# Base Load Power Hub (BLPH)

# OTP – F&G and ESD C&E Logics

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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.

## 1.2 Project Location

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

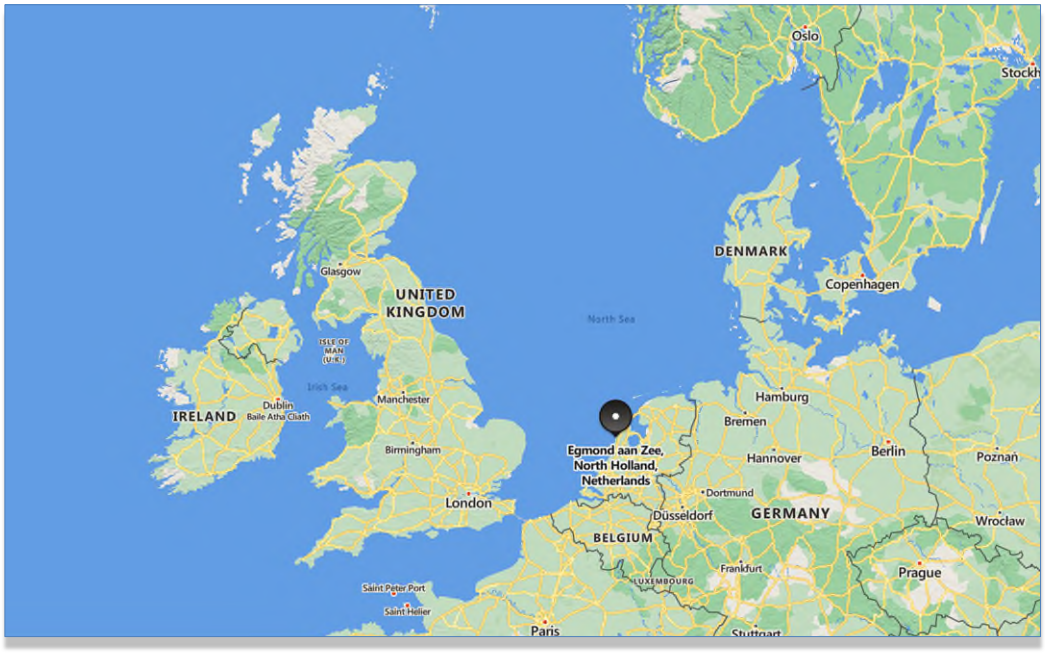



*Figure 1 - HOLLANDSE KUST NOORD WIND PARK Location Map*

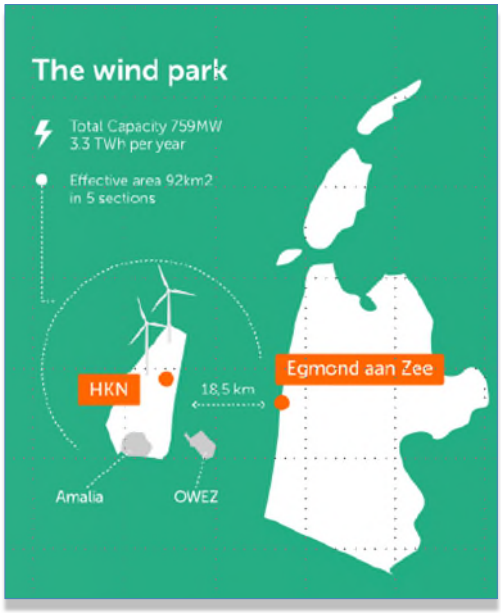



*Figure 2 - Wind Park Details*

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

## 1.3 Project Concept

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

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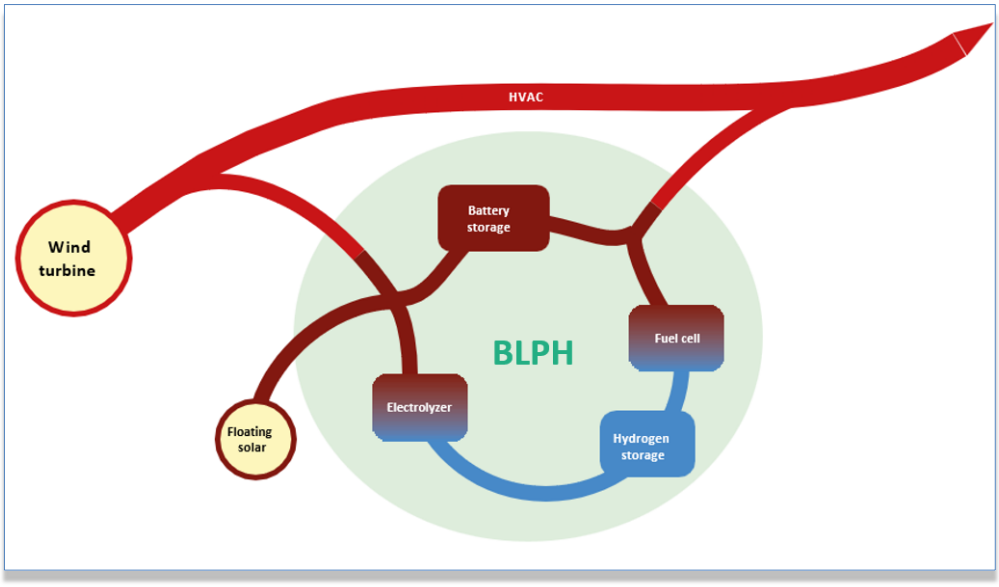



*Figure 3 – BLPH Concept*

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

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

## 2. DOCUMENT SCOPE

The scope of this document is intended to provide a procedure to ensure the functionality of the SIS and FIRE & GAS systems in normal and emergency condition of the platform according to the project requirements.

## 3. OTP SUMMARY

### 3.1 Test Objective

The operating test of the SIS-Fire & Gas system is executed to ensure the functionality of the system in normal and emergency condition of the platform according to the project requirements.
These OTP will demonstrate the functionality of the SIS-Fire & Gas system scope as defined in Customer supplied IO Lists, Control and Process Shutdown narratives, P&IDs, Process Graphics design inputs, Alarm list, C&E Documents, Emergency Shutdown Diagrams, Layout graphics and approved design documents available in Crosswind project.

### 3.2 Test and System Description

Safety system (SIS-Fire & Gas) is combined into two System cabinet but with segregated racks for each system. For Safety System there are 1 dedicated to SIS and 3 for Fire & Gas marshalling cabinets included. There are 2 PCS system cabinets and 1 dedicated network cabinet. Network is redundant via direct connection between PCS and SIS and Fire & Gas. Modbus TCP is used as communication to other packages. For network architecture refer to document 172400594-IN-DD-00015.

This document is related to the following ICSS systems / subsystems:

- SS 79-00 Emergency Shutdown Systems (SIS).
- SS 70-00 Fire and Gas Control Systems (F&G).

Reference documents:
123A90-DDL-IN-SP-40100 - Safety System Specification (SIS-Fire & Gas).
123A90-DDL-SAF-DL-30028 - Fire & Gas Detection (plant area).

### 3.3 Safety Devices

- Appropriate Personnel Protective Equipment (PPE) and safety equipment e.g., safety shoes, hand gloves, helmet, earplugs etc. are available and must be used in line with the site requirements.
- Warning safety signs are to be posted with restricted access to essential personnel only.
- Adequate firefighting equipment.

## 3.4 HSE Management

All necessary safety precautions must be taken to avoid any risk for personnel injury.

- All personnel involved in this operational test shall be competent for the tasks they will be required to undertake
- Place safety / warning signs and segregate the entire area with barrier tapes (safety barriers) of a colour distinguished (blue and white) from those used for construction activities
- Restrict access into area only to authorized personnel
- Conduct "Toolbox Talk" with all personnel prior to starting test work
- Appropriate Personnel Protective Equipment (PPE) and safety equipment e.g. safety shoes, safety glasses, hand gloves, helmet, earplugs etc. are available and must be used in line with the site requirements
- All activities carried out on the project shall be performed in accordance with the "Permit to Work" system Doc. PRO-HSE-23
- Electrical and mechanical isolations are to be assured as per Doc. PRO-HSE-08 and "Commissioning and start-up operation" procedure.
- Observe and enforce all international codes and regulations to safeguard personnel, plant and environment.
- Ensure that the working area is clean, tidy, well illuminated and that access and escape routes are free from obstructions.

Before starting work on any of the activities in this OTP it is the responsibility of the persons performing the work to:

- Familiarize themselves with the plant/equipment to be worked on
- Ensure they are aware of all other work activities that are taking place, or due to take place
- If necessary, re-plan any situation/activity
- Ensure proper communications between parties involved in the execution of the OTP
- Read the relevant Vendor documentation for the equipment covered by this OTP and observe any special requirements and limitations recommended or imposed by Vendor
- Verify that all personnel involved in the implementation of this procedure are familiar with its content as well as the associated safety requirements (Toolbox Talk)

## 3.5 Acceptance Criteria

Visual inspection and verification are a crucial step to identify any obvious issues with the installation, such as loose connections, missing components, or damage to the equipment.
Crosschecking the installation with engineering documentation ensures that the installation is done correctly and according to the manufacturer's guidelines. These steps can help identify any missing or incorrect components, and wrong connections.

The testing procedures will be considered accepted when all of the steps in this document will be successfully completed.

# 4. DOCUMENTS REFERENCES AND ABBREVIATIONS

## 4.1 Reference documents

### 4.1.1 Company Documents and Standards

| Document ID | Document Title |
|---|---|
| [1] K559-2254-CG-PHI-001 | Commissioning Philosophy |
| [2] K559-2254-EL-ELL-002 | BLPH Electrical Load List (CCS MODE 2(A) 'HOT STANDBY') |
| [3] K559-2254-EL-ELL-003 | BLPH Electrical Load List (CCS MODE 3(C) 'DISCHARGING') |
| [4] K559-2254-EL-ELL-004 | BLPH Electrical Load List (CCS MODE 4(A) 'COLD STANDBY') |
| [5] K559-2254-EL-ELL-005 | BLPH Electrical Load List (CCS MODE 4A(D) 'EMERGENCY MODE (Island)) |
| [6] K559-2254-EL-ELL-006 | BLPH Electrical Load List (CCS MODE 5(D) 'POWER OUT (Blackout)) |
| [7] K559-2254-PR-PHI-001 | Main process control philosophy |

*Table 1*: *Company Documents and Standards*

These documents were produced in FEED and made available to RM for info. They have subsequently been superseded by Detailed Design, similar or same deliverables.

