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C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

4.120.6.h 6 O’Clock (PEER 7) ODH Tests

C-A-OPM Procedures in which this Attachment is used.		
4.120.6		

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Approved: _____ *Signature on File* _____
 Collider-Accelerator Department Chairman Date

V. Castillo

4.120.6.h 6 O’Clock (PEER 7) ODH Tests

PASS ANNUAL ACCEPTANCE TEST PROTOCOL

Division A Software Filename and Checksum: Title: _____ Checksum: _____

Division B Software Filename and Checksum: Title: _____ Checksum: _____

Initial testing complete:

Test Team Leader’s Name (Print): _____ Life Number: _____

Test Team Leader’s Name (Sign): _____ Date: ____/____/____

Acceptance test procedure complete (following repairs and retesting if required):

Test Team Leader’s Name (Print): _____ Life Number: _____

Test Team Leader’s Name (Sign): _____ Date: ____/____/____

Test results reviewed by:

Safety Section Head’s Name (Print): _____ Life Number: _____

Safety Section Head’s Name (Sign): _____ Date: ____/____/____

Test results accepted by Radiation Safety Committee:

RSC Member’s Name (Print): _____ Life Number: _____

RSC Member’s Name (Sign): _____ Date: ____/____/____

- 1.1 Conduct a visual check on Peer 7 Crash and Crash/ODH boxes following Table 1 below
 √ = ok, x = problem

BOXES		Verify mechan condn. ok	Verify elec. condn. ok	Crash/ODH boxes only				Verify all X's corrected
CRASH	Crash/ODH			Division A		Division B		
				Lcd Rdg	Tp2 – Tp4 Vltg	Lcd Rdg	Tp2 – Tp4 Vltg	
5CB1		<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	N/A	N/A	<input type="checkbox"/>
5CB2		<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	N/A	N/A	<input type="checkbox"/>
	5CB3	<input type="checkbox"/>	<input type="checkbox"/>	%	V	%	V	<input type="checkbox"/>
	5CB4	<input type="checkbox"/>	<input type="checkbox"/>	%	V	%	V	<input type="checkbox"/>
5CB5		<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	N/A	N/A	<input type="checkbox"/>
6CB1		<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	N/A	N/A	<input type="checkbox"/>
	6CB2	<input type="checkbox"/>	<input type="checkbox"/>	%	V	%	V	<input type="checkbox"/>
	6CB3	<input type="checkbox"/>	<input type="checkbox"/>	%	V	%	V	<input type="checkbox"/>
6CB4		<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	N/A	N/A	<input type="checkbox"/>
	6CB5	<input type="checkbox"/>	<input type="checkbox"/>	%	V	%	V	<input type="checkbox"/>
	6XCB6	<input type="checkbox"/>	<input type="checkbox"/>	%	V	%	V	<input type="checkbox"/>

Table 1 – Summary of visual check on Crash and Crash/ODH boxes in Peer 7

- 1.2 Verification of valid calibration of ODH sensors in Peer 7, following Table 2 below
 √ = ok, x = problem

ODH sensor	Verify valid calibration	Record calibration date	Verify all x's corrected	Record new calibration date
5AS1	<input type="checkbox"/>	____/____/____	<input type="checkbox"/>	____/____/____
5AS2	<input type="checkbox"/>	____/____/____	<input type="checkbox"/>	____/____/____
6AS1	<input type="checkbox"/>	____/____/____	<input type="checkbox"/>	____/____/____
6AS2	<input type="checkbox"/>	____/____/____	<input type="checkbox"/>	____/____/____
6AS3	<input type="checkbox"/>	____/____/____	<input type="checkbox"/>	____/____/____
6XAS5	<input type="checkbox"/>	____/____/____	<input type="checkbox"/>	____/____/____

Table 2 – Verification of valid calibration of ODH sensors in Peer 7

1.3 Test of ODH sensor 5AS1 in 5CB3

	PLACE	Peer 7 in Mode 8	
<input type="checkbox"/>	VERIFY	Peer 7 is in Restricted Access	MODE 8
	FLOW	Helium (or Nitrogen) gas across 5AS1	
	RECORD	Oxygen trip level for Div A	_____ %
	RECORD	Oxygen trip level for Div B	_____ %
<input type="checkbox"/>	VERIFY	MCR sees 5AS1 Div A	TRIPPED
<input type="checkbox"/>	VERIFY	MCR sees 5AS1 Div B	TRIPPED
<input type="checkbox"/>	VERIFY	Div A & B strobes on 5CB3 are	FLASHING
<input type="checkbox"/>	VERIFY	Div A & B sonalerts on 5CB3 are	SOUNDING
<input type="checkbox"/>	VERIFY	Fan 5EF2 is	ON
<input type="checkbox"/>	VERIFY	Vent 5AV1 is	OPEN
<input type="checkbox"/>	VERIFY	Vent 5AV2 is	OPEN
<input type="checkbox"/>	VERIFY	Vent 5AV3 is	OPEN
	HALT	Flow of gas on 5AS1	
	WAIT	For 5AS1 to clear (level ~ trip-level above)	
<input type="checkbox"/>	VERIFY	Div A & B strobes and sonalerts on 5CB3 are	OFF
<input type="checkbox"/>	VERIFY	Fan 5EF2 is	OFF
<input type="checkbox"/>	VERIFY	Vent 5AV1 is	CLOSED
<input type="checkbox"/>	VERIFY	Vent 5AV2 is	CLOSED
<input type="checkbox"/>	VERIFY	Vent 5AV3 is	CLOSED
	RESET	ODH in MCR	
<input type="checkbox"/>	VERIFY	MCR sees ODH as	RESET
<input type="checkbox"/>	Check for Test Acceptance of sensor 5AS1		

