Base Load Power Hub (BLPH)

PERFORMANCE STANDARDS COLLECTION

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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.

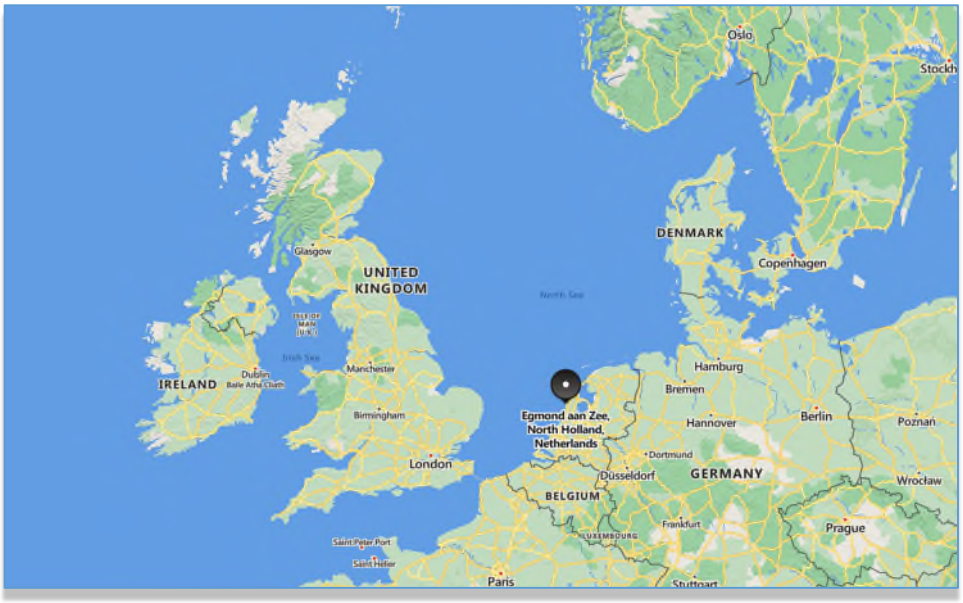


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

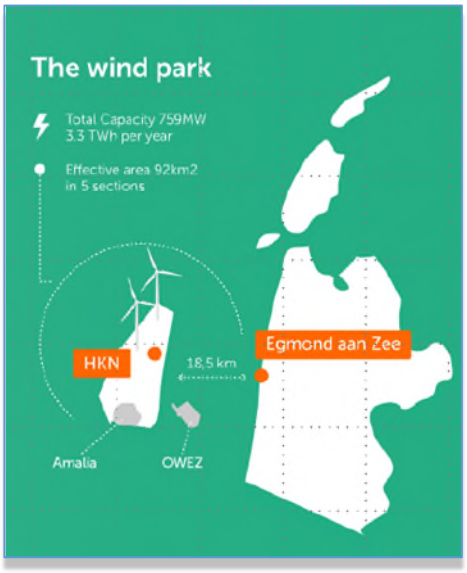


Figure 2 - Wind Park Details

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 located on coordinates E 590719.1, N 5841602.3 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.

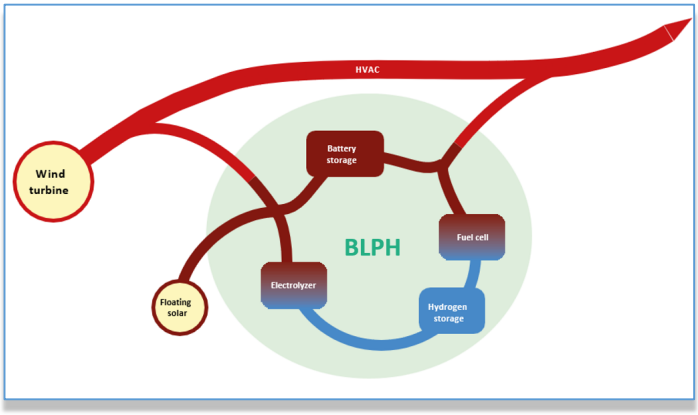


Figure 3 – BLPH Concept

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 s 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 PURPOSE

This document defines the Performance Standards (PS) for the Safety and Environmental Critical Elements (SECEs) developed for the Base Load Power Hub (BLPH) package. Performance Standards are developed for each of the SECEs identified for BLPH during the design development.

The PSs are goal setting and risk based. The essence of such an approach is that any means may be applied to achieve the required performance, without constraint or prescription. Thus, the PSs do not:

- Specify, prescribe or constrain methods to achieve the required performance
- Specify requirements for redundancy or other reliability enhancing approaches
- Require compliance with any specific codes or standards other than those required by law

The PSs specify the minimum standards of performance to be achieved by each SECE. Achievement of the required performance will be verified in accordance with the project Technical Integrity Verification Programme 123A90-PML-QHSE-LIS-00065.

3 SCOPE

These PSs apply to the Base Load Power Hub (BLPH) including associated systems and sub-systems. They shall apply during the design, procurement, fabrication, construction and commissioning phase of the project.

They are intended to include the activities that must take place during the design stages of the facilities to ensure that the required standards are met. The activities required to assure performance during the operational phase of BLPH shall be captured at a later date, prior to the facility going into operation.

