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PRINT DATE: 03/10/95

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL HARDWARE

NUMBER: 05-6J-2355A -X

SUBSYSTEM NAME: EPD&C MAIN PROPULSION SYSTEM

REVISION:

03/03/95

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: DIODE BOX, AVIONICS BAY 5	VO70-765380-001
SRU	: DIODE	JANTXV1N5551

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

| DIODE, BLOCKING (3 AMP) - LH2 OUTBOARD FILL/DRAIN VALVE, MANUAL OPEN SWITCH COMMAND

REFERENCE DESIGNATORS: 55V76A208A2CR14

QUANTITY OF LIKE ITEMS: 1

| ONE PER LH2 OUTBOARD FILL/DRAIN VALVE

FUNCTION:

| ISOLATES GROUND OPEN COMMAND FROM MANUAL SWITCH OPEN COMMAND.
CONDUCTS MANUAL SWITCH OPEN COMMAND TO HDC FOR CONTROL OF POWER TO OPEN SOLENOID OF LH2 OUTBOARD FILL/DRAIN VALVE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NONCRITICAL FAILURE MODE
NUMBER: 05-6J-2355A - 01

REVISION# 03/03/95

SUBSYSTEM NAME: EPD&C MAIN PROPULSION SYSTEM

LRU: DIODE

CRITICALITY OF THIS

ITEM NAME: DIODE

FAILURE MODE: 1R3

FAILURE MODE:

OPEN, FAILS TO CONDUCT

MISSION PHASE:

LO LIFT-OFF
 OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:

102	COLUMBIA
103	DISCOVERY
104	ATLANTIS
105	ENDEAVOUR

CAUSE:

STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), ELECTRICAL STRESS,
 THERMAL STRESS, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN

A) PASS
B) PASS
C) PASS

PASS/FAIL RATIONALE:

A)

B)

C)

CORRECTING ACTION:

IF THE LH2 OUTBOARD FILL AND DRAIN VALVE FAILS TO OPEN DURING DUMP, THE
 CREW WILL MANUALLY OPEN THE RTLS DUMP VALVES FOR THE DURATION OF OPS 1
 TO PROVIDE ADDED DUMP CAPABILITY. REFERENCE FLIGHT RULE 5-65B.

REMARKS/RECOMMENDATIONS:

NONE

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE
NUMBER: 05-6J-2355A - 01**

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF MANUAL SWITCH COMMAND.

(B) INTERFACING SUBSYSTEM(S):

LOSS OF MANUAL CAPABILITY TO OPEN THE LH2 OUTBOARD FILL/DRAIN VALVE. NOTE - SEQUENCING DURING DUMP AND VACUUM INERT IS BY AUTOMATIC SOFTWARE COMMAND.

(C) MISSION:

NO EFFECT - FIRST FAILURE

(D) CREW, VEHICLE, AND ELEMENT(S):

NO EFFECT - FIRST FAILURE

(E) FUNCTIONAL CRITICALITY EFFECTS:

1RV3, S PATH SCENARIO. TIME FRAME - VACUUM INERT.

- 1) DIODE FAILS TO CONDUCT - LOSS OF ABILITY TO MANUALLY OPEN THE LH2 OUTBOARD FILL AND DRAIN VALVE (PV11).
- 2) LH2 OUTBOARD FILL AND DRAIN VALVE (PV11) FAILS TO OPEN BY AUTOMATIC SOFTWARE COMMAND TO PERFORM DUMP AND VACUUM INERT.
- 3) LH2 MANIFOLD RELIEF VALVE (RV6) FAILS TO RELIEVE.

DIODE FAILURE IN THE OPEN SOLENOID VALVE ELECTRICAL CIRCUIT WILL LEAD TO LOSS OF ABILITY TO MANUALLY OPEN THE LH2 OUTBOARD FILL AND DRAIN VALVE DURING VACUUM INERT IF THE VALVE FAILS TO OPEN AUTOMATICALLY BY SOFTWARE COMMAND (i.e. DUE TO AN MDM COMMAND PATH FAILURE). LH2 OUTBOARD FILL AND DRAIN VALVE FAILING TO OPEN DURING LH2 VACUUM INERT RESULTS IN EXCESS LH2 RESIDUALS CAUSING THE LH2 MANIFOLD PRESSURE TO RISE TO RELIEF PRESSURE. FAILURE OF THE LH2 MANIFOLD RELIEF VALVE WILL RESULT IN OVERPRESSURIZATION AND RUPTURE OF THE LH2 MANIFOLD, AFT COMPARTMENT OVERPRESSURIZATION, AND FIRE/EXPLOSIVE HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT COMPONENTS DUE TO CRYO EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

- APPROVALS -

PRODUCT ASSURANCE ENGR : T. K. KIMURA
DESIGN ENGINEERING : J. L. PECK

J. Kimura 3/10/95
J. L. Peck 3/10/95