FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 05-6J-2111 -X

SUBSYSTEM NAME: EPD&C - MAIN PROPULSION SYSTEM
REVISION: 1 07/24/00

PART DATA

	PART NAME **VENDOR NAME**	**PART NUMBER** **VENDOR NUMBER**
LRU	: PANEL R2	V070-730277
SRU	: SWITCH, TOGGLE	ME452-0102-7203, -8203

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE (TWO POLES, THREE POSITIONS), HELIUM SUPPLY ISOLATION VALVE B (LV 2/4/6).

REFERENCE DESIGNATORS: 32V73A2S12
32V73A2S13
32V73A2S14

QUANTITY OF LIKE ITEMS: 3

FUNCTION:
PROVIDES MANUAL CONTROL OF POWER TO HELIUM SUPPLY ISOLATION VALVE B.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 05-6J-2111-01

REVISION#: 1 07/24/00

SUBSYSTEM NAME: EPD&C - MAIN PROPULSION SYSTEM

LRU: PANEL R2 **CRITICALITY OF THIS**

ITEM NAME: SSME GHE ISO VLV B TOGGLE SWITCH (LV2, 4, 6) **FAILURE MODE:** 1R3

FAILURE MODE:

FAILS TO REMAIN IN OPEN POSITION: PREMATURE TRANSFER TO "GPC".

MISSION PHASE: LO LIFT-OFF

VEHICLE/PAYLOAD/KIT EFFECTIVITY:

102 COLUMBIA
103 DISCOVERY
104 ATLANTIS
105 ENDEAVOUR

CAUSE:

PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY.

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN

A) PASS
B) FAIL
C) PASS

PASS/FAIL RATIONALE:

A)

B)

FAILS B SCREEN BECAUSE DUAL SWITCH POLES MASK SWITCH SCAN INDICATION

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

NO EFFECT FIRST FAILURE. LOSS OF REDUNDANT OPEN COMMAND TO SSME ISOLATION VALVE B.

(B) INTERFACING SUBSYSTEM(S):

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SAME AS A.

(C) MISSION:
SAME AS A.

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
1R/3 4 SUCCESS PATHS. TIME FRAME - ENGINE OPERATION.
1) EITHER SWITCH POLE FAILS TO REMAIN IN "OPEN" POSITION (PREMATURE TRANSFER TO "GPC" POSITION).
2) LOSS OF SERIES MDM OPEN COMMAND.
3) LOSS OF PARALLEL SOLENOID POWER PATH.
4) SSME ISOLATION VALVE A FAILS OFF.

FAILURES WILL RESULT IN LOSS OF HELIUM REQUIRED TO PERFORM CONTINUOUS PURGING OF HIGH PRESSURE OXIDIZER TURBOPUMP INTERMEDIATE SEAL CAVITY. THIS CAVITY IS BETWEEN TWO SEALS, ONE OF WHICH CONTAINS THE HOT, FUEL-RICH GAS IN OXIDIZER TURBINE AND THE OTHER CONTAINS THE LIQUID OXYGEN IN OXIDIZER TURBOPUMP. LEAKAGE THROUGH ONE OR BOTH SEALS COULD RESULT IN A CATASTROPHIC EXPLOSION IF ALLOWED TO ACCUMULATE. CONTINUOUS OVERBOARD PURGE OF THIS AREA PREVENTS THIS ACCUMULATION FROM OCCURRING. POSSIBLE LOSS OF CREW/VEHICLE.

-DISPOSITION RATIONALE-

(A) DESIGN:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

(B) TEST:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

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

(C) INSPECTION:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

(D) FAILURE HISTORY:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

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CURRENT DATA ON TEST FAILURE, FLIGHT FAILURE, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATABASE.

(E) OPERATIONAL USE:
NO CREW ACTION CAN BE TAKEN.

- APPROVALS -

S&R ENGINEERING	: W.P. MUSTY	:/S/ W.P. MUSTY
S&R ENGINEERING ITM	: P. A. STENGER-NGUYEN	:/S/ P.A. STENGER-NGUYEN
DESIGN ENGINEERING	: ANDY RIZVI	:/S/ ANDY RIZVI
MPS SUBSYSTEM MGR.	: TIM REITH	:/S/ TIM REITH
EPD&C SUBSYSTEM MGR.	: RICHARD PHAN	:/S/ RICHARD PHAN
MOD	: JEFF MUSLER	:/S/ JEFF MUSLER
USA SAM	: MIKE SNYDER	:/S/ MIKE SNYDER
USA ORBITER ELEMENT	: SUZANNE LITTLE	:/S/ SUZANNE LITTLE
NASA SR&QA	: BILL PRINCE	:/S/ BILL PRINCE