- The periodic monitoring of the materials/equipment in storage or standing idle, prior to COMMISSIONING and START-UP. CONTRACTOR shall employ a team of technicians under suitable supervision and provide them with the requisite tools, equipment and consumables to carry out preservation activities as part of the WORK;
- Periodic renewal of preservation materials;
- An auditable record of preservation shall be maintained from equipment receipt till START-UP and made available to COMPANY at request;
- The requirement for air-conditioned and/or sheltered storage of sensitive materials/equipment and spares;
- The requirement to segregate carbon steel and exotic steel line pipe materials.

13.10MATERIAL RECEIVING

Incoming inspections (materials receiving) are carried out according to the internal procedure "Materials Receiving":

- O-PRO-4B-002 - Materials Receiving.

CONTRACTOR will be responsible for ensuring that the material delivered and received at the site is in full compliance with the drawings, the specifications and the purchase order.

As soon as a material or equipment arrives to the construction yard warehouse, the Warehouse Manager firstly check the material/equipment documentation against the P.O. and, before the unloading operations, he calls the Quality Assurance Inspector who shall perform a visual inspection in order to verify the following:

- Original packaging integrity;
- Absence of visible damages;
- Quality and shipment documents checking;
- Shipment release issued by an inspector of CONTRACTOR.

When deeper technical checks are required, they are carried out by field supervisors and/or lead engineers. If the material or equipment is approved it is formally accepted by the project and the Warehouse Manager proceeds with the unloading, the storage and the updating of the material management system.

In case non-compliances are detected, a non-compliance report is prepared and the material or equipment is stored in a dedicated area separate from that one assigned to the project materials approved for installation.

13.11 STORAGE AND PRESERVATION

The Warehouse Manager decides the equipment and materials storage place and preservation provisions depending on the contract requirements, instructions given by the suppliers, material type and from the COMPANY in relation to the COMPANY PROVIDED ITEMS free-issued to the CONTRACTOR for the installation. The following guidelines are generally adopted.

Non-covered warehouse:

- Tanks.
- Vessels.
- Exchangers.
- Power Cable (with terminals protected).
- Conduits.
- Carbon Steel pipes.
- Outdoor designed transformers.
- Steel structure.

Non-covered warehouse but with protection:

- Power motors of 100 kW or more.
- High sized pumps.
- Compressors.
- Stainless steel materials.
- High sized process equipment.
- Heaters.
- Valves and high sized carbon steel fittings.
- Desalination Unit, Electro-chlorination unit, Ultra Filtration unit.
- Instrument Air / Nitrogen generation packages.

Covered warehouse:

- Thermal Insulation material.
- Pumps.
- Fans.
- Motors < 100 Kw.
- Valves 4" or less.

- Fittings < 6".
- Flanges.
- Conduit fittings.
- Safety and control valves.
- Small equipment.
- Cable connectors.
- Switchboards.
- Other type of Transformers

Air conditioning storage:

- Control panels.
- Instruments.
- Software equipment.

Fireproof storage:

- Paint.
- Industrial gases.
- Other flammable materials.

13.12MATERIAL/EQUIPMENT STORAGE CONTROL, INVENTORY AND SURPLUS

CONTRACTOR will operate a computerized system of material control and tracking to monitor the status of all MATERIAL AND EQUIPMENT at any time. The system will monitor from the point of dispatch from any SUBCONTRACTOR's works, through the collection and onward shipment of the material/equipment through to final issue for construction/installation.

CONTRACTOR ensures that all MATERIAL AND EQUIPMENT for incorporation into the WORK are segregated and that access is only possible for CONTRACTOR's stores personnel and that all areas are secure against unofficial access.

CONTRACTOR will provide a weekly updated materials inventory for the following:

- Materials commitments.
- Purchases.
- Materials on site.

13.13REPORTING

CONTRACTOR will issue on a monthly basis or as agreed with COMPANY, a report relevant to the status of the materials including the following information:

- number of the purchase order;
- brief description of the material;

- subcontractor identification;
- required delivery date;
- contractual delivery date;
- expected delivery date;
- date of the last contact with the subcontractor;
- type of contact (visit, telex, telephone);
- expected arrival date at destination (site);
- actual arrival date at destination (site);
- planned Inspections and expediting activities;
- data of tests to be performed (regarding IDS and certification).

14 FABRICATION AND ERECTION MANAGEMENT

14.1 SCOPE OF THE SECTION

CONTRACTOR'S approach to construction is specifically aimed at maximizing productivity; the main phases of construction are defined as follows:

- Fabrication/Prefabrication refers to manufacturing of single items such as beams, plates, nodes, pipes, fittings, special items, minor/tertiary items, appurtenances and minor subassemblies which are normally indicated and detailed individually on drawings.
- Erection consists of assembling prefabricated items, coming from CONTRACTOR or SUBCONTRACTORS workshops and transferred to the construction yard. Items of the same Sub-assembly are assembled in the erection area, according to the erection sequence. This phase includes all relevant welding work and its controls.

The construction method, the erection sequence and the yard layouts are studied and defined in order to minimize the assembly, erection, handling activities and to optimize quality and HSE performance.

The assembly of prefabricated items are done either indoor or inside temporary facilities according to CONTRACTOR's workload.

A weekly construction meeting with COMPANY and CONTRACTOR representatives, construction manager and other relevant persons is organized on construction yard. Relevant minute of meeting (MOM) is prepared and signed runtime. The ongoing weekly activities, progress and the 2 weeks look-ahead are the main subjects of this meeting.

The construction activities are performed according to the Project schedule, on single shift or double shifts. Overnight and over weekends shifts are organized when needed and only for special activities (NDE on welds, fireproofing, hydrotests, leak tests) or in case of recovery plan.

14.2 PREFABRICATION

CONTRACTOR generally prefabricates structural and piping items in CONTRACTOR or SUBCONTRACTORS' workshops (Ref. Figure 1) and Yard with internal resources.

All items prefabricated in-house (e.g., structural items or piping spools) will be NDE examined and tested in-house with dedicated SUBCONTRACTOR and either stored in segregated areas or transported to the assembly areas ready to be erected, according to the Project schedule and the erection sequence.

Most of the fabricated items will be made in transportable sizes (no outsize loads will be expected) and marked with markers, punching, stickers or tag plates before transport to the construction yard, with information of drawings, marks and position.

The level of prefabrication that it is possible to perform in workshops is as follow:

- Cones by plates;
- Legs: made from plates, cut, rolled, welded and bevelled in order to fabricate tubular elements of 3 meters length up to realize complete elements of length maximum of 12 meter;
- Preassembly of legs in sections up to 12/15 m long;

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- Horizontal bracings cut to length and beveled;
- Beams cutting and prefabrication (including stiffeners, etc);
- Plate cutting;
- Structural nodes including stiffeners;
- Columns and diagonal bracings cut to size and beveled;
- Minor Sub-assemblies prefabrication;
- Ancillary structures prefabrication (stairs, walkways, ladders, equipment supports, tertiary structures);
- Piping Spools.

Shelters (Instrument Room, LV and HV Switchgear rooms) will be fabricated to the SUBCONTRACTORS workshops or in yard in transportable sizes (outsize loads will be expected), ready to be erected and filled with necessary equipment. Due to long time delivery of shelters equipment, the installation on the Topside will proceed even if equipment will not be available on time.

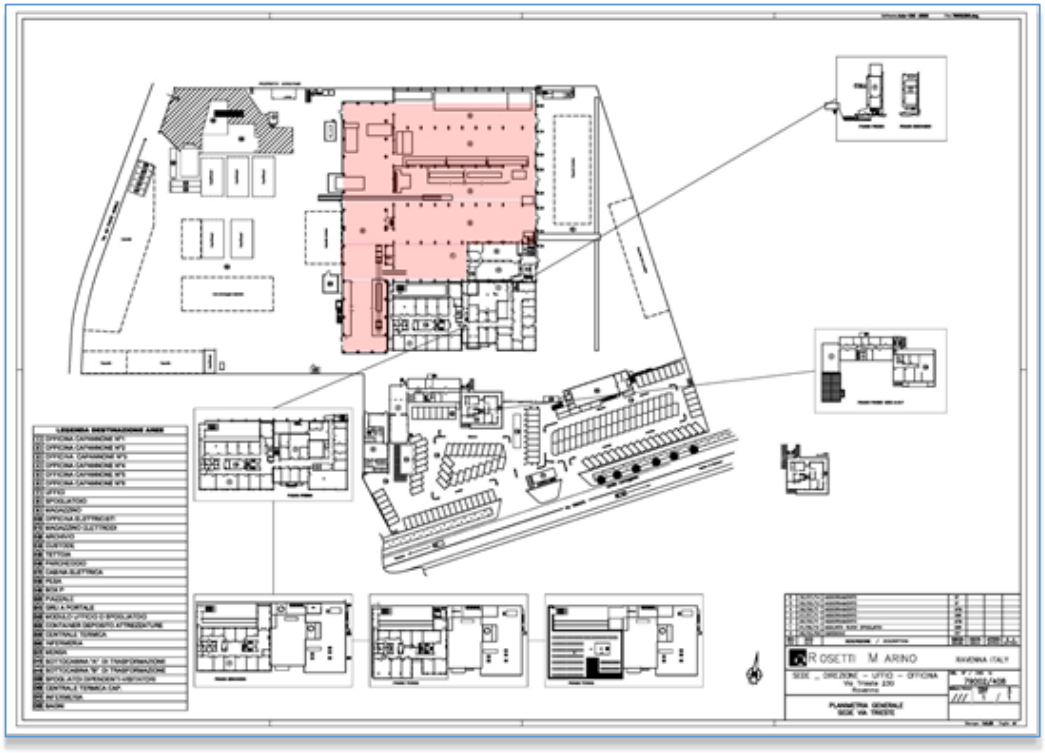


Figure 8 - CONTRACTOR Workshop

14.2.1 Topside and Transition Piece

The prefabricated and loose items will be transported to yard (Piomboni Yard - YPB) where the deck levels (including elevation columns, bracings and walls, if any) will be assembled at ground level or on temporary

supports (e.g., totem, concrete's blocks, etc.), possibly inside the "block fabrication workshop" or external area, in order to build "erection sub-assemblies" whose dimensions and weight are mainly driven by the painting shop dimensions and the yard cranes capacity (Ref. Figure 2).

More in details, the following activities will be performed in order of execution:

- preparation of temporary supports and staging on yard;
- preliminary setup of primary structures sub-assembly;
- adjustment and positioning of primary structures;
- dimensional control of primary structures sub-assembly;
- assembly of secondary structures;
- assembly of additional steelwork (e.g., tertiary, ancillary, equipment supports, etc.);
- pre-welding inspection;
- welding of structures;
- deck plating (if any) installation and welding;
- installation of appurtenances. These normally include the maximum amount of drain boxes available from Engineering Department, supports for walkways, piping supports, instrument supports, supports for cable trays, sockets and kick-plate for handrails, pins, blast wall attachments etc.;
- overall NDE and dimensional control.

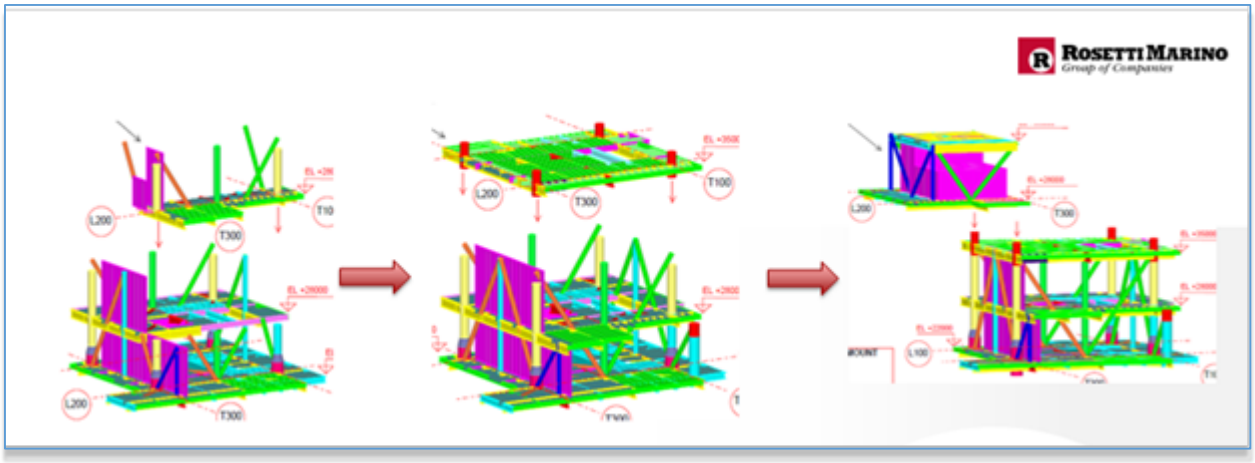


Figure 9 - Topside subassemblies

14.2.2 Piping

The Material Management, spools feasibility, welding procedures, traceability, dimensional controls and NDEs, Quality Controls will be managed and executed by CONTRACTOR.

Piping will be able to be cut and beveled in headquarter workshop (Ref. Figure 4Figure 3) or SUBCONTRACTOR premises, depending on CONTRACTOR workload.

Piping spools will be fitted-up and welded in YPB workshop or SUBCONTRACTOR premises, depending on CONTRACTOR workload.

Workshops potentially dedicated to piping fabrication activities are:

- Carbon Steel workshop (Ref. Figure 9, workshop in warehouse 3).
- Exotic material workshop (Ref. Figure 9, workshop in warehouse 4).

Cutting and beveling of pipes will be performed by cutting and beveling machine or by manual grinding machines.



Figure 10 - Rosetti Marino HQ Aerial view

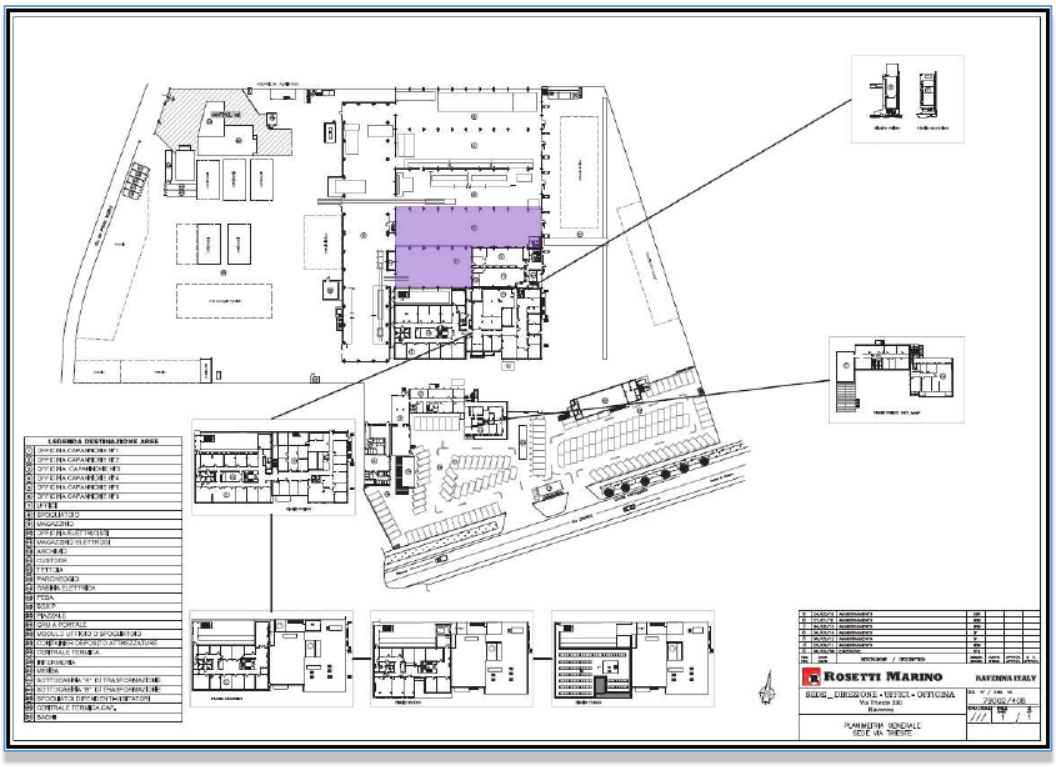


Figure 11 - Rosetti Marino HQ – Cutting and Beveling area



Figure 12 - Yard Piomboni Aerial view

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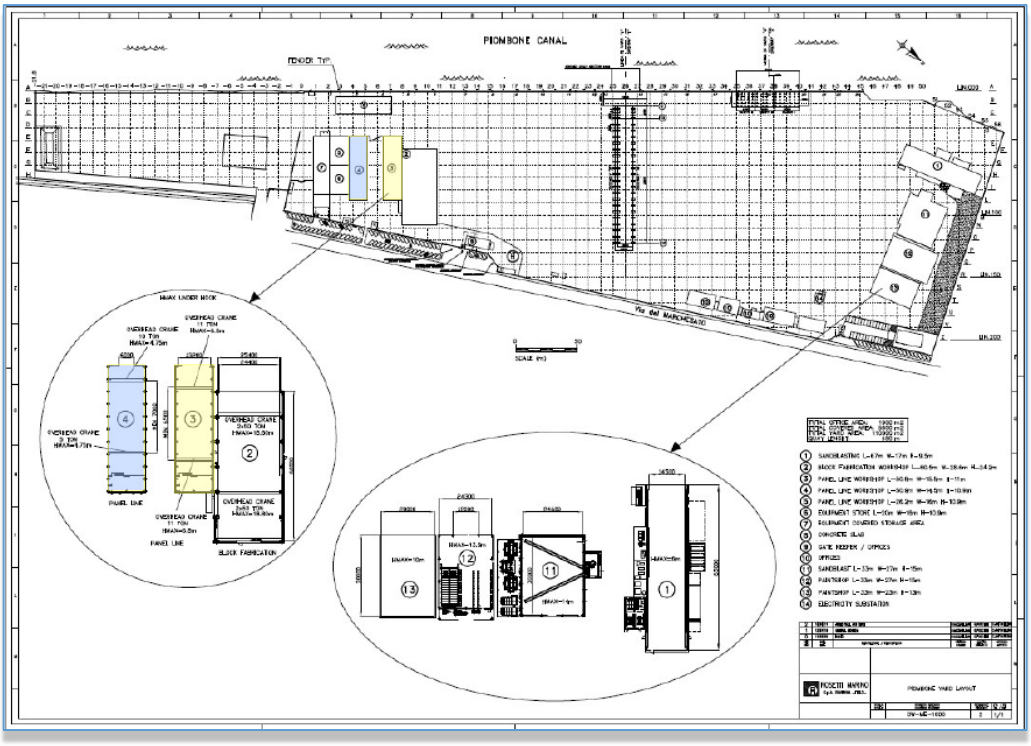


Figure 13 - Rosetti Marino Yard Piomboni Piping Fabrication Area



Figure 14 - YPB White Area

Pre-heating, fit-ups, welding activities and NDEs will be carried out according to the Project Welding Book and Execution Test Plan. Figure 8 shows NDEs PAUT (Phased Array Ultrasonic Testing) on piping spools.