### 4.1.2 Project Documents

| Document ID | Document Title |
|---|---|
| [1] 123A90-PML-PM-LIS-01001 | Master Document Register |
| [2] 123A90-PML-COM-PL-03002 | Mechanical Completion & Commissioning Execution Plan |
| [3] 123A90-PML-COM-LIS-03011 | System/Sub-Systems List |
| [4] 123A90-PML-COM-LIS-03012 | System/Sub-System Boundary Limit Diagrams |
| [5] 123A90-PML-COM-PRO-03007 | Commissioning Strategy |
| [6] 123A90-PML-COM-PRO-03038 | Leak Test Procedure |
| [7] 123A90-PML-COM-SP-03032 | Pre-Commissioning Functional Test Sheet Template Collection (ITR-B) |
| [8] 123A90-PML-COM-SP-03014 | Commissioning TDS - Temporary Equipment & Facilities |
| [9] 123A90-PML-COM-PRO-03019 | OTP – Onshore Performance & Integrated Test Procedure |
| [10] 123A90-PML-COM-LIS-03034 | Inhibit-Override Register |
| [11] 123A90-PML-COM-LIS-03035 | PSV Calibration Register |
| [12] 123A90-PML-COM-PRO-03036 | OTP - Black Start Procedure |

| Document ID | Document Title |
|---|---|
| [13] 123A90-PML-COM-LIS-03024 | Commissioning Spare Parts and Consumables List |
| [14] 123A90-PML-COM-PRO-03022 | Initial offshore START-UP procedures |
| [15] 123A90-PML-COM-RE-03001 | Commissioning Final Dossier (ITR-B) |
| [16] 123A90-PML-QHSE-PRO-00116 | Flushing and Cleaning Procedures |
| [17] 123A90-PML-QHSE-SP-00118 | Mechanical Completion Check Sheet Template Collection (ITR-A) |
| [18] 123A90-PML-QHSE-RE-00115 | Mechanical Completion Final Dossier (ITR-A) |
| [19] 123A90-PML-QHSE-PRO-00117 | Punch list Management Procedure |
| [20] 123A90-PML-COM-PRO-03041 | OTP - Hydrogen Storage & Venting Systems |
| [21] 123A90-PML-COM-PRO-03042 | OTP - Sea Water Intake & Fresh Water Treatment Systems |
| [22] 123A90-PML-COM-PRO-03043 | OTP - Instrument Air System |
| [23] 123A90-PML-COM-PRO-03055 | OTP - Nitrogen Generation System |
| [24] 123A90-PML-COM-PRO-03045 | OTP - HV Switchgear & 66 kV Transformer Systems |
| [25] 123A90-PML-COM-PRO-03046 | OTP - MV Switchgear & 6.6 kV Transformer Systems |
| [26] 123A90-PML-COM-PRO-03047 | OTP - LV Switch Boards & LV Distribution Board Systems |
| [27] 123A90-PML-COM-PRO-03048 | OTP - Lighting & Small Power Systems |
| [28] 123A90-PML-COM-PRO-03049 | OTP - Electrical Heat Tracing Systems |
| [29] 123A90-PML-COM-PRO-03050 | OTP - DC UPS System 10KVA UP-200F1 |
| [30] 123A90-PML-COM-PRO-03051 | OTP - Data Network Systems |
| [31] 123A90-PML-COM-PRO-03053 | OTP - Navaid System |
| [32] 123A90-PML-COM-PRO-03054 | OTP - F&G and ESD C&E Logics |
| [33] 123A90-PML-COM-SP-03057 | Worksite WEF (Work Execution Flow Scheme) |
| [34] 123A90-PML-COM-SP-03058 | Site WEF (Work Execution Flow Scheme) |
| [35] 123A90-PML-QHSE-PL-00001 | Project HSE Plan |
| [36] 123A90-PML-QHSE-PRO-00120 | Proverlis Management Procedure |
| [37] 123A90-PML-COM-PRO-03056 | OTP – Document Template |
| [38] 123A90-PML-COM-PRO-03059 | OTP - AC UPS System 35kVA UP-200F3 |
| [39] 123A90-PML-COM-PRO-03060 | OTP - AC UPS System 15kVA UP-200F4 |
| [40] 123A90-PML-COM-PRO-03061 | OTP – Electrolyser (CPI) |
| [41] 123A90-PML-COM-PRO-03062 | OTP – Fuel Cell (CPI) |

| Document ID | Document Title |
|---|---|
| [42] 123A90-PML-COM-PRO-03063 | OTP – BESS (CPI) |

