SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :P/L RETEN & DEPLOY-MPM PYRO FMEA NO P2-5A-J02-1 REV:08/12/88

ASSEMBLY :MPM SHOULDER MECHANISM
P/N RI :SKD26100103-201
:MC325-0022-0001
QUANTITY :1

CRIT. FUNC: 1
CRIT. HDW: 1

VEHICLE EFFECTIVITY:	102	103	104
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 R. H. Yee for Ann Oakley	SSM Russ Thorpe 9-12
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ITEM:
GUILLOTINE, MANIPULATOR POSITIONING MECHANISM (MPM) SHOULDER, TYPE I

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

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

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

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

(A) LOSS OF FUNCTION.

(B) RESULTANT INABILITY TO CLOSE PAYLOAD BAY (PLB) DOORS, IF RMS CANNOT BE JETTISONED.

(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) PRESSURE CARTRIDGES, A SINGLE CARTRIDGE WITH 85% CHARGE IS SUFFICIENT TO SEVER THE UMBILICAL. STRUCTURAL FACTOR OF SAFETY 1.4 OR GREATER TO ENSURE PROTECTION FROM SHRAPNEL, DEBRIS, OR GAS PRESSURE WHEN INITIATED BY DUAL 130% CARTRIDGES, 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, SINGLE 85% CARTRIDGE AND DUAL 130% CARTRIDGES. CR 44-325-0022-0001; QTR (OEA, INC) 2889-10-100.

ACCEPTANCE TESTS: SHEAR PIN TEST, INTERNAL PROOF PRESSURE TEST (1.2 X MAXIMUM OPERATING PRESSURE), LEAK TEST/SHEAR PIN VERIFICATION, X-RAY, AND TENSILE TEST COUPONS. ATP (OEA, INC) 2889-7-100.

SYSTEM LEVEL TESTS: (MPM CERTIFICATION AND SEPARATION) - VIBRATION, THERMAL EXPOSURE AT -120 DEG F AND +168 DEG F, 3 AMBIENT FIRINGS WITH WIRE BUNDLE. SYSTEM TEST: CR 44-000002-001-001; STS 83-0987.

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 ARE VERIFIED BY INSPECTION. CARTRIDGE RELATIVE TO HOUSING IS INSPECTED AFTER 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
NONE.