SUBSYSTEM :AUXILIARY POWER (APUS) FMEA NO 04-2 -IK11 -12 REV:02/26/88

ASSEMBLY :FUEL SUPPLY
P/N RI :MC262-0084-0100
P/N VENDOR:PSI P/N 60228-1
QUANTITY :3
:1 PER APU
:

ABORT RTLS, AOA, ATO, TAL	CRIT. FUNC:	1R
	CRIT. HDW:	2
VEHICLE	102 103 104	
EFFECTIVITY:	X X X	
PHASE(S):	PL X LO X OO DO X LS X	

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

PREPARED BY:		APPROVED BY:	APPROVED BY (NASA):
DES	J R MUNROE	DES	SSM
REL	T R BOLTZ	REL	REL
QE	W J SMITH	QE	QE

ITEM:
TANK, FUEL, POSITIVE EXPULSION (DIAPHRAGM)

FUNCTION:
(1) TO PROVIDE STORAGE AND CONTAINMENT OF MONOPROPELLANT HYDRAZINE AT PRESSURES BETWEEN 50 AND 370 PSIA; (2) TO EXPEL LIQUID HYDRAZINE UNDER ALL OPERATING CONDITIONS.

FAILURE MODE:
DEGRADED OUTPUT (EXPULSION DEVICE FAILURE).

CAUSE(S):
STRUCTURAL FAILURE OF THE DIAPHRAGM.

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

(A) FUNCTIONAL DEGRADATION. POSSIBLE REDUCTION IN FUEL FLOW TO APU RESULTING IN DEGRADED OPERATION AND POSSIBLE APU SHUTDOWN.

(B) POSSIBLE LOSS OF SHAFT POWER TO ONE HYDRAULIC PUMP.

(C) ABORT DECISION IS REQUIRED, IF FAILURE OCCURS PRIOR TO ENTRY COMMITMENT.

(D) NO EFFECT UNTIL SECOND SYSTEM LOSS. CRITICALITY 1 FOR SSME INDUCED RTLS, ATO, AOA, OR TAL DUE TO THE POSSIBLE ADDITIONAL LOSS OF ASSOCIATED APU/HYD AND MAIN ENGINE.

(E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF VEHICLE IF TWO OUT OF THREE SYSTEMS ARE LOST.

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

(A) DESIGN
DIAPHRAGM: AF-E-332 MOLDED ETHYLENE PROPYLENE RUBBER. S70-0613 FUEL SERVICING UNIT, 10-MICRON ABSOLUTE FILTERS. EXPULSION EFFICIENCY: 98.7% MIN. DIAPHRAGM ALLOWABLE LEAKAGE: 20.0 SCC MAXIMUM/15 MIN.

SUBSYSTEM :AUXILIARY POWER (APUS) FMEA NO 04-2 -IN11 -12 REV:02/26/88

(B) TEST

ACCEPTANCE TEST PROOF PRESSURE AT 970 PSIG IS 2.73 TIMES MAXIMUM WORKING PRESSURE. FUNCTIONAL VERIFICATION AT ACCEPTANCE PER ATP.

QUALIFICATION TEST SPECIMEN BURST AT 1,321 PSIG (ACTUAL) AND HAD 200 EXPULSION CYCLES.

INTEGRATED TEST ARTICLE TANK HAS BEEN EXPOSED TO HYDRAZINE FOR 120 MONTHS AND 206 EXPULSION CYCLES HAVE BEEN ACCUMULATED.

PRE- AND POST FLIGHT INSPECTION PER APPLICABLE TMO/TCP REQUIREMENTS.

OMRSD: FUEL TANK DIAPHRAGM LEAK TEST IS PERFORMED EVERY FLOW.

(C) INSPECTION

RECEIVING INSPECTION
MATERIAL AND PROCESSES CERTIFICATIONS ARE VERIFIED BY INSPECTION. ELASTOMER COMPONENTS ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
MOLD CLEANLINESS IS VERIFIED BY INSPECTION. CLEANLINESS TO LEVEL 100 IS VERIFIED BY INSPECTION. CORROSION PROTECTION IS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
CRITICAL DIMENSIONS AND SURFACE FINISHES ARE VERIFIED BY INSPECTION. MANUFACTURING, ASSEMBLY, AND INSTALLATION PROVISIONS ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION
BACKLIGHTING AND X-RAY OF DIAPHRAGM ARE VERIFIED BY INSPECTION. PENETRANT AND RADIOGRAPHIC INSPECTIONS OF WELDS ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES
WELDING PER SPECIFICATION REQUIREMENTS IS VERIFIED BY INSPECTION.

TESTING
PRESSURE TEST OF DIAPHRAGM PRIOR TO INSTALLATION INTO TANK HEMISPHERE IS VERIFIED BY INSPECTION. TEST EQUIPMENT AND TOOL CALIBRATION ARE VERIFIED BY INSPECTION. ATP IS WITNESSED AND VERIFIED BY INSPECTION.

HANDLING/PACKAGING
HANDLING, PACKAGING, STORAGE, AND SHIPPING PROCEDURES ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY
NONE

(E) OPERATIONAL USE
NONE