1.4 Test of ODH sensor 5AS2 in 5CB4

	PLACE	Peer 7 in Mode 8	
<input type="checkbox"/>	VERIFY	Peer 7 is in Restricted Access	MODE 8
	FLOW	Helium (or Nitrogen) gas across 5AS2	
	RECORD	Oxygen trip level for Div A	_____ %
	RECORD	Oxygen trip level for Div B	_____ %
<input type="checkbox"/>	VERIFY	MCR sees 5AS2 Div A	TRIPPED
<input type="checkbox"/>	VERIFY	MCR sees 5AS2 Div B	TRIPPED
<input type="checkbox"/>	VERIFY	Div A & B strobes on 5CB4 are	FLASHING
<input type="checkbox"/>	VERIFY	Div A & B sonalerts on 5CB4 are	SOUNDING
<input type="checkbox"/>	VERIFY	Fan 5EF3 is	ON
<input type="checkbox"/>	VERIFY	Vent 5AV2 is	OPEN
<input type="checkbox"/>	VERIFY	Vent 5AV3 is	OPEN
	HALT	Flow of gas on 5AS2	
	WAIT	For 5AS2 to clear (level ~ trip-level above)	

- VERIFY** **Div A & B strobes and sonalerts on 5CB4 are** **OFF**
- VERIFY** **Fan 5EF3 is** **OFF**
- VERIFY** **Vent 5AV2 is** **CLOSED**
- VERIFY** **Vent 5AV3 is** **CLOSED**

- RESET** **ODH in MCR**
- VERIFY** **MCR sees ODH as** **RESET**

- Check for Test Acceptance of sensor 5AS2**

1.5 Test of ODH sensor 6AS1 in 6CB2

- PLACE** **Peer 7 in Mode 8**
- VERIFY** **Peer 7 is in Restricted Access** **MODE 8**

- FLOW** **Helium (or Nitrogen) gas across 6AS1**
- RECORD** **Oxygen trip level for Div A** _____ %
- RECORD** **Oxygen trip level for Div B** _____ %
- VERIFY** **MCR sees 6AS1 Div A** **TRIPPED**
- VERIFY** **MCR sees 6AS1 Div B** **TRIPPED**
- VERIFY** **Div A & B strobes on 6CB2 are** **FLASHING**
- VERIFY** **Div A & B sonalerts on 6CB2 are** **SOUNDING**
- VERIFY** **Fan 6EF1 is** **ON**
- VERIFY** **Fan 6EF2 is** **ON**
- VERIFY** **Vent 6AV1 is** **OPEN**
- VERIFY** **Vent 6AV2 is** **OPEN**

- HALT** **Flow of gas on 6AS1**
- WAIT** **For 6AS1 to clear (level ~ trip-level above)**

- VERIFY** **Div A & B strobes and sonalerts on 6CB2 are** **OFF**
- VERIFY** **Fan 6EF1 is** **ON**
- VERIFY** **Fan 6EF2 is** **OFF**
- VERIFY** **Vent 6AV1 is** **CLOSED**
- VERIFY** **Vent 6AV2 is** **CLOSED**

- RESET** **ODH in MCR**
- VERIFY** **MCR sees ODH as** **RESET**

- Check for Test Acceptance of sensor 6AS1**

1.6 Test of ODH sensor 6AS2 in 6CB3

- PLACE** **Peer 7 in Mode 8**
- VERIFY** **Peer 7 is in Restricted Access** **MODE 8**

- FLOW** **Helium (or Nitrogen) gas across 6AS2**
- RECORD** **Oxygen trip level for Div A** _____ %
- RECORD** **Oxygen trip level for Div B** _____ %
- VERIFY** **MCR sees 6AS2 Div A** **TRIPPED**
- VERIFY** **MCR sees 6AS2 Div B** **TRIPPED**