Figure 15 - PAUT on CRA piping spool

A Piping Spool will be fabricated by CONTRACTOR considering:

- fabrication spool's shop drawings including piping support welded to piping: pads or trunnions;
- fabrication piping support's shop drawings;
- pipes will be marked before cutting, each fit up, weld, welder's identification number will be identified and readable to keep its traceability;
- erection welds allocation; dimensional control will be carried out for each single spool;
- each spool after completion and before the transportation, will be plugged and blinded off for preservation purposes;
- all NDE examinations will be performed and registered before transportation;
- pickling and passivation (if required) will be executed in specialized SUBCONTRACTOR's facilities in different tanks, considering: austenitic stainless steel, ferritic stainless steel, duplex or super duplex as per Figure 9, which shows a typical super duplex pickled and passivated piping spool treated in accordance to ASTM A380 and ASTM A967 where the heat tints are absent, having been completely removed.



Figure 16 - Pickling and passivation

Piping support fabrication is typically divided into two types:

- supports that are welded to the piping spools, these supports are fabricated and welded in the piping or structural workshops;
- supports that are not welded to the piping spools, these supports are supplied fully fabricated within subcontractor's workshop.

Hereinafter other specific objects relevant to piping discipline are addressed:

- CONTRACTOR is familiar with Project Material and welding techniques which have been developed and used for years. Copies of these welding procedures are available in the welding department;
- CONTRACTOR is familiar with flange management: torque wrench, both pneumatic and hydraulic torque wrenches are commonly used and skilled technicians are available; when bolt tensioners are required, a specialized subcontractor is involved in the Project;
- CONTRACTOR performs pressure test as part of the Piping Mechanical Completion/Precommissioning. Examples of documentation relating to punch listing, flushing, hydro testing, leak testing and drying of a single line of a system on a previous project are available upon request;
- The management of welding consumables (e.g., distribution, handling and storage) is regulated by the Quality Manual. These rules are implemented in relevant procedures issued both for the handling of welding materials and daily monitoring of welding processes. Examples of these procedures are available upon request.
- Material Traceability and Control are regulated by procedures, which assure the traceability of materials during receipt, storage and fabrication phases.

14.3 MOVEMENT TO PAINTING APPLICATION AREA (TOPSIDE AND TRANSITION PIECE)

After prefabrication is complete, fabricated items, piping spools, sub-assemblies will be moved to the paint shop by means of trolleys of adequate capacity.

Painting/Coating will be performed according to COMPANY's procedure.

Areas available for coating activities located at Piomboni Yard are:

- Cabin 1 (Dimensions: w=14,500mm, h=6,000mm (4,500 NET), l=65,000mm) – ref. Pos. 1 on following Figure 13;
- Cabin 2 (Dimensions w=25,000mm, h=14,000mm (13,500 NET), l=30,000mm) – ref. Pos. 11 on following Figure 13;
- Cabin 3 New (Dimensions w=24,300mm, h=13,500mm, l=30,000mm) – ref. Pos. 12 on following Figure 13;

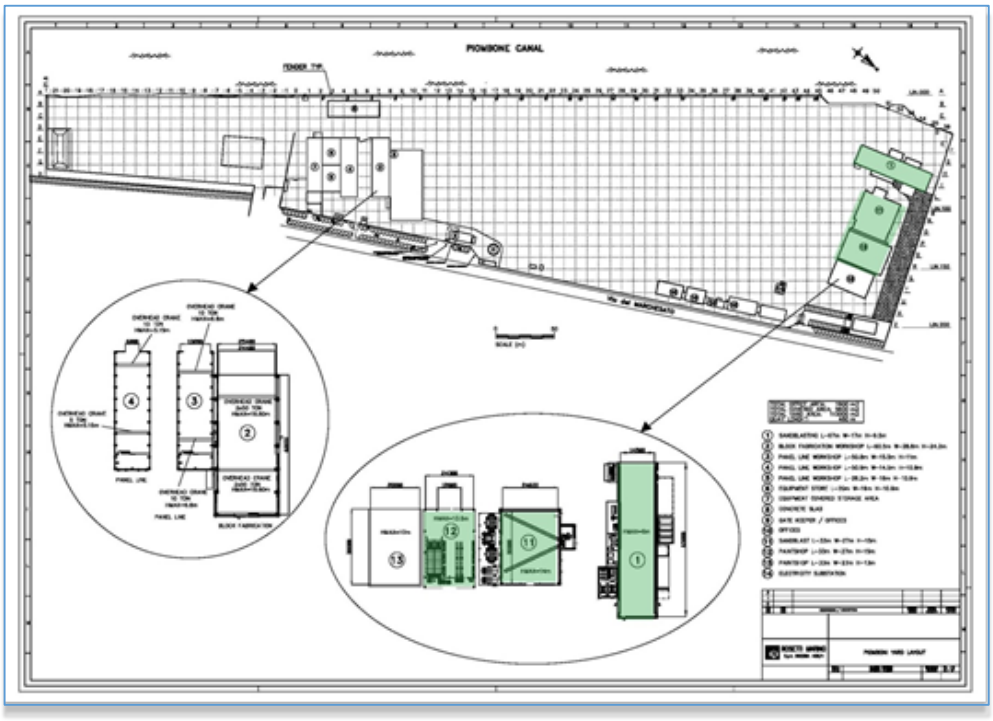


Figure 17 - Rosetti Yard Painting Area

Upon completion, the painted block will be moved to the yard erection area where the overall Topside steel structures will be built by progressively positioning and joining the sub-assemblies according to the selected erection sequence.

14.4 ERECTION

14.4.1 Topside – Structure

Once the painting cycle is complete, each Sub Assembly will be moved from the paint shop to the erection area, with self-propelled multi-wheeled trolleys, uplifted and placed on temporary handling supports.

As soon as they reach the erection area, the lift with 1 or 2 crawler cranes (500 tons capacity) will be arranged and the assembly will be lifted into its final configuration on the upper grillage (final supports ready for loadout.

As soon as the dimensional controls and the relative welding which grant the load release are completed, the load from the cranes will be released.

Lift after lift, the Topside structure will be erected joining together the main assemblies independently fabricated, blasted and painted. The preparation of structural items and deck parts will be carried out following a specific sequence, in order to optimize the project schedule.

Examples of sub-assemblies painted and ready to be moved and lifted are shown in Figure 14 and Figure 14.



Figure 18 - Lifting of Topside subassemblies 1

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Figure 19 - Lifting of Topside subassemblies 2



Figure 20 - Lifting of Subassembly

14.4.2 Erection Sequence

As a preliminary and general erection sequence, COMPANY to refer to Attachment 1 Preliminary Erection Sequence, which is based on the "pancake" method, level by level, from bottom to top.

14.4.3 Multidisciplinary Activities

Once the Topside structure is complete, the multidisciplinary installation activities will be able to start.

Process and utility equipment (e.g., vessels, pumps, compressors, filters, skids, manifolds) will be installed to allow a smooth piping installation.

The piping erection sequence will start from large diameters and long spools of pipe in the most congested area.

Some flanged piping spools could be flushed and hydro tested during the fabrication phase.

Electrical and instrumentation installation will proceed with piping erection.

The electrical & instrument cable trays will be erected following the criteria of minimizing the interfaces with piping works (erection by areas).

The instruments and tubing will be installed as late as possible to avoid any possible damage during the erection works.

Documents describing the main complex lifting, as per internal procedure, will be prepared before performing each significant operation, including calculations and details of any temporary attachment (lifting lug, temporary reinforcements) that may be needed to perform the operation; these documents will be submitted to Company for approval/review.

14.4.4 Shelters Fabrication

Platform Facilities will include different Shelters to be installed in the Lower deck of the Platform.

The Shelters could house the following items (according with drawings):

- Air Lock;
- Fire and Gas system;
- HVAC system;
- Electrical and mechanical equipment;
- Technical Room.

Shelters will be fabricated at SUBCONTRACTOR or CONTRACTOR's workshops, including all the appurtenances and will be delivered at CONTRACTOR's Yard. Shelters will be installed during the onshore construction before the lifting of the upper level or in later stage.

SUBCONTRACTOR's scope includes but not limited to the following supply, detail design, fabrication, assembly and testing of:

- Shelter structure;
- Steel painting;
- Architectural construction, insulation, finishing and furniture described on drawings or throughout this document;
- Lifting aids;

- Lighting and power sockets;
- Fire and gas detectors;
- Life-saving equipment;
- All necessary cabling and fittings;
- MCT;
- Installation, assembly, connection of HVAC System.

14.4.5 Piping

The installation of pipe spools will start as soon as possible after the erection of supporting structure and after the placing of the equipment to be connected by the piping line.

If and where valves will not be available when piping lines will be erected, CONTRACTOR may be able to put in place "dummy spools", in order to proceed with piping erection.

CONTRACTOR will perform piping hydro-tests as part of the pre-commissioning and leak test as part of the commissioning, short after the piping mechanical completion, including most of the lines having the same testing pressure.

14.4.6 Equipment

CONTRACTOR will incorporate the equipment in the plant by installing, aligning and fixing all relevant items in accordance with detail engineering and VENDORS instructions. Whenever possible all equipment on each level will be installed prior to piping erection.

The equipment erection will be performed on each level before the lifting of the upper level.

14.4.7 E&I Installation

Electrical, Instrumentation & Telecom (E&I) activities follow a proper sequence to fulfil the objectives of mechanical system completion and onshore commissioning, thus achieving the critical success factors of the Project.

During the execution of the project, CONTRACTOR will develop a work program which contains a sufficient level of detail to enable the completion of mechanical works in each area (i.e., Structural, Mechanical & Equipment, Piping). The schedule will show all major activities in each area (i.e., outstanding mechanical work for electrical, cable ladder installation, cable rack installation, glanding & terminating, testing) and then relates the completion of these activities to the mechanical completion of each system.

In order to have an effective look-ahead, dedicated KPI will be used to monitor the progress and to estimate the remaining activities, as an example:

- cables to be pulled by week;
- cables to be terminated by week.

During installation, all the Equipment will be adequately protected and covered with non-flammable tarpaulins.

14.4.8 Painting touch-up & Insulation

Touch up of field weld will be performed according to relevant contractual requirements and dedicated procedures, during the erection activities.

Installation of:

- Insulation (if requested and only where necessary) of all piping, valves, in-line instruments and special piping items as defined in the line list and P&ID;
- Insulation of pipe supports as indicated on the design drawings (if requested);
- Insulation of mechanical packages (If required).
- For piping installation, painting and insulation (If required) will be finalized after mechanical Completion.

14.4.9 Brine and Seawater Caissons

CONTRACTOR strategy is to carry out the supply and complete fabrication of Brine and Seawater Caissons at the SUBCONTRACTORS and/or CONTRACTORS' workshops and/or yard.

The welding procedures and traceability, dimensional control and NDE, Quality Control will be performed directly by the SUBCONTRACTOR, supervised and managed directly by CONTRACTOR personnel dedicated to the Project, or by the CONTRACTOR.

The transportation up to offshore site will be performed along with Topside and Transition Piece.

14.5 SUPPORTING ARRANGEMENTS

The structures inside the workshop will be supported by means of steel supports in order to allow the positioning of trailers for movement to the paint shop.

Scaffolding will be tailored based on material availability during the erection stage. The scaffolding erection sequence of the sub-assemblies will be defined based on the level of completion when leaving the coating area.

Final position in yard erection area will be arranged with the employment of both concrete blocks and steel supports placed to ensure structural integrity. This supporting arrangement will be designed in order to perform both weighing and load-out operations.

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15 MECHANICAL COMPLETION, PRE-COMMISSIONING, COMMISSIONING

This section defines the strategy to plan and execute successful the Mechanical Completion and Pre-Commissioning activities.

A key objective is the safe and efficient planning and execution of the activities, including the process of handing over the completed assets to the operator with the assurance of technical integrity and full operation ability after Commissioning.

The main objective is to maximize onshore Mechanical Completion, Pre-Commissioning and punch list closure and leaving only minimal necessary for hook up phase. To achieve that, it is mandatory to establish an interface and excellent interaction between Engineering, Construction, Commissioning and Operations.

Meeting schedule will be defined with occurrences relative to project phase and criticality. The Pre-Commissioning Team will prepare and issue the minutes of interface meetings for all the interfaces that will be held on the Project (Conference calls and face to face meetings).

15.1 BOUNDARIES

Mechanical Completion

This is the verification of the construction phase. Completion is the process used to log and record the technical data and verification information for equipment and plant that will be pre-commissioned and commissioned.

It is the inspection and testing of the workmanship to prove and validate the complete and correct execution of the construction in accordance with the scope and specification for the work. It is documented by the completion of the check sheets. These work instructions define the mechanical completion testing and inspections to be undertaken, depending upon the equipment items contained within a system/sub-system.

The Discipline Acceptance Certificates (DAC) and the System/Sub-system Completion Certificate, with associated punch list and outstanding work list, will be raised by the Construction Manager with verification of QC inspector.

It is commissioning representative responsibility to accept the subsystem and transfer if from construction into commissioning.

Pre-commissioning

This is the activity to prove and validate the correct functionality of equipment. The nature of the testing to be undertaken is defined on a series of check sheets, with each item of equipment having a number of tests identified against it.

The Pre-Commissioning Certificate, and associated punch list, will be raised by the commissioning representative with verification by the QC inspector.

It will be responsibility of the CONTRACTOR Commissioning Manager issues for each system or subsystem the RFCC.

Commissioning

Commissioning covers the testing and verification activities carried out to ensure that equipment and systems perform in accordance with specified requirements, bringing them safely into operation. Aim of Commissioning is to verify dynamically the functionality of the equipment and facilities by bringing grouped systems/sub-systems into operation in readiness for handover to the operations group.

Furthermore, the commissioning team is responsible for undertaking all preparation and execution of Commissioning scope of work. Commissioning team will be responsible for the successful Handover of all systems and sub-systems to the COMPANY. It will be responsibility of the CONTRACTOR Commissioning Manager asking for Company signature of the relevant RFSUC.

Scope of commissioning is constantly reviewed and challenged where necessary, in order to keep a clear focus on the overall project in accordance with the project schedule.

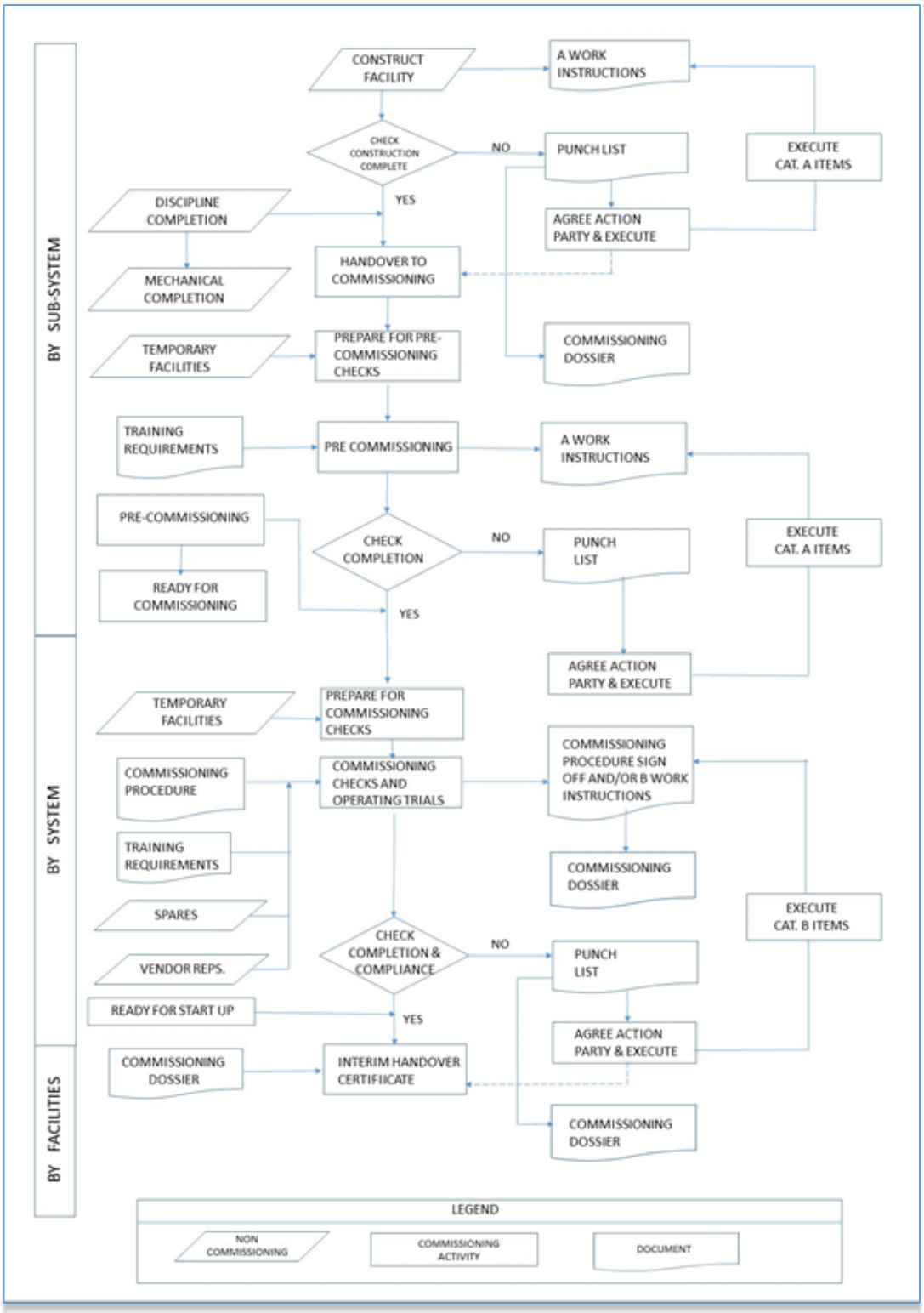


Figure 21 - MC & Commissioning chart

15.1.1 Commissioning Engineering Responsibility

The Commissioning Engineering includes the engineering activities required to prepare the documents for the Mechanical Completion, Pre-commissioning and Commissioning phases. In general, the activities can be summarized as follows:

- System definition
- Work breakdown
- Setup and development of work execution flow scheme
- Schedule development
- Completion management system implementation and follow up
- Commissioning procedure preparation / check
- Definition of equipment and services needed to execute the activities;
- Energization and process fluids introduction procedures
- Commissioning As-built dossier.

The system definition will be done using Color Code and will be produced by marking-up the Project P&ID's, D&ID and one-line diagrams. Additionally, when necessary, dedicated layout drawings will be produced.

Commissioning engineering team will fully collaborate and interface with design engineers, procurement and operations on the subject. As verification is overall project activity, commissioning team will define its part and add it to overall inspection plan.

15.1.2 Vendor Mechanical Completion

The inspection on items installed on package or skid equipment shall be performed by Supplier with "A" Check Sheet already approved by CONTRACTOR. During the FAT at presence of CONTRACTOR and COMPANY representative (where is required), a spot check of Items already inspected by Supplier shall be performed.

Evidence of all inspection "A" Check Sheet shall be provided with the Manufacture Record Book (MRB).

At WORKSITE, only the Mechanical Completion inspection of the installation for the package/skid shall be verified including all interface with other systems.

15.2 SYSTEMIZATION PHILOSOPHY

Systemization will provide a structured subdivision of the Facilities in Systems and Subsystems and each System can include one or more Subsystems.

System can be defined as composite assembly as having a singular purpose and can be commissioned and started up individually when certain conditions are met.

Subsystems is composite assembly of piping, vessel, equipment, instruments, cables, electrical items, etc.

15.3 ONSHORE MECHANICAL COMPLETION

Mechanical Completion will be performed according to the system and subsystems identified and according to the CONTRACTOR Corporate procedure.

15.3.1 Mechanical Completion Documentation

15.3.1.1 General

The Mechanical Completion activities imply the issue of technical documentation and the utilization of the documentation issued during the preceding phases BLPH Project. All the edited documentation will be coded and numbered in accordance with the specification issued for the project.

Documents shall meet the following requirements:

- To inform and notify the Company of the program of MC activities;
- To inform and notify the Company of the MC activity progress;
- To provide evidence of the correct execution of the MC activities as per contractual agreement
- MC plan;
- MC dossier.

The MC documentations will be placed in dedicate dossier files, one for each system.

The following guidelines will be used for all documentation:

- X a cross (X) shall be written in all check windows when the checks/tests have been performed and accepted by the Company's Representative.
- R shall be written in all check windows if the check/tests are not acceptable, and the reason shall be given in the attached comments sheet or at foot page.

The check windows shall be left blank if the check/inspections have not been made.

All the documents shall be prepared only in one copy "original".

On completion of each inspection, the stage reached shall be indicated on the MC/Pre-Commissioning/Commissioning Database, thereby making all personnel aware of the current status of any installation. This is an ongoing exercise until individual System or Sub-system are Ready for Commissioning.

During both Mechanical Completion and Pre-Commissioning all inspection and test results will be recorded on the appropriate Check Sheets; inspection and test record sheets shall be prepared by the Main CONTRACTOR and approved by the Company and Third Party.

All Check Sheet will be signed by an authorized representative of the CONTRACTOR and by the COMPANY and Third Party site representative.

15.3.1.2 Dossier

A set of dossier for the Mechanical Completion of all the facilities will be prepared.

The final documentation will consist of a complete set of inspection and test certificates compiled per discipline and within each discipline either per module or per mechanical equipment, part systems, systems or areas at the fabrication yard and offshore site.

All these certificates will be placed in the MC dossier files and, when all the activities are completed, shall be handover to Commissioning team.

All the reports will be placed in the dossier files per disciplines.

15.3.1.3 Documentation Issued during the Activities

During the activities of the various phases, the following documents shall be issued:

- progress report of the works, issued weekly or biweekly;
- review report concerning the correct execution of the activities;

15.3.2 Mechanical Completion Methodology

The Mechanical Completion scope of work consists, as previously said, of:

- systematic conformity checks of equipment items;
- selected static/de-energized tests of equipment items;
- systematic pipes and vessel flushing and cleaning (chemical cleaning to be performed wherever necessary or requested).

The items relevant to the skid mounted packages will be identified in the interface connections (flanges at the borders, junction boxes, field board etc.).

The Packages that have been thoroughly tested at the manufacturers' workshops are subjected to a Mechanical Completion limited to a single general check list (instead of check lists per item of equipment) and tests of safety-related items only. FAT documentation will be duly verified and filed.

In either case, there are no spot or random checks and tests; every item subject to a check and a test will effectively be Mechanical Completed.

The Mechanical Completion activities will be organized by discipline, following an approved sequence that will optimize the start-up phase.

The dossier provides all necessary technical procedures forms and support documents to prepare and carry out Mechanical Completion operations.

15.3.2.1 Checks and Tests

The conformity checks will be performed during the Mechanical Completion phase by means of dedicated discipline "A" Check Sheets, which have to be controlled and endorsed at this stage by commissioning team.

15.3.2.2 Punch List

During the Mechanical Completion checks and tests, all discrepancies, damaged or missing equipment, malfunctions, missing documents, etc. will be recorded in the system punch lists, in case it is not possible to take immediate corrective actions.

These lists will be kept updated during the Mechanical Completion operations, so as to have a precise status of each system at the Ready for Commissioning stage.

The systems punch lists once established at the Ready for Commissioning stage shall be continuously updated during the subsequent commissioning operations, by adding all newly discovered items and deleting cleared ones.

15.3.3 Execution

15.3.3.1 Piping

The test of all the plant lines is an operation done during the Mechanical Completion phase in order to verify the suitability of lines at the pressure conditions indicated in Hydro Test Books and Project Documents to control the welding execution.

These operations will be performed filling the lines with fresh water and venting from the lines highest points.

Pressure is then increased using some alternative pumps, up to the requested values recommended in the lines' specifications. The following components will be subject to interventions:

Valves

Regulating valves will be removed or isolated by blind flanges during tests and lines flushing.

Manual valves may be installed and maintained open or partially open during the tests. Anyway, care will be taken that lines' test pressure does not exceed valves' test pressure.

Pipes instrument components

All the pipe components that could obstruct or be damaged during testing or flushing operations must be removed before all these operations and then re-installed.

These components might be:

- calibration discs (e.g., Flanged Orifice)
- gas turbines or magnetic flow meters,
- Venturi meters

all on-line mounted devices/instruments (if required).

Pipes insulation (if requested)

Pipes will not be insulated before hydraulic or pneumatic tests furthermore welds shall be free and well-visible.

Installation checks

Verify that all equipment are installed (pipe, valves, support,) according P&ID, isometric and support's drawings.

Hydraulic or Pneumatic Test Procedure

Before starting the test, the operator in charge for its execution shall:

- ask to the Test Supervisor the authorization to proceed with the test;
- prepare, for each test circuit, n°1 manometer perfectly calibrated and zero set, and install it on the highest and lower part of the line. Vent System will be provided in highest part of the line and filling point in the lower part. The full-scale manometer cannot exceed 1.5 times its test pressure;
- isolate, by blind flanges/spades, the safety valves, the control valves and actuated valves (if required);
- Fill in the "Inspection before test Report" form.

The pressure test value is indicated on Hydro Test book. Once reached the test pressure, it must be maintained for 1 hour.

Then, together with the COMPANY representative, the following activities will be carried out:

- control of the leakage of flanged connections;
- control and elimination of weld spatters and welding points for the temporary supports.

No additional control of the single line shall be done in the future since possible leakage tests shall be done during the system leak test.

The valves installed on-line are in "open" or "close" position as per Hydro Test book.

At the end of the test, the form "Pressure test report" is filled in and handed over for acceptance to the Client representative.

Clarification About Tests

Drain lines are to be pressure tested full of water while generally vent lines are not tested, if atmospheric line.

Once the test is performed and approved by Client, CONTRACTOR will discharge completely the lines from the fluid, and the lines will be flushed and cleaned.

Once accomplished discharge operations, CONTRACTOR will:

- eliminate blind flanges and temporary supports (if any);
- re-position the definitive gaskets;
- carry out the final tightening of the bolts.

Flushing And Cleaning

flushing and cleaning of the completed equipment will be performed in order to eliminate sand, dust and iron dust.

15.3.3.2 Equipment

General

The equipment Mechanical Completion consists of a general control of all the equipment, in order to verify that the construction complies with the design.

The operations that must be done are the following:

- before closing the final equipment, verify that all the vessels do not contain dusters, tools, nets, parts of pipes or other parts not complying with the design;
- verify that equipment supports are positioned according to the layout drawings;
- verify that equipment are bolted correctly to their supports;
- verify that all instrumentation is correctly connected and in the right position;
- control that all the nameplates of equipment and valves are perfectly readable;
- control that all the regulating and check valves are installed in the right flow direction and free from obstacles;
- control that all the connections with electrical and pneumatic instrumentation are installed;
- check that all the instrumentation is marked with nameplate;
- check that all the instruments, drains, vents and sample points are in the correct position and ready to operate;
- control that pumps and aerator fans rotate freely in the right direction and that all the lubricating and cooling circuits are in place;
- verify that all the blind flanges installed during sectioning are dismantled;
- check that the length of tie rods is correct; tie rods have to jut from the bolts about 2 or 3 threads out;
- control that all the gaskets are correctly installed and replaced when removed;
- control that ratings of valves and fittings correspond to those of the section in which they are mounted.

Final Checks

Once completely cleaned the plant, it is necessary to check it accurately in order to verify if it is ready for start-up.

In particular it is necessary to:

- Check that valves, instruments and calibrated discs removed during cleaning operations, have been reinstalled in the right position.
- Check that blind flanges installed for cycles sectioning during flushing operation have been removed.
- It is suitable to fill previously one list of blind flanges to be installed.
- Check that all equipment internals removed during flushing operations are reinstalled.
- Check the installation of all PSV, one by one, verifying that their lead seal is not damaged.

Machines

As far as the Mechanical Completion of machinery installed in the plant (pumps, generator, etc.) is concerned, it is necessary to refer to Vendors' manuals for a detailed description of the operations to be done.

Anyhow, some checks have to be performed in order to guarantee the compliance with the conditions indicated in the following paragraphs.

Alignment and Coupling

The pump and the motor will be accurately aligned, as per Vendor's instructions, in order to avoid that during the operation of the machine some malfunctions will take place and the equipment joint and internals will quickly wear out.

Once connected all the pipes, before coupling the two half-joints, it is necessary to check again the alignment and:

- Manually rotate the machine shaft before its coupling with the motor in order to verify that it freely rotates.
- Check the motor sense of rotation that shall comply with that indicated by the arrow on the equipment.
- Never rotate the equipment in the opposite direction.
- Then carry out the coupling by connecting the two half-joints.

If the equipment is submitted to high temperatures, check its alignment before the first start-up. Re-align it if necessary.

Suction and Discharge Pipes

Suction and discharge pipes will be correctly connected to the equipment in order to prevent that too high stresses are transmitted to the machine, causing misalignment, overheating of bearings and excessive wear of the components.

Indications for checking before Start-Up

Suction and discharge pipes will be controlled in order to remove possible extraneous particles before the connections.

In case of pumps, a temporary filter must be installed as near as possible to the suction flange to filter out the pumped liquid. The filter will be removed once completely cleaned the line.

It is advisable to install a differential pressure gauge to measure the pressure drop in the filter.

The pump will be immediately stopped and the filter cleaned if the pressure drop exceeds a set value.

A similar check will be done for auxiliary flushing pipes on seals, for cooling and for heat exchangers of relevant circuits.

After these controls it is necessary to:

- accurately clean bearings housings before operating the machine.
- Use a suitable solvent in the housings and clean the hollows. Drain the solvent and dry completely before filling with oil.
- Fill bearings housings with oil up to the indicated level. If the machine is equipped with constant level lubricator, any topping up will be not necessary, since the lubricator is calibrated at the right level.
- Before start-up the machine it is necessary to check the following:
- Half-joints is strictly bolted
- Metering devices and control equipment shall be correctly installed

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- All pipe connections and plugs shall be tightened
- Circulation in external cooling or flushing lines shall be free without obstacles

15.3.3.3 Instrumentation

The purpose of this section is to describe any aspect of Mechanical Completion activities for instruments devices.

Pre-Calibration

Tools pre-calibration will be performed before installing the instruments in order to verify if some instruments have been damaged during transport and if every device works correctly.

Detailed information about the right way for pre-calibration of any instrument are provided in the manufacturers' data sheet.

Test results will be recorded in particular forms for pre-calibration and will be duly signed.

Pressure / PDT instruments

- Settings of pressure gauge will be verified in 5 different increasing/decreasing steps (0-25-50-75-100%) of the field value using pendulum scale.
- Pressure switch will be calibrated as follows: apply an increasing (or decreasing) pressure in order that the switch changes its state, adjust the switch value until it corresponds to the technical data sheet value.
- Analog pressure transmitters and local controls will be verified in 5 different steps (0-25-50-75-100%) of the whole scale applying a right input signal.

Temperature instruments

- Thermometer resistance's will be verified as far as the temperature curve is concerned using the thermostatic method.
- Thermometers (dry-bulb thermometer or thermoelectric thermometer) will be verified in 5 different steps (0-25-50-75-100%) of the whole scale using the thermostatic method.
- Temperature switch will be verified as far as calibration is concerned using the thermostatic method.
- The label code and the length of thermometric sheath will be verified.

Safety Valves

For safety valves with mechanical damage (if any) will be verified only the calibration for the valves; for the other valves shall be verified the conformity calibration with the Vendor certification.

Miscellaneous

The label code, the right positioning, the right flow direction, pipeline diameter and hole diameter of orifice meters will be verified.

Visual Inspection

This kind of activity will be done after the previous calibration checks and the consequent installation of prepared instruments.

Inspections common to all installed devices

- Check condition of equipment, quality of installation, and compliance with project drawings, manufacturers' instructions, safety rules, specification and good practice.
- Verify instruments technical feature against project specification (rate scale, model, etc.)
- Verify all necessary operation in order to guarantee a good instrument work.
- Verify every bracket's full working and the accurate straightness to avoid critical vibrations and verify the correct installation on the brackets as well.
- Verify according to secondary sketch, electrical and pneumatic links that must be completed and correctly installed.

Primary connections

- Verify process device links (primary connection) evaluating position and bracketing.
- Verify the necessary shape of primary connection and the optimal installation (primary links must be as short as possible).
- Verify that instruments are correctly installed, considering process flow direction.

Pressure gauges

- Verify all accessory installed according to project specification (diaphragm, damping valves, etc.)
- Verify, if specified, instrument glycerin level.

Flow devices – Piston meter

- Verify the correct instrument installation with regard to fluid direction and mechanical protections.
- Verify the device rate if corresponding with measure pipe characteristics and project specifications.

Level instruments

- Verify device's mechanical conditions by checking glass, hemp packing, storm choke and safety valves status.
- Verify the instrument's correct orientation in order to be easily readable and accessible for every kind of tools installed (valves, level rate, etc.)
- Verify process connections.
- Verify, if any, the correct installation of lighting and its electrical connections.

Level switch

- Verify the right position and process links
- Verify the easily accessible instrument for any kind of disassembly (floater, electrical connections, etc.)
- Verify floater mobility and that every part used for transportation is removed.

- Verify drain valve installation in the lowest place.

Control and safety valves

- Verify the technical compliance with project specification for every installed valve, in particular model, materials, dimensioning, rating and all accessory requested.
- Verify valve's overall conditions (positioning, actuator, etc.)
- Verify type and condition of packing gland and stuffing box.
- Verify, if any, the correct working of hand operated control and positioning indicator.
- Verify status and positioning of limit switch.
- Verify the valve's correct installation considering fluid direction and keeping into account the arrow shown on device.

Safety valves

- Verify the technical compliance with project specification for every installed valve, in particular model, materials, dimensioning, rating and all accessory requested.
- Verify the right disassembly of valves.

To avoid possible damage, just before the hydraulic test, safety valves will be removed and replaced with blind flanges. These will be removed at the end of hydraulic test and safety valves will be reinstalled.

15.3.3.4 Electric Instrument Circuits Test

Every instrument electrical connection will be submitted to the following tests:

- Connections examination and electrical circuit continuity.

At the end of assembly, for every electrical circuit, the continuity test using an acoustic tester must be done in order to verify the correct connections as per the project specification and to avoid any possible interruptions in the circuit.

Instruments Distribution Air Test

This test will be done once completed the hydraulic test and the blow of main manifold; it proceeds as follows:

- Remove in-line instruments before hydraulic test;
- Blow and test of primary network seal (connection between manifold and barrels distribution);
- Blow and test of secondary network seal (connection between barrels and pneumatic actuators);
- Install sealing fluid where required.

Test procedure of instrument distribution air

- Close all isolating valves on the main manifold.
- Pressurize with air the manifold until the normal work pressure (5-7 Kg/cm2).
- Open head valves and close the needle valves of distribution barrels.

- Open the isolating valve on the main manifold relatively to the network under test.
- Blow network piping and distribution barrel at least 5 minute.
- Close head valve and leave the distribution barrel under pressurization.
- Check out possible leak on the joints using water-soap solution.
- Disconnect the secondary pneumatic connection from the instrument.
- Open the needle valves of distribution barrels and blow the pipe for about 3 minutes.
- Reconnect the secondary network connection to the instrument, wait for the new pressurization and look for possible leak using water-soap solution.
- Test the remaining secondary network connections.

Testing the assembly of instrumentation systems

- Verify for every instrument the whole assembly checking their compliance with project specifications.
- Check the suitable procedure, according to vendors instructions, in order to establish if each standard assembly step has been followed, utilizing the right tools and device.
- Check devices list and testing certificates.
- Make sure that all pieces of equipment provided correspond to project specifications and particularly:
  - Identification label
  - Assembly type and dimensions
  - Technical characteristics
  - Right installation of accessories. (Buttons, wires, interconnection junctions)

15.3.3.5 Electrical System

The purpose of this section is to describe which are the tests and procedures to follow at the end of mechanical construction and once installed electrical network and loads.

Electrical components must be "checked and tested" during plant construction and before start-up.

Verify condition of equipment, quality of installation, and compliance with project drawings, manufacturer instructions, safety rules and refer to the following documents for related to the Electrical System.

Check And Visual Testing

When installations or part of them are mechanically completed, it will be necessary to perform different testing to ensure that every tool and every single component will be installed according to design requirements.

A check list is described as guideline:

- All cable systems must be installed in compliance with cable type and section as indicated in the project.
- Cables must be laid according to project layout including every subdivision.

- Cables must be fixed to cable trays structures and more generally to the supports.
- Cables' terminations must be correctly assembled.
- Both ends must be connected to the right equipment.
- Conductors must be fixed correctly and firmly to terminals as shown in the interconnecting list.
- Cables must have identification labels.
- Cable glands must keep the cables strongly.
- Electric cable trenches (MCT) between walls must be correctly sealed to avoid diffusion of fire, water or gas losses.
- Cable trays shall be provided with the dedicated enclosure if any in the project.
- Pipes joints, boxes, and accessories must be locked.
- Earth connection must be installed according to the project, rightly fixed and protected.
- Metallic sheath and amour's cable must be earthed.
- Every equipotent connection and earth connection for electrical machines, devices, components and structures must comply with the project.
- There must be no direct contact among parts under voltage and earth potential.
- Bus bar bolts in the distribution center must be correctly tightened.
- Devices and particularly automatic circuits breakers and control systems must work correctly from the mechanical point of view; to verify that, automatic switches controls and mechanisms must be actioned.
- A suitable protection against voltage parts contacts must be provided.
- Air ventilation filters must be correctly installed and must not be closed.
- Glasses and lighting protections must not be broken.
- Boxes, cut out box, etc. must be closed correctly and unused holes must be closed.
- Devices, boxes, piping, etc. must be strongly fixed.
- Lighting fixtures must be correctly placed as: operational place, instrumentation, walkways, escape routes.
- Painting must be done and must be functional.
- Battery groups must be installed according to vendor and project's instructions.
- There must not be electrolytic liquid losses and each single element must have integrity.
- For rotating machines check their free revolution.
- Bearings must be lubricated with the correct tube oil.
- Inside rotating machines there must not be extraneous particle as pallets used for their transport.
- All electrical devices (including rotating machines) must have their local labels and must not be damaged.

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Electric Circuits Test

Check continuity of transmission and identification of indication, control and alarm signals. Every instrument electrical connection will be submitted to the following tests:

- Connections examination and electrical circuit continuity.
- Insulation wires test

At the end of assembly, for every electrical circuit, the continuity test using an acoustic tester must be done in order to verify the correct connections as per the project specification and to avoid any possible interruptions in the circuit.

After continuity test, the insulation among wires must be verified, standard procedure will be done between a cable under test and the other(s) cable(s) earth connected with armor, if any.

Insulation test will be made applying a voltage test level (500 or 1000 V according cable operating voltage) with a "merger" between conductor and earth pin verifying the insulating resistance for at least a minute.

Insulation values smaller than 1 or 10 Mohm should be considered not enough.

Be careful to disconnect the electrical circuit from measure device or any other equipment (excluding the junction boxes) before starting the test.

15.3.3.6 Telecommunication System

The scope of this description is to explain which the various tests and inspections are to perform at the end of telecommunications system installation.

There will be an equipment inspection and testing during installation and/or before start-up in order to verify the compliance of the installation with project drawings, regulations and safety codes.

Radio Link System

An accurate setting up will be tested through the cable connections checks.

15.4 COMMISSIONING

Pre-Commissioning and Commissioning will be performed according to the systems and subsystems identified during the course of the Project.

Commissioning will be carried out in the fabrication yard prior to load out and after the systems are Mechanically Completed. Commissioning activities will be completed to the maximum extent possible during the onshore phase of the WORK by using temporaries where necessary to simulate a level and interface.

15.4.1 Commissioning Documentation

General

Onshore necessary documentation will be prepared and submitted for Company approval.

The documentation produced will be:

- Pre-commissioning and Commissioning Plan
- Pre-commissioning and commissioning organisation chart
- Marked up P&ID and Keys documents with the limits identification by subsystem and system.(this documents will be use also for the MC)
- Man power organization chart for Pre-comm. And Commissioning
- Platform hand over procedure
- Commissioning Procedures by systems
- Energization Procedure
- LOTO Procedure

The Precommissioning/Commissioning documentations will be placed in dedicate dossier files, one for each system.

The following guidelines will be used for all documentation:

- X a cross (X) shall be written in all check windows when the checks/tests have been performed and accepted by the Company's Representative.
- R shall be written in all check windows if the check/tests are not acceptable, and the reason shall be given in the attached comments sheet or at foot page.

The check windows shall be left blank if the check/inspections have not been made.

All the documents shall be prepared only in one copy "original".

On completion of each inspection, the stage reached shall be indicated on the Mechanical Completion /Pre-Commissioning/Commissioning Database, thereby making all personnel aware of the current status of any installation. This is an ongoing exercise until individual System or Sub-system are Ready for Start Up.

During both Commissioning all inspection and test results will be recorded on the appropriate Check Sheets and Test Sheets; inspection and test record sheets shall be prepared by the CONTRACTOR and approved by the Company and Third Party.

All Check Sheet will be signed by an authorised representative of the CONTRACTOR and by the COMPANY and Third Party site representative.

Dossier

A set of dossiers for the Precommissioning and Commissioning of all the Systems/Subsystems will be prepared; in particular the following information shall be generally covered:

- Interim SYSTEM Acceptance Certificate
- PRE-COMMISSIONING Completion Certificates
- Dynamic COMMISSIONING Certificate
- PRE-COMMISSIONING Status Index

- SYSTEM Limit drawings
- Signed COMMISSIONING Procedure
- Red line mark ups
- Temporary Links Status Register
- Software Change Records / Copy of Software
- Outstanding PUNCH LIST
- Associated SUBCONTRACTOR Reports
- Associated Engineering Queries
- Associated Correspondence
- Associated Correspondence

Documentation Issued during the Activities

During the activities of the various phases, the following documents shall be issued:

- progress report of the works, issued weekly or biweekly;
- review report concerning the correct execution of the activities;
- feedback reports, in order to highlight notable and significant situations;
- documentation for the competent Law Authorities if necessary;
- certificate of the analysis on the taken samples.

15.4.2 HSE Requirements

Commissioning Engineers will ensure that all necessary safety precautions are being taken and will ensure that all work is carried out in accordance with the project Permit to Work procedure.

Reference will be made to HSE Plan for Commissioning Document.

Onshore & Offshore commissioning activities will be carried out under a Permit to work system.

System commissioning procedures will detail any specific safety requirements for the system or sub-system under test, and these will be complied with at all times in addition to other project safety codes or standards.

All systems, sub-systems or equipment items which are undergoing commissioning will be labelled using an adhesive label on equipment items, or continuous tape on piping with the words "SYSTEM LIVE COMMISSIONING" clearly printed.

Subsequent to appendix of this label, no person other than the authorized ones shall work on the system or equipment without prior authorisation of the Commissioning Manager.

Temporary fire-fighting and safety procedure will be fully complied with during commissioning until the permanent platform systems are available.

15.4.3 Commissioning Activities

Commissioning preliminary Activities

The work to be carried out on the Equipment of the System consists of verification and checks, provided the following activities being carried out before commencement of commissioning:

- Verify that the final inspections and checks of relevant equipment /packages have been carried out in line with Vendor requirements
- Verify that the System has no outstanding construction or pre-commissioning activities.
- Verify that All "A" punch list items have been cleared.
- Verify that all Electrical and Instruments MC activities related to the System have been completed and signed off.
- All A & B check sheets closed with acceptable Punch List items outstanding.
- Safety devices are functional.
- All equipment has successfully undergone all relevant F.A.T. & S:A:T
- All equipment is ready for start-up
- The RFCC certificate must be filled and signed by Comm. Manager & Company representative

Commissioning

Commissioning is the integrated phase where tests are undertaken to demonstrate the correct and safe operation of a system or individual component identified and classified as a Commissioning Sub-System.

The main objective for these tests is to ensure consistency between engineering, procurement and construction and to verify that these equipment/packages are fulfilling the operational requirements.

Where complex control or interlock systems are used, will be demonstrate compliance with the design requirements using specific functional check-lists and system logic diagrams.

Energization of electrical equipment/systems will be done so under the strict control of the "Permit to Work" system that will be in operation on the Plant.

Commissioning Activities

The activities to be carried out during commissioning will be detailed inside assigned commissioning procedures.

The commissioning procedures will be issued for each unit/system/sub-system and will also identify the need of the Vendor supervision and the links between associated systems.

The interactions between the sub-systems within the commissioning network will be identified in each commissioning procedures. The Commissioning Schedule will identify priorities, sequences and schedules of the whole commissioning activity.

For each commissioning procedures will be provided set of Commissioning Check Sheet that will be utilised to certify the tests required by the commissioning procedures.

15.4.4 Commissioning Handover

To document that the Commissioning scope has been carried out, the Commissioning Manager will issue the System Commissioning Completion Certificate (SCCC) Acceptance and endorsement for all the commissioning packages pertaining to a system imply that the system can be handed over.

Handover to COMPANY will be at unit/system level with a definite System Handover Certificate.

16 WEIGHING

EPCI CONTRACTOR for BLPH will operate a Weight Control program throughout the Project duration and will provide a continuously updated best estimate of the dry, operational, lift and load out weights (net & gross) and centers of gravity. The Weight Control will be in accordance with ISO-19901-5, Class A.

The BLPH TP and Topside will be physically weighed to verify the calculated weight and location of the Centre of Gravity. The weighing will be carried out within 7 days before the load out and with less than 1% of the total weight of temporaries.

EPCI CONTRACTOR selects the most suitable weighing configuration and quantities of equipment based on the following:

- Predicted Weight and Predicted Centre of Gravity;
- Number of Weighing Points/Calculated Max reaction loads related to:
  - Bearing Capacity of the ground/foundations under each weighing point;
  - Structural capacity of the Jack Support stools/bearing points;
  - Both local and global Structural integrity at each reaction point.
- Installation Clearance;
- Overall Size (for hose and cable lengths);
- Support Point Details;
- Shim and Packaging.

Jacking equipment and load cells will be sized to ensure that all lifting and measuring equipment is operating within the range of 20-80 % of its rated capacity. The system as a whole is accurate to within +/- 0.5 % over its full Working range. All equipment to be used in the weighing operation will be calibrated and certified within one month of the proposed weighing date.

All equipment will be function tested and where pressure testing is required, pressure test and related Pressure Test Certificates will be issued.

17 LOAD OUT, GRILLAGE AND SEA FASTENING

The load out method, considered by EPCI CONTRACTOR, considers the use of Self-Propelled Multi-wheel Trailers (SPMTs).

Load out will be carried out in accordance with the Load Out procedure developed during the Project execution, after its approval by Company and MWS and operations shall be carried out according to the following sequence:

- No. 1 dedicated approx. 300' barge will be made available by T&I Contractor at EPCI CONTRACTOR YPB, Italy for Topsides, TP and caissons.

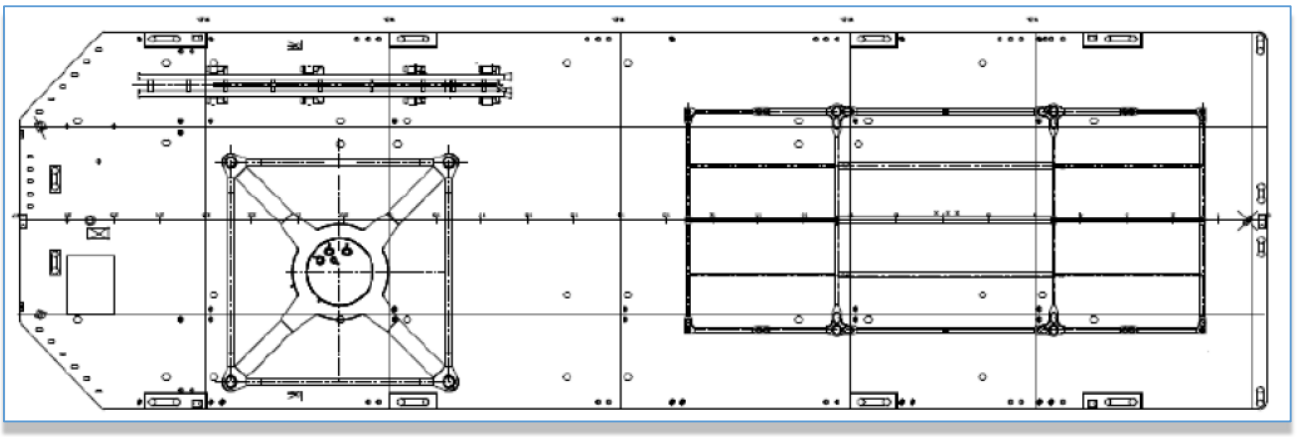


Figure 22 - Layout on Standard barge

EPCI CONTRACTOR will perform the following activities:

- load out engineering activities such as:
  - the detail design of load out grillage and barge grillage;
  - the detail design of sea-fastening.
- detail design of yard movement;
- the design of load out sequence;
- grillage and sea-fastening prefabrication and erection.

The load out methods will be described in the Load Out procedures that will be issued during the Project execution phase.

Here below a brief description of the main operations:

- Barges, once arrived, will be moored along the quay;
- Before the load out execution, lower grillage will be installed on barges;
- The day before load out execution the dedicated barge will be moored perpendicular to quay along the selected load out ways;

- The Topside will be loaded onto transport trailers by jacking up trailer platform, using the hydraulic stroke of same trailers;
- Barge will be rotated back parallel to quay after the completion of minimum SF of topside
- TP will be loaded out by SPMTs or Crawler crane.

In detail the loading sequence will be the following:

- SPMT units will be transferred from their assembling area to the Platform erection area;
- Loading of Platform will start only after MWS authorization;
- SPMT units will be manoeuvered into position beneath the support point and will be positioned according to the transportation arrangement drawings to ensure accurate positioning. Make sure that trailers are hydraulically connected in the right way so that stability is grant and no overstress is induced in the steel structure of the Deck;
- SPMT units will be gradually elevated to take the load by raising the SPMT's stroke till they are in contact with the bottom of the Jacket or Topside upper grillage. Shim with plywood as required to have full contact between SPMT's and the contact point;
- Continuously check that the pressure in the hydraulic circuits is in agreement with the predicted values;
- Check that the Deck structure has no abnormal deflections;
- Another careful check will be made on the pressure of the hydraulic supporting groups and the level of the platform, before starting the lifting operation;
- Lifting of the Deck, by hydraulic stroke of trailer, up to suitable height in order to prepare the transport manoeuvre;
- Check if the SPMT spine beam deflection is in accordance with the predicted calculation;
- Lashing material will be installed;
- Yard movements.

The heavy transport operations shall be executed under the supervision of the Construction Manager, according to the transport drawings and Method Statement "approved for execution".

The Transport Superintendent will be constantly monitoring the operations for conformity with information elaborated during the engineering phase.

The Construction manager and Transportation Superintendent will be in contact by radio with the SPMT operators to instruct them during the operation.

Load-out

The Load-out commences after the barge has been ballasted to the required draft. The barge will be moored with stern to quay side. When the barge mooring will be ready the barge bridge plates will be installed.

In charge of the load-out will be the Construction Manager who will be in constant radio contact with the barge load-out engineer and Transportation Superintendent. Construction Manager /Transportation

Superintendent will be in constant radio contact with the experienced SPMT Operators who will steer and adjust SPMT height/elevation.

The barge moorings will be continuously checked by visually inspection reading the line tension in load cells.

The SPMT's will pause in line with the flow rate of the ballast pumps to maintain the barge level aligned with the quay during all stages of the transfer operation.

Platform lowering phase:

The unloading operation for Platform will start after the convoy will be in final position in accordance with stowage plan. The Platform will be finally seated onto lower grillage by jacking down trailer platform, using their hydraulic stroke.

Unloading operation will be done to remove SPMT.

At the same time the installation of the sea-fastening will start and before rotating the barge, a certain amount of sea-fastening is required to be welded.

The barge will be rotated to arrange it parallel to quay and mooring will be carried out. Final sea-fastening installation and ballasting for transport will be carried out.

Examples of loadout performed by means of SPMTs are given in the following figures.



Figure 23 - Topside Loadout with SPMT



Figure 24 - Loadout onto the barge perpendicular to quay

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18 TRANSPORTATION AND INSTALLATION

Transportation of BLPH components (topside, TP and caissons) will be performed by CONTRACTOR's appointed subcontractor, under CONTRACTOR's responsibility.

The mooring operation of the transportation barge will be performed under transportation Contractor responsibility, agreed with installation CONTRACTOR.

Installation of the BLPH platform TP, Caissons and Topside shall be carried out by EPCI CONTRACTOR's appointed subCONTRACTOR (DEME Offshore).

18.1 TRANSPORTATION PHASE

Prior to sail-away the Tow Master shall agree with COMPANY, MWS and local Pilot a departure procedure showing any tidal/depth limitations alongside the berth or in the channel and connection sequence for the harbor tugs.

Once the tow is in suitable area the main tug will be attached, the harbor tugs will be disconnected, the emergency tow line deployed and the tow to the installation site will commence.

The actual routing will be determined by the Tow Master during the transport based on theoretical route, cargo configuration, work schedule, local weather conditions and long-range weather forecasts.

The towing of the cargo barge is planned to be weather restricted tow. In the event of a forecast for weather conditions which are likely to endanger the transport, safe locations will be sought.



Figure 25 - Transportation route PBY Yard – Offshore Site

18.2 HLV ANCHORING IN THE FIELD

Upon given the green light from CLIENT to enter the field, the (I) subcontractor will perform the mooring of HLV. Mooring plan will be designed to allow both the pick-up of TP, caissons and Topside from transportation barge and the installation over the pre-installed foundation.

HLV will arrive near the works location after voyage. The Company Representative on board of the HLV has to give his approval for entering the field. Prior to anchoring, a suitable weather window needs to be available for the duration of the anchoring operation.

If, for some reason, the conditions as mentioned above cannot be fulfilled, HLV will not enter the field and stay in idle mode at a safe distance.

The principle mooring arrangement for HLV is a 4-point anchor pattern consisting of two stern anchors and two bow anchors. The anchor positions from the prepared anchor plans will be inserted in the DGPS navigation system on board of HLV and will be shown on the navigation computer screens at the bridge. The AHT will deck and secure the anchors during paying out operation.

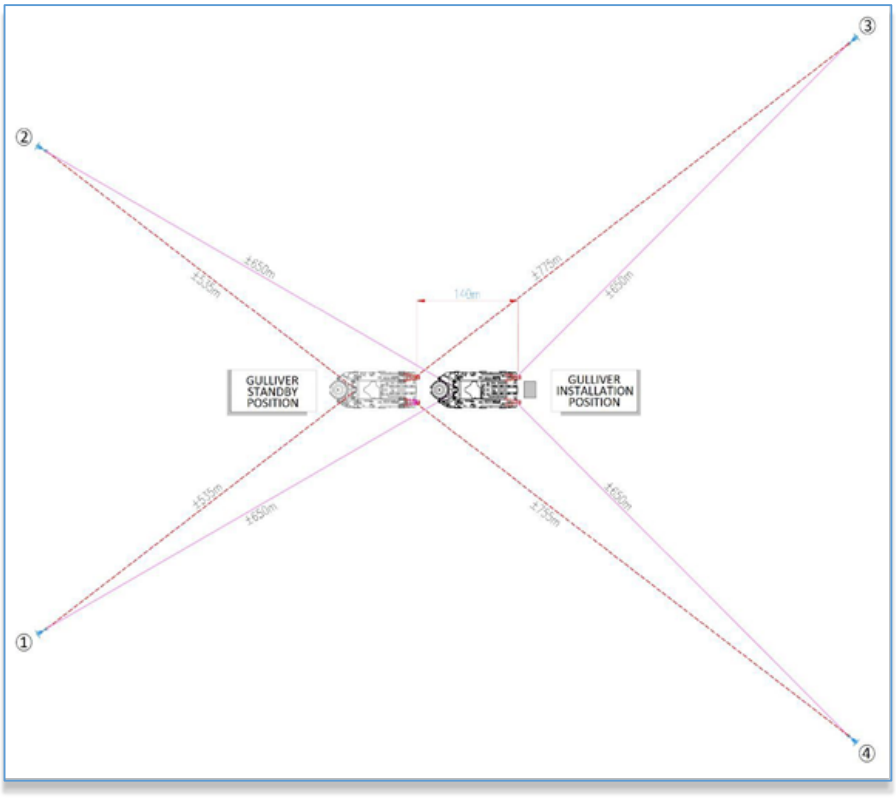


Figure 26 - HLV Anchor layout

18.3 PRE-INSTALLATION SURVEY

(I) Subcontractor will equip the HLV with a survey spread comprising ROV with video and sector scan sonar to identify debris.

(I) Subcontractor will perform a pre-installation ROV seabed survey from the HLV to visually check for the presence of debris or other obstructions that may hinder the installation, once the HLV has moved into the working position.

The pre-installation seabed survey will cover an area of the topside footprint and up to fifteen metres (15m) around it.

(I) Subcontractor will provide the ROV survey report as a preliminary full video to the EPC Contractor and Customer Representative within twenty-four (24) hours after completion of the survey and a final report within seven (7) working days.

18.4 INSTALLATION SEQUENCE

The BLPH consist of:

- A Monopile foundation including boat landing structure (installed by Van Oord Offshore Wind).
- One Transitions piece.
- Caisson structure containing:
  - 2x seawater lift caissons
  - 1x brine water disposal caisson
- Topside

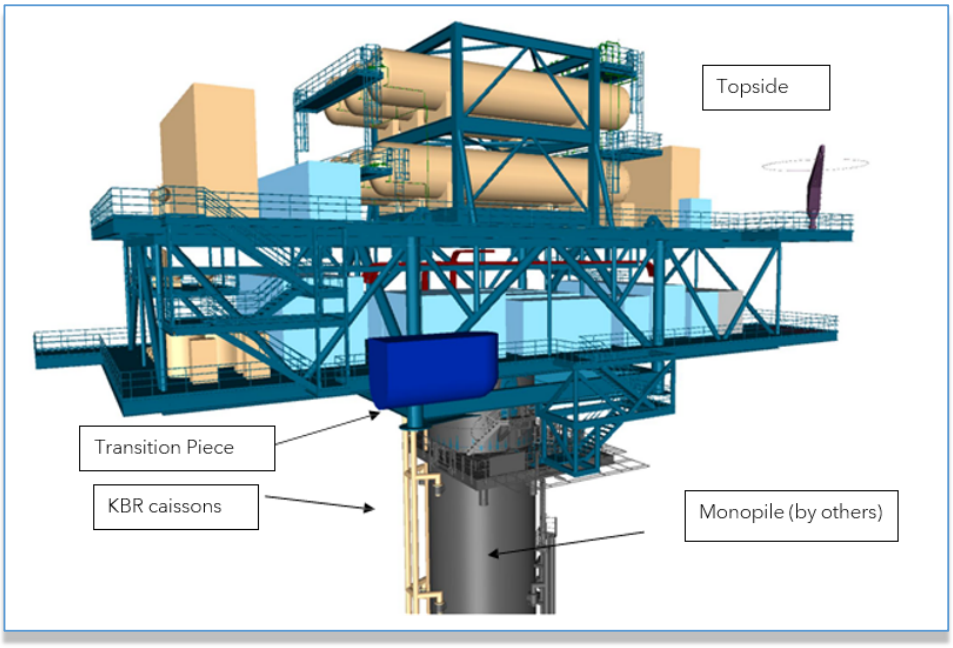


Figure 27 - BLPH Platform

Weight summary BLPH:

Monopile

Monopile including boat landing and upper work platform installed by Van Oord Offshore Wind (VOOW). Interface frozen.	
Topside	
NTE weight	2 400 tonnes
Current dry weight estimate (gross)	1 711 tonnes
TP	
Gross weight	260 tonnes
Caisson structure	
Estimated weight	25 tonnes

Table 11 - BLPH Weight summary

18.5 MOORING OF TRANSPORTATION BARGE TO HLV

The cargo barge will be moored to the stern of HLV allowing it to carry out the heavy lift operations. A minimum of three Contractor's riggers will be transferred to the barge to connect the HLV stern mooring wires.

The transfer of riggers will be done in accordance with the Contractor personnel transfer procedure. The riggers have VHF radios for communicating with the HLV bridge and tugs.

The cargo barge is towed by her towing tug. The HLV's AHT will connect to the stern of the cargo barge to assist as a steering tug. The towing tug will be the lead tug in the mooring operation.

The two tugs will slowly direct the cargo barge to the stern of the HLV.

During approach and connection of the cargo barge, the stern anchor wires of HLV will be slacked completely while she keeps station on a combination of her bow anchors and the four thrusters. A watchman will monitor that the wire is kept slack at all time during the mooring operations. The mooring wires may be tensioned after mooring of the barge and as soon as the tugs are clear of them.

The HLV stern is equipped with welded on heavy duty steel fendering and specialized removable fender panels. These panels are designed to allow mooring of barges alongside at sea. As soon as the barge is completely moored in front of the HLV, the tugs will slack their towing lines and connect temporarily to each side of the HLV or keep station with slack towing lines on safe distance of the cargo barge. The tugs remain connected during rigging connection and lifting operations.

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Figure 28 - Cargo barge moored to HLV, as example

After the load is lifted free of her grillages and other items on the cargo barge, the riggers on board the barge disconnect the wires between HLV and barge and the tugs tow away the cargo barge to a safe distance. The HLV's AHT will be disconnected from the barge and takes the Contractor's riggers off the cargo barge for transfer back to the HLV.

18.6 TP INSTALLATION SEQUENCE & BOLTING TO LOWER FLANGE

The load will be lifted up while lifting supervisor and deck foreman monitor clearance. Once sufficient height including clearance has been reached HLV will move into position for installation on her anchors, with the load suspended from her cranes.

TP will be lift off from cargo barge at first, then HLV will be moved in installation position by maneuvering the mooring lines.

TP will be lifted with slings in single hook configuration.

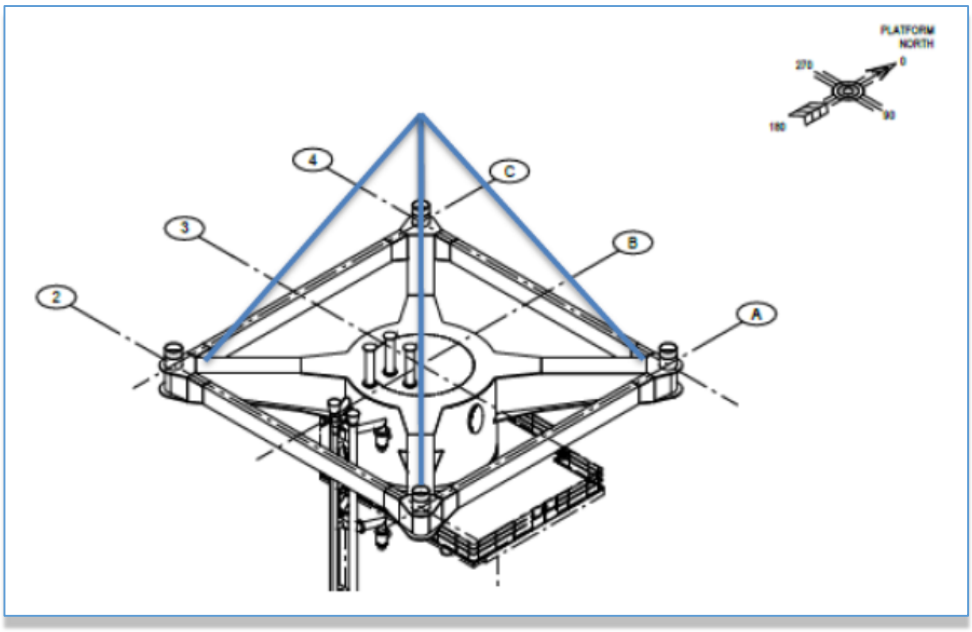


Figure 29- TP's rigging scheme

TP will be equipped with primary and secondary stabbing guides to assist during positioning and orientation. The proposed guides must be cross-checked and defined after the offshore survey on monopile (MP).

Once the load is positioned above the substructure it will be slowly lowered and guided towards its supports onto the substructure. A primary and secondary stabbing guide will need to make sure a correct position will be obtained in a constantly lowering process. The load will be lowered until set down has been reached.

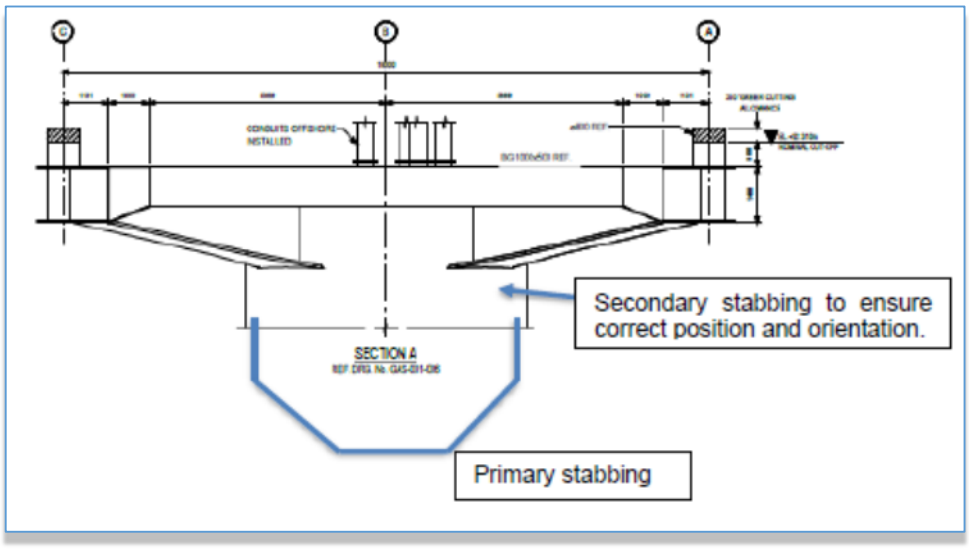


Figure 30 - TP' stabbing guide

After the positioning and alignment, the Offshore team will proceed with the bolting connection of TP to MP.

Contractor will investigate the possibility to pre-install on TP flange all the bolts, to save time offshore.

Contractor riggers will be transferred as per personnel transfer procedure and will disconnect the rigging in accordance with the prepared rigging disconnecting plan. During the disconnecting procedure, clearances between rigging and load's structure can be made possible by using the crane auxiliary hoists or deck crawler crane. Once all slings have been released, the rigging is lifted free from the load and the Gulliver cranes are boomed up to remove the rigging configuration.

18.7 CAISSONS INSTALLATION SEQUENCE

The sequence is repeated for Caissons.

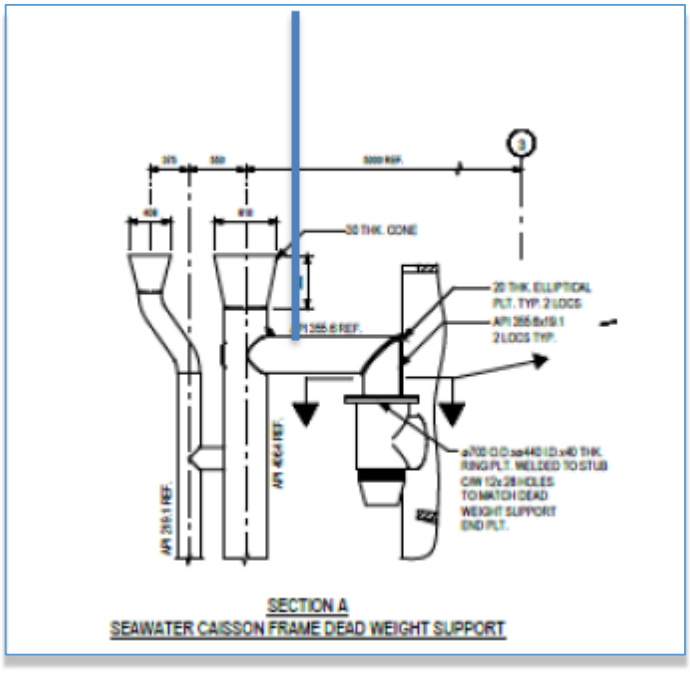


Figure 31 - Caissons proposed lift points

The MP is already equipped with sleeves, primary and secondary stabbing guides as well as controlling lines are foreseen for the caissons installations.

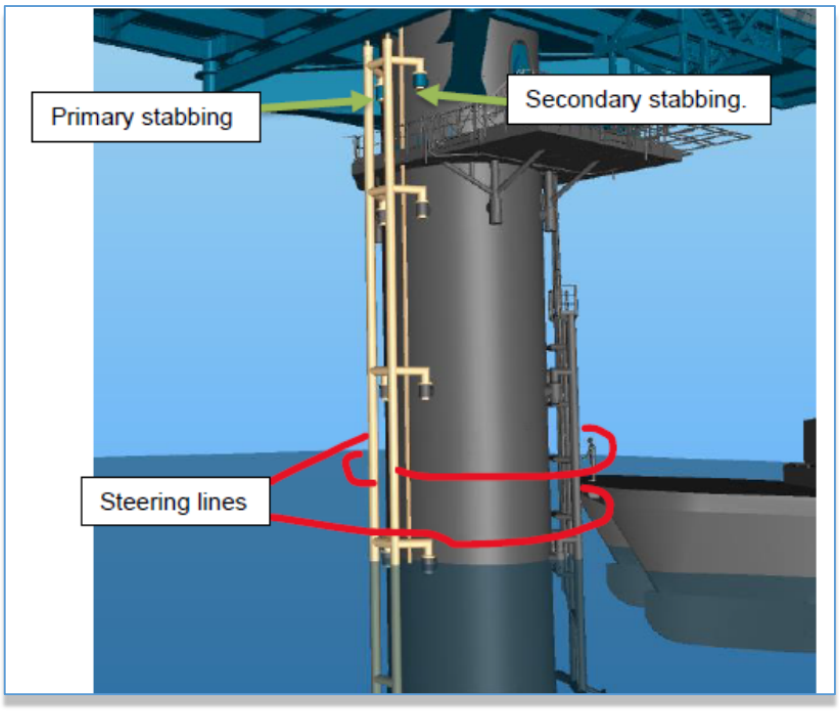


Figure 32 - Caissons installation

18.8 TOPSIDE INSTALLATION SEQUENCE & WELDING TO TP LEGS

The topside follows the same steps presented above, HLV will make use of its lifting beam in a dual crane lift configuration.

Primary and secondary stabbing with minimum difference in length of 0,5m will equip the deck 4 legs. Concept as shown below.

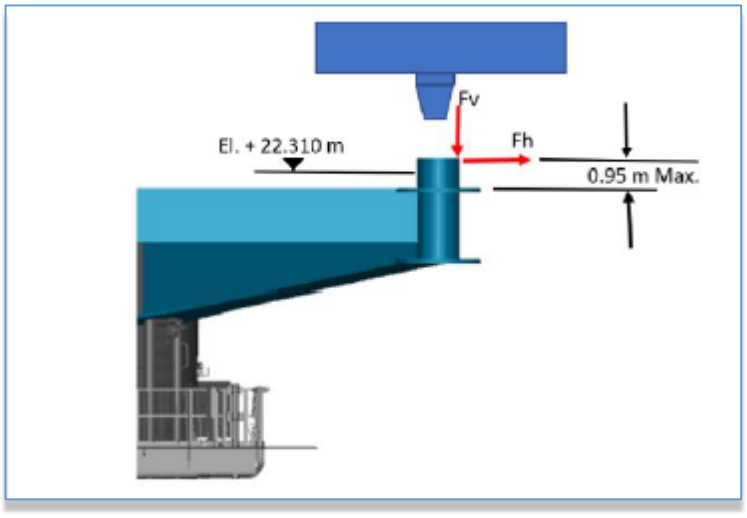


Figure 33 - Topside installation

18.9 ENVIRONMENTAL CONDITIONS

The entire lifting operation is weather sensitive. Maximum care will be taken to monitoring the actual weather and weather forecast and anticipating on these.

Before lifting the load from the cargo barge and positioning it on the substructure, a suitable weather window should be available. The final decision whether to continue with an off-shore lifting operation will be taken in a "go no-go" meeting which is held on board of the HLV with all involved parties (Contractor, HLV Captain, MWS, Company).

If no suitable installation window is available, a meeting will be held on board to decide to stay in the field or seeks shelter.

Should at any point during the operations the weather deteriorate, the parties shall discuss and agree on steps to be taken and/or reverse the operations as done so far. In the unlikely event the weather deteriorates during the lifting phase, with the load suspended, the Gulliver will move away from the installation position.

18.10CONTINGENCIES

A risk assessments for all operations will be prepared prior to offshore operations. Refer below to the list of risks considered most important.

Anchor line or propulsion failure

In case one of the Anchor wires fails, the HLV thrusters will be on standby during the entire operation. They will be running stationary, but if needed they can be used.

All four HLV thrusters are independently controlled, therefore the chance of a complete propulsion failure is minimized. In case one of the thrusters fails, the HLV can still manoeuvre with the three remaining thrusters. Also the HLV AHT will be on standby nearby at all-time during operations, in case of emergency.

Ballast pump failure

HLV has two independent ballast pumps on board, one for the SB tanks and one for the PS tanks. In case one of the pumps fail, the second one can be used to fill the remaining tanks

Power failure

HLV has three independent generators on board. Operations can proceed with one generator less but at a reduced speed. In case of a power failure, HLV hoisting winches are equipped with a fail-safe system, the winches will be blocked automatically and load will stay in the same position.

Unforeseen events

In the event operations have to stop due to unforeseen events, following measures may be agreed:

- Waiting until the reason for suspension is taken away.
- Place Topside back onto the supports
- HLV leaves field.

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19 OFFSHORE HOOK-UP WORKS

CONTRACTOR scope encompasses the completion of the remaining items to be installed offshore (including Structural, Piping, Electrical and Instrument (E&I), Telecom, Safety, Integrated Control and Safety System) with the related commissioning.

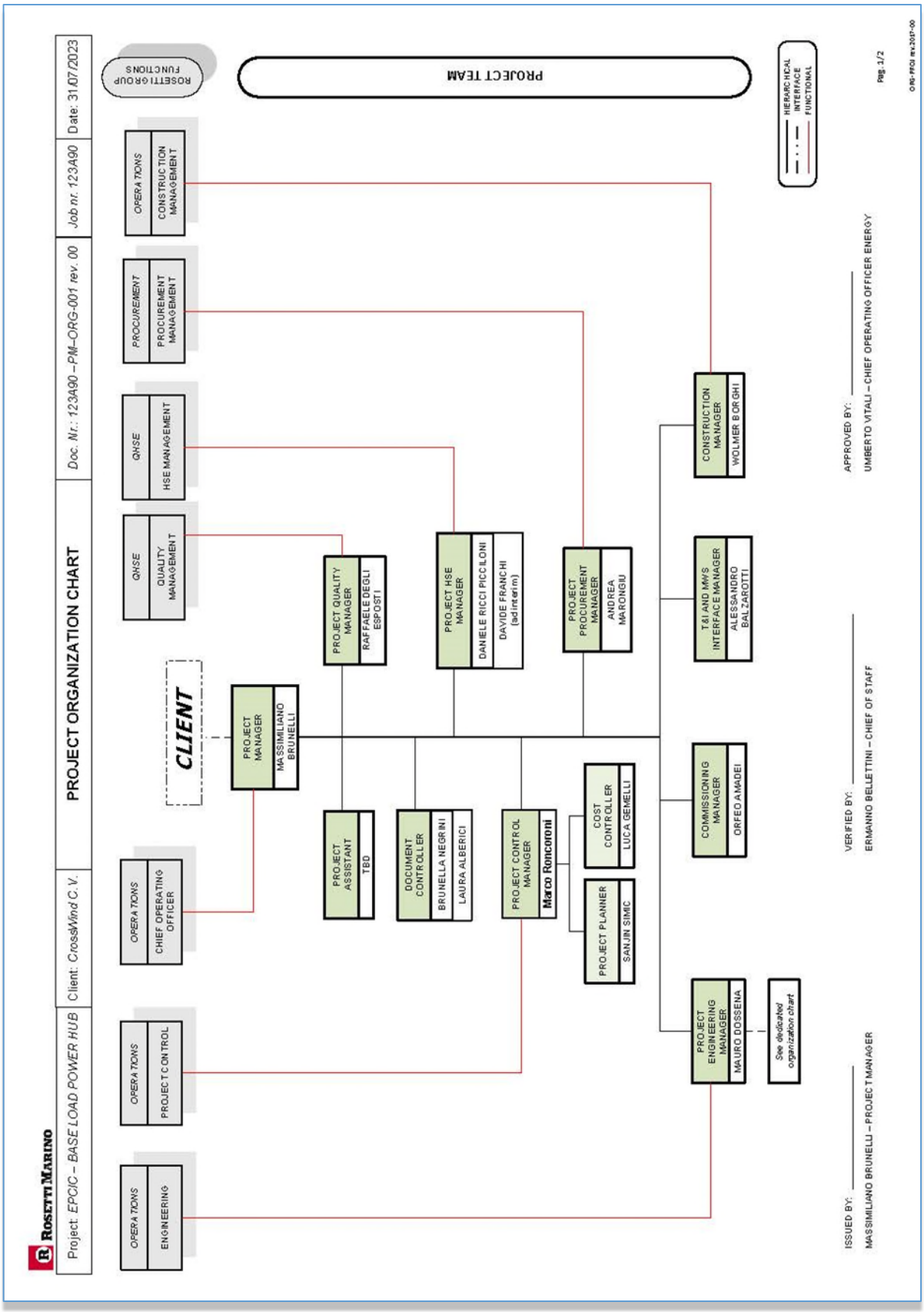
CONTRACTOR has considered a preliminary sequence which covers the offshore hook-up and testing works.

- Provide a walk to work vessel for personnel (flotel and lodging offshore are not foreseen);
- Removal of all temporary structures and appurtenances (e.g., Internal Seafastening);
- Completion of structural works on both Topside and Transition Piece;
- Completion of E&I activities;
- Completion of the Remaining Commissioning activities;
- Completion of the Handover of all systems.

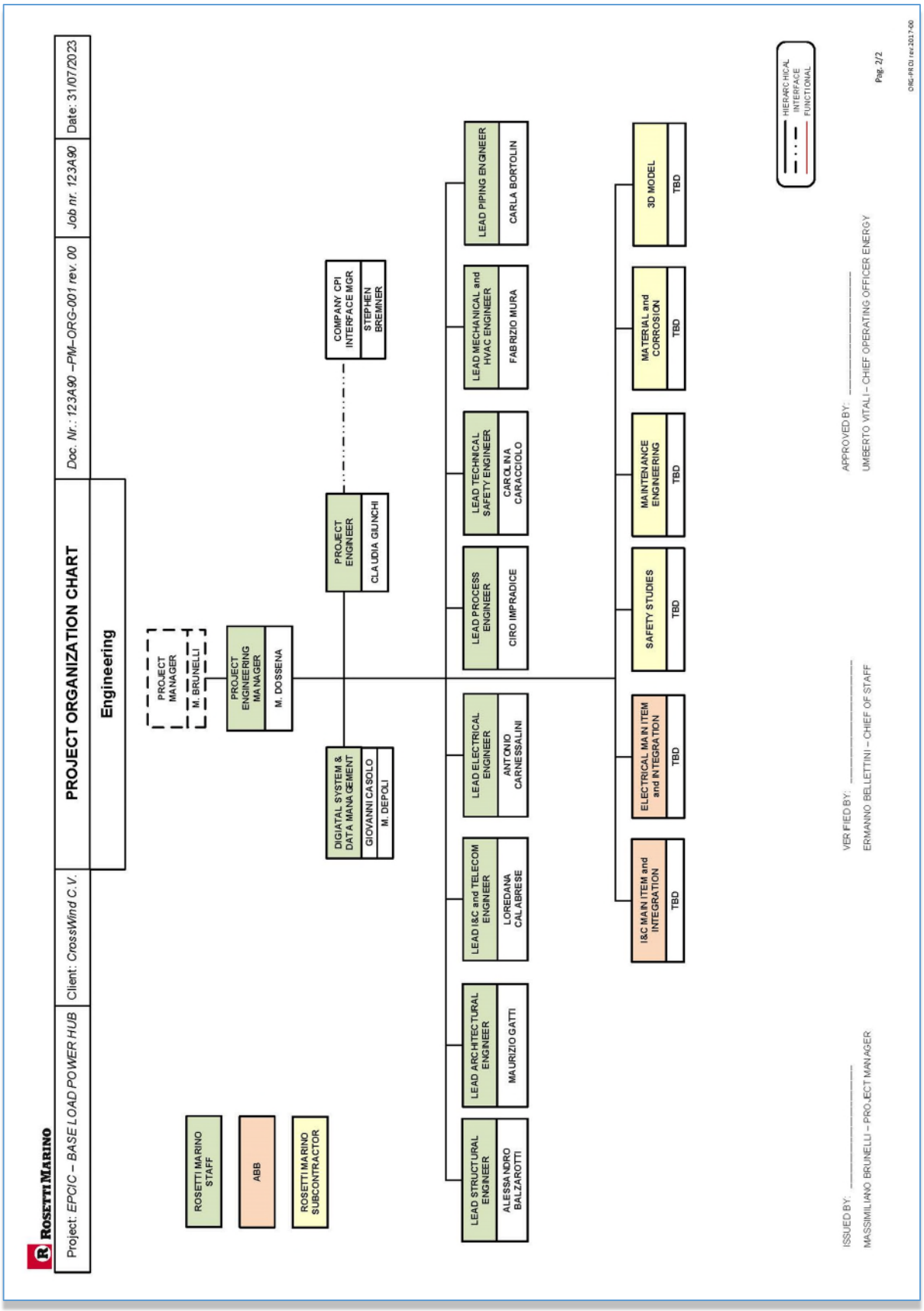
Schedule and dedicated method statement will be developed and issued at a later stage.

