SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :LANDING/DECELERATION-PYRO FMEA NO P2-1A -103 -1 REV:12/02/87

ASSEMBLY :NOSE LANDING GEAR
P/N RI :SKD26100101-301
P/N VENDOR:
QUANTITY :1
:ONE CARTRIDGE

CRIT. FUNC: 1
CRIT. HDW: 1

VEHICLE	102	103	104
EFFECTIVITY:	X	X	X

PHASE(S): PL LO OO DO X LS

REDUNDANCY SCREEN: A- B- C-

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ITEM:
PYRO-PRESSURE CARTRIDGE, UPLOCK THRUSTER, NOSE LANDING GEAR

FUNCTION:
DUAL INITIATOR CARTRIDGE PROVIDES A PRESSURE OUTPUT TO ACTIVATE THE EMERGENCY BACKUP PYRO UPLOCK THRUSTER AFTER THE PRIMARY HYDRAULIC SYSTEM MALFUNCTIONS. PYRO UPLOCK FUNCTIONS AUTOMATICALLY 1 SECOND AFTER GEAR DEPLOYMENT COMMAND IF PROXIMITY SWITCH DOES NOT SENSE MOVEMENT.

FAILURE MODE:
FAILS TO FUNCTION OR LOW PRESSURE OUTPUT

CAUSE(S):
DUAL INITIATOR FAILURE, LOSS OF DUAL ELECTRICAL SIGNALS TO NASA STANDARD INITIATORS (NSI'S) (REF. P2-5A-J05-1), CONTAMINATION OF PYRO MIX, HANDLING DAMAGE

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

(A) NOSE GEAR FAILS TO EXTEND (LOSS OF HYDRAULIC SYSTEM #1 HAS TO OCCUR FIRST).

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

(D) POTENTIAL LOSS OF CREW/VEHICLE.

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

(A) DESIGN
DUAL INITIATORS WITH SEPARATE POWER SUPPLIES. THRUSTER DESIGNED TO OPERATE WITH 80% LOADED CARTRIDGE INITIATED WITH EITHER OR BOTH NSI'S.

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(B) TEST

PREVIOUSLY QUALIFIED FOR APOLLO REQUIREMENTS AS V36-596007-51: 0 DEG F TO +250 DEG F, THERMAL/VACUUM, THERMAL CYCLING, VIBRATION AT TEMPERATURE. ROCKWELL SPECIFICATION MA0408-0052.

QUALIFICATION TESTS: HUMIDITY, SALT FOG, SHOCK, RANDOM VIBRATION, THERMAL CYCLING (-65 DEG F TO +200 DEG F), THERMAL/VACUUM, LOCKED SHUT, MARGINAL CARTRIDGE ACTUATION, -65 DEG F/AMBIENT/+200 DEG F FIRINGS. CERTIFICATION REQUIREMENTS (CR) 26-325-0006-0001, OEA INC. #2571-8/A: SKD26100101.

SYSTEM TESTS: NOSE GEAR DEPLOY AT DOWNEY - 3 TESTS (2 AMBIENT AND ONE AT 0 DEG F) (CR-26-510601-001).

ACCEPTANCE TESTS: EXAMINATION OF PRODUCT, HELIUM LEAK TEST, EXPLOSIVE WEIGHT VERIFICATION, TENSILE TEST COUPONS FROM HEAT LOT, LOT ACCEPTANCE FIRINGS OF RANDOM SAMPLES. ATP - ROCKWELL MA0208-0043, QUANTIC 213.0014.

PYRO VERIFICATION TEST (PVT): SAMPLE LOT FIRING YEARLY AT KSC UNTIL AGE LIFE EXPIRES.

OMRSD: GROUND TURNAROUND INCLUDES PYRO INITIATOR CONTROLLER (PIC) RESISTANCE TEST (POST-HOOKUP) (V55AM0.110), PIC GO/NO-GO RESISTANCE TEST (PRE-HOOKUP) (V55AA0.020 AND V55AA0.030), POWER-OFF STRAY VOLTAGE CHECK (V55AM0.010), POWER-ON STRAY VOLTAGE CHECK (V55AA0.040), NSI ELECTRICAL VERIFICATION (V55AN0.010), AND PYRO FIRING TEST (LANDING GEAR) (V55AD0.000).

(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.

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(D) FAILURE HISTORY
NONE.

(E) OPERATIONAL USE
NONE.