

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE

NUMBER: M5-6MB-2262-G -X

SUBSYSTEM NAME: ELECTRICAL POWER GENERATION - CRYO, GENERIC

REVISION: 8 09/09/92

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	: MID PCA 1	V070-764400
LRU	: MID PCA 2	V070-764430
SRU	: DIODE	JANTXV1N4248

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

DIODE, ISOLATION, 1 AMP - O2 MANIFOLD 1 AND 2 ISOLATION VALVES - CLOSE POSITION

REFERENCE DESIGNATORS: 40V76A25A1CR19
 40V76A25A1CR21
 40V76A26A1CR19
 40V76A26A1CR21

QUANTITY OF LIKE ITEMS: 4
 FOUR, TWO PER O2 MANIFOLD VALVE CIRCUIT

FUNCTION:

PROVIDES CIRCUIT ISOLATION FROM GROUND COMMANDS AND CONDUCTS CREW INITIATED TOGGLE SWITCH COMMANDS CONTROLLING CLOSING OF THE O2 MANIFOLD 1 AND 2 ISOLATION VALVES.

FAILURE MODES EFFECTS ANALYSIS FMEA - CIL FAILURE MODE

NUMBER: M5-6MB-2262-G-01

REVISION#: 9 04/16/96

SUBSYSTEM NAME: ELECTRICAL POWER GENERATION - CRYO, GENERIC

LRU: MID PCA 1

CRITICALITY OF THIS

ITEM NAME: DIODE

FAILURE MODE: 1R2

FAILURE MODE:

OPEN, FAILS TO CONDUCT

MISSION PHASE: LO LIFT-OFF
 DO DE-ORBIT

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

CAUSE:

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

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) PASS
 B) FAIL
 C) PASS

PASS/FAIL RATIONALE:

A)

B)

REDUNDANCY SCREEN "B" FAILS EVEN THOUGH THE FAILURE OF THIS DIODE IS
 DETECTABLE BECAUSE THE TIME FOR CORRECTIVE ACTION (ELECTRICAL LOAD
 RECONFIGURATION) EXCEEDS TIME TO EFFECT (MANIFOLD GROSS EXTERNAL LEAK
 STARVES TWO FCP'S DURING ASCENT/DESCENT).

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

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LOSS OF FUNCTION - NO EFFECT UNLESS FAILURE IN ASSOCIATED PLUMBING REQUIRES ISOLATION OF SUBASSEMBLY. INABILITY TO CLOSE VALVE FOLLOWING GROSS EXTERNAL LEAKAGE WOULD DEGRADE OR PRECLUDE OPERATION OF TWO FUEL CELL POWER PLANTS (FCP'S).

(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 DUE TO THE FOLLOWING SCENARIO: 1) DIODE FAILS OPEN (LOSE ABILITY TO CLOSE MANIFOLD VALVE), AND 2) GROSS EXTERNAL LEAK STARVES TWO FCP'S (LOSS OF TWO FCP'S DURING ASCENT LOSES CREW/VEHICLE. LOSS OF A SECOND FCP DURING DESCENT LOSES CREW/VEHICLE IF INSUFFICIENT TIME IS AVAILABLE FOR AN ELECTRICAL LOAD RECONFIGURATION RESULTING IN THE INABILITY OF THE SINGLE REMAINING FUEL CELL TO SUPPLY ADEQUATE ELECTRICAL POWER.)

-DISPOSITION RATIONALE-

(A) DESIGN:
REFER TO APPENDIX F, ITEM NO. 3 - DIODE

(B) TEST:
GROUND TURNAROUND TEST
ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD. THE OMRSD DATA PROVIDED BELOW IS NO LONGER BEING KEPT UP-TO-DATE. IF THERE IS ANY DISCREPANCY BETWEEN THE GROUND TESTING DATA PROVIDED BELOW AND THE OMRSD, THE OMRSD IS THE MORE ACCURATE SOURCE OF THE DATA.

CIRCUIT IS FUNCTIONALLY VERIFIED IN FLIGHT. PERFORM GROUND TURNAROUND TEST WHEN VALID VERIFICATION IS UNOBTAINABLE IN FLIGHT OR AFTER LRU REPLACEMENT.

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(C) INSPECTION:
 REFER TO APPENDIX F, ITEM NO. 3 - DIODE

(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. THE FAILURE HISTORY DATA PROVIDED IN APPENDIX F IS NO LONGER BEING KEPT UP-TO-DATE.

(E) OPERATIONAL USE:
 NO CREW ACTION AFTER FIRST FAILURE.

- APPROVALS -

PAE MANAGER	: P. STENGER-NGUYEN	<i>P. Stenger-Nguyen</i>
PRODUCT ASSURANCE ENGR	: J. NGUYEN	<i>J. Nguyen</i>
DESIGN ENGINEERING	: T. D. NGUYEN	<i>T. D. Nguyen</i>
EDITORIALLY APPROVED	: JSC	<i>JSC</i>
TECHNICAL APPROVAL	: VIA APPROVAL FORM	<i>96-CIL-012_M5/6MB</i>