PRINT DATE: 01/13/94

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-6-3019-X

SUBSYSTEM NAME: ELECTRICAL POWER GENERATION - CRYO, GENERIC
REVISION: 9 01/12/94

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	MID PCA 1	V070-764400
LRU	:	MID PCA 2	V070-764430
SRU	:	FUSE	ME451-0018-0500

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
FUSE, 5 AMP, MAIN DC BUS ("A" OR "B") POWER FOR LO2 TANK 6, 7, 8, AND 9 HEATER CIRCUIT CURRENT LEVEL DETECTORS.

REFERENCE DESIGNATORS: 40V76A25F21
40V76A26F21

QUANTITY OF LIKE ITEMS: 2
TWO, ONE PER MAIN DC BUS ("A" AND "B")

FUNCTION:
PROVIDE OVERCURRENT PROTECTION FOR AND CONDUCT MAIN DC BUS ("A" AND "B") POWER TO THE A15 PANEL, WHERE ONE FUSE CONNECTS MAIN DC BUS "A" TO THE CIRCUIT ENERGIZING THE FIRST SERIES PAIR OF CURRENT LEVEL DETECTORS (CLD) IN EACH LO2 TANK HEATER CIRCUIT, AND THE OTHER FUSE CONNECTS MAIN DC BUS "B" TO THE CIRCUIT ENERGIZING THE SECOND SERIES PAIR OF CLD'S. THIS PRECLUDES A SINGLE FAILURE FROM CAUSING THE LOSS OF PROTECTION OF THE LO2 HEATER CIRCUITS FROM DIFFERENTIAL CURRENT CONDITIONS.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CRITICAL FAILURE MODE
NUMBER: 05-6-3019-01

REVISION: 0 01/12/94

SUBSYSTEM NAME: ELECTRICAL POWER GENERATION - CRYO, GENERIC
LRU: MID PCA 1 **CRITICALITY OF THIS**
ITEM NAME: FUSE **FAILURE MODE:** 1R3

FAILURE MODE:
FAILS OPEN

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: EDO MISSION ONLY
102 COLUMBIA
105 ENDEAVOUR

CAUSE:
STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL STRESS, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN
A) PASS
B) FAIL
C) PASS

PASS/FAIL RATIONALE:
A)

B)
REDUNDANCY SCREEN "B" FAILS BECAUSE LOSS OF POWER TO ONE SERIES CURRENT LEVEL DETECTOR CIRCUIT IS NOT READILY DETECTABLE IN FLIGHT. FAILURE WILL NOT BE DETECTED UNTIL DAILY CURRENT LEVEL DETECTOR TEST IS PERFORMED.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF ABILITY TO ENERGIZE ONE SET OF REDUNDANT CURRENT LEVEL DETECTORS IN EACH LO2 TANK HEATER CIRCUIT.

(B) INTERFACING SUBSYSTEM(S):
LOSS OF REDUNDANT PROTECTION AGAINST LO2 TANK HEATER ELEMENT INCURRING INTERNAL SHORT TO STRUCTURE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CRITICAL FAILURE MODE
NUMBER: 05-6-3019-01

(C) MISSION:
NO EFFECT - FIRST FAILURE

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT - FIRST FAILURE

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW/VEHICLE DUE TO THE FOLLOWING SCENARIO: 1) FUSE FAILS OPEN - LOSS OF ONE OF TWO SERIES REDUNDANT CURRENT LEVEL DETECTORS IN EACH LO2 TANK HEATER CIRCUIT, 2) REDUNDANT FUSE FAILS OPEN - LOSS OF ALL CURRENT LEVEL DETECTORS, 3 & 4) LO2 TANK HEATER SHORTS TO STRUCTURE THROUGH BOTH LAYERS OF INSULATION (TWO FAILURE REQUIRED), POSSIBLE INDUCING LOCALIZED HOT SPOTS, RESULTING IN POSSIBLE LO2 TANK RUPTURE/EXPLOSION.

-DISPOSITION RATIONALE-

(A) DESIGN:
REFER TO APPENDIX D, ITEM NO. 4 - FUSE

(B) TEST:
REFER TO APPENDIX D, ITEM NO. 4 - FUSE

THE OPERATION OF THE PALLET CURRENT LEVEL DETECTOR CIRCUIT IS VERIFIED IN FLIGHT DURING LO2 HEATER CURRENT LEVEL SENSOR TESTS. TESTS ARE PERFORMED PRIOR TO FIRST EDO FLIGHT, WHEN VALID VERIFICATION IS UNOBTAINABLE IN FLIGHT, OR AFTER LRU REPLACEMENT.

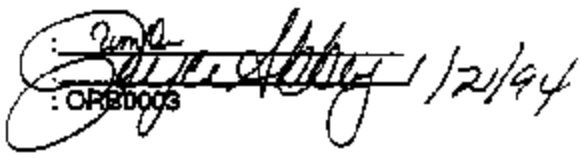
(C) INSPECTION:
REFER TO APPENDIX D, ITEM NO. 4 - FUSE

(D) FAILURE HISTORY:
REFER TO APPENDIX D, ITEM NO. 4 - FUSE

(E) OPERATIONAL USE:
WHEN THE CLD FAILS ITS DAILY TEST, THE AFFECTED TANK HEATERS WILL BE DISABLED.

- APPROVALS -

EDITORIALLY APPROVED : RI
EDITORIALLY APPROVED : JSC
TECHNICAL APPROVAL : VIA CR
: CR80003

:  1/12/94