FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 02-2A-011102 -X

SUBSYSTEM NAME: FLIGHT CONTROL MECH - RUDDER SPEED BRAKE & BF
REVISION: 0 02/02/88

PART DATA

	PART NAME **VENDOR NAME**	**PART NUMBER** **VENDOR NUMBER**
ASSY	: RUDDER/SPEEDBRAKE (R/SB) SUN	MC621-0053-0068 5004918B
SRU	: FILTER, 15 MICRON	

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
FILTER, 15 MICRON

REFERENCE DESIGNATORS:

QUANTITY OF LIKE ITEMS: 2
ONE EACH RUDDER AND SPEEDBRAKE

FUNCTION:
RETAINS INSOLUBLE CONTAMINANTS CONTAINED IN THE HYDRAULIC FLUID SUPPLIED TO THE RUDDER AND SPEEDBRAKE SERVOVALVES, BYPASS VALVES, AND POWER VALVE.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE
NUMBER: 02-2A-011102- 02

REVISION#: 1 08/07/98
SUBSYSTEM NAME: FLIGHT CONTROL MECH - RUDDER SPEED BRAKE & BF
LRU: **CRITICALITY OF THIS**
ITEM NAME: FILTER, 15 MICRON **FAILURE MODE:** 1/1

FAILURE MODE:
NO FLOW

MISSION PHASE: DO DE-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:

102	COLUMBIA
103	DISCOVERY
104	ATLANTIS
105	ENDEAVOUR

CAUSE:
EXCESSIVE CONTAMINATION

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:
LOSS OF CONTROL OF HYDRAULIC FLUID TO THREE HYDRAULIC MOTORS, RESULTING IN LOSS OF RUDDER OR SPEEDBRAKE FUNCTIONS.

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(B) INTERFACING SUBSYSTEM(S):
NONE.

(C) MISSION:
LOSS OF MISSION, CREW/VEHICLE.

(D) CREW, VEHICLE, AND ELEMENT(S):
SAME AS (C)

-DISPOSITION RATIONALE-

(A) DESIGN:
FILTER SIZED FOR VEHICLE LIFE. FILTER ELEMENT DESIGNED TO MEET MIL-F- 8815 SPEC. PROVEN DESIGN COMPATIBLE WITH REQUIREMENTS OF SE-F-0044 RATED 15 MCRN ABSOLUTE ELEMENT SIZED FOR WORST CASE CONTAMINANT LEVEL - 100 MISSION LIFE. VISIBLE POP-UP INDICATOR (100 PSID). UPSTREAM 5 MICRON HYDRAULIC SYSTEM FILTER AND SERVICING CART FILTER. SYSTEM WILL OPERATE ON 1,000 PSID PRESSURE DROP ACROSS FILTER.

(B) TEST:
QUALIFICATION TESTS: ELEMENT BUBBLE POINT MONITORED DURING QUALIFICATION TESTING. FILTER USEFUL LIFE WAS VERIFIED BY DEMONSTRATING ACCEPTABLE PERFORMANCE AFTER THE COMPLETION OF A 400 MISSION DUTY CYCLE QUALIFICATION TEST WITH EXPOSURE OF FLUID THAT HAD MAXIMUM ALLOWABLE HYDRAULIC SYSTEM CONTAMINATION LEVEL. TEST ENVIRONMENTS INCLUDES FULL VIBRATION TESTING. CONTAMINATION ADDED TO FLUID UPSTREAM OF FILTER TO VERIFY PERFORMANCE UNTIL 3,000 PSID WAS PRODUCED ACROSS ELEMENT TO VERIFY DIRT CAPACITY AND STRUCTURAL INTEGRITY.

ACCEPTANCE TESTS: ELEMENT RECEIVES COMPONENT ACCEPTANCE TEST TO VERIFY BUBBLE POINT/VIBRATION OF ELEMENT AND CASE FOLLOWED BY FLUSH SAMPLE. PARTICLE COUNT VERIFIES CLEANLINESS. CLEAN ELEMENT INSTALLED IN ACTUATOR FOLLOWING UNIT ATP AND PRIOR TO DELIVERY TO ROCKWELL. FLUID FROM ACTUATOR IS VERIFIED TO CLEANLINESS LEVEL 190 PER MA0110-301.

GROUND TURNAROUND TEST
ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

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(C) INSPECTION:
RECEIVING INSPECTION
AT THE FILTER SUPPLIER (WINTEC), THE FILTER MATERIAL IS DEBURRED AFTER MACHINING AND INSPECTED UNDER 10X MAGNIFICATION. MOOG SOURCE INSPECTION VERIFIES DEBURRING PRIOR TO FINAL ASSEMBLY OF FILTER ELEMENT. AT MOOG, FILTER MESH MATERIAL CERITIFICATIONS ARE VERIFIED, AND CRITICAL DIMENSIONS ARE INSPECTED. FOLLOWING DIMENSIONAL INSPECTION, FILTER ELEMENTS ARE RECLEANED AND CERTIFIED.

CONTAMINATION CONTROL
THE HYDRAULIC SYSTEM TEST STAND FLUID IS MAINTAINED CLEAN PER CONTAMINATION CONTROL PLAN. END ITEM FLUID SAMPLE IS VERIFIED PRIOR TO SHIPMENT OF ACTUATOR.

TESTING
ROCKWELL DESIGN AND QUALITY PERSONNEL, WITH NASA PARTICIPATION, CONDUCT DETAILED ACCEPTANCE REVIEW OF THE HARDWARE AT THE VENDOR'S FACILITY, PRIOR TO SHIPMENT OF EACH END ITEM COVERED BY CONTROL PLAN. ATP VERIFICATION IS MIP FOR RI QA REPRESENTATIVE.

(D) FAILURE HISTORY:
CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATA BASE.

(E) OPERATIONAL USE:
NONE.

- APPROVALS -

EDITORIALLY APPROVED	: BNA	: J. Kimura 8-18-98
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 95-CIL-009_02-2A