*Table 2*: Project Documents

### 4.1.3 Vendor Documents

- N/A

| Document ID | Document Title |
|---|---|
| n/a | |

*Table 3*: Vendor Documents

## 4.2 Acronyms and Abbreviations

| Acronyms and Abbreviations | Description |
|---|---|
| BLPH | Base Load Power Hub |
| BESS | Battery Energy Storage System |
| C&E | Cause & Effects |
| CCS | Central Control System |
| CPI | Company Provided Item |
| E&I | Electrical & Instrumentation |
| ESD | Emergency Shut Down |
| F&G | Fire & Gas |
| FAT | Factory Acceptance Test |
| HKN | Hollandse Kust Noord |
| HSE | Health, Safety, & Environment |
| HSSE | Health, Safety, Security & Environment |
| HV | High Voltage |
| HVAC | Heating, Ventilation and Air Conditioning |
| ICSS | Integrated Control and Safety System |
| ITR | Inspection & Test Record |
| LOTO | Lock-Out / Tag-Out |
| LV | Low Voltage |
| OEM | Original Equipment Manufacturer |
| ORR | Operations Readiness Review |
| OTP | Operational Test Procedure (Commissioning) |

| Acronyms and Abbreviations | Description |
|---|---|
| PCS | Process Control System |
| PSV | Pressure Safety Valve |
| RFC | Ready for Commissioning |
| RFO | Ready for Operation |
| SAT | Site Acceptance test |
| SIS | Safety Instrumented System |
| UPS | Uninterruptible Power Supply |
| VooW | Van Oord Offshore Wind |
| WEF | Work Execution Flow Scheme |

*Table 4*: Acronyms and Abbreviation

# 5. OTP TEST REQUIREMENTS – ONSHORE WORKSITE

This chapter refers to the activities on the Contractor worksite (construction yard).

## 5.1 PLANNING AND MANPOWER

### 5.1.1 Planned tasks with estimated manpower

Estimated manpower for the entire duration of the Test:

- 1 E&I commissioning superintendent from Contractor
- 1 E&I commissioning supervisor from Contractor
- 1 Specialist F&G and SIS with Operator workstation

### 5.1.2 Test duration estimate

The test duration should be as follows:

- 6 days approx.

If necessary, the estimated time can be extended in order to complete all required pre-commissioning and commissioning activities.

### 5.1.3 Vendor Assistance

Vendor YOKOGAWA will provide a qualified specialist to assist with all aspects of commissioning of the SIS and F&G systems.

### 5.1.4 Items postponed being tested

- Not Applicable

#### 5.1.5 Items HARDWIRED to be tested

| **Document Number:** | **Document description:** |
|---|---|
| 1724000594-IN-LIS-00004 | PCS and Safety System IO List (HW-SW) |

## 5.2 OTP TEST REQUIREMENTS – ON SHORE WORKSITE

### 5.2.1 Pre-Commissioning achievement

Prior the commissioning operation starts, the relevant pre-commissioning ITRs should be fully signed.

### 5.2.2 Commissioning achievement

The commissioning achievement will be the successful operation, functionality of SIS and F&G systems, installed and put in operation during the WORKSITE phase:

- SS 79-00 SIS (ESD)
- SS 70-00 FGS

### 5.2.3 Status of Required Associated Subsystem

- SS 86-00 Server Cabinet
- SS 86-00 Network Cabinet

### 5.2.4 Special tools & test equipment

The following special tool and Test Equipment are required:

- Continuity tester (Multimeter).
- Toolbox.
- Hart Communicator.
- Portable radios (2 pcs + 1 per Technical Room).
- Gas bottles for gas sensors test.
- Smoke bottles for smoke detector test.
- UV lamp for flame detector test.

| **TESTING & MEASUREMENT INSTRUMENT USED** | | | |
|---|---|---|---|
| Type | Serial N. | Calibration certificate | Validity |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

#### 5.2.5 Consumable list

- Not applicable

#### 5.2.6 Commissioning spare parts

- Not applicable

#### 5.2.7 Temporary facilities

- Temporary control room

### 5.3 OTP DESCRIPTION – ONSHORE WORKSITE

#### 5.3.1 OTP test preparation

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1. | System Ready for Commissioning Certificate (RFC) is issued and approved. | | | |
| 2. | No Mechanical Completion or Pre-commissioning punch list 'A' items are outstanding against the system to be commissioned. | | | |
| 3. | Factory Acceptance Test Procedure has been carried out successfully (refer to Doc. 1724000594-QC-PRO-00031) | | | |
| 4. | All personnel involved in the implementation of this procedure are familiar with its content as well as with associated safety requirements (Toolbox Talk to be conducted before initiation of activities). | | | |
| 5. | A final walkdown of the system has been completed, to ensure that the system and the area are ready for commissioning (correct installation of all sensors/elements). | | | |
| 6. | Check that areas are free for work and escape routes are clear of any obstructions. | | | |
| 7. | All safety barriers and warning signs have been installed. | | | |
| 8. | Ensure that proper communications have been established between parties involved in the implementation of the procedure. | | | |
| 9. | Verify availability of test equipment as per section 5.2.4. | | | |
| 10. | System(s) isolations as per LOTO procedure defined within HSSE Permits to Work and Commissioning procedures duly prepared and approved | | | |

| | | | | |
|---|---|---|---|---|
| 11. | All yard personnel have been duly notified by dedicated LUN (Livening Up Notification) that the system(s) is ready for commissioning. | | | |

### 5.3.2 Electrical preparation

- Check that grounding and bonding are in accordance with applicable documents.