4 REFERENCES AND ABBREVIATIONS

REFERENCES

	Doc. No.	Description
[1]	CW-I-WP4-2023-05	Contract
[2]	CW-I-WP4-2023-05 - SECTION V	Scope Description
[3]	CW-I-WP4-2023-05 - SECTION IX	Quality Management
[4]	CW-I-WP4-2023-05 - SECTION X	Technical Information
[5]	K559-2254-QM-PLN-001	BLPH Technical Integrity Verification Plan
[6]	123A90-DDL-SAF-RE-30003	Safety Critical Elements (SCE) and Performance Standard

Table 1 - Reference Documents

ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
ALARP	As Low As Reasonably Practicable
ATEX	ATmosphères EXplosibles
BESS	Battery Energy Storage System
BLPH	Base Load Power Hub
CE	Conformité Européenne
DS	Detection Systems
EMC	Electromagnetic Compatibility
EPCM	Engineering, Procurement, and Construction Management
ER	Emergency Response
FAT	Factory Acceptance Test
HKN	Hollandse Kust Noord
HVAC	Heating, Ventilation, and Air Conditioning
IC	Ignition Control
ITP	Inspection and Test Plan
LS	Life Saving
NDT	Non-Destructive Testing
PC	Process Containment
PED	Pressure Equipment Directive
PS	Performance Standard
PSV	Pressure Safety Valve
PV	Pressure Vessel
QC	Quality Control
SCE	Safety Critical Elements
SD	Shutdown System
SI	Structural Integrity
TI	Technical Integrity
TIV	Technical Integrity Verification

TIVR	Technical Integrity Verification Report
TP	Test Procedure
VAT	Verification Activity Tracker
VooW	Van Oord Offshore Wind

Table 2 - Abbreviations

5 SAFETY CRITICAL ELEMENTS

5.1 SCE DEFINITION AND CHARACTERIZATION

The Safety Critical Elements (SCEs) are those items or structures or systems (or subsystems) whose main objective is to prevent a major accident or mitigate the consequences related to a major accident, or whose failure can lead to a major accident or contribute to its occurrence/evolution.

Safety Critical Element shall meet the performance standards as listed below and shall meet the technical specifications, standards and Project applicable DEPs and the Basic Design and Engineering Package (BDEP).

SCEs that have been identified for BLPH Hub installation were based on the eight hardware categories which are below listed and reported in Figure 4.

- Structural integrity
- Process Containment
- Ignition Control
- Detection Systems
- Protection Systems
- Shutdown system
- Emergency Response
- Life Saving

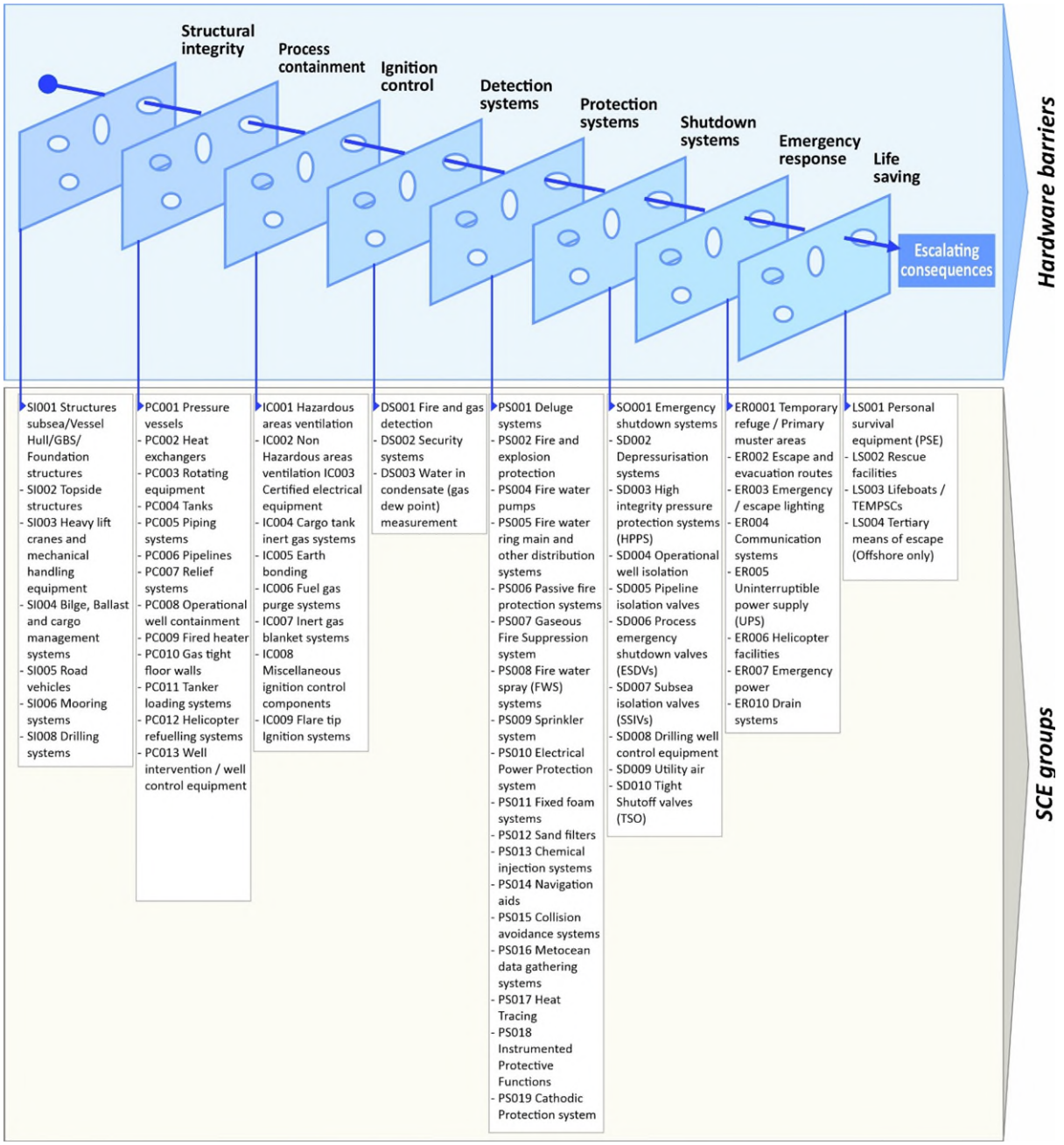


Figure 4 –Hardware barrier and SCE groups

6 PERFORMANCE STANDARDS

The Performance Standards ensure that SECEs continue to be able to prevent, detect, control or mitigate the major accident hazards for which they are expected to perform.