- | | | | |
|--------------------------|---|--|-----------------|
| <input type="checkbox"/> | VERIFY | Div A & B strobes on 6CB3 are | FLASHING |
| <input type="checkbox"/> | VERIFY | Div A & B sonalerts on 6CB3 are | SOUNDING |
| <input type="checkbox"/> | VERIFY | Fan 6EF3 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 6AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | OPEN |
| | HALT | Flow of gas on 6AS2 | |
| | WAIT | For 6AS2 to clear (level ~ trip-level above) | |
| <input type="checkbox"/> | VERIFY | Div A & B strobes and sonalerts on 6CB3 are | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6EF3 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 6AV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | CLOSED |
| | RESET | ODH in MCR | |
| <input type="checkbox"/> | VERIFY | MCR sees ODH as | RESET |
| <input type="checkbox"/> | Check for Test Acceptance of sensor 6AS2 | | |

1.7 Test of ODH sensor 6AS3 in 6CB5

- | | | | |
|--------------------------|---|--|-----------------|
| | PLACE | Peer 7 in Mode 8 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Restricted Access | MODE 8 |
| | FLOW | Helium (or Nitrogen) gas across 6AS3 | |
| | RECORD | Oxygen trip level for Div A | _____ % |
| | RECORD | Oxygen trip level for Div B | _____ % |
| <input type="checkbox"/> | VERIFY | MCR sees 6AS3 Div A | TRIPPED |
| <input type="checkbox"/> | VERIFY | MCR sees 6AS3 Div B | TRIPPED |
| <input type="checkbox"/> | VERIFY | Div A & B strobes on 6CB5 are | FLASHING |
| <input type="checkbox"/> | VERIFY | Div A & B sonalerts on 6CB5 are | SOUNDING |
| <input type="checkbox"/> | VERIFY | Fan 7EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | OPEN |
| | HALT | Flow of gas on 6AS3 | |
| | WAIT | For 6AS3 to clear (level ~ trip-level above) | |
| <input type="checkbox"/> | VERIFY | Div A & B strobes and sonalerts on 6CB5 are | OFF |
| <input type="checkbox"/> | VERIFY | Fan 7EF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | CLOSED |
| | RESET | ODH in MCR | |
| <input type="checkbox"/> | VERIFY | MCR sees ODH as | RESET |
| <input type="checkbox"/> | Check for Test Acceptance of sensor 6AS3 | | |

1.8 10-minute Activation test of sensor 5AS1 in sector 5

	PLACE	Peer 7 in Mode 8	
<input type="checkbox"/>	VERIFY	Peer 7 is in Restricted Access	MODE 8
	JUMPER	Tp2 and Tp4 on the Div A pcb in 5CB3	
	JUMPER	Tp2 and Tp4 on the Div B pcb in 5CB3	
<input type="checkbox"/>	VERIFY	MCR sees Peer 7 is in	MODE 2
<input type="checkbox"/>	VERIFY	MCR sees 5AS1 Div A	TRIPPED
<input type="checkbox"/>	VERIFY	MCR sees 5AS1 Div B	TRIPPED
<input type="checkbox"/>	VERIFY	Fan 5EF2 is immediately	ON
<input type="checkbox"/>	VERIFY	Vent 5AV1 is immediately	OPEN
<input type="checkbox"/>	VERIFY	Vent 5AV2 is immediately	OPEN
<input type="checkbox"/>	VERIFY	Vent 5AV3 is immediately	OPEN
	BEGIN	10-minute timer	
	RECORD	Volume of air-flow at the inlet of fan 5EF2	_____ LFM
		<i>Target flow value ($\pm 10\%$)</i>	<i>2078 LFM</i>
<input type="checkbox"/>	VERIFY	Air flow at tell-tale of vent 5AV1 is	ADEQUATE
<input type="checkbox"/>	VERIFY	Air flow at tell-tale of vent 5AV2 is	ADEQUATE
<input type="checkbox"/>	VERIFY	Air flow at tell-tale of vent 5AV3 is	ADEQUATE
	AFTER	~ 10 minutes	
	RECORD	Duration of timer	_____ mins
<input type="checkbox"/>	VERIFY	Fan 4EF1 is	ON
<input type="checkbox"/>	VERIFY	Fan 4XEF2 is	ON
<input type="checkbox"/>	VERIFY	Fan 5EF1 is	ON
<input type="checkbox"/>	VERIFY	Fan 5EF3 is	ON
<input type="checkbox"/>	VERIFY	Fan 5EF4 is	ON
<input type="checkbox"/>	VERIFY	Vent 4AV1 is	OPEN
<input type="checkbox"/>	VERIFY	Vent 4XAV2 is	OPEN
<input type="checkbox"/>	VERIFY	Vent 4XAV3 is	OPEN
	REMOVE	Jumper between Tp2 and Tp4 on the Div A pcb in 5CB3	
	REMOVE	Jumper between Tp2 and Tp4 on the Div B pcb in 5CB3	
<input type="checkbox"/>	VERIFY	Fan 5EF2 is	OFF
<input type="checkbox"/>	VERIFY	Vent 5AV1 is	CLOSED
<input type="checkbox"/>	VERIFY	Vent 5AV2 is	CLOSED
<input type="checkbox"/>	VERIFY	Vent 5AV3 is	CLOSED
<input type="checkbox"/>	VERIFY	Fan 4EF1 is	OFF
<input type="checkbox"/>	VERIFY	Fan 4XEF2 is	OFF
<input type="checkbox"/>	VERIFY	Fan 5EF1 is	OFF
<input type="checkbox"/>	VERIFY	Fan 5EF3 is	OFF
<input type="checkbox"/>	VERIFY	Fan 5EF4 is	OFF
<input type="checkbox"/>	VERIFY	Vent 4AV1 is	CLOSED
<input type="checkbox"/>	VERIFY	Vent 4XAV2 is	CLOSED
<input type="checkbox"/>	VERIFY	Vent 4XAV3 is	CLOSED
	RESET	ODH in MCR	
<input type="checkbox"/>	VERIFY	MCR sees ODH as	RESET
<input type="checkbox"/>	Check for Test Acceptance of sensor 5AS1 on for > 10 minutes		

