

CRITICAL ITEMS LIST (CIL)

SYSTEM:	Propulsion/Mechanical	FUNCTIONAL CRIT:	1
SUBSYSTEM:	Nose Cone Purge	PHASE(S):	a
REV & DATE:	J, 12-19-97	HAZARD REF:	P.04, S.05
DCN & DATE:			
ANALYSTS:	J. Atter/N. Claybrook		

FAILURE MODE: Leakage

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

TIME TO EFFECT: Seconds

FAILURE CAUSE(S): A: Structural Failure of Tube  
B: Structural Failure of Nut Couplings

REDUNDANCY SCREENS: Not Applicable

FUNCTIONAL DESCRIPTION: Transports heated nose cone purge GN2 through the intertank.

<u>FMEA ITEM CODE(S)</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY</u>	<u>EFFECTIVITY</u>
2.12.1.1	80923021036-049 -060	Tube Assy (Intertank)	1 1	LWT-54 thru 85, 89-93 LWT-86 thru 88, 94 & Up
2.12.2.1	80923021036-050	Tube Assy (Intertank)	1	LWT-54 & Up
2.12.3.1	80923021036-059	Tube Assy (Intertank)	1	LWT-54 & Up
2.12.4.1	80921021026-030	Tube Assy (Intertank)	1	LWT-54 & Up
2.12.8.1	80921021026-039 -059	Tube Assy (LD2 Tank C/T)	1 1	LWT-54 thru 77 LWT-78 & Up

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

CRITICAL ITEMS LIST (CIL)  
CONTINUATION SHEET

SYSTEM: Propulsion/Mechanical  
SUBSYSTEM: Nose Cone Purge  
FMEA ITEM CODE(S): 2.12.1.1, 2.12.2.1, 2.12.3.1, 2.12.4.1, 2.12.8.1

REV & DATE: J, 12-19-97  
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RATIONALE FOR RETENTION

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DESIGN:

The nose cone purge delivers heated GN2 from the Intertank umbilical carrier plate to the nose cone. Tube assemblies transