Base Load Power Hub (BLPH)

PROVERLIS MANAGEMENT PROCEDURE

Document Number: 123A90-PML-QHSE-PRO-00120

Document Class: 2

02	10/10/2024	Accepted for Construction (AFC)	M.SAMPAOLI	R.DEGLI ESPOSTI	M.BRUNELLI
01	09/09/2024	Accepted for Construction (AFC)	M.SAMPAOLI	R.DEGLI ESPOSTI	M.BRUNELLI
00	24/06/2024	Issued for Review (IFR)	M.SAMPAOLI	R.DEGLI ESPOSTI	M.BRUNELLI
Rev.	Date	Description	Prepared	Reviewed	Approved

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

Revision / Change Log

Rev.	Description
00	Issued for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	HOLD 1 (sh.14) : READY FOR OPERATION CERTIFICATE (RFO) TEMPLATE SHOULD BE PROVIDED BY CPY
2	
3	
4	

TABLE OF CONTENTS

1. INTRODUCTION 4

1.1 PROJECT OVERVIEW 4

1.2 PROJECT LOCATION 4

1.3 PROJECT CONCEPT 5

2. DOCUMENT SCOPE 6

3. REFERENCE DOCUMENTS 6

4. TERMS & DEFINITIONS 7

5. PROVERLIS DEFINITION 9

6. PROVERLIS CONFIGURATION 9

7. PROVERLIS PROCESS MANAGEMENT 10

8. PROVERLIS DATABASE POPULATION 12

9. PROVERLIS COMPLETION PROGRESS MONITORING 12

10. ANNEXES 14

10.1 ANNEX 1: PROVERLIS REPORTS SAMPLE (Status Index detail, PL report) 14

10.2 ANNEX 2: READY FOR COMMISSIONING CERTIFICATE (RFCC) SAMPLE 15

10.3 ANNEX 3: READY FOR OPERATION CERTIFICATE (RFO) SAMPLE 15

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

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.

1.2 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.

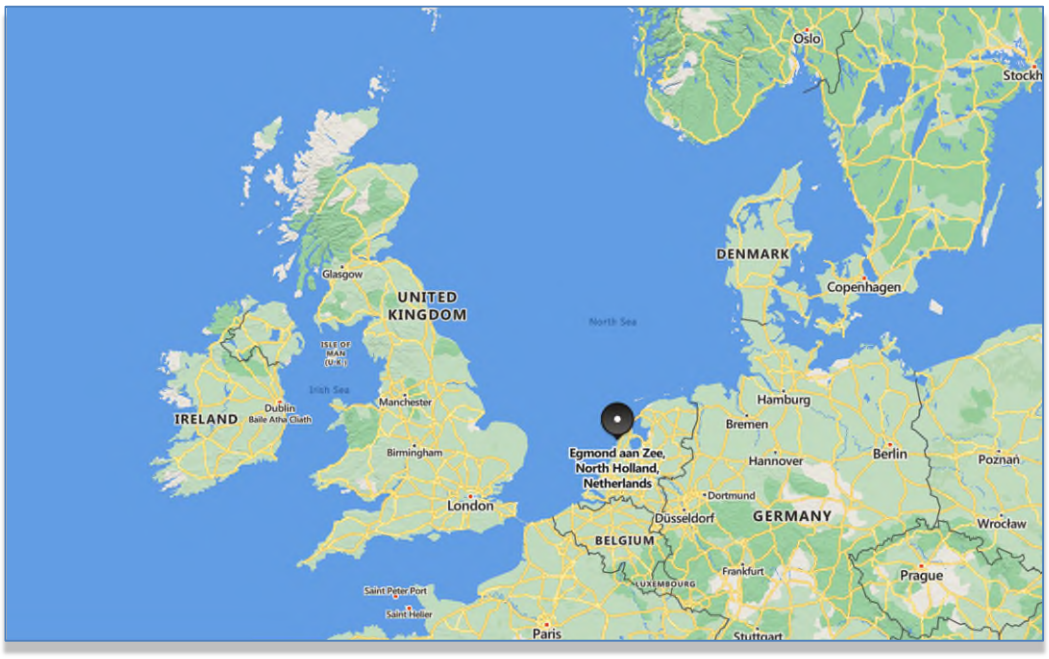
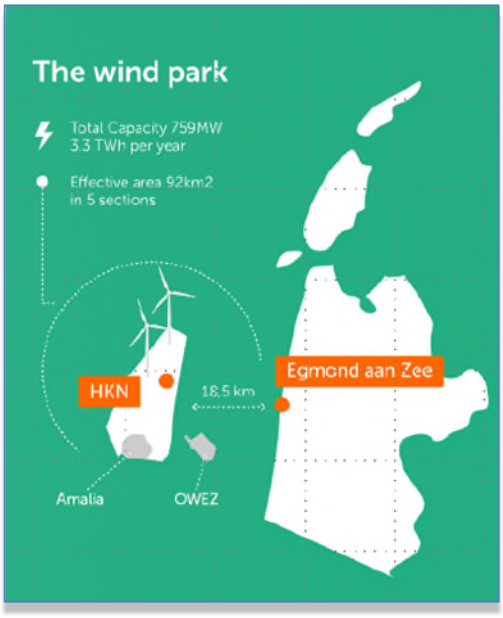


