FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 05-6J-2058B -X

SUBSYSTEM NAME: EPD&C - MAIN PROPULSION SYSTEM
REVISION: 1 06/20/00

PART DATA

	PART NAME **VENDOR NAME**	**PART NUMBER** **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 CLOSE SOLENOID CONTROL POWER.

REFERENCE DESIGNATORS: 56V76A123AR J10(P)

QUANTITY OF LIKE ITEMS: 1

FUNCTION:
CONDUCTS MAIN BUS POWER TO CLOSE SOLENOID OF LO2 OUTBOARD FILL/DRAIN VALVE.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 05-6J-2058B-02

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 CLOSE HDC (PV9) **FAILURE MODE:** 1R2

FAILURE MODE:
INADVERTENT OUTPUT, FAILS ON, CONDUCTS PREMATURELY.

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

REDUNDANCY SCREEN
A) PASS
B) PASS
C) PASS

PASS/FAIL RATIONALE:
A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
PREMATURE ACTUATION OF CLOSE SOLENOID.

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT - FIRST FAILURE. BISTABLE FEATURE MAINTAINS FILL/DRAIN VALVE IN OPEN POSITION.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL **FAILURE MODE NUMBER: 05-6J-2058B-02**

(C) MISSION:
NO EFFECT - FIRST FAILURE.

CRITICALITY 1/1 FOR RTLS ABORTS; CLOSE HDC FAILURE ON RESULTS IN INABILITY TO REMOVE CLOSE COMMAND TO LO2 OUTBOARD FILL AND DRAIN VALVE RESULTING 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/DRAIN.
1) HDC FAILS ON
2) PREMATURE DEACTUATION OF OPEN SOLENOID RESULTING IN PREMATURE CLOSURE OF LO2 OUTBOARD 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 COTROLLER.

(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.

(D) FAILURE HISTORY:
REFER TO APPENDIX B, ITEM NUMBER 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:
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