Base Load Power Hub (BLPH)

Fire & Gas Cause & Effect Matrix

Document Number: 123A90-DDL-IN-CE-40002

Document Class: 1

03	11/02/2025	Accepted for Construction (AFC)	LCA	MGA	DLO
02	08/10/2024	Accepted for Construction (AFC)	LCA	MGA	DLO
01	12/06/2024	Accepted for Construction (AFC)	LCA	MGA	DLO
00	08/03/2024	Issue for Acceptance (IFA)	LCA	MGA	DLO
Rev.	Date	Description	Prepared	Reviewed	Approved

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15	FIRE ZONE 01/02/03/04/05/06: FIRE OPEN AREA	X	X	X	X				
16	FIRE ZONE 01/02/03/04/05/06/7: MFA PUSH BUTTONS	X	X	X					
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Revision / Change Log

Rev.	Description
00	ISSUE FOR ACCEPTANCE (IFA)
01	ACCEPTED FOR CONSTRUCTION (AFC)
02	ACCEPTED FOR CONSTRUCTION (AFC)
03	ACCEPTED FOR CONSTRUCTION (AFC)

HOLDS LIST

No.	Description
1.	
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Notes:

1) Abbreviation

CCR = CENTRAL CONTROL ROOM (ONSHORE)
OER = ONSHORE EQUIPMENT ROOM
ITER = OFFSHORE CONTROL ROOM
R = RESET
EL = EVENT LOG
F = FLASHING LIGHT INDICATION ON CAP
T = TIME DELAY

ASD=ABANDON
ESD=EMERGENCY SHUTDOWN
MOB= MAN OVERBORD
FGS=FIRE & GAS SYSTEM
HMI=HUMAN MACHINE INTERFACE
SIS=SAFETY INSTRUMENTED SYSTEM

PKG=PACKGE
UPS=Uninterruptible Power Supply
P&ID=Piping and Instrument Diagram
HVAC=Heating, Ventilation and Air Condition.
BLPH=Base Load Power Hub
ITER=Instrument & Telecoms Equipment Room

2) Digital Input/Output on SIS System TAGs legend:

Digital Output from SIS	Digital Input to Fire & Gas System
79-XS-001 (ASD activation)	79-XA-001 (ASD activation)
79-XS-002 (ESD-1D activation)	79-XA-002 (ESD-1D activation)
79-XS-003 (ESD-1 activation)	79-XA-003 (ESD-1 activation)
79-XS-004 (MOB activation)	79-XA-004 (MOB activation)

3) Digital Input/Output on FGS System TAGs legend:

Digital Output from FGS	Digital Input to SIS
70-XS-001 (ASD activation)	70-XA-001 (ASD activation)
70-XS-002 (ESD-1D activation)	70-XA-002 (ESD-1D activation)
70-XS-003 (S/D Electrolyzer)	70-XA-003 (S/D Electrolyzer)
70-XS-004 (Inhibit battery Charging B-300)	70-XA-004 (Inhibit battery Charging B-300)
70-XS-005 (H2 Open Area)	70-XA-005 (H2 Open Area)
70-XS-006 (H2/SMOKE B-100)	70-XA-006 (H2/SMOKE B-100)
70-XS-007 (H2/SMOKE B-200)	70-XA-007 (H2/SMOKE B-200)
70-XS-008 (Inhibit battery Charging B-100)	70-XA-008 (Inhibit battery Charging B-100)
70-XS-010 (H2/Smoke in water Treat.)	70-XA-010 (H2/Smoke in water Treat.)
70-XS-015 (H2/Smoke intake B-100)	70-XA-015 (H2/Smoke intake B-100)
70-XS-016 (H2/Smoke intake B-200)	70-XA-016 (H2/Smoke intake B-200)
70-XS-017 (H2/Smoke intake B-300)	70-XA-017 (H2/Smoke intake B-300)
70-XS-018 (H2/Smoke intake B-400)	70-XA-018 (H2/Smoke intake B-400)

4) Voting logic degradation:

1) in case of a MooN Loop, the F&G logic degradation will be as follow:
a) Detector in fault condition: (M-1)oo(N-1) if N≤3
b) 2 (Two) Detectors in fault condition→ "Trip Logic" if N≤3
c) Detector in fault condition: Moo(N-1) if N>3
d) Detector in by-pass condition: (M-1)oo(N-1) if N≤3 (with Loop 2oo3)
e) Detector in by-pass condition: Moo(N-1) if N≤3 (with Loop 1oo2)
f) Detector in by-pass condition: Moo(N-1) if N>3

5) Software push buttons for RESET F&G logics on HMI is provided

6) INTERNAL WIRING ISOLATION INSIDE FGS CABINETS:

70-XS-011	ELECTR. ISOLATION LIMIT SWITCHES FGS DAMPERS B-100 (77-ZSL-001/002/003)
70-XS-012	ELECTR. ISOLATION LIMIT SWITCHES FGS DAMPERS B-200 (77-ZSL-004/005/006)

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FIRE ZONE 06
B-100 (HV CONTAINER)

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

EFFECT

No.	SYS	NOTES	DESCRIPTION	TAG No.
1	AUDIO / VISUAL ALERT		OPERATOR WORKSTATION DISPLAY - EVENT/ALARM	
2				
3			F&G ALARM ON CAP ONSHORE	
4				
5		TO SHEET 17	GAS BEACON ACTIVATION - AMBER	
6				
7		TO SHEET 17	FIRE BEACON ACTIVATION - RED	
8				
9		TO SHEET 17	SOUNDER ACTIVATION	
10				
11			WAVE-OFF LIGHT ACTIVATION TO NAVAIDS	72-XS-001
12				
13				
14				
15				
16				
17	SIS SYSTEM	3	ESD-1D TO SIS SYTEM	70-XS-002
18				
19		3	INHIBIT BATTERY CHARGING B-100 TO SIS	70-XS-008
20				
21		3	H2/SMOKE INSIDE B-100 (ELECT. ISOLATION) TO SIS SYTEM	70-XS-006
22				
23		3	H2/SMOKE INTAKE B-100 TO SIS SYTEM	70-XS-015
24				
25				
26				
27	ELECTRIC ISOLATION	4	ELECTR. ISOLATION LIMIT SWITCHES FGS DAMPERS B-100 (77-ZSL-001/002/003)	70-XS-011
28				
29				
30				
31				
32				
33	OTHER			
34			CLOSE F&G DAMPER 77-HFD-001 B-100 (HV CONTAINER)	77-HY-001
35			CLOSE F&G DAMPER 77-HFD-002 B-100 (HV CONTAINER)	77-HY-002
36			CLOSE F&G DAMPER 77-HFD-003 B-100 (HV CONTAINER)	77-HY-003
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CAUSE

