CRITICAL ITEMS LIST (CIL)

SYSTEM:	Propulsion/Mechanical	FUNCTIONAL CRIT:	1
SUBSYSTEM:	Helium Inject	PHASE(S):	a, b
REV & DATE:	J, 12-19-97	HAZARD REF:	P.02, S.11
DCN & DATE:			
ANALYSTS:	E. Flauss/H. Claybrook		

FAILURE MODE: Leakage

FAILURE EFFECT:
a) Loss of mission and vehicle/crew due to fire/explosion.
b) Loss of mission and vehicle/crew due to fire/explosion.

TIME TO EFFECT: Seconds

FAILURE CAUSE(S):
A: Structural Failure of Line Component
B: Structural Failure of Nut Coupling
C: Tube Mating Defects
D: Structural Failure of Support
E: Fracture of Attachment Hardware

REDUNDANCY SCREENS: Not Applicable

FUNCTIONAL DESCRIPTION: Transports ground GHe to supply a controlled flow of helium into the aft elbow of the LO2 feedline which provides propellant conditioning and prevents geysering.

FMEA ITEM CODE(S)	PART NO.	PART NAME	QTY	EFFECTIVITY
2.4.26.1	80921011931-039	Tube Assembly (Downstream of Orifice)	1	LWT-54 & Up
2.4.27.1	80921011931-008	Tube Assembly (Downstream of Orifice)	1	LWT-54 & Up

REMARKS: These items are grouped as the failure mode, causes and effects are the same.

SYSTEM: Propulsion/Mechanical
SUBSYSTEM: Helium Inject
FMEA ITEM CODE(S): 2.4.26.1, 2.4.27.1

REV & DATE: J, 12-19-97
DCN & DATE:

RATIONALE FOR RETENTION

DESIGN:

A, B: The tube assemblies provide helium flow downstream of the orifice to the LO2 feedline. The flared tubes are fabricated from 321 CRES and couplings are fabricated from 304 CRES. Material selected in accordance with MMC-ET-SE16, and controlled per MMMA Approved Vendor Product Assurance Plan assures conformance of composition, material compatibility and properties. The assemblies are designed to meet the required ultimate (4.0) and yield (1.25) safety factors for pressure (ET Stress Report 826-2188). Installation loads are sufficient to provide screening for major flaws.

C: Tube mating surface is specified to preclude leakage. Coupling joint torques are specified on the engineering installation drawing.

D: The bracket is fabricated from 2024-T8511 aluminum alloy extrusion, and meets the required ultimate (1.4) and yield (1.1) safety factors (ET Stress Report 826-2188). Material selected in accordance with MMC-ET-SE16 and controlled per MMMA Approved Vendor Product Assurance Plan assures conformance of composition and properties.

D, E: Attachment hardware was selected from the Approved Standard Parts List (ASPL 826-3500), installed per STP2014 and torqued using values specified on engineering drawings.

TEST:

The Tube Assemblies (Downstream only) are certified. References HCS MMC-ET-TM08-L-P014.

Acceptance:

MAF - (Subassembly):

A, B: Perform proof test of tube assemblies (STP2012).

A, B: Perform leak test of tube assemblies (STP2012)(UCN J31174).

MAF (Vehicle Assembly):

A-C: Perform leakage test (MMC-ET-TM04k).

INSPECTION:

Vendor Inspection - Lockheed Martin Surveillance:

A, B, D, E: Verify materials selection and verification controls (MMC-ET-SE16 drawings 80921011931, 80921011936 and Standard drawings 57L8, 45L1, 26L17 and 57L10).

MAF Quality Inspection:

A-C: Witness proof pressure test (STP2012).

A, B: Witness leakage test of tube assembly (STP2012)(UCN J31174).

A: Witness installation of thermal insulation wrap (drawing 80921011934 for LWT-76 & Up).

B-E: Verify installation and witness torque (drawings 80921011941 and 80921011930).

C: Inspect (visually) sealing surfaces for freedom of nicks, radial scratches or other imperfections during installation (drawing 80921011941 and 80921011930).

A-C: Witness leakage test (MMC-ET-TM04k).

FAILURE HISTORY:

Current data on test failures, unexplained anomalies and other failures experienced during ground processing activity can be found in the PRACA data base.