SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2227 -2 REV:04/25/88

ASSEMBLY :AFT LCA-3
P/N RI :MC477-0261-0002
P/N VENDOR:
QUANTITY :1
:ONE
:

CRIT. FUNC: 1R
CRIT. HDW: 3

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

PHASE(S): PL LO X OO DO LS

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS

PREPARED BY:
DES J BROWN
REL F DEFENSOR
QE D MASAI

APPROVED BY:
DES
REL 5-6-88
QE 5-6-88

APPROVED BY (NASA):
EPDC SSM 5-12-88
MPS SSM
EPDC REL
MPS REL
QE

ITEM:
CONTROLLER, HYBRID DRIVER (HDC), TYPE I, ENGINE CUT OFF (ECO) DRY SIMULATION COMMAND, POINT SENSOR ELECTRONICS BOX CHECKOUT CIRCUIT.

FUNCTION:
UPON GROUND MDM COMMAND, CONDUCTS MAIN BUS C POWER TO DRY SIMULATION COMMAND INPUT OF POINT SENSOR ELECTRONICS BOX. IN COMBINATION WITH INDIVIDUAL WET SIMULATION COMMAND, STIMULATES INDIVIDUAL LO2/LH2 ECO DRY SIGNAL. IN COMBINATION WITH ALL OPEN SIMULATION COMMAND, STIMULATES ALL LO2/LH2 ECO DRY SIGNALS. 56V76A123J1(118).

FAILURE MODE:
INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF".

CAUSE(S):
PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS.

EFFECT(S) ON:
(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE (E)FUNCTIONAL CRITICALITY

(A) LOSS OF CAPABILITY TO REMOVE DRY SIMULATION COMMAND BY GROUND MDM.

(B) DEGRADATION OF REDUNDANCY AGAINST FALSE DRY ECO SIGNALS.

(C,D) NO EFFECT - FIRST FAILURE.

(E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE.
TIME FRAME - ASCENT, AFTER ECO SENSORS ARE ARMED.
1) SIM DRY HDC FAILS "ON".
2) SIM WET HDC FAILS "ON", RESULTING IN A FALSE DRY SIGNAL.
NOTE: ORBITER SOFTWARE WILL DISABLE A SINGLE FALSE DRY SENSOR PER PROPELLANT SYSTEM AT ARM COMMAND (CR89325), HOWEVER, THIS SCENARIO ASSUMES SECOND FAILURE OCCURS AFTER ARM COMMAND.
3) SECOND SIM WET HDC FAILS "ON", RESULTING IN A SECOND FALSE DRY SIGNAL.

RESULTS IN PREMATURE MECO. SSME CUTOFF MAY OCCUR TOO LATE FOR A TAL OR BE SHORT OF VELOCITY REQUIRED FOR AOA (OMS CANNOT SUPPLY THE REQUIRED DELTA-VELOCITY NEEDED FOR AOA). POSSIBLE LOSS OF CREW/VEHICLE.

FAILS B SCREEN BECAUSE NO INSTRUMENTATION IS AVAILABLE TO DETECT FAILURE.

DISPOSITION & RATIONALE:
(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE

(A-D) FOR DISPOSITION AND RATIONALE:
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

(B) GROUND TURNAROUND TEST
ENG C/O SEN "OPEN" SIM COND V41AI0.050 EVERY FLIGHT.

(E) OPERATIONAL USE
PRIOR TO THE ARM COMMAND: CREW WILL PERFORM TAL ABORT IF THERE ARE THREE OR MORE FALSE DRY SIGNALS AND LESS THAN TWO SIGMA CONFIDENCE OF ACHIEVING AOA CAPABILITY.

AFTER THE ARM COMMAND: NO CREW ACTION CAN BE TAKEN.