SHUTTLE CRITICAL ITEMS LIST - ORBITER

SYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2162 -3 REV:06/14/88
ABORT: RTLS.

ASSEMBLY :D & C PANEL R2
P/N RI :ME452-0102-7201
P/N VENDOR:
QUANTITY :1
:ONE
:

CRIT. FUNC: 1R
CRIT. HDW: 2

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

PHASE(S): PL LO X OO DO LS

REDUNDANCY SCREEN: A-PASS B-PASS C-PASS

PREPARED BY:
DES J BROWN
REL F DEFENSOR
QE D MASAI

APPROVED BY:
DES
REL 6/27/88
QE 6/27/88

APPROVED BY (NASA):
EPDC SSM
MPS SSM
EPDC REL
MPS REL
QE 6/30/88

ITEM:
SWITCH, TOGGLE (TWO POLES, THREE POSITIONS, LEVER LOCKED), MPS PROPELLANT DUMP SEQUENCE CONTROL CIRCUIT.

FUNCTION:
PROVIDES MANUAL "START" AND "STOP" CONTROL OF MPS PROPELLANT DUMP SEQUENCE CONTROL CIRCUIT. 32V73A2S1.

FAILURE MODE:
CONTACT-TO-CONTACT SHORT (BOTH "STOP" POLES).

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) INADVERTENT MPS PROPELLANT DUMP SEQUENCE STOP COMMAND.

(B) INADVERTENTLY TERMINATES MPS PROPELLANT DUMP SEQUENCE IF DUMP IS IN PROGRESS. IF DUMP HAS NOT YET OCCURRED, WILL INHIBIT GPC FROM INITIATING DUMP SEQUENCE AUTOMATICALLY.

(C,D) NO EFFECT - FIRST FAILURE.

(E) CASE I: LH2
1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE.
TIME FRAME - POST MECO, PRIOR TO DUMP.
1) CONTACT-TO-CONTACT SHORT (BOTH "STOP" POLES), RESULTING IN INADVERTENT TERMINATION OF MPS PROPELLANT DUMP SEQUENCE IF DUMP IS IN PROGRESS. IF DUMP HAS NOT YET OCCURRED, WILL INHIBIT GPC FROM INITIATING DUMP SEQUENCE AUTOMATICALLY.
2) LH2 MANIFOLD RELIEF SYSTEM FAILS TO RELIEVE.

LH2 REMAINING IN MANIFOLD CANNOT BE RELIEVED. RESULTS IN OVERPRESSURIZATION AND RUPTURE OF THE FEEDLINE MANIFOLD. RTLS DUMP VALVES ARE OPENED FOLLOWING MECO, BUT NOT LONG ENOUGH TO DUMP THE MAJORITY OF REMAINING LH2. AFT COMPARTMENT OVERPRESSURIZATION AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT FUNCTIONS DUE TO CRYOGENIC EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

CASE II: LO2
1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE.
TIME FRAME - POST MECO, PRIOR TO DUMP.
1) CONTACT-TO-CONTACT SHORT (BOTH "STOP" POLES), RESULTING IN INADVERTENT TERMINATION OF MPS PROPELLANT DUMP SEQUENCE IF DUMP IS IN PROGRESS. IF DUMP HAS NOT YET OCCURRED, WILL INHIBIT GPC FROM INITIATING DUMP SEQUENCE AUTOMATICALLY.
2) LO2 MANIFOLD RELIEF SYSTEM FAILS TO RELIEVE.

LO2 REMAINING IN MANIFOLD CANNOT BE RELIEVED. RESULTS IN OVERPRESSURIZATION AND RUPTURE OF THE FEEDLINE MANIFOLD. AFT COMPARTMENT OVERPRESSURIZATION AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT FUNCTIONS DUE TO CRYOGENIC EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

A VENT PATH EXISTS (APPROXIMATELY 4 SCFM PER BLEED CHECK VALVE) THROUGH THE POGO SYSTEM TO THE SSME HPOT SEAL AND RELEASED OVERBOARD. THIS VENT PATH IS NOT CONSIDERED SUFFICIENT TO RELIEVE THE LO2 MANIFOLD IF THE MANIFOLD RELIEF SYSTEM FAILS.

ABORT 1/1 FOR OI-8C CONTINGENCY RTLS MISSION. CREW USES SWITCH TO MANUALLY INITIATE CONTINGENCY RTLS DUMP. FAILURE TO DUMP CAUSES GH2 VENTING THROUGH FLAME ARRESTOR (FL1). INGESTION OF VENTED GH2 RESULTS IN HAZARDOUS CONCENTRATION IN AFT COMPARTMENT PRIOR TO BAILOUT OPPORTUNITY. POSSIBLE AFT COMPARTMENT FIRE/EXPLOSION. POSSIBLE LOSS OF CREW.

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. 1 - TOGGLE SWITCH.

(B) GROUND TURNAROUND TEST
PROPELLANT DUMP SEQUENCE SW VERIF V41AFO.260A EVERY FLIGHT.

(E) OPERATIONAL USE

LH2/LO2 MANIFOLD PRESSURE IS ON CAUTION AND WARNING. CREW WILL OPEN THE APPROPRIATE LH2/LO2 FILL AND DRAIN VALVES TO INERT THE SYSTEM.