SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - AFT-RCS FMEA NO 05-6KA-2133 -2 REV:11/03/87

ASSEMBLY :AFT MCA 1,3
P/N RI :MC455-0135-0001
P/N VENDOR:
QUANTITY :16
:SIXTEEN
:

CRIT. FUNC: 1R
CRIT. HDW: 2

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

PHASE(S): PL X LO X OO 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
REL
QE

APPROVED BY (NASA):
SSM
REL
QE

ITEM:
HYBRID RELAY (4 POLE) NON-LATCHING - LEFT AND RIGHT AFT RCS FUEL AND OXIDIZER CROSSFEED ISOLATION VALVE 1/2 AND 3/4/5 CIRCUITS (OPEN RELAYS).

FUNCTION:
UPON COMMAND FROM THE GENERAL PURPOSE COMPUTER (GPC) (THROUGH FLIGHT MULTIPLEXER-DEMULTIPLEXER (MDM)S) OR THE CREW (THROUGH PANEL SWITCHES), THE "OPEN" HYBRID RELAY CONTACTS CONNECT THE PROPER AC PHASE VOLTAGE TO THE ASSOCIATED FUEL AND OXIDIZER CROSSFEED ISOLATION VALVE 1/2 AND 3/4/5 MOTOR OPEN CIRCUITS OF THE LEFT OR RIGHT AFT RCS.
54V76A114K35,36,39,40,65,66,67,68. 56V76A116K43,45,46,47,51,53,54,55

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) AC CONTACTS OF ONE HYBRID RELAY CLOSE. THE ASSOCIATED VALVE DRIVE CIRCUIT IS ENERGIZED CONTINUOUSLY PRECLUDING VALVE CLOSURE.

(B) CONTINUOUS POWER WILL BE APPLIED TO THE AFFECTED VALVE DRIVE MOTOR AND CROSSFEED ISOLATION IS PRECLUDED.

(C) POSSIBLE EFFECT ON CROSSFEED OPERATIONS.

(D) NO EFFECT FIRST FAILURE.

(E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO CONTINUOUS MOTOR OPERATION IN CONJUNCTION WITH A POSSIBLE BELLOWS LEAK LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES 1 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.

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
NO ACTION FOR FIRST FAILURE. IF CONTINUOUS POWER SITUATION EXISTS, 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).