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FAILURE MODES EFFECTS ANALYSIS (FMEA) NUMBER: P7-2B-CRW2-X

SUBSYSTEM NAME: SIDE HATCH JETTISON

REVISION : 09/12/88

CLASSIFICATION NAME PART NUMBER
LRU : ENERGY TRANSFER SYSTEM (ETS) MC325-0004

QUANTITY OF LIKE ITEMS:
2 REDUNDANT SYSTEMS

DESCRIPTION/FUNCTION:
SHIELDED MILD DETONATING CORD (SMDC) AND CONFINED DETONATING CORD (CDC) LINES, TIME DELAY, THROUGH-BULKHEAD INITIATOR, TEES, UNIONS, ELBOW FITTINGS. ENERGY TRANSFER SYSTEM TRANSMITS DETONATING SIGNAL FROM T-HANDLES TO VENT, COLLAR, HINGE SEVERANCE ASSEMBLIES AND HATCH JETTISON ASSEMBLY.

REFERENCE DOCUMENTS: VD70-553414

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SUMMARY

SUBSYSTEM NAME: SIDE HATCH JETTISON
LRU :ENERGY TRANSFER SYSTEM (ETS)
LRU PART #: MC325-0004
ITEM NAME:ENERGY TRANSFER SYSTEM (ETS)

FMEA NUMBER	ABBREVIATED FAILURE MODE DESCRIPTION	CIL FLG	CRIT	NO FD
P7-2B-CRW2-01	NO OUTPUT OR FAILS OFF	X	1R2	

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FAILURE MODES EFFECTS ANALYSIS (FMEA) NUMBER: P7-2B-CRW2-01

SUBSYSTEM: SIDE HATCH JETTISON
LRU :ENERGY TRANSFER SYSTEM (ETS)
ITEM NAME: ENERGY TRANSFER SYSTEM (ETS)

REVISION: 09/12/88

CRITICALITY OF THIS
FAILURE MODE:1R2

FAILURE MODE:
NO OUTPUT

MISSION PHASE:

RTLS RETURN TO LAUNCH SITE
TAL TRANS ATLANTIC ABORT
AOA ABORT ONCE AROUND
DO DE-ORBIT
LS LANDING SEQUENCE

VEHICLE/PAYLOAD/KIT EFFECTIVITY:	102	COLUMBIA
	: 103	DISCOVERY
	: 104	ATLANTIS
	: 105	NEW ORBITER

CAUSE:
CONTAMINATED PYRO MIXTURE, STRUCTURAL FAILURE, EXCESSIVE GAP IN
EXPLOSIVE CORD, EXCESSIVE TRANSFER GAP.

CRITICALITY 1/1 DURING ANY MISSION PHASE OR ABORT? NO

REDUNDANCY SCREEN A) N/A
B) N/A
C) FAIL

PASS/FAIL RATIONALE:

A)
NOT APPLICABLE TO PYRO/MECHANICAL SYSTEM.

B)
NOT APPLICABLE TO PYRO/MECHANICAL SYSTEM.

C)
PROXIMITY OF ETS LINES OR T-HANDLE FAILURE ALLOWS POSSIBLE LOSS OF ALL
REDUNDANCY DUE TO A SINGLE EVENT.

METHOD OF FAULT DETECTION:
NONE.

CORRECTING ACTION: NONE
NO CORRECTING ACTION IS POSSIBLE.

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- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF ANY ETS COMPONENT RESULTS IN THE LOSS OF ONE REDUNDANT LEG OF THE ETS SYSTEM. REMAINING LEG CAPABLE OF INITIATING ALL CREW ESCAPE FUNCTIONS.

(B) INTERFACING SUBSYSTEM(S):
NONE FOR FIRST FAILURE. LOSS OF COLLAR, HINGE, TRUSTER AND VENT FUNCTION IF REDUNDANT ETS FAILS.

(C) MISSION:
NONE.

(D) CREW, VEHICLE, AND ELEMENT(S):
PROBABLE LOSS OF CREW IF REDUNDANT ETS FAILS. ON GROUND, OVERHEAD WINDOW COULD BE UTILIZED AS AN ALTERNATE MEANS OF EGRESS.

