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PRINT DATE 02/24/95

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL HARDWARE

NUMBER: 05-6KA-2177-X

SUBSYSTEM NAME: EPD&C - AFT REACTION CONTROL (03-2A)

REVISION: 1 02/06/95

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: AFT PCA 3	V070-765240
LRU	: AFT PCA 3	V070-765330
SRU	: CONTROLLER, REMOTE POWER	MC450-0017-1050
SRU	: CONTROLLER, REMOTE POWER	MC450-0017-2050
SRU	: CONTROLLER, REMOTE POWER	MC450-0017-3050
SRU	: CONTROLLER, REMOTE POWER	MC450-0017-4050

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

REMOTE POWER CONTROLLER (RPC 5 AMP) - LEFT AND RIGHT AFT RCS - FUEL AND OXIDIZER MANIFOLD 5 ISOLATION VALVES "CLOSE" SERIES POWER CIRCUIT.

REFERENCE DESIGNATORS: 54V76A133RPC10  
54V76A133RPC15

QUANTITY OF LIKE ITEMS: 2  
TWO

FUNCTION:

UPON STIMULUS FROM THE ASSOCIATED COMMAND DRIVER, THE REMOTE POWER CONTROLLER CONDUCTS "CLOSE" COIL CURRENT IN SERIES WITH OTHER CIRCUIT ELEMENTS TO THE FUEL AND OXIDIZER MANIFOLD 5 ISOLATION VALVE SOLENOIDS.

- APPROVALS -

PAE MANAGER : K. L. PRESTON  
 PRODUCT ASSURANCE ENGR : N. HAFEZIZADEH  
 DESIGN ENGINEERING : D. SOVEREIGN  
 NASA EPD&C SUBSYS MGR :  
 NASA MPS SUBSYS MGR :  
 NASA EPD&C SSMA :  
 NASA MPS SSMA :

*K.L. Preston 4/2/95*  
*N. Hafezizadeh*  
*D. Sovereign*  
*D. Sovereign 3-16-95*  
 N/A  
 N/A

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - APT-RCS

FMEA NO 05-6KA-2177 -2

REV:11/03/87

ASSEMBLY :AFT PCA 3  
 P/N RI :MC450-0017-1050  
 P/N VENDOR:  
 QUANTITY :2  
 :TWO  
 :

CRIT. FUNC: 1R  
 CRIT. HDW: 3  
 VEHICLE 102 103 104  
 EFFECTIVITY: X X X  
 PHASZ(S): FL X LO X OO X DO X LS X

PREPARED BY:  
 DES D SOVEREIGN  
 REL J BECKMAN  
 QE

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS  
 APPROVED BY:  
 DES D.S. A. Bunn  
 REL Michael C. Hottel 11-19-87  
 QE Bill [unclear] 11/7/87  
 APPROVED BY (NASA):  
 SSM [Signature]  
 REL [Signature]  
 QE [Signature]

ITEM:  
 REMOTE POWER CONTROLLER (RPC 5 AMP) - LEFT AND RIGHT APT RCS - FUEL AND OXIDIZER MANIFOLD 5 ISOLATION VALVES "CLOSE" SERIES POWER CIRCUIT.

FUNCTION:  
 UPON STIMULUS FROM THE ASSOCIATED COMMAND DRIVER, THE REMOTE POWER CONTROLLER CONDUCTS "CLOSE" COIL CURRENT IN SERIES WITH OTHER CIRCUIT ELEMENTS TO THE FUEL AND OXIDIZER MANIFOLD 5 ISOLATION VALVE SOLENOIDS. 56V76A30RPC10,15.

FAILURE MODE:  
 INADVERTENT OPERATION, SHORT, INADVERTENTLY CONDUCTS.

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

EFFECT(S) ON:  
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE  
 (A) DEGRADATION OF REDUNDANCY AGAINST INADVERTENT SOLENOID COIL POWERING.  
 (B,C,D) NO EFFECT - FIRST FAILURE.  
 (E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO VALVE OVERHEATING AND PROPELLANT DECOMPOSITION BY CONTINUOUS SOLENOID COIL POWERING LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES 2 OTHER FAILURES (TYPE III CLOSE DRIVER ON, TYPE IV DRIVER ON) BEFORE EFFECT IS MANIFESTED. THE FAILURE STRING COULD BE UNDETECTABLE AFTER THE FIRST FAILURE DUE TO LACK OF MEASUREMENT INDICATIONS FOR THE TYPE III AND TYPE IV HYBRID DRIVERS.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - APT-RCS

FMEA NO 05-6KA-2177 -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 B, ITEM NO. 2 -  
REMOTE POWER CONTROLLER.

(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 - NOT DETECTABLE. IF SERIES "CLOSE" DRIVER  
FAILS ON, MINIMIZE POSSIBILITY OF CONTINUOUS POWER BY PULLING CIRCUIT  
BREAKER. CIRCUIT BREAKER WILL BE RESET WHEN THE VALVE IS TO BE MOVED.