SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - OMS
ASSEMBLY :AFT MCA 1,2,3
P/N RI :MC455-0135-0001
P/N VENDOR:
QUANTITY :16
:SIXTEEN
:(TWO PER VALVE)

FMEA NO 05-6L -2131 -2 REV:10/30/8
CRIT. FUNC: 1R
CRIT. HDW: 3

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-PAS

PREPARED BY:		APPROVED BY:		APPROVED BY (NASA):	
DES	D SOVEREIGN	DES	[signature]	SSM	[signature]
REL	F DEFENSOR	REL	[signature] 11-12-87	REL	[signature]
QE	J COURSEN	QE	[signature]	QE	[signature]

EPDC ssm [signature] for WES

ITEM:
RELAY, HYBRID, 4 POLES, NONLATCHING, LEFT AND RIGHT OMS - OXIDIZER A
FUEL CROSSFEED ISOLATION VALVE A AND B "CLOSE" CIRCUIT.

FUNCTION:
UPON RECEIVING THE PROPER STIMULI FROM THE GENERAL PURPOSE COMPUT
(GPC) THROUGH FLIGHT MDMS OR CREW PANEL SWITCHES, THE HYBRID REI
CONTACTS CONNECT THE PROPER AC PHASE VOLTAGE TO ENERGIZE ASSOCIAT
DRIVE CIRCUIT TO CLOSE THE OXIDIZER AND FUEL CROSSFEED ISOLATION VALVE
AND B OF THE LEFT OR RIGHT OMS. 54V76A114K49, 50, 53, 5
55V76A115K41, 42, 46, 47, 49, 50, 54, 55. 56V76A116K74, 76, 80, 81.

FAILURE MODE:
INADVERTENT OPERATION, INADVERTENTLY TRANSFERS, FAILS CLOSED.

CAUSE(S):
CONTAMINATION, PIECE PART STRUCTURAL FAILURE, VIBRATION, THERMAL STRES
MECHANICAL SHOCK.

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

(A) LOSS OF REDUNDANCY - ONE SET OF CONTACTS OF ONE "CLOSED" HYBR
RELAY CLOSE.

(B) FIRST FAILURE HAS NO EFFECT. AC MOTOR VALVE DRIVE "CLOSE" CIRCU
REQUIRES CLOSURE OF TWO SETS OF RELAY CONTACTS IN SERIES BEFORE T
DRIVE IS ENERGIZED. A SECOND SIMILAR FAILURE WOULD ENERGIZE THE DRI
AND CLOSE THE ASSOCIATED OXIDIZER OR FUEL CROSSFEED VALVE RESULTING
CONTINUOUS POWER APPLIED TO THE VALVE. THERMAL SWITCH IN VALVE WI
INTERRUPT POWER ON A CYCLIC BASIS.

(C,D) FIRST FAILURE HAS NO EFFECT.

(E) POSSIBLE LOSS OF CREW/VEHICLE DUE TO CONTINUOUS MOTOR OPERATION IN CONJUNCTION WITH A BELLOWS LEAK LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES TWO OTHER FAILURES (SECOND "CLOSE" RELAY FAILS ON, BELLOWS LEAK) BEFORE THE EFFECT IS MANIFESTED. FAILURE IS NOT DETECTABLE IN FLIGHT DUE TO LACK OF MONITORING MEASUREMENTS FOR EACH "CLOSE" HYBRID RELAY. BELLOWS LEAK IS NOT DETECTABLE IN FLIGHT.

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
V43CA0.070 - REDUNDANT CIRCUIT VERIFICATION (PERIODIC) - ORB/POD; PERFORMED FOR FIRST FLIGHT AND AT FIVE FLIGHT INTERVALS OR FOR LRU RETEST PER FIGURE V43Z00.000 OR FOR ORBITER DISRUPTED COPPER PATHS. FUNCTIONAL CHECKOUT OF AC MOTOR VALVE CONTROL CIRCUITS PER FIGURE V43CA0.070-2.

V43CA0.072 - REDUNDANT CIRCUIT VERIFICATION; PERFORMED EACH FLIGHT (AFTER FIRST FLIGHT). FUNCTIONAL CHECKOUT OF AC MOTOR VALVE CONTROL CIRCUITS PER FIGURE V43CA0.070-2.

V43CB0.165 - AC MOTOR VALVE ACTUATOR SNIFF CHECK; PERFORMED EACH FLIGHT. ALL AC MOTOR VALVE ACTUATORS CHECKED FOR PRESENCE OF PROPELLANT VAPORS.

V43CF0.010 - PROPELLANT SERVICING TO FLIGHT LOAD; PERFORMED EACH FLIGHT. ALL AC MOTOR VALVES CYCLED DURING LOADING OPERATION.

(E) OPERATIONAL USE
NO ACTION FOR FIRST FAILURE. IF REDUNDANT CLOSE RELAY OPERATES INADVERTENTLY, REMOVE POWER TO RELAY BY PULLING APPROPRIATE CIRCUIT BREAKERS. CIRCUIT BREAKERS WILL BE RESET DURING CRITICAL RECONFIGURATION RESPONSE PERIODS (E. G., DEORBIT BURN).