

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - AFT-RCS

FMEA NO 05-6KA-2126 -1

REV: 11/03/87

ASSEMBLY : AFT MCA 3
 P/N RI : MC455-0135-0001
 P/N VENDOR:
 QUANTITY : 8
 : EIGHT
 :

ABORT,	CRIT. FUNC:	1R
RTLS, TAL	CRIT. HDW:	3
VEHICLE	102	103 104
EFFECTIVITY:	X	X X
PHASE(S) :	PL	LO X OO X DO X LS

PREPARED BY:
 DES D SOVEREIGN
 REL J BEEKMAN
 QE

REDUNDANCY SCREEN: A-PASS B-PASS C-PASS
 APPROVED BY: APPROVED BY (NASA):
 DES *P. J. ...* SSM
 REL *M. ... 11-14-87* REL *...*
 QE *...* QE *...*

ITEM:

HYBRID RELAY - LEFT AND RIGHT AFT RCS FUEL AND OXIDIZER TANK ISOLATION VALVES 1/2 DRIVER POWER "CLOSE" RELAY.

FUNCTION:

UPON RECEIVING THE PROPER STIMULI (FROM THE GPC (GENERAL PURPOSE COMPUTER) OR MANUAL SWITCHES), THE HYBRID RELAYS OPERATE TO ENERGIZE THREE PHASE AC DRIVE MOTORS TO CLOSE THE AFT RCS FUEL AND OXIDIZER TANK ISOLATION VALVES 1/2. "CLOSE" RELAYS ARE ENERGIZED DURING THE MISSION FOR CROSSFEED OPERATIONS BETWEEN OMS AND RCS OR RCS TO RCS AND DURING RTLS, OMS DEPLETION BURN, TO RESERVE RCS PROPELLANTS FOR CONTROL DURING ENTRY. UNIQUE TO INTACT ABORT. 56V76A116K26, K33, K28, K32, K34, K40, K41, K36.

FAILURE MODE:

FAILS TO TRANSFER, FAILS TO CONDUCT, FAILS TO CLOSE.

CAUSE(S):

PIECE PART FAILURE, VIBRATION, THERMAL STRESS, MECHANICAL SHOCK

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

(A) LOSS OR DEGRADATION OF ABILITY TO ENERGIZE THE AFFECTED VALVE DRIVE CIRCUIT.

(B) LOSS OF ABILITY TO CLOSE ONE PROPELLANT TANK ISOLATION VALVE 1/2. LOSS OF TANK ISOLATION CAPABILITY. LOSS OF 1 AND 2 MANIFOLDS DURING OMS INTERCONNECT OPERATIONS.

(C) POSSIBLE MISSION MODIFICATION OR EARLY MISSION TERMINATION

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(D) NO EFFECT FOR NOMINAL MISSION - CRITICALITY INCREASED TO 1/1 DURING RTLS AND TAL ABORT. VALVE UTILIZED BY MCA OPTIMIZATION SOFTWARE IN "LANDING HEAVY" CONDITION. WILL ALSO RESULT IN CONTROL PROBLEMS DURING ENTRY. RESULTS IN LOSS OF 12 AFT RCS THRUSTERS BEING USED DURING THE OMS DUMP.

(E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO INABILITY TO PERFORM EXTERNAL TANK SEPARATION OR ENTRY CONTROL RESULTING FROM LOSS OF PROPELLANT THROUGH A LEAKY THRUSTER. THE EFFECT IS MANIFESTED AFTER 2 OTHER FAILURES (MANIFOLD VALVE OPEN, THRUSTER LEAK).

DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY.

(B) GROUND TURNAROUND TEST

COMPONENT CHECKED OUT EVERY FLIGHT DURING GROUND TURNAROUND. THE TESTING CONSISTS OF CYCLING VALVE MANUAL SWITCHES AND/OR SENDING GENERAL PURPOSE COMPUTER (GPC) COMMANDS TO CYCLE VALVES OR HEATERS WHILE MONITORING VEHICLE INSTRUMENTATION TO DETERMINE IF COMPONENTS HAVE FAILED.

(E) OPERATIONAL USE

AVOID CROSSFEED/INTERCONNECT TO AFFECTED LEG. LOSS OF INTERCONNECT CAPABILITY MAY RESULT IN MISSION MODIFICATION.