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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 06-2F-330005-X

SUBSYSTEM NAME: LIFE SUPPORT
REVISION : 2 06/13/90

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	CBRF3 FIRE SUPPRESSION SUBSYS	MC282-0065-0001 APCO 819201-1
SRU	:	NOZZLE ASSY, FIRE EXTINGUISHER	42-11245 APCO 819201-1

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
NOZZLE ASSEMBLY, AVIONICS BAY FIRE EXTINGUISHER.

QUANTITY OF LIKE ITEMS: 3
ONE PER EXTINGUISHER

FUNCTION:
PROVIDES HOUSING FOR NSI AND CONTAINS NOZZLE, KNIFE, AND ACTIVATION GAS CHAMBER. PROVIDES PATHWAY FOR SUBSEQUENT EXIT OF SUPPRESSANT. NOZZLE CONTAINS TWO HOLES WHICH CHANNEL THE DIRECTION OF THE SUPPRESSANT STREAM.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 06-2F-330005-01

REVISION# 2 06/13/90 R

SUBSYSTEM: LIFE SUPPORT
LRU :CBRF3 FIRE SUPPRESSION SUBSYS
ITEM NAME: NOZZLE ASSY, FIRE EXTINGUISHER

CRITICALITY OF THIS FAILURE MODE:1/1

FAILURE MODE:
KNIFE FAILS TO RUPTURE DIAPHRAGM (KNIFE JAMMED)

MISSION PHASE:
LO LIFT-OFF
DO DE-ORBIT

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

CAUSE:
PIECE PART STRUCTURAL FAILURE, CORROSION, MECHANICAL SHOCK, VIBRATION.

■ CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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

PASS/FAIL RATIONALE:
A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
INABILITY TO DISPENSE SUPPRESSANT FROM ONE AVIONICS BAY EXTINGUISHER.

(B) INTERFACING SUBSYSTEM(S):
INABILITY TO EXTINGUISH A FIRE REMOTELY IN ONE AVIONICS BAY.

(C) MISSION:
NO EFFECT.

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(D) CREW, VEHICLE, AND ELEMENT(S):
POSSIBLE LOSS OF CREW/VEHICLE IF COMBUSTION IS SUPPORTED DURING LAUNCH AND DEORBIT. SINGLE STRING EMERGENCY SYSTEM.

(E) FUNCTIONAL CRITICALITY EFFECTS:

- DISPOSITION RATIONALE -

(A) DESIGN:
MATERIALS COMPATIBLE WITH HALON 1301 - ANODIZED ALUMINUM HOUSING; STAINLESS STEEL KNIFE PLUNGER, SPRING AND RETAINER; ANNEALED COPPER DIAPHRAGM DESIGNED TO PEEL BACK AND NOT FRAGMENT. COMPONENTS DESIGNED NOT TO GENERATE ANY FRAGMENTS THAT MAY BLOCK NOZZLES. TWO REDUNDANT 1/2 INCH NOZZLES. ALL TORQUED ITEMS LOCKWIRED.

(B) TEST:
QUALIFICATION TEST - QUALIFIED FOR 100 MISSION LIFE; 20G SHOCK/AXIS; 5-24 HOUR TEMP. CYCLES AT 60 TO 125 DEG. F; 24 HR. HIGH TEMPERATURE TEST AND ACTIVATION AT 135 DEG.F. LOW TEMPERATURE ACTIVATION AT 53 DEG F., VIBRATION TEST AT 0.09G SQ/HZ FOR 48 MIN/AXIS,SALT FOG TEST.

ACCEPTANCE TEST - ACTIVATION CHAMBER LEAK TESTED AT 1800 PSIG.; KNIFE PLUNGER DISPLACEMENT TESTED AT 100 PSIG; FREE KNIFE MOVEMENT TEST DURING ASSEMBLY.

TURNAROUND - VISUAL INSPECTION EVERY TWO FLIGHTS TO VERIFY NOZZLE ASSY IS FREE OF DEBRIS.

(C) INSPECTION:
RECEIVING INSPECTION
RAW MATERIALS AND PURCHASED COMPONENTS ARE VERIFIED BY RECEIVING INSPECTION. DIAPHRAGM LOT TEST CERTIFICATION VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
CORROSION PROTECTION PROVISIONS AND CONTAMINATION CONTROL PLAN ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES
COATING AND PLATING PROCESSES ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
ALL DIMENSIONS, TORQUING AND LOCKWIRE VERIFIED. PARTS PROTECTION, MANUFACTURING PROCESSES, INSTALLATION AND ASSEMBLY ARE VERIFIED BY INSPECTION.

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TESTING
ACCEPTANCE TESTING IS WITNESSED AND VERIFIED BY INSPECTION.

(D) FAILURE HISTORY:
NO APPLICABLE FAILURE HISTORY.

(E) OPERATIONAL USE:
POWER DOWN AFFECTED AVIONICS BAY IF FIRE OCCURS.

- APPROVALS -

RELIABILITY ENGINEERING	D. R. RISING	
DESIGN ENGINEERING	D. WADA	
QUALITY ENGINEERING	W. J. SMITH	6/14/90
NASA RELIABILITY		7/17/90
NASA SUBSYSTEM MANAGER		7/17/90
NASA QUALITY ASSURANCE		7-9-90