TAG Nos	DESCRIPTION	VOTING	INHIBITION	REMARK	No.	1	3	5	7	9	11	17	19	21	23	27	34	35	36
950-GDZ-06204 950-GDZ-06205 950-GDZ-06206	H2 GAS LOW (ELECTROCHEM. POINT 5% LFL)	1oo3	X		1	X	F												
	H2 GAS HIGH (ELECTROCHEM. POINT 10% LFL)	1oo3	X		2	X	F												
	H2 GAS HIGH CONFIRMED (ELECTROCHEM. POINT 10% LFL)	2oo3			3	X	F	X		X	(1)		(2)	(1)		(1)	(1)	(1)	(1)
					4														
950-GDZ-06201 950-GDZ-06202 950-GDZ-06203	AIR INTAKE-H2 GAS LOW (ELECTROCHEM. POINT 5% LFL)	1oo3	X		5	X	F												
	AIR INTAKE -H2 GAS HIGH (ELECTROCHEM. POINT 10% LFL)	1oo3	X		6	X	F												
	AIR INTAKE -H2 GAS HIGH CONFIRMED (ELECT. POINT 10% LFL)	2oo3			7	X	F	X		X	X	X			X		X	X	X
					8														
					9														
950-SDZ-06204 950-SDZ-06205 950-SDZ-06206	SMOKE DETECTION SINGLE	1oo3	X		10	X	F												
	SMOKE DETECTION CONFIRMED	2oo3			11	X	F		X	X	X			X			X	X	X
					12														
					13														
950-SDZ-06201 950-SDZ-06202 950-SDZ-06203	AIR INTAKE - SMOKE DETECTION SINGLE	1oo3	X		14	X	F												
	AIR INTAKE - SMOKE DETECTION CONFIRMED	2oo3			15	X	F		X	X	X	X			X		X	X	X
					16														
79-XA-001	ASD PUSH BUTTON ACTIVATION FROM SIS SYSTEM			NOTE 3	17												X	X	X
					18														
					19														
					20														
					21														
					22														
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NOTES:

1. Logic activation only in case of 2ooN H2 confirmed is caused by H2 detectors inside B-100 container and at least one of platform H2 detectors (excluded inside B-100 container) is Alarmed/Failed.

2. Logic activation only in case of 2ooN H2 confirmed is caused by H2 detectors inside B-100 container and all the others platform H2 detectors (excluded inside B-100 container) shall not be Alarmed/Failed.

3. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

4. INTERNAL WIRING ISOLATION INSIDE FGS CABINETS.

LEGEND

REFERENCE DOCUMENTS	
TITLE	**NUMBER**
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

Rev.	Date	Status	Description	DRN	CHKD	APPD
00	08/03/2024	IFA	Issue for Acceptance (IFA)	LCA	MGA	DLO
01	12/06/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
02	08/10/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND — ROSETTI MARINO

Fire & Gas Cause & Effect Matrix: B-100 (HV CONTAINER)

DATE 11/02/2025

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

FIRE ZONE 04
B-200 (LV CONTAINER)

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

EFFECT

No.	SYS	NOTES	DESCRIPTION	TAG No.
1	AUDIO / VISUAL ALERT		OPERATOR WORKSTATION DISPLAY - EVENT/ALARM	
2	AUDIO / VISUAL ALERT			
3	AUDIO / VISUAL ALERT		F&G ALARM ON CAP ONSHORE	
4	AUDIO / VISUAL ALERT			
5	AUDIO / VISUAL ALERT	TO SHEET 17	GAS BEACON ACTIVATION - AMBER	
6	AUDIO / VISUAL ALERT			
7	AUDIO / VISUAL ALERT	TO SHEET 17	FIRE BEACON ACTIVATION - RED	
8	AUDIO / VISUAL ALERT			
9	AUDIO / VISUAL ALERT	TO SHEET 17	SOUNDER ACTIVATION	
10	AUDIO / VISUAL ALERT			
11	AUDIO / VISUAL ALERT		WAVE-OFF LIGHT ACTIVATION TO NAVAIDS	72-XS-001
12–16	AUDIO / VISUAL ALERT			
17	SIS SYSTEM	1	ESD-1D TO SIS SYTEM	70-XS-002
18	SIS SYSTEM			
19	SIS SYSTEM	1	H2/SMOKE INSIDE B-200 (ELECT. ISOLATION) TO SIS SYTEM	70-XS-007
20	SIS SYSTEM			
21	SIS SYSTEM	1	H2/SMOKE INTAKE B-200 TO SIS SYTEM	70-XS-016
22–26	SIS SYSTEM			
27	ELECTRIC ISOLATION	2	ELECTR. ISOLATION LIMIT SWITCHES FGS DAMPERS B-200 (77-ZSL-004/005/006)	70-XS-012
28–32	ELECTRIC ISOLATION			
33	OTHER			
34	OTHER		CLOSE F&G DAMPER 77-HFD-004 B-200 (LV CONTAINER)	77-HY-004
35	OTHER		CLOSE F&G DAMPER 77-HFD-005 B-200 (LV CONTAINER)	77-HY-005
36	OTHER		CLOSE F&G DAMPER 77-HFD-006 B-200 (LV CONTAINER)	77-HY-006
37–53	OTHER			

CAUSE

TAG Nos	DESCRIPTION	VOTING	INHIBITION	REMARK		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
950-GDZ-04216 950-GDZ-04217 950-GDZ-04218	H2 GAS LOW (ELECTROCHEM. POINT 5% LFL)	1oo3	X		1	X		F																																																		
	H2 GAS HIGH (ELECTROCHEM. POINT 10% LFL)	1oo3	X		2	X		F																																																		
	H2 GAS HIGH CONFIRMED (ELECTROCHEM. POINT 10% LFL)	2oo3			3	X		F		X				X		X								X								X							X	X	X																	
					4																																																					
950-GDZ-04213 950-GDZ-04214 950-GDZ-04215	AIR INTAKE-H2 GAS LOW (ELECTROCHEM. POINT 5% LFL)	1oo3	X		5	X		F																																																		
	AIR INTAKE -H2 GAS HIGH (ELECTROCHEM. POINT 10% LFL)	1oo3	X		6	X		F																																																		
	AIR INTAKE -H2 GAS HIGH CONFIRMED (ELECT. POINT 10% LFL)	2oo3			7	X		F		X				X		X						X				X													X	X	X																	
					8																																																				
					9																																																					
950-SDZ-04216 950-SDZ-04217 950-SDZ-04218	SMOKE DETECTION SINGLE	1oo3	X		10	X		F																																																		
	SMOKE DETECTION CONFIRMED	2oo3			11	X		F				X		X		X								X															X	X	X																	
					12																																																					
					13																																																					
950-SDZ-04213 950-SDZ-04214 950-SDZ-04215	AIR INTAKE - SMOKE DETECTION SINGLE	1oo3	X		14	X		F																																																		
	AIR INTAKE - SMOKE DETECTION CONFIRMED	2oo3			15	X		F				X		X		X						X				X													X	X	X																	
					16																																																				
79-XA-001	ASD PUSH BUTTON ACTIVATION FROM SIS SYSTEM			NOTE 1	17																																		X	X	X																	
					18																																																					
					19																																																					
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NOTES:

1. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

2. INTERNAL WIRING ISOLATION INSIDE FGS CABINETS.

LEGEND

REFERENCE DOCUMENTS	
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03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND — ROSETTI MARINO

Fire & Gas Cause & Effect Matrix : B-200 (LV CONTAINER)

DATE 11/02/2025

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

 03

FIRE ZONE 04
B-300 (UPS CONTAINER)

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

EFFECT

SYS	Columns
AUDIO / VISUAL ALERT	1–16
SIS SYSTEM	17–26
ELECTRIC ISOLATION	27–32
OTHER	33–53

Column	NOTES	DESCRIPTION	TAG No.
1		OPERATOR WORKSTATION DISPLAY - EVENT/ALARM	
3		F&G ALARM ON CAP ONSHORE	
5	TO SHEET 17	GAS BEACON ACTIVATION - AMBER	
7	TO SHEET 17	FIRE BEACON ACTIVATION - RED	
9	TO SHEET 17	SOUNDER ACTIVATION	
11		WAVE-OFF LIGHT ACTIVATION TO NAVAIDS	72-XS-001
17	Note 1,3	ASD TO SIS SYTEM	70-XS-001
19	Note 2, 3	INHIBIT BATTERY CHARGING B-300 TO SIS	70-XS-004
21	3	ESD-1D TO SIS SYTEM	70-XS-002
23	3	H2/SMOKE INTAKE B-300 TO SIS SYTEM	70-XS-017
34		CLOSE F&G DAMPER 77-HFD-007 B-300 (UPS CONTAINER)	77-HY-007
35		CLOSE F&G DAMPER 77-HFD-008 B-300 (UPS CONTAINER)	77-HY-008
36		CLOSE F&G DAMPER 77-HFD-009 B-300 (UPS CONTAINER)	77-HY-009
37		CLOSE F&G DAMPER 77-HFD-010 B-300 (UPS CONTAINER)	77-HY-010
38		CLOSE F&G DAMPER 77-HFD-011 B-300 (UPS CONTAINER)	77-HY-011

CAUSE (effect columns 1–26)

TAG Nos	DESCRIPTION	VOTING	INHIBITION	REMARK		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
950-GDZ-04210 950-GDZ-04211 950-GDZ-04212	H2 GAS LOW (ELECTROCHEM. POINT 5% LFL)	1oo3	X		1	X		F																							
	H2 GAS HIGH (ELECTROCHEM. POINT 10% LFL)	1oo3	X		2	X		F																							
	H2 GAS HIGH CONFIRMED (ELECTROCHEM. POINT 10% LFL)	2oo3			3	X		F		X				X		(1)						(1)		(2)							
					4																										
950-GDZ-04207 950-GDZ-04208 950-GDZ-04209	AIR INTAKE-H2 GAS LOW (ELECTROCHEM. POINT 5% LFL)	1oo3	X		5	X		F																							
	AIR INTAKE -H2 GAS HIGH (ELECTROCHEM. POINT 10% LFL)	1oo3	X		6	X		F																							
	AIR INTAKE -H2 GAS HIGH CONFIRMED (ELECT. POINT 10% LFL)	2oo3			7	X		F		X				X		X										X		X			
					8																										
					9																										
950-SDZ-04210 950-SDZ-04211 950-SDZ-04212	SMOKE DETECTION SINGLE	1oo3	X		10	X		F																							
	SMOKE DETECTION CONFIRMED	2oo3			11	X		F				X		X		X						X									
					12																										
					13																										
950-SDZ-04207 950-SDZ-04208 950-SDZ-04209	AIR INTAKE - SMOKE DETECTION SINGLE	1oo3	X		14	X		F																							
	AIR INTAKE - SMOKE DETECTION CONFIRMED	2oo3			15	X		F				X		X		X										X		X			
					16																										
79-XA-001	ASD PUSH BUTTON ACTIVATION FROM SIS SYSTEM			NOTE 3	17																										
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(effect columns 27–53)

	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
1																											
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NOTES:

1. Logic activation only in case of 2ooN H2 confirmed is caused by H2 detectors inside UPS container and at least one of platform H2 detectors (excluded inside UPS container) is Alarmed/Failed.

2. Logic activation only in case of 2ooN H2 confirmed is caused by H2 detectors inside UPS container and all the others platform H2 detectors (excluded inside UPS container) shall not be Alarmed/Failed.

3. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

LEGEND

REFERENCE DOCUMENTS

TITLE	NUMBER
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

Rev.	Date	Status	Description	DRN	CHKD	APPD
00	08/03/2024	IFA	Issue for Acceptance (IFA)	LCA	MGA	DLO
01	12/06/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
02	08/10/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND | ROSETTI MARINO

Fire & Gas Cause & Effect Matrix: B-300 (UPS CONTAINER)

DATE 11/02/2025

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

FIRE ZONE 04
B-400 (ITER CONTAINER)

