PRINT DATE: 08/24/98

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 02-2C-C01-FE-B -X

SUBSYSTEM NAME: FLIGHT CONTROL MECH

REVISION: 0 12/04/87

PART DATA

	PART NAME / **VENDOR NAME**	**PART NUMBER** / **VENDOR NUMBER**
LRU	:ELEVON ACTUATOR MOOG	MC621-0014
SRU	:SERVOVALVE INLET FILTER	

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SERVOVALVE INLET FILTER

QUANTITY OF LIKE ITEMS: 4
ONE PER ACTUATOR

FUNCTION:
PROVIDES 10 MICRON NOMINAL, 15 MICRON ABSOLUTE FILTRATION OF HYDRAULIC FLUID SUPPLIED TO THE SERVOVALVES, SOLENOID ISOLATION VALVES AND SERVOVALVE DIFFERENTIAL PRESSURE SENSORS.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE
NUMBER: 02-2C-C01-FE-B-08

REVISION#: 1 08/20/98

SUBSYSTEM NAME: FLIGHT CONTROL - ELEVON ACTUATOR
LRU: ELEVON ACTUATOR **CRITICALITY OF THIS**
ITEM NAME: SERVOVALVE INLET FILTER **FAILURE MODE:** 1/1

FAILURE MODE:
CLOGGED ELEMENT

MISSION PHASE: LO LIFT-OFF
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 ONE ACTUATOR FUNCTION.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE
NUMBER: 02-2C-C01-FE-B- 08

(B) INTERFACING SUBSYSTEM(S):
LOSS OF CONTROL FOR ONE ELEVON SURFACE.

(C) MISSION:
POSSIBLE LOSS OF MISSION, CREW/VEHICLE. LOSS OF FUNCTION CAN RESULT IN LOSS OF VEHICLE CONTROL.

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

-DISPOSITION RATIONALE-

(A) DESIGN:
DESIGNED PER MIL-F-8815 AND IS A STAINLESS STEEL WIRE MESH MATERIAL. ELEMENT SIZED TO RETAIN WORST CASE 100 MISSION CONTAMINANT LEVEL. REFERENCE MOOG REPORT (WINTEC NUMBER TR419) FLOW PERFORMANCE CONTAMINANT CAPACITY. THE SERVOVALVE INLET FILTER ELEMENT IS PROTECTED BY A 5 MICRON HYDRAULIC SYSTEM FILTER UPSTREAM OF THE ACTUATOR. THE SERVOVALVE INLET FILTER IS PROVIDED WITH A DELTA PRESSURE INDICATOR.

(B) TEST:
QUALIFICATION: ELEMENT BUBBLE POINT MONITORED DURING QUALIFICATION TESTING. FILTER USEFUL LIFE WAS VERIFIED BY DEMONSTRATING ACCEPTABLE PERFORMANCE AFTER THE COMPLETION OF A 400 MISSION QUALIFICATION TEST WITH EXPOSURE OF FLUID THAT HAD MAXIMUM ALLOWABLE HYDRAULIC SYSTEM CONTAMINATION LEVEL. TEST ENVIRONMENTS INCLUDE 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: 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 MEET CLEANLINESS LEVEL 190 PER MAO110-301.

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

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE
NUMBER: 02-2C-C01-FE-B- 08

(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 CERTIFICATIONS 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 A DETAILED ACCEPTANCE REVIEW OF THE HARDWARE AT THE VENDOR'S FACILITY, PRIOR TO THE 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. Kamura 8-24-98
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 95-CIL-009_02-2C