

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2171 -1 REV:06/14/88

ASSEMBLY : D & C PANEL C3A1 CRIT. FUNC: 1R  
 P/N RI : ME452-0060-XXXX CRIT. HDW: 2  
 LEFT -4186  
 CENTER -4184  
 RIGHT -4185

P/N VENDOR: VEHICLE 102 103 104  
 QUANTITY : 3 EFFECTIVITY: X X X  
 : THREE PHASE(S): PL LO X OO DO IS  
 :

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS  
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
 DES MB J BROWN DES A. B... EPDC SSM [Signature]  
 REL J. K... REL J. K... MPS SSM [Signature]  
 QE D. M... QE [Signature] EPDC REL [Signature]  
 MPS REL [Signature] QE [Signature]

ITEM:  
 PUSHBUTTON SWITCH, (TWO POLES), MAIN ENGINE SHUTDOWN CIRCUIT.

FUNCTION:  
 PROVIDES MANUAL MAIN ENGINE SHUTDOWN CAPABILITY.  
 35V73A0A1S12, 13, 14.

FAILURE MODE:  
 FAILS OPEN.

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

EFFECT(S) ON:  
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY  
 (A) LOSS OF COMMANDS TO SWITCH REDUNDANCY MANAGEMENT (RM).  
 (B) LOSS OF MANUAL SHUTDOWN AND SAFING COMMAND CAPABILITY.  
 (C,D) NO EFFECT - FIRST FAILURE.

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- (E) 1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE. TIME FRAME - ASCENT.  
1) SWITCH FAILS OPEN, RESULTING IN LOSS OF MANUAL SHUTDOWN AND SAFING COMMAND CAPABILITY.  
2) ASSOCIATED SSME EXPERIENCES UNCONTAINED SHUTDOWN, INCLUDING DAMAGE WHICH CAUSES LOSS OF DATA PATH.

FOR ENGINE-OUT FAILURE INCLUDING LOSS OF DATA PATH, CREW USES SHUTDOWN PUSHBUTTON SWITCH TO INITIATE PREVALVE CLOSURE SEQUENCE WHICH ISOLATES PROPELLANT SUPPLY. FIRST FAILURE RESULTS IN LOSS OF THIS CAPABILITY. SECOND FAILURE THEN RESULTS IN PROPELLANT LEAKAGE INTO THE AFT COMPARTMENT, OVERPRESSURIZATION, AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT FUNCTIONS DUE TO CRYOGENIC EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

FAILS B SCREEN BECAUSE NO INSTRUMENTATION IS AVAILABLE TO DETECT FAILURE.

DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE

REFER TO APPENDIX A, ITEM NO. 3 - SWITCH, PUSHBUTTON.

(B) GROUND TURNAROUND TEST

SSME SHUTDOWN SWITCH VERIFICATION V41AFO.270 EVERY FLIGHT.

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.

05-6J-280