Performance Standards are specifications, either quantitative or qualitative, of the performance required for an SECE. Each Performance Standard lists the key features of the SECE, defined as:

- Functionality – The functional aims of the SECE and the necessary safety considerations that must be adopted during its use.
- Availability / Reliability – The conditions under which the SECE remains available and reliable during a MAH, with any applicable system / equipment data as required.
- Survivability – A summary of the MAH conditions (e.g. environmental, fire, explosion, etc.) an SECE is expected to survive whilst still maintaining its performance.
- Interactions / Dependencies – Other SECEs required to function at the same time (interact) with the SECE or those systems upon which the function of others depend.

Within each of these categories, Performance Standards are presented in terms of:

- Performance Statement – An overarching statement outlining the way in which the SECE is expected to perform, and the goal(s) that it is expected to fulfil.
- Performance Criteria – Specific performance in terms of actions or components within the SECE that must be met in order to fulfil the Performance Statement
- Assurance / Verification Activities – Details of the way in which each of the Performance Criteria are assured / verified over time to satisfy the requirement for continuous performance to the Performance Standard.

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6.1 PERFORMANCE STANDARDS TABLE

Group Code	**Description**	**Tags**	
SI002	Topside Structure		
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Maintain topside structural integrity for design life	Basic Design Engineering Package	Refer to TIV reports
	Design Reliablity; Withstand fatique loading imposed by operational requirements	Basic Design Engineering Package	
	Compliance with BDEP and DEM1	Notified Body (DNV) to verify and approve the design. Issuance of design IRC.	
	Compliance with project specific requirements	Notified Body (DNV) to verify and approve the design. Issuance of design IRC.	
	Preparation of Material Selection Plan that includes all project specific requirements and standard codes as applicable	Notified Body (DNV) to verify and approve the design. Issuance of design IRC.	
	Corrosion and erosion prevention	Verification of painting specification and procedure according to NORSOK Std.	
Procurement	Issuance of Material Selection Plan that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Develop an inspection and test plan based on the material requisition and perform all the related test associated. (e.g., radiographic, ultrasonic, penetrant tests) to verify weld and material integrity	Perform intervention points as per approved ITP. Internal audits performed on key activities.	
	Use materials certified according to ISO 10204 Type 3.1 or 3.2 for traceability.	Verify the material certificates.	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book	
Construction	Mechanical completion	Verification of the Inspection test report	
Commissioning	N/A	N/A	
Dependencies/Interactions	Fire + Explosion Protection	PS002	
	Pressure Safety Valves	PC007	
	Passive Fire Protection	PS006	

Group Code	Description	Tags	
PC0001	Pressure Vessels	PC001-V-25001A, PC001-V-25001B, PC001-V-25001C, PC001-V-25001D, PC001-V-25001E, PC001-V-25001F, PC001-V-43001 PC001-Q-43004	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Pressure vessels shall store gases and liquids at design pressures, temperatures and environmental loadings for the design life of the installation	Basic Design Engineering Package	Refer to TIV reports
	Design Reliability; Pressurised containment are considered reliable	Basic Design Engineering Package	
	Compliance with PED and ASME BPVC Section VIII.	Notified Body and ASME AI to verify and approve the design.	
	Compliance with project specific requirements	Company review and approval of the design documents are aligned with project requirements	
	Preparation of Material Requisition that includes all project specific requirements and standard codes as applicable	Compliance of the vendor to the material requisition by preparing a technical bid evaluation.	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Develop an inspection and test plan based on the material requisition and perform all the related test associated. (e.g., radiographic, ultrasonic, penetrant tests) to verify weld and material integrity based Perform hydrostatic pressure tests as per PED/ASME requirements.	Perform intervention points as per approved ITP.	
	Use materials certified according to ISO 10204 Type 3.1 or 3.2 for traceability.	Verify the material certificates.	
	Perform Factory acceptance test.	Witnessing of the Factory Acceptance test	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book Design Examination Certificates	
Construction	Mechanical completion	Verification of the Inspection test report	
Commissioning	Issuance of OTP	Compliance to OTPs.	
	SAT including visual checks	Issuance of commissioning reports	
Dependencies/Interactions	Piping Systems	PC005	
	Emergency Shutdown	SD001	
	Relief System	PC007	
	Blowdown Valves	SD002	
	Passive Fire Protection	PS006	
	Topside Structures	SI002	

Group Code	Description	Tags	
PC0005	Piping System	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Ensure containment of gas during normal operation through the design life of the facility	Basic Design Engineering Package	Refer to TIV reports
	Design reliability; Bolted connection s will be managed through flange management	Flange Management Strategy 123A90-PML-CON-RE-04006	
	Compliance with PED and ASME B31.3 / 31.12	Notified Body to verify and approve the design (Only for Cat.III piping)	
	Compliance with project specific requirements	Company review and approval of the design documents are aligned with project requirements	
	Preparation of Material Requisition that includes all project specific requirements and standard codes as applicable	Compliance to the material requisition by preparing a technical bid evaluation.	
	Preparation of test packs	Perform cross check verification against P&Ids and Line List	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Develop an inspection and test plan based on the material requisition and perform all the related test associated. (e.g., radiographic, ultrasonic, penetrant tests) to verify weld and material integrity based Perform hydrostatic pressure tests as per PED/ASME requirements.	Perform intervention points as per approved ITP and test packs. Attendance of pressure testing by No.Bo for Cat. II (10%) III (100%) lines	
	Use materials certified according to ISO 10204 Type 3.1 or 3.2 for traceability.	Verify the material certificates.	
	Identify golden welds and management according to ASME B31.3.	Verification of approved DR and fabrication.	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book (shop fabrication related) Design Examination Certificates (Cat.III only)	
Construction	Installation completed according with the approved design documentation and in accordance with the P&IDs	Ready For Commissioning Certificate issued	
	Perform hydrostatic pressure tests as per PED/ASME requirements.	Verification of test packs and attendance of pressure testing by No.Bo for Cat. II (10%) III (100%) lines.	
	Flange management operations including issuance of joint register	Verification of flange management and associated records	
	Mechanical completion as per test pack	Issuance of RFCC (ready for commissioning certificate)	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book (constuction related)	
Commissioning	Service test of process lines (Gross Air Leak test)	Attendance of the tests and verification of the reports.	
	Leak test of process lines		

