Base Load Power Hub (BLPH)

Safety Critical Elements (SCE) and Performance Standard

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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.

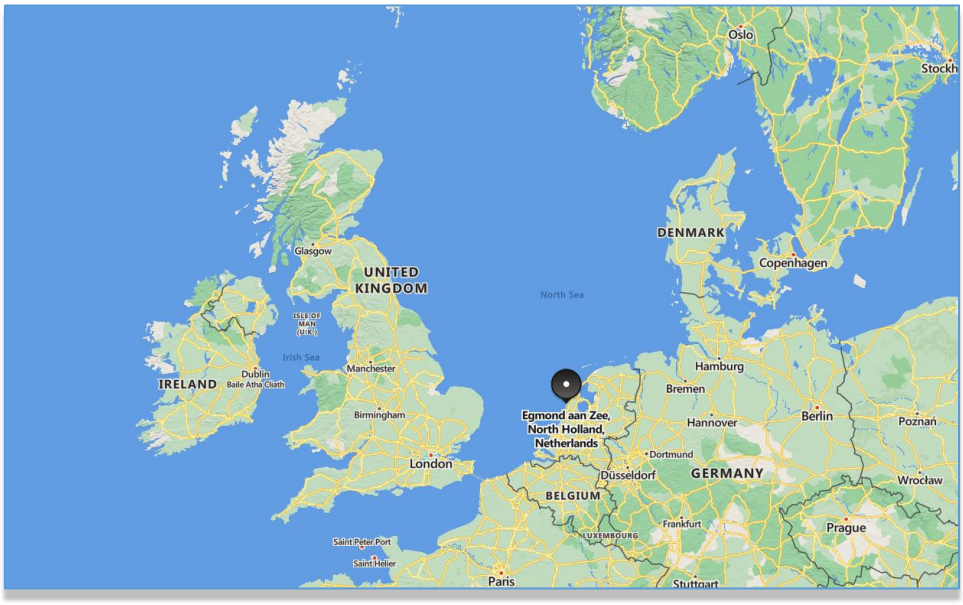


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

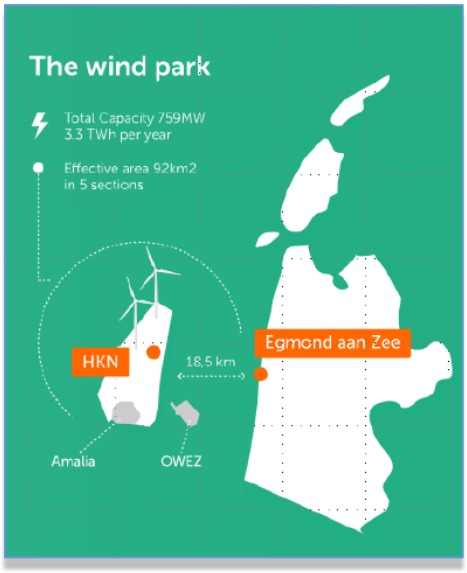


Figure 2 - Wind Park Details

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.

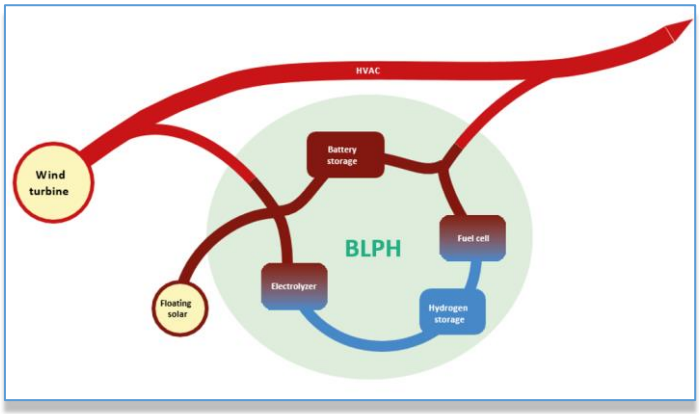


Figure 3 – BLPH Concept

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.

2. DOCUMENT SCOPE

This document has the purpose of identify the Safety Critical Elements (SCE) and relevant Performance Standards (PS) in the scope of BLPH project.

SCE are defined as the elements which can be subjected to failure and substantially cause, contribute, prevent or help recover from a major accident hazard or event on the platform, and the purpose of Performance Standard is to determine maintenance testing activities necessary to maintain SCE in suitable working conditions.

2.1 MAIN REFERENCES

Ref.	Description
1	BLPH_MODEL_15-01-24 (3D model of platform)
2	123A90-DDL-PP-DL-70070 - Base Load Power Hub (BLPH) - Plot Plan - Lower & Upper deck
3	123A90-DDL-PP-DL-70071- Base Load Power Hub (BLPH) - Plot Plan - Below Lower deck
4	123A90-DDL-PR-RE-80040 – Process Design Philosophy
5	123A90-DDL-PR-DG-80003//123A90-DDL-PR-DG-80005- PFD
6	123A90-DDL-PR-PID-80010//123A90-DDL-PR-PID-80029- PID
7	123A90-DDL-IN-CE-40000 - Process Safety Cause & Effect Matrix
8	123A90-DDL-SAF-RE-30046 – HSE Design Philosophy, rev 01, 16/10/2023
9	123A90-DDL-PR-BL-80002 – H&MB, rev 01, 09/11/2023
10	K559-2254-PM-PLN-003 – BDEP – Basic Desing Engineering Package revision 1
11	123A90-DDL-SAF-RE-30009 – HAZID Report
12	123A90-DDL-SAF-RE-30006 – HAZOP Report
13	144671-VOOW-TF-ENG-REP-1056 Ship impact for BLPH
14	123A90-DDL-SAF-RE-30019 - Quantified Risk Assessment (QRA) Report
15	123A90-DDL-SAF-RE-30020 - Fire and Explosion Risk Analysis (FERA) report
16	123A90-DDL-SAF-RE-30015 - Evacuation, Escape and Rescue Assessment (EERA) Report

Ref.	Description
17	123A90-DDL-SAF-RE-30041 - Noise Assessment Study Report
18	123A90-DDL-SAF-RE-30022 – Hazardous Area Classification Area Lower and upper Deck
19	123A90-DDL-SAF-DL-30024– Hazardous Area Classification Area Elevation Looking North & East
20	123A90-DDL-SAF-DL-30025 – Escape Routes, Firefighting; Life Saving Equipment and Safety Equipment Layout Drawings
21	K559-2254-SE-REP-018 - BLPH SCE Identification (note: study for FEED phase)
22	123A90-DDL-SAF-DL-30028 – F&G detection Layout
23	123A90-DDL-SAF-RE-30001 - Fire protection philosophy
24	123A90-DDL-TL-SP-45007 - Telecom System Specification & Philosophy
25	123A90-DDL-EL-RE-20154 - Lightning Protection System Calculation Report

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

2.2.1 Definitions

COMPANY or Client (CPY):	Crosswind
EPC CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
CONSEQUENCES	The outcome of an event. For the purpose of this project, the outcome is identified in terms of harm to exposed persons and assets.
EVENT	Occurrence or change of a particular set of circumstances.
HAZARD	Situation having the potential to cause harm, including ill health and injury, damage to property, production losses or increased liabilities
FAILURE	Damage of equipment which can lead to release of substances from the process.
FIRE	The outcome of combustion of flammable substance released in the atmosphere as a consequence of a LOC, which can produce effects to exposed persons and to process equipment and structure due to thermal radiation.

MAJOR ACCIDENT	Major Accident can be defined as: - a fire, explosion or the release of a dangerous substance involving death or serious personal injury to persons on the installation or engaged in an activity on or in connection with it; - any event involving major damage to the structure of the installation or plant affixed thereto or any loss in the stability of the installation or major environmental impact
MAJOR ACCIDENT HAZARD	Source of danger that has the potential to cause a Major Accident
LOSS OF CONTAINMENT	The event associated with the release of a hazardous substance from equipment leading to a potential accident scenario
RANDOM LOSS	A loss of containment from piping and equipment due to random causes which leads to a release of a hazardous substance in the environment.
TOP EVENT	The identification and quantification of a Major Accident

Table 2 - Definitions

2.2.2 Abbreviations

BDV	Blow Down Valve
BDES	Basic Design and Engineering Package
BESS	Battery Energy Storage System
BLPH	Base Load Power Hub
DEPs	Design and Engineering Practices
EERA	Escape, Evacuation and Rescue Assessment
ESD	Emergency Shut Down system
F&G	Fire and Gas
FERA	Fire and Explosion Risk Assessment
HAZID	Hazard Identification Study
HAZOP	Hazard and Operability Study
H&MB	Heat and Material Balance
HKN	Hollandse Kust Noord
HSE	Health, Safety and Environment
LOC	Loss Of Containment
MAH	Major Accident Hazard
PID	Piping and Instrumentation Diagram
PFD	Process Flow Diagram

POB	Person On Board
PSV	Pressure Safety Valve
QRA	Quantitative Risk Assessment
SCE	Safety Critical Element
SDV	Emergency Shut Down Valve
UPS	Uninterruptable Power System

Table 3 - Abbreviations

3. SAFETY CRITICAL ELEMENTS

3.1 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

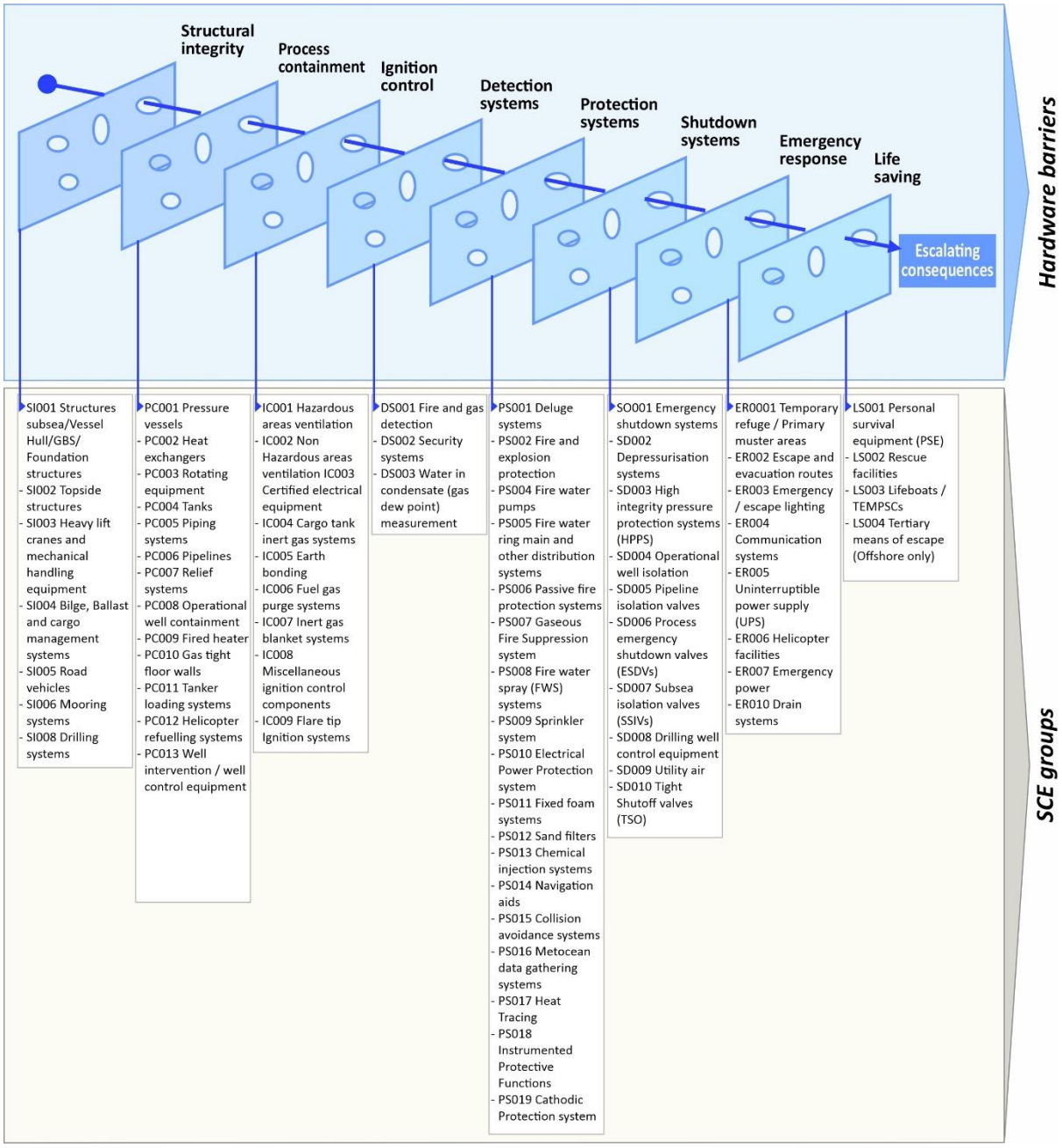


Figure 4 –Hardware barrier and SCE groups

3.2 MAH AND SCE IDENTIFICATION

The process of MAH identification for the installation was already undergone during the previous phase of the project [21], and can be summarized in the following two Major Hazards:

- Hydrogen Release:

  The identified MAH is associated to the potential risk of loss of containment (LOC) of Hydrogen gas which might evolve in terms of fire scenario or explosion with impact to personnel safety and for platform structure. The risks associated to Hydrogen release has been identified with reference to the results of the HAZID [11], HAZOP [12], and QRA [14] studies. The result of a hydrogen release might lead to fire and explosion.

- Marine Vessel Collision:

  The identified MAH is associated to the potential risk of boat collision to the platform which might evolve in terms of structure loss of stability. The risks associated to critical structure has been identified with reference to the results of the HAZID [11] and Ship impact [13] studies.

- Thermal Runaway within BESS:

  The identified MAH is associated to the potential risk of thermal runaway within BESS during maintenance activities which might evolve in terms internal explosion with impact to personnel safety and for platform structure. The risks associated to critical structure has been identified with reference to the results of the HAZID [11] study.

The SCE groups identified through the analysis of the MAHs are summarized in the following table 4. For each SCE group, the table reports the relation to the identified MAHs.

SCE Category (Hardware Barrier)		SCE Groups		MAH_01 Hydrogen Release with Fire and Explosion	MAH_02 Marine Vessel Collision	MAH_03 TR within BESS
SI	Structural integrity	SI001	Subsea structures		X	
		SI002	Topside structures		X	
PC	Process Containment	PC001	Pressure vessel	X		
		PC005	Piping system	X		
		PC007	Relief System (PSV)	X		
IC	Ignition Control	IC001	Hazardous area ventilation	X		X

SCE Category (Hardware Barrier)		SCE Groups		MAH_01 Hydrogen Release with Fire and Explosion	MAH_02 Marine Vessel Collision	MAH_03 TR within BESS
		IC002	Non-Hazardous area ventilation	X		X
		IC003	Certified (ex-rated) electrical equipment	X		X
		IC005	Electrical earthing continuity & bonding	X		X
		IC007	Inert gas blanket system	X		
DS	Detection Systems	DS001	Fire and gas detection	X		X
PS	Protection Systems	PS002	Fire and explosion protection	X		X
		PS015	Collision Avoidance System		X	
SD	Shutdown system	SD001	Emergency Shutdown System (ESD)	X		X
		SD002	Blowdown Valves (BDV)	X		
		SD006	Emergency Shutdown Valves (SDV)	X		X
		SD009	Utility Air	X		
ER	Emergency Response	ER001	Muster Area	X	X	X
		ER002	Escape Routes	X	X	X
		ER003	Emergency / Escape Lighting	X	X	X
		ER004	Communication System	X	X	X
		ER005	Uninterruptible Power System (UPS)	X		X
LS	Life Saving	LS001	Personal Survival Equipment	X	X	X
		LS002	Alternate means of escape (liferaft)	X	X	X

Table 4 – SCE Group and association to MAH

3.3 SCE REGISTER

The above list of SCE group has been developed also at TAG level, analysing the relevant documentation in order to provide the list of the critical elements in a proper SCE register.

The analysis has not taken into account those elements which are not continuously present on the platform but are brought on board from crew when entering the platform, such as:

- Portable eye wash station
- Portable phone

The reason is that those elements are not associated only to the subject platform and for those elements is already present a dedicated control and maintenance plan.

The SCE register has been provided as a worksheet, organized by column, in which are reported the following information:

- SCE TAG Unique identification Tag of the SCE.
- Description Brief description of functionality of the SCE.
- SCE Group Identification of the SCE group, on basis of the categories provided in Table 4 .
- CODE SCE unique code based on TAG and SCE category.
- Notes Explanation notes for the completeness of information.

The analysis led to the identification of an overall number of 620 SCEs, categorized in 23 SCE groups.

The SCE register is reported in ATTACHMENT 1.

4. PERFORMANCE STANDARDS

The purpose of Performance Standard activity is to determine maintenance testing activities necessary to maintain SCE in suitable working conditions, and to elaborate the Performance Standard (PS) cards for each typology of element of the platform which have been classified as SCE.

One PS card has been elaborated for each SCE category as defined in section 3.2.

PS cards have been structured in header part and detailed part.

The header part contains following information:

- SCE ID / Description: Description and code of SCE category as per section 3.2
- SCE boundaries: equipment / components to be included
- SCE Goal: Information about SCE function / purpose
- Interactions & Dependencies: influence on / by others main equipment / systems

The detailed part contains following information, divided for all the elements which comprise the SCE category:

- functionality criteria: Specific function of the element
- performance measure: required performance of the element
- assurance method: specific parameter to check (if any)
- operating instructions (including testing frequency)
- reliability criteria: how often the SCE should be operational and available for use.
- Survivability criteria: conditions under which the SCE must remain operational, including during adverse events

The PS cards (one for each SCE Group) are reported in ATTACHMENT 2.

ATTACHMENT 1 – SCE REGISTER

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
SI001 SUBSEA STRUCTURE				
BLPH-STRUCTURES	BLPH SUBSEA STRUCTURES	SI001	SI001-BLPH-STRUCTURES	
SI002 TOPSIDE STRUCTURES				
BLPH-TOPSIDE	BLPH TOPSIDE AND PRIMARY STRUCTURE	SI002	SI002-BLPH-TOPSIDE	
PC001 VESSELS				
V-25001A	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001A	PC001	PC001-V-25001A	
V-25001B	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001B	PC001	PC001-V-25001B	
V-25001C	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001C	PC001	PC001-V-25001C	
V-25001D	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001D	PC001	PC001-V-25001D	
V-25001E	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001E	PC001	PC001-V-25001E	
V-25001F	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001F	PC001	PC001-V-25001F	
V-43001	HYDROGEN VENT KO DRUM V-43001	PC001	PC001-V-43001	
Q-43004	HYDROGEN VENT Q-43004	PC001	PC001-Q-43004	
PC005 PIPING SYSTEM				
1"-HY-007-03HSS-N	FROM ELECTROLYZER PACKAGE (A-20000) TO HYDROGEN STORAGE VESSELS HEADER (INLET)	PC005	PC005-1"-HY-007-03HSS-N	
2"-VL-003-01HSS-N	A20000 VENT LINE	PC005	PC005-2"-VL-003-01HSS-N	
1"-HY-007-03HSS-N	H2 COMMON INLET LINE TO STORAGE VESSELS	PC005	PC005-1"-HY-007-03HSS-N	
1"-HY-143-03HSS-N	FROM 1"-HY-007-03HSS-N TO 25-BDV-003 (VENT LINE)	PC005	PC005-1"-HY-143-03HSS-N	
1"-VL-014-01HSS-N	H2 DISTRIBUTION LINE TO STORAGE VESSELS VENT LINE	PC005	PC005-1"-VL-014-01HSS-N	
1"-HY-015-03HSS-N	H2 INLET LINE TO HYDROGEN STORAGE VESSEL V-25001A	PC005	PC005-1"-HY-015-03HSS-N	
1"-HY-016-03HSS-N	H2 INLET LINE TO HYDROGEN STORAGE VESSEL V-25001B	PC005	PC005-1"-HY-016-03HSS-N	
1"-HY-017-03HSS-N	H2 INLET LINE TO HYDROGEN STORAGE VESSEL V-25001C	PC005	PC005-1"-HY-017-03HSS-N	

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SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
1"-HY-018-03HSS-N	H2 INLET LINE TO HYDROGEN STORAGE VESSEL V-25001D	PC005	PC005-1"-HY-018-03HSS-N	
1"-HY-019-03HSS-N	H2 INLET LINE TO HYDROGEN STORAGE VESSEL V-25001E	PC005	PC005-1"-HY-019-03HSS-N	
1"-HY-020-03HSS-N	H2 INLET LINE TO HYDROGEN STORAGE VESSEL V-25001F	PC005	PC005-1"-HY-020-03HSS-N	
1"-HY-024-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001A TO 25-PSV-001A (VENT LINE)	PC005	PC005-1"-HY-024-03HSS-N	
3"-HY-142-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001A TO 25-BDV-005/25-PV-005 (VENT LINE)	PC005	PC005-3"-HY-142-03HSS-N	
4"-VL-145-01HSS-N	HYDROGEN STORAGE VESSEL V-25001A VENT LINE	PC005	PC005-4"-VL-145-01HSS-N	
4"-VL-025-01HSS-N	HYDROGEN STORAGE VESSEL V-25001A VENT LINE	PC005	PC005-4"-VL-025-01HSS-N	
1"-HY-026-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001A TO HYDROGEN STORAGE VESSELS HEADER (OUTLET)	PC005	PC005-1"-HY-026-03HSS-N	
1"-HY-153-03HSS-N	N2 CONNECTING LINE TO HYDROGEN STORAGE VESSEL V-25001A	PC005	PC005-1"-HY-153-03HSS-N	
1"-HY-166-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001B TO 25-PSV-001B (VENT LINE)	PC005	PC005-1"-HY-166-03HSS-N	
3"-HY-167-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001B TO 25-BDV-007/25-PV-007 (VENT LINE)	PC005	PC005-3"-HY-167-03HSS-N	
4"-VL-168-01HSS-N	HYDROGEN STORAGE VESSEL V-25001B VENT LINE	PC005	PC005-4"-VL-168-01HSS-N	
4"-VL-111-01HSS-N	HYDROGEN STORAGE VESSEL V-25001B VENT LINE	PC005	PC005-4"-VL-111-01HSS-N	
1"-HY-132-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001B TO HYDROGEN STORAGE VESSELS HEADER (OUTLET)	PC005	PC005-1"-HY-132-03HSS-N	
1"-HY-186-03HSS-N	N2 CONNECTING LINE TO HYDROGEN STORAGE VESSEL V-25001B	PC005	PC005-1"-HY-186-03HSS-N	
1"-HY-170-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001C TO 25-PSV-001C (VENT LINE)	PC005	PC005-1"-HY-170-03HSS-N	
3"-HY-171-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001C TO 25-BDV-010/25-PV-010 (VENT LINE)	PC005	PC005-3"-HY-171-03HSS-N	
4"-VL-172-01HSS-N	HYDROGEN STORAGE VESSEL V-25001C VENT LINE	PC005	PC005-4"-VL-172-01HSS-N	
4"-VL-112-01HSS-N	HYDROGEN STORAGE VESSEL V-25001C VENT LINE	PC005	PC005-4"-VL-112-01HSS-N	

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SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
1"-HY-133-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001C TO HYDROGEN STORAGE VESSELS HEADER (OUTLET)	PC005	PC005-1"-HY-133-03HSS-N	
1"-HY-187-03HSS-N	N2 CONNECTING LINE TO HYDROGEN STORAGE VESSEL V-25001C	PC005	PC005-1"-HY-187-03HSS-N	
1"-HY-174-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001D TO 25-PSV-001D (VENT LINE)	PC005	PC005-1"-HY-174-03HSS-N	
3"-HY-175-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001D TO 25-BDV-013/25-PV-013 (VENT LINE)	PC005	PC005-3"-HY-175-03HSS-N	
4"-VL-176-01HSS-N	HYDROGEN STORAGE VESSEL V-25001D VENT LINE	PC005	PC005-4"-VL-176-01HSS-N	
4"-VL-113-01HSS-N	HYDROGEN STORAGE VESSEL V-25001D VENT LINE	PC005	PC005-4"-VL-113-01HSS-N	
1"-HY-134-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001D TO HYDROGEN STORAGE VESSELS HEADER (OUTLET)	PC005	PC005-1"-HY-134-03HSS-N	
1"-HY-188-03HSS-N	N2 CONNECTING LINE TO HYDROGEN STORAGE VESSEL V-25001D	PC005	PC005-1"-HY-188-03HSS-N	
1"-HY-179-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001E TO 25-PSV-001E (VENT LINE)	PC005	PC005-1"-HY-179-03HSS-N	
3"-HY-180-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001E TO 25-BDV-016/25-PV-016 (VENT LINE)	PC005	PC005-3"-HY-180-03HSS-N	
4"-VL-181-01HSS-N	HYDROGEN STORAGE VESSEL V-25001E VENT LINE	PC005	PC005-4"-VL-181-01HSS-N	
4"-VL-114-01HSS-N	HYDROGEN STORAGE VESSEL V-25001E VENT LINE	PC005	PC005-4"-VL-114-01HSS-N	
1"-HY-135-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001E TO HYDROGEN STORAGE VESSELS HEADER (OUTLET)	PC005	PC005-1"-HY-135-03HSS-N	
1"-HY-189-03HSS-N	N2 CONNECTING LINE TO HYDROGEN STORAGE VESSEL V-25001E	PC005	PC005-1"-HY-189-03HSS-N	
1"-HY-183-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001F TO 25-PSV-001F (VENT LINE)	PC005	PC005-1"-HY-183-03HSS-N	
3"-HY-184-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001F TO 25-BDV-019/25-PV-019 (VENT LINE)	PC005	PC005-3"-HY-184-03HSS-N	
4"-VL-185-01HSS-N	HYDROGEN STORAGE VESSEL V-25001F VENT LINE	PC005	PC005-4"-VL-185-01HSS-N	
4"-VL-115-01HSS-N	HYDROGEN STORAGE VESSEL V-25001F VENT LINE	PC005	PC005-4"-VL-115-01HSS-N	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
1"-HY-136-03HSS-N	FROM HYDROGEN STORAGE VESSEL V-25001F TO HYDROGEN STORAGE VESSELS HEADER (OUTLET)	PC005	PC005-1"-HY-136-03HSS-N	
1"-HY-190-03HSS-N	N2 CONNECTING LINE TO HYDROGEN STORAGE VESSEL V-25001F	PC005	PC005-1"-HY-190-03HSS-N	
1-1/2"-HY-148-03HSS-N	H2 COMMON OUTLET LINE FROM STORAGE VESSELS TO 25-SDV-023	PC005	PC005-1-1/2"-HY-148-03HSS-N	
1"-HY-144-03HSS-N	H2 COMMON OUTLET LINE FROM STORAGE VESSELS TO 25-BDV-022 (VENT LINE)	PC005	PC005-1"-HY-144-03HSS-N	
1"-VL-022-01HSS-N	H2 COMMON OUTLET LINE FROM STORAGE VESSELS VENT LINE	PC005	PC005-1"-VL-022-01HSS-N	
2"-HY-023-01HSS-N	FROM HYDROGEN STORAGE VESSEL HEADER (OUTLET) TO FUEL CELL PACKAGE A-80000	PC005	PC005-2"-HY-023-01HSS-N	
1"-HY-152-01HSS-N	INLET LINE OF FUEL CELL PACKAGE A-80000 TO 80-PSV-001 (VENT LINE)	PC005	PC005-1"-HY-152-01HSS-N	
2"-VL-010-01HSS-N	FUEL CELL PACKAGE A-80000 VENT LINE	PC005	PC005-2"-VL-010-01HSS-N	
1"-HY-163-01HSS-N	INLET LINE OF FUEL CELL PACKAGE A-80000 TO 80-XV-001 (VENT LINE)	PC005	PC005-1"-HY-163-01HSS-N	
PC007 PRESSURE SAFETY VALVES (PSV)				
25-PSV-001A	PRESSURE SAFETY VALVE (FROM HYDROGEN STORAGE VESSEL V-25001A TO HYDROGEN VENT HEADER)	PC007	PC007-25-PSV-001A	
25-PSV-001B	PRESSURE SAFETY VALVE (FROM HYDROGEN STORAGE VESSEL V-25001B TO HYDROGEN VENT HEADER)	PC007	PC007-25-PSV-001B	
25-PSV-001C	PRESSURE SAFETY VALVE (FROM HYDROGEN STORAGE VESSEL V-25001C TO HYDROGEN VENT HEADER)	PC007	PC007-25-PSV-001C	
25-PSV-001D	PRESSURE SAFETY VALVE (FROM HYDROGEN STORAGE VESSEL V-25001D TO HYDROGEN VENT HEADER)	PC007	PC007-25-PSV-001D	
25-PSV-001E	PRESSURE SAFETY VALVE (FROM HYDROGEN STORAGE VESSEL V-25001E TO HYDROGEN VENT HEADER)	PC007	PC007-25-PSV-001E	
25-PSV-001F	PRESSURE SAFETY VALVE (FROM HYDROGEN STORAGE VESSEL V-25001F TO HYDROGEN VENT HEADER)	PC007	PC007-25-PSV-001F	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
80-PSV-001	PRESSURE SAFETY VALVE (FROM HYDROGEN STORAGE VESSELS HEADER (OUTLET) TO HYDROGEN VENT HEADER)	PC007	PC007-80-PSV-001	
IC001 HAZARDOUS AREA VENTILATION				
BLPH-EXTRACTION FANS in A-8500	EXTRACTION FANS IN BESS PACKAGE A-8500	IC001	IC002-BLPH-EXTRACTION FANS in A-8500	
IC002 NON-HAZARDOUS AREA VENTILATION				
BLPH-EXTRACTION FANS in B-300	EXTRACTION FANS IN AC UPS ROOM B-300	IC002	IC002-BLPH-EXTRACTION FANS in B-300	
IC003 CERTIFIED (EX RATED) ELEC EQPT				
25-PT-035	ATEX Transmitter	IC003	IC003-25-PT-035	
25-PT-037	ATEX Transmitter	IC003	IC003-25-PT-037	
25-PT-040	ATEX Transmitter	IC003	IC003-25-PT-040	
25-PT-043	ATEX Transmitter	IC003	IC003-25-PT-043	
25-PT-046	ATEX Transmitter	IC003	IC003-25-PT-046	
25-PT-049	ATEX Transmitter	IC003	IC003-25-PT-049	
43-FT-001	ATEX Transmitter	IC003	IC003-43-FT-001	
43-LT-003	ATEX Transmitter	IC003	IC003-43-LT-003	
43-LT-001	ATEX Transmitter	IC003	IC003-43-LT-001	
43-PT-001	ATEX Transmitter	IC003	IC003-43-PT-001	
25-FT-031	ATEX Transmitter	IC003	IC003-25-FT-031	
25-FT-032	ATEX Transmitter	IC003	IC003-25-FT-032	
25-FT-033	ATEX Transmitter	IC003	IC003-25-FT-033	
25-FT-034	ATEX Transmitter	IC003	IC003-25-FT-034	
25-FT-036	ATEX Transmitter	IC003	IC003-25-FT-036	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
25-FT-038	ATEX Transmitter	IC003	IC003-25-FT-038	
25-PT-001	ATEX Transmitter	IC003	IC003-25-PT-001	
25-PT-055A	ATEX Transmitter	IC003	IC003-25-PT-055A	
25-PT-055B	ATEX Transmitter	IC003	IC003-25-PT-055B	
25-FE-031	ATEX Instrument	IC003	IC003-25-FE-031	
25-FE-032	ATEX Instrument	IC003	IC003-25-FE-032	
25-FE-033	ATEX Instrument	IC003	IC003-25-FE-033	
25-FE-034	ATEX Instrument	IC003	IC003-25-FE-034	
25-FE-036	ATEX Instrument	IC003	IC003-25-FE-036	
25-FE-038	ATEX Instrument	IC003	IC003-25-FE-038	
25-RO-024	ATEX Instrument	IC003	IC003-25-RO-024	
25-RO-005	ATEX Instrument	IC003	IC003-25-RO-005	
25-RO-008	ATEX Instrument	IC003	IC003-25-RO-008	
25-RO-010	ATEX Instrument	IC003	IC003-25-RO-010	
25-RO-013	ATEX Instrument	IC003	IC003-25-RO-013	
25-RO-016	ATEX Instrument	IC003	IC003-25-RO-016	
25-RO-019	ATEX Instrument	IC003	IC003-25-RO-019	
25-RO-022	ATEX Instrument	IC003	IC003-25-RO-022	
64-FG-001	ATEX Instrument	IC003	IC003-64-FG-001	
80-RO-001	ATEX Instrument	IC003	IC003-80-RO-001	
25-FY-031	ATEX Instrument	IC003	IC003-25-FY-031	
25-FY-032	ATEX Instrument	IC003	IC003-25-FY-032	
25-FY-033	ATEX Instrument	IC003	IC003-25-FY-033	
25-FY-034	ATEX Instrument	IC003	IC003-25-FY-034	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
25-FY-036	ATEX Instrument	IC003	IC003-25-FY-036	
25-FY-038	ATEX Instrument	IC003	IC003-25-FY-038	
25-PY-035	ATEX Instrument	IC003	IC003-25-PY-035	
25-PY-037	ATEX Instrument	IC003	IC003-25-PY-037	
25-PY-040	ATEX Instrument	IC003	IC003-25-PY-040	
25-PY-043	ATEX Instrument	IC003	IC003-25-PY-043	
25-PY-046	ATEX Instrument	IC003	IC003-25-PY-046	
25-PY-049	ATEX Instrument	IC003	IC003-25-PY-049	
25-PY-055A	ATEX Instrument	IC003	IC003-25-PY-055A	
25-PY-055B	ATEX Instrument	IC003	IC003-25-PY-055B	
43-LY-031	ATEX Instrument	IC003	IC003-43-LY-031	
25-XV-004	ATEX ActuatedValve	IC003	IC003-25-XV-004	
25-XV-006	ATEX ActuatedValve	IC003	IC003-25-XV-006	
25-XV-008	ATEX ActuatedValve	IC003	IC003-25-XV-008	
25-XV-009	ATEX ActuatedValve	IC003	IC003-25-XV-009	
25-XV-011	ATEX ActuatedValve	IC003	IC003-25-XV-011	
25-XV-012	ATEX ActuatedValve	IC003	IC003-25-XV-012	
25-XV-014	ATEX ActuatedValve	IC003	IC003-25-XV-014	
25-XV-015	ATEX ActuatedValve	IC003	IC003-25-XV-015	
25-XV-017	ATEX ActuatedValve	IC003	IC003-25-XV-017	
25-XV-018	ATEX ActuatedValve	IC003	IC003-25-XV-018	
25-XV-020	ATEX ActuatedValve	IC003	IC003-25-XV-020	
25-XV-021	ATEX ActuatedValve	IC003	IC003-25-XV-021	
64-SDV-001	ATEX ActuatedValve	IC003	IC003-64-SDV-001	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
80-XV-001	ATEX ActuatedValve	IC003	IC003-80-XV-001	
25-XV-024	ATEX ActuatedValve	IC003	IC003-25-XV-024	
IC005 ELEC EARTHING CONTINUITY&BONDING				
BLPH -AIR TERMINAL RODS	LIGHTNING PROTECTION SYSTEM - AIR TERMINAL RODS	IC005	IC005-BLPH -AIR TERMINAL RODS	
BLPH - SPDs	LIGHTNING PROTECTION SYSTEM - SURGE PROTECTION DEVICES	IC005	IC005-BLPH - SPDs	
IC007 INERT GAS BLANKET SYSTEM				
64-AT-051	OXYGEN ANALYZER LOCATED INSIDE NITROGEN GENERATION PAKAGE A-64000	IC007	IC007-64-AT-051	
64-PT-059	64-PT-059 LOCATED ON NITROGEN RECIEVER V-64001 (INSIDE NITROGEN GENERATION PAKAGE A-64000)	IC007	IC007-64-PT-059	
64-PT-002	64-PT-002 LOCATED ON NITROGEN HEADER	IC007	IC007-64-PT-002	
DS001 FIRE AND GAS DETECTION				
950FZ-03101	UV-IR FLAME DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950FZ-03101	
950FZ-03102	UV-IR FLAME DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950FZ-03102	
950FZ-03103	UV-IR FLAME DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950FZ-03103	
950FZ-03104	UV-IR FLAME DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950FZ-03104	
950GZ-03101	ULTRA SONIC HYDROGEN DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950GZ-03101	
950GZ-03102	ULTRA SONIC HYDROGEN DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950GZ-03102	
950GZ-03103	ULTRA SONIC HYDROGEN DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950GZ-03103	
950GZ-03104	ULTRA SONIC HYDROGEN DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950GZ-03104	
950GZ-03105	ULTRA SONIC HYDROGEN DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950GZ-03105	

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SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
950GZ-03106	ULTRA SONIC HYDROGEN DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950GZ-03106	
950GZ-03107	POINT SOURCE OXYGEN DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950GZ-03107	
950GZ-03108	POINT SOURCE OXYGEN DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950GZ-03108	
950GZ-03109	POINT SOURCE OXYGEN DETECTOR ELECTROLYZER AREA, UPPER DECK	DS001	DS001-950GZ-03109	
950GZ-02109	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02109	
950GZ-02110	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02110	
950GZ-02111	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02111	
950GZ-02112	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02112	
950GZ-02113	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02113	
950GZ-02114	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02114	
950GZ-02115	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02115	
950GZ-02116	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02116	
950FZ-02101	UV-IR FLAME DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950FZ-02101	
950FZ-02102	UV-IR FLAME DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950FZ-02102	
950FZ-02103	UV-IR FLAME DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950FZ-02103	
950FZ-02104	UV-IR FLAME DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950FZ-02104	
950GZ-02117	ULTRA SONIC HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02117	

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SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
950GZ-02118	ULTRA SONIC HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02118	
950GZ-02119	ULTRA SONIC HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02119	
950GZ-02120	ULTRA SONIC HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02120	
950GZ-02101	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02101	
950GZ-02102	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02102	
950GZ-02103	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02103	
950GZ-02104	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02104	
950GZ-02105	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02105	
950GZ-02106	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02106	
950GZ-02107	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02107	
950GZ-02108	POINT SOURCE HYDROGEN DETECTOR STORAGE AREA, UPPER DECK	DS001	DS001-950GZ-02108	
950FZ-01101	UV-IR FLAME DETECTOR FUEL CELL AREA, UPPER DECK	DS001	DS001-950FZ-01101	
950FZ-01102	UV-IR FLAME DETECTOR FUEL CELL AREA, UPPER DECK	DS001	DS001-950FZ-01102	
950FZ-01103	UV-IR FLAME DETECTOR FUEL CELL AREA, UPPER DECK	DS001	DS001-950FZ-01103	
950FZ-01104	UV-IR FLAME DETECTOR FUEL CELL AREA, UPPER DECK	DS001	DS001-950FZ-01104	
950GZ-01101	ULTRA SONIC HYDROGEN DETECTOR FUEL CELL AREA, UPPER DECK	DS001	DS001-950GZ-01101	
950GZ-01102	ULTRA SONIC HYDROGEN DETECTOR FUEL CELL AREA, UPPER DECK	DS001	DS001-950GZ-01102	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
950GZ-06201	POINT SOURCE HYDROGEN DETECTOR IN B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-06201	
950GZ-06202	POINT SOURCE HYDROGEN DETECTOR IN B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-06202	
950GZ-06203	POINT SOURCE HYDROGEN DETECTOR IN B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-06203	
950GZ-06204	POINT SOURCE HYDROGEN DETECTOR IN B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-06204	
950GZ-06205	POINT SOURCE HYDROGEN DETECTOR IN B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-06205	
950GZ-06206	POINT SOURCE HYDROGEN DETECTOR IN B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-06206	
950FZ-05101	UV-IR FLAME DETECTOR BESS AREA, LOWER DECK	DS001	DS001-950FZ-05101	
950FZ-05102	UV-IR FLAME DETECTOR BESS AREA, LOWER DECK	DS001	DS001-950FZ-05102	
950FZ-05103	UV-IR FLAME DETECTOR BESS AREA, LOWER DECK	DS001	DS001-950FZ-05103	
950FZ-05104	UV-IR FLAME DETECTOR BESS AREA, LOWER DECK	DS001	DS001-950FZ-05104	
950GZ-05101	POINT SOURCE HYDROGEN DETECTOR BESS AREA, LOWER DECK	DS001	DS001-950GZ-05101	
950GZ-05102	POINT SOURCE HYDROGEN DETECTOR BESS AREA, LOWER DECK	DS001	DS001-950GZ-05102	
950GZ-05103	POINT SOURCE HYDROGEN DETECTOR BESS AREA, LOWER DECK	DS001	DS001-950GZ-05103	
950GZ-04213	POINT SOURCE HYDROGEN DETECTOR IN B-200 LV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-04213	
950GZ-04214	POINT SOURCE HYDROGEN DETECTOR IN B-200 LV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-04214	
950GZ-04215	POINT SOURCE HYDROGEN DETECTOR IN B-200 LV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-04215	
950GZ-04216	POINT SOURCE HYDROGEN DETECTOR IN B-200 LV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-04216	
950GZ-04217	POINT SOURCE HYDROGEN DETECTOR IN B-200 LV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-04217	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
950GZ-04218	POINT SOURCE HYDROGEN DETECTOR IN B-200 LV SWITCHROOM, LOWER DECK	DS001	DS001-950GZ-04218	
950GZ-04207	POINT SOURCE HYDROGEN DETECTOR IN B-300 AC UPS ROOM, LOWER DECK	DS001	DS001-950GZ-04207	
950GZ-04208	POINT SOURCE HYDROGEN DETECTOR IN B-300 AC UPS ROOM, LOWER DECK	DS001	DS001-950GZ-04208	
950GZ-04209	POINT SOURCE HYDROGEN DETECTOR IN B-300 AC UPS ROOM, LOWER DECK	DS001	DS001-950GZ-04209	
950GZ-04210	POINT SOURCE HYDROGEN DETECTOR IN B-300 AC UPS ROOM, LOWER DECK	DS001	DS001-950GZ-04210	
950GZ-04211	POINT SOURCE HYDROGEN DETECTOR IN B-300 AC UPS ROOM, LOWER DECK	DS001	DS001-950GZ-04211	
950GZ-04212	POINT SOURCE HYDROGEN DETECTOR IN B-300 AC UPS ROOM, LOWER DECK	DS001	DS001-950GZ-04212	
950GZ-04201	POINT SOURCE HYDROGEN DETECTOR IN B-400, I&T ROOM, LOWER DECK	DS001	DS001-950GZ-04201	
950GZ-04202	POINT SOURCE HYDROGEN DETECTOR IN B-400, I&T ROOM, LOWER DECK	DS001	DS001-950GZ-04202	
950GZ-04203	POINT SOURCE HYDROGEN DETECTOR IN B-400, I&T ROOM, LOWER DECK	DS001	DS001-950GZ-04203	
950GZ-04204	POINT SOURCE HYDROGEN DETECTOR IN B-400, I&T ROOM, LOWER DECK	DS001	DS001-950GZ-04204	
950GZ-04205	POINT SOURCE HYDROGEN DETECTOR IN B-400, I&T ROOM, LOWER DECK	DS001	DS001-950GZ-04205	
950GZ-04206	POINT SOURCE HYDROGEN DETECTOR IN B-400, I&T ROOM, LOWER DECK	DS001	DS001-950GZ-04206	
950XZ-01101	SOUNDER, EXTERNAL AREA OF FUEL CELL, UPPER DECK	DS001	DS001-950XZ-01101	
950XL-01101	FLAMMABLE GAS RELEASE BEACON, EXTERNAL AREA OF FUEL CELL, UPPER DECK	DS001	DS001-950XL-01101	
950XL-01102	FIRE BEACON, EXTERNAL AREA OF FUEL CELL, UPPER DECK	DS001	DS001-950XL-01102	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
950MFA-01101	MANUAL FIRE ALARM, EXTERNAL AREA OF FUEL CELL, UPPER DECK	DS001	DS001-950MFA-01101	
950ASD-01101	ABANDON SHUTDOWN, EXTERNAL AREA OF FUEL CELL, UPPER DECK	DS001	DS001-950ASD-01101	
950MOB-01101	MAN OVER BOARD, EXTERNAL AREA OF FUEL CELL, UPPER DECK	DS001	DS001-950MOB-01101	
950XZ-01102	SOUNDER, EXTERNAL AREA OF FUEL CELL TRANSFORMER, UPPER DECK	DS001	DS001-950XZ-01102	
950MFA-01102	MANUAL FIRE ALARM, EXTERNAL AREA OF FUEL CELL TRANSFORMER, UPPER DECK	DS001	DS001-950MFA-01102	
950MFA-01103	MANUAL FIRE ALARM,EXTERNAL AREA OF FUEL CELL, UPPER DECK	DS001	DS001-950MFA-01103	
950XZ-02101	SOUNDER, STORAGE AREA, UPPER DECK	DS001	DS001-950XZ-02101	
950XL-02101	FLAMMABLE GAS RELEASE BEACON, STORAGE AREA, UPPER DECK	DS001	DS001-950XL-02101	
950XL-02102	FIRE BEACON, STORAGE AREA, UPPER DECK	DS001	DS001-950XL-02102	
950MFA-02101	MANUAL FIRE ALARM, STORAGE AREA, UPPER DECK	DS001	DS001-950MFA-02101	
950XZ-03101	SOUNDER, EXTERNAL AREA OF ELECTROLYZER, UPPER DECK	DS001	DS001-950XZ-03101	
950MFA-03101	MANUAL FIRE ALARM, EXTERNAL AREA OF ELECTROLYZER, UPPER DECK	DS001	DS001-950MFA-03101	
950XZ-03102	SOUNDER, EXTERNAL AREA OF ELECTROLYZER, UPPER DECK	DS001	DS001-950XZ-03102	
950MFA-03102	MANUAL FIRE ALARM, EXTERNAL AREA OF ELECTROLYZER, UPPER DECK	DS001	DS001-950MFA-03102	
950XL-03101	FLAMMABLE GAS RELEASE BEACON, EXTERNAL AREA OF ELECTROLYZER, UPPER DECK	DS001	DS001-950XL-03101	
950XL-03102	FIRE BEACON, EXTERNAL AREA OF ELECTROLYZER, UPPER DECK	DS001	DS001-950XL-03102	
950MFA-03103	MANUAL FIRE ALARM, EXTERNAL AREA OF ELECTROLYZER, UPPER DECK	DS001	DS001-950MFA-03103	
950XL-03103	FLAMMABLE GAS RELEASE BEACON, EXTERNAL AREA OF UV WATER FILTER, UPPER DECK	DS001	DS001-950XL-03103	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
950XL-03104	FIRE BEACON, EXTERNAL AREA OF UV WATER FILTER, UPPER DECK	DS001	DS001-950XL-03104	
950MFA-03104	MANUAL FIRE ALARM, EXTERNAL AREA OF UV WATER FILTER, UPPER DECK	DS001	DS001-950MFA-03104	
950ASD-03101	ABANDON SHUTDOWN, EXTERNAL AREA OF UV WATER FILTER, UPPER DECK	DS001	DS001-950ASD-03101	
950MOB-03101	MAN OVER BOARD, EXTERNAL AREA OF UV WATER FILTER, UPPER DECK	DS001	DS001-950MOB-03101	
950XL-06101	FLAMMABLE GAS RELEASE BEACON, EXTERNAL AREA OF B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950XL-06101	
950XL-06102	FIRE BEACON, EXTERNAL AREA OF B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950XL-06102	
950MFA-06101	MANUAL FIRE ALARM, EXTERNAL AREA OF B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950MFA-06101	
950ASD-06101	ABANDON SHUTDOWN, EXTERNAL AREA OF B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950ASD-06101	
950MOB-06101	MAN OVER BOARD, EXTERNAL AREA OF B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950MOB-06101	
950XZ-06201	SOUNDER IN B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950XZ-06201	
950XL-06201	FLAMMABLE GAS RELEASE BEACON IN B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950XL-06201	
950XL-06202	FIRE BEACON IN B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950XL-06202	
950MFA-06201	MANUAL FIRE ALARM IN B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950MFA-06201	
950XL-06103	FLAMMABLE GAS RELEASE BEACON, EXTERNAL AREA OF B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950XL-06103	
950XL-06104	FIRE BEACON, EXTERNAL AREA OF B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950XL-06104	
950MFA-06102	MANUAL FIRE ALARM, EXTERNAL AREA OF B-100 HV/MV SWITCHROOM, LOWER DECK	DS001	DS001-950MFA-06102	
950XZ-05101	SOUNDER, BESS AREA, LOWER DECK	DS001	DS001-950XZ-05101	

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SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
950MFA-05101	MANUAL FIRE ALARM, BESS AREA, LOWER DECK	DS001	DS001-950MFA-05101	
950XZ-05102	SOUNDER, BESS AREA, LOWER DECK	DS001	DS001-950XZ-05102	
950MFA-05102	MANUAL FIRE ALARM, BESS AREA, LOWER DECK	DS001	DS001-950MFA-05102	
950XZ-05103	SOUNDER, BESS AREA, LOWER DECK	DS001	DS001-950XZ-05103	
950MFA-05103	MANUAL FIRE ALARM, BESS AREA, LOWER DECK	DS001	DS001-950MFA-05103	
950XZ-04201	SOUNDER IN B-400, I&T ROOM, LOWER DECK	DS001	DS001-950XZ-04201	
950XL-04201	FLAMMABLE GAS RELEASE BEACON IN B-400, I&T ROOM, LOWER DECK	DS001	DS001-950XL-04201	
950XL-04202	FIRE BEACON IN B-400, I&T ROOM, LOWER DECK	DS001	DS001-950XL-04202	
950MFA-04201	MANUAL FIRE ALARM IN B-400, I&T ROOM, LOWER DECK	DS001	DS001-950MFA-04201	
950XZ-04202	SOUNDER IN B-300 AC UPS ROOM, LOWER DECK	DS001	DS001-950XZ-04202	
950XL-04203	FLAMMABLE GAS RELEASE BEACON IN B-300 AC UPS ROOM, LOWER DECK	DS001	DS001-950XL-04203	
950XL-04204	FIRE BEACON IN B-300 AC UPS ROOM, LOWER DECK	DS001	DS001-950XL-04204	
950MFA-04202	MANUAL FIRE ALARM IN B-300 AC UPS ROOM, LOWER DECK	DS001	DS001-950MFA-04202	
950XZ-04203	SOUNDER IN B-200 LV SWITCHROOM, LOWER DECK	DS001	DS001-950XZ-04203	
950XL-04205	FLAMMABLE GAS RELEASE BEACON IN B-200 LV SWITCHROOM, LOWER DECK	DS001	DS001-950XL-04205	
950XL-04206	FIRE BEACON IN B-200 LV SWITCHROOM, LOWER DECK	DS001	DS001-950XL-04206	
950MFA-04203	MANUAL FIRE ALARM IN B-200 LV SWITCHROOM, LOWER DECK	DS001	DS001-950MFA-04203	
950XZ-04102	SOUNDER, EXTERNAL AREA OF B-400 I&T ROOM, LOWER DECK	DS001	DS001-950XZ-04102	
950MFA-04102	MANUAL FIRE ALARM, EXTERNAL AREA OF B-400 I&T ROOM, LOWER DECK	DS001	DS001-950MFA-04102	
950XZ-04101	SOUNDER, EXTERNAL AREA OF B-400 I&T ROOM, LOWER DECK	DS001	DS001-950XZ-04101	
950XL-04101	FLAMMABLE GAS RELEASE BEACON, EXTERNAL AREA OF B-400 I&T ROOM, LOWER DECK	DS001	DS001-950XL-04101	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
950XL-04102	FIRE BEACON, EXTERNAL AREA OF B-400 I&T ROOM, LOWER DECK	DS001	DS001-950XL-04102	
950MFA-04101	MANUAL FIRE ALARM,EXTERNAL AREA OF B-400 I&T ROOM, LOWER DECK	DS001	DS001-950MFA-04101	
950ASD-04101	ABANDON SHUTDOWN, EXTERNAL AREA OF B-400 I&T ROOM, LOWER DECK	DS001	DS001-950ASD-04101	
950MOB-04101	MAN OVER BOARD, EXTERNAL AREA OF B-400 I&T ROOM, LOWER DECK	DS001	DS001-950MOB-04101	
950XZ-07101	SOUNDER, WASTE WATER TANK AREA, EXISTING PLATFORM	DS001	DS001-950XZ-07101	
950XL-07101	FLAMMABLE GAS RELEASE BEACON, WASTE WATER TANK AREA, EXISTING PLATFORM	DS001	DS001-950XL-07101	
950XL-07102	FIRE BEACON, WASTE WATER TANK AREA, EXISTING PLATFORM	DS001	DS001-950XL-07102	
950MFA-07102	MANUAL FIRE ALARM, WASTE WATER TANK AREA, EXISTING PLATFORM	DS001	DS001-950MFA-07102	
950ASD-07101	ABANDON SHUTDOWN, WASTE WATER TANK AREA, EXISTING PLATFORM	DS001	DS001-950ASD-07101	
950MOB-07101	MAN OVER BOARD,WASTE WATER TANK AREA, EXISTING PLATFORM	DS001	DS001-950MOB-07101	
PS002 FIRE AND EXPLOSION PROTECTION				
BLPH-DECK PLATING	BLPH-DECK PLATING	PS002	PS002-BLPH-DECK PLATING	
BLPH-EXTINGUISHER	PORTABLE FIRE EXTINGUISHER	PS002	PS002-BLPH-EXTINGUISHER	
PS015 COLLISION AVOIDANCE SYSTEM				
BLPH-RACON	RADAR TRASPONDIND BEACON (RACON)	PS015	PS015-BLPH-RACON	
BLPH-NAV AIDS	VISUAL NAVIGATION AIDS	PS015	PS015-BLPH-NAV AIDS	
BLPH-MARINE LIGHTS	MARINE LIGHTS & OBSTRUCTION LIGHTS	PS015	PS015-BLPH-MARINE LIGHTS	
BLPH-AERO AIS	AUTOMATIC IDENTIFICATION SYSTEM (AIS)	PS015	PS015-BLPH-AERO AIS	
SD001 EMERGENCY SHUTDOWN SYSTEM				
25-PT-002	25-PT-002 LOCATED ON COMMON LINE TO STORAGE VESSELS	SD001	SD001-25-PT-002	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
25-PT-004	25-PT-004 LOCATED ON STORAGE VESSEL V-25001A	SD001	SD001-25-PT-004	
25-PT-006	25-PT-006 LOCATED ON STORAGE VESSEL V-25001B	SD001	SD001-25-PT-006	
25-PT-008	25-PT-008 LOCATED ON STORAGE VESSEL V-25001C	SD001	SD001-25-PT-008	
25-PT-009	25-PT-009 LOCATED ON STORAGE VESSEL V-25001D	SD001	SD001-25-PT-009	
25-PT-011	25-PT-011 LOCATED ON STORAGE VESSEL V-25001E	SD001	SD001-25-PT-011	
25-PT-012	25-PT-012 LOCATED ON STORAGE VESSEL V-25001F	SD001	SD001-25-PT-012	
80-PT-002	80-PT-002 LOCATED ON COMMON LINE TO FUEL CELL PACKAGE	SD001	SD001-80-PT-002	
950ESD-01101	ESD-1 PUSH BUTTON, EXTERNAL AREA OF FUEL CELL, UPPER DECK	SD001	SD001-950ESD-01101	
950ESDD-01101	ESD-1D PUSH BUTTON, EXTERNAL AREA OF FUEL CELL, UPPER DECK	SD001	SD001-950ESDD-01101	
950ESD-03101	ESD-1 PUSH BUTTON, EXTERNAL AREA OF UV WATER FILTER, UPPER DECK	SD001	SD001-950ESD-03101	
950ESDD-03101	ESD-1D PUSH BUTTON, EXTERNAL AREA OF UV WATER FILTER, UPPER DECK	SD001	SD001-950ESDD-03101	
950ESD-06101	ESD-1 PUSH BUTTON, EXTERNAL AREA OF B-100 HV/MV SWITCHROOM, LOWER DECK	SD001	SD001-950ESD-06101	
950ESDD-06101	ESD-1D PUSH BUTTON, EXTERNAL AREA OF B-100 HV/MV SWITCHROOM, LOWER DECK	SD001	SD001-950ESDD-06101	
950ESD-04101	ESD-1 PUSH BUTTON, EXTERNAL AREA OF B-400 I&T ROOM, LOWER DECK	SD001	SD001-950ESD-04101	
950ESDD-04101	ESD-1D PUSH BUTTON, EXTERNAL AREA OF B-400 I&T ROOM, LOWER DECK	SD001	SD001-950ESDD-04101	
950ESD-07101	ESD-1 PUSH BUTTON, WASTE WATER TANK AREA, EXISTING PLATFORM	SD001	SD001-950ESD-07101	
950ESDD-07101	ESD-1D PUSH BUTTON, WASTE WATER TANK AREA, EXISTING PLATFORM	SD001	SD001-950ESDD-07101	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
SD002 BLOWDOWN VALVES VALVES (BDV)				
25-BDV-003	BLOWDOWN VALVE (FROM STORAGE INLET LINE TO HYDROGEN VENT HEADER)	SD002	SD002-25-BDV-003	
25-BDV-005	BLOWDOWN VALVE (FROM HYDROGEN STORAGE VESSEL V-25001A TO HYDROGEN VENT HEADER)	SD002	SD002-25-BDV-005	
25-BDV-007	BLOWDOWN VALVE (FROM HYDROGEN STORAGE VESSEL V-25001B TO HYDROGEN VENT HEADER)	SD002	SD002-25-BDV-007	
25-BDV-010	BLOWDOWN VALVE (FROM HYDROGEN STORAGE VESSEL V-25001C TO HYDROGEN VENT HEADER)	SD002	SD002-25-BDV-010	
25-BDV-013	BLOWDOWN VALVE (FROM HYDROGEN STORAGE VESSEL V-25001D TO HYDROGEN VENT HEADER)	SD002	SD002-25-BDV-013	
25-BDV-016	BLOWDOWN VALVE (FROM HYDROGEN STORAGE VESSEL V-25001E TO HYDROGEN VENT HEADER)	SD002	SD002-25-BDV-016	
25-BDV-019	BLOWDOWN VALVE (FROM HYDROGEN STORAGE VESSEL V-25001F TO HYDROGEN VENT HEADER)	SD002	SD002-25-BDV-019	
25-BDV-022	BLOWDOWN VALVE (MAIN LINE FROM HYDROGEN STORAGE VESSELS TO HYDROGEN VENT HEADER)	SD002	SD002-25-BDV-022	
SD006 EMERGENCY SHUTDOWN VALVE (SDV)				
25-SDV-001	SHUTDOWN VALVE (MAIN LINE FROM ELECTROLYSER PACKAGE A-20000 TO HYDROGEN VESSELS)	SD006	SD006-25-SDV-001	
25-SDV-023	SHUTDOWN VALVE (MAIN LINE FROM HYDROGEN STORAGE VESSELS TO FUEL CELL PACKAGE)	SD006	SD006-25-SDV-023	
SD009 UTILITY AIR				
K-63001A	INSTRUMENT AIR COMPRESSOR / MOTOR (INSIDE INSTRUMENT AIR PACKAGE A-63000)	SD006	SD006-K-63001A	
K-63001B	INSTRUMENT AIR COMPRESSOR / MOTOR (INSIDE INSTRUMENT AIR PACKAGE A-63000)	SD006	SD006-K-63001B	
63-PT-064	63-PT-064 LOCATED ON INSTRUMENT AIR RECIEVER V-63001 (INSIDE INSTRUMENT AIR PACKAGE A-63000)	SD006	SD006-63-PT-064	
63-PT-004	63-PT-004 LOCATED ON INSTRUMENT AIR HEADER	SD006	SD006-63-PT-004	

SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
ER001 MUSTER AREA				
BLPH- PRIMARY MUSTER AREA	PRIMARY MUSTER AREA	ER001	ER001-BLPH- PRIMARY MUSTER AREA	
BLPH- SECONDARY MUSTER AREA	SECONDARY MUSTER AREA	ER001	ER001-BLPH- SECONDARY MUSTER AREA	
ER002 ESCAPE ROUTES				
BLPH- PRIMARY ESCAPE ROUTES	PRIMARY ESCAPE ROUTES	ER002	ER002-BLPH- PRIMARY ESCAPE ROUTES	
BLPH- SECONDARY ESCAPE ROUTES	SECONDARY ESCAPE ROUTES	ER002	ER002-BLPH- SECONDARY ESCAPE ROUTES	
ER003 EMERGENCY / ESCAPE LIGHTING				
BLPH- EM LIGHTING PANEL	EMERGENCY LIGHTING PANEL	ER003	ER003-BLPH- EM LIGHTING PANEL	
BLPH-EMERGENCY LIGHTS	EMERGENCY LIGHTS	ER003	ER003-BLPH-EMERGENCY LIGHTS	
ER004 COMMUNICATION SYSTEM				
BLPH-UHF	UHF MARINE PORTABLE RADIOS	ER004	ER004-BLPH-UHF	
BLPH-SART	SART (Safety And Rescue Transponder)	ER004	ER004-BLPH-SART	
BLPH-EPIRB	EPIRB (Emergency Position Indicating Radio Beacon)	ER004	ER004-BLPH-EPIRB	
ER005 UNINTERRUPTED POWER SUPPLY				
BLPH-AC UPS B-300	AC UPS SYSTEM B-300	ER005	ER005-BLPH-AC UPS B-300	
BLPH-DC UPS	DC UPS SYSTEM	ER005	ER005-BLPH-DC UPS	
LS001 PERSONAL SURVIVAL EQUIPMENT				
BLPH - SAFETY CABINET	SAFETY CABINET (WITH IMMERSION SUIT, LIFE JACKET)	LS001	LS001 -BLPH - SAFETY CABINET	
BLPH - FIRST AID KIT	FIRST AID KIT	LS001	LS001 -BLPH - FIRST AID KIT	

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SCE TAG	DESCRIPTION	SCE GROUP	CODE	NOTE
BLPH - RESUSCITATION UNIT	RESUSCITATION UNIT	LS001	LS001 -BLPH - RESUSCITATION UNIT	
BLPH - ESCAPE MASK	ESCAPE MASK	LS001	LS001 -BLPH - ESCAPE MASK	
BLPH - EVACUATION STRETCHER	EVACUATION STRETCHER	LS001	LS001 -BLPH - EVACUATION STRETCHER	
BLPH - LIFEBUOY	LIFEBUOY	LS001	LS001 -BLPH - LIFEBUOY	
LS002 ALTERNATE MEANS OF ESCAPE (LIFERAFT)				
BLPH - LIFERAFT	LIFERAFT	LS002	LS002 -BLPH - LIFERAFT	

ATTACHMENT 2 – PERFORMANCE STANDARDS CARDS

SI001: SUBSEA STRUCTURES

SCE PERFORMANCE STANDARD	SUBSEA STRUCTURES		Revision 00
SCE Group	Subsea Structures	SCE ID:	SI001
SCE Boundaries	Platform structural elements: - Subsea/ substructure	Performance Standard Owner	HSE /CIVIL
SCE Goal	Ensure integrity of platform structures	Interdependence	-SI002: Topside structures -PS015: Navigation aids (to avoid structure damage)

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Substructure Ensure platform structural integrity through the design life of the facility	Mechanical integrity	- General visual inspection on substructure (above water part)	• External Visual Inspection, including marine growth, defects	1 Year	EN ISO 19901-9 Petroleum and natural gas industries – Specific requirements for offshore structures – Part 9: Structural integrity management
		- General visual inspection on substructure (above and underwater part)	• External Visual Inspection, including marine growth, defects • Non Destructive Test on main critical elements (wall, weld, joints)[1]	5 Years [2]	EN ISO 17640:2017 Non-destructive testing of welds – Ultrasonic Testing – Techniques, Testing Levels and Assessment

[1] NDE is performed only when triggered by visual inspection findings or specific event, while it will not be done on fixed time intervals.
[2] Any SCE task with a frequency that is higher than 2 years, will not be executed during the 2 years demonstration period but it is still valid and will be recorded on this document in case operation period is extended.

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
External coating Ensure protection toward external agents and prevent corrosion during normal operation through the design life of the facility	Coating integrity	- External Visual Inspection	• External Visual Inspection • Check any damage	1 Year	

Reliability
Not applicable
Survivability
Structures need to survive major accidents and extreme weather (e.g. extreme storms, seismic) within its design requirements.

SI002: TOPSIDE STRUCTURES

SCE PERFORMANCE STANDARD	TOPSIDE STRUCTURES		Revision 00
SCE Group	Topside Structures	SCE ID:	SI002
SCE Boundaries	Platform structural elements: - Topside structure	Performance Standard Owner	HSE /CIVIL
SCE Goal	Ensure integrity of platform structures	Interdependence	-SI001: Subsea structures -PS015: Navigation aids (to avoid structure damage) -ER002: Escape routes (since topside structure can be used)

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Topside structure Ensure platform structural integrity through the design life of the facility	Mechanical integrity	- General visual inspection on topside structure (elements / connections of bridge/deck/ flare, jacket/ deck connections, handling systems)	• External Visual Inspection	1 Year	EN ISO 19901-9 Petroleum and natural gas industries – Specific requirements for offshore structures – Part 9: Structural integrity management
		- Close visual inspection on topside structure (elements / connections of bridge/deck / flare, jacket/deck connections,	• External Visual Inspection • Non Destructive Test on main critical elements[3]	4-5 Year [4]	EN ISO 17640:2017 Non-destructive testing of welds – Ultrasonic Testing – Techniques, Testing Levels

[3] NDE is performed only when triggered by visual inspection findings or specific event, while it will not be done on fixed time intervals.

[4] Any SCE task with a frequency that is higher than 2 years, will not be executed during the 2 years demonstration period but it is still valid and will be recorded on this document in case operation period is extended.

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
		handling systems)			and Assessment
External coating Ensure protection toward external agents and prevent corrosion during normal operation through the design life of the facility	Coating integrity	- External Visual Inspection	• External Visual Inspection • Check any damage	1 Year	

Reliability
Not applicable
Survivability
Structures need to survive major accidents and extreme weather (e.g. extreme storms, seismic) within its design requirements.

PC001 PRESSURE VESSEL

SCE PERFORMANCE STANDARD	PRESSURE VESSELS		Revision 00
SCE Description	Pressure Vessels	SCE ID:	PC001
SCE Boundaries	Pressure Vessels	Performance Standard Owner	HSE /Process / Mechanical / Piping
SCE Goal	Ensure containment of gas during normal operation through the design life of the facility	Interdependence	-PC007: Relief system (to protect equipment in overpressure case) -DS001: Detection system (to detect any leak) -PS002: Fire and explosion protection system -SD001/SD002/SD006: Shutdown system (to isolate and depressurize the equipment in leak case)

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Vessels Ensure containment of gas during normal operation through the design life of the facility	Wall and weld Thickness	- External Visual Inspection - Welded joint condition - Corrosion under insulation - Wall thickness measurements - Leak test (where appropriate)	• External Visual Inspection • Check any leakage	6 Months	API RP 572: Inspection of Pressure Vessels API 510: Pressure Vessel Inspection Code: In-service Inspection, Rating, Repair, and Alteration.
			• UT Inspection for Wall thickness measurements	3 Years or Turnaround [5]	

[5] Any SCE task with a frequency that is higher than 2 years, will not be executed during the 2 years demonstration period but it is still valid and will be recorded on this document in case operation period is extended.