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

EFFECT

Column	SYS	NOTES	DESCRIPTION	TAG No.
1	AUDIO / VISUAL ALERT		OPERATOR WORKSTATION DISPLAY - EVENT/ALARM	
2	AUDIO / VISUAL ALERT			
3	AUDIO / VISUAL ALERT		F&G ALARM ON CAP ONSHORE	
4	AUDIO / VISUAL ALERT			
5	AUDIO / VISUAL ALERT	TO SHEET 17	GAS BEACON ACTIVATION - AMBER	
6	AUDIO / VISUAL ALERT			
7	AUDIO / VISUAL ALERT	TO SHEET 17	FIRE BEACON ACTIVATION - RED	
8	AUDIO / VISUAL ALERT			
9	AUDIO / VISUAL ALERT	TO SHEET 17	SOUNDER ACTIVATION	
10	AUDIO / VISUAL ALERT			
11	AUDIO / VISUAL ALERT		WAVE-OFF LIGHT ACTIVATION TO NAVAIDS	72-XS-001
12–16	AUDIO / VISUAL ALERT			
17	SIS SYSTEM	1	ASD TO SIS SYTEM	70-XS-001
18	SIS SYSTEM			
19	SIS SYSTEM	1	ESD-1D TO SIS SYTEM	70-XS-002
20	SIS SYSTEM			
21	SIS SYSTEM	1	H2/SMOKE INTAKE B-400 TO SIS SYTEM	70-XS-018
22–26	SIS SYSTEM			
27–32	ELECTRIC ISOLATION			
33–34	OTHER			
35	OTHER		CLOSE F&G DAMPER 77-HFD-012 B-400 (ITER CONTAINER)	77-HY-012
36	OTHER		CLOSE F&G DAMPER 77-HFD-013 B-400 (ITER CONTAINER)	77-HY-013
37	OTHER		CLOSE F&G DAMPER 77-HFD-014 B-400 (ITER CONTAINER)	77-HY-014
38	OTHER		CLOSE F&G DAMPER 77-HFD-015 B-400 (ITER CONTAINER)	77-HY-015
39	OTHER		CLOSE F&G DAMPER 77-HFD-016 B-400 (ITER CONTAINER)	77-HY-016
40–53	OTHER			

CAUSE

Row	TAG Nos	DESCRIPTION	VOTING	INHIBITION	REMARK
1	950-GDZ-04204 950-GDZ-04205 950-GDZ-04206	H2 GAS LOW (ELECTROCHEM. POINT 5% LFL)	1oo3	X	
2		H2 GAS HIGH (ELECTROCHEM. POINT 10% LFL)	1oo3	X	
3		H2 GAS HIGH CONFIRMED (ELECTR. POINT 10% LFL)	2oo3		
4					
5	950-GDZ-04201 950-GDZ-04202 950-GDZ-04203	AIR INTAKE-H2 GAS LOW (ELECTROCHEM. POINT 5% LFL)	1oo3	X	
6		AIR INTAKE -H2 GAS HIGH (ELECTROCHEM. POINT 10% LFL)	1oo3	X	
7		AIR INTAKE -H2 GAS HIGH CONFIRMED (ELECT. POINT 10% LFL)	2oo3		
8					
9					
10	950-SDZ-04204 950-SDZ-04205 950-SDZ-04206	SMOKE DETECTION SINGLE	1oo3	X	
11		SMOKE DETECTION CONFIRMED	2oo3		
12					
13					
14	950-SDZ-04201 950-SDZ-04202 950-SDZ-04203	AIR INTAKE - SMOKE DETECTION SINGLE	1oo3	X	
15		AIR INTAKE - SMOKE DETECTION CONFIRMED	2oo3		
16					
17	79-XA-001	ASD PUSH BUTTON ACTIVATION FROM SIS SYSTEM			NOTE 1
18					
19					
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MATRIX (Cause row vs. Effect column)

Row	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
1	X		F																																																		
2	X		F																																																		
3	X		F		X				X		X						X																		X	X	X	X	X														
4																																																					
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6	X		F																																																		
7	X		F		X				X		X								X		X														X	X	X	X	X														
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11	X		F				X		X		X						X																		X	X	X	X	X														
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NOTES:

1. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

LEGEND

REFERENCE DOCUMENTS

TITLE	NUMBER
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

Rev.	Date	Status	Description	DRN	CHKD	APPD
00	08/03/2024	IFA	Issue for Acceptance (IFA)	LCA	MGA	DLO
01	12/06/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
02	08/10/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND | ROSETTI MARINO

Fire & Gas Cause & Effect Matrix: B-400 (ITER CONTAINER)

DATE 11/02/2025

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

 03

FIRE ZONE 01
FUEL CELL

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

EFFECT

No.	SYS	NOTES	DESCRIPTION	TAG No.
1	AUDIO / VISUAL ALERT		OPERATOR WORKSTATION DISPLAY - EVENT/ALARM	
3	AUDIO / VISUAL ALERT		F&G ALARM ON CAP ONSHORE	
5	AUDIO / VISUAL ALERT	TO SHEET 17	GAS BEACON ACTIVATION - AMBER	
7	AUDIO / VISUAL ALERT	TO SHEET 17	FIRE BEACON ACTIVATION - RED	
9	AUDIO / VISUAL ALERT	TO SHEET 17	SOUNDER ACTIVATION	
11	AUDIO / VISUAL ALERT		WAVE-OFF LIGHT ACTIVATION TO NAVAIDS	72-XS-001
17	SIS SYSTEM	1	ESD-1D TO SIS SYTEM	70-XS-002

(SYS groups: AUDIO / VISUAL ALERT columns 1–16; SIS SYSTEM columns 17–26; ELECTRIC ISOLATION columns 27–32; OTHER columns 33–53.)

TAG Nos	CAUSE DESCRIPTION	VOTING	INHIBITION	REMARK		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
80-XA-001	GAS CONFIRMED IN FUEL CELL				1	X		F		X				X		X						X																																				
					2																																																						
80-XA-002	SMOKE CONFIRMED IN FUEL CELL				3	X		F				X		X		X						X																																				
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NOTES:
1. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

LEGEND

REFERENCE DOCUMENTS

TITLE	NUMBER
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

Rev.	Date	Status	Description	DRN	CHKD	APPD
00	08/03/2024	IFA	Issue for Acceptance (IFA)	LCA	MGA	DLO
01	12/06/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
02	08/10/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND — ROSETTI MARINO

Fire & Gas Cause & Effect Matrix: FUEL CELL

DATE 11/02/2025

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

FIRE ZONE 05
BESS

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

TAG Nos	CAUSE DESCRIPTION	VOTING	INHIBITION	REMARK	EFFECT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
					SYS	AUDIO / VISUAL ALERT																SIS SYSTEM										ELECTRIC ISOLATION						OTHER																				
					NOTES					TO SHEET 17		TO SHEET 17		TO SHEET 17								1																																						
					DESCRIPTION	OPERATOR WORKSTATION DISPLAY - EVENT/ALARM		F&G ALARM ON CAP ONSHORE		GAS BEACON ACTIVATION - AMBER		FIRE BEACON ACTIVATION - RED		SOUNDER ACTIVATION		WAVE-OFF LIGHT ACTIVATION TO NAVAIDS						ESD-1D TO SIS SYTEM																																						
					TAG No.											72-XS-001						70-XS-002																																						
85-XA-001	GAS CONFIRMED IN BESS				1	X		F		X				X		X						X																																						
					2																																																						
85-XA-002	SMOKE CONFIRMED IN BESS				3	X		F				X		X		X						X																																						
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NOTES:
1. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

