

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ELECTRICAL POWER (FCP) FMEA NO 04-1A -0153 -1 REV:04/07/88

ASSEMBLY :		CRIT. FUNC:	1R
P/N RI :	V070-454110-148	CRIT. HDW:	2
P/N VENDOR:		VEHICLE	102 103 104
QUANTITY :	1	EFFECTIVITY:	X X X
:	ONE	PHASE(S):	PL LO X OO X DO X LS
:			

PREPARED BY:	DES	J F WILLIAMS	DES	J. F. Williams	4-8-88	SSM	<i>[Signature]</i>
REL	M E CORDERO	REL		<i>[Signature]</i>		REL	<i>[Signature]</i>
QE	J T COURSEN	QE		<i>[Signature]</i>		QE	<i>[Signature]</i>

7/13/88

ITEM: ALTERNATE PRODUCT WATER SUPPLY LINE TO ECLSS.

FUNCTION: SUPPLIES PRODUCT WATER FROM FUEL CELLS TO ECLSS IF PRIMARY PATH LOST.

FAILURE MODE: LEAKAGE EXTERNAL.

CAUSE(S): MECHANICAL SHOCK, VIBRATION, CORROSION.

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

- (A) NO EFFECT ON FUEL CELL PERFORMANCE IF PRODUCT WATER FLOW IS POSSIBLE THROUGH PRIMARY ECLSS LINE OR EMERGENCY WATER RELIEF SYSTEM. IF EXTERNAL LEAKAGE CAUSES ICE TO BLOCK FLOW IN THE ALTERNATE PRODUCT WATER LINE TO ECLSS AND THE EMERGENCY WATER RELIEF SYSTEM AND PRIMARY H2O SUPPLY LINE ARE BLOCKED, THE FUEL CELLS WILL BE LOST DUE TO FLOODING (REF. CIL 04-1A-0137-1).
- (B) NO EFFECT FIRST FAILURE. IF SECOND FAILURE OCCURS AND FUEL CELLS ARE LOST DUE TO FLOODING, ALL ORBITER POWER IS LOST.
- (C) ABORT DECISION OR MISSION MODIFICATION.
- (D) NO EFFECT ON CREW OR VEHICLE IF PRIMARY ECLSS LINE OR EMERGENCY WATER RELIEF SYSTEM FUNCTIONS. CREW AND VEHICLE WILL BE LOST IF NEITHER SYSTEM IS FUNCTIONAL.

REDUNDANCY SCREEN B - SCREEN IS N/A AS ALTERNATE PRODUCT WATER SUPPLY LINE IS BACKUP TO THE PRIMARY PRODUCT WATER SUPPLY LINE.

DISPOSITION & RATIONALE:

(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE

(A) DESIGN

STAINLESS STEEL IS USED IN THE CONSTRUCTION OF LINES AND FITTINGS FOR CORROSION RESISTANCE. BRAZED JOINTS OR HIGH STRENGTH MECHANICAL FITTINGS

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ELECTRICAL POWER (FCP) FMEA NO 04-1A -0153 -1 REV:04/07/88

ARE USED THROUGHOUT FOR FLUID CONNECTIONS.

PLUMBING INSTALLATION DESIGNED TO STANDARDS DEVELOPED FOR ORBITER MIDBODY VIBRATION FOR MINIMUM TUBE SPACING, MAXIMUM DISTANCE BETWEEN LINE SUPPORTS, EXPANSION LOOPS, AND LINE TO SUPPORT ATTACHMENT METHODS. ANALYSIS OF THIS TYPE INSTALLATION INDICATES COMPATIBILITY WITH SHOCK LOADS OF 40 TO 50 G.

OPERATION AT LOW PRESSURE (51 PSIA MAX) MINIMIZES STRESS ON LINES AND FITTINGS CAPABLE OF WORKING AT SEVERAL THOUSAND PSI. COMPONENTS ARE DESIGNED WITH A MINIMUM BURST PRESSURE SAFETY FACTOR OF TWO AND ARE DESIGNED TO OPERATE IN THE VIBRATION, SHOCK, AND THERMAL ENVIRONMENTS ASSOCIATED WITH THIS APPLICATION.

B) TEST

PROOF AND LEAKAGE TESTS PER ML0101-0001-004 AFTER LINE INSTALLATION. FINAL LEAKAGE TEST PER VEHICLE TEST PREPARATION SHEET AFTER COMPONENT INSTALLATION. QUALIFICATION VIBRATION TESTING OF WATER RELIEF PANEL AND WATER LINES DEMONSTRATED STRUCTURAL INTEGRITY.

OMRSD: WATER SYSTEM INTEGRITY IS VERIFIED DURING GROUND TURNAROUND EVERY FLIGHT

C) INSPECTION

RECEIVING INSPECTION

SUPPLIER HARDWARE IS INSPECTED IN ACCORDANCE WITH QUALITY PLANNING REQUIREMENTS DOCUMENT, WHICH WAS APPROVED BY NASA. TUBE MATERIAL IS VERIFIED BY INSPECTION ON MANUFACTURING ORDERS.

CONTAMINATION CONTROL

PART CLEANED AND PASSIVATED PER APPLICABLE SPECIFICATION, AND VERIFIED BY INSPECTION. CLEANED TO LEVEL 300A OF THE CLEANLINESS SPECIFICATION FOR ALL INTERNAL SURFACES, AND GENERAL CLEANLINESS FOR EXTERNAL SURFACES IS VERIFIED BY INSPECTION. QA VERIFIES CLEANLINESS PRIOR TO INSTALLATION PER DRAWING AND CHECKOUT AFTER INSTALLATION PER V070-454021, V070-454907, V070-454927, V070-454011, V070-454906, V070-454926 AS APPLICABLE.

ASSEMBLY/INSTALLATION

FABRICATION OF TUBE IS PER DRAWING AND APPLICABLE SPECIFICATION, AND IS VERIFIED BY INSPECTION. ELECTROPOLISH REQUIRED AREAS PER DRAWING AND APPLICABLE SPECIFICATION AND VERIFIED BY INSPECTION. INSULATION IS EXAMINED BY INSPECTION FOR DAMAGE. INDUCTION BRAZING OF COMPONENTS IS PER SPECIFICATION AND DRAWING REQUIREMENTS, INCLUDING VISUAL AND X-RAY INSPECTION, TO DETERMINE ACCEPTABLE CRITERIA.

TESTING

LEAK TESTED PER APPLICABLE SPECIFICATION AND VERIFIED BY INSPECTION.

) FAILURE HISTORY

THERE HAVE BEEN NO ACCEPTANCE TEST, QUALIFICATION TEST, FIELD OR FLIGHT FAILURES ASSOCIATED WITH THIS FAILURE MODE.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ELECTRICAL POWER (FCP) FMEA NO 04-1A -0153 -1 REV:04/07/

(E) OPERATIONAL USE
NO CREW ACTION AFTER FAILURE.