SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - AFT-RCS FMEA NO 05-6KA-2128 -2 REV:11/03/87

ASSEMBLY :AFT MCA 1,2,3
P/N RI :MC455-0135-0001
P/N VENDOR:
QUANTITY :8
:EIGHT
:

CRIT. FUNC: 1R
CRIT. HDW: 2

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

PHASE(S): PL X LO X CO X DO X LS X

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

PREPARED BY:
DES D SOVEREIGN
REL J BEEKMAN
QE

APPROVED BY:
DES D.F. Q Burn
REL 11-14-87
QE

APPROVED BY (NASA):
SSM
REL
QE

ITEM:
HYBRID RELAY - LEFT AND RIGHT AFT RCS FUEL AND OXIDIZER MANIFOLD 1,2,3 AND 4 ISOLATION VALVES DRIVER POWER "CLOSE" RELAY.

FUNCTION:
UPON RECEIVING THE PROPER STIMULI (FROM THE GENERAL PURPOSE COMPUTER (GPC) OR MANUAL SWITCHES), THE HYBRID RELAYS OPERATE TO ENERGIZE THREE PHASE AC DRIVE MOTORS TO CLOSE THE FUEL AND OXIDIZER MANIFOLDS 1,2,3 AND 4 ISOLATION VALVES. 54V76A114K21,23. 55V76A115K20,21. 56V76A116K19,21,23,25.

FAILURE MODE:
INADVERTENT OPERATION, INADVERTENTLY TRANSFERS.

CAUSE(S):
PIECE PART FAILURE, VIBRATION, MECHANICAL SHOCK.

EFFECT(S) ON:
(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE

(A) THE ASSOCIATED VALVE DRIVE CIRCUIT IS ENERGIZED CONTINUOUSLY.

(B) CONTINUOUS "CLOSE" POWER WILL BE APPLIED TO THE VALVE DRIVE MOTOR. VALVE WILL BE MAINTAINED IN THE "CLOSE" POSITION.

(C,D) NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO CONTINUOUS MOTOR OPERATION IN CONJUNCTION WITH A BELLOWS LEAK LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES ONE OTHER FAILURE (BELLOWS LEAK) BEFORE EFFECT IS MANIFESTED. A BELLOWS LEAK IS UNDETECTABLE EXCEPT BY PERFORMING A SNIFF CHECK OF THE VALVE'S ACTUATOR ON THE GROUND. ALSO, POSSIBLE LOSS OF CREW/VEHICLE DUE TO INABILITY TO PERFORM EXTERNAL TANK SEPARATION OR ENTRY CONTROL DUE TO LOSS OF ONE MANIFOLD IN CONJUNCTION WITH THE LOSS OF TWO THRUSTERS IN A CRITICAL AXIS.

SUBSYSTEM :EPD&C - AFT-RCS FMEA NO 05-6KA-2128 -2 REV:11/03/87

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
REMOVE POWER TO RELAY BY PULLING APPROPRIATE CIRCUIT BREAKERS. CIRCUIT BREAKERS WILL BE RESET WHEN VALVES ARE TO BE MOVED AND DURING TIME CRITICAL RECONFIGURATION RESPONSE PERIODS (E.G., ENTRY).