FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE
NUMBER: M5-6MB-2202-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
LRU	: MID PCA 3	V070-764450
SRU	: CONTROLLER, HYBRID DRIVER	MC477-0263-0002

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
CONTROLLER, HYBRID DRIVER (HDC), TYPE III - FUEL CELLS 1, 2, AND 3 REACTANT SUPPLY VALVE "CLOSE" CONTROL

REFERENCE DESIGNATORS:
40V76A25AR27
40V76A25AR28
40V76A25AR29
40V76A25AR30
40V76A26AR27
40V76A26AR28
40V76A26AR29
40V76A26AR30
40V76A27AR19
40V76A27AR20
40V76A27AR21
40V76A27AR22

QUANTITY OF LIKE ITEMS: 12
TWELVE

FUNCTION:
PROVIDES POWER TO CLOSE H2 AND O2 REACTANT SUPPLY VALVES FOR FUEL CELLS 1, 2, AND 3.

FAILURE MODES EFFECTS ANALYSIS FMEA – CIL FAILURE MODE
NUMBER: M5-6MB-2202-G- 02

REVISION#: 9 4/16/96
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
OO ON-ORBIT
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)
REDUNDANCY 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 REDUNDANCY - ONE OF TWO SERIES HDC'S IS ENABLED.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: M5-6MB-2202-G- 02

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT - FIRST FAILURE. FAILURE OF SECOND SERIES HDC WOULD RESULT IN CLOSING THE ASSOCIATED REACTANT SUPPLY VALVE (NORMALLY OPEN IN FLIGHT). SHUTDOWN OF REACTANT SUPPLIES TO THE ASSOCIATED FCP (LOSS OF SUBSYSTEM REDUNDANCY).

(C) MISSION:
NO EFFECT AFTER LOSS OF ONE FUEL CELL. MINIMUM DURATION FLIGHT.

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF TWO FCP'S DURING ASCENT DUE TO THE FOLLOWING SCENARIO: 1) FIRST HDC FAILS "ON" - NO EFFECT, 2) SECOND HDC FAILS "ON" - FC REACTANT VALVE FAILS CLOSED, LOSE FIRST FCP, AND 3) LOSS OF SECOND FCP. LOSS OF 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 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.

GROUND TURNAROUND TEST
CIRCUIT IS FUNCTIONALLY VERIFIED DURING DRIVER SERIES REDUNDANCY TEST (FUEL CELL REACTANT VALVE TEST) DURING EVERY TURNAROUND.

(C) INSPECTION:

PRINT DATE: 04/17/96

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE
NUMBER: M5-6MB-2202-G-02

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER

(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	: PStengerNguyen
PRODUCT ASSURANCE ENGR	: J. NGUYEN	: J. Nguyen
DESIGN ENGINEERING	: T. D. NGUYEN	:
EDITORIALLY APPROVED	: JSC	:
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 96-CIL-012_M5-6MB