 PRINT DATE: 6/16/05

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CRITICAL HARDWARE
NUMBER: 05-6J-2182 -X

SUBSYSTEM NAME: EPD&C MAIN PROPULSION SYSTEM
REVISION: 0 11/04/87

		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	:	DIODE	JANTXV1N5551

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DIODE, BLOCKING (3 AMP), OPEN MDM, HYBRID DRIVER CONTROLLER COMMAND, LO2 PREVALVE 1, 2 AND 3.

REFERENCE DESIGNATORS: AV BAY 4:
P140(81)
P140(95)
-
BAY 5:
P140(64)
P140(108)
-
BAY 6:
P140(78)
P140(64)
-
56V76A123-J1(37)
54V76A121-J1(37)
55V76A122-J1(37)

QUANTITY OF LIKE ITEMS: 9
NINE 3 PER PREVALVE 1, 2 AND 3

FUNCTION:
DIODE ISOLATES MANUAL SWITCH COMMAND FROM MDM, CONDUCTS MDM COMMAND TO HYBRID DRIVER CONTROLLER FOR CONTROL OF REDUNDANT POWER TO OPEN SOLENOIDS FOR LO2 PREVALVE OPERATION.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE
NUMBER: 05-6J-2182-02

REVISION#: 0 09/13/95

SUBSYSTEM NAME: EPD&C MAIN PROPULSION SYSTEM
LRU: AFT LCA 1, 2, 3 AV BAY 4, 5, 6 DIODE BOX
ITEM NAME: DIODE

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
SHORT, END-TO-END

MISSION PHASE: PL PRE-LAUNCH
LO LIFT-OFF

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

CAUSE:
STRUCTURAL FAILURE, ELECTRICAL STRESS, PROCESSING ANOMALY, CONTAMINATION, MECHANICAL SHOCK, VIBRATION, 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 BECAUSE FAILURE OF DIODE ALONE ALLOWS FULL FUNCTION OF COMMAND PATH AND IS NOT READILY DETECTABLE.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF MDM ISOLATION FROM MANUAL SWITCH COMMAND.

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT - FIRST FAILURE

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE
NUMBER: 05-6J-2162-02

(C) MISSION:
NO EFFECT - FIRST FAILURE

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT - FIRST FAILURE

(E) FUNCTIONAL CRITICALITY EFFECTS:
1R3, 4 SUCCESS PATHS. TIME FRAME - ASCENT

1) DIODE SHORTS END-TO-END

2) SERIES OPEN HDC I SHORTS TO GROUND. RESULTS IN LOSS OF REDUNDANCY FOR OPEN PREVALVE COMMAND.

3) PARALLEL POWER PATH FAILS "OFF" (HDC, RPC, OR DIODE). RESULTS IN LOSS OF OPEN POWER PATH TO LO2 PREVALVE. BISTABLE FEATURE MAINTAINS PREVALVE IN OPEN POSITION.

4) EITHER CLOSING SOLENOID FAILS "ON". RESULTS IN PREMATURE ACTUATION OF CLOSE SOLENOID.

RESULTS IN PREMATURE LO2 PREVALVE CLOSURE WHILE ENGINE IS RUNNING, CAUSING UNCONTAINED ENGINE DAMAGE DUE TO STARVATION CUTOFF. FIRE/EXPLOSION IN AFT COMPARTMENT, LOSS OF CREW/VEHICLE.

-DISPOSITION RATIONALE-

(A) DESIGN:
REFER TO APPENDIX F, ITEM NO. 4 - DIODE.

(B) TEST:
REFER TO APPENDIX F, ITEM NO. 4 - DIODE.

GROUND TURNAROUND TEST
MDM COMMAND REDUNDANCY, V41ABO.360B, F, H, J; 400B, F, H, J; 420B, F, H, J, EVERY FLIGHT.

(C) INSPECTION:
REFER TO APPENDIX F, ITEM NO. 4 - DIODE.

(D) FAILURE HISTORY:
REFER TO APPENDIX F, ITEM NO. 4 - DIODE.

(E) OPERATIONAL USE:
NO CREW ACTION CAN BE TAKEN.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: 05-6J-2183-02

- APPROVALS -

PAE MANAGER	: D. F. MIKULA	: [illegible]
PRODUCT ASSURANCE ENGR	: M. R. MILLER	: [illegible] 9/19/95
DESIGN ENGINEERING	: J. L. PECK	: [illegible]
NASA SSMA	:	: [illegible] 9/20/95
NASA SUBSYSTEM MANAGER	:	: [illegible] 9/20/95
JSC MOD	:	: [illegible] 9/20/95
SSE	:	: [illegible] 9/20/95