FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL HARDWARE
NUMBER: M5-6MR-B006-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
REVISION: 0 OCT, 1995

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	ENERGIA POWER PANEL RSC-E	MC621-0087-0009 CKB>=468=312=001
SRU	:	PUSH BUTTON SWITCH	PKZ-8 (AGO.360 212.TU)

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
PUSH-BUTTON SWITCHES (TWO DOUBLE POLE SWITCHES UNDER A SINGLE COVER CAP,) TWO POLE, MOMENTARY - APDS "APDS CIRCUIT PROTECTION OFF" COMMAND.

REFERENCE DESIGNATORS: 36V73A8A3SB2-B1
36V73A8A3SB2-B2

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:
PROVIDE THE "APDS CIRCUIT PROTECTION OFF" COMMAND STIMULI TO ENERGIZE THE APPROPRIATE RELAYS IN THE DOCKING SYSTEM CONTROL UNIT (DSCU). THE SWITCH IS USED AS A PROTECTIVE DEVICE WHICH PREVENTS THE IMPLEMENTATION OF INVOLUNTARY (OUT OF SEQUENCE) CRITICAL COMMANDS INTO THE DSCU. THE "APDS CIRCUIT PROTECTION OFF" SWITCH PREVENTS UNWANTED EXECUTION OF THE FOLLOWING COMMANDS: "RING OUT," "UNDOCKING," "OPEN LATCHES," AND "OPEN HOOKS."

27 ORIGINAL

PRINT DATE: 12/27/95

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: M5-6MR-B006- 02

REVISION# 0 OCT, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC621-0087-0009
ITEM NAME: PUSH BUTTON SWITCH

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
FAILS CLOSED (MULTIPLE CONTACTS WITHIN ONE SWITCH.) SHORTS TO GROUND

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:
A) PIECE PART FAILURE, B) CONTAMINATION, C) VIBRATION, D) MECHANICAL SHOCK, E) PROCESSING ANOMALY, F) THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? NO

REDUNDANCY SCREEN
A) PASS
B) PASS
C) PASS

PASS/FAIL RATIONALE:
A)

B)

C)

METHOD OF FAULT DETECTION:
THE DISPLAY PANEL PROVIDES INDICATION THAT THE APDS CIRCUIT PROTECTION IS OFF AND THAT THE APDS IS READY TO RECEIVE CRITICAL COMMANDS.

MASTER MEAS. LIST NUMBERS: V53X0784E

CORRECTING ACTION:
NONE.

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF SWITCH CONTROL CAPABILITY FOR THE APDS "APDS CIRCUIT PROTECTION OFF" CIRCUITS.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6MR-B006- 02

(B) INTERFACING SUBSYSTEM(S):
UNWANTED "APDS CIRCUIT PROTECTION OFF" COMMAND. LOSS OF REDUNDANCY AGAINST IMPLEMENTATION OF INVOLUNTARY (OUT OF SEQUENCE) CRITICAL COMMANDS INTO THE DSCU.

(C) MISSION:
NO EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FAILURE - NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW OR VEHICLE AFTER THREE FAILURES. 1) ONE OF TWO "APDS CIRC PROT OFF" SWITCHES FAILS CLOSED. LOSS OF PROTECTION AGAINST AN UNWANTED "OPEN LATCHES" COMMAND TO THE APDA. 2) ONE OF TWO ASSOCIATED "OPEN LATCHES" SWITCHES FAILS CLOSED. ENABLES TWO OF THREE PANEL COMMAND SIGNALS. THREE CAPTURE LATCHES INADVERTENTLY OPEN DURING DYNAMIC CAPTURE OPERATION.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): 1R2

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
THIRD FAILURE (INABILITY TO PERFORM FIRING RCS JETS TO ENABLE SEPARATION) - POTENTIALLY CAUSING A COLLISION BETWEEN THE TWO VEHICLES.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: HOURS

TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT?
YES
RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
CREW WOULD HAVE SUFFICIENT TIME TO PERFORM FIRING OF JETS TO PREVENT COLLISION.
HAZARDS REPORT NUMBER(S) : ORBI 402A
HAZARD DESCRIPTION:
UNCONTROLLED/INADVERTENT COLLISION BETWEEN ORBITER AND MIR.

- APPROVALS -

PRODUCT ASSURANCE ENGR : M. NIKOLAYEVA

DESIGN ENGINEER : B. VAKULIN

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