LEGEND

REFERENCE DOCUMENTS

TITLE	NUMBER
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

Rev.	Date	Status	Description	DRN	CHKD	APPD
00	08/03/2024	IFA	Issue for Acceptance (IFA)	LCA	MGA	DLO
01	12/06/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
02	08/10/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND | ROSETTI MARINO

Fire & Gas Cause & Effect Matrix: BESS

DATE 11/02/2025

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

FIRE ZONE 03
ELECTROLYZER

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

EFFECT

Column	SYS	NOTES	DESCRIPTION	TAG No.
1	AUDIO / VISUAL ALERT		OPERATOR WORKSTATION DISPLAY - EVENT/ALARM	
2	AUDIO / VISUAL ALERT			
3	AUDIO / VISUAL ALERT		F&G ALARM ON CAP ONSHORE	
4	AUDIO / VISUAL ALERT			
5	AUDIO / VISUAL ALERT	TO SHEET 17	GAS BEACON ACTIVATION - AMBER	
6	AUDIO / VISUAL ALERT			
7	AUDIO / VISUAL ALERT	TO SHEET 17	FIRE BEACON ACTIVATION - RED	
8	AUDIO / VISUAL ALERT			
9	AUDIO / VISUAL ALERT	TO SHEET 17	SOUNDER ACTIVATION	
10	AUDIO / VISUAL ALERT			
11	AUDIO / VISUAL ALERT		WAVE-OFF LIGHT ACTIVATION TO NAVAIDS	72-XS-001
12–16	AUDIO / VISUAL ALERT			
17	SIS SYSTEM	1	ESD-1D TO SIS SYTEM	70-XS-002
18–26	SIS SYSTEM			
27–32	ELECTRIC ISOLATION			
33–53	OTHER			

TAG Nos	CAUSE DESCRIPTION	VOTING	INHIBITION	REMARK		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
20-XA-001	GAS CONFIRMED IN ELECTROLYZER				1	X		F		X				X		X						X																																				
					2																																																						
20-XA-002	SMOKE CONFIRMED IN ELECTROLYZER				3	X		F				X		X		X						X																																				
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NOTES:

1. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

LEGEND

REFERENCE DOCUMENTS	
TITLE	**NUMBER**
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

Rev.	Date	Status	Description	DRN	CHKD	APPD
00	08/03/2024	IFA	Issue for Acceptance (IFA)	LCA	MGA	DLO
01	12/06/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
02	08/10/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND | ROSETTI MARINO

Fire & Gas Cause & Effect Matrix: ELECTROLYZER

DATE 11/02/2025

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

 03

FIRE ZONE 05
WATER TREATMENT

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

EFFECT

Col.	SYS	NOTES	DESCRIPTION	TAG No.
1	AUDIO / VISUAL ALERT		OPERATOR WORKSTATION DISPLAY - EVENT/ALARM	
2				
3			F&G ALARM ON CAP ONSHORE	
4				
5		TO SHEET 17	GAS BEACON ACTIVATION - AMBER	
6				
7		TO SHEET 17	FIRE BEACON ACTIVATION - RED	
8				
9		TO SHEET 17	SOUNDER ACTIVATION	
10				
11			WAVE-OFF LIGHT ACTIVATION TO NAVAIDS	72-XS-001
12				
13				
14				
15				
16				
17	SIS SYSTEM	1	H2/SMOKE IN WATER TREAT. (ELECT. ISOLATION) TO SIS SYTEM	70-XS-010
18				
19				
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26				
27	ELECTRIC ISOLATION			
28				
29				
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CAUSE

TAG Nos	DESCRIPTION	VOTING	INHIBITION	REMARK		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
50-XA-001	GAS CONFIRMED IN WATER TREATMENT PKG				1	X		F		X				X		X						X																																				
					2																																																						
50-XA-002	SMOKE CONFIRMED IN WATER TREATMENT PKG				3	X		F				X		X		X						X																																				
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NOTES:
1. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

LEGEND

REFERENCE DOCUMENTS	
TITLE	NUMBER
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

Rev.	Date	Status	Description	DRN	CHKD	APPD
00	08/03/2024	IFA	Issue for Acceptance (IFA)	LCA	MGA	DLO
01	12/06/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
02	08/10/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND — ROSETTI MARINO

Fire & Gas Cause & Effect Matrix: WATER TREATMENT

DATE 11/02/2025

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

 03

FIRE ZONE 01/02/03/05
HYDROGEN OPEN AREA

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

CAUSE / EFFECT

TAG Nos	DESCRIPTION	VOTING	INHIBITION	REMARK	No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
SYS						AUDIO / VISUAL ALERT																SIS SYSTEM										ELECTRIC ISOLATION					
NOTES										TO SHEET 17		TO SHEET 17		TO SHEET 17								1															
DESCRIPTION						OPERATOR WORKSTATION DISPLAY - EVENT/ALARM		F&G ALARM ON CAP ONSHORE		GAS BEACON ACTIVATION - AMBER		FIRE BEACON ACTIVATION - RED		SOUNDER ACTIVATION		WAVE-OFF LIGHT ACTIVATION TO NAVAIDS						H2 IN OPEN AREA TO SIS SYST. (TRIP EQ. NOT FOR ZONE 1 IN OPEN AREA)										ELECTRICAL ISOLATION VISIBILITY METER NOT SUITABLE FOR ZONE IIC or (IIB+H2)					
TAG No.																72-XS-001						70-XS-005										72-XS-002					
950-GDZ-02101 950-GDZ-02102 950-GDZ-02103 950-GDZ-02104 950-GDZ-02105 950-GDZ-02106 950-GDZ-02107 950-GDZ-02108 950-GDZ-02109 950-GDZ-02110 950-GDZ-02111 950-GDZ-02112 950-GDZ-02113 950-GDZ-02114 950-GDZ-02115 950-GDZ-02116 950-GDZ-02117 (ULTRAS.) 950-GDZ-02118 (ULTRAS.) 950-GDZ-02119 (ULTRAS.) 950-GDZ-02120 (ULTRAS.)	FZ-02 - H2 GAS LOW (ELECT./ ULTRAS. POINT 5% LFL)	1oo20	X		1	X		F																													
	FZ-02 - H2 GAS HIGH (ELECT./ ULTRAS. POINT 10% LFL)	1oo20	X		2	X		F																													
	FZ-02 - H2 GAS HIGH CONFIRMED (ELECT./ ULTRAS. POINT 10% L	2oo20			3	X		F		X				X		X						X										X					
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950-GDZ-01101 (ULTRAS.) 950-GDZ-01102 (ULTRAS.) 950-GDZ-01103 (POINT)	FZ-01 - H2 GAS LOW (ULTRAS. POINT 5% LFL)	1oo3	X		13	X		F																													
	FZ-01 - H2 GAS HIGH (ULTRAS. POINT 10% LFL)	1oo3	X		14	X		F																													
	FZ-01 - H2 GAS HIGH CONFIRMED (ULTRAS. POINT 10% LFL)	2oo3			15	X		F		X				X		X						X										X					
					16																																
950-GDZ-03101 (ULTRAS.) 950-GDZ-03102 (ULTRAS.) 950-GDZ-03103 (ULTRAS.) 950-GDZ-03104 (POINT) 950-GDZ-03105 (POINT)	FZ-03 - H2 GAS LOW (ULTRAS. POINT 5% LFL)	1oo5	X		17	X		F																													
	FZ-03 - H2 GAS HIGH (ULTRAS POINT 10% LFL)	1oo5	X		18	X		F																													
	FZ-03 - H2 GAS HIGH CONFIRMED (ULTRAS POINT 10% LFL)	2oo5			20	X		F		X				X		X						X										X					
					21																																
950-GDZ-05101 950-GDZ-05102 950-GDZ-05103 950-GDZ-05104 950-GDZ-05105 950-GDZ-05106	FZ-05 - H2 GAS LOW (ELECTROCHEM. POINT 5% LFL)	1oo6	X		22	X		F																													
	FZ-05 - H2 GAS HIGH (ELECTROCHEM. POINT 10% LFL)	1oo6	X		23	X		F																													
	FZ-05 - H2 GAS HIGH CONFIRMED (ELECTROCHEM. POINT 10% LFL)	2oo6			24	X		F		X				X		X						X										X					
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OTHER																				
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53