- 1.9 Test Activation of multiple sensors, 5AS1 and 5AS2, in sector 5
- PLACE Peer 7 in Mode 8
- VERIFY Peer 7 is in Restricted Access MODE 8
- JUMPER Tp2 and Tp4 on the Div A pcb in 5CB3
- JUMPER Tp2 and Tp4 on the Div B pcb in 5CB3
- JUMPER Tp2 and Tp4 on the Div A pcb in 5CB4
- JUMPER Tp2 and Tp4 on the Div B pcb in 5CB4
- VERIFY MCR sees Peer 7 is in MODE 2
- VERIFY MCR sees 5AS1 Div A TRIPPED
- VERIFY MCR sees 5AS1 Div B TRIPPED
- VERIFY MCR sees 5AS2 Div A TRIPPED
- VERIFY MCR sees 5AS2 Div B TRIPPED
- VERIFY Fan 4EF1 is ON
- VERIFY Fan 4XEF2 is ON
- VERIFY Fan 5EF1 is ON
- VERIFY Fan 5EF2 is ON
- VERIFY Fan 5EF3 is ON
- VERIFY Fan 5EF4 is ON
- VERIFY Vent 4AV1 is OPEN
- VERIFY Vent 4XAV2 is OPEN
- VERIFY Vent 4XAV3 is OPEN
- VERIFY Vent 5AV1 is OPEN
- VERIFY Vent 5AV2 is OPEN
- VERIFY Vent 5AV3 is OPEN
- AFTER ~ 30 secs
- TURN Bypass Switch to Bypass
- VERIFY Strobes , Sonalerts and Fans (after ~90secs) STOP
- TURN Bypass Switch from Bypass
- VERIFY Strobes , Sonalerts and Fans (after ~30secs) CONTINUE
- REMOVE Jumper between Tp2 and Tp4 on the Div A pcb in 5CB3
- REMOVE Jumper between Tp2 and Tp4 on the Div B pcb in 5CB3
- REMOVE Jumper between Tp2 and Tp4 on the Div A pcb in 5CB4
- REMOVE Jumper between Tp2 and Tp4 on the Div B pcb in 5CB4
- VERIFY Fan 4EF1 is OFF
- VERIFY Fan 4XEF2 is OFF
- VERIFY Fan 5EF1 is OFF
- VERIFY Fan 5EF2 is OFF
- VERIFY Fan 5EF3 is OFF
- VERIFY Fan 5EF4 is OFF
- VERIFY Vent 4AV1 is CLOSED
- VERIFY Vent 4XAV2 is CLOSED
- VERIFY Vent 4XAV3 is CLOSED
- VERIFY Vent 5AV1 is CLOSED
- VERIFY Vent 5AV2 is CLOSED
- VERIFY Vent 5AV3 is CLOSED
- RESET ODH in MCR
- VERIFY MCR sees ODH as RESET
- Check for Test Acceptance of Activation of multiple sensors 5AS1 and 5AS2 in sector 5

