PAGE: 1 PRINT DATE: 02/24/95

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FAILURE MODES EFFECTS ANALYSIS (FMEA) – CRITICAL HARDWARE
NUMBER: 05-6L4-2177 -X

SUBSYSTEM NAME: EPD& C - OMS

REVISION: 1 02/05/95

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU :	AFT PCA 1	V070-765200
LRU :	AFT PCA 2	V070-765220
LRU :	AFT PCA 3	V070-765240
LRU :	AFT PCA 1	V070-765310
LRU :	AFT PCA 2	V070-765320
LRU :	AFT PCA 3	V070-765330
SRU :	CONTROLLER, REMOTE POWER	MC450-0017-1100
SRU :	CONTROLLER, REMOTE POWER	MC450-0017-2100
SRU :	CONTROLLER, REMOTE POWER	MC450-0017-3100
SRU :	CONTROLLER, REMOTE POWER	MC450-0017-4100

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
CONTROLLER, REMOTE POWER, RPC, (10 AMP), LEFT/RIGHT OMS THRUST VECTOR CONTROL CONTROLLER MOTOR POWER INPUT

REFERENCE DESIGNATORS: 54V76A131RPC25
54V76A131RPC26
54V76A131RPC27
54V76A131RPC28
55V76A132RPC15
55V76A132RPC16
56V76A133RPC17
56V76A133RPC18

QUANTITY OF LIKE ITEMS: 8
EIGHT
(FOUR PER LEFT/RIGHT THRUST VECTOR CONTROL)

FUNCTION:
UPON INDIVIDUAL COMMAND BY THE GPC THROUGH FLIGHT MDM'S, PARALLEL RPC'S ENERGIZE EACH THRUST VECTOR CONTROLLER POWER CIRCUIT. EACH CONTROLLER

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CRITICAL FAILURE MODE
NUMBER: 05-6LA-2177 -X

SUPPLIES ONE YAW AND ONE PITCH ACTUATOR DRIVE. AN ACTIVE AND A STANDBY CONTROLLER IS ASSOCIATED WITH EACH OMS ENGINE

- APPROVALS -

PAE MANAGER	: K. L. PRESTONS	K.L. Prestons 4/26/95
PRODUCT ASSURANCE ENGR	: N. HAFEZIZADEH	N Hafez
DESIGN ENGINEERING	: D. SOVEREIGN	D Sovereign
NASA EPD&C SUBSYS MGR	:	[illegible] 3/14/95
NASA SUBSYS VGR	:	N/A
NASA EPD&C SSMA	:	[illegible] 3-14-95
NASA SSVA	:	N/A

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - OMS FMEA NO 05-6LA-2177 -1 REV:10/21/88

ASSEMBLY :APT PCA 1, 2, & 3 CRIT. FUNC: 1R
P/N RI :MC450-0017-1100 CRIT. HDW: 3
P/N VENDOR: VEHICLE 102 103 104
QUANTITY :8 EFFECTIVITY: X X X
:EIGHT PHASE(S): PL LO X OO DO X LS
:(FOUR PER LEFT/RIGHT THRUST VECTOR CONTROL)
REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS

PREPARED BY:		APPROVED BY:		APPROVED BY (NASA):	
DES	D SOVEREIGN	DES		SSM	11-10-88
REL	F DEFENSOR	REL		REL	11-4-88
QE	J COURSEN	QE	10-21-88	QE	8 NOV 88
				EPD&C SSM	
				REL	

ITEM:
CONTROLLER, REMOTE POWER, RPC, (10 AMP), LEFT/RIGHT OMS THRUST VECTOR CONTROL CONTROLLER MOTOR POWER INPUT.

FUNCTION:
UPON INDIVIDUAL COMMAND BY THE GPC THROUGH FLIGHT MDM'S, PARALLEL RPC'S ENERGIZE EACH THRUST VECTOR CONTROLLER POWER CIRCUIT. EACH CONTROLLER SUPPLIES ONE YAW AND ONE PITCH ACTUATOR DRIVE. AN ACTIVE AND A STANDBY CONTROLLER IS ASSOCIATED WITH EACH OMS ENGINE.
54V76A131RPC25, 26, 27, 28. 55V76A132RPC15, 16. 56V76A133RPC17, 18.

FAILURE MODE:
LOSS OF OUTPUT, FAILS TO CONDUCT, FAILS TO TURN "ON".

CAUSE(S):
PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS.

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

(A) LOSS OF ONE OF TWO CONTROLLER POWER SUPPLY INPUTS TO ASSOCIATED THRUST VECTOR CONTROLLERS TO EITHER LEFT OR RIGHT OMS ENGINE. PARALLEL RPC WILL TRIP IF BOTH PITCH AND YAW MOTORS ARE ACTUATED SIMULTANEOUSLY SINCE THE REQUIRED LOAD IS ABOVE THE RPC'S 10 AMP RATING.

(B) LOSS OF CONTROLLER REDUNDANCY - LOSS OF PRIMARY OR STANDBY THRUST VECTOR CONTROLLER TO EITHER LEFT OR RIGHT OMS ENGINE. OMS ENGINE CAN STILL BE GIMBALED WITH THE OTHER CONTROLLER.

(C,D) FIRST FAILURE - NO EFFECT.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - OMS FMEA NO 05-6LA-2177 -1 REV:10/21/88

(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER TWO ADDITIONAL FAILURES (LOSS OF OTHER CONTROLLER ON SAME ENGINE, LOSS OF OTHER OMS ENGINE UNDER WORST CASE CONDITIONS - INSUFFICIENT PROPELLANT FOR RCS BACK-UP AND THE AFFECTED OMS ENGINE NOT GIMBALED THROUGH THE VEHICLE CENTER OF GRAVITY) DUE TO LOSS OF ABILITY TO PERFORM ORBIT INSERTION OR DE-ORBIT. FAILURE NOT DETECTABLE IN FLIGHT DUE TO LACK OF MONITORING MEASUREMENTS. PROBABLE DETECTION ONLY DURING POST OMS BURN GIMBAL PROFILE.

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 - CONTROLLER, REMOTE POWER.

(B) GROUND TURNAROUND TEST
V79AZ0.010 LEFT OMS TVC INTERFACE VERIFICATION. VAF1,5I5F;C.

V79AZ0.020 RIGHT OMS TVC INTERFACE VERIFICATION. VAF1, 5I5F;C.

S00FA0.700 OMS GIMBAL PROFILE. VAF1-90.

(E) OPERATIONAL USE
FAILURE REQUIRES CREW ACTION TO SELECT SECONDARY CHANNEL. GIMBAL OMS ENGINE THROUGH VEHICLE CENTER OF GRAVITY FOLLOWING EACH OMS BURN. WITH ONE KNOWN RPC FAILED "OFF", IT IS POSSIBLE TO PROCEDURALLY DRIVE THE ACTUATOR EITHER IN YAW OR PITCH DIRECTION BUT NOT SIMULTANEOUSLY.