Group Code	Description	Tags	
PC0005	Piping System	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Dependencies/Interactions	Pressure Safety Valves	PC007	
	Emergency Shutdown	SD001	
	Blowdown Valves (BDV)	SD002	
	Topside Structures	SI001	

Group Code	Description	Tags	
PC0007	Pressure Safety Valves	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Prevent loss of containment	Basic Design Engineering Package	Refer to TIV reports
	Design Reliability; Meets functional criteria	Basic Design Engineering Package	
	Compliance with PED, API 527, ISO 15158 (Part.1) and ATEX.	Notified Body to verify and approve the design.	
	Compliance with project specific requirements	Company review and approval of the design documents are aligned with project requirements	
	Preparation of Material Requisition that includes all project specific requirements and standard codes as applicable	Compliance to the material requisition by preparing a technical bid evaluation.	
	Compliance with IEC 60079, Parts 14 and 17	Company review and approval of the design documents by suitable qualified personnel according EEHA	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Equipment shall be suitable for use in hazardous areas.	Vendor's Declaration of Conformity to ATEX Vendor's ATEX EC Examination Certification	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Develop an inspection and test plan based on the material requisition and perform all the related test associated. (e.g., radiographic, ultrasonic, penetrant tests) to verify weld and material integrity based Perform hydrostatic pressure tests as per PED, ASME B16.34 requirements. Perform FET as per ISO 15158 Part 1.	Perform intervention points as per approved ITP. Perform hydrotest and fugitive emission tests and verify related report	
	Use materials certified according to ISO 10204 Type 3.1 or 3.2 for traceability.	Verify the material certificates.	
	PED and ATEX endorsement	Stamp of nameplates and issuance of Declaration fo Conformities.	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book including calibration certificate validity.	
Construction	Installation completed according with the approved design documentation and in accordance with the P&IDs	Ready For Commissioning Certificate issued	
	Verification of calibration validity	Re-certification will be performed at an accredited laboratory (ISO 17025)	
	Flange management operations including issuance of joint register	Verification of flange management and associated records	
	Mechanical completion	Verification of the Inspection test report	

Group Code	Description	Tags	
PC0007	Pressure Safety Valves	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Commissioning	Service test of process lines (Gross Air Leak test)	Attendance of the tests and verification of the reports.	
	Leak test of process lines		
Dependencies/Interactions	Pressure Vessels	PC001	
	Piping System	PC005	
	Blowdown Valves (BDV)	SD002	
	Emergency Shutdown System (ESD)	SD001	

Group Code	Description	Tags	
IC001	Hazardous Area Ventilation	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Functionality; Minimise the likelihood and extent of a flammable and/or toxic gas cloud being formed on loss of containment and minimise the potential consequences should a flammable cloud ignite	Layout based on natural ventiliation of open areas	Refer to TIV reports
	Design Reliability; Maintain ventilation for hazardous area enclosure.	Hazard Area Classification	
	Review HVAC system design to ensure it is sized to achieve the required level of overpressure / under pressure	Company review and approval of the design documents are aligned with project requirements	
	Areas which are protected by overpressure / under pressure shall be indicated on the datasheet	Company review and approval of the design documents are aligned with project requirements	
	Alarms upon loss of pressurisation protection shall be indicated ion HVAC and ICSS design	Company review and approval of the design documents are aligned with project requirements	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Perform Factory acceptance test.	Witnessing of the Factory Acceptance test by suitable qualified inspector according EEHA	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book	
Construction	Verify installation in accordance with project mechanical completion procedure	Ready For Commissioning Certificate issued	
Commissioning	Perform testing in accordance with approved procedures to confirm that the HVAC system provides the required differential over/under pressure	Witnessing of the Site Acceptance test by suitable qualified inspector according EEHA and issuance of commissioning reports	
	Perform testing in accordance with approved procedures to confirm that loss of over/under pressure protection generates an alarm in the CCR in accordance with the Cause & Effects diagrams	Witnessing of the Site Acceptance test by suitable qualified inspector according EEHA and issuance of commissioning reports	
Dependencies/Interactions	Topside Structures	SI001	

Group Code	Description	Tags	
IC003	Certified (ex-rated) Electrical Equipment	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Minimise ignition from electrical equipment	Hazardous Area Classification	Refer to TIV reports
	Electrical equipment shall be suitable for hazardous areas	ATEX 2014/34/UE	
	Compliance with ATEX 2014/34/UE	Company Verify and approve the design.	
	Compliance with IEC 60079, Parts 14 and 17	Company review and approval of the design documents by suitable qualified personnel according EEHA	
	Preparation of Material Requisition that includes all project specific requirements and standard codes as applicable	Compliance of the vendor to the material requisition by preparing a technical bid evaluation.	
	Compliance with project specific requirements	Company review and approval of the design documents are aligned with project requirements	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Electrical equipment shall be suitable for use in hazardous areas.	Vendor's Declaration of Conformity to ATEX Vendor's ATEX EC Examination Certification	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Provide a ATEX declaration of conformity	Verify the material certificates.	
	Population of ATEX register	Verify completion of ATEX register	
	Perform Factory acceptance test.	Witnessing of the Factory Acceptance test by suitable qualified inspector according EEHA	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book	
Construction	Installation completed according to the approved design documentation	Ready For Commissioning Certificate issued	
Commissioning	Issuance of OTP	Compliance to OTPs.	
	SAT including ATEX inspection	Witnessing of the Site Acceptance test by suitable qualified inspector according EEHA and issuance of commissioning reports	
Dependencies/Interactions	SD001 Emergency Shutdown	SD001	
	DS001 Fire & Gas Detection	DS001	
	IC001 Hazardous Area Ventilation	IC001	
	IC005 Earth Bonding	IC005	

