

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - OMS

FMEA NO 05-6L -2209 -1 REV:12/04/87
 ABORT: TAL, ATO

ASSEMBLY :AFT LCA 1,3
 P/N RI :MC477-0263-0002
 P/N VENDOR:
 QUANTITY :4
 :FOUR
 :(ONE PER VALVE)

	VEHICLE	102	103	104
EFFECTIVITY:		X	X	X
PHASE(S):		PL X LO X OO X DO X LS X		

CRIT. FUNC: 3
 CRIT. HDW: 3

PREPARED BY:
 DES D SOVEREIGN
 REL F DEFENSOR
 QE J COURSEN

REDUNDANCY SCREEN:
 APPROVED BY:
 DES D.S. G. Burns
 REL John A. ... 12-5-87
 QE Joe ...

A- B- C-
 APPROVED BY (NASA):
 SSM John ...
 REL ...
 QE ...
 EPOC SSM ...

ITEM:

DRIVER, HYBRID, TYPE III, LEFT AND RIGHT OMS-ENGINE PURGE VALVE 1 AND 2 CONTROL.

FUNCTION:

UPON GENERAL PURPOSE COMPUTER (GPC) COMMAND THROUGH FLIGHT MM'S EACH DRIVER CONDUCTS MAIN BUS POWER TO ENERGIZE THE ASSOCIATED OMS ENGINE PURGE VALVE 1 OR 2 SOLENOID. 54V76A121AR (J11-G', J'). 56V76A123AR (J11-R', FF).

FAILURE MODE:

LOSS OF OUTPUT, FAILS TO CONDUCT, INADVERTENTLY OPENS.

CAUSE(S):

PIECE PART STRUCTURAL FAILURE, MECHANICAL SHOCK, THERMAL STRESS, VIBRATION, CONTAMINATION.

EFFECT(S) ON:

(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE

(A) FIRST FAILURE WILL CAUSE LOSS OF FUNCTION. INABILITY TO PURGE ASSOCIATED OMS ENGINE.

(B) LOSS OF INTERFACE FUNCTION. INABILITY TO OPEN ONE OF THE SERIES ENGINE PURGE VALVES WILL PRECLUDE THE FLOW OF REGULATED GN2 INTO THE ENGINE'S FUEL (MMH) COOLING PASSAGES. INTERNAL SPRING FORCES WILL CLOSE THE VALVES WHEN ELECTRICAL POWER IS REMOVED FROM THE VALVE.

(C) FIRST FAILURE HAS NO EFFECT.

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(D) NO EFFECT FOR NORMAL MISSION; COAST TIME BETWEEN BURNS ALLOWS RESIDUAL FUEL TO DISPERSE. CRITICALITY 1 FOR TAL AND ATO ABORTS. MISSION RULES REQUIRE MINIMUM 10 MINUTE COAST TIME FOR RESTART OF AN UNPURGED ENGINE; POST-MAIN ENGINE CUTOFF (POST-MECO) ABORT DUMP TIMELINE DOES NOT ALLOW 10 MINUTE COAST. RESIDUAL FUEL IN THE REGION JACKET MAY ALTER THE START TRANSIENT CAUSING ENGINE HARDSTART OR ENGINE DETONATION. INABILITY TO RESTART AN UNPURGED ENGINE POST-MECO MAY RESULT IN LOSS OF CREW/VEHICLE DUE TO EXCESSIVE VEHICLE DOWNWEIGHT OR UNCONTROLLABLE X OR Y-AXIS VEHICLE CENTER OF GRAVITY. THE PURGE VALVE IS NOT MONITORED IN THE COCKPIT, HOWEVER, A PURGE OPERATION CAN BE INFERRED BY MONITORING THE GN2 TANK PRESSURE.

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.

(B) GROUND TURNAROUND TEST
V43CAO.070 - REDUNDANT CIRCUIT VERIFICATION (PERIODIC) - ORB/PCD;
PERFORMED FOR FIRST FLIGHT AND AT 5 FLIGHT INTERVALS OR FOR LRU RETEST
PER FIGURE V43200.000 OR FOR ORBITER DISRUPTED COPPER PATHS. FUNCTIONAL
CHECKOUT OF OMS PURGE VALVE CONTROL CIRCUITS PER FIGURE V43CAO.070-4.

V43CEO.055 - PNEUMATIC SYSTEM VENT; PERFORMED AFTER EACH FLIGHT.
VERIFIES PURGE VALVE OPERATION.

(E) OPERATIONAL USE
SCHEDULE AT LEAST TEN MINUTES BETWEEN BURNS OF AFFECTED ENGINE. ALLOWS
FUEL IN COOLING CHANNELS TO DISPERSE, ELIMINATING HAZARD. ENGINE STILL
USABLE FOR NORMAL MISSION OPERATIONS.