

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE**NUMBER: 05-6J-2112 -X****SUBSYSTEM NAME:** EPD&C - MAIN PROPULSION SYSTEM**REVISION:** 1 07/24/00**PART DATA**

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: AFT LCA 1	MC450-0057-0001
LRU	: AFT LCA 2	MC450-0058-0001
LRU	: AFT LCA 3	MC450-0059-0001
SRU	: CONTROLLER, HYBRID DRIVER	MC477-0261-0002

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

CONTROLLER, HYBRID DRIVER (HDC), TYPE I, HELIUM ISOLATION VALVE B (LV 2/4/6).

REFERENCE DESIGNATORS:

- 54V76A121J3(77)-
- 54V76A121J7(117)
- 54V76A121J3(78)-
- 54V76A121J7(118)
- 55V76A122J3(77)-
- 55V76A122J7(117)
- 55V76A122J3(78)-
- 55V76A122J7(118)
- 56V76A123J3(77)-
- 56V76A123J7(117)
- 56V76A123J3(78)-
- 56V76A123J7(118)

QUANTITY OF LIKE ITEMS: 6**FUNCTION:**

CONDUCTS POWER TO HELIUM SUPPLY ISOLATION VALVE B (LV2/4/6).

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE**NUMBER: 05-6J-2112-01****REVISION#:** 1 07/24/00**SUBSYSTEM NAME:** EPD&C - MAIN PROPULSION SYSTEM**LRU:** AFT LCA 1, 2, 3**ITEM NAME:** SSME GHE ISO VLV B HDC (LV2, 4, 6)**CRITICALITY OF THIS****FAILURE MODE:** 1R3**FAILURE MODE:**

LOSS OF OUTPUT, FAILS "OFF", FAILS TO TURN "ON".

MISSION PHASE: LO LIFT-OFF

VEHICLE/PAYLOAD/KIT EFFECTIVITY:	102	COLUMBIA
	103	DISCOVERY
	104	ATLANTIS
	105	ENDEAVOUR

CAUSE:

PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS.

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN

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

PASS/FAIL RATIONALE:

A)

B)

FAILS B SCREEN SINCE SWITCH COMMAND (NOMINALLY "ON") MASKS FAILURE.

C)

- FAILURE EFFECTS -**(A) SUBSYSTEM:**

NO EFFECT FIRST FAILURE. RESULTS IN LOSS OF REDUNDANT MDM COMMAND TO OPEN SSME B ISOLATION VALVE.

(B) INTERFACING SUBSYSTEM(S):

SAME AS A.

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(C) MISSION:

SAME AS A.

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

SAME AS A.

(E) FUNCTIONAL CRITICALITY EFFECTS:

1R/3 4 SUCCESS PATHS. TIME FRAME - ASCENT.

- 1) HDC FAILS "OFF".
- 2) LOSS OF SWITCH OPEN COMMAND.
- 3) LOSS OF PARALLEL POWER LEG TO ISOLATION VALVE B. RESULTS IN INADVERTANT CLOSURE OF ISOLATION VALVE B.
- 4) ISOLATION VALVE A FAILS CLOSED.

RESULTS IN LOSS OF HELIUM REQUIRED TO PERFORM CONTINUOUS PURGING OF HIGH PRESSURE OXIDIZER TURBOPUMP INTERMEDIATE SEAL CAVITY. THIS CAVITY IS BETWEEN TWO SEALS, ONE OF WHICH CONTAINS THE HOT, FUEL-RICH GAS IN OXIDIZER TURBINE AND THE OTHER CONTAINS THE LIQUID OXYGEN IN OXIDIZER TURBOPUMP. LEAKAGE THROUGH ONE OR BOTH SEALS COULD RESULT IN A CATASTROPHIC EXPLOSION IF ALLOWED TO ACCUMULATE. CONTINUOUS OVERBOARD PURGE OF THIS AREA PREVENTS THIS ACCUMULATION FROM OCCURRING. POSSIBLE LOSS OF CREW/VEHICLE.

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

(B) TEST:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

GROUND TURNAROUND TEST

ANY TURNAROUND CHECKOUT IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

(D) FAILURE HISTORY:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

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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:
NO CREW ACTION CAN BE TAKEN.

- 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	: JEFF MUSLER	:/S/ JEFF MUSLER
USA SAM	: MIKE SNYDER	:/S/ MIKE SNYDER
USA ORBITER ELEMENT	: SUZANNE LITTLE	:/S/ SUZANNE LITTLE
NASA SR&QA	: BILL PRINCE	:/S/ BILL PRINCE