Group Code	Description	Tags	
IC005	Electrical Earthing Continuity & Bonding	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Functionality; Prevent build up of static electricity	Basic Design Engineering Package	Refer to TIV reports
	All equipment & structures to be designed with electrical earthing and bonding	Basic Design Engineering Package	
	Packaged equipment shall be specified to comply with applicable earthing codes/standards	Company review and approval of the design documents by suitable qualified personnel according EEHA	
	For piping and structures, the Electrical Design Philosophy and Earthing Installation drawings shall comply with applicable earthing codes/standards	Company review and approval of the design documents are aligned with project requirements	
Procurement	Vendor design documentation and certification shall be reviewed to confirm compliance with the applicable earthing codes/ standards	Company review and approval of the design documents are aligned with project requirements	
	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Perform Factory acceptance test.	Witnessing of the Factory Acceptance test by suitable qualified inspector according EEHA	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book	
Construction	Confirm by survey that electrical Earthing continuity has been as per the design drawings.	Mechancial completion checks and compilation of related ITRs	
	Perform electrical earthing continuity testing for all piping	Mechancial completion checks and compilation of related ITRs	
	Structures, electrical and mechanical equipment	Mechancial completion checks and compilation of related ITRs	
	Perform electrical earthing continuity testing and ensure no significant recordable faults in the earth bond systems: Static Earth reels continuity reading < 10 ohms, Earthing terminations secure and no damage to earth equipment/cable.	Mechancial completion checks and compilation of related ITRs	
Commissioning	N/A	N/A	
Dependencies/Interactions	Hazardous Area	IC001	
	Certified (ex-rated) Electrical Equipment	IC003	

Group Code	Description	Tags	
IC007	Inert Gas Blanket System	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Systems that are vented to atmosphere and contain hazardous gas shall be provided with a purge or blanket system to avoid creation of explosive gas mixture	Basic Design Engineering Package	Refer to TIV reports
	Design calculations shall establish maximum purge flow demands for vessel or tanks which are vented to atmosphere and contain hazardous fluids in accordance with approved procedures	Company review and approval of the design documents by suitable qualified personnel according EEHA	
	Purge feed systems shall be sized to meet the maximum purge demand	Company review and approval of the design documents are aligned with project requirements	
	Purging systems shall be shown on P&IDs; isolation valves on purge feed lines will be specified as locked or tagged open	Company review and approval of the design documents are aligned with project requirements	
	Trip & Alarm Schedule and P&IDs shall show alarms raised at the CCR	Company review and approval of the design documents are aligned with project requirements	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Undertake activities defined in ITP for manufacture and testing of IG / nitrogen generation package	Verification that all ITP activities are included in the Material Requisition	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Perform Factory acceptance test.	Witnessing of the Factory Acceptance test by suitable qualified inspector	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book	
Construction	Confirm by inspection that purge systems are installed in accordance with the design	Mechancial completion checks and compilation of related ITRs	
Commissioning	Perform testing in accordance with approved procedures to confirm that purge gas is delivered at the required rates.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
	Confirm that all isolation valves on purge feed lines are locked or tagged open	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
Dependencies/Interactions	Fuel Gas Purge System	IC006	
	Topside Structures	SI001	

Group Code	Description	Tags	
DS001	Fire and Gas Detection	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function:The F&G Detection System shall provide automatic early detection and monitoring for flame and gas detectors.	Basic Design Engineering Package	Refer to TIV reports
	Design of fire detector types and their arrangement/layout shall consider potential fire sources and characteristics, consequences, area and equipment arrangement and environmental conditions so as to provide detection suitable for the hazard expected in the area	Company Verify and approve the design.	
	A fire & gas mapping study shall assess the suitability of the detector configuration and confirm that sufficient detectors are provided	Company review and approval of the design documents are aligned with project requirements	
	The F&G Philosophy and equipment specifications shall specify that the fire detection system shall be configured for continuous monitoring	Company review and approval of the design documents are aligned with project requirements	
	The F&G Philosophy shall specify the internal areas and ventilation air intakes where fire detection is required	Company review and approval of the design documents are aligned with project requirements	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Perform Factory acceptance test.	Witnessing of the Factory Acceptance test by suitable qualified inspector	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book	
Construction	Perform surveys to confirm that fire detectors are in the correct locations as per the fire and gas layouts and the fire detector coverage is not obstructed by any other equipment.	Mechancial completion checks and compilation of related ITRs	
Commissioning	Perform testing in accordance with approved procedures to confirm that the fire detection devices are functioning satisfactorily.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
Dependencies/Interactions	Emergency Shutdown System	SD001	
	Communication Systems	ER004	
	Primary Muster Areas	ER001	
	Certified Electrical Equipment	IC003	
	Uninterrupted Power Supply (UPS)	ER005	

Group Code	Description	Tags	
PS002	Fire and Explosion Protection	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Provide structural barriers to prevent Fire &/or Explosion	Basic Design Engineering Package	Refer to TIV reports
	Review layout drawings to confirm compliance with Safety Philosophy and outputs from the Fire and Explosion studies.	Company Verify and approve the design.	
	Review structural calculations and drawings to confirm compliance.	Company review and approval of the design documents are aligned with project requirements	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	See references in the Dependencies and Interaction section.	See references in the Dependencies and Interaction section.	
Construction	Confirm by inspection and review of mechanical completion records to confirm installation is in accordance with the design.	Mechancial completion checks and compilation of related ITRs	
Commissioning	N/A	N/A	
Dependencies/Interactions	Topside Structures	SI002	
	Passive Fire Protection	PS006	

