

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE
NUMBER: 05-7S-2000 -X

SUBSYSTEM NAME: EW&I/DPS, BFS, SAW & COMP

REVISION: 0 04/23/96

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
SRU	: CONNECTOR, PLUG	NB6EG20-41XXXX

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
CONNECTOR, PLUG, 41 #20 CONTACTS - ENGINE INTERFACE UNIT (EIU) NO. 1
COMMAND PATH LOCATION: AFT AVIONICS BAY 4

REFERENCE DESIGNATORS: 50W1P121

QUANTITY OF LIKE ITEMS:
NB6EG20-41XXXX (1)

FUNCTION:
PROVIDES MATE/DEMATE CAPABILITY FOR WIRING THAT CONTAINS TWO OF THREE
COMMAND PATHS - ONE COMMAND PATH FROM THE EIU TO THE SPACE SHUTTLE
MAIN ENGINE CONTROLLERS (SSMEC) FOR MAIN ENGINE NO. 1 AND COMMAND PATH
FROM THE GENERAL PURPOSE COMPUTER (GPC) TO THE EIU.

FAILURE MODES EFFECTS ANALYSIS FMEA - CIL FAILURE MODE

NUMBER: 05-7S-2000-02

REVISION#: 0 04/23/96

SUBSYSTEM NAME: EW&I/DPS, BFS, SAW & COMP

LRU:

CRITICALITY OF THIS

ITEM NAME: CONNECTOR, PLUG

FAILURE MODE: 1/1

FAILURE MODE:
PIN-TO-PIN SHORT (HOT)

MISSION PHASE: PL PRE-LAUNCH
LO LIFT-OFF

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

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

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) N/A
B) N/A
C) N/A

PASS/FAIL RATIONALE:

A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF ABILITY TO CONDUCT THE PROPER COMMAND SIGNALS THROUGH THE CONNECTOR.

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(B) INTERFACING SUBSYSTEM(S):

LOSS OF ABILITY TO TRANSMIT PROPER COMMANDS TO THE SSMEC FROM THE ORBITER GPC'S.

(C) MISSION:

LAUNCH OR MISSION ABORT MAY OCCUR UPON LOSS OF THROTTLE ADJUSTMENT ON A SINGLE MAIN ENGINE.

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

THIS CONNECTOR CONTAINS TWO OF THREE COMMAND PATHS. THREE COMMAND PATHS ARE VOTED BY THE SSMEC'S - EACH SSMEC REQUIRES A VALID TWO OF THREE AGREEMENT VOTE TO RESPECT AN ORBITER COMMAND.

POSSIBLE LOSS OF CREW/VEHICLE DUE TO A PIN-TO-PIN SHORT BETWEEN PINS S AND H WHICH WILL SHORT THE EIU NO. 1 CHANNEL NO. 1 OUTPUT TO THE EIU NO. 1 CHANNEL NO. 2 INPUT RESULTING IN DISTORTED COMMANDS FOR BOTH CHANNEL NO. 1 AND NO. 2 OUTPUTS TO SSMEC NO. 1. A VALID COMMAND FROM THE GPC MAY NOT BE SEEN AS VALID BY SSMEC NO. 1 IN ITS TWO OF THREE VOTING AND MAY NOT BE PROPERLY ACTED UPON.

LOSS OF TWO COMMAND CHANNELS RESULTS IN LOSS OF COMMAND CAPABILITY TO THE ENGINE. SOME RESULTS ARE: INABILITY TO THROTTLE UP FROM A MINIMUM COMMANDED THRUST LEVEL WHICH CAN LEAD TO AN ABORT; LOSS OF THROTTLE DOWN CAPABILITY MAY INDUCE HAZARDOUS LOADS ON VEHICLE AND/OR EXCEED 3G LIMIT; AND SSMEC DOES NOT RECEIVE SHUTDOWN COMMAND PRIOR TO MECO. WITHOUT THE SHUTDOWN COMMAND PRIOR TO MECO, DEPLETION OCCURS, CAUSING CAVITATION AND CATASTROPHIC SSME SHUTDOWN. PRELAUNCH: RESULTS IN LAUNCH SCRUB OR PAD ABORT.

REFERENCE CIL 05-5-BD8-1-2, EIU ERRONEOUS OUTPUT

(E) FUNCTIONAL CRITICALITY EFFECTS:

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX K, ITEM NO. 1 - TYPE NB CONNECTOR, CIRCULAR, MINIATURE

(B) TEST:

REFER TO APPENDIX K, ITEM NO. 1 - TYPE NB CONNECTOR, CIRCULAR, MINIATURE

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GROUND TURNAROUND TEST: ALL TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:

REFER TO APPENDIX K, ITEM NO. 1 - TYPE NB CONNECTOR, CIRCULAR, MINIATURE

(D) FAILURE HISTORY:

CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATABASE.

(E) OPERATIONAL USE:

FLIGHT RULES AND CREW PROCEDURES CALL FOR MANUAL ENGINE SHUTDOWN PRE-MECO FOR COMMAND PATH FAILURE. THESE ARE ONLY USEFUL IF THE FAILURE CAN BE DETECTED EARLY ENOUGH PRIOR TO MECO (BEFORE THE LAST 30 SECONDS).

COMMAND PATH FAILURE IS DETECTABLE ONLY WHEN COMMANDS ARE ISSUED. FOR NOMINAL ASCENT, COMMANDS ARE ISSUED FREQUENTLY DURING 3G THROTTLING, UP UNTIL FINE COUNT. FOR ABORT MODES, COMMANDS MAY BE ISSUED LESS FREQUENTLY PRIOR TO FINE COUNT.

- APPROVALS -

EDITORIALLY APPROVED : RI
EDITORIALLY APPROVED : JSC
TECHNICAL APPROVAL : VIA APPROVAL FORM

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96-CIL-013 05-7S