Figure 1 *- HOLLANDSE KUST NOORD WIND PARK Location Map*



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.

1.3 PROJECT CONCEPT

All components included in the BLPH will be integrated onshore on 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.

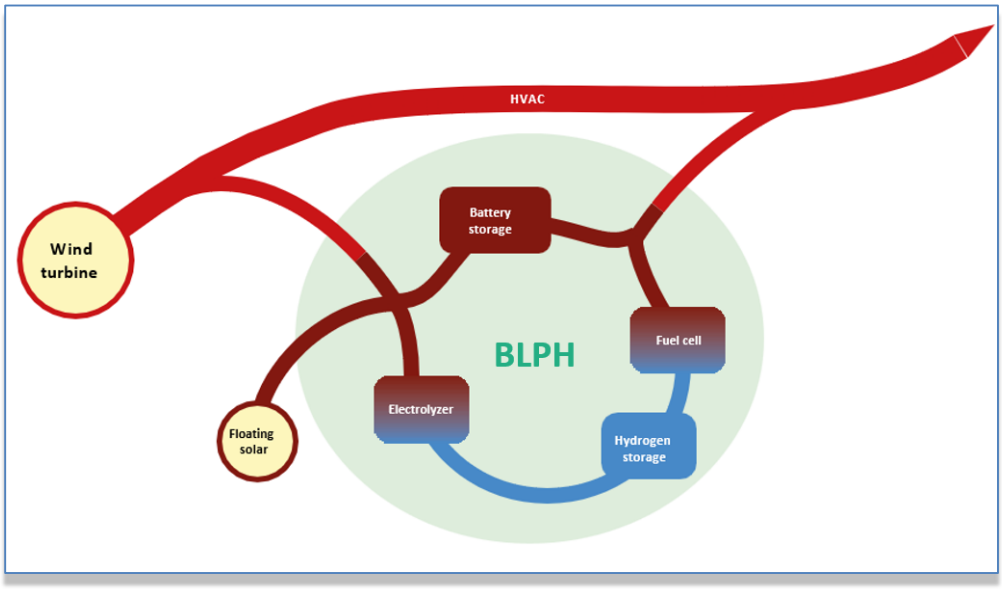


Figure 2 – *BLPH Concept*

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.

2. DOCUMENT SCOPE

The purpose of this document is to explain briefly how the CMS (Completion Management System) PROVERLIS works in order to ensure the tracking and reporting of all documentation/certificates produced during the entire life of CROSSWIND project, hence during the phases of Mechanical Completion, Pre-Commissioning and Commissioning.

3. REFERENCE DOCUMENTS

Document Number	Document Title
123A90-PML-PM-LIS-01001	Master Document Register
123A90-PML-COM-PRO-03007	Commissioning Strategy

123A90-PML-COM-PL-03002	Commissioning Execution Plan
123A90-PML-COM-LIS-03011	System/Sub-System List
123A90-PML-COM-DG-03012	System/Sub-System Boundary Limit Diagrams
123A90-PML-COM-PRO-03039	Preservation Procedure
123A90-PML-COM-PRO-03030	Punch List Management Procedure
123A90-PML-QHSE-SP-00118	Mechanical Completion ITR Template Collection
123A90-PML-COM-RE-03032	Commissioning Functional Test Sheet Template Collection
123A90-PML-QHSE-ITP-00074	Inspection And Test Plan for Surface Protection
123A90-PML-QHSE-ITP-00075	Inspection And Test Plan for Structure
123A90-PML-QHSE-ITP-00076	Inspection And Test Plan Piping
123A90-PML-QHSE-ITP-00077	Inspection And Test Plan for Mechanical
123A90-PML-QHSE-ITP-00078	Inspection And Test Plan for EI

4. TERMS & DEFINITIONS

Terms	Definitions
AVEVA	A common project database to manage and control multi-discipline data
CMS (COMPLETION MANAGEMENT SYSTEM)	Refers to the software designated application utilised to manage and record progress of Mechanical Completion, Pre-commissioning and Commissioning activities.
COMPANY (CPY)	Means CROSSWIND C.V., owner & developer of the offshore WIND FARM Hollandse Kust Noord Wind Park Project.
Conformity Checks (CCK)	Is a PROVERLIS coding that groups together the Checks carried out on each item in order to verify visually the condition of the equipment, the quality of the installation and the compliance with project drawings and project Specifications.
CONTRACTOR (CTR)	Means ROSETTI MARINO S.p.A., the named party with whom COMPANY will place a contract for engineering, procurement, construction, offshore installation & Commissioning of the facilities associated with the PROJECT.
Factory Acceptance Test (FAT)	A process that evaluates the equipment during and after the assembly process by verifying that it is built and operating in accordance with design specifications.
Functional Tests (FTS)	Is a PROVERLIS coding that groups together the dynamic tests in order to prove their operation according to the relevant design intent criteria.

Inspection and Test Plan (ITP)	Inspection and Test Plan is a document that identifies the activities to be inspected as well as specifications, methods and acceptance criteria for monitoring and/or testing.
ITEM TRACE	The production activities management database within which CTR Engineering develops and keeps up to date the item lists for the E&I/Telecom and Piping discipline. All item lists are downloadable in Excel format for proper database population
ITR A	Inspection Test Records A is used to record and verify construction scope associated with of a tagged item (component).
ITR B	Inspection Test Records B is used to record and verify energisation and function testing during pre-commissioning of a tagged item
MECHANICAL COMPLETION	Mechanical Completion is the point in the project when construction is complete, and subsystems are ready to be handed over to the commissioning team.
Piping and Vessels Preparation (PVP)	Is a PROVERLIS coding that groups together the activities carried out on pipe work and vessels in order to demonstrate their readiness for the commencement of operation.
Piping Test (PIP)	Is a PROVERLIS coding that groups together the Checks/Tests carried out on pipe work in order to verify their mechanical integrity, cleanness, alignment, etc.
PL A	Punch List A item that will prevent the safe operation of the Equipment, System and Plant and may jeopardise personnel or environment. Such item, as agreed, shall be cleared before the Equipment/System/Plant can progress to the next stage of the Commissioning and Handover phase.
PL B	Punch List B item that will not endanger the safe operation of the Equipment, System and Plant or personnel and/or environment. Such item, as agreed, can be carried over to the next stage and may be cleared later.
PLANT	Refers to the permanent facilities (Base Load Power Hub) being constructed or to be constructed at SITE resulting from the WORK.
PRE-COMMISSIONING	Pre-Commissioning relates to the preliminary Commissioning activities to test and check the individual basic functions, systems and/or sub-systems within a logical area to ensure that the components of any given system and/or sub-system perform as designed.
PRESERVATION	Refers to the activities performed on all equipment, piping, and spare parts, special tools and consumables in order to protect them against external and internal deterioration factors and to keep them in unimpaired condition until the equipment are in normal operation.
PROJECT	Refers to the BASE LOAD POWER HUB (BLPH) project.
PROVERLIS	Refers to the Completion Management System that efficiently manages and tracks project completion in all of its phases
PUNCH ITEM PUNCH LIST (PL)	A Punch Item is an uncompleted, unsatisfactory or missing work, identified as being part of a scope of work, which is cleared during the course of the project at a specific technical or contractual milestone.

	The Punch Items are recorded in a consolidated document called Punch List (PL).
RFC (C)	The Ready For Commissioning Certificate states that the Sub-System is ready for the commencement of the associated Commissioning activities.
RFO (C)	A Ready For Operation Certificate shall be raised on completion of the commissioning procedure scope and presented to the Asset Operator for acceptance before any system (or sub-system) is placed into operation.
RFSU (C)	This certificate shall be issued by COMPANY when CONTRACTOR will achieve READY FOR START-UP for the PERMANENT WORK or part thereof when ready for introduction of hydrogen or energy / electrolyser start-up.
SITE	Refers to the offshore location where the PLANT is to be installed and the vicinity thereof (offshore North Sea - Netherlands).
Static Tests (STS)	Is a PROVERLIS coding that groups together the tests carried out on Items in order to ensure their individual quality/performance (e.g. calibration of instrument, machinery alignments, etc.)

5. PROVERLIS DEFINITION

PROVERLIS is a Software, that designates the tool to be used during the preparation and execution of Mechanical Completion, Pre-Commissioning and Commissioning activities.
On CROSSWIND project, the CONTRACTOR will use PROVERLIS as the database in order to keep an updated status of all foreseen activities and documentation throughout the main phases, hence Mechanical Completion, Pre-Commissioning, Commissioning, Preservation and completion of Systems/Sub-Systems until the final handover to the COMPANY.

6. PROVERLIS CONFIGURATION

PROVERLIS database shall be prepared as part of the Mechanical Completion, Pre-Commissioning and Commissioning Engineering activities.
It shall be used to set-up and follow-up all Mechanical Completion, Pre-Commissioning, Commissioning and Preservation activities up to the Ready For Start-Up certificate (RFSUC) of the last Sub-System and track all the Punch-Lists.
During Detailed Engineering phase, all supplied data from the engineering and subcontractors (ITEM TRACE) shall be adapted to the required PROVERLIS format in order to ensure efficient upload of the information into the database.
All items, test packs and basic functions, grouped by Sub-System, discipline and type of function of all equipment and materials included in the PLANT to be populated in PROVERLIS database shall be properly listed.
Mechanical Completion Forms (CCK, STS, PIP – ITR A) and Pre-Commissioning ones (FTS, PVP – ITR B) shall constitute an exhaustive list of the activities to be performed on each Item, Test Pack, Basic Function (ref Doc: 123A90-PML-QHSE-SP-00118 for ITR-A and doc. 123A90-PML-COM-RE-03032 for ITR-B) and System/Sub-system.
Traceable records shall be maintained in an orderly and timely manner to establish a control of all the modifications; engineering data from ITEM TRACE shall be tracked and timely updated into PROVERLIS database only after the Subsystem confirmation by Commissioning Department.

The Responsible Party shall, as a minimum requirement, prepare, issue for approval and maintain the following documentation:

- *PROVERLIS Management Procedure*
- *Set of Typical Mechanical Completion Check and Test Sheets (per discipline)*
- *Set of Typical Pre- Commissioning & Commissioning Functional check and Test Sheets (per discipline)*

7. PROVERLIS PROCESS MANAGEMENT

When one or more items are in status RFI (Ready For Inspection), a notification of inspection is sent to the CPY.
The notification includes the following information:

- *Inspection n. (defined by the notification system in progressive order)*
- *Description (where the type and discipline of every RFI item is enlisted)*
- *Test inspection date and time (agreed between CTR and CPY prior to every notification)*
- *Rosetti person in charge (inspector in charge of carrying out the Mechanical Completion, Pre-Commissioning & Commissioning activities with CPY)*
- *List of the applicable tasks, hence Mechanical Completion, Pre-Commissioning & Commissioning checks and tests, connected to every item subject to inspection*
- *Notes (if any)*

Once all these data are agreed and defined, a notification is sent to all parties (CPY and CTR subjects in charge).
During the inspection, it is responsibility of the CTR's inspector to raise new Punch Items (hard/soft copy) in agreement with CPY together with the fill-up of the checks and tests foreseen. (hard/soft copy)

At the end of an inspection, it will be responsibility of the CTR's inspector to provide the punch list entry form properly filled up in order to check its content, prior to the upload into the PROVELIS database, which is going to be scope of the PROVERLIS Admin.
He also receives from the Supply Quality Lead all Release Notes and all outstanding punch items (Vendors Punch Lists raised during FAT) to import into the database.
Once all checks and tests are filled up and signed off, they will be released in PROVERLIS by the Admin; by doing so, the status sets automatically to 100% completion.

A detailed CMS flowchart that includes both the phases of the Mechanical Completion and Commissioning is showed in the next page.

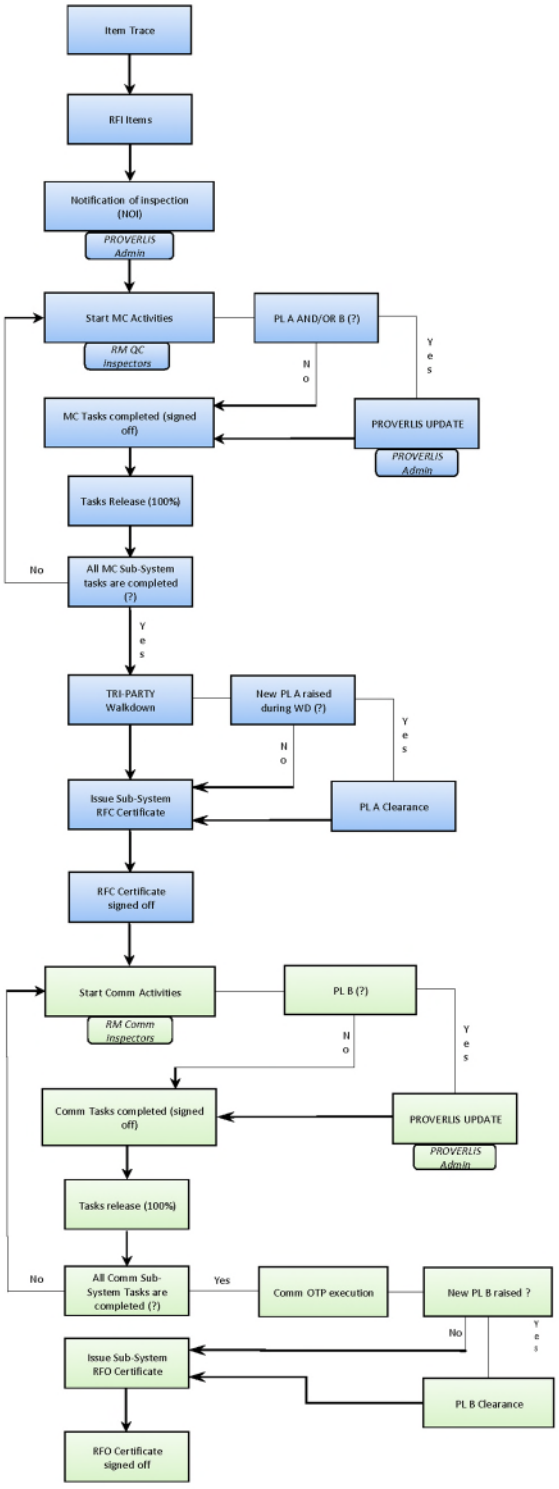


Figure 3 – *CMS Flow Chart*

8. PROVERLIS DATABASE POPULATION

PROVERLIS database will be set-up and managed from the Yard during Engineering and Onshore phases, by PROVERLIS Admin.
The database will be populated by means of the imported Excel files of all the documentation produced during the Engineering phase, in particular Project Engineering Documents such as P&ID's, AVEVA files, ITEM TRACE files, Instrument Loop schedules, Equipment lists, Piping Isometrics, Test Packs etc.
During the development/engineering phase and later on during Mechanical Completion, Pre-Commissioning and Commissioning phases of the Project, controls will be established and maintained up to date, on all Engineering Data uploaded into PROVERLIS Database.
Rosetti Marino can provide an updated status (normally once a month) of the database population during the entire lifecycle of the project; all possible modifications ongoing within the database will be handled internally in order to keep PROVERLIS aligned with the latest Engineering revisions.

9. PROVERLIS COMPLETION PROGRESS MONITORING

- **Mechanical Completion:**
  The progress monitoring of Mechanical Completion activities done by the CONTRACTOR Construction team, including recording and management of punch lists generated throughout this phase, is carried out in the Yard by means of PROVERLIS. This database tracking system will enable rapid tracking of the completion and of what is still missing, of individual Check/Test sheets for the Mechanical Completion phase, by issuing priority printable reports (sample reports generated by PROVERLIS in 10.1 ANNEX 1) generated by an individual user (including CONTRACTOR's Construction team supervision and management).
  PROVERLIS will therefore allow any designated end-user to identify quickly which Mechanical Completion check/test sheet may be causing a delay to the planned completion of priority or critical Systems/Sub-systems.
  By doing so, it will also be possible to keep a track of the Mechanical Completion handover to the CONTRACTOR's Commissioning team as well as reporting the successful completion of other Mechanical Completion check/test sheets.
  The Handover process between Construction and Commissioning will be managed by means of PROVERLIS database system in order to record and control the "certification status" of each commissionable System/Sub-System and to issue the Ready For Commissioning (RFC) certificate (template sample in 10.2 ANNEX 2).
  The list of activities foreseen for this project phase will be exhaustively explained and covered in the relative ITP documents.

- **Pre-Commissioning & Commissioning:**
  PROVERLIS database will be used also during the Pre-Commissioning and Commissioning Completion phases, in order to:

- Manage the closure of check and test sheets for each System/Sub-System
- Register the status of punch list(s) generated during such phases
- Generate and submit for signature the formal RFO (Ready For Operation)

  For all those Sub-systems that foresee some Pre-Commissioning and Commissioning activities to be carried out by COMPANY Offshore, similarly to what was done during the

Mechanical Completion phase, all Offshore tasks will be implemented in the database so that there will be a full traceability. Their completion will be done by PROVERLIS Admin in charge, during Offshore campaign, the same way it was done for the Onshore tasks that is by uploading them into the database through barcode reading (after proper signature of the parties) so that they will reflect the real status, on a daily basis.

10. ANNEXES

10.1 ANNEX 1: PROVERLIS REPORTS SAMPLE (Status Index detail, PL report)

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on system: 83 & subsystem: 83-00 & process: MC

Electrical	83-00: 400 V Switchboard & Connection Box (SG-200N1)						
ITEM		TASK					
Code	Description	Comment	Code	Form	Form description	Progress	Date
83010-CEL-L1	LV Switchgear / Temporary Generator / Mobile Battery Pack	-	C10000517	CPX09	LV Power Cable	0	-
83010-CEL-L2	LV Switchgear / Temporary Generator / Mobile Battery Pack	-	C10000518	CPX09	LV Power Cable	0	-
83010-CEL-L3	LV Switchgear / Temporary Generator / Mobile Battery Pack	-	C10000519	CPX09	LV Power Cable	0	-
83010-CEL-N	LV Switchgear / Temporary Generator / Mobile Battery Pack	-	C10000520	CPX09	LV Power Cable	0	-
83010-CEL-PE	LV Switchgear / Temporary Generator / Mobile Battery Pack	-	C10000521	CPX09	LV Power Cable	0	-
83120-CEL	Lighting & Small Power DB BoP / Auxiliary LV	-	C10000639	CPX09	LV Power Cable	0	-
84318-CEL	AC UPS - PAS DB / LV Switchboard Auxiliary	-	C10002114	CPX09	LV Power Cable	0	-
JB-200E2	Temporary Generator / Mobile Battery Pack	-	C10001223	CPX31	Junction and Marshalling Box	0	-
SG-200N1	LV 0,4 kV MCC Switchgear	-	C10000866	CPX05	LV Switchboard	0	-

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM 83 Main Power Distribution Low Voltage 440 V
SUBSYSTEM 83-00 400 V Switchboard & Connection Box (SG-200N1)

Electrical

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30000100	B	SG-200N1	Missing n.15 drawers (highlighted in the GA) and all accessories. The missing drawers wil be tested during FAT, mid-september			SLinari 2024-08-02			
C30000101	B	SG-200N1	Missing PLC wago cubicle A2/02 - signals in the I/O list from row 2 to 16 cannot be tested			SLinari 2024-08-02			
C30000102	B	SG-200N1	Missing relè K86 incoming			SLinari 2024-08-02			
C30000103	B	SG-200N1	All documentation shall be re-issued and approval in final revision after mark-up during FAT			SLinari 2024-08-02			

10.2 ANNEX 2: READY FOR COMMISSIONING CERTIFICATE (RFCC) SAMPLE

ROSETTI MARINO	123A90 - HOLLANDSE KUST NOORD WIND PARK BLPH Project	CROSSWIND

RFC Certificate

COMPLETE		PARTIAL	

Revision:			Issued on:		
System:		/			
SubSystem:		/			

1	COMPANY hereby certifies that the mechanical completion associated with the above-named sub-systems of the plant have been completed, that such functional sub-system has been brought into readiness for commencement of the associated Pre-commissioning and commissioning activities (with the exception of the outstanding punch list items attached to this certificate).
2	Issuance of this CERTIFICATE shall not release CONTRACTOR from any of his obligations, responsibilities or liabilities under the CONTRACT.
3	Mechanical Completion Status Index attached (per Discipline) Punch List report attached (Outstanding and Cleared)

PUNCH LIST	PENDING POINTS	
Note: All Category "A" Items must be cleared.	A	B

REMARKS:

	CONTRACTOR Construction Manager	CONTRACTOR Commissioning Manager	COMPANY Construction Lead	COMPANY Commissioning Lead
Name				
Date				
Signature				

10.3 ANNEX 3: READY FOR OPERATION CERTIFICATE (RFO) SAMPLE

HOLD 1