

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE**NUMBER: 05-6J-2057B -X****SUBSYSTEM NAME:** EPD&C - MAIN PROPULSION SYSTEM**REVISION:** 1 08/01/00

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	: AFT LCA 3	MC450-0059-0001
SRU	: CONTROLLER, HYBRID DRIVER	MC477-0263-0002

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

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

REFERENCE DESIGNATORS: 56V76A123AR J10(R)**QUANTITY OF LIKE ITEMS:** 1**FUNCTION:**

CONDUCTS MAIN BUS POWER TO OPEN SOLENOID OF THE LO2 OUTBOARD FILL/DRAIN VALVES.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 05-6J-2057B-01

REVISION#: 1 08/01/00

SUBSYSTEM NAME: EPD&C - MAIN PROPULSION SYSTEM

LRU: AFT LCA 3

CRITICALITY OF THIS

ITEM NAME: LO2 O/B FILL/DRAIN VALVE OPEN HDC, PV9

FAILURE MODE: 1R2

FAILURE MODE:

LOSS OF OUTPUT, OPENS, INADVERTENTLY OPENS, FAILS TO CONDUCT

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 STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? YES

RTLS RETURN TO LAUNCH SITE

REDUNDANCY SCREEN

- A) PASS
- B) PASS
- C) PASS

PASS/FAIL RATIONALE:

A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF POWER TO OPEN 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 ON GROUND. FIRST FAILURE.

CRITICALITY 1/1 FOR RTLS ABORTS; LOSS OF OPEN HDC OUTPUT TO LO2 OUTBOARD FILL AND DRAIN VALVE RESULTS IN 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) HYBRID DRIVER FAILS OFF
- 2) PREMATURE ACTUATION OF CLOSE 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.

MULTIPLE CRITICAL FAILURE MODES EXIST. REFERENCE MPS CIL 03-1-0311-05.

-DISPOSITION RATIONALE-

(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.

- APPROVALS -

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	: WILLIAM LANE	:/S/ WILLIAM LANE
USA SAM	: MICHAEL SNYDER	:/S/ MICHAEL SNYDER
USA ORBITER ELEMENT	: SUZANNE LITTLE	:/S/ SUZANNE LITTLE
NASA SR&QA	: BILL PRINCE	:/S/ BILL PRINCE