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PRINT DATE: 10/07/91

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE

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SUBSYSTEM NAME: EPD&C - HYDRAULICS (02-6)

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	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
■ LRU :	PANEL R4	V070-730278
■ SRU :	SWITCH, TOGGLE	ME452-0102-7105

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PART DATA

- EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:  
SWITCH, TOGGLE, 1 POLE 3 POSITION, MOMENTARY - "HYD SYS BRAKE ISOL VLV", "OPEN/GPC/CLOSE" CONTROL
- REFERENCE DESIGNATORS: 32V73A4S22  
                              : 32V73A4S23  
                              : 32V73A4S24
- QUANTITY OF LIKE ITEMS: 3  
THREE
- FUNCTION:  
PROVIDES FOR MANUAL SELECTION OF "OPEN/CLOSE" POSITION FOR THE HYDRAULIC SYSTEM 1, 2, OR 3 BRAKE ISOLATION VALVE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE

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SUBSYSTEM: EPD&C - HYDRAULICS (G2-6)  
LRU : PANEL R4  
ITEM NAME: SWITCH, TOGGLE

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CRITICALITY OF THIS  
FAILURE MODE: 1R2

FAILURE MODE:  
SWITCH FAILS ~~CLOSED~~ IN VALVE "OPEN" POSITION

MISSION PHASE:  
00 0E-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 105 ENDEAVOUR 102 COLUMBIA

CAUSE: *103 Discovery*  
*104 Atlantis*  
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) VALVE HAS POSITION INDICATION.
- C)

- FAILURE EFFECTS -

- (A) SUBSYSTEM:  
PREMATURE POWER TO "OPENING" SOLENOID OF HYDRAULIC SYSTEM BRAKE ISOLATION VALVE
- (B) INTERFACING SUBSYSTEM(S):  
PREMATURE OPENING OF HYDRAULIC BRAKE ISOLATION VALVE PROVIDING HYDRAULIC SUPPLY TO BRAKES.
- (C) MISSION:  
FIRST FAILURE - NO EFFECT WITHOUT SUBSEQUENT FAILURES.

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- (D) CREW, VEHICLE, AND ELEMENT(S):  
 FIRST FAILURE - NO EFFECT WITHOUT SUBSEQUENT FAILURES.
- (E) FUNCTIONAL CRITICALITY EFFECTS:  
 POSSIBLE LOSS OF CREW/VEHICLE WITH TWO FAILURES (THIS FAILURE PLUS, FOR EXAMPLE, CHECK VALVE FAILS CLOSED) RESULTING IN UNCOMMANDED BRAKE PRESSURE (SYSTEMS 1 AND 2 ONLY). THIS RESULTS IN BLOWN TIRE IF IT IS PRESENT AT WHEEL SPIN-UP. ALSO, POSSIBLE LOSS OF CREW/VEHICLE WITH THREE FAILURES (THIS FAILURE, PLUS LEAK DOWNSTREAM OF VALVE, PLUS LOSS OF SECOND HYDRAULIC SYSTEM ((SYSTEMS 1, 2, OR 3)).

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 - DISPOSITION RATIONALE -  
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- (A) DESIGN:  
 REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH
- (B) TEST:  
 REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH  
  
 GROUND TURNAROUND TEST  
 V58APO.015, "BRAKE & EXTND HYD ISO VLV SWITCH VERIF" (PERFORMED PRIOR TO EACH FLIGHT OR FOR LRU REPLACEMENT). VERIFY VALVE RESPONDS TO SWITCH COMMANDS.
- (C) INSPECTION:  
 REFER TO APPENDIX A, ITEM NO. 2 - TOGGLE SWITCH
- (D) FAILURE HISTORY:  
 REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH
- (E) OPERATIONAL USE:  
 FIRST FAILURE - NONE  
  
 SECOND FAILURE RESULTING IN UNCOMMANDED BRAKE PRESSURE - IF PRIOR TO TOUCHDOWN DURING ENTRY, SHUTDOWN APU

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- APPROVALS -

RELIABILITY MANAGER	:	M. C. HOVE	:	<u>Moham Ch Hove</u> 6-21-91
RELIABILITY ENGINEERING	:	T. K. KIMURA	:	<u>T. Kimura</u> 10-8-91
DESIGN MANAGER	:	G. M. ANDERSON	:	<u>G.M. Anderson</u> 10/5/91
DESIGN ENGINEERING	:	G. A. FINNEMAN	:	<u>G.A. Finneman</u> 10/2/91
SUBSYSTEM MANAGER	:	B. J. VAN METER	:	<u>B.J. Van Meter</u> 10/24/91
QUALITY MANAGER	:	R. M. SPURLOCK	:	<u>R.M. Spurlock</u> 10/24/91
QUALITY ENGINEERING	:	W. R. HIGGINS	:	<u>W.R. Higgins</u> 10/24/91
NASA RELIABILITY	:		:	<u>W.R. Higgins</u> 2/3/92
NASA SUBSYSTEM MANAGER	:		:	<u>W.R. Higgins</u> 2/4/92
NASA EPD&C RELIABILITY	:		:	<u>M. Saleem Dwan</u> 12/3/91
NASA QUALITY ASSURANCE	:		:	<u>KO [Signature]</u> 11/13/91
NASA EPD&C SUBSYS MGR	:		:	<u>[Signature]</u> for F. Alvin 12-3-91