

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE

NUMBER: M5-6MB-2271-G -X

SUBSYSTEM NAME: ELECTRICAL POWER GENERATION - CRYO, GENERIC

REVISION: 9 04/16/96

PART DATA

PART NAME	PART NUMBER
VENDOR NAME	VENDOR NUMBER
LRU : H2/O2 CONTROL BOXES	V070-764470
SRU : DIODE	JANTXV1N5551

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

DIODE. ISOLATION, 3 AMPERE - LO2 TANKS 1 THRU 9 "TEST" CONTROL CIRCUIT

REFERENCE DESIGNATORS:

- 40V76A141CR42
- 40V76A141CR44
- 40V76A142CR42
- 40V76A142CR44
- 40V76A143CR42
- 40V76A143CR44
- 40V76A144CR42
- 40V76A144CR44
- 40V76A217CR42
- 40V76A217CR44
- 40V76A218A1CR42
- 40V76A218A1CR44
- 40V76A218A2CR42
- 40V76A218A2CR44
- 40V76A218A3CR42
- 40V76A218A3CR44
- 40V76A218A4CR42
- 40V76A218A4CR44

QUANTITY OF LIKE ITEMS:
TWO PER H2/O2 CONTROL BOX

FUNCTION:

PROVIDES ISOLATION FROM CREW-PROVIDED CURRENT LEVEL DETECTOR (CLD) TEST CIRCUIT POWER, AND PROVIDES A PATH FOR PRE-FLIGHT BUS POWER TO THE CLD TEST CIRCUIT.

- APPROVALS -

PRODUCT ASSURANCE ENGR : J. NGUYEN

: J. Name 7/2/97

PRINT DATE: 09/09/92

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
 NUMBER: M5-6MB-2271-G-02

SUBSYSTEM: ELECTRICAL POWER GENERATION - CRYO, GENERIC
 LRD H2/O2 CONTROL BOXES
 ITEM NAME: DIODE

REVISION# 9 09/09/92
 CRITICALITY OF THIS
 FAILURE MODE:1R3

FAILURE MODE:
 SHORT (END TO END)

MISSION PHASE:
 LO LIFT-OFF

VEHICLE/PAYLOAD/KIT EFFECTIVITY:	102	COLUMBIA
	:	103 DISCOVERY
	:	104 ATLANTIS
	:	105 ENDEAVOUR

CAUSE:
 STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, ELECTRICAL
 STRESS, 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 THE REVERSE-CURRENT CHARACTERISTICS OF
 THE AFFECTED DIODE ARE NOT BEING MONITORED IN FLIGHT.

C)

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
 NUMBER: M5-6MB-2271-G-02

 - FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF REDUNDANCY. LOSS OF ONE OF TWO SERIES DIODES ISOLATING PRE-FLIGHT BUS POWER FROM CREW-PROVIDED POWER FOR TESTING THE CURRENT LEVEL DETECTORS

(B) INTERFACING SUBSYSTEM(S):

DEGRADATION OF PROTECTION AGAINST INADVERTENT POWER-UP OF THE AFFECTED PRE-FLIGHT BUS.

(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) DIODE FAILS SHORTED, 2) REDUNDANT SERIES DIODE FAILS SHORTED, 3) ASSOCIATED "TEST/RESET" SWITCH FAILS CLOSED IN "TEST" POSITION, INADVERTENTLY ENERGIZING ASSOCIATED PRE-FLIGHT BUS, AND 4) ENGINE CUT-OFF (ECO) OPEN SIMULATION COMMAND HYBRID DRIVER CONTROLLER FAILS "ON", SENDING AN ECO SIMULATION "OPEN" COMMAND TO POINT SENSOR ELECTRONICS BOX, PRECLUDING DRY ECO OUTPUT UPON PROPELLANT DEPLETION. PROPELLANT DEPLETION MAIN ENGINE CUT-OFF (MECO) COMMAND CAPABILITY WOULD BE LOST, AND PROPELLANT STARVATION COULD RESULT IN SSME PUMP CAVITATION AND UNCONTAINED ENGINE DAMAGE.

 - DISPOSITION RATIONALE -

(A) DESIGN:

REFER TO APPENDIX F, ITEM NO. 4 - DIODE, AXIAL LEAD

(B) TEST:

REFER TO APPENDIX F, ITEM NO. 4 - DIODE, AXIAL LEAD

GROUND TURNAROUND TEST

DIODE IS FUNCTIONALLY VERIFIED DURING PRE-FLIGHT BUS DIODE TESTS PERFORMED DURING ORBITER MAINTENANCE DOWN PERIOD (OMDP).

(C) INSPECTION:

REFER TO APPENDIX F, ITEM NO. 4 - DIODE, AXIAL LEAD

PRINT DATE: 09/09/92

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NUMBER: M5-6MB-2271-G-02

(D) FAILURE HISTORY:
REFER TO APPENDIX F, ITEM NO. 4 - DIODE, AXIAL LEAD

(E) OPERATIONAL USE:
NONE

- APPROVALS -

PRODUCT ASSURANCE MGR	:	T. J. EAVENSON	:	<u>T. J. Eavenson</u> 9/14/92
PRODUCT ASSURANCE ENG	:	T. K. KIMURA	:	<u>T. K. Kimura</u> 9/14/92
DESIGN ENG TEAM LEADER	:	G. M. ANDERSON	:	<u>G. M. Anderson</u> 9.15.92
DESIGN ENGINEERING	:	T. D. NGUYEN	:	<u>T. D. Nguyen</u> 9/15/92
NASA RELIABILITY	:		:	<u>William D. ...</u> 12/16/92
NASA SUBSYSTEM MANAGER	:		:	<u>Stanley L. ...</u> 12/16/92
NASA EPD&C RELIABILITY	:		:	<u>Stanley L. ...</u> 12/14/92
NASA QUALITY ASSURANCE	:		:	<u>WTF KO Hill ...</u> 12/22/92
NASA EPD&C SUBSYS MGR	:		:	<u>Stanley L. ...</u> 14/2/92