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PRINT DATE: 02/06/90

SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 05-6J-2062-X

SUBSYSTEM NAME: EPD&amp;C - MAIN PROPULSION (03-1)

REVISION : 1 02/05/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
■ LRU	: MID PCA 1	VO70-764400
■ LRU	: MID PCA 3	VO70-764450
■ SRU	: CONTROLLER, HYBRID DRIVER	MC477-0263-0002

- EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:  
CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LH2 RELIEF SHUTOFF VALVE  
CLOSE SOLENOID.
- REFERENCE DESIGNATORS: 40V76A27AR29  
: 40V76A25AR48
- QUANTITY OF LIKE ITEMS: 2  
TWO
- FUNCTION:  
CONDUCTS POWER TO CLOSE SOLENOID IN EACH REDUNDANT CIRCUIT FOR LH2  
RELIEF SHUTOFF VALVE. HDC IS IN SERIES WITH A DIODE AND A RPC IN EACH  
CIRCUIT.

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SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2062 -1 REV:04/25/88

ASSEMBLY : MID PCA-1, 3				CRIT. FUNC: 1R
P/N RI : MC477-0263-0002				CRIT. HDW: 3
P/N VENDOR:	VEHICLE	102	103	104
QUANTITY : 2	EFFECTIVITY:	X	X	X
: TWO	PHASE(S):	PL X LO X OO	DO	LS
:				

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

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES <i>J. Brown</i>	DES <i>[Signature]</i>	EPDC SSM <i>[Signature]</i>
REL F DEFENSOR <i>[Signature]</i>	REL <i>[Signature]</i>	MPS SSM <i>[Signature]</i>
QE <i>[Signature]</i>	QE <i>[Signature]</i>	EPDC REL <i>[Signature]</i>
		MPS REL <i>[Signature]</i>
		QE <i>[Signature]</i>

ITEM:  
CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LH2 RELIEF SHUTOFF VALVE CLOSE SOLENOID (LV 25).

FUNCTION:  
CONDUCTS POWER TO CLOSE SOLENOID IN EACH REDUNDANT CIRCUIT FOR LH2 RELIEF SHUTOFF VALVE. HDC IS IN SERIES WITH A DIODE AND A RPC IN EACH CIRCUIT. 40V76A27AR29, 40V76A25AR48.

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 POWER PATHS TO LH2 RELIEF SHUTOFF VALVE CLOSE SOLENOID. DEGRADATION OF REDUNDANCY AGAINST PREMATURE DEACTUATION OF CLOSE SOLENOID.

(B,C,D) NO EFFECT - FIRST FAILURE.

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SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2062 -1 REV:04/25/88

- (E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE.  
TIME FRAME - PRELAUNCH AND ASCENT.  
1,2) HDCs FAIL "OFF" CAUSING LH2 RELIEF SHUTOFF VALVE (PV8) TO OPEN.  
FEEDLINE RELIEF VALVE (RV6) WILL PREVENT OVERBOARD  
LEAKAGE OF LH2 (RELIEF VALVE CRACK PRESSURE IS ABOVE NOMINAL SYSTEM  
OPERATING PRESSURE).  
3) RELIEF VALVE (RV6) FAILS TO REMAIN CLOSED.

LH2 WILL DUMP OVERBOARD RESULTING IN LOSS OF PROPELLANT AND POSSIBLE  
PREMATURE ENGINE SHUTDOWN. FIRE/EXPLOSION HAZARD EXTERIOR TO THE  
VEHICLE. POSSIBLE VIOLATION OF ET MINIMUM STRUCTURAL REQUIREMENTS DUE TO  
REDUCED ULLAGE PRESSURE. POSSIBLE LOSS OF CREW/VEHICLE.

FAILS B SCREEN BECAUSE PARALLEL POWER PATH MASKS FAILURE.

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A-D) DISPOSITION AND RATIONALE:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION V41AB0.080J,K. EVERY FLIGHT.

(E) OPERATIONAL USE

FLIGHT: NO CREW ACTION CAN BE TAKEN.

GROUND: OMI S1004 SEQUENCE TITLED "EMERGENCY PROCEDURE FOR MAJOR LEAK  
OR FIRE IN THE ORBITER AFT FUSELAGE" CONTAINS SAFING SEQUENCE OF  
EVENTS FOR MAJOR LEAKS IN THE HYDROGEN SYSTEM.