

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE
NUMBER:05-3-12309 -X

SUBSYSTEM NAME: DISPLAYS & CONTROLS

REVISION: 2 12/18/95

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	:C&W ELECTRONICS UNIT	MC409-0012-0031

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

REFERENCE DESIGNATORS:

QUANTITY OF LIKE ITEMS: 1
ONE/AVIONICS BAY 3

FUNCTION:

THE CAUTION AND WARNING ELECTRONICS UNIT (CWE) MONITORS SELECTED ORBITER SUBSYSTEM PARAMETERS VIA A HARDWIRED PRIMARY SYSTEM (SYSTEM A) AND A GPC SOFTWARE SYSTEM (SYSTEM B) KNOWN AS C&W BACKUP. THE CWE PROVIDES OUTPUT SIGNALS TO GIVE AURAL AND VISUAL WARNINGS (MASTER ALARM TONE AND LIGHTS) TO THE CREW OF OUT-OF-TOLERANCE CONDITIONS. THE CWE ALSO ILLUMINATES THE APPROPRIATE LIGHT ON THE C&W ANNUNCIATOR ARRAY.

| FAILURE MODES EFFECTS ANALYSIS FMEA – NON-CIL FAILURE MODE

NUMBER: 05-3-12309-09

REVISION#: 2 12/18/95

SUBSYSTEM NAME: DISPLAYS & CONTROLS

LRU: C&W ELECTRONICS UNIT

CRITICALITY OF THIS

| ITEM NAME: C&W ELECTRONICS UNIT

FAILURE MODE: 1R3

FAILURE MODE:

LOSS OF ONE OF TWO POWER SUPPLIES/TONE GENERATORS.

MISSION PHASE: PL PRE-LAUNCH
 LO LIFT-OFF
 OO ON-ORBIT
 DO DE-ORBIT
 LS LANDING/SAFING

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

CAUSE:

| VIBRATION, SHOCK, CONTAMINATION, PIECE PART FAILURE.

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) PASS
 B) PASS
 C) PASS

PASS/FAIL RATIONALE:

A)

B)

C)

CORRECTING ACTION: MANUAL

CORRECTING ACTION DESCRIPTION:

| THE FLIGHT CREW MUST CONTINUALLY MONITOR FAULT SUMMARY MESSAGES ON THE DISPLAY UNIT (CRT) FOR LOSS OF THE ASSOCIATED ESSENTIAL BUS, UNLESS THE

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REMAINING POWER SUPPLY IS REDUNDANTLY POWERED THROUGH AN IN-FLIGHT MAINTENANCE PROCEDURE, OR THE ASSOCIATED FUEL CELL IS PLACED IN STANDBY.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF ONE OF TWO POWER SUPPLIES, "A" OR "B".

(B) INTERFACING SUBSYSTEM(S):

NO EFFECT.

(C) MISSION:

NO EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(S):

NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:

EACH POWER SUPPLY IS CONNECTED TO A DIFFERENT ESSENTIAL BUS THROUGH C&W CIRCUIT BREAKERS. LOSS OF ONE C&W POWER SUPPLY WILL TRIGGER A C&W ALARM. THE CREW ACKNOWLEDGES THE ALARM BY DEPRESSING THE MASTER ALARM RESET SWITCH. IF THE REMAINING POWER SUPPLY, OR ITS ESSENTIAL BUS FAILS, THE RESULT WILL BE THE LOSS OF ALL C&W AURAL AND VISUAL ALARMS. THE ESSENTIAL BUS FAILURE WILL SIMULTANEOUSLY INTERRUPT FUEL CELL COOLANT PUMP OPERATION, CREATING A TIME CRITICAL EMERGENCY CONDITION. THE CREW MUST TAKE REMEDIAL ACTION WITHIN 9 MINUTES OF ESSENTIAL BUS FAILURE TO AVOID A CATASTROPHIC FUEL CELL FAILURE.

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

(F) RATIONALE FOR CRITICALITY DOWNGRADE:

AFTER THE FIRST FAILURE THE CREW WILL PERFORM AN IFM TO REDUNDANTLY POWER THE REMAINING C&W UNIT AND PRECLUDE A SINGLE FAILURE (ESSENTIAL BUS LOSS) FROM RESULTING IN AN UNANNOUNCIATED TIME CRITICAL CATASTROPHIC FUEL CELL FAILURE.

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- APPROVALS -

EDITORIALLY APPROVED	: RI	: <i>Qun Du 12/19/95</i>
EDITORIALLY APPROVED	: JSC	: <i>Law Security 1-8-96</i>
TECHNICAL APPROVAL	: APPROVAL FORM	: 85-CIL-003-RI