

PAGE: 1

PRINT DATE: 03/03/95

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL HARDWARE
NUMBER: 05-6J-2054A -X

SUBSYSTEM NAME: EPD&C MAIN PROPULSION SYSTEM

REVISION:

03/03/95

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: PANEL R4	VO70-730278
SRU	: FUSE	ME451-0018-0100

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

FUSE (1 AMP) - LH2 OUTBOARD FILL/DRAIN VALVE POWER CONTROL.

REFERENCE DESIGNATORS: 32V73A4F11

QUANTITY OF LIKE ITEMS: 1

ONE PER LH2 OUTBOARD FILL/DRAIN VALVE

FUNCTION:

PROVIDES CONTROL BUS PROTECTION IN THE EVENT OF LH2 OUTBOARD FILL/DRAIN VALVE CONTROL CIRCUIT FAULTS.

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE
NUMBER: 05-6J-2054A - 01

REVISION# 03/03/95
SUBSYSTEM NAME: EPD&C MAIN PROPULSION SYSTEM
LRU: PANEL R4
ITEM NAME: FUSE
CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
FAILS 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, CONTAMINATION, VIBRATION, MECHANICAL SHOCK,
PROCESSING ANOMALY, THERMAL STRESS

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-2054A - 01

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF MANUAL SWITCH COMMAND.

(B) INTERFACING SUBSYSTEM(S):

LOSS OF MANUAL CAPABILITY TO OPEN OR CLOSE THE LH2 OUTBOARD FILL/ DRAIN VALVE. NOTE - NOMINAL 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:

1R/3, 3 PATH SCENARIO. TIME FRAME - POST LH2 DUMP STOP.

- 1) FUSE FAILS OPEN - 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.

FUSE 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 DUMP AND 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 DUMP AND 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 3/24/95