1.10 10-minute Activation test of sensor 6AS1 in sector 6

	PLACE	Peer 7 in Mode 8	
<input type="checkbox"/>	VERIFY	Peer 7 is in Restricted Access	MODE 8
	JUMPER	Tp2 and Tp4 on the Div A pcb in 6CB2	
	JUMPER	Tp2 and Tp4 on the Div B pcb in 6CB2	
<input type="checkbox"/>	VERIFY	MCR sees Peer 7 is in	MODE 2
<input type="checkbox"/>	VERIFY	MCR sees 6AS1 Div A	TRIPPED
<input type="checkbox"/>	VERIFY	MCR sees 6AS1 Div B	TRIPPED
<input type="checkbox"/>	VERIFY	Fan 6EF1 is immediately	ON
<input type="checkbox"/>	VERIFY	Fan 6EF2 is immediately	ON
<input type="checkbox"/>	VERIFY	Vent 6AV1 is immediately	OPEN
<input type="checkbox"/>	VERIFY	Vent 6AV2 is immediately	OPEN
	AFTER	~ 30 secs	
	TURN	Bypass Switch to Bypass	
<input type="checkbox"/>	VERIFY	Strobes <input type="checkbox"/>, Sonalerts <input type="checkbox"/> and Fans (after ~90secs) <input type="checkbox"/>	STOP
	TURN	Bypass Switch from Bypass	
<input type="checkbox"/>	VERIFY	Strobes <input type="checkbox"/>, Sonalerts <input type="checkbox"/> and Fans (after ~30secs) <input type="checkbox"/>	CONTINUE
	BEGIN	10-minute timer	
	RECORD	Volume of air-flow at the inlet of fan 6EF1	_____ LFM
		<i>Target flow value ($\pm 10\%$)</i>	2078 LFM
	RECORD	Volume of air-flow at the inlet of fan 6EF2	_____ LFM
		<i>Target flow value ($\pm 10\%$)</i>	1592 LFM
<input type="checkbox"/>	VERIFY	Air flow at tell-tale of vent 6AV1 is	ADEQUATE
<input type="checkbox"/>	VERIFY	Air flow at tell-tale of vent 6AV2 is	ADEQUATE
	AFTER	~ 10 minutes	
	RECORD	Duration of timer	_____ mins
<input type="checkbox"/>	VERIFY	Fan 6EF3 is	ON
<input type="checkbox"/>	VERIFY	Fan 7EF1 is	ON
<input type="checkbox"/>	VERIFY	Fan 7EF2 is	ON
<input type="checkbox"/>	VERIFY	Fan 7EF3 is	ON
<input type="checkbox"/>	VERIFY	Vent 6AV3 is	OPEN
<input type="checkbox"/>	VERIFY	Vent 7AV1 is	OPEN
<input type="checkbox"/>	VERIFY	Vent 7AV2 is	OPEN
<input type="checkbox"/>	VERIFY	Vent 7AV3 is	OPEN
<input type="checkbox"/>	VERIFY	Vent 7AV4 is	OPEN
<input type="checkbox"/>	VERIFY	Vent 7AV5 is	OPEN
	REMOVE	Jumper between Tp2 and Tp4 on the Div A pcb in 6CB2	
	REMOVE	Jumper between Tp2 and Tp4 on the Div B pcb in 6CB2	
<input type="checkbox"/>	VERIFY	Fan 6EF1 is	OFF
<input type="checkbox"/>	VERIFY	Fan 6EF2 is	OFF
<input type="checkbox"/>	VERIFY	Vent 6AV1 is	CLOSED
<input type="checkbox"/>	VERIFY	Vent 6AV2 is	CLOSED
<input type="checkbox"/>	VERIFY	Fan 6EF3 is	OFF
<input type="checkbox"/>	VERIFY	Fan 7EF1 is	OFF

- | | | | |
|--------------------------|--|------------------------|---------------|
| <input type="checkbox"/> | VERIFY | Fan 7EF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 7EF3 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV2 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV4 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV5 is | CLOSED |
| | RESET | ODH in MCR | |
| <input type="checkbox"/> | VERIFY | MCR sees ODH as | RESET |
| <input type="checkbox"/> | Check for Test Acceptance of sensor 6AS1 on for > 10 minutes | | |

1.11 Test Activation of multiple sensors, 6AS2 and 6AS3, in sector 6

- | | | | |
|--------------------------|---------------|---|-----------------|
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 8 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Restricted Access | MODE 8 |
| | JUMPER | Tp2 and Tp4 on the Div A pcb in 6CB3 | |
| | JUMPER | Tp2 and Tp4 on the Div B pcb in 6CB3 | |
| | JUMPER | Tp2 and Tp4 on the Div A pcb in 5CB5 | |
| | JUMPER | Tp2 and Tp4 on the Div B pcb in 5CB5 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 is in | MODE 2 |
| <input type="checkbox"/> | VERIFY | MCR sees 6AS2 Div A | TRIPPED |
| <input type="checkbox"/> | VERIFY | MCR sees 6AS2 Div B | TRIPPED |
| <input type="checkbox"/> | VERIFY | MCR sees 6AS3 Div A | TRIPPED |
| <input type="checkbox"/> | VERIFY | MCR sees 6AS3 Div B | TRIPPED |
| <input type="checkbox"/> | VERIFY | Fan 6EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6EF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6EF3 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 7EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 7EF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 7EF3 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 6AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV4 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV5 is | OPEN |
| | AFTER | ~ 30 secs | |
| | TURN | Bypass Switch to Bypass | |
| <input type="checkbox"/> | VERIFY | Strobes <input type="checkbox"/>, Sonalerts <input type="checkbox"/> and Fans (after ~90secs) <input type="checkbox"/> | STOP |
| | TURN | Bypass Switch from Bypass | |
| <input type="checkbox"/> | VERIFY | Strobes <input type="checkbox"/>, Sonalerts <input type="checkbox"/> and Fans (after ~30secs) <input type="checkbox"/> | CONTINUE |
| | REMOVE | Jumper between Tp2 and Tp4 on the Div A pcb in 6CB3 | |
| | REMOVE | Jumper between Tp2 and Tp4 on the Div B pcb in 6CB3 | |

