FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE
NUMBER: 05-6MA-2039 -X

SUBSYSTEM NAME: EPD&C - ELEC PWR GENERATION:FUEL CELL (04-1A)
REVISION: 0 03/30/89

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: PANEL R1A2	V070-730276
SRU	: SWITCH, TOGGLE	ME452-0102-7355

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE, 3 POLE, 3 POSITION - START/STOP CONTROL, FCP'S NO. 1, 2 AND 3.

REFERENCE DESIGNATORS: 32V73A1A2S16
32V73A1A2S17
32V73A1A2S18

QUANTITY OF LIKE ITEMS: 3
THREE

FUNCTION:
STARTS FUEL CELL POWER PLANT (FCP) OPERATION WHEN HELD IN START POSITION. STOPS FCP OPERATION WHEN SWITCHED TO STOP POSITION. SNAPS BACK TO NEUTRAL POSITION WHEN NOT HELD IN ANY OTHER POSITION.

FAILURE MODES EFFECTS ANALYSIS FMEA – CIL FAILURE MODE
NUMBER: 05-6MA-2039- 04

REVISION#: 0 04/15/96
SUBSYSTEM NAME: EPD&C - ELEC PWR GENERATION:FUEL CELL (04-1A)
LRU: PANEL R1A2 CRITICALITY OF THIS
ITEM NAME: SWITCH, TOGGLE FAILURE MODE: 1R2

FAILURE MODE:
FAILS CLOSED (TWO CONTACT SETS CLOSED), INADVERTENTLY CLOSES STOP CIRCUIT

MISSION PHASE: LO LIFT-OFF

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

CAUSE:
PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN
A) PASS
B) PASS
C) PASS

PASS/FAIL RATIONALE:
A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF CONTROL POWER TO COOLANT PUMP AND H2 PUMP LEADING TO FCP OVER-HEATING/FLOODING AND OUTPUT VOLTAGE DEGRADATION. TIME CRITICAL

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

(C) MISSION:
NO EFFECT. MINIMUM DURATION FLIGHT. LOSS OF FUEL CELL REDUNDANCY. (CAPABILITY EXISTS FOR SAFE RETURN ON ONE OF THREE FCP.)

(D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FCP LOSS NO EFFECT - SECOND FCP SHUTDOWN DURING ASCENT LOSES CRITICAL FUNCTIONS AND MAY RESULT IN CREW/VEHICLE LOSS. FAILURE TO REMOVE LOAD FROM AFFECTED FCP WITHIN 9 MINUTES MAY RESULT IN OVERTEMP AND SUBSEQUENT EXTERNAL REACTANT LEAKAGE, CAUSING POSSIBLE LOSS OF VEHICLE/CREW.

(E) FUNCTIONAL CRITICALITY EFFECTS:
FIRST FCP LOSS NO EFFECT - SECOND FCP SHUTDOWN DURING ASCENT LOSES CRITICAL FUNCTIONS AND MAY RESULT IN CREW/VEHICLE LOSS. FAILURE TO REMOVE LOAD FROM AFFECTED FCP WITHIN 9 MINUTES MAY RESULT IN OVERTEMP AND SUBSEQUENT EXTERNAL REACTANT LEAKAGE, CAUSING POSSIBLE LOSS OF VEHICLE/CREW.

-DISPOSITION RATIONALE-

(A) DESIGN:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

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

(C) INSPECTION:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

(D) FAILURE HISTORY:
CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE

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FOUND IN THE PRACA DATA BASE. THE FAILURE HISTORY DATA PROVIDED IN APPENDIX A IS NO LONGER BEING KEPT UP-TO-DATE.

(E) OPERATIONAL USE:
CREW ACTION REQUIRED TO SHUTDOWN AFFECTED FCP DURING FLIGHT. ONBOARD PROCEDURES MANAGE POWER FOR LOSS OF ONE FCP.

- APPROVALS -

PAE MANAGER	: P. STENGER-NGUYEN	:
PRODUCT ASSURANCE ENGR	: J. NGUYEN	:
DESIGN ENGINEERING	: T. D. NGUYEN	:
EDITORIALLY APPROVED	: JSC	:
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 96-CIL-012_ 05-M6A