

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE

NUMBER: MO-AB1-302000-01-000-X

SUBSYSTEM NAME: GAMMA RAY OBSERVATORY

REVISION : 1 01/23/91

S050270
ATTACHMENT
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	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
■ SRU	: PLUG ASSEMBLY, C&D	V784-540006-001
■ SRU	: PLUG ASSEMBLY, POWER	V784-540006-007

 PART DATA

- EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DISCONNECT PLUG ASSEMBLY, P/N -001 FOR THE COMMAND AND DATA DISCONNECT (PORT SIDE); P/N -007 FOR THE POWER DISCONNECT (STARBOARD SIDE).
- QUANTITY OF LIKE ITEMS: 2
TWO: ONE FOR THE COMMAND AND DATA DISCONNECT (PORT SIDE); ONE FOR THE POWER DISCONNECT (STARBOARD SIDE).
- FUNCTION:
PROVIDES THE CAPABILITY TO DISCONNECT THE ELECTRICAL UMBILICALS BETWEEN THE ORBITER AND PAYLOAD PRIOR TO THE DEPLOYMENT OF THE PAYLOAD. TWO UMBILICAL DISCONNECTS ARE PROVIDED - COMMAND AND DATA DISCONNECT (PORT SIDE) AND POWER DISCONNECT (STARBOARD SIDE). DISCONNECTS ARE MOUNTED ON RETRACTION/RETENTION ARMS TO SWING CLEAR OF THE PAYLOAD AT SEPARATION

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ITEM NAME: PLUG ASSEMBLY, ~~POWER~~

CRITICALITY OF THIS
FAILURE MODE: 2/2

- FAILURE MODE:
CONNECTOR ASSEMBLY SEPARATES PREMATURELY FROM THE PAYLOAD.

MISSION PHASE:
 LO LIFT-OFF
 OO ON-ORBIT

- VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

- CAUSE:
ADVERSE TOLERANCES/WEAR, DEFECTIVE PART/MATERIAL OR MANUFACTURING
DEFECT, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY.

(i.e. Broken Blades)

*or Broken
Lock Ring*

- 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:
PLUG ASSEMBLY SEPARATES PREMATURELY.
- (B) INTERFACING SUBSYSTEM(S):
LOSS OF ELECTRICAL CIRCUITS (POWER OR COMMAND AND DATA) BETWEEN ORBITER
AND PAYLOAD. LOSS OF PAYLOAD FUNCTION IN ORBITER PAYLOAD BAY.
- (C) MISSION:
POSSIBLE LOSS OF GRO MISSION.

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- (D) CREW, VEHICLE, AND ELEMENT(S):
NONE

- (E) FUNCTIONAL CRITICALITY EFFECTS:
N/A

 - DISPOSITION RATIONALE -

- (A) DESIGN:

MATING PROCEDURE VERIFIES PROPER ENGAGEMENT OF PLUG IN RECEPTACLE. LATCH BLADE SNAPS INTO PLACE BETWEEN ENDS OF LOCKRING. TIGHTENING OF ENGAGEMENT NUT TO COMPRESS EJECTION SPRING GIVES ADDITIONAL ASSURANCE OF PROPER MATING.

- (B) TEST:

QUALIFICATION TESTS: QUALIFICATION TESTS INCLUDE QUALIFICATION ACCEPTANCE VIBRATION TESTS (QAVT), SEPARATION CYCLES AT AMBIENT, -200 DEG F, -75 DEG F, AND THERMAL VACUUM.

ACCEPTANCE TESTS: ACCEPTANCE TESTS INCLUDE VISUAL INSPECTION, ELECTRICAL CONTINUITY AND RESISTANCE, SEPARATION AT AMBIENT, +200 DEG F AND -75 DEG F, AND ACCEPTANCE VIBRATION TESTING (AVT) 20-80 HZ, +308/OCT; 80-350 HZ, 0.067G2/HZ; 350-2000 HZ, -308/OCT WITH SEPARATION.

OMRSD: GROUND TURNAROUND INCLUDES STANDARD UMBILICAL RETRACTION/RETENTION SYSTEM (SURS) DISCONNECT VERIFICATION, VERIFYING POWER TO THE SURS DISCONNECT SOLENOIDS, AND SURS DISCONNECT VERIFICATION IN ACCORDANCE WITH MLO103-0574 AND VERIFIED BY OMRSD FILE II VOL II ANNEX 9 (PAYLOAD REQUIREMENTS).

- (C) INSPECTION:

RECEIVING INSPECTION
 MATERIAL AND PROCESS CERTIFICATION ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

CONTAMINATION CONTROL AND CORROSION PROTECTION ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

DETAIL PARTS, WIRE/CABLE HARNESSSES MANUFACTURED PER DRAWING ON MANUFACTURING ORDERS VERIFIED BY INSPECTION. ELECTRICAL HARNESSSES AND COAXIAL CABLES INSTALLED TO ARM ASSEMBLY PER DRAWING AND VERIFIED BY INSPECTION ON MANUFACTURING ORDERS. ASSEMBLY OF UMBILICAL ARM ASSEMBLY PER DRAWING VERIFIED BY INSPECTION. INSTALLATION OF THREADED FASTENERS

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AND TORQUE REQUIREMENTS ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION
DYE-PENETRANT INSPECTION IS VERIFIED BY INSPECTION.

CRITICAL PROCESSES
ELECTRICAL BOND AND TEST PER APPLICABLE SPECIFICATION AND VERIFIED BY INSPECTION.

TESTING
ATP IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING
HANDLING AND PACKAGING REQUIREMENTS ARE VERIFIED BY INSPECTION.

- (D) FAILURE HISTORY:
THERE HAVE BEEN NO ACCEPTANCE TEST, QUALIFICATION TEST, FIELD OR FLIGHT FAILURES ASSOCIATED WITH THIS FAILURE MODE.

- (E) OPERATIONAL USE:
~~An EFA workaround procedure is available to reconnect the SURS in the event that this failure does occur.~~

- APPROVALS -

RELIABILITY ENGINEERING: M. P. RAGUSA
 DESIGN ENGINEERING : R. DIVINSKY
 DESIGN ENGINEERING : M. GUTIERREZ
 QUALITY ENGINEERING : M. F. Mergen
 NASA RELIABILITY :
 NASA SUBSYSTEM MANAGER :
 NASA QUALITY ASSURANCE :

: M. P. Ragusa
 : R. Divinsky
 : M. Gutierrez
 : M. F. Mergen
 G.E.: B. L. ...
 : W. H. ... 4/17/90
 : B.

BQ entered 8/13/90