NOTES:
1. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

LEGEND

TITLE	NUMBER

REFERENCE DOCUMENTS

TITLE	NUMBER
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

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02	08/10/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

Fire & Gas Cause & Effect Matrix: HYDROGEN OPEN AREA

DATE: 11/02/2025

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

FIRE ZONE 03
OXYGEN OPEN AREA

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

EFFECT

Effect No.	SYS	NOTES	DESCRIPTION	TAG No.
1	AUDIO / VISUAL ALERT		OPERATOR WORKSTATION DISPLAY - EVENT/ALARM	
2	AUDIO / VISUAL ALERT			
3	AUDIO / VISUAL ALERT		F&G ALARM ON CAP ONSHORE	
4	AUDIO / VISUAL ALERT			
5	AUDIO / VISUAL ALERT	TO SHEET 17	GAS BEACON ACTIVATION - AMBER	
6	AUDIO / VISUAL ALERT			
7	AUDIO / VISUAL ALERT	TO SHEET 17	FIRE BEACON ACTIVATION - RED	
8	AUDIO / VISUAL ALERT			
9	AUDIO / VISUAL ALERT	TO SHEET 17	SOUNDER ACTIVATION	
10	AUDIO / VISUAL ALERT			
11	AUDIO / VISUAL ALERT		WAVE-OFF LIGHT ACTIVATION TO NAVAIDS	72-XS-001
12–16	AUDIO / VISUAL ALERT			
17	SIS SYSTEM	1	SHUT-DOWN ELECTROLYZER TO SIS SYSTEM	70-XS-003
18–26	SIS SYSTEM			
27–32	ELECTRIC ISOLATION			
33–53	OTHER			

TAG Nos	CAUSE: DESCRIPTION	VOTING	INHIBITION	REMARK		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
					1																																																					
950-GDZ-03107 950-GDZ-03108 950-GDZ-03109	O2 GAS HIGH (ELECTROCHEM. POINT 23 % VOL)	1oo3	X		2	X		F																																																		
	O2 GAS HIGH CONFIRMED (ELECTROCHEM. POINT 23% VOL)	2oo3			3	X		F		X				X		X						X																																		
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NOTES:
1. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

LEGEND

REFERENCE DOCUMENTS	
TITLE	**NUMBER**
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

Rev.	Date	Status	Description	DRN	CHKD	APPD
00	08/03/2024	IFA	Issue for Acceptance (IFA)	LCA	MGA	DLO
01	12/06/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
02	08/10/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND — ROSETTI MARINO

Fire & Gas Cause & Effect Matrix: OXYGEN OPEN AREA	DATE: 11/02/2025
HOLLANDSE KUST NOORD WIND PARK Project Contract No. CW-I-WP4-2023-05	Sheet. 14 of 17 — 03

FIRE ZONE 01/02/03/04/05/06
FIRE OPEN AREA

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

NOTES:
1. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP.

EFFECT

SYS	No.	NOTES	DESCRIPTION	TAG No.
AUDIO / VISUAL ALERT	1		OPERATOR WORKSTATION DISPLAY - EVENT/ALARM	
AUDIO / VISUAL ALERT	2			
AUDIO / VISUAL ALERT	3		F&G ALARM ON CAP ONSHORE	
AUDIO / VISUAL ALERT	4			
AUDIO / VISUAL ALERT	5	TO SHEET 17	GAS BEACON ACTIVATION - AMBER	
AUDIO / VISUAL ALERT	6			
AUDIO / VISUAL ALERT	7	TO SHEET 17	FIRE BEACON ACTIVATION - RED	
AUDIO / VISUAL ALERT	8			
AUDIO / VISUAL ALERT	9	TO SHEET 17	SOUNDER ACTIVATION	
AUDIO / VISUAL ALERT	10			
AUDIO / VISUAL ALERT	11		WAVE-OFF LIGHT ACTIVATION TO NAVAIDS	72-XS-001
AUDIO / VISUAL ALERT	12–16			
SIS SYSTEM	17	1	ESD-1D TO SIS SYTEM	70-XS-002
SIS SYSTEM	18–26			
ELECTRIC ISOLATION	27–32			
OTHER	33–53			

