

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE

NUMBER: 05-6MA-2201 -X

SUBSYSTEM NAME: EPD&C - ELEC PWR GENERATION:FUEL CELL (04-1A)

REVISION: 0 04/16/96

PART DATA

PART NAME	PART NUMBER
VENDOR NAME	VENDOR NUMBER
LRU : MID PCA 1	V070-784400
LRU : MID PCA 2	V070-784430
LRU : MID PCA 3	V070-784450
SRU : CONTROLLER, HYBRID DRIVER	MC477-0263-0002

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

HYBRID DRIVER CONTROLLER, TYPE III - AR1, AR2, AR3, AR4

REFERENCE DESIGNATORS:

- 40V76A25AR1
- 40V76A25AR2
- 40V76A25AR3
- 40V76A25AR4
- 40V76A26AR1
- 40V76A26AR2
- 40V76A26AR3
- 40V76A26AR4
- 40V76A27AR1
- 40V76A27AR2
- 40V76A27AR3
- 40V76A27AR4

QUANTITY OF LIKE ITEMS: 12
FOUR PER FCP

FUNCTION:

PROVIDES FOR REMOTE CONTROL OF POWER APPLICATION TO THE O2 AND H2 PURGE VALVES OF ASSOCIATED FUEL CELL POWER PLANT (FCP) WHEN PURGE VALVE SWITCH IS IN THE "GPC" OR "OPEN" POSITION.

- APPROVALS -

PRODUCT ASSURANCE ENGR - J. NGUYEN

J. Nguyen 2/2/97

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - ELECT. PWR GENER FMEA NO 05-6MA-2201 -2 REV: 01/03/91

ASSEMBLY : MID PCA NO. 1,2,3		CRIT. FUNC: 2R
P/N RI : MC477-0263-0002		CRIT. HDW: 3
P/N VENDOR:	VEHICLE 102	103 104
QUANTITY : 6	EFFECTIVITY: X	X X
: TWO PER FCP	PHASE(S): PL LO	OO X DO LS

PREPARED BY:	REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS	APPROVED BY:	APPROVED BY (NASA):
DES A BAIZ	DES T <i>[Signature]</i>	SSM <i>[Signature]</i>	
REL T KIMURA	REL <i>[Signature]</i> 1-4-90	REL <i>[Signature]</i>	
QE J COURSEN	QE <i>[Signature]</i>	QE <i>[Signature]</i>	

EPDC SSM *[Signature]*
 EPDC REL *[Signature]*

ITEM:
 HYBRID DRIVER CONTROLLER, TYPE III - AR1, AR2

FUNCTION:
 PROVIDES FOR REMOTE CONTROL OF POWER APPLICATION TO THE O2 AND H2 PURG VALVES OF ASSOCIATED FUEL CELL POWER PLANT (FCP) WHEN PURGE VALVE SWITC IS IN THE "GPC" POSITION.
 40V76A25AR1; AR2;
 40V76A26AR1, AR2;
 40V76A27AR1, AR2

FAILURE MODE:
 INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF"

CAUSE(S):
 PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK PROCESSING ANOMALY

EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY EFFECT:

- (A) LOSS OF REDUNDANCY - ONE OF THE TWO HDC'S IN SERIES BECOME CONDUCTING.
- (B) NO EFFECT - SERIES REDUNDANCY PREVENTS INADVERTENT PURGE VALVE OPENING. SECOND RELATED FAILURE RESULTS IN EXTRA EXPENDITURE OF REACTANTS AND POSSIBLE FUEL CELL POWER PLANT (FCP) SHUTDOWN.
- (C) NO EFFECT FIRST FAILURE. POSSIBLE MISSION DEGRADATION SECOND FAILURE.
- (D) NO EFFECT

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - ELECT. PWR GENERFMEA NO 05-6MA-2201 -2 REV:01/03/90

(E) POSSIBLE MISSION EFFECT IF CRYO QUANTITY REACHES CONTINGENCY LEVELS DUE TO AN UNCONTROLLED PURGE VALVE OPERATION OR IF AFFECTED FCP MUST BE SHUTDOWN BECAUSE OF UNCONTROLLED PURGE.

"B" SCREEN - FIRST FAILURE NOT DETECTABLE IN FLIGHT BECAUSE THE OUTPUT OF EACH OF THE SERIES DRIVERS IS NOT MONITORED.

DISPOSITION & RATIONALE:

(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE

(A-D) DISPOSITION AND RATIONALE

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

(B) TEST

GROUND TURNAROUND TEST - FCP PURGE VALVE DRIVER OPERATION VERIFIED DURING EVERY FIFTH TURNAROUND.

(E) OPERATIONAL USE

NO CREW ACTION AFTER FAILURE.