SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :P/L RETEN & DEPLOY-MPM PYRO FMEA NO P2-5A-J04-1 REV:08/12/88

ASSEMBLY :MPM PEDESTAL MECHANISM CRIT. FUNC: 1
P/N RI :SKD26100103-301 CRIT. HDW: 1
:MC325-0022-0005 VEHICLE 102 103 104
QUANTITY :3 EFFECTIVITY: X X X
PHASE(S): PL LO OO X DO LS

REDUNDANCY SCREEN: A- B- C-

PREPARED BY:		APPROVED BY:	APPROVED BY (NASA):
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ITEM:
GUILLOTINE, MANIPULATOR POSITIONING MECHANISM (MPM) PEDESTAL, TYPE II

FUNCTION:
SEVERS PEDESTAL MANIPULATOR POSITIONING MECHANISM (MPM) ELECTRICAL UMBILICAL TO ALLOW JETTISON OF REMOTE MANIPULATOR SYSTEM (RMS) IF MPM CANNOT BE PROPERLY STOWED.

FAILURE MODE:
FAILS TO FUNCTION UPON RECEIVING PRESSURE OUTPUT FROM EITHER OR BOTH (REDUNDANT) NASA STANDARD INITIATORS (NSI'S)

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

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

(A) LOSS OF FUNCTION.

(B) UPPER MPM IS STILL ATTACHED TO ORBITER BY WIRE BUNDLE. RESULTANT INABILITY TO CLOSE PAYLOAD BAY (PLB) DOORS, IF MPM CANNOT BE JETTISONED. (LOSS OF CAPABILITY TO STOW MPM HAS ALREADY OCCURRED).

(C,D) POSSIBLE LOSS OF CREW/VEHICLE.

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

(A) DESIGN
DESIGNED WITH DUAL (REDUNDANT) NSI'S. A SINGLE NSI IS SUFFICIENT TO SEVER A 115% OVERSIZED UMBILICAL. STRUCTURAL FACTOR OF SAFETY OF 1.4 OR GREATER TO ENSURE PROTECTION FROM SHRAPNEL, DEBRIS, OR GAS PRESSURE WHEN INITIATED BY DUAL 130% EQUIVALENT NSI'S. DUAL O-RINGS ON PISTON.

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(B) TEST

QUALIFICATION TESTS: SALT FOG, TEMPERATURE AND PRESSURE CYCLING, 20-G SHOCK, TRANSIENT AND RANDOM VIBRATION. FIRINGS AT -110 DEG F/AMBIENT/ +150 DEG F, 15% OVERSIZE BUNDLE WITH SINGLE NSI AND DUAL 130% EQUIVALENT NSI'S. CR 44-325-0022-0002, QTR (OEA, INC) 2889-10-200, (OEA, INC) 2889-10-2.

ACCEPTANCE TESTS: SHEAR PIN TEST, INTERNAL PROOF PRESSURE (1.2 X MAXIMU OPERATING PRESSURE), LEAK TEST/SHEAR PIN VERIFICATION, X-RAY. ATP 2889-7-200.

SYSTEM LEVEL TESTS: (MPM CERTIFICATION AND SEPARATION) - VIBRATION, THERMAL EXPOSURE AT -120 DEG F AND +158 DEG F, 3 AMBIENT (DUAL NSI) FIRINGS WITH WIRE BUNDLE. CR 44-000002-001, STS83-0987.

OMRSD: NONE - HARDWARE INACCESSIBLE.

(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 ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
VISUAL INSPECTION, IDENTIFICATION PERFORMED, AND PARTS PROTECTION VERIFIED BY INSPECTION. CARTRIDGE RELATIVE TO HOUSING IS INSPECTED AFTE INSTALLATION TO ASSURE PROPER BACKUP RING SEATING TO PREVENT PRESSURE BLOWBY. SELECTED MANUFACTURING/ASSEMBLY STEPS ARE IDENTIFIED BY NASA QUALITY ASSURANCE AND VERIFIED BY GOVERNMENT INSPECTION AS MANDATORY INSPECTION POINTS (MIPS).

NONDESTRUCTIVE EVALUATION
PARTS ARE X-RAYED TO ASSURE FREEDOM FROM VOIDS AND CRACKS AND TO VERIFY CORRECT ASSEMBLY AND PRESENCE OF ALL DETAILED PARTS. X-RAYS ARE REVIEWED BY VENDOR, DCAS, AND NASA ENGINEERING AND QUALITY.

CRITICAL PROCESSES
ALL MANUFACTURING PROCESSES, SUCH AS WELDING, HEAT TREATING, PASSIVATION AND ANODIZING ARE VERIFIED BY INSPECTION.

TESTING
ATP IS VERIFIED PER PROCEDURE.

HANDLING/PACKAGING
HANDLING, PACKAGING AND STORAGE ENVIRONMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

THERE HAVE BEEN NO ACCEPTANCE TEST, QUALIFICATION TEST, FIELD OR FLIGHT FAILURES ASSOCIATED WITH THIS FAILURE MODE.

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(E) OPERATIONAL USE
POSSIBLE EXTRAVEHICULAR ACTIVITY (EVA) TO MANUALLY SEVER UMBILICAL. MULTI-LAYER INSULATION (MLI) BLANKETS ON UPPER PEDESTAL COULD BE UNSNAPPED TO OBTAIN ACCESS TO WIRE BUNDLE. (NOT PRESENTLY DOCUMENTED).