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20 APPENDIX 1 – PRELIMINARY ORGANISATION CHART



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ROSETTI MARINO
Project: EPCIC – BASE LOAD POWER HUB
Client: CrossWind C.V.
PROJECT ORGANIZATION CHART
Doc. Nr.: 123A90 –PM–ORG-001 rev. 00
Job nr. 123A90
Date: 31/07/2023
Engineering
PROJECT MANAGER
M. BRUNELLI
PROJECT ENGINEERING MANAGER
M. DOSSENA
COMPANY CPI INTERFACE MGR
STEPHEN BREMNER
PROJECT ENGINEER
CLAUDIA GIUNCHI
DIGIATAL SYSTEM & DATA MANAGEMENT
GIOVANNI CASOLO
M. DEPOLI
LEAD PIPING ENGINEER
CARLA BORTOLIN
LEAD MECHANICAL and HVAC ENGINEER
FABRIZIO MURA
LEAD TECHNICAL SAFETY ENGINEER
CAROLINA CARACCIOLO
LEAD PROCESS ENGINEER
CIRO IMPRADICE
LEAD ELECTRICAL ENGINEER
ANTONIO CARNESSALINI
LEAD I&C and TELECOM ENGINEER
LOREDANA CALABRESE
LEAD ARCHITECTURAL ENGINEER
MAURIZIO GATTI
LEAD STRUCTURAL ENGINEER
ALESSANDRO BALZAROTTI
3D MODEL
TBD
MATERIAL and CORROSION
TBD
MAINTENANCE ENGINEERING
TBD
SAFETY STUDIES
TBD
ELECTRICAL MAIN ITEM and INTEGRATION
TBD
I&C MAIN ITEM and INTEGRATION
TBD
ROSETTI MARINO STAFF
ABB
ROSETTI MARINO SUBCONTRACTOR
HIERARCHICAL
INTERFACE
FUNCTIONAL
ISSUED BY:
MASSIMILIANO BRUNELLI – PROJECT MANAGER
VERIFIED BY:
ERMANNO BELLETTINI – CHIEF OF STAFF
APPROVED BY:
UMBERTO VITALI – CHIEF OPERATING OFFICER ENERGY
Pag. 2/2
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21 APPENDIX 2 – PROJECT CALENDAR

Project Calendar
HOLLANDSE KUST NOORD WIND PARK Project
Contract No. CW-I-WP4-2023-05

2023

JANUARY							
CW	PW	M	T	W	T	F	S	S
52								01
1		02	03	04	05	06	07	08
2		09	10	11	12	13	14	15
3		16	17	18	19	20	21	22
4		23	24	25	26	27	28	29
5		30	31					

FEBRUARY							
CW	PW	M	T	W	T	F	S	S
5				01	02	03	04	05
6		06	07	08	09	10	11	12
7		13	14	15	16	17	18	19
8		20	21	22	23	24	25	26
9		27	28					

MARCH							
CW	PW	M	T	W	T	F	S	S
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10		06	07	08	09	10	11	12
11		13	14	15	16	17	18	19
12		20	21	22	23	24	25	26
13		27	28	29	30	31		

APRIL							
CW	PW	M	T	W	T	F	S	S
13							01	02
14		03	04	05	06	07	08	09
15		10	11	12	13	14	15	16
16		17	18	19	20	21	22	23
17		24	25	26	27	28	29	30

MAY							
CW	PW	M	T	W	T	F	S	S
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19		08	09	10	11	12	13	14
20		15	16	17	18	19	20	21
21		22	23	24	25	26	27	28
22		29	30	31				

JUNE							
CW	PW	M	T	W	T	F	S	S
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24		12	13	14	15	16	17	18
25		19	20	21	22	23	24	25
26		26	27	28	29	30		

JULY							
CW	PW	M	T	W	T	F	S	S
26							01	02
27		03	04	05	06	07	08	09
28	1	10	11	12	13	14	15	16
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31	4	31						

AUGUST							
CW	PW	M	T	W	T	F	S	S
31	4		01	02	03	04	05	06
32	5	07	08	09	10	11	12	13
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34	7	21	22	23	24	25	26	27
35	8	28	29	30	31			

SEPTEMBER							
CW	PW	M	T	W	T	F	S	S
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36	9	04	05	06	07	08	09	10
37	10	11	12	13	14	15	16	17
38	11	18	19	20	21	22	23	24
39	12	25	26	27	28	29	30	

OCTOBER							
CW	PW	M	T	W	T	F	S	S
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44	18	30	31					

NOVEMBER							
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46	20	13	14	15	16	17	18	19
47	21	20	21	22	23	24	25	26
48	22	27	28	29	30			

DECEMBER							
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50	24	11	12	13	14	15	16	17
51	25	18	19	20	21	22	23	24
52	26	25	26	27	28	29	30	31

LEGENDA:

	Effective Date
	Kick off Meeting
	Project Weekly Meeting
	Monthly Project Management Report cut off date
	Deadline for issue of Monthly Project Management Report report
	Weekly Report cut off date
	Deadline for issue of Weekly Report
	Reporting and meeting suspended due to Holiday Period

CW **Calendar Week**
PW **Project Week**

Figure 34 - Project Calendar 2023

Project Calendar

HOLLANDSE KUST NOORD WIND PARK Project

Contract No. CW-I-WP4-2023-05

2024

JANUARY

CW	PW	M	T	W	T	F	S	S
1	27	01	02	03	04	05	06	07
2	28	08	09	10	11	12	13	14
3	29	15	16	17	18	19	20	21
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FEBRUARY

CW	PW	M	T	W	T	F	S	S
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MARCH

CW	PW	M	T	W	T	F	S	S
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10	36	04	05	06	07	08	09	10
11	37	11	12	13	14	15	16	17
12	38	18	19	20	21	22	23	24
13	39	25	26	27	28	29	30	31

APRIL

CW	PW	M	T	W	T	F	S	S
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18	44	29	30					

MAY

CW	PW	M	T	W	T	F	S	S
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19	45	06	07	08	09	10	11	12
20	46	13	14	15	16	17	18	19
21	47	20	21	22	23	24	25	26
22	48	27	28	29	30	31		

JUNE

CW	PW	M	T	W	T	F	S	S
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23	49	03	04	05	06	07	08	09
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JULY

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29	55	15	16	17	18	19	20	21
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31	57	29	30	31				

AUGUST

CW	PW	M	T	W	T	F	S	S
31	57				01	02	03	04
32	58	05	06	07	08	09	10	11
33	59	12	13	14	15	16	17	18
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SEPTEMBER

CW	PW	M	T	W	T	F	S	S
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40	66	30						

OCTOBER

CW	PW	M	T	W	T	F	S	S
40	66		01	02	03	06	05	06
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NOVEMBER

CW	PW	M	T	W	T	F	S	S
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DECEMBER

CW	PW	M	T	W	T	F	S	S
48	74							01
49	75	02	03	04	05	06	07	08
50	76	09	10	11	12	13	14	15
51	77	16	17	18	19	20	21	22
52	78	23	24	25	26	27	28	29
1	79	30	31					

LEGENDA:

	Effective Date
	Kick off Meeting
	Project Weekly Meeting
	Monthly Project Management Report cut off date
	Deadline for issue of Monthly Project Management Report report
	Weekly Report cut off date
	Deadline for issue of Weekly Report
	Reporting and meeting suspended due to Holiday Period

CW **Calendar Week**

PW **Project Week**

Figure 35 - Project Calendar 2024

Project Calendar

HOLLANDSE KUST NOORD WIND PARK Project

Contract No. CW-I-WP4-2023-05

2025

JANUARY							
CW	PW	M	T	W	T	F	S	S
1	79			01	02	03	04	05
2	80	06	07	08	09	10	11	12
3	81	13	14	15	16	17	18	19
4	82	20	21	22	23	24	25	26
5	83	27	28	29	30	31		

FEBRUARY							
CW	PW	M	T	W	T	F	S	S
5	83						01	02
6	84	03	04	05	06	07	08	09
7	85	10	11	12	13	14	15	16
8	86	17	18	19	20	21	22	23
9	87	24	25	26	27	28		

MARCH							
CW	PW	M	T	W	T	F	S	S
9	87						01	02
10	88	03	04	05	06	07	08	09
11	89	10	11	12	13	14	15	16
12	90	17	18	19	20	21	22	23
13	91	24	25	26	27	28	29	30
14	92	31						

APRIL							
CW	PW	M	T	W	T	F	S	S
14	92		01	02	03	04	05	06
15	93	07	08	09	10	11	12	13
16	94	14	15	16	17	18	19	20
17	95	21	22	23	24	25	26	27
18	96	28	29	30				

MAY							
CW	PW	M	T	W	T	F	S	S
18	96				01	02	03	04
19	97	05	06	07	08	09	10	11
20	98	12	13	14	15	16	17	18
21	99	19	20	21	22	23	24	25
22	100	26	27	28	29	30	31	

JUNE							
CW	PW	M	T	W	T	F	S	S
22	100							01
23	101	02	03	04	05	06	07	08
24	102	09	10	11	12	13	14	15
25	103	16	17	18	19	20	21	22
26	104	23	24	25	26	27	28	29
27	105	30						

JULY							
CW	PW	M	T	W	T	F	S	S
27	105		01	02	03	04	05	06
28	106	07	08	09	10	11	12	13
29	107	14	15	16	17	18	19	20
30	108	21	22	23	24	25	26	27
31	109	28	29	30	31			

AUGUST							
CW	PW	M	T	W	T	F	S	S
31	109					01	02	03
32	110	04	05	06	07	08	09	10
33	111	11	12	13	14	15	16	17
34	112	18	19	20	21	22	23	24
35	113	25	26	27	28	29	30	31

SEPTEMBER							
CW	PW	M	T	W	T	F	S	S
36	114	01	02	03	04	05	06	07
37	115	08	09	10	11	12	13	14
38	116	15	16	17	18	19	20	21
39	117	22	23	24	25	26	27	28
40	118	29	30					

OCTOBER							
CW	PW	M	T	W	T	F	S	S
40	118			01	02	03	04	05
41	119	06	07	08	09	10	11	12
42	120	13	14	15	16	17	18	19
43	121	20	21	22	23	24	25	26
44	122	27	28	29	30	31		

NOVEMBER							
CW	PW	M	T	W	T	F	S	S
44	122						01	02
45	123	03	04	05	06	07	08	09
46	124	10	11	12	13	14	15	16
47	125	17	18	19	20	21	22	23
48	126	24	25	26	27	28	29	30

DECEMBER							
CW	PW	M	T	W	T	F	S	S
49	127	01	02	03	04	05	06	07
50	128	08	09	10	11	12	13	14
51	129	15	16	17	18	19	20	21
52	130	22	23	24	25	26	27	28
1	131	29	30	31				

LEGENDA:

	Effective Date
	Kick off Meeting
	Project Weekly Meeting
	Monthly Project Management Report cut off date
	Deadline for issue of Monthly Project Management Report report
	Weekly Report cut off date
	Deadline for issue of Weekly Report
	Reporting and meeting suspended due to Holiday Period

CW **Calendar Week**

PW **Project Week**

Figure 36 - Project Calendar 2025

22 APPENDIX 3 – PRELIMINARY ERECTION SEQUENCE

22.1 INTRODUCTION

All structures will be erected at Rosetti Marino Yard Piomboni (YPB) using indoor or outdoor areas.

Principles of Constructability review process will be followed during all phases of the project, with a continuous and mutual exchange of information between the members of the project team, including but not limited to the early stage of the project.

Project Constructability meetings periodically scheduled are a consolidated practice for Rosetti and their outcomes are typically reported and shared throughout the Company, in order to integrate construction knowledge, design, planning for a continuous improvement in terms of safety, quality, accuracy and cost-effective skills.

Hereunder is described CONTRACTOR's preliminary approach to erection activities, dividing main structures into Sub-assemblies as follows:

1. Lower Deck A
2. Lower Deck B
3. Upper Deck A
4. Upper Deck B
5. H2 Vessel (PAU) (to be defined in later stage)
6. Transition Piece (TP)

The assembly of the above will be done either indoor or inside temporary facilities according to CONTRACTOR workload.

Documents describing the main complex lifting, as per internal procedure, will be prepared before performing each significant operation, including calculations and details of any temporary attachment (lifting lug, temporary reinforcements) that may be needed to perform the operation; these documents will be submitted to Company for approval/review.

The erection sequences will be executed according to the above description and following a schedule which ensures completion of each item prior to its erection.

Structural erection of Topside will be done in two stages:

1. Fabrication and painting of sub-assemblies, starting from prefabricated items (i.e. nodes, beams, columns, bracings, PG and deck plates...) cut to measures;
2. Final erection of Sub-Assemblies to complete Topside structure in upright position.

Once completed, the Sub-assemblies will be transferred, typically by trailers, to the yard painting workshop or in a temporary encapsulated area where sandblasting and painting activities will be performed.

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22.2 FABRICATION OF SUB-ASSEMBLIES

Primary beams/PG of each Sub-Assembly will be placed on temporary yard supports in horizontal position and fitted-up, secondary beams will follow. NDE will be performed subsequently (x-rays and/or gamma-rays overnight). Stiffeners and supports will be welded to reduce the workload after the lifting of the Sub-Assemblies.

Purpose is to complete a sub-assembly including all the appurtenances in order to avoid future abortive works (e.g., lifting trunnions, pad-eyes, walkways) and all the temporary supports, if necessary, for the successive installation of the scaffolding

At this stage the sub-assemblies will be moved to the paint shop on trailers of adequate capacity (Ref. Figure 33).



Figure 37 - Sub-Assembly transferring to Painting shop

In case of contemporary activities due to CONTRACTOR's workload, as a common practice temporary shops with all facilities will be arranged at Construction Yard.

Installation aids if any and upon availability, will be installed on Sub-Assemblies prior to painting.

Deck plates and penetrations are planned to be installed before coating, if available on time.

22.3 PRELIMANRY ERECTION SEQUENCE

After the completion of painting activities, Sub-Assemblies will be moved from the paint shop to a dedicated area for the final assembly.

Dedicated area will be arranged with temporary supports, upper grillage and other items suitable for installation completion, weighing and Loadout activities.

Sub-Assemblies will be moved from trailers on the upper grillage or temporary supports by lifting.



Figure 38 - Yard erection area – lifting and final assembly of Topside subassemblies

Connection joints between Sub-assemblies will be designed in order to minimize welding activities during the erection phase.

The preliminary study for erection sequence of Topside could foresees two different ways of installation.

A combination of both solutions may be applied.

22.4 INSTALLATION: FIRST OPTION

Lower Deck A with legs and columns will be lifted in his final position on the upper grillage. Subsequently Lower Deck B will be lifted, fitted-up and welded with Lower Deck A (Ref. Figure 35).

After the assembly of the first level, CONTRACTOR will lift and place all the equipment available on it. Shelters will be fabricated maximizing their level of completion before lifting activities and placed as well, even if the internal equipment will not be received. The equipment installation inside the Shelters will be done in later stage.

Due to long delivery times of few equipment, CONTRACTOR should install in later stages some items (i.e., bracings, portion of Stair Towers, etc.)

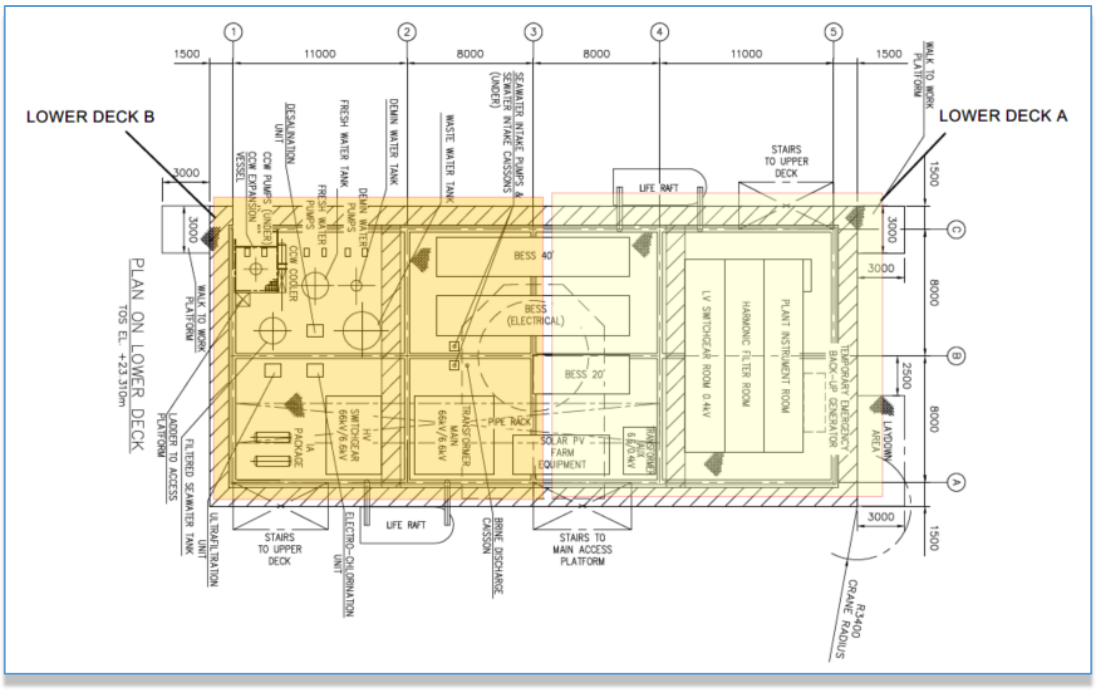


Figure 39 - BLPH Topside Erection Sequence (Lifting of Lower Deck A and B)

Same configuration is hereunder represented for the Upper Level. Upper Deck A will be lifted in his final position on the Lower Deck. After the completion of welding and NDEs activities between Upper Deck A and Lower Deck, Upper Deck B will be lifted, fitted-up and welded with Upper Deck A and Lower Deck (Ref. Figure 36).