### 5.3.3 Mechanical preparation

- Not applicable

### 5.3.4 Instrument preparation

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1. | Check related punch list 'B' items and confirm acceptability for start of commissioning activities. | | | |
| 2. | Verify that all relevant associated systems / subsystems are ready. | | | |
| 3. | Check Inhibit and Override register has been prepared and validated. | | | |
| 4. | Verify that relevant equipment/ components are available and in operation for start of commissioning activities. | | | |
| 5. | Verify availability of test equipment as per section | | | |

### 5.3.5 Piping preparation

- Not applicable

### 5.3.6 Additional Discipline preparation

- Not applicable

## 5.4 OTP TEST STEPS - ONSHORE WORKSITE

In the following steps the functionality of the SIS and F&G shall be tested:

- SS 79-00 SIS (ESD)
- SS 70-00 FGS

### 5.4.1 Test Preparation

Need to Verify:

- SS 86-00 Server Cabinet
- SS 86-00 Network Cabinet

All systems and subsystems involved in this procedure must be ready for commissioning and available.

### 5.4.2 OTP DESCRIPTION WORKSITE TEST OF SIS and F&G

The previous chapters must be successfully performed prior to commissioning of the SIS and F&G.
Relevant SIS and F&G ITRs must be closed and accepted.
Other system OTP relevant to SIS and F&G C&E shall be finalized and approved.
Dedicated output/input signals from/to F&G to/from SIS will be forced and simulated during this OTP.

Master document to follow up during this OTP will be:
123A90-DDL-IN-CE-40002 F&G - Cause and Effect Matrix
123A90-DDL-IN-CE-40000 SIS - Cause and Effect Matrix

All points tested and confirmed OK will be marked up on C&E, each page on C&E will be signed off and stamped when test is completed together with dedicated OTP steps signed below in this OTP.
If some Steps are already performed and accepted as part of other OTP, they can also be signed off in this OTP with attached documentation as a proof of acceptance.
During Loop Check hand pump, calibrated gas, IR light, aerosol bottle, etc. test equipment will be used to have real simulation where possible.
During Functional test it can be proceed with simulation for instrument that were tested by real simulation during Loop Check.
Cause can be simulated, and effect will be checked in real action, logic will be verified if correctly implemented as per C&E documents.
Through the OTP shall be verified the override functionality Bypass, Maintenance Inhibit, Reset function (Manual and Auto), relevant timers, graphic representation and animation, Alarm activation on OWS.

### 5.4.3 OTP Methodology

To avoid duplication of the test, the Shutdown output to the effects will be verified only once.
Once the reset and normalization of the tripped bar has been carried out, the effect (valve, motor, etc.) will not be normalized until the test is completed.
The next shutdowns will be verified only in the HMI.
The cascade effect from a higher level will be tested as a normal input of the level under test and will be executed using one of the causes of this level. The output or effect of this higher level towards the lower level will not need to be checked when the higher-level test is performed.

Testing of Inputs:
At the beginning of the test of each bar all the associated causes must have their bypass active.
Activate the trip of the signal to test and verify that the bar is not tripped, and the corresponding alarms appear in the HMI. Remove the bypass and verify the trip of the bar and alarms in HMI.

Testing of Outputs:
At the beginning of the test of each bar all the associated effects must have their bypass active.
After the Trip of the bar, verify that no effect was activated.
Remove the bypass of the effects one by one and verify that the corresponding effect was activated, and the alarms appear in HMI.

### 5.4.4 Test step

In this section there will be described step procedure for OTP of SIS and F&G C&E documents.
It is divided in section as per SIS and PSD levels following same structure as SIS and F&G C&E documents.
Once each level has been successfully completed dedicated section of this OTP will be signed off.
SIS-Fire & Gas C&E need to be read in conjunction with documents listed in point 4.1.3 Project document from [1] to [18]

### 5.4.5 SIS SYSTEM TEST

#### 5.4.5.1 ASD Level

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant Process Safety C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | ASD level check see document 123A90-DDL-IN-CE-40000 page 5. | | | |
| 3 | Test the signal 70-XA-001 from F&G and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 5. | | | |
| 4 | Test all push buttons ADS in FZ 01/03/04/ 06/07 and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 5. | | | |
| 5 | Verify that all relevant HMI alarms are activated and graphics symbols animated and indicated correctly to the operator as detailed in the Process Safety C&E document 123A90-DDL-IN-CE-40000 page 5. | | | |
| 6 | Check and confirm all relevant Time Delay timers are configured and executed as detailed in the Process Safety C&E document 123A90-DDL-IN-CE-40000.<br><br>T3: _____Seconds<br><br>T4: _____Seconds | | | |

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 7 | Normalize input to ASD and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

5.4.5.2 ESD-1D level

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant Process Safety C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | ESD 1 D level check see document 123A90-DDL-IN-CE-40000 page 6. | | | |
| 3 | Test all signals from F&G and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 6. | | | |
| 4 | Test all input transmitters on H2 Storage Tank and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 6. | | | |
| 5 | Test all push buttons EDS-D1 in FZ 01/03/04/ 06/07 and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 6. | | | |
| 6 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the ESD -1D and C&E documents. | | | |
| 7 | Check and confirm all relevant Time Delay timers are configured and executed as detailed in the Process Safety C&E document 123A90-DDL-IN-CE-40000.<br><br>T1: _____Seconds.<br><br>T2: _____Seconds.<br><br>T4: _____Seconds. | | | |

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| | T5: _____Seconds. | | | |
| 8 | Normalize input to ESD-1D and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