Group Code	Description	Tags	
PS015	Collision Avoidance System	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design function; Collision warning system to provide sufficient coverage around the installation to alert personnel and marine traffic of a potential collision course with the installation.	Basic Design Engineering Package	Refer to TIV reports
	Design Reliability; To continue functioning on loss of main and emergency power generation.	Collision Avoidance Systems shall have an uninterruptible power supply that allows continued operation	
	Collision avoidance system equipment specifications and datasheets shall specify the requirement for compliance with The Electromagnetic Compatibility Regulations	Company Verify and approve the design.	
	The collision avoidance system equipment specifications and datasheets shall specify the ingress protection required	Company review and approval of the design documents are aligned with project requirements	
Procurement	Review vendor equipment datasheets, design dossier and certification to confirm ingress protection is correctly specified		
	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Electrical equipment shall be suitable for use in hazardous areas.	Vendor's Declaration of Conformity to ATEX Vendor's ATEX EC Examination Certification	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Perform Factory acceptance test.	Witnessing of the Factory Acceptance test by suitable qualified inspector	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book	
Construction	Confirm by inspection that collision avoidance system equipment is installed in accordance with the design, and that the installed equipment data matches the certification records	Mechancial completion checks and compilation of related ITRs	
Commissioning	Perform testing in accordance with approved procedures to confirm satisfactory performance	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
Dependencies/Interactions	ER005 Uninterrupted Power Supply (UPS)	ER005	

Group Code	Description	Tags	
SD001	Emergency Shutdown System (ESD)	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; The ESD System shall initiate the procedure to convey the system to a safe condition and avoid major accident hazard. It has to be designed to minimize the consequnces of emergency situations.	Basic Design Engineering Package	Refer to TIV reports
	Design Reliability; Meets functional criteria	Basic Design Engineering Package	
	Complete HAZOP	Company Verify and approve the design.	
	Review of P&IDs, Trip & Alarm Schedule and Shutdown C&E Diagrams	Company review and approval of the design documents are aligned with project requirements	
	Selection of instruments in accordance with project specifications.		
	Review of the instrument specification and data sheets for detection devices.		
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	N/A	N/A	
Construction	Installation completed according with the approved design documentation and in accordance with the P&IDs	Mechancial completion checks and compilation of related ITRs	
	Mechanical completion of instrument loops.	Mechancial completion checks and compilation of related ITRs	
Commissioning	Complete calibration & confirm functionality of instruments as per commissioning procedure & check sheets.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
Dependencies/Interactions	Emergency Shutdown System (ESD)	SD001	

Group Code	Description	Tags	
SD002	Blowdown Valves (BDV)	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function: Facilitate emergency depressurisation of flammable or harmful inventories	Basic Design Engineering Package	
	Design Reliability; Meets functional criteria	Basic Design Engineering Package	
	Compliance with PED	Notified Body to verify and approve the design (Only for Cat.III)	
	Compliance with project specific requirements	Company review and approval of the design documents are aligned with project requirements	
	Preparation of Material Requisition that includes all project specific requirements and standard codes as applicable	Compliance to the material requisition by preparing a technical bid evaluation.	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Develop an inspection and test plan based on the material requisition and perform all the related test associated. (e.g., radiographic, ultrasonic, penetrant tests) to verify weld and material integrity based Perform hydrostatic pressure tests as per PED requirements.	Perform intervention points as per approved ITP and test packs. Attendance of pressure testing by No.Bo	Refer to TIV reports
	Use materials certified according to ISO 10204 Type 3.1 or 3.2 for traceability.	Verify the material certificates.	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book (shop fabrication related)	
Construction	Installation completed according with the approved design documentation and in accordance with the P&IDs	Ready For Commissioning Certificate issued	
	Mechanical completion as per test pack	Issuance of RFCC (ready for commissioning certificate)	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book (constuction related)	
Commissioning	Perform testing in accordance with approved procedures to confirm satisfactory performance	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
Dependencies/Interactions	Fire + Explosion Protection	PS002	
	Pressure Safety Valves	PC007	
	Passive Fire Protection	PS006	

Group Code	Description	Tags	
SD006	Emergency Shutdown Valves (SDV)	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Shutdown valves shall close on demand to isolate process and prevent fire and explosion scenarios	Review P&IDs and Cause & Effect Diagrams in conjunction with HAZOP Reports to confirm that shutdown valve is sized correctly	
	Design Reliability; Meets functional criteria	Basic Design Engineering Package	
	Compliance with PED	Notified Body to verify and approve the design (Only for Cat.III)	
	Compliance with project specific requirements	Company review and approval of the design documents are aligned with project requirements	
	Preparation of Material Requisition that includes all project specific requirements and standard codes as applicable	Compliance to the material requisition by preparing a technical bid evaluation.	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Develop an inspection and test plan based on the material requisition and perform all the related test associated. (e.g., radiographic, ultrasonic, penetrant tests) to verify weld and material integrity based Perform hydrostatic pressure tests as per PED requirements.	Perform intervention points as per approved ITP and test packs. Attendance of pressure testing by No.Bo	Refer to TIV reports
	Use materials certified according to ISO 10204 Type 3.1 or 3.2 for traceability.	Verify the material certificates.	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book (shop fabrication related)	
Construction	Installation completed according with the approved design documentation and in accordance with the P&IDs	Ready For Commissioning Certificate issued	
	Mechanical completion as per test pack	Issuance of RFCC (ready for commissioning certificate)	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book (constuction related)	
Commissioning	Perform testing in accordance with approved procedures to confirm satisfactory performance	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
Dependencies/Interactions	Emergency Shutdown System	SD001	