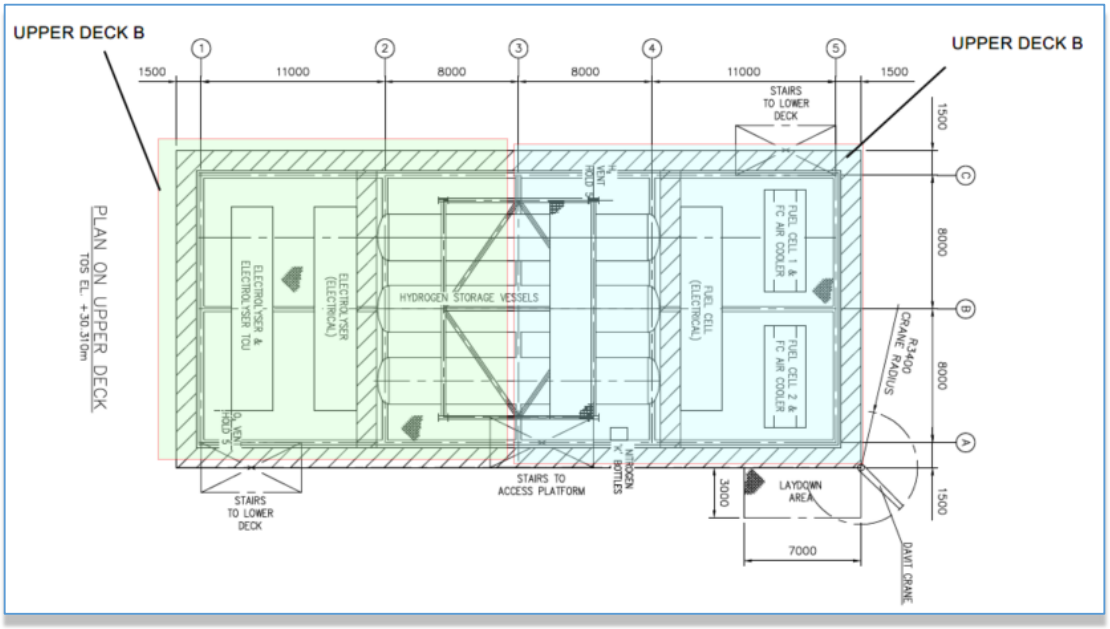


Figure 40 - BLPH Topside Erection Sequence (Lifting of Upper Deck A and B)

After the completion of the welding activities of the Upper Level, the H2 Vessel (PAU) will be lifted and installed on the BLPH Topside.

H2 Vessel Sub-assembly will be defined in later stage, in order to optimize the lifting and installation of H2 storage tanks.

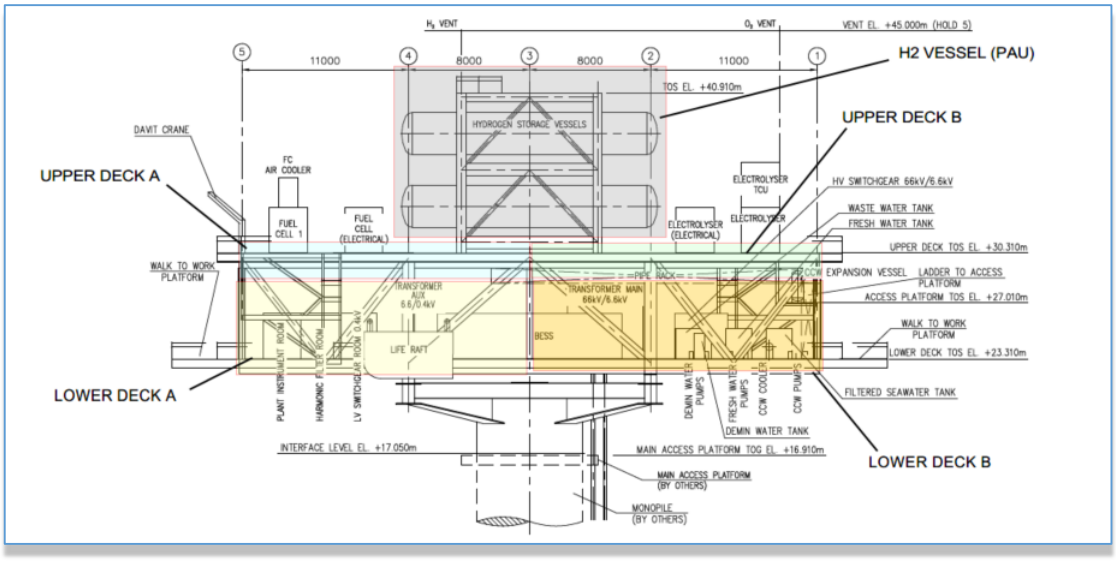


Figure 41 - BLPH Topside Erection Sequence 1st Option (EAST View)

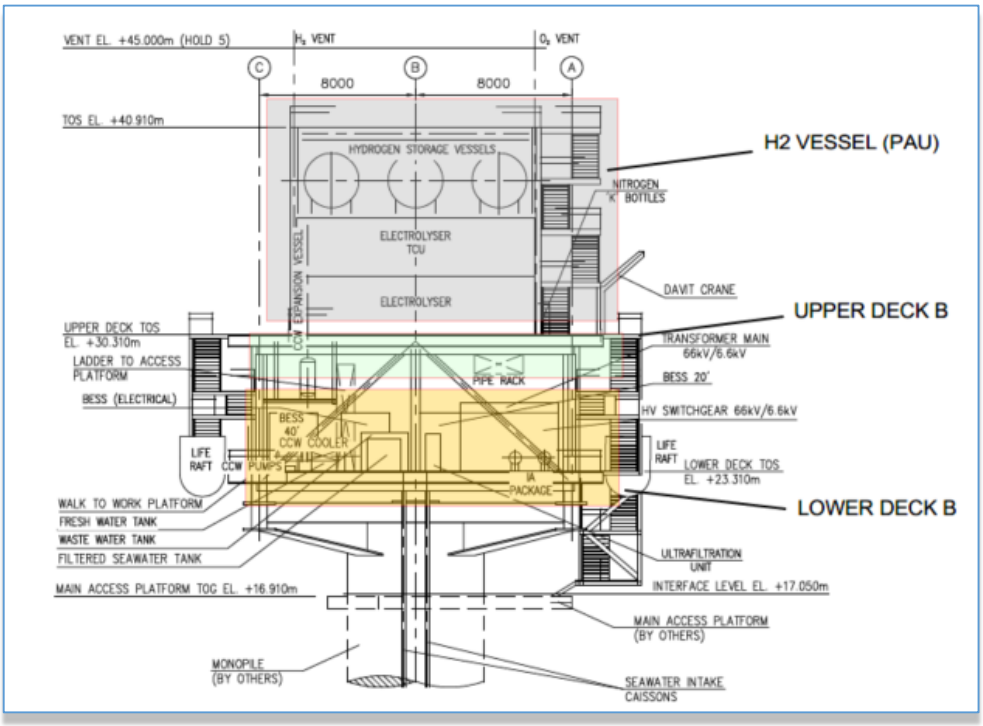


Figure 42 - BLPH Topside Erection Sequence 1st Option (NORTH View)

22.5 INSTALLATION: SECOND OPTION

Both Lower Deck A and Lower Deck B will be placed on temporary supports and will be fitted-up and welded together. Therefore, Lower Deck may be assembled on ground level in order to optimize the assembly activities.

Once the welding and NDEs activities are complete, Lower Deck may be lifted in his final position on the Upper grillage.

This installation case feasibility required to be verified in later stage due to higher weight to be lifted on the upper grillage.

After the assembly of the first level, CONTRACTOR will lift and place all the equipment available on it. Shelters will be placed as well, even if the internal equipment will not be received. The equipment installation inside the Shelters will be done in later stage.

Due to long delivery times of few equipment, CONTRACTORS should install in later stages some items (i.e., bracings, portion of Stair Towers, etc.).

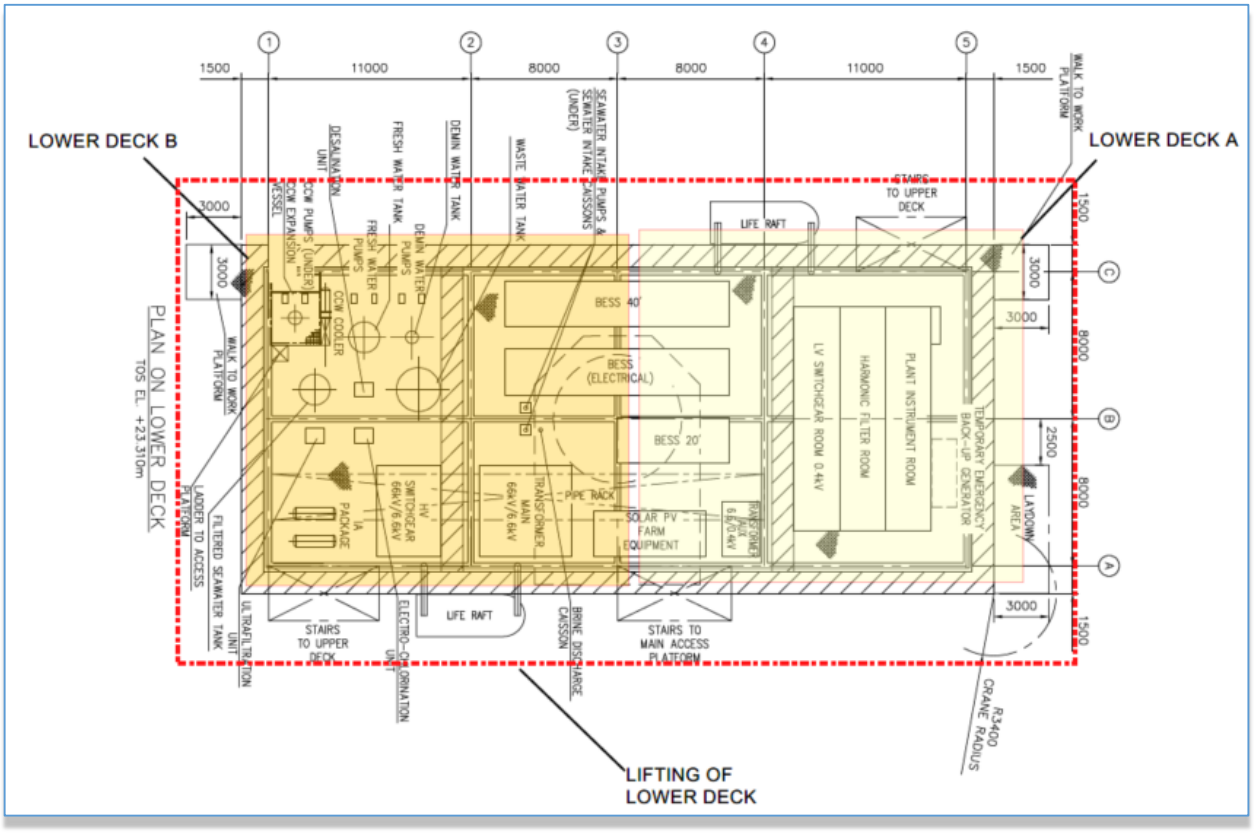


Figure 43 - BLPH Topside Erection Sequence (Lifting of assembled Lower Deck)

As per Lower Deck, both Upper Deck A and B will be placed on temporary supports, fitted-up and welded together.

Once the welding and NDEs activities are complete, Upper Deck may be lifted, fitted up and welded in his final position on the Lower Deck

Figure 8 - BLPH Topside Erection Sequence (Lifting of assembled Upper Deck)

After the completion of the welding activities of the Upper Level, the H2 Vessel (PAU) will be lifted and installed on the BLPH Topside.

H2 Vessel Sub-assembly will be defined in later stage, in order to optimize the lifting and installation of H2 storage tanks.

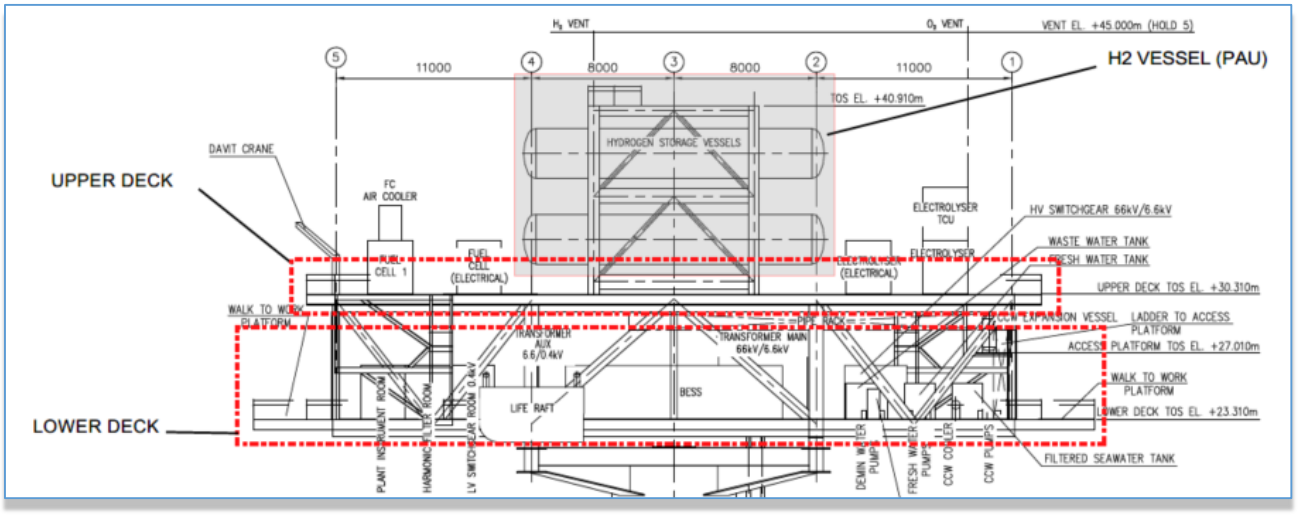


Figure 44 - BLPH Topside Erection Sequence 2nd Option (EAST View)

22.6 TRANSITION PIECE

Structural and piping items will be fabricated in CONTRACTOR or SUBCONTRACTOS' premises, depending on CONTRACTOR's workload.

The level of fabrication that it is possible to perform in workshops or yard will be as follow:

- Plates cutting
- Rolling, fit-up and welding of plates for the fabrication of rolled tubulars
- Main rolled tubular (basement of Transition Piece) will be made from three or more rolled plates due to transport limitation
- Fabrication of main flange
- Fabrication of PGs, BGs and Beams
- Fabrication of stairs, walkways and ancillaries

The assembly of the transition piece in CONTRACTOR or SUBCONTRACTOR's yard may foresee the following steps:

- Assembly of main rolled tubular in horizontal or upright position

- Assembly of Joints PGs, BGs and Beams
- Assembly of top plates
- Assembly of stairs, flange, walkways and ancillaries

After the assembly is complete, Transition Piece will be moved to the paint shop by means of trolleys of adequate capacity.

Once the painting cycle is complete, the Transition Piece will be moved from the paint shop to the erection area, with self-propelled multi-wheeled trolleys, uplifted and placed on final handling supports.

As soon as they reach the erection area, the lift with 1 or 2 crawler cranes (500 tons capacity) will be arranged and the assembly will be lifted into its final configuration on the upper grillage.

As soon as the dimensional controls and the relative welding which grant the load release are completed, the load from the cranes will be released.

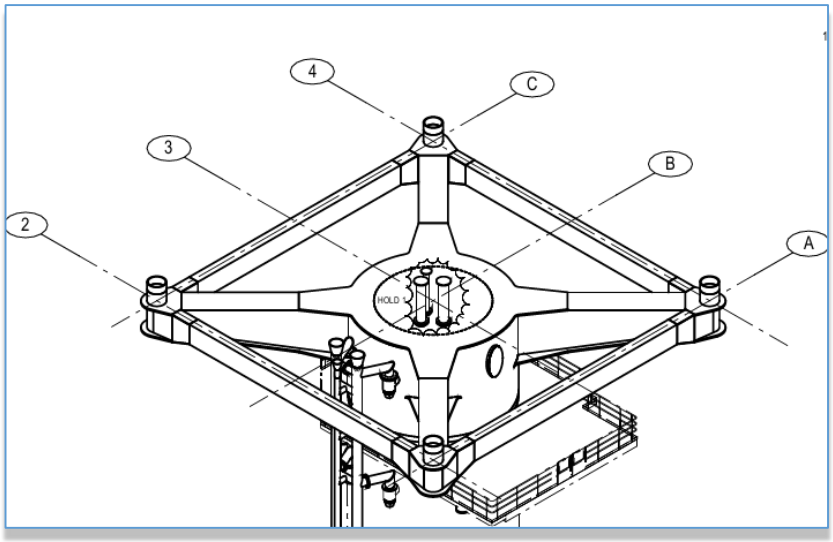


Figure 45 - BLPH Transition Piece