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SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 05-6J-2060-X

SUBSYSTEM NAME: EPD&C - MAIN PROPULSION (03-1)

REVISION : 1 02/07/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
■ LRU :	PANEL R4	V070-730278
■ SRU :	SWITCH, TOGGLE	ME452-0102-7354

■ EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
TOGGLE SWITCH (THREE POLES, THREE POSITIONS, CENTER LEVER LOCKED), LH2 RELIEF SHUTOFF VALVE CLOSE SOLENOID (LV25).

■ REFERENCE DESIGNATORS: 32V73A4S18

■ QUANTITY OF LIKE ITEMS: 1
ONE

■ FUNCTION:
PROVIDES MANUAL CONTROL OF POWER TO CLOSE SOLENOID OF LH2 RELIEF SHUT-OFF VALVE.

SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 05-6J-2060-02

REVISION# 1 02/07/90

SUBSYSTEM: EPD&C - MAIN PROPULSION (03-1)
LRU :PANEL R4 CRITICALITY OF THIS FAILURE MODE:1R2
ITEM NAME: SWITCH, TOGGLE

■ FAILURE MODE:
FAILS CLOSED, CONTACT-TO-CONTACT SHORT, POLE-TO-POLE SHORT - "CLOSE" COMMAND CONTACTS

MISSION PHASE:
LO LIFT-OFF

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

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

■ CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO YES, RTLS, TAL

■ REDUNDANCY SCREEN A) PASS
■ B) PASS
■ C) PASS

PASS/FAIL RATIONALE:
■ A)

■ B) CLOSE POSITION SWITCH SEAL WILL INDICATE "ON" IF FAILURE OCCURS.

■ C)

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
INADVERTENT SWITCH CLOSE COMMAND TO LH2 RELIEF SHUTOFF VALVE CLOSE SOLENOID.

■ (B) INTERFACING SUBSYSTEM(S):
LOSS OF CAPABILITY TO OPEN LH2 RELIEF SHUTOFF VALVE (PV8). NO EFFECT FOR NOMINAL MISSION. LH2 MANIFOLD PRESSURE WILL NOT RISE TO RELIEF PRESSURE BEFORE DUMP START.

ENOUGH RESIDUALS REMAIN IN THE LH2 MANIFOLD DURING AN RTLS/TAL ABORT TO CAUSE THE LH2 MANIFOLD PRESSURE TO RISE TO RELIEF PRESSURE. FAILURE RESULTS IN LACK OF RELIEF CAPABILITY. POSSIBLE RUPTURE OF THE LH2 MANIFOLD CAUSING LH2 LEAKAGE INTO THE AFT COMPARTMENT, OVERPRESSURIZATION, AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF ADJACENT CRITICAL COMPONENTS DUE TO CRYOGENIC EXPOSURE.

■ **(C) MISSION:**
NO EFFECT FOR NOMINAL MISSION. POSSIBLE LOSS OF CREW/VEHICLE DURING RTLS/TAL ABORT.

■ **(D) CREW, VEHICLE, AND ELEMENT(S):**
NO EFFECT FOR NOMINAL MISSION. POSSIBLE LOSS OF CREW/VEHICLE DURING RTLS/TAL ABORT.

■ **(E) FUNCTIONAL CRITICALITY EFFECTS:**
1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE. TIME FRAME - ASCENT.
1) SWITCH FAILS RESULTING IN ISSUANCE OF SWITCH CLOSE COMMANDS TO LH2 RELIEF SHUTOFF VALVE.
2) ONE OF THE TWO RTLS DUMP VALVES (PV17,18) FAILS TO OPEN/REMAIN OPEN FROM MECO + 10 TO MECO + 90 SECONDS.

RESULTS IN LACK OF RELIEF CAPABILITY PRIOR TO DUMP, POSSIBLE RUPTURE OF THE LH2 MANIFOLD CAUSING LEAKAGE INTO AFT COMPARTMENT, OVERPRESSURIZATION, AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF ADJACENT CRITICAL COMPONENTS DUE TO CRYOGENIC EXPOSURE.

POSSIBLE LOSS OF CREW/VEHICLE.

- DISPOSITION RATIONALE -

■ **(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
COMPLETE ELECTRICAL VERIFICATION V41AB0.080 "0", EVERY FLIGHT.

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

■ **(D) FAILURE HISTORY:**
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

■ (E) OPERATIONAL USE:
LH2 MANIFOLD PRESSURE IS ON CAUTION AND WARNING.
POST MECO/PRE DUMP: START MPS PROPELLANT DUMP AS SOON AS POSSIBLE.
POST DUMP: OPEN THE LH2 FILL/DRAIN VALVES.

- APPROVALS -

RELIABILITY ENGINEER	:S. TRUJILLO	: 2-8-90
RELIABILITY SUPERVISOR	:M.L. HOVE	:
DESIGN ENGINEER	:J.L. PECK	:
DESIGN SUPERVISOR	:T.J. TAUFER	: 2-9-90
QUALITY ENGINEER	:D. MASAI	:
QUALITY SUPERVISOR	:J.T. COURSEN	:
NASA RELIABILITY	:	: 3/2/90
NASA SUBSYSTEM MANAGER	:	: 3/2/90
NASA EPD&C RELIABILITY	:	: 3/2/90
NASA QUALITY ASSURANCE	:	:
NASA EPD&C SUBSYS MGR	:	: F. Slevin 5/5/90