CAUSE

TAG Nos	DESCRIPTION	VOTING	INHIBITION	REMARK		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
950-FDZ-01101 950-FDZ-01102 950-FDZ-01103 950-FDZ-01104	FZ-01 - FLAME (UV/IR)	1oo4	X		1	X		F																																																		
	FZ-01 - FLAME CONFIRMED (UV/IR)	2oo4			2	X		F				X		X		X						X																																				
					3																																																							
950-FDZ-02101 950-FDZ-02102 950-FDZ-02103 950-FDZ-02104	FZ-02 - FLAME (UV/IR)	1oo4	X		4	X		F																																																		
	FZ-02 - FLAME CONFIRMED (UV/IR)	2oo4			5	X		F				X		X		X						X																																				
					6																																																							
950-FDZ-03101 950-FDZ-03102 950-FDZ-03103 950-FDZ-03104	FZ-03 (ELECTROLYZER AREA) - FLAME (UV/IR)	1oo4	X		7	X		F																																																		
	FZ-03 (ELECTROLYZER AREA) - FLAME CONFIRMED (UV/IR)	2oo4			8	X		F				X		X		X						X																																				
					9																																																							
950-FDZ-04101 950-FDZ-04102 950-FDZ-04103 950-FDZ-04104	FZ-04 - FLAME (UV/IR)	1oo4	X		10	X		F																																																		
	FZ-04 - FLAME CONFIRMED (UV/IR)	2oo4			11	X		F				X		X		X						X																																				
					12																																																							
950-FDZ-05101 950-FDZ-05102 950-FDZ-05103 950-FDZ-05104	FZ-05 - FLAME (UV/IR)	1oo4	X		13	X		F																																																		
	FZ-05 - FLAME CONFIRMED (UV/IR)	2oo4			14	X		F				X		X		X						X																																				
					15																																																							
950-FDZ-06101 950-FDZ-06102	FZ-06 - FLAME (UV/IR)	1oo2			16	X		F																																																		
	FZ-06 - FLAME CONFIRMED (UV/IR)	2oo2			17	X		F				X		X		X						X																																				
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LEGEND

REFERENCE DOCUMENTS	
TITLE	NUMBER
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

Rev.	Date	Status	Description	DRN	CHKD	APPD
00	08/03/2024	IFA	Issue for Acceptance (IFA)	LCA	MGA	DLO
01	12/06/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
02	08/10/2024	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO
03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND — ROSETTI MARINO

Fire & Gas Cause & Effect Matrix: FIRE OPEN AREA

DATE 11/02/2025

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

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

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

EFFECT

SYS	Columns
AUDIO / VISUAL ALERT	1–16
SIS SYSTEM	17–26
ELECTRIC ISOLATION	27–32
OTHER	33–53

Column	NOTES	DESCRIPTION
1		OPERATOR WORKSTATION DISPLAY - EVENT/ALARM
3		F&G ALARM ON CAP ONSHORE
5	TO SHEET 17	GAS BEACON ACTIVATION - AMBER
7	TO SHEET 17	FIRE BEACON ACTIVATION - RED
9	TO SHEET 17	SOUNDER ACTIVATION

TAG Nos	CAUSE DESCRIPTION	VOTING	INHIBITION	REMARK		1	2	3	4	5	6	7	8	9
					1									
950-MFA-01101	FZ-01 MFA ACTIVATION		X	1	2	X		F				X		X
950-MFA-01102	FZ-01 MFA ACTIVATION		X	1	3	X		F				X		X
950-MFA-01103	FZ-01 MFA ACTIVATION		X	1	4	X		F				X		X
					5									
950-MFA-02101	FZ-02 MFA ACTIVATION		X	1	6	X		F				X		X
					7									
950-MFA-03101	FZ-03 MFA ACTIVATION		X	1	8	X		F				X		X
950-MFA-03102	FZ-03 MFA ACTIVATION		X	1	9	X		F				X		X
950-MFA-03103	FZ-03 MFA ACTIVATION		X	1	10	X		F				X		X
950-MFA-03104	FZ-03 MFA ACTIVATION		X	1	11	X		F				X		X
					12									
950-MFA-04101	FZ-04 MFA ACTIVATION		X	1	13	X		F				X		X
950-MFA-04102	FZ-04 MFA ACTIVATION		X	1	14	X		F				X		X
					15									
950-MFA-04201	FZ-04 MFA ACTIVATION - B-400 INDOOR		X	1	16	X		F				X		X
950-MFA-04202	FZ-04 MFA ACTIVATION - B-400 INDOOR		X	1	17	X		F				X		X
950-MFA-04203	FZ-04 MFA ACTIVATION - B-400 INDOOR		X	1	18	X		F				X		X
					19									
950-MFA-05101	FZ-05 MFA ACTIVATION		X	1	20	X		F				X		X
950-MFA-05102	FZ-05 MFA ACTIVATION		X	1	21	X		F				X		X
950-MFA-05103	FZ-05 MFA ACTIVATION		X	1	22	X		F				X		X
950-MFA-05104	FZ-05 MFA ACTIVATION		X	1	23	X		F				X		X
					24									
950-MFA-05201	FZ-05 MFA ACT. - WATER TREAT. PK INDOOR		X	1	25	X		F				X		X
					26									
950-MFA-06101	FZ-06 MFA ACTIVATION		X	1	27	X		F				X		X
950-MFA-06102	FZ-06 MFA ACTIVATION		X	1	28	X		F				X		X
					29									
950-MFA-06201	FZ-06 MFA ACTIVATION - B-100 INDOOR		X	1	30	X		F				X		X
					31									
950-MFA-07101	FZ-07 MFA ACTIVATION		X	1	32	X		F				X		X
					33									
					34									
					35									
					36									
					37									
					38									
					39									
					40									
					41									

NOTES:
1. THE FLASHING ALARM ON CAP ONSHORE IS A CUMULATIVE OF ALL ASD PUSH BUTTONS ACTIVATION.

LEGEND

REFERENCE DOCUMENTS	
TITLE	**NUMBER**
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
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03	11/02/2025	AFC	Accepted for Construction (AFC)	LCA	MGA	DLO

CROSSWIND ROSETTI MARINO

Fire & Gas Cause & Effect Matrix: MFA PUSH BUTTONS

DATE 11/02/2025

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

 03

FIRE ZONE 01/02/03/04/05/06/7
SOUNDERS AND BEACONS

FZ-01= FUEL CELL AREA
FZ-02= H2 STORAGE VESSELS AREA
FZ-03= ELECTROLYZER AREA
FZ-04= B-200/B-300/B-400 CONTAINERS AREA
FZ-05= BESS AREA
FZ-06= B-100 CONTAINER AREA
FZ-07= MASTER POINT AREA
FZ-08= TRANSITION PIECE AREA

