

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE**NUMBER: 05-6J-2284 -X****SUBSYSTEM NAME:** EPD&C - MAIN PROPULSION SYSTEM**REVISION:** 1 08/02/00

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	: AFT LCA-2	MC450-0058-0001
SRU	: DIODE	JANTXV1N5551

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

DIODE, BLOCKING (3 AMP), LO2 INBOARD FILL/DRAIN VALVE (PV10), MDM OPEN COMMAND A OUTPUT.

REFERENCE DESIGNATORS: 55V76A122CR J1(54)**QUANTITY OF LIKE ITEMS:** 1**FUNCTION:**

ISOLATES GROUND OPEN COMMAND FROM MDM OPEN COMMAND A, CONDUCTS MDM OPEN COMMAND A TO ONE OF THE TWO SERIES HDCS FOR CONTROL OF POWER TO THE OPEN SOLENOID OF THE LO2 INBOARD FILL/DRAIN VALVE.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 05-6J-2284-01

REVISION#: 1 08/02/00

SUBSYSTEM NAME: EPD&C - MAIN PROPULSION SYSTEM

LRU: AFT LCA-2

ITEM NAME: LO2 I/B F/D OP A/GND CMD BLK DIODE (PV10)

CRITICALITY OF THIS

FAILURE MODE: 1R3

FAILURE MODE:

OPEN, FAILS OPEN, FAILS TO CONDUCT

MISSION PHASE: PL PRE-LAUNCH

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

CAUSE:

CONTAMINATION, MECHANICAL SHOCK, VIBRATION, THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? YES

RTLS RETURN TO LAUNCH SITE

REDUNDANCY SCREEN

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

PASS/FAIL RATIONALE:

A)

B)

FAILS B SCREEN BECAUSE REDUNDANT POWER PATH MASKS FAILURE.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF ONE OF TWO POWER PATHS (MDM OPEN COMMAND A) TO ONE OF TWO SERIES HDCS OF OPEN SOLENOID. DEGRADATION OF REDUNDANCY AGAINST PREMATURE DEACTUATION OF OPEN SOLENOID.

(B) INTERFACING SUBSYSTEM(S):

FIRST FAILURE - NO EFFECT.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE
NUMBER: 05-6J-2284-01**

(C) MISSION:

FIRST FAILURE - NO EFFECT.

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

FIRST FAILURE - NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:

1R/3 3 SUCCESS PATHS. TIME FRAME – LOADING/DETANK.

- 1) DIODE FAILS OPEN.
- 2) LOSS OF GROUND OPEN COMMAND, BISTABLE FEATURE MAINTAINS FILL/DRAIN VALVE IN OPEN POSITION.
- 3) PREMATURE ACTUATION OF CLOSE SOLENOID VALVE 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.

CRIT 1/1 FOR RTLS ABORT

LOSS OF OPEN COMMAND A PREVENTS LO2 DUMP. FAILURE TO ADEQUATELY DUMP LO2 MAY CAUSE VIOLATION OF MAXIMUM DOWNWEIGHT FOR HEAVY MANIFESTED PAYLOADS.

REFERENCE CIL 03-1-0310-06.

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX F, ITEM NUMBER 4 - DIODE.

(B) TEST:

REFER TO APPENDIX F, ITEM NUMBER 4 - DIODE.

GROUND TURNAROUND TEST

ANY TURNAROUND CHECKOUT IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:

REFER TO APPENDIX F, ITEM NUMBER 4 - DIODE.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE
NUMBER: 05-6J-2284-01**

(D) FAILURE HISTORY:

REFER TO APPENDIX F, ITEM NUMBER 4 - DIODE.

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