Reliability
Not applicable
Survivability
Not applicable

PC005 PIPING SYSTEM

SCE PERFORMANCE STANDARD	PIPING SYSTEM		Revision 00
SCE Description	Piping system	SCE ID:	PC002
SCE Boundaries	Piping system	Performance Standard Owner	HSE /Process / Mechanical / Piping
SCE Goal	Ensure containment of gas during normal operation through the design life of the facility	Interdependence	-PC007: Relief system (to protect equipment in overpressure case) -DS001: Detection system (to detect any leak) -PS002: Fire and explosion protection system -SD001/SD002/SD006: Shutdown system (to isolate and depressurize the equipment in leak case)

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Piping system Ensure containment of gas during normal operation of the facility	Line Thickness	- External Visual Inspection - Welded joint condition - Corrosion under insulation - Wall thickness measurements - Leak test (where appropriate)	• External Visual Inspection • Check any leakage	6 Months	API 574 : Inspection Practices for Piping System Components API 570: Piping Inspection Code: In-Service Inspection, Rating, Repair, And Alteration of Piping Systems
			• Wall thickness measurements • Leak test (where appropriate)	5-10 Year (as per piping class) [6]	

[6] Any SCE task with a frequency that is higher than 2 years, will not be executed during the 2 years demonstration period but it is still valid and will be recorded on this document in case operation period is extended.

Reliability
Not applicable
Survivability
Not applicable

PC007 RELIEF SYSTEM

SCE PERFORMANCE STANDARD	RELIEF SYSTEM		Revision 00
SCE Description	Relief system	SCE ID:	PC007
SCE Boundaries	- Protection systems against overpressure (PSV)	Performance Standard Owner	HSE
SCE Goal	To prevent uncontrolled loss of containment under extreme process conditions through service life	Interdependence	-SI002: Structural integrity of topside structures to provide support and impact protection PC001: Pressure vessel process containment PC005: Piping process containment SD002: Blowdown valves

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
PSV To ensure integrity with no leak	No leak from pressure retaining components or joints	• External Visual Inspection • - Check any leakage	• External Visual Inspection • Check any leakage • Check any PSV obstructions	1 Year	• ISO 4126-1 : Safety devices for protection against excessive pressure – Part 1: Safety valves – • API RP 527 : Seat Tightness of pressure relief valves API RP 576 : Pressure Relieving Device

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
PSV To ensure functionality of protection against overpressure	To test operating characteristics of PSV (set pressure, opening rate)	Pressure and calibration test	Type test to determine: - set pressure = ±3% - Overpressure = less than 10% set pressure or 0.1 bar whichever is the greater; - Reproducibility of valve performance ability to reseat satisfactorily (visual check) absence of chatter, flutter, sticking (visual check) • lift at overpressure = no lower than manufacturer value	2 Years[7]	• ISO 4126-1 : Safety devices for protection against excessive pressure – Part 1: Safety valves

Reliability
Systems should always be available on demand.
Survivability
Not applicable

[7] Any SCE task with a frequency that is higher than 2 years, will not be executed during the 2 years demonstration period but it is still valid and will be recorded on this document in case operation period is extended.

IC001 HAZARDOUS AREA VENTILATION

SCE PERFORMANCE STANDARD	NON-HAZARDOUS AREA VENTILATION		Revision 00
SCE Description	Hazardous area ventilation	**SCE ID:**	IC001
SCE Boundaries	- Ventilation system in hazardous areas	**Performance Standard Owner**	HSE / Electric
SCE Goal	To prevent the formation of potentially hazardous concentration of flammable and/or toxic gas mixtures in hazardous areas by providing adequate ventilation to dilute, disperse and remove such mixtures to a suitable location.	**Interdependence**	- DS001 Fire and Gas Detection;

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq	[Doc. Ref.]
Ventilation system To provide sufficient air ventilation and minimum flow requirement	Ventilation system integrity and functionality	- Visual inspection - Function Test	• External Visual Inspection • No plugging / blockages / obstruction • Fan functionality	6 months [8]	Electrical equipments for ATEX IEC 60079-17" Inspection and maintenance of electrical installations in hazardous areas (other than mines)
		Ventilation System Air Flow Test	Perform flow test for the HVAC system (according to design specification)	1 year	Electrical equipments for ATEX IEC 60079-17" Inspection and maintenance of electrical installations in hazardous areas (other than mines)

[8] The frequency of the test is aligned with the minimum time in which is foreseen the visit from the external crew.

Reliability
Ventilation should always be in continuous operation.
Survivability
The HVAC system's ability to prevent gas accumulation in are vital during major accident

IC002 NON-HAZARDOUS AREA VENTILATION

SCE PERFORMANCE STANDARD	NON-HAZARDOUS AREA VENTILATION	Revision 00

SCE Description	Non-hazardous area ventilation	**SCE ID:**	IC002
SCE Boundaries	- Ventilation system into non-hazardous areas	**Performance Standard Owner**	HSE / Electric
SCE Goal	To prevent the formation of potentially hazardous concentration of flammable and/or toxic gas mixtures into non-hazardous areas.	**Interdependence**	- DS001 Fire and Gas Detection;

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq	[Doc. Ref.]
Ventilation system To prevent the ingress of flammable gas-air mixtures or life-threatening atmospheres into non-hazardous areas.	Ventilation system integrity and functionality	- Visual inspection - Function Test	• External Visual Inspection • No plugging / blockages / obstruction • Fan functionality • Check ventilation fan stops upon activation of FGS signal	1 Year	Electrical equipments for ATEX IEC 60079-17" Inspection and maintenance of electrical installations in hazardous areas (other than mines)
Battery extraction fans Prevent the build-up of flammable atmosphere within the battery room.	Ventilation system integrity and functionality	- Visual inspection - Function Test	• External Visual Inspection • Fan functionality	1 Year	Electrical equipments for ATEX IEC 60079-17" Inspection and maintenance of electrical installations in hazardous areas (other than mines)

Reliability
Ventilation should always be in continuous operation.
Survivability
The HVAC system's ability to prevent gas migration to other areas are vital during major accident

IC003 CERTIFIED (EX-RATED) ELECTRICAL EQUIPMENT

SCE PERFORMANCE STANDARD	Certified (Ex-rated) Electrical Equipment		Revision 00
SCE Description	Certified (Ex-rated) Electrical Equipment	SCE ID:	IC003
SCE Boundaries	- Electrical equipment - Instrumentation	Performance Standard Owner	HSE / Electric
SCE Goal	To prevent risk of ignition by providing control loops certified for corresponding hazardous area To prevent risk of ignition by providing certified electrical equipment for corresponding hazardous area	Interdependence	N/A

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions [9], [10]	Freq	[Doc. Ref.]
Ex-d, Ex-e, Ex-n equipment apparatus: No ignition source formation probability inside the concerned hazardous area	Enclosure, glasses and glass-to-metal sealing gaskets and/or compounds integrity	Visual inspection Close inspection Detailed inspection	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)	Type / Frequency V / 6 Months C / Yearly D / 3 Years	Electrical equipment for ATEX IEC 60079-17" Inspection and maintenance of electrical installations in hazardous areas (other than mines)
	Bolts, cable entry devices and blanking elements completeness and tightness	- Physical check (detailed and close inspection) - Visual check	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n"	Type / Frequency V / 6 Months C / Yearly D / 3 Years	

[9] The detailed inspection will not be executed during the 2 years demonstration period but it is still valid and will be recorded on this document in case operation period is extended.
[10] Frequency of visual inspection is aligned with the minimum time interval for which is foreseen the visit from the external crew.

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions [9], [10]	Freq	[Doc. Ref.]
			Installations (D = Detailed, C = Close, V = Visual)		
	Cable gland installation	-Visual inspection -Close inspection -Detailed inspection	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)	Type / Frequency V / 6 Months C / Yearly D / 3 Years	
	Lamp rating, type and position	Detailed inspection	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)	Type / Frequency V / 6 Months C / Yearly D / 3 Years	
	Electrical connections tightness	Detailed inspection	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)	Type / Frequency V / 6 Months C / Yearly D / 3 Years	

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Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions [9], [10]	Freq	[Doc. Ref.]
	No damage to cables	Visual inspection Close inspection Detailed inspection	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)	Type / Frequency V / 6 Months C / Yearly D / 3 Years	
	Sealing of trunking, ducts, pipes and/or conduits	Visual inspection Close inspection Detailed inspection	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)	Type / Frequency V / 6 Months C / Yearly D / 3 Years	
	Earthing connections	- Physical check (detailed and close inspection) - Visual check	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)	Type / Frequency V / 6 Months C / Yearly D / 3 Years	
	Fault loop impedance or Earthing resistance	Detailed inspection	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed,	Type / Frequency V / 6 Months C / Yearly D / 3 Years	

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Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions [9], [10]	Freq	[Doc. Ref.]
			C = Close, V = Visual)		
	Insulation resistance	Detailed inspection	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)	Type / Frequency V / 6 Months C / Yearly D / 3 Years	
	Automatic electrical protective devices	Detailed inspection	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)	Type / Frequency V / 6 Months C / Yearly D / 3 Years	
	Protection against corrosion, weather, vibration and other adverse factors	Visual inspection Close inspection Detailed inspection	• Refer to the Attached Table1: Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)	Type / Frequency V / 6 Months C / Yearly D / 3 Years	

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions [9], [10]	Freq	[Doc. Ref.]
Ex-i, equipment apparatus: No ignition source formation probability inside the concerned hazardous area	Same measures as above + Safety barrier units, relays with correct installation and safe earthed	Visual inspection Close inspection Detailed inspection	• Refer to the Attached Table2: Inspection Schedule for Ex "i" Installations	Type / Frequency V / 6 Months C / Yearly D / 3 Years	Electrical equipment for ATEX IEC 60079-17" Inspection and maintenance of electrical installations in hazardous areas (other than mines)
	Same measures as above + Intrinsically safe circuit isolation from earth	Detailed inspection	• Refer to the Attached Table2: Inspection Schedule for Ex "i" Installations	Type / Frequency V / 6 Months C / Yearly D / 3 Years	
	Same measures as above + Separation between Intrinsically and non-intrinsically safe circuit	Detailed inspection	• Refer to the Attached Table2: Inspection Schedule for Ex "i" Installations	Type / Frequency V / 6 Month C / Yearly D / 3 Years	
	Protection against corrosion, weather, vibration and other adverse factors	Visual inspection Close inspection Detailed inspection	• Refer to the Attached Table2: Inspection Schedule for Ex "i" Installations	Type / Frequency V / 6 Months C / Yearly D / 3 Years	
	No dust and dirt accumulation	Visual inspection Close inspection	• Refer to the Attached Table2: Inspection Schedule for	Type / Frequency V / 6 Months C / Yearly D / 3 Years	

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions [9], [10]	Freq	[Doc. Ref.]
		Detailed inspection	Ex "i" Installations		

Reliability
Not applicable
Survivability
Not applicable

Table 1 Inspection Schedule for Ex "d", Ex "e" and Ex "n" Installations (D = Detailed, C = Close, V = Visual)

Check that:		Ex "d"			Ex "e"			Ex "n"		
		Grade of Inspection								
		D	C	V	D	C	V	D	C	V
A	APPARATUS									
1	Apparatus is appropriate to area classification	*	*	*	*	*	*	*	*	*
2	Apparatus group is correct	*	*		*	*		*	*	
3	Apparatus temperature class is correct	*	*		*	*		*	*	
4	Apparatus circuit identification is correct	*			*			*		
5	Apparatus circuit identification is available	*	*	*	*	*	*	*	*	*
6	Enclosure, glasses and glass-to-metal sealing gaskets and/or compounds are satisfactory	*	*	*	*	*	*	*	*	*
7	There are no unauthorized modifications	*			*			*		
8	There are no visible unauthorized modifications		*	*		*	*		*	*
9	Bolts, cable entry devices (direct and indirect) and blanking elements are of the correct type and are complete and tight									
	– physical check	*	*		*	*		*	*	
	– visual check			*			*			*
10	Cable Glands installed are appropriate for the area classification	*	*	*	*	*	*	*	*	*
11	Cable Gland installation is appropriate and correct	*	*	*	*	*	*	*	*	*
12	Flange faces are clean and undamaged and gaskets, if any, are satisfactory	*								
13	Flange gap dimensions are within maximal values permitted	*	*							
14	Lamp rating, type and position are correct	*			*			*		
15	Electrical connections are tight				*			*		
16	Condition of enclosure gaskets is satisfactory				*			*		
17	Enclosed – break and hermetically sealed devices are undamaged							*		
18	Restricted breathing enclosure is satisfactory							*		
19	Motor fans have sufficient clearance to enclosure and/or covers	*			*			*		
20	Breathing and draining devices are satisfactory	*	*		*	*		*	*	
B	INSTALLATION									
1	Type of cable is appropriate	*			*			*		
2	There is no obvious damage to cables	*	*	*	*	*	*	*	*	*
3	Sealing of trunking, ducts, pipes and/or conduits is satisfactory	*	*	*	*	*	*	*	*	*
4	Stopper boxes and cable boxes are correctly filled	*								
5	Integrity of conduit system and interface with mixed system is maintained	*			*			*		
6	Earthing connections, including any supplementary Earthing bonding connections are satisfactory (for Example connections are tight and conductors are of sufficient cross-section)									

Check that:		Ex "d"			Ex "e"			Ex "n"		
		Grade of Inspection								
		D	C	V	D	C	V	D	C	V
	– physical check	*			*			*		
	– visual check		*	*		*	*		*	*
7	Fault loop impedance (TN systems) or Earthing resistance (IT systems) is satisfactory * Fault loop impedance will not be done on live hydrocarbon plants	*			*			*		
8	Insulation resistance is satisfactory	*			*			*		
9	Automatic electrical protective devices operate within permitted limits	*			*			*		
10	Automatic electrical protective devices are set correctly (auto-reset not possible in zone 1)	*			*			*		
11	Special conditions of use (if applicable) are complied with	*			*			*		
12	Cables not in use are correctly terminated	*			*			*		
13	Obstructions adjacent to flameproof flanged joints are in accordance with IEC 60079-14	*	*	*						
14	Variable voltage/frequency installation in accordance with documentation	*	*		*	*		*	*	
C	ENVIRONMENT									
1	Apparatus is adequately protected against corrosion, weather, vibration and other adverse factors	*	*	*	*	*	*	*	*	*
2	No undue accumulation of dust and dirt	*	*	*	*	*	*	*	*	*
3	Electrical insulation is clean and dry				*			*		

Notes:

(1) General: the checks used for apparatus using both types of protection "e" and "d" will be a combination of both columns.

