

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE

NUMBER: 05-6J-2029 -X

SUBSYSTEM NAME: EPD&C MAIN PROPULSION SYSTEM

REVISION: 0 06/20/88

PART DATA

PART NAME	PART NUMBER
VENDOR NAME	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	MC477-0263-0002

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

CONTROLLER, HYBRID DRIVER (HDC), TYPE III, GH2 FLOW CONTROL VALVE (LV56/57/58), CLOSE SOLENOID.

REFERENCE DESIGNATORS: 54V76A121J3(84)
 54V76A121J3(85)
 55V76A122J3(88)
 55V76A122J3(86)
 56V76A123J3(86)
 56V76A123J4(102)

QUANTITY OF LIKE ITEMS: 6
 SIX

FUNCTION:

CONDUCTS MAIN BUS POWER TO GH2 FLOW CONTROL VALVE CLOSE SOLENOID.
 TWO HDCS III ARE IN SERIES TO EACH CLOSE SOLENOID.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2029 -2 REV: 06/20/88

ASSEMBLY : APT LCA - 1, 2, 3	CRIT. FUNC: 1R
P/N RI : MC477-0263-0002	CRIT. HDW: 3
P/N VENDOR:	VEHICLE 102 103 104
QUANTITY : 6	EFFECTIVITY: X X X
: SIX	PHASE(S): PL LO X OO DO LS
:	

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS		
PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES <i>J Brown</i> J BROWN	DES <i>R Brown</i>	EPDC SSM <i>Lowell Perry for J.S. Stang 6/27/88</i>
REL <i>F Defensor</i> DEFENSOR	REL <i>J Kanun 6/27/88</i>	MPS SSM <i>Lowell Perry for J.S. Stang 6/27/88</i>
QE <i>Dum</i> D MASAI	QE <i>D. Conner 6/27/88</i>	EPDC REG <i>Lowell Perry for J.S. Stang 6/27/88</i>
		MPS REG <i>Lowell Perry for J.S. Stang 6/27/88</i>

ITEM:

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FAILURE MODE:

INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF".

CAUSE(S):

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

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY

(A) DEGRADATION OF REDUNDANCY AGAINST INADVERTENT ACTUATION OF GH2 FLOW CONTROL VALVE CLOSE SOLENOID.

(B,C,D) NO EFFECT - FIRST FAILURE.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2029 -2 REV:06/20/88

- (E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE.
TIME FRAME - ASCENT.
1) HDC FAILS "ON".
2) SERIES HDC FAILS "ON" CAUSING ONE GH2 FLOW CONTROL VALVE TO CLOSE.
3) SECOND GH2 FLOW CONTROL VALVE FAILS CLOSED.

RESULTS IN INSUFFICIENT PRESSURIZATION GAS TO MAINTAIN LH2 ULLAGE PRESSURE IN THE REQUIRED FLIGHT CONTROL BAND (32-34 PSIA). POSSIBLE VIOLATION OF TANK MINIMUM STRUCTURAL CAPABILITY REQUIREMENTS AND UNCONTAINED SSME SHUTDOWN DUE TO LOW NPSP.

POSSIBLE LOSS OF CREW/VEHICLE.

FAILS B SCREEN BECAUSE OF SERIES CIRCUIT CONFIGURATION.

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A-D) DISPOSITION AND RATIONALE:

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

(B) GROUND TURNAROUND TEST

ULL PRESS CNTL W/CK OUT CMDS V41ADO.010J,K; V41ADO.020J,K;
V41ADO.030J,K EVERY FLIGHT.

(E) OPERATIONAL USE

LH2 ULLAGE PRESSURE IS ON SYSTEMS MANAGEMENT (SM) ALERT. CREW WILL OPEN THE LH2 FLOW CONTROL VALVES (VIA COCKPIT SWITCH S53 ON PANEL R2) FOR A LOW LH2 ULLAGE PRESSURE CONDITION.

IF THE LH2 NPSP DROPS BELOW THE PRE-FLIGHT ACCEPTED LEVELS (PER FLIGHT RULES), THE CREW WILL MANUALLY THROTTLE THE ENGINES TO KEEP THE NPSP HIGH ENOUGH TO PREVENT LH2 TURBOPUMP CAVITATION.