

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE****NUMBER: 05-6J-2059 -X****SUBSYSTEM NAME:** EPD&C - MAIN PROPULSION SYSTEM**REVISION:** 1 08/02/00

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**PART DATA**

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	<b>PART NAME</b>	<b>PART NUMBER</b>
	<b>VENDOR NAME</b>	<b>VENDOR NUMBER</b>
LRU	: AFT LCA-2	MC450-0058-0001
SRU	: CONTROLLER, HYBRID DRIVER	MC477-0263-0002

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**

CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LO2 INBOARD FILL/DRAIN VALVE CONTROL POWER, CLOSE SOLENOID.

**REFERENCE DESIGNATORS:** 56V76A122AR J3(58)**QUANTITY OF LIKE ITEMS:** 1**FUNCTION:**

CONDUCTS MAIN BUS POWER TO CLOSE SOLENOID FOR LO2 INBOARD FILL/DRAIN VALVE.

**FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE**

**NUMBER: 05-6J-2059-02**

**REVISION#:** 1 08/02/00

**SUBSYSTEM NAME:** EPD&C - MAIN PROPULSION SYSTEM

**LRU:** AFT LCA-2

**CRITICALITY OF THIS**

**ITEM NAME:** LO2 INBOARD FILL/DRAIN VALVE CL HDC (PV10)

**FAILURE MODE:** 1R2

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**FAILURE MODE:**

INADVERTENT OUTPUT, PREMATURELY CONDUCTS

**MISSION PHASE:**

PL PRE-LAUNCH  
LO LIFT-OFF

**VEHICLE/PAYLOAD/KIT EFFECTIVITY:**

102 COLUMBIA  
103 DISCOVERY  
104 ATLANTIS  
105 ENDEAVOUR

**CAUSE:**

PIECE PART FAILURE, CONTAMINATION, MECHANICAL SHOCK, VIBRATION, THERMAL SHOCK

**CRITICALITY 1/1 DURING INTACT ABORT ONLY? YES**

RTLS RETURN TO LAUNCH SITE

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**REDUNDANCY SCREEN**

A) PASS  
B) PASS  
C) PASS

**PASS/FAIL RATIONALE:**

A)

B)

C)

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**- FAILURE EFFECTS -**

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**(A) SUBSYSTEM:**

INADVERTENTLY CONDUCTS POWER TO LO2 INBOARD FILL/DRAIN VALVE CLOSE SOLENOID.

**(B) INTERFACING SUBSYSTEM(S):**

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NO EFFECT - FIRST FAILURE. BISTABLE FEATURE MAINTAINS FILL/DRAIN VALVE IN OPEN POSITION.

**(C) MISSION:**

NO EFFECT - FIRST FAILURE. POSSIBLE LOSS OF CREW AND VEHICLE AFTER SECOND FAILURE

CRIT 1/1 FOR RTLS ABORT

INADVERTANT CLOSE POWER PREVENTS LO2 DUMP. FAILURE TO ADEQUATELY DUMP LO2 MAY CAUSE VIOLATION OF MAXIMUM DOWNWEIGHT FOR HEAVY MANIFESTED PAYLOADS.

**(D) CREW, VEHICLE, AND ELEMENT(S):**

SAME AS C.

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

1R/2 2 SUCCESS PATHS. TIME FRAME – LOADING/DETANK

- 1) HDC FAILS ON.
- 2) PREMATURE DEACTUATION OF OPEN SOLENOID RESULTING IN PREMATURE CLOSURE OF FILL/DRAIN VALVE.

CAUSES TERMINATION OF PROPELLANT LOADING OR DETANKING. RESULTS IN PRESSURE SPIKE WHICH MAY CAUSE RUPTURE OF THE ORBITER FILL LINE, MANIFOLD, AND/OR GSE INTERFACE/FACILITY LINES. POSSIBLE AFT COMPARTMENT OVERPRESSURIZATION AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF ADJACENT CRITICAL FUNCTIONS DUE TO CRYO EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

REFERENCE CIL 03-1-0310-06.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**

REFER TO APPENDIX B, ITEM NUMBER 1 - HYBRID DRIVER CONTROLLER.

**(B) TEST:**

REFER TO APPENDIX B, ITEM NUMBER 1 - HYBRID DRIVER CONTROLLER.

GROUND TURNAROUND TEST

ANY TURNAROUND CHECKOUT IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

**(C) INSPECTION:**

REFER TO APPENDIX B, ITEM NUMBER 1 - HYBRID DRIVER CONTROLLER.

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**(D) FAILURE HISTORY:**

REFER TO APPENDIX B, ITEM NUMBER 1 - HYBRID DRIVER CONTROLLER.

CURRENT DATA ON TEST FAILURE, FLIGHT FAILURE, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATABASE.

**(E) OPERATIONAL USE:**

FLIGHT - NO CREW ACTION CAN BE TAKEN.

GROUND - TERMINATE LOADING.

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**- APPROVALS -**

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S&R ENGINEERING	: W.P. MUSTY	:/S/ W.P. MUSTY
S&R ENGINEERING ITM	: P. A. STENGER-NGUYEN	:/S/ P.A. STENGER-NGUYEN
DESIGN ENGINEERING	: ANDY RIZVI	:/S/ ANDY RIZVI
MPS SUBSYSTEM MGR.	: TIM REITH	:/S/ TIM REITH
EPD&C SUBSYSTEM MGR.	: RICHARD PHAN	:/S/ RICHARD PHAN
MOD	: BILL LANE	:/S/ BILL LANE
USA SAM	: MIKE SNYDER	:/S/ MIKE SNYDER
USA ORBITER ELEMENT	: SUZANNE LITTLE	:/S/ SUZANNE LITTLE
NASA SR&QA	: BILL PRINCE	:/S/ BILL PRINCE