# SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ACTUATION MECH-KU-BAND PYRO FMEA NO P2-4H-R103-1 REV:08/25/88

ASSEMBLY :KU-BAND ANTENNA JETTISON MECH CRIT. FUNC: 1
P/N RI :SKD26100105-201 CRIT. HDW: 1
P/N VENDOR:
QUANTITY :1
:ONE

| VEHICLE EFFECTIVITY: | 102 | 103 | 104 |
|---|---|---|---|
| | X | X | X |

PHASE(S): PL LO OO X DO LS

REDUNDANCY SCREEN: A- B- C-

| PREPARED BY: | | APPROVED BY: | APPROVED BY (NASA): |
|---|---|---|---|
| DES | R. H. YEE | DES | SSM 9-12-8 |
| REL | M. B. MOSKOWITZ | REL | REL 9-7-88 |
| QE | E. M. GUTIERREZ | QE EMG 8/29/88 | QE NQZ 9-12-88 |

ITEM:
GUILLOTINE ASSEMBLY, PYROTECHNIC - KU-BAND ANTENNA UMBILICAL SEPARATION

FUNCTION:
PYROTECHNICALLY ACTIVATED ASSEMBLY WILL SEVER THE ELECTRICAL UMBILICAL, IF THE ANTENNA CANNOT BE PROPERLY STOWED PRIOR TO DE-ORBIT/RE-ENTRY.

FAILURE MODE:
FAILS TO FUNCTION UPON RECEIVING PRESSURE OUTPUT FROM EITHER OR BOTH REDUNDANT CARTRIDGES

CAUSE(S):
BINDING OF PISTON, BLOWBY DUE TO DAMAGED PISTON SEAL, STRUCTURAL FAILURE, DUAL CARTRIDGE FAILURE

EFFECT(S) ON:
(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE

(A) LOSS OF FUNCTION.

(B) POSSIBLE INABILITY TO CLOSE PAYLOAD BAY DOORS IF ANTENNA CANNOT BE PROPERLY STOWED OR JETTISONED.

(C,D) POSSIBLE INABILITY TO DE-ORBIT SAFELY IF ANTENNA CANNOT BE JETTISONED OR SECURED IN PAYLOAD BAY BY CREW EXTRAVEHICULAR ACTIVITY (EVA); LOSS OF CREW/VEHICLE.

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DISPOSITION & RATIONALE:
(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE

(A) DESIGN
DESIGN UTILIZES TWO (REDUNDANT) CARTRIDGES; A SINGLE CARTRIDGE WITH 85% CHARGE LOAD IS SUFFICIENT TO SEVER THE KU-BAND ANTENNA UMBILICAL. STRUCTURAL FACTOR OF SAFETY (GREATER THAN 1.4) IS HIGH ENOUGH TO ENSURE THAT THE ASSEMBLY WILL RESIST RUPTURE/BURSTING DUE TO SHRAPNEL, DEBRIS OR HIGH GAS PRESSURE (WHEN INITIATED BY DUAL 130% CARTRIDGES).

(B) TEST
QUALIFICATION TESTS: FIRINGS AT -130 DEG F, AMBIENT AND +160 DEG F WITH DUAL 130% CARTRIDGES AND SINGLE 85% CARTRIDGES (NOMINAL WIRE BUNDLE), SALT FOG, SHOCK, TEMPERATURE CYCLING -130 DEG F TO +270 DEG F, PRESSURE CYCLES (5), TRANSIENT AND RANDOM VIBRATION. CERTIFICATION REQUIREMENT (CR) 44-325-0024-0001; QTR (OEA, INC.) NO. 2889-10-300.

ACCEPTANCE TESTS: PROOF PRESSURE TEST (1.2 X MAXIMUM OPERATING PRESSURE), X-RAY, SHEAR PIN TEST, LEAK TEST. ATP (OEA, INC.) #2889-7-300A.

SYSTEM LEVEL TESTS: RANDOM VIBRATION, THERMAL CYCLING, AMBIENT FIRING (1) (CR)44-544901-001.

OMRSD: NONE.

(C) INSPECTION

RECEIVING INSPECTION
RAW MATERIAL IS VERIFIED BY INSPECTION TO ASSURE SPECIFIED SHUTTLE REQUIREMENTS ARE SATISFIED.

CONTAMINATION CONTROL
CONTAMINATION CONTROL AND CORROSION PROTECTION PROCESSES AND STORAGE ENVIRONMENTS ARE MONITORED AND VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
PARTS ARE X-RAYED AND N-RAYED TO VERIFY CORRECT ASSEMBLY AND PRESENCE OF ALL DETAIL PARTS AND EXPLOSIVES. VISUAL INSPECTION, IDENTIFICATION PERFORMED, AND PARTS PROTECTION VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION
X-RAYS AND N-RAYS ARE REVIEWED BY VENDOR, DCAS, NASA QUALITY, AND ENGINEERING.

CRITICAL PROCESSES
SELECTED MANUFACTURING/ASSEMBLY STEPS ARE IDENTIFIED BY NASA QUALITY ASSURANCE AND VERIFIED BY GOVERNMENT INSPECTION AS MANDATORY INSPECTION POINTS (MIPS). ALL MANUFACTURING PROCESSES, SUCH AS WELDING, PLATING, HEAT TREATING, PASSIVATION, AND ANODIZING ARE VERIFIED BY INSPECTION.

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

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(D) FAILURE HISTORY
NONE.

(E) OPERATIONAL USE
POSSIBLE EVA TO MANUALLY SEVER UMBILICAL.