Criticality/
Required Fault Tolerance/Achieved Fault Tolerance: 1R/1/1

RATIONALE FOR CRITICALITY:
REDUNDANT ENERGY TRANSFER SYSTEMS.

TIME FROM FAILURE TO CRITICAL EFFECT: IMMEDIATE

TIME FROM FAILURE OCCURRENCE TO DETECTION: IMMEDIATE

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: N/A

TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT? N/A

- DISPOSITION RATIONALE -

(A) DESIGN:
DUAL REDUNDANT ENERGY TRANSFER SYSTEMS. EITHER IS CAPABLE OF PERFORMING FUNCTION.

(B) TEST:
QUAL TEST INCLUDES: SALT FOG, RANDOM VIBRATION, THERMAL CYCLING, PRESSURE CYCLING, SHOCK, FLEXIBILITY (CDC), HUMIDITY, +350 DEGREES F/-65 DEGREES F AMBIENT FIRING, 8-FOOT DROP.

ACCEPTANCE TESTING INCLUDES: EXAMINATION OF PRODUCT, X-RAY, N-RAY,

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HELIUM LEAK TEST, LOT ACCEPTANCE FIRING OF RANDOM SAMPLES.

SYSTEM TEST: ONE (1) INTEGRATED SYSTEM TEST (ITS (ELECTRICAL INITIATION), COLLAR, HINGE, THRUSTER), PRIOR TO STS-26. FIVE (5) ADDITIONAL INTEGRATED SYSTEM TESTS PLANNED. RANDOM SAMPLE FIRING TEST (QUAL TEST FIRINGS FULFILL REQUIREMENT FOR FIRE LOT).

(C) INSPECTION:

RECEIVING INSPECTION

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

CONTAMINATION CONTROL

CONTAMINATION CONTROL AND CORROSION PROTECTION PROCESSES VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

OPERATION VERIFIED BY MIPS ON SHOP TRAVELER.

NONDESTRUCTIVE EVALUATION

PARTS ARE X-RAYED AND N-RAYED TO VERIFY CORRECT ASSEMBLY AND PRESENCE OF ALL DETAIL PARTS AND EXPLOSIVES. X-RAYS AND N-RAYS ARE REVIEWED BY VENDOR, DCAS, NASA QUALITY AND ENGINEERING. ALL CRITICAL DIMENSIONS ARE INSPECTED.

TEST

ATP IS VERIFIED BY INSPECTION.

CRITICAL PROCESSES

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

STORAGE

STORAGE ENVIRONMENT VERIFIED BY INSPECTION.

HANDLING AND PACKAGING

HANDLING AND PACKAGING IS VERIFIED BY INSPECTION PER THE REQUIREMENTS OF INSPECTION PER THE REQUIREMENTS OF APPLICABLE SPECIFICATIONS.

(D) FAILURE HISTORY:

NO FAILURE HISTORY.

(E) OPERATIONAL USE:

ON GROUND, OVERHEAD EGRESS WINDOW COULD BE UTILIZED AS AN ALTERNATE MEANS OF EGRESS.

REMARKS:

- APPROVALS -

FAILURE MODES EFFECTS ANALYSIS (FMEA) NUMBER: P7-2B-CRW2-01

RELIABILITY ENGINEERING:	C. FERRARELLA	:	<i>C. Ferrarella for R64 9/12/88</i>
DESIGN ENGINEERING	: R. YEE	:	<i>R. Yee for P. S. DeLong 9/12/88</i>
QUALITY ENGINEERING	: E. GUTIERREZ	:	<i>E. Gutierrez for P. S. DeLong 9/12/88</i>
NASA RELIABILITY	:	:	<i>Thomas J. Sullivan 9-27-88</i>
NASA DESIGN	:	:	<i>W.D. J. Sullivan 9-27-88</i>
NASA QUALITY ASSURANCE	:	:	<i>W.D. J. Sullivan 9-27-88</i>