REMOVE Jumper between Tp2 and Tp4 on the Div A pcb in 6CB5
REMOVE Jumper between Tp2 and Tp4 on the Div B pcb in 6CB5

- VERIFY** Fan **6EF1** is **OFF**
- VERIFY** Fan **6EF2** is **OFF**
- VERIFY** Fan **6EF3** is **OFF**
- VERIFY** Fan **7EF1** is **OFF**
- VERIFY** Fan **7EF2** is **OFF**
- VERIFY** Fan **7EF3** is **OFF**
- VERIFY** Vent **6AV1** is **CLOSED**
- VERIFY** Vent **6AV2** is **CLOSED**
- VERIFY** Vent **6AV3** is **CLOSED**
- VERIFY** Vent **7AV1** is **CLOSED**
- VERIFY** Vent **7AV2** is **CLOSED**
- VERIFY** Vent **7AV3** is **CLOSED**
- VERIFY** Vent **7AV4** is **CLOSED**
- VERIFY** Vent **7AV5** is **CLOSED**

- RESET ODH in MCR**
- VERIFY** MCR sees **ODH** as **RESET**

- Check for Test Acceptance of Activation of multiple sensors 6AS2 and 6AS3 in sector 5**

1.12 Test Manual fan ON/OFF controls in Alcove 5C

- PLACE Peer 7 in Mode 8**
- VERIFY** Peer **7** is in **Restricted Access** **MODE 8**

- PRESS** Fan **ON** button in **Alcove 5C**
BEGIN **90-sec timer**
- VERIFY** Fan **5EF2** is **ON**
- VERIFY** Fan **5EF3** is **ON**
- VERIFY** Fan **5EF4** is **ON**
- VERIFY** Vent **5AV1** is **OPEN**
- VERIFY** Vent **5AV2** is **OPEN**
- VERIFY** Vent **5AV3** is **OPEN**

- RECORD** **Volume of air-flow** at the inlet of fan **5EF3** _____ **LFM**
Target flow value ($\pm 10\%$) **1592 LFM**
- RECORD** **Volume of air-flow** at the inlet of fan **5EF4** _____ **LFM**
Target flow value ($\pm 10\%$) **1592 LFM**

- PRESS** Fan **OFF** button in **Alcove 5C**
AFTER **90 secs** from **ON** command
- VERIFY** Fan **5EF2** is **OFF**
- VERIFY** Fan **5EF3** is **OFF**
- VERIFY** Fan **5EF4** is **OFF**
- VERIFY** Vent **5AV1** is **CLOSED**
- VERIFY** Vent **5AV2** is **CLOSED**
- VERIFY** Vent **5AV3** is **CLOSED**

- Check for Test Acceptance of Manual fan-ON/OFF controls in Alcove 5C**

1.13 Test Manual fan OFF controls in MCR

- | | | | |
|--------------------------|--|---------------------------------------|---------------|
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 8 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Restricted Access | MODE 8 |
| | PRESS | Fan ON button in Alcove 5C | |
| | BEGIN | 90-sec timer | |
| <input type="checkbox"/> | VERIFY | Fan 5EF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 5EF3 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 5EF4 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 5AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 5AV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 5AV3 is | OPEN |
| | PRESS | Fan OFF button in MCR | |
| | AFTER | 90 secs from ON command | |
| <input type="checkbox"/> | VERIFY | Fan 5EF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 5EF3 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 5EF4 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 5AV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 5AV2 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 5AV3 is | CLOSED |
| <input type="checkbox"/> | Check for Test Acceptance of Manual fan OFF controls in MCR | | |

1.14 Test Manual fan-ON/OFF controls in Alcove 7A

- | | | | |
|--------------------------|---------------|---|------------------|
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 8 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Restricted Access | MODE 8 |
| | PRESS | Fan ON button in Alcove 7A | |
| | BEGIN | 90-sec timer | |
| <input type="checkbox"/> | VERIFY | Fan 6EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6EF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6EF3 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 7EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 6AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | OPEN |
| | RECORD | Volume of air-flow at the inlet of fan 6EF3 | _____ LFM |
| | | <i>Target flow value (± 10%)</i> | <i>2078 LFM</i> |
| | RECORD | Volume of air-flow at the inlet of fan 7EF1 | _____ LFM |
| | | <i>Target flow value (± 10%)</i> | <i>2078 LFM</i> |
| <input type="checkbox"/> | VERIFY | Air flow at tell-tale of vent 7AV1 is | ADEQUATE |
| | PRESS | Fan OFF button in Alcove 7A | |
| | AFTER | 90 secs from ON command | |
| <input type="checkbox"/> | VERIFY | Fan 6EF1 is | OFF |