(2) Items B7 and B8: account should be taken of the possibility of an Explosive atmosphere in the vicinity of the apparatus when using electrical test equipment.

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Table 2 Inspection Schedule for Ex 'I' Installations (D=detailed, C=Close, V=Visual)

Check that:		Grade of inspection		
		D	C	V
A	EQUIPMENT			
1	Circuit and/or equipment documentation is appropriate to area classification	X	X	X
2	Equipment installed is that specified in the documentation	X	X	
3	Circuit and/or equipment category and group correct	X	X	
4	IP rating of equipment is appropriate to the group III material present	X	X	
5	Equipment temperature class is correct	X	X	
6	Ambient temperature range of the apparatus is correct for the installation	X	X	
7	Service temperature range of the apparatus is correct for the installation	X	X	
8	Installation is clearly labelled	X	X	
9	Enclosure, glass parts and glass-to-metal sealing gaskets and/or compounds are satisfactory	X	X	
10	Cable glands and blanking elements are the correct type, complete and tight – physical and visual check	X	X	X
11	There are no unauthorised modifications	X		
12	There is no evidence of unauthorised modifications		X	X
13	Diode safety barriers, galvanic isolators, relays and other energy limiting devices are of the approved type, installed in accordance with the certification requirements and securely earthed where required	X	X	X
14	Conditions of enclosure gaskets is satisfactory	X		
15	Electrical connections are tight	X		
16	Printed circuit boards are clean and undamaged	X		
17	The maximum voltage Um of the associated apparatus is not exceeded	X	X	
B	INSTALLATION			
1	Cables are installed in accordance with the documentation	X		
2	Cables screens are earthed in accordance with the documentation	X		
3	There is no obvious damage to cables	X	X	x
4	Sealing of trunking, ducts, pipes and/or conduits is satisfactory	X	X	X
5	Point-to-point connections are all correct (initial inspection only)	X		
6	Earth continuity is satisfactory (e.g. connections are tight and conductors are of sufficient cross-section) for non-galvanically isolated circuits	X		
7	Earth connections maintain the integrity of the type of protection	X	X	X
8	The intrinsically safe circuit earthing is satisfactory	X		
9	Insulation resistance is satisfactory	X		

Check that:		Grade of inspection		
		D	C	V
10	Separation is maintained between intrinsically safe and non-intrinsically safe circuits in common distribution boxes or relay cubicles	X		
11	Short-circuit protection of the power supply is in accordance with the documentation	X		
12	Special conditions of use (if applicable) are complied with	X		
13	Cables not in use correctly terminated	X		
C	ENVIRONMENT			
1	Equipment is adequately protected against corrosion, weather, vibration and other adverse factors	X	X	X
2	No undue accumulation of dust and dirt	X	X	X

IC005 ELECTRICAL EARTHING CONTINUITY AND EARTH BONDING

SCE PERFORMANCE STANDARD	Electrical earthing continuity and earth bonding	Revision 00

SCE Description	Electrical earthing continuity and earth bonding	**SCE ID:**	IC005
SCE Boundaries	- Lightning protection system	**Performance Standard Owner**	HSE / Electric
SCE Goal	To minimise the likelihood of ignition from lightning and static discharge in hazardous areas	**Interdependence**	- IC003 Certified electrical equipment

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq	[Doc. Ref.]
Lightning protection system The condition of the earthing and lightning protection system installation is suitable for operations in all areas.	Lightning protection system integrity	- Visual inspection	• External Visual Inspection, looking for sign of damage, loose fixing & fitting and corrosion, including cables general status	1 Year	IEC 60079 Electrical Apparatus for Explosive Atmospheres Part 17- Inspection and Maintenance of Electrical Installations in Hazardous Areas requirements
Earthing continuity for structure, piping and equipment The electric continuity between metallic elements is required	Electrical continuity system integrity	- Visual inspection	• External Visual Inspection • Hearting resistance measurement	2 Years	IEC 60079 Electrical Apparatus for Explosive Atmospheres Part 17- Inspection and Maintenance of Electrical Installations in Hazardous Areas requirements

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Reliability
Electrical earthing system should always be available at all times.
Survivability
Not applicable

IC007 INERT GAS BLANKET SYSTEM

SCE PERFORMANCE STANDARD	Electrical earthing continuity and earth bonding		Revision 00
SCE Description	Inert gas blanket system	**SCE ID:**	IC007
SCE Boundaries	- Nitrogen blanketing for Hydrogen vent system	**Performance Standard Owner**	HSE / Process / Instrumentation
SCE Goal	To provide an inert atmosphere within enclosed process systems in order to prevent the ignition of flammable inventory.	**Interdependence**	- PC007 Relief system - SD002 BDV - SD009 Utility air - DS001 F&G detection

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq	[Doc. Ref.]
Inert gas availability Provide nitrogen gas at sufficient pressure and correct concentration to enclosed process systems.	No leak from flanges and connections, Integrity check of instrument air piping system	- External Visual Inspection - Leak test (where appropriate)	• External Visual Inspection Check any leakage	1 Year	• For leak test, API 598 Valve Inspection and Testing" • API 574 : Inspection Practices for Piping System Components
	Correct nitrogen purity	Online Oxygen analyzer measurement is precise and accurate	• To perform calibration for online oxygen analyzers	1 Year[11]	IEC 61508 : Functional safety of electrical safety-related systems – Part 2
Pressure Transmitter functionality	Internal diagnostic system to monitor	Simulate readings discrepancy inside the	• Verify the activation of alarm in case	1 Year	IEC 61508 : Functional safety of electrical

[11] Frequency may vary depending on the equipment type; refer to vendor's manuals.

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq	[Doc. Ref.]
Low pressure alarm functionality	discrepancy between measures.	Transmitter calibrated range. Verify the activation of alarm in case of revealed discrepancy.	of revealed discrepancy		safety-related systems – Part 2

Reliability
System should always be available at all times.
Survivability
Not applicable

DS001 FIRE AND GAS DETECTION

SCE PERFORMANCE STANDARD	FIRE AND GAS DETECTION		Revision 00
SCE Description	F&G Detection System	SCE ID:	DS001
SCE Boundaries	Fire and gas detection system on platform • H2 detector • Flame detector • Manual Fire Alarms • Beacons and Sounders	Performance Standard Owner	HSE / Instrumentation
SCE Goal	To ensure gas / flame detection in case of fire and to ensure initiation of relevant automatic actions	Interdependence	-SD001/SD002/SD006: Shutdown system (ESD initiated by F&G system) -ER005:UPS (back-up for F&G system) -IC003: Certified (Ex rated) Electrical Equipment -ER2: Communication system -ER001: Muster Area -ER004: Emergency Communication

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Flame /smoke Detector Functionality. To ensure the prompt detection of a fire	- Early detection of fire	Detectors are clean and in good condition.	• External Visual Inspection	6 Months	API RP 14G - Recommended Practice for Fire Prevention and Control on Fixed Open-type Offshore Production Platforms
Gas Detector Functionality.	- Early detection of gas release	Detectors are clean and in good condition.	• External Visual Inspection	6 Months	API RP 14G - Recommended Practice for Fire Prevention

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
To ensure the prompt detection of H_2 gas release		As specified in the C&E matrices gas detectors initiate alarms at the correct LEL setpoints	• Functional and calibration test[12]	1 Year	and Control on Fixed Open-type Offshore Production Platforms Vendor Manual
F&G logic Functionality.– To ensure the prompt alarm signalling of a fire or gas release	Logic Solver Functionality. - Initiation of the relevant automatic actions (ESD & depressurization) via voting logic	To perform test on system SIS for F&G	• Check detector status for fault or alarm	6 Months	IEC 61508 : Functional safety of electrical safety-related systems – Part 2 API RP 14G - Recommended Practice for Fire Prevention and Control on Fixed Open-type Offshore Production Platforms
			• Perform function test	1 Year	
Manual alarms To provide means for personnel to manually alert of an event and its location.	Manual alarm functionality	MAC within specification, unobstructed, clean and in good working condition. MAC actions are as per the cause and effect matrices	• External Visual Inspection • Functional test (on sample)	1 Year	IEC 61508 : Functional safety of electrical safety-related systems – Part 2

[12] Details about functional and calibration test should be checked on sensor's vendor manual.

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Visible / audible alarms	Audible alarm detection Flashing beacon visibility.	Beacons are visible and local sounder is audible on initiation.	• Beacon and sounders function test	1 Year	IEC 61508 : Functional safety of electrical safety-related systems – Part 2

Reliability
systems should always be available at all time.
Survivability
• Fire detectors response time should activate and initiate executive actions before direct exposure destroys detector or cabling. • Cables shall be fire resistant type. Cabling to be routed to reduce the risk of loss of detection functionality in the event of a reasonably likely fire or explosion route to avoid fire zone areas. • Marshalling and System cabinets shall be in a protected area outside process area fire zones.

PS002 FIRE AND EXPLOSION PROTECTION

SCE PERFORMANCE STANDARD	FIRE AND EXPLOSION PROTECTION		Revision 00
SCE Description	Fire and explosion protection	SCE ID:	PS002
SCE Boundaries	• Deck plating • Fire extinguisher	Performance Standard Owner	HSE / Mechanical
SCE Goal	To protect personnel and SCEs from explosion effects by way of shielding	Interdependence	SI002: Topside structures PC001: pressure vessel PC006: piping system

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Deck plating. To ensure mechanical protection	Mechanical integrity	Protection systems are in good working condition.	• External Visual Inspection	1 Year	-
Fire extinguishers To ensure proper activation of extinguisher in fire case	*System integrity and functionality*	• External Visual Inspection • Extinguisher functionality	• to perform general visual inspection of portable extinguishers and any relevant accessory equipment, such as trolley, storage box, and conditions of hoses, nozzles and valves	6 Month	API 14G - Recommended Practice for Fire Prevention and Control on Fixed Open-type Offshore Production Platforms NFPA 10 - Standard for Portable Fire Extinguishers
			• to perform discharge test and agent sample analysis, gas cartridge test, with check of powder agent condition.	1 year	

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
			• To perform Hydrostatic test	5 Years	

Reliability
Systems should always be available at all time.
Survivability
To maintain integrity of areas intended to be protected

PS015 COLLISION AVOIDANCE SYSTEM

SCE PERFORMANCE STANDARD	COLLISION AVOIDANCE SYSTEM		Revision 00
SCE Description	Collision avoidance system	SCE ID:	PS015
SCE Boundaries	Collision avoidance systems: • Visual navigation aids • Marine acoustic aids	Performance Standard Owner	HSE / Instrument
SCE Goal	To alert marine vessels of the position of the installation, taking enough time to avoid the area and preventing any collision	Interdependence	-SI001: Subsea structures -SI002: Topside structures -ER002: Escape routes (since topside structure can be used

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Flashing/ Fixed light To provide visible indication / warning of the presence of the installation to aircraft & marine vessels	System functionality and integrity	White/Red flashing light inspection and functionality Red fixed light inspection and functionality	• External Visual Inspection • Check light intensity • Check flash light functionality to exhibit Morse letter "U"	6 Months	IALA standards, CAP 437 Standards for Offshore Helicopter Landing Areas
Nav aid back-up batteries To provide electrical power in case of main power supply loss	Batteries availability and functionality	Power connections and switchgear Electrical test of Battery	• Verify protections, load measure / signalling and pilot lamps test (if applicable) • Check mechanical integrity of board structures • Measure and load voltage and current on circuit	1 Year	IEC 62040-3:2021 - Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
			breakers (if applicable) • Check all electrical terminations are firmly secured and free from overheating and corrosion		

Reliability
Systems should always be available at all time.
Survivability
There shall always be a means of communication in case of ship collision event.