5.4.5.3 ESD1 level

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and Available.<br>Ensure that all loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | ESD-1 level check see document 123A90-DDL-IN-CE-40000 page 7. | | | |
| 3 | Test all push buttons EDS-1 in FZ 01/03/04/ 06/07 and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 7. | | | |
| 4 | Test the ESD-1 push buttons ONSHORE 950-ESD-00001 and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 7. | | | |
| 5 | Test the signal 85-XA-004 BESS Alarm Thermal Run Away and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 7. | | | |
| 6 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the ESD -1D and C&E documents. | | | |
| 7 | Normalize input to ESD-1D and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

5.4.5.4 PSD level

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | PSD level check see document 123A90-DDL-IN-CE-40000 page 8. | | | |
| 3 | Test all input transmitters listed in C&E Charts PSD and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 8. | | | |
| 4 | Test all Cumulative Critical Fault from:<br>• Electrolyzer 20-XA-003 [__]<br>• Fuel Cell 80-XA-003 [__]<br>• Bess 85-XA-003 [__]<br>• Instrument package 63-XA-003 [__]<br>• Nitrogen Package 64-XA-003 [__]<br>• HVAC (HV Container) 77-XA-001 [__]<br>• HVAC (LV Container) 77-XA-002 [__]<br>• HVAC (UPS Container) 77-XA-003 [__]<br>• HVAC (ITER Container) 77-XA-004 [__]<br>• Navaids Package 72-XA-001 [__]<br><br>and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 8. | | | |
| 5 | Test the signal 50-XA-003 S/D Electrolyzer PKG from FGS System for O2 Confirmed and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 8. | | | |
| 6 | Test the signal 70-XA-003 F&G UCP Panel Fault Water Treatment and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 8. | | | |
| 7 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the PSD and C&E documents. | | | |
| 8 | Normalize input to PSD and Reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

#### 5.4.5.5 MOB

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | MOB check document 123A90-DDL-IN-CE-40000 page 9. | | | |
| 3 | Test all push buttons MOB in FZ 01/03/04/ 06/07 and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40000 page 9. | | | |
| 4 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the MOB and C&E documents. | | | |
| 5 | Normalize input to MOB and Reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

### 5.4.6 FIRE & GAS SYSTEM TEST

#### 5.4.6.1 FIRE ZONE 06 B100 (HV CONTAINER)

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 06 (HV CONTAINER) check document 123A90-DDL-IN-CE-40002 page 5. | | | |
| 3 | Test all H2 GAS sensors listed in C&E page 5 and confirm all relevant effects have been activated as per document. | | | |

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 4 | Test all SMOKE sensors listed in C&E page 5 and confirm all relevant effects have been activated as per document. | | | |
| 5 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 06 and C&E documents. | | | |
| 6 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E documents page 17. | | | |
| 7 | Normalize input to FIRE ZONE 06 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

#### 5.4.6.2 FIRE ZONE 04 B200 (LV Technical Room)

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly. Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 04 (LV CONTAINER) check document 123A90-DDL-IN-CE-40002 page 6. | | | |
| 3 | Test all H2 GAS sensors listed in C&E page 6 and confirm all relevant effects have been activated as per document. | | | |
| 4 | Test all SMOKE sensors listed in C&E page 6 and confirm all relevant effects have been activated as per document. | | | |
| 5 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 04 and C&E documents. | | | |
| 6 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E documents page 17. | | | |
| 7 | Normalize input to FIRE ZONE 04 and reset activated trip and alarms. | | | |

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| | Verify and confirm that system has returned to normal operating condition. | | | |

### 5.4.6.3 FIRE ZONE 04 B300 (UPS TECHNICAL ROOM)

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 04 (UPS CONTAINER) check document 123A90-DDL-IN-CE-40002 page 7. | | | |
| 3 | Test all H2 GAS sensors listed in C&E page 7 and confirm all relevant effects have been activated as per document. | | | |
| 4 | Test all SMOKE sensors listed in C&E page 7 and confirm all relevant effects have been activated as per document. | | | |
| 5 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 04 and C&E documents. | | | |
| 6 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E documents page17. | | | |
| 7 | Normalize input to FIRE ZONE 04 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

### 5.4.6.4 FIRE ZONE 04 B400 (ITR TECHNICAL ROOM)

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B | | | |

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| | items.<br>Confirm that communication between SIS-F&G and PCS is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 04 (ITR CONTAINER) check document 123A90-DDL-IN-CE-40002 page 8. | | | |
| 3 | Test all H2 GAS sensors listed in C&E page 8 and confirm all relevant effects have been activated as per document. | | | |
| 4 | Test all SMOKE sensors listed in C&E page 8 and confirm all relevant effects have been activated as per document. | | | |
| 5 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E documents page17. | | | |
| 6 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 04 and C&E documents. | | | |
| 7 | Normalize input to FIRE ZONE 04 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

### 5.4.6.5 FIRE ZONE 01 FUEL CELL

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 01 FUEL CELL check document 123A90-DDL-IN-CE-40002 page 9. | | | |
| 3 | Test the signal 80-XA-001 GAS Confirmed in Fuel Cell and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40002 page 9. | | | |
| 4 | Test the signal 80-XA-002 SMOKE Confirmed in Fuel Cell and confirm all relevant effects have | | | |

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| | been activated as per document 123A90-DDL-IN-CE-40002 page 9. | | | |
| 5 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 01 and C&E documents. | | | |
| 6 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E documents page 17. | | | |
| 7 | Normalize input to FIRE ZONE 01 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