- VERIFY** Fan **6EF2** is **OFF**
- VERIFY** Fan **6EF3** is **OFF**
- VERIFY** Fan **7EF1** is **OFF**
- VERIFY** Vent **6AV1** is **CLOSED**
- VERIFY** Vent **6AV2** is **CLOSED**
- VERIFY** Vent **6AV3** is **CLOSED**
- VERIFY** Vent **7AV1** is **CLOSED**

- Check for Test Acceptance of Manual fan-ON/OFF controls in Alcove 7A**

1.15 Test Manual fan OFF controls in MCR

- PLACE** **Peer 7 in Mode 8**
- VERIFY** **Peer 7 is in Restricted Access** **MODE 8**

PRESS Fan **ON** button in **Alcove 7A**
BEGIN **90-sec timer**

- VERIFY** Fan **6EF1** is **ON**
- VERIFY** Fan **6EF2** is **ON**
- VERIFY** Fan **6EF3** is **ON**
- VERIFY** Fan **7EF1** is **ON**
- VERIFY** Vent **6AV1** is **OPEN**
- VERIFY** Vent **6AV2** is **OPEN**
- VERIFY** Vent **6AV3** is **OPEN**
- VERIFY** Vent **7AV1** is **OPEN**

PRESS Fan **OFF** button **MCR**
AFTER **90 secs from ON command**

- VERIFY** Fan **6EF1** is **OFF**
- VERIFY** Fan **6EF2** is **OFF**
- VERIFY** Fan **6EF3** is **OFF**
- VERIFY** Fan **7EF1** is **OFF**
- VERIFY** Vent **6AV1** is **CLOSED**
- VERIFY** Vent **6AV2** is **CLOSED**
- VERIFY** Vent **6AV3** is **CLOSED**
- VERIFY** Vent **7AV1** is **CLOSED**

- Check for Test Acceptance of Manual fan OFF controls in MCR**

1.16 Test Manual fan-ON/OFF controls in Alcove 7B

- PLACE** **Peer 7 in Mode 8**
- VERIFY** **Peer 7 is in Restricted Access** **MODE 8**

PRESS Fan **ON** button in **Alcove 7B**
BEGIN **90-sec timer**

- VERIFY** Fan **6EF1** is **ON**
- VERIFY** Fan **6EF2** is **ON**
- VERIFY** Fan **6EF3** is **ON**

- | | | | |
|--------------------------|---------------|---|---------------|
| <input type="checkbox"/> | VERIFY | Fan 7EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 6AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | OPEN |
| | PRESS | Fan OFF button in Alcove 7B | |
| | AFTER | 90 secs from ON command | |
| <input type="checkbox"/> | VERIFY | Fan 6EF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6EF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6EF3 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 7EF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 6AV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 6AV2 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | CLOSED |
| <input type="checkbox"/> | | Check for Test Acceptance of Manual fan ON/OFF controls in Alcove 7B | |

1.17 Test of ODH sensor 6XAS1 in 6XCB1 in 1006B

- | | | | |
|--------------------------|---------------|---|-----------------|
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 8 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Restricted Access | MODE 8 |
| | FLOW | Helium (or Nitrogen) gas across 6XAS1 | |
| | RECORD | Oxygen trip level for Div A | _____ % |
| | RECORD | Oxygen trip level for Div B | _____ % |
| <input type="checkbox"/> | VERIFY | MCR sees 6XAS1 Div A | TRIPPED |
| <input type="checkbox"/> | VERIFY | MCR sees 6XAS1 Div B | TRIPPED |
| <input type="checkbox"/> | VERIFY | Div A & B strobes on 6XCB1 are | FLASHING |
| <input type="checkbox"/> | VERIFY | Div A & B sonalerts on 6XCB1 are | SOUNDING |
| <input type="checkbox"/> | VERIFY | Fans in 1006B are | ON |
| <input type="checkbox"/> | VERIFY | Vent 1006B is | OPEN |
| | TURN | Bypass Switch to Bypass | |
| <input type="checkbox"/> | VERIFY | Strobes <input type="checkbox"/> and Sonalerts <input type="checkbox"/> | STOP |
| | TURN | Bypass Switch from Bypass | |
| <input type="checkbox"/> | VERIFY | Strobes <input type="checkbox"/> and Sonalerts <input type="checkbox"/> | CONTINUE |
| | HALT | Flow of gas on 6XAS1 | |
| | WAIT | For 6XAS1 to clear (level ~ trip-level above) | |
| <input type="checkbox"/> | VERIFY | Div A & B strobes and sonalerts on 5CB3 are | OFF |
| <input type="checkbox"/> | VERIFY | Fan in 1006B are | OFF |
| <input type="checkbox"/> | VERIFY | Vent 1006B is | CLOSED |
| | RESET | ODH in MCR | |
| <input type="checkbox"/> | VERIFY | MCR sees ODH as | RESET |
| <input type="checkbox"/> | | Check for Test Acceptance of sensor 6XAS1 | |

