SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :LANDING/DECELERATION-PYRO FMEA NO P2-1A -015 -2 REV:12/02/87

ASSEMBLY :MAIN LANDING GEAR
P/N RI :SKD26100102-201
P/N VENDOR:
QUANTITY :2
:ONE PER GEAR

CRIT. FUNC: 1
CRIT. HDW: 1

VEHICLE EFFECTIVITY:	102 X	103 X	104 X
PHASE(S): PL LO OO DO X LS			

REDUNDANCY SCREEN: A- B- C-

PREPARED BY:		APPROVED BY:		APPROVED BY (NASA):
DES	R. H. YEE	DES	12/4/87	SSM 1-7-88
REL	M. B. MOSKOWITZ	REL		REL 12-16-87
QE	E. M. GUTIERREZ	QE	12/4/87	QE 1-7-88

ITEM:
UPLOCK RELEASE THRUSTER, MAIN LANDING GEAR

FUNCTION:
AUTOMATIC EMERGENCY BACKUP RELEASE OF MAIN LANDING GEAR IF PRIMARY HYDRAULIC DEPLOYMENT SYSTEM UPLOCK MALFUNCTIONS. PYRO UPLOCK FIRES AUTOMATICALLY 1 SECOND AFTER GEAR DEPLOYMENT COMMAND IF PROXIMITY SWITCH DOES NOT SENSE MOVEMENT.

FAILURE MODE:
FAILS TO FUNCTION

CAUSE(S):
STRUCTURAL FAILURE, JAMMED PISTON, CARTRIDGE FAILS TO FIRE, PISTON PRESSURE BLOWBY, SHEAR PIN OVERSTRENGTH

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

(A) MAIN LANDING GEAR WILL NOT DEPLOY. (LOSS OF HYDRAULIC SYSTEM #1 HAS TO OCCUR FIRST).

(B,C) NONE. EVENT OCCURS SECONDS BEFORE LANDING.

(D) POSSIBLE LOSS OF CREW/VEHICLE.

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

(A) DESIGN
THRUSTER DESIGNED TO OPERATE WHEN FIRED WITH AN 85% LOADED CARTRIDGE. PISTON UTILIZES DUAL O-RINGS FOR PRESSURE INTEGRITY. PARTS DESIGNED WITH FACTOR OF SAFETY OF 1.4 OR GREATER. CARTRIDGE WILL OPERATE THRUSTER WHEN IGNITED WITH ONE OF TWO INITIATORS.

(B) TEST

QUALIFICATION TESTS: SHOCK, SALT FOG, RANDOM VIBRATION, FIVE THERMAL CYCLES -80 DEG F TO +350 DEG F, HYDROSTATIC BURST PRESSURE TEST (1.75 X NORMAL OPERATING PRESSURE), LOCKED SHUT FIRING WITH NOMINAL CARTRIDGE, FIRINGS (3 EACH) AT -80 DEG F, AMBIENT, AND +350 DEG F, MARGINAL CARTRIDGE FIRING WITH 85% LOADED CARTRIDGE. REF. CERTIFICATION REQUIREMENTS (CR) 26-325-0019-0001, SKD26100102; QTR SCOT INC. #1001-201.

ACCEPTANCE TESTS: 100% THRUSTER PROOF PRESSURE TEST (1.2 X NORMAL OPERATING PRESSURE), 100% LEAK TEST OF O-RINGS IN ASSEMBLY, 100% SHEAR PIN SHEAR TEST, PISTON LOCK TEST AT 45 PSI WITH POST TEST FREEDOM TO ROTATE VERIFICATION, RANDOM LOT ACCEPTANCE TEST PERFORMANCE FIRINGS. REF. CR-26-325-0019-0001, ATP SCOT INC. #1001-200.

SYSTEM TESTS (AT DOWNEY): 3 FULL SCALE DEPLOYMENT TESTS WITH SIMULATED AIRLOADS AT AMBIENT, -35 DEG F, AND +140 DEG F ON THE LANDING GEAR TEST ASSEMBLY. REF. CR-26-510201-008, QTR S0D80-0347.

OMRSD: GROUND TURNAROUND INCLUDES VISUAL INSPECTION OF THRUSTER FOR EVIDENCE OF DAMAGE (V55ARO.210) AND VISUAL INSPECTION AND MEASUREMENT OF GAP FOR EVIDENCE OF THRUSTER EXTENSION (V55AUO.010).

(C) INSPECTION

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

ASSEMBLY/INSTALLATION
ASSEMBLIES ARE X-RAYED TO ASSURE FREEDOM FROM VOIDS AND CRACKS AND TO VERIFY CORRECT ASSEMBLY AND PRESENCE OF ALL DETAILED PARTS. VISUAL INSPECTION, IDENTIFICATION PERFORMED, AND PARTS PROTECTION VERIFIED BY INSPECTION.

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

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.

(D) FAILURE HISTORY
NONE

(E) OPERATIONAL USE
NONE.