#### 5.4.6.6 FIRE ZONE 05 BESS

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 05 BESS check document 123A90-DDL-IN-CE-40002 page 10. | | | |
| 3 | Test the signal 85-XA-001 GAS Confirmed in Bess and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40002 page 10. | | | |
| 4 | Test the signal 85-XA-002 SMOKE Confirmed in Bess and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40002 page 10. | | | |
| 5 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 05 and C&E documents. | | | |
| 6 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E documents page 17. | | | |

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 7 | Normalize input to FIRE ZONE 05 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

5.4.6.7 FIRE ZONE 03 ELECTROLYZER

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 03 ELECTROLYSER check document 123A90-DDL-IN-CE-40002 page 11. | | | |
| 3 | Test the signal 20-XA-001 GAS Confirmed in Electrolyzer and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40002 page 11. | | | |
| 4 | Test the signal 20-XA-002 SMOKE Confirmed in Electrolyzer and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40002 page 11. | | | |
| 5 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 03 and C&E documents. | | | |
| 6 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E documents page 17. | | | |
| 7 | Normalize input to FIRE ZONE 03 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

### 5.4.6.8 FIRE ZONE 05 WATER TREATMENT

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 05 WATER TREATMENT check document 123A90-DDL-IN-CE-40002 page 12. | | | |
| 3 | Test the signal 50-XA-001 GAS Confirmed in water Treatment and confirm all relevant effects have been activated as per documents 123A90-DDL-IN-CE-40002 page 12. | | | |
| 4 | Test the signal 50-XS-002 SMOKE Confirmed in Water Treatment PKG and confirm all relevant effects have been activated as per documents123A90-DDL-IN-CE-40002 page 12. | | | |
| 5 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 05 and C&E documents. | | | |
| 6 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E documents page 17. | | | |
| 7 | Normalize input to FIRE ZONE 05 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

### 5.4.6.9 FIRE ZONE 01/02/03/05 HYDROGEN IN OPEN AREA

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 01/02/03/05 HYDROGEN IN OPEN AREA check document 123A90-DDL-IN-CE-40002 page 13. | | | |
| 3 | Test the signals H2 GAS FZ-01/02/03/05 and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40002 page 13. | | | |
| 4 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 01/02/03/05 and C&E document 123A90-DDL-IN-CE-40002. | | | |
| 5 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E document 123A90-DDL-IN-CE-40002 page17. | | | |
| 6 | Normalize input to FIRE ZONE 01/02/03 /05 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

### 5.4.6.10 FIRE ZONE 03 OXYGEN IN OPEN AREA

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA CI server is available, and all graphic pages are updated as last revision. | | | |

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 2 | FIRE ZONE 03 OXYGEN IN OPEN AREA check see document 123A90-DDL-IN-CE-40002 page 14. | | | |
| 3 | Test the signals O2 GAS FZ-03 and confirm all relevant effects have been activated as per document 123A90-DDL-IN-CE-40002 page 14. | | | |
| 4 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 03 and C&E document 123A90-DDL-IN-CE-40002. | | | |
| 5 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E document123A90-DDL-IN-CE-40002 page 17. | | | |
| 6 | Normalize input to FIRE ZONE 03 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

### 5.4.6.11 FIRE ZONE 01/02/03/04/05/06 FIRE IN OPEN AREA

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA IC server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 01/02/03/04/05/06 FIRE IN OPEN AREA check document 123A90-DDL-IN-CE-40002 page 15. | | | |
| 3 | Test all signals FDZ (UV/IR) FZ 01/02/ 03/04/ 05/06 and confirm all relevant effects have been activated as per 123A90-DDL-IN-CE-40002 page 15. | | | |
| 4 | Verify that all relevant HMI alarms are activated and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 01/02/03/ 04/ 05/06 and C&E document 123A90-DDL-IN-CE-40002 page 15. | | | |

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 5 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E document 123A90-DDL-IN-CE-40002 page 17. | | | |
| 6 | Normalize input to FIRE ZONE 01/02/03/04/05/06 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

### 5.4.6.12 FIRE ZONE 01/02/03/04/05/06/7 MFA PUSH BUTTONS

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1 | Check that the following is completed and available:<br>Ensure that all Loops for relevant C&E page that is going to be tested are completed and without outstanding punch B items.<br>Confirm that communication between SIS and F&G is working properly.<br>Ensure that SCADA IC server is available, and all graphic pages are updated as last revision. | | | |
| 2 | FIRE ZONE 01/02/03/04/05/06 MFA PUSH BUTTON check document 123A90-DDL-IN-CE-40002 page 16. | | | |
| 3 | Test all signals MFA FZ 01/02/ 03/ 04/ 05/06 and confirm all relevant effects have been activated as per 123A90-DDL-IN-CE-40002 page 16. | | | |
| 4 | Verify that all relevant HMI alarms are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the FIRE ZONE 01/02/03/ 04/ 05/06 and C&E document 123A90-DDL-IN-CE-40002 page 16. | | | |
| 5 | Verify that all SOUNDERS AND BEACONS are activated, and graphics symbols animated and indicated correctly to the operator as detailed in the C&E document 123A90-DDL-IN-CE-40002 page 17. | | | |
| 6 | Normalize input to FIRE ZONE 01/02/03/04/ 05/06 and reset activated trip and alarms.<br>Verify and confirm that system has returned to normal operating condition. | | | |

### 5.4.7 OTP Worksite Tests Notes and Remark

### 5.4.8 OTP Worksite Tests Certifying Authority Table of Attendances

| Name and Surname | Certifying Authority | Position | Signature |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

### 5.4.9 OTP Worksite Test Final Signatures and Company Acceptance

| Name and Surname | Company Representative | Position | Signature |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

## 5.5 POST TEST CONDITION

the previous chapters are successfully performed.

