

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 05-6-2185 -X

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL
REVISION: 0 05/03/88

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	: MDCA 1	V070-764200
LRU	: MDCA 2	V070-764220
LRU	: MDCA 3	V070-764230
SRU	: DIODE	JANTX1N1188R

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DIODE, ISOLATION, 35 AMP - FUEL CELL TO ESSENTIAL BUS ISOLATION

REFERENCE DESIGNATORS: 40V76A31CR1
40V76A31CR4
40V76A32CR1
40V76A32CR4
40V76A33CR1
40V76A33CR4

QUANTITY OF LIKE ITEMS: 6
SIX -2 PER FCP/ ESS. BUS CIRCUIT

FUNCTION:
ISOLATES THE FUEL CELL FEEDER TO THE ESSENTIAL BUS FROM THE OTHER TWO
POWER SOURCES OF THE ESSENTIAL BUS.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 05-6-2185-02

REVISION#: 1 07/26/99

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL

LRU: MDCA 1, 2, 3

ITEM NAME: DIODE

CRITICALITY OF THIS

FAILURE MODE: 1R3

FAILURE MODE:

SHORT (END TO END)

MISSION PHASE:

PL	PRE-LAUNCH
LO	LIFT-OFF
OO	ON-ORBIT
DO	DE-ORBIT
LS	LANDING/SAFING

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

CAUSE:

STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN

A) FAIL
B) N/A
C) PASS

PASS/FAIL RATIONALE:

A)

"A" SCREEN FAILS BECAUSE FAILURE OF ONE OF THE SERIES DIODES IS NOT DETECTABLE EXCEPT BY INVASIVE PROCEDURES.

B)

"B" SCREEN IS "N/A" BECAUSE FAILURE OF AT LEAST TWO REMAINING PATHS IS READILY DETECTABLE DURING FLIGHT (DIODE SHORT TO STRUCTURE, POWER CONTACTOR, REDUNDANT REACTANT VALVE CLOSURE).

C)

- FAILURE EFFECTS -

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE
NUMBER: 05-6-2185-02**

(A) SUBSYSTEM:

DIODE SHORT (END TO END) - NO EFFECT. REDUNDANT DIODE ISOLATES FUEL CELL.

(B) INTERFACING SUBSYSTEM(S):

SAME AS (A)

(C) MISSION:

NO EFFECT - FIRST FAILURE

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

NO EFFECT - FIRST FAILURE

(E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF CREW/VEHICLE AFTER FOURTH FAILURE (ASSOCIATED FUEL CELL TO MAIN DC BUS POWER CONTACTOR FAILED CLOSED) DUE TO INABILITY TO "SAFE" A FUEL CELL. LOSS OF AN ESSENTIAL BUS (REQUIRES TWO FAILURES - SHORT AND SHORT TO GROUND ON DIODE CR1) RESULTS IN LOSS OF THE ASSOCIATED FUEL CELL COOLANT PUMP AS WELL AS REDUNDANT CONTROL OF THAT FUEL CELL'S REACTANT VALVES. THIS NECESSITATES REMOVAL OF ALL LOAD FROM THE FUEL CELL IN ORDER TO RENDER IT SAFE. INABILITY TO REDUNDANTLY CLOSE REACTANT VALVES OR REMOVE THE BUS LOAD FROM THE FUEL CELL UNDER THESE CIRCUMSTANCES, WILL RESULT IN FUEL CELL OVERHEATING WITH SUBSEQUENT RUPTURE AND/OR EXPLOSION/FIRE.

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX F, ITEM NO 1 - DIODE, POWER, STUD-MOUNTED

(B) TEST:

REFER TO APPENDIX F, ITEM NO 1 - DIODE, POWER, STUD-MOUNTED

GROUND TURNAROUND TEST

ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD. TESTING VERIFIES THAT NEITHER DIODE IS SHORTED TO GROUND OR BOTH DIODES ARE NOT SHORTED.

NONE FOR SHORTED DIODE

(C) INSPECTION:

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: 05-6-2105-02**

REFER TO APPENDIX F, ITEM NO 1 - DIODE, POWER, STUD-MOUNTED

(D) FAILURE HISTORY:

CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATA BASE.

(E) OPERATIONAL USE:

NONE

- APPROVALS -

EDITORIALLY APPROVED	: BNA	: <u>J. Kemura 7-26-99</u>
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 96-CIL-025_05-6