FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 02-2C-C01-CV-C -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	:CHECK VALVE	

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
CHECK VALVE

QUANTITY OF LIKE ITEMS: 4
ONE PER ACTUATOR

FUNCTION:
PREVENTS ELEVON SURFACE MOVEMENT DURING ACTUATOR HYDRAULIC SELECTION.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE
NUMBER: 02-2C-C01-CV-C- 09

REVISION#: 1 08/20/98

SUBSYSTEM NAME: FLIGHT CONTROL - ELEVON ACTUATOR
LRU: ELEVON ACTUATOR **CRITICALITY OF THIS**
ITEM NAME: CHECK VALVE **FAILURE MODE:** 1R2

FAILURE MODE:
FAILS OPEN

MISSION PHASE:
LO LIFT-OFF
DO DE-ORBIT

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

CAUSE:
CONTAMINATION, JAMMED

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN
A) FAIL
B) FAIL
C) PASS

PASS/FAIL RATIONALE:
A)
"A" SCREEN FAILS SINCE THE CHECK VALVE IS NORMALLY OPEN AND A FAILURE CANNOT BE DETECTED WHEN THE HYDRAULIC SUBSYSTEM IS POWERED DOWN.

B)
"B" SCREEN FAILS SINCE THE CHECK VALVE IS NORMALLY OPEN AND A FAILURE CANNOT BE DETECTED WHEN THE HYDRAULIC SUBSYSTEM IS POWERED DOWN.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
NONE

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(B) INTERFACING SUBSYSTEM(S):
NONE

(C) MISSION:
NONE

(D) CREW, VEHICLE, AND ELEMENT(S):
NONE

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF MISSION, CREW/VEHICLE AFTER TWO FAILURES: CHECK VALVE FAILED AND LOSS OF PRIMARY HYDRAULIC SYSTEM WITH HIGH HINGE MOMENTS MAY CAUSE HARD OVER ELEVON SURFACE. LOSS OF FUNCTION CAN RESULT IN LOSS OF VEHICLE CONTROL.

-DISPOSITION RATIONALE-

(A) DESIGN:
COMPONENT IS PROTECTED BY SYSTEM FILTRATION OF 5 MICRON FILTER AND CLEARANCES WITHIN THE CHECK VALVE ARE IN EXCESS OF 100 MICRONS. INTERNAL PARTS OF THE CHECK VALVE ARE IDENTICAL IN MATERIALS, FORM, FIT AND FUNCTION TO THE SHUTTLE QUALIFIED ROCKWELL CHECK VALVES, ME284-0434, WHICH ARE USED THROUGHOUT THE HYDRAULIC SUBSYSTEM.

(B) TEST:
QUALIFICATION: THE CHECK VALVE IS CYCLED 20,000 TIMES DURING ENDURANCE TESTING, IN CONJUNCTION WITH SWITCHING VALVE COMPONENT TEST.

ACCEPTANCE: SWITCHING VALVE/ACTUATOR PERFORMANCE TESTS VERIFY CHECK VALVE IS OPERATIONAL. 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.

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(C) INSPECTION:
RECEIVING INSPECTION
MATERIAL CERTIFICATIONS ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
LEVEL 190 PER MAO110-301 IS VERIFIED TO BE IN COMPLIANCE DURING ASSEMBLY AND TEST. FLUID SAMPLE VERIFIED PRIOR TO SHIPMENT.

ASSEMBLY/INSTALLATION
CRITICAL CHARACTERISTICS/DIMENSIONS VERIFIED BY INSPECTION. INSTALLATION PERFORMED IN CLEAN ROOM ENVIRONMENT. ENVIRONMENT IS VERIFIED PER MOOG CONTAMINATION CONTROL PLAN.

TESTING
CHECK VALVE FLOW IS VERIFIED AT THE COMPONENT LEVEL PRIOR TO INSTALLATION AND DURING ATP. 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