- All necessary tests are performed and accepted for that system.
- All Communication Cables are pulled up, tested and completed.
- All panels are in normal operation and no alarm pending.
- System to remain active after completion of validation tests.

## 5.6 REINSTATEMENT AND PRESERVATION TASKS

After functional tests have been completed, system / sub-systems are left in safety condition and that they are operational.

After the tests have been completed, the SIS and F&G systems are left in operational condition.

# 6. OTP AT OFFSHORE SITE

## 6.1 PLANNING AND MANPOWER

### 6.1.1 Offshore Site Test Overview

The propose of this test is to recheck the good condition of all equipment and the commissioning of SIS and F&G. At the end of the test the equipment will remain in operation.

### 6.1.2 Planned Tasks with Estimated Manpower

Estimated manpower for the entire duration of the Test:

- 1 E&I commissioning supervisor from Contractor.
- 1 E&I commissioning technicians from Contractor.
- 1 Operator workstation field engineer.

### 6.1.3 Test Duration Estimate

The test duration should be as follows:

- 4 days.

## 6.2 OTP TEST REQUIREMENT – OFFSHORE SITE

### 6.2.1 Pre-Commissioning Achievement

- Not applicable

### 6.2.2 Commissioning Achievement

- Not applicable

### 6.2.3 Status of Required Associated Subsystem

Subsystems required for Commissioning of SIS and F&G

- SS 86-00 Server Cabinet
- SS 86-00 Network Cabinet

### 6.2.4 Special Tools & Test Equipment

The following special tool and Test Equipment are required:

- Continuity tester (Multimeter)
- Toolbox
- Portable radios (2 pcs + 1 per Technical Room)

| **TESTING & MEASUREMENT INSTRUMENT USED** | | | |
|---|---|---|---|
| Type | Serial N. | Calibration certificate | Validity |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

### 6.2.5 Consumable List

- Not applicable

### 6.2.6 Commissioning Spare Parts

- Not applicable

### 6.2.7 Temporary Facilities

- Not applicable

## 6.3 OTP DESCRIPTION – OFFSHORE SITE

### 6.3.1 OTP Test Preparation

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1. | System Ready for Operation (from WORKSITE Phase) (RFO) Certificate is issued and approved. | | | |
| 2. | All personnel involved in the implementation of this procedure are familiar with its content as well as with associated safety requirements (Toolbox Talk to be conducted before initiation of activities). | | | |
| 3. | A final walkdown of the system has been completed, to ensure that the system and the area are ready for start-up. | | | |
| 4. | Verify availability of test equipment as per section 6.2.4. | | | |
| 5. | All personnel have been duly notified that the system(s) is ready for start-up. | | | |

### 6.3.2 Electrical Preparation

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1. | Verify that all relevant associated systems / subsystems are ready. | | | |

### 6.3.3 Mechanical Preparation

- Not applicable

### 6.3.4 Instrument Preparation

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1. | Verify all Panels are available as per section 6.2.3 | | | |

### 6.3.5 Piping Preparation

- Not applicable

### 6.3.6 Additional Discipline Preparation

- Not applicable

## 6.4 OTP TEST STEPS - OFFSHORE SITE

### 6.4.1 Test Preparation

Need to confirm availability of the following systems

- SS 86-00 NETWORK CABINET is available.
- SS 86-00 SERVER CABINET is available.

All systems and subsystems involved in this procedure must be ready and available.

### 6.4.2 Test Steps

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 1. | Check and confirm all relevant systems / subsystems are ready.<br>• SS 70-00 F&G<br>• SS 79-00 SIS (ESD)<br>• SS 86-00 Server Cabinet<br>• SS 86-00 Network Cabinet | | | |

| Step | Description | Result | Verified by | Date |
|---|---|---|---|---|
| 2. | Verify and confirm that Systems has to normal operating condition. | | | |

### 6.4.3 OTP Site Tests Notes and Remarks

6.4.4 OTP Site Tests Certifying Authority Table of Attendances

| Name and Surname | Certifying Authority | Position | Signature |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

6.4.5 OTP Site Tests Final Signatures and Company Acceptance

| Name and Surname | Company Representative | Position | Signature |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

## 6.5 POST TEST CONDITIONS

- The previous chapters are successfully performed.
- All panels are in normal operation and no alarm pending.

## 6.6 REINSTATEMENT AND PRESERVATION TASKS

After the test are completed, the system is left in a safe condition and that it is operational.

## 7. APPENDICES

## 7.1 Vendor SAT Procedure (where applicable)

## 7.2 Proverlis Summery System Reports

## 7.3 Equipment Related Technical Queries (where applicable)

## 7.4 As Built Documentation (where applicable)

7.5 Management of Change – Summary Table of Tasks and Details of Affected Related Documentation (where applicable).