

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE
 NUMBER: M5-5MB-20&2-G -X

SUBSYSTEM NAME: ELECTRICAL POWER GENERATION - CRYO, GENERIC
 REVISION: 9 09/09/92

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: PANEL C3A5	V070-730283
SRU	: RESISTOR	RWR80S1211FR

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
 RESISTOR, 1.2K OHM, 2 WATT - FUEL CELL 1, 2, AND 3 REACTANT VALVE "CLOSE"
 CONTROL CIRCUIT

REFERENCE DESIGNATORS: 35V73A3A5A10R2
 35V73A3A5A11R2
 35V73A3A5A12R2

QUANTITY OF LIKE ITEMS: 3
 THREE

FUNCTION:
 PROVIDES CURRENT LIMITING FOR THE SECONDARY (REDUNDANT) H2 AND O2
 REACTANT VALVE "CLOSE" CONTROL CIRCUIT.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: M6-6MB-2082-G-02

REVISION#: 9 04/18/96

SUBSYSTEM NAME: ELECTRICAL POWER GENERATION - CRYO, GENERIC

LRU: PANEL C3A5

CRITICALITY OF THIS

ITEM NAME: RESISTOR

FAILURE MODE: 1R3

FAILURE MODE:

SHORT (END TO END)

MISSION PHASE: LO LIFT-OFF
 OO ON-ORBIT
 DO DE-ORBIT

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)
 REDUNDANCY SCREEN "A" FAILS BECAUSE THERE IS NO TEST THAT CAN BE
 DEVELOPED TO DETECT THE SHORT (END TO END) FAILURE MODE OF THIS RESISTOR
 WITHOUT USING INVASIVE PROCEDURES.

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE
NUMBER: M5-6MB-2082-G-02**

LOSS OF ABILITY TO LIMIT THE CURRENT DRAWN FROM ITS ASSOCIATED CONTROL BUS.

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

**(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) RESISTOR FAILS SHORT, 2) REDUNDANT FUEL CELL REACTANT VALVE SWITCH SHORTS TO STRUCTURE CAUSING THE LOSS OF ASSOCIATED CONTROL BUS POWER WHICH CAUSES THE LOSS OF ONE OF TWO REDUNDANT CONTROL PATHS TO H2 AND O2 SUPPLY VALVES OF TWO DIFFERENT FUEL CELLS, 3) PRIMARY CLOSE CIRCUIT FAILS TO OPERATE - LOSS OF ABILITY TO CLOSE AFFECTED FUEL CELL H2 OR O2 SUPPLY VALVE, AND 4) FAILURE OF REACTANT CROSSOVER (REF. 04-0101-09) OR EXTERNAL LEAKAGE OF REACTANTS (REF. CIL 04-1A-0101-04) OCCURRING IN THE ASSOCIATED FUEL CELL.**

-DISPOSITION RATIONALE-

**(A) DESIGN:
REFER TO APPENDIX E, ITEM NO. 3 - RESISTOR, WIRE WOUND**

**(B) TEST:
GROUND TURNAROUND TEST
ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.**

**(C) INSPECTION:
REFER TO APPENDIX E, ITEM NO. 3 - RESISTOR, WIRE WOUND**

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: M5-GMB-2082-G- 02

(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 E IS NO LONGER BEING KEPT UP-TO-DATE.

(E) OPERATIONAL USE:

EGIL CONSOLE HANDBOOK SHUTTLE CONSOLE PROCEDURES (SCP) 2.22 'LF01 MULTIPLEXER/DEMUTIPLEXER WORKAROUND' REFERS TO THE INFLIGHT MAINTENANCE (IFM) CHECKLIST WHICH CONTAINS A PROCEDURE (PREFLIGHT TEST BUS SETUP) TO PERFORM CONTINGENCY POWERUP OF A FUEL CELL IN THE EVENT THAT POWER IS LOST TO A FUEL CELL ELECTRONIC CONTROL UNIT (ECU). THIS PROCEDURE USES THE LAUNCH MULTIPLEXER/DEMUTIPLEXER (MDM) LFO1 GROUND SWITCHING CAPABILITY AS A WORKAROUND BY ISSUING COMMANDS BY JUMPING PIN TO PIN. THIS SAME PROCEDURE CAN BE USED TO ISSUE THE FUEL CELL REACTANT VALVE CLOSE COMMANDS. NOTE - THIS PROCEDURE REQUIRES APPROXIMATELY ONE HOUR TO PERFORM.

- APPROVALS -

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