

## FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE

NUMBER: M5-6MB-2205-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	: MID PCA 1	V070-764400
LRU	: MID PCA 2	V070-764430
SRU	: CONTROLLER, HYBRID DRIVER	MC477-0263-0002

## EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

CONTROLLER, HYBRID DRIVER (HDC), TYPE III - O2 MANIFOLD 1 AND 2 ISOLATION VALVES - CLOSE POSITION

REFERENCE DESIGNATORS: 40V76A25AR17  
40V76A25AR18  
40V76A26AR17  
40V76A26AR18

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

## FUNCTION:

CONTROLS POWER TO CLOSE O2 MANIFOLD 1 AND 2 ISOLATION VALVES. CONTROL CIRCUITRY IS INDEPENDENT FOR EACH MANIFOLD.

## FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: M5-6MB-2206-G-02

REVISION#: 9 04/16/96

SUBSYSTEM NAME: ELECTRICAL POWER GENERATION - CRYO, GENERIC

LRU: MID PCA 1

CRITICALITY OF THIS

ITEM NAME: CONTROLLER, HYBRID DRIVER

FAILURE MODE: 1R3

## FAILURE MODE:

INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF"

MISSION PHASE:       LO   LIFT-OFF  
                           DO   DE-ORBIT

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

## CAUSE:

PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK,  
 PROCESSING ANOMALY, THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN       A) PASS  
                               B) FAIL  
                               C) PASS

## PASS/FAIL RATIONALE:

A)

B)

SCREEN "B" FAILS BECAUSE THE SERIES DRIVER CONFIGURATION MASKS THE FAILED  
 "ON" FAILURE MODE OF THE AFFECTED HDC.

C)

## - FAILURE EFFECTS -

## (A) SUBSYSTEM:

LOSS OF ABILITY TO MANUALLY OPEN THE AFFECTED O2 MANIFOLD VALVE WITH THE  
 PANEL SWITCH.

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**(B) INTERFACING SUBSYSTEM(S):**  
SAME AS (A)

**(C) MISSION:**  
NO EFFECT - FIRST FAILURE. POSSIBLE MISSION TERMINATION AFTER THE SECOND FAILURE OF THE ASSOCIATED HDC DUE TO THE O2 MANIFOLD VALVE FAILING CLOSED RESULTING IN ONE TANK BEING ISOLATED TO A SINGLE FUEL CELL AND THE OXYGEN IN THAT TANK CONSUMED.

**(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) FIRST SERIES HDC FAILS "ON", 2) SECOND SERIES HDC FAILS "ON" - AFFECTED O2 MANIFOLD VALVE FAILS CLOSED, AND 3) ASSOCIATED TANK CHECK VALVE FAILS CLOSED RESULTING IN INSUFFICIENT OXYGEN FLOW FOR THE ASTRONAUT'S LAUNCH/ENTRY SUITS (LES). LOSS OF THIS EMERGENCY SYSTEM (LES) MAY OCCUR IN A CABIN/CREW ATMOSPHERE WHERE HARMFUL CONTAMINANTS OR DEPRESSURIZATION MAY EXIST.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**  
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER

**(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 DURING FLIGHT. PERFORM GROUND TURNAROUND TEST IF VALID VERIFICATION IS UNOBTAINABLE IN FLIGHT OR AFTER LRU REPLACEMENT.

**(C) INSPECTION:**  
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER

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

(E) OPERATIONAL USE:

NO CREW ACTION AFTER FIRST FAILURE.

- 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>JSC</i></u>
TECHNICAL APPROVAL	: VIA APPROVAL FORM :	<u><i>96-CIL-012_M5-6MB</i></u>