Group Code	Description	Tags	
SD009	Utility Air	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; To prevent an unplanned and / or out-of-sequence operation of safety critical air controlled equipment, such as emergency shutdown valves. Assuring that continuos operation is guaranteed.	Basic Design Engineering Package	Refer to TIV reports
	Compliance with PED and ASME B31.3	Notified Body to verify and approve the design (Only for Cat.III piping)	
	Compliance with project specific requirements	Company review and approval of the design documents are aligned with project requirements	
	Preparation of Material Requisition that includes all project specific requirements and standard codes as applicable	Compliance to the material requisition by preparing a technical bid evaluation.	
	Preparation of test packs	Perform cross check verification against P&Ids and Line List	
Procurement	Issuance to vendor of Material Requisition that includes all project specific requirements and standard codes as applicable	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Control over the supply chain.	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabrication/Manufacture	Develop an inspection and test plan based on the material requisition and perform all the related test associated. (e.g., radiographic, ultrasonic, penetrant tests) to verify weld and material integrity based Perform hydrostatic pressure tests as per PED/ASME requirements.	Perform intervention points as per approved ITP and test packs. Attendance of pressure testing by No.Bo for Cat. II (10%) III (100%) lines	
	Use materials certified according to ISO 10204 Type 3.1 or 3.2 for traceability.	Verify the material certificates.	
	Identify golden welds and management according to ASME B31.3.	Verification of approved DR and fabrication.	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book (shop fabrication related)	
Construction	Installation completed according to the approved design documentation	Ready For Commissioning Certificate issued	
	Perform hydrostatic pressure tests as per PED/ASME requirements.	Verification of test packs and attendance of pressure testing by No.Bo for Cat. II (10%) III (100%) lines.	
	Flange management operations including issuance of joint register	Verification of flange management and associated records	
	Mechanical completion as per test pack	Issuance of RFCC (ready for commissioning certificate)	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book (constuction related)	
Commissioning	Service test of process lines (Gross Air Leak test)	Attendance of the tests and verification of the reports.	
	Leak test of process lines		
Dependencies/Interactions	Fire + Explosion Protection	PS002	
	Pressure Safety Valves	PC007	
	Passive Fire Protection	PS006	

Group Code	Description	Tags	
ER001	Muster Area	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function, To provide a location that protects personnel from the effects of explosion, fire, heat, smoke, and fumes.	Review layout drawings to confirm that the Muster Area boundaries are specified to enclose and effectively protect	Refer to TIV reports
	All escape routes to be modelled in PDMS model.	Company review and approval of the design documents are aligned with project requirements	
	Review layout drawings to confirm escape route provision & dimensions meet project criteria	Company review and approval of the design documents are aligned with project requirements	
	Review layout drawings to check type, numbers and distribution of signage and marking	Company review and approval of the design documents are aligned with project requirements	
Procurement	N/A	N/A	
Fabrication/Manufacture	N/A	N/A	
Construction	Verify evacuation routes against Lifesaving, Escape Route drawings	Mechancial completion checks and compilation of related ITRs	
	Inspection of doors/hatches on escape routes	Mechancial completion checks and compilation of related ITRs	
	Ensure that no offshore construction and outfitting works have obstructed evacuation routes prior to start-up	Mechancial completion checks and compilation of related ITRs	
Commissioning	N/A	N/A	
Dependencies/Interactions	Emergency Shutdown System (ESD)	SD001	
	Fire and Gas Detection	DS001	
	Emergency / Escape Lighting	ER003	
	Escape and Evacuation Routes	ER002	
	Personal Survival Equipment	LS001	
	Topsides Structures	SI002	

Group Code	Description	Tags	
ER002	Escape Routes	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Provide sufficient readily identifiable routes for all personnel to reach their designated muster point and/or access escape and evacuation facilities if necessary.	Confirm by review of Escape route drawings that the escape routes comply with the design requirements	Refer to TIV reports
	All escape routes to be modelled in PDMS model.	Company review and approval of the design documents are aligned with project requirements	
	Review layout drawings to confirm escape route provision & dimensions meet project criteria	Company review and approval of the design documents are aligned with project requirements	
	Review layout drawings to check type, numbers and distribution of signage and marking	Company review and approval of the design documents are aligned with project requirements	
	Undertake Evacuation, Escape and Rescue Analysis and implement any design changes necessary	Company review and approval of the design documents are aligned with project requirements	
Procurement	N/A	N/A	
Fabrication/Manufacture	N/A	N/A	
Construction	Verify evacuation routes against Lifesaving, Escape Route drawings	Mechancial completion checks and compilation of related ITRs	
	Inspection of doors/hatches on escape routes	Mechancial completion checks and compilation of related ITRs	
	Ensure that no offshore construction and outfitting works have obstructed evacuation routes prior to start-up	Mechancial completion checks and compilation of related ITRs	
Commissioning	N/A	N/A	
Dependencies/Interactions	Emergency / Escape Lighting	ER003	
	Blowdown Valves (BDV)	SD002	
	Fire and Explosion Protection	PS002	
	Personal Survival Equipment	LS001	
	Alternate means of escape (Liferaft)	LS004	

Group Code	Description	Tags	
ER003	Emergency / Escape Lighting	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Provide adequate illumination at all time on escape/evacuation routes, at designated emergency response locations and act at abandonment/escape points following loss of main power supply.	Review lighting layouts in conjunction with lighting calculations and escape route layout drawings to confirm that the emergency lighting layout specified is appropriate	Refer to TIV reports
	Lighting calculations carried out to confirm illumination levels meet requirements.	Company review and approval of the design documents are aligned with project requirements	
	Lighting layouts issued to reflect required design	Company review and approval of the design documents are aligned with project requirements	
Procurement	Electrical equipment shall be suitable for use in hazardous areas.	Vendor's Declaration of Conformity to ATEX Vendor's ATEX EC Examination Certification	
	Verify the material requisition. Review vendor submissions to confirm they are technically acceptable and meet the requirements of specification.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
Fabrication/Manufacture	N/A	N/A	
Construction	Verify that luminaires are installed as per lighting layouts.	Mechancial completion checks and compilation of related ITRs	
	Undertake test and review test records so that light levels in all platform areas comply with requirements when main, & emergency power supplies have been disconnected	Mechancial completion checks and compilation of related ITRs	
Commissioning	Complete calibration & confirm functionality of lighting as per commissioning procedure & check sheets.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
Dependencies/Interactions	ER007 Emergency Power	ER007	
	Uninterrupted Power Supply (UPS)	ER005	