SD001 EMERGENCY SHUTDOWN SYSTEM (ESD)

SCE PERFORMANCE STANDARD	EMERGENCY SHUTDOWN SYSTEM (ESD)		Revision 00
SCE Description	Emergency shutdown system (ESD)	SCE ID:	SD001
SCE Boundaries	Safety control loop including the transmitter with sensor for parameter (pressure, temperature, level), and logic solver (interlock, analogical or digital input/output modules, interposing relay, pulse barrier)	Performance Standard Owner	HSE / Instrumentation
SCE Goal	To ensure platform shutdown in safe conditions	Interdependence	-IC003: Ignition control (to preserve integrity of Ex rated equipment in ESD system) -DS001: Detection system (ESD initiated by F&G system) -ER005:UPS (back-up for F&G system) -ER001: Muster Area -ER004:Emergency Communication

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Transmitter signal SIF functionality	Internal diagnostic system to monitor discrepancy between measures.	Simulate readings discrepancy inside the Transmitter calibrated range. Verify the activation of alarm in case of revealed discrepancy.	• Verify the activation of alarm in case of revealed discrepancy	1 Year	• IEC 61508 : Functional safety of electrical safety-related systems – Part 2

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Logic Solver functionality	Loop check for alarm threshold, voting operation, outputs, alarms and indications.	Simulate readings discrepancy inside the software (Software module testing)	• Loop check	1 Year	• IEC 61508 : Functional safety of electrical safety-related systems – Part 2

Reliability
Systems should always be available on demand.
Survivability
Equipment that are critical for the effectuation of system actions, shall be protected against mechanical damage and an Major Hazard scenario until shutdown sequence is complete.

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SD002 BLOWDOWN VALVES (BDV)

SCE PERFORMANCE STANDARD	BLOWDOWN VALVES (BDV)		Revision 00
SCE Description	Blowdown Valves (BDV)	SCE ID:	SD002
SCE Boundaries	Blowdown Valves	Performance Standard Owner	HSE / Instrumentation
SCE Goal	To prevent escalation during a major accident event ensuring a rapid reduction in the size of inventory.	Interdependence	-DS001: Detection system (ESD initiated by F&G system) -PC001 Pressure Vessels; -PC005 Piping Systems; - SD001 Emergency Shutdown (ESD) Control System.

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
BDV integrity Ensure containment of gas	No leak from flanges and connections, Integrity check of actuator, position indicator switches and end stops	- External Visual Inspection - Leak test (where appropriate)	• External Visual Inspection • Check any leakage	1 Year	• For leak test, API 598 Valve Inspection and Testing"

Reliability
Systems should always be available on demand.
Survivability
Equipment that are critical for the effectuation of system actions, shall be protected against mechanical damage and an Major Hazard scenario until shutdown sequence is complete.

SD006 EMERGENCY SHUTDOWN VALVES (SDV)

SCE PERFORMANCE STANDARD	EMERGENCY SHUTDOWN VALVES (SDV)		Revision 00
SCE Description	Emergency Shutdown Valves (SDV)	SCE ID:	SD002
SCE Boundaries	Emergency Shutdown Valves	Performance Standard Owner	HSE / Instrumentation
SCE Goal	To ensure platform shutdown in safe conditions	Interdependence	-DS001: Detection system (ESD initiated by F&G system) -PC001 Pressure Vessels; -PC005 Piping Systems; - SD001 Emergency Shutdown (ESD) Control System.

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
SDV integrity Ensure containment of gas	No leak from flanges and connections, Integrity check of actuator, position indicator switches and end stops	- External Visual Inspection - Leak test (where appropriate)	• External Visual Inspection • Check any leakage	1 Year	• For leak test, API 598 Valve Inspection and Testing"

Reliability
Systems should always be available on demand.
Survivability
Equipment that are critical for the effectuation of system actions, shall be protected against mechanical damage and an Major Hazard scenario until shutdown sequence is complete.

SD009 UTILITY AIR

SCE PERFORMANCE STANDARD	UTILITY AIR		Revision 00
SCE Description	Utility Air	SCE ID:	SD009
SCE Boundaries	Instrument air	Performance Standard Owner	HSE / Mechanical
SCE Goal	To prevent an unplanned and / or out-of-sequence operation of safety critical air-controlled equipment, such as emergency shutdown valves.	Interdependence	- SD001 Emergency Shutdown (ESD) Control System. - IC007 Inert gas blanket system

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Instrument Air availability To provide a continuous supply of instrument air at a suitable pressure.	No leak from flanges and connections, Integrity check of instrument air piping system	- External Visual Inspection - Leak test (where appropriate)	• External Visual Inspection • Check any leakage	1 Year	• For leak test, API 598 Valve Inspection and Testing" • API 574 : Inspection Practices for Piping System Components
	Correct functionality of compressor / driver	- Inspection and maintenance	• Compressor / driver periodic maintenance	1 Year[13]	• Vendor's maintenance manual
Moisture and Pressure Transmitter functionality Low pressure / high moisture	Internal diagnostic system to monitor discrepancy between measures.	Simulate readings discrepancy inside the Transmitter calibrated range.	• Verify the activation of alarm in case of revealed discrepancy	1 Year	• IEC 61508 : Functional safety of electrical safety-related

[13] Frequency may vary depending on the equipment type; refer to vendor's manuals.

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
alarm functionality		Verify the activation of alarm in case of revealed discrepancy.			systems – Part 2

Reliability
Systems should always be available at all times.
Survivability
Not available

ER001 MUSTER AREA

SCE PERFORMANCE STANDARD	MUSTER AREA		Revision 00
SCE Description	Muster area	SCE ID:	ER001
SCE Boundaries	Escape evacuation	Performance Standard Owner	HSE
SCE Goal	To ensure the emergency to be assessed and to allow the appropriate parts of the emergency response plan to be executed during a Major Accident Event	Interdependence	-SI001: Subsea structures -SI002: Topside structures -SD001: Emergency Shutdown (ESD) System; -ER002: Escape Routes; -ER004:Emergency Communication.

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Muster point availability To ensure safe evacuation and rescue inside the site	Muster point availability	Muster areas are to be free from obstructions to allow personnel to prepare for evacuation.	• Visual check on Muster Area	1 Year	OSHA 1910.37 - Maintenance, safeguards, and operational features for exit routes.

Reliability
Systems should always be available during operations.
Survivability
The muster area shall be located to ensure safe abandonment of the installation during a major hazard scenario

ER002 ESCAPE ROUTES

SCE PERFORMANCE STANDARD	ESCAPE ROUTES		Revision 00
SCE Description	Escape routes	SCE ID:	ER002
SCE Boundaries	Escape routes	Performance Standard Owner	HSE
SCE Goal	To provide sufficient safe and readily identifiable escape routes for all personnel to leave an area affected by an incident, reach the muster area from any part of the platform and transfer from the muster area to the evacuation and embarkation points	Interdependence	-SI001: Subsea structures -SI002: Topside structures -SD001: Emergency Shutdown (ESD) System; -ER001: Muster Area; -ER003: Emergency Lighting -ER004:Emergency Communication.

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Escape routes availability To ensure safe escape ways from the platform	Escape routes availability and usable by all personnel including passage for a stretcher.	Clear marking and exit signs All evacuation routes are to be free from obstructions and has adequate width and height clearance	• Check clear marking and exit signs	1 Year	NFPA 101: Life safety code OSHA 1910.37 - Maintenance, safeguards, and operational features for exit routes.
			• Check escape route free of obstacles	6 Months	

Reliability
Escape routes should always be available at all times.
Survivability
Ther shall be one escape route available during a major hazard scenario to allow emergency escape and evacuation

ER003 EMERGENCY / ESCAPE LIGHTING

SCE PERFORMANCE STANDARD	ESCAPE ROUTES	Revision 00

SCE Description	Emergency / Escape Lighting	SCE ID:	ER003
SCE Boundaries	Emergency Lighting	Performance Standard Owner	HSE / Electrical
SCE Goal	To provide adequate illumination at emergency response locations and escape routes in the event of a major accident event.	Interdependence	-ER001: Muster Area; -ER002: Escape Routes

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Emergency Lighting functionality To provide adequate illumination	Emergency lightning integrity and functionality	Emergency lighting are functioning correctly	• Function test	1 Year	IEC 60598-2-22: -Luminaires - Part 2-22: Particular requirements - Luminaires for emergency lighting
			• Battery autonomy Test	1 Year	

Reliability
Systems should always be available on demand.
Survivability
Emergency lighting shal be functioning during a major hazard scenario

ER004 EMERGENCY COMMUNICATION SYSTEM

SCE PERFORMANCE STANDARD	COMMUNICATION SYSTEM		Revision 00
SCE Description	Emergency communication system	SCE ID:	ER004
SCE Boundaries	Emergency Communication system • UHF marine portable radios • SART (Safety And Rescue Transponder) • EPIRB (Emergency Position Indicating Radio Beacon)	Performance Standard Owner	HSE / Instrumentation
SCE Goal	To ensure effective communication during emergency conditions	Interdependence	-SD001: ESD system -DS001: F&G detection -ER001: Muster Area; -ER002: Escape Routes -LS001 Personal Survival Equipment

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Emergency Communication functionality (UHF Radio) To ensure communication with the standby vessel	Marine UHF Radio functionality	All Marine UHF Radios function correctly.	• Function test	1 Year	ETSI EN 300 676-1 Electromagnetic compatibility and Radio spectrum Matters (ERM); Ground-based UHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the UHF aeronautical mobile service
Emergency Communication functionality (SART / EPIRB for liferaft) To ensure survival craft	SART / EPIRB functionality	SART / EPIRB function as intended	• Function test	1 Year	

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
location provision to support organisations.					using amplitude modulation; Part 1: Technical characteristics and methods of measurement

Reliability
Systems should always be available on demand.
Survivability
Communication systems shall remain capable of performing their primary role in adjacent areas not directly affected by a Major Accident Event for a period long enough to execute all the emergency and evacuation actions.

ER005 UNINTERRUPTIBLE POWER SISTEM (UPS)

SCE PERFORMANCE STANDARD	UNINTERRUPTED POWER SUPPLY (UPS)		Revision 00
SCE Description	Uninterruptible Power System (UPS)	SCE ID:	ER005
SCE Boundaries	AC/ DC UPS	Performance Standard Owner	HSE / Electrical
SCE Goal	To provide an uninterrupted power supply to the vital services of the facility during a Major Accident Event when normal power fails.	Interdependence	-SD001: ESD system -DS001: F&G detection -ER004: Emergency communication

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
UPS functionality To provide electrical power in case of main power supply loss	Batteries availability and functionality	• Power connections and switchgear	• Perform visual inspection of UPS batteries, UPS cabinet to verify condition, and ventilation fan operation • Check all electrical terminations are firmly secured and free from overheating and corrosion	1 Year	IEC 62040-3:2021 - Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements IEC 62040-5-3 Ed. 1.0 b:2016 Uninterruptible power systems (UPS) - Part 5-3: DC Output UPS- Performance And Test Requirements
		• Electrical test of Battery	• Perform battery discharge test and service	2 Years[14]	

[14] Considering that frequency is higher than design life of the platform, the task is not applicable to the installation

Reliability
Systems should always be available at all times.
Survivability
The UPS system shall be arranged in such a way that an MAH will not impact its functionality

LS001 PERSONAL SURVIVAL EQUIPMENT

SCE PERFORMANCE STANDARD	PERSONAL SURVIVAL EQUIPMENT		Revision 00
SCE Description	Personal Survival Equipment (PSE)	SCE ID:	LS001
SCE Boundaries	Personal Survival Equipment • Safety Cabinet (With Immersion Suit, Life Jacket) • First Aid Kit • Resuscitation Unit • Escape Masks • Evacuation Stretcher • Liferaft • Lifebuoy	Performance Standard Owner	HSE
SCE Goal	To provide all personnel escaping from a Major Accident Event with suitable protective clothing and equipment. To provide personnel with emergency response roles with suitable protective equipment.	Interdependence	-ER001: muster area -ER002 Escape routes -ER004: Emergency communication

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
PSE availability To ensure that personal safety equipment are available and ready for use	Correct PSE available (type and number)	• PSE are in acceptable condition and quantities are adequate	• Visual inspection of Personal Survival Equipment (PSE) to confirm the location, quantity of, and condition of the Personal Survival Equipment (PSE) is correct and serviceable	6 Months	SOLAS Chapter III Life Saving Appliances and Arrangements;

Reliability
The Personal Survival Equipment shall always be available for all credible emergency scenarios.
Survivability
The lifejacket shall be stored within cabinets if located in the field to provide the best protection from environmental condition Liferafts are to survive major accident events of the facility, to ensure they are available for evacuation of 100% of POB post event.

LS002 ALTERNATE MEANS OF ESCAPE

SCE PERFORMANCE STANDARD	ALTERNATE MEANS OF ESCAPE		Revision 00
SCE Description	Alternate Means of Escape	SCE ID:	LS002
SCE Boundaries	Alternate Means of Escape: • Liferaft	Performance Standard Owner	HSE
SCE Goal	To provide for the safe escape of all persons from the installation in case arrangements for evacuation fail.	Interdependence	-ER001: muster area -ER002 Escape routes -ER004: Emergency communication

Functionality Criteria / Availability	Performance Measure	Assurance Method	Instructions	Freq.	[Doc. Ref.]
Liferaft availability / integrity To provide means to facilitate all personnel for safe escape on the water when primary and secondary means are unavailable.	Liferaft availability and functionality in case of necessity	• Liferafts are in good working conditions and provided with adequate equipment/ accessories	• Visual inspection of liferaft • Perform operational test, if applicable • Perform inspection and replacement of liferaft Accessories/ Equipment (including expiry dates)	1 Year	SOLAS Chapter III Life Saving Appliances and Arrangements;

Reliability
Liferafts shall always be reliable for all credible emergency scenarios.
Survivability
Liferafts are to survive major accident events of the facility, to ensure they are available for evacuation of 100% of POB post event.