EFFECT

TAG Nos	CAUSE	VOTING	INHIBITION	REMARK
	DESCRIPTION			
	GAS CONFIRMED IN B-100 (HV CONTAINER)			From sheet 5
	GAS CONFIRMED B-200 IN (LV CONTAINER)			From sheet 6
	GAS CONFIRMED IN B-300 (UPS CONTAINER)			From sheet 7
	GAS CONFIRMED IN B-400 (ITER CONTAINER)			From sheet 8
	GAS CONFIRMED IN FUEL CELL			From sheet 9
	GAS CONFIRMED IN BESS			From sheet 10
	GAS CONFIRMED IN ELECTROLYZER			From sheet 11
	GAS CONFIRMED IN WATER TREAT. PKG			From sheet 12
	HYDROGEN OPEN AREA			From sheet 13
	SMOKE CONFIRMED IN B-100 (HV CONTAINER)			From sheet 5
	SMOKE CONFIRMED B-200 IN (LV CONTAINER)			From sheet 6
	SMOKE CONF. IN B-300 (UPS CONTAINER)			From sheet 7
	SMOKE CONF. IN B-400 (ITER CONTAINER)			From sheet 8
	SMOKE CONFIRMED IN FUEL CELL			From sheet 9
	SMOKE CONFIRMED IN BESS			From sheet 10
	SMOKE CONFIRMED IN ELECTROLYZER			From sheet 11
	SMOKE CONFIRMED IN WATER TREAT. PKG			From sheet 12
	FIRE OPEN AREA			From sheet 15
	O2 GAS HIGH CONFIRMED			From sheet 14
	MFA PUSH BUTTONS ACTIVATION FZ 01/02/03/04/05/06/7			From sheet 16
79-XA-001	ASD ACTIVATION FROM SIS SYSTEM			NOTE 1
79-XA-002	ESD-1D ACTIVATION FROM SIS SYSTEM			NOTE 1
79-XA-003	ESD-1 ACTIVATION FROM SIS SYSTEM			NOTE 1
79-XA-004	MOB PUSH BUTTONS ACTIVATION FROM SIS SYSTEM			NOTE 1

	SYS	GAS VISUAL ALERT BEACONS (AMBER)																
	NOTES																	
	DESCRIPTION		FZ-01 GAS BEACON ACTIVATION	FZ-02 GAS BEACON ACTIVATION	FZ-03 GAS BEACON ACTIVATION	FZ-03 GAS BEACON ACTIVATION	FZ-04 GAS BEACON ACTIVATION	FZ-04 GAS BEACON ACTIVATION	FZ-04 GAS BEACON ACT. - B-400 INDOOR	FZ-04 GAS BEACON ACT. - B-300 INDOOR	FZ-04 GAS BEACON ACT. - B-200 INDOOR	FZ-04 GAS BEACON ACT. - B-200 INDOOR	FZ-05 GAS BEACON ACT. - WATER T. INDOOR	FZ-06 GAS BEACON ACTIVATION	FZ-06 GAS BEACON ACTIVATION	FZ-06 GAS BEACON ACT. - B-100 INDOOR	FZ-07 GAS BEACON ACTIVATION	
	TAG No.		950-XL-01101	950-XL-02101	950-XL-03101	950-XL-03103	950-XL-04101	950-XL-04103	950-XL-04201	950-XL-04203	950-XL-04205	950-XL-05201	950-XL-06101	950-XL-06103	950-XL-06201	950-XL-07101		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

	SYS	FIRE VISUAL ALERT BEACONS (RED)																
	NOTES																	
	DESCRIPTION		FZ-01 FIRE BEACON ACTIVATION	FZ-02 FIRE BEACON ACTIVATION	FZ-03 FIRE BEACON ACTIVATION	FZ-03 FIRE BEACON ACTIVATION	FZ-04 FIRE BEACON ACTIVATION	FZ-04 FIRE BEACON ACTIVATION	FZ-04 FIRE BEACON ACT. - B-400 INDOOR	FZ-04 FIRE BEACON ACT. - B-300 INDOOR	FZ-04 FIRE BEACON ACT. - B-200 INDOOR	FZ-04 FIRE BEACON ACT. - WATER T. INDOOR	FZ-05 FIRE BEACON ACTIVATION	FZ-06 FIRE BEACON ACTIVATION	FZ-06 FIRE BEACON ACT. - B-100 INDOOR	FZ-07 FIRE BEACON ACTIVATION		
	TAG No.		950-XL-01102	950-XL-02102	950-XL-03102	950-XL-03104	950-XL-04102	950-XL-04104	950-XL-04202	950-XL-04204	950-XL-04206	950-XL-05202	950-XL-06102	950-XL-06104	950-XL-06202	950-XL-07102		
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

	SYS	AUDIO ALERT SOUNDERS																												
	NOTES																										2			
	DESCRIPTION		FZ-01 SOUNDER ACTIVATION	FZ-01 SOUNDER ACTIVATION	FZ-02 SOUNDER ACTIVATION	FZ-03 SOUNDER ACTIVATION	FZ-03 SOUNDER ACTIVATION	FZ-04 SOUNDER ACTIVATION	FZ-04 SOUNDER ACTIVATION	FZ-04 SOUNDER ACT. - B-400 INDOOR	FZ-04 SOUNDER ACT. - B-300 INDOOR	FZ-04 SOUNDER ACT. - B-200 INDOOR	FZ-05 SOUNDER ACTIVATION	FZ-05 SOUNDER ACTIVATION	FZ-05 SOUNDER ACTIVATION	FZ-05 SOUNDER ACTIVATION	FZ-05 SOUNDER ACTIVATION - WTER T. INDOOR	FZ-06 SOUNDER ACTIVATION	FZ-06 SOUNDER ACT. - B-100 INDOOR	FZ-07 SOUNDER ACTIVATION		WAVE-OFF LIGHT ACTIVATION TO NAVAIDS	
	TAG No.		960-XZ-01101	960-XZ-01102	960-XZ-02101	960-XZ-03101	960-XZ-03102	960-XZ-04101	960-XZ-04102	960-XZ-04201	960-XZ-04202	960-XZ-04203	960-XZ-05101	960-XZ-05102	960-XZ-05103	960-XZ-05104	960-XZ-05201	960-XZ-06101	960-XZ-06201	960-XZ-07101		72-XS-001	
		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	

NOTES:
1. FGS AND SIS SYSTEM EXCHANGE DATA BETWEEN THEM BY USING THE Vnet/IP NETWORK. THIS IS IMPLEMENTED AS REDUNDANT SAFETY COMMUNICATION, APPROVED FOR SIL 3 LOOP

2. It will be possible to deactivate the sounder 950-XZ-07101 (installed in Master Area) from CAP onshore.

LEGEND

REFERENCE DOCUMENTS	
TITLE	**NUMBER**
Process Safety Cause and Effect Matrix	123A90-DDL-IN-CE-40000
Process Safety Cause and Effect Block Diagram	123A90-DDL-PR-DG-80000
F&G detectors Layout - Lower deck and Upper deck	123A90-DDL-SAF-DL-30027
F&G detectors Layout - Below Lower deck	123A90-DDL-SAF-DL-30028

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