1.18 Test of Emergency fan ON button at gate 5GE1

PRESS Emergency fan **ON** button at gate **5GE1**

BEGIN **90-sec timer**

- VERIFY** Fan **5EF2** is **ON**
- VERIFY** Fan **5EF3** is **ON**
- VERIFY** Fan **5EF4** is **ON**
- VERIFY** Vent **5AV1** is **OPEN**
- VERIFY** Vent **5AV2** is **OPEN**
- VERIFY** Vent **5AV3** is **OPEN**

PRESS Emergency fan **OFF** button at gate **5GE1**

- VERIFY** Fan **5EF2** is **OFF**
- VERIFY** Fan **5EF3** is **OFF**
- VERIFY** Fan **5EF4** is **OFF**
- VERIFY** Vent **5AV1** is **CLOSED**
- VERIFY** Vent **5AV2** is **CLOSED**
- VERIFY** Vent **5AV3** is **CLOSED**

- Check for Acceptance of Test of Emergency fan ON button at gate 5GE1**

1.19 Test of Emergency fan ON button at gate 6GE3

PRESS Emergency fan **ON** button at gate **6GE3**

BEGIN **90-sec timer**

- VERIFY** Fan **6EF1** is **ON**
- VERIFY** Fan **6EF2** is **ON**
- VERIFY** Fan **6EF3** is **ON**
- VERIFY** Fan **7EF1** is **ON**
- VERIFY** Vent **6AV1** is **OPEN**
- VERIFY** Vent **6AV2** is **OPEN**
- VERIFY** Vent **6AV3** is **OPEN**
- VERIFY** Vent **7AV1** is **OPEN**

PRESS Emergency fan **OFF** button at gate **6GE3**

- VERIFY** Fan **6EF1** is **OFF**
- VERIFY** Fan **6EF2** is **OFF**
- VERIFY** Fan **6EF3** is **OFF**
- VERIFY** Fan **7EF1** is **OFF**
- VERIFY** Vent **6AV1** is **CLOSED**
- VERIFY** Vent **6AV2** is **CLOSED**
- VERIFY** Vent **6AV3** is **CLOSED**
- VERIFY** Vent **7AV1** is **CLOSED**

- Check for Acceptance of Test of Emergency fan ON button at gate 6GE3**

1.20 Summary of air-flow in fans and vents in Sectors 5 and 6

- | | | |
|--------------------------|---|------------------|
| RECORD | Volume of air-flow at the inlet of fan 5EF2 | _____ LFM |
| | <i>Target flow value ($\pm 10\%$)</i> | 2078 LFM |
| <input type="checkbox"/> | VERIFY Air flow at tell-tale of vent 5AV1 is | ADEQUATE |
| RECORD | Volume of air-flow at the inlet of fan 5EF3 | _____ LFM |
| | <i>Target flow value ($\pm 10\%$)</i> | 1592 LFM |
| <input type="checkbox"/> | VERIFY Air flow at tell-tale of vent 5AV2 is | ADEQUATE |
| RECORD | Volume of air-flow at the inlet of fan 5EF4 | _____ LFM |
| | <i>Target flow value ($\pm 10\%$)</i> | 1592 LFM |
| <input type="checkbox"/> | VERIFY Air flow at tell-tale of vent 5AV3 is | ADEQUATE |
| RECORD | Volume of air-flow at the inlet of fan 6EF1 | _____ LFM |
| | <i>Target flow value ($\pm 10\%$)</i> | 2078 LFM |
| <input type="checkbox"/> | VERIFY Air flow at tell-tale of vent 6AV1 is | ADEQUATE |
| RECORD | Volume of air-flow at the inlet of fan 6EF2 | _____ LFM |
| | <i>Target flow value ($\pm 10\%$)</i> | 1592 LFM |
| <input type="checkbox"/> | VERIFY Air flow at tell-tale of vent 6AV2 is | ADEQUATE |
| RECORD | Volume of air-flow at the inlet of fan 6EF3 | _____ LFM |
| | <i>Target flow value ($\pm 10\%$)</i> | 2078 LFM |
| <input type="checkbox"/> | VERIFY Air flow at tell-tale of vent 6AV3 is | ADEQUATE |
| RECORD | Volume of air-flow at the inlet of fan 7EF1 | _____ LFM |
| | <i>Target flow value ($\pm 10\%$)</i> | 2078 LFM |
| <input type="checkbox"/> | VERIFY Air flow at tell-tale of vent 7AV1 is | ADEQUATE |
| <input type="checkbox"/> | Check for acceptance of Summary of air-flow in fans and vents in Sectors 5 and 6 | |

END OF TEST PROCEDURE

TTL: Sign for completion of initial testing: _____

Date: ____/____/____

TTL: Sign for completion of final testing: _____

Date: ____/____/____