Group Code	Description	Tags	
ER004	Communication System	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; Safety Critical telecommunications equipment is required during a Major Accident to enable co-ordination of emergency response and allow for escape, muster and evacuation	Basic Design Engineering Package	Refer to TIV reports
	Design Reliability; Communication systems to be available on demand as far as reasonably practicable.	Communication systems shall be fed from totally separate independent Un-interruptible Power Supplies	
	Review telecoms equipment layout drawings & block diagrams to confirm internal means of communication (e.g. UHF radio, telephone system, status lights) comply with the criteria.	Company review and approval of the design documents are aligned with project requirements	
	Confirm requirements are detailed in specification.	Company review and approval of the design documents are aligned with project requirements	
Procurement	Electrical equipment shall be suitable for use in hazardous areas.	Vendor's Declaration of Conformity to ATEX Vendor's ATEX EC Examination Certification	
	Review vendor submissions to confirm they are technically acceptable and meet the requirements of specification	Verify and review the documentation provided Suppliers Declaration of Conformity	
Fabrication/Manufacture	Witness telecoms equipment FAT to confirm supplied equipment is in line with design requirements.	Witnessing of the Factory Acceptance test by suitable qualified inspector	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book	
Construction	Confirm telecoms system equipment is installed as per design requirements	Mechancial completion checks and compilation of related ITRs	
Commissioning	Witness commissioning of telecoms equipment to confirm satisfactory operation.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
Dependencies/Interactions	Temporary Refuge / Primary Muster Areas	ER001	
	Certified Electrical Equipment	IC003	
	Uninterrupted Power Supply (UPS)	ER005	

Group Code	Description	Tags	
ER005	Uninterruptible Power System (UPS)	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; UPS systems shall maintain power supply to safety critical systems for a defined period when main power supply fails	Basic Design Engineering Package	Refer to TIV reports
	Design Reliability; To provide uninterruptible power supply on demand.	UPS system equipment shall be designed and manufactured in accordance with the EMC directive 2014/30/EU.	
	Review UPS specification and data sheets	Company review and approval of the design documents are aligned with project requirements	
	Review UPS single line diagrams and load schedule.	Company review and approval of the design documents are aligned with project requirements	
Procurement	Review vendor submissions, including battery sizing calculations, to confirm they are technically acceptable and meet the requirements of specification	Verify and review the documentation provided Suppliers Declaration of Conformity	
Fabrication/Manufacture	Witness telecoms equipment FAT to confirm supplied equipment is in line with design requirements.	Witnessing of the Factory Acceptance test by suitable qualified inspector	
	Manufacturer Record Book aligned with project specifications	Review and approve Manufacturer Record Book	
Construction	Confirm by inspection that UPS systems are installed as per design requirements	Mechancial completion checks and compilation of related ITRs	
Commissioning	Witness commissioning of UPS systems to confirm supplied equipment functions satisfactorily in accordance with design requirements.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
	The design of the UPS shall inhibit boost charge in the event of H2, initiate any additional ventilation (if required)	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
Dependencies/Interactions	Primary Muster Areas	ER001	
	Certified Electrical Equipment	IC003	

Group Code	Description	Tags	
LS001	Personal Survival Equipment	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Design Function; To provide personal protection during emergency situations including evacuation to the sea.	Compliance with SOLAS (Safety of Life at Sea), Lifesaving Appliances Code requirements.	Refer to TIV reports
	Review specifications, datasheets & layout drawings to ensure that lifejackets are specified as required.	Company review and approval of the design documents are aligned with project requirements	
Procurement	Review vendor submissions to confirm they are technically acceptable and meet the requirements of specification	Verify and review the documentation provided	
	Review vendor declarations or certificates of conformity to confirm that survival suits /transit suits are in accordance with legislative, code and project requirements	Verify and review the documentation provided	
Fabrication/Manufacture	N/A	N/A	
Construction	Confirm by inspection that survival suits /transit suits are installed in accordance with the design	Mechancial completion checks and compilation of related ITRs	
	Check certification of survival suits / transit suits is current and valid	Mechancial completion checks and compilation of related ITRs	
Commissioning	N/A	N/A	
Dependencies/Interactions	TR/Primary Muster Areas	ER001	
	Communication Systems	ER004	
	Escape and Evacuation Routes	ER002	
	Personal Survival Equipment	LS004	

Group Code	Description	Tags	
LS004	Alternate means of escape (Liferaft)	Various - LIST ITEMS & TAG NUMBERS	
Phase	**Criteria**	**Assurance**	**Verification**
Design	Cambia con definizione in CHAT	Class Approval Letter for sufficient number of life raft places and suitable distribution of type and sizes of life rafts	Refer to TIV reports
	Review specifications, datasheets & layout drawings to ensure that escape kits are specified as required.	Company review and approval of the design documents are aligned with project requirements	
Procurement	Review vendor submissions to confirm they are technically acceptable and meet the requirements of specification	Verify and review the documentation provided	
	Review vendor declarations or certificates of conformity to confirm that survival suits / transit suits are in accordance with legislative, code and project requirements	Verify and review the documentation provided	
Fabrication/Manufacture	N/A	N/A	
Construction	Confirm by inspection that escape kits/liferaft are installed in accordance with the design	Mechancial completion checks and compilation of related ITRs	
	Check certification is current and valid	Mechancial completion checks and compilation of related ITRs	
Commissioning	N/A	N/A	
Dependencies/Interactions	Escape and Evacuation Routes	ER002	
	Fire and Explosion Protection.	PS002	
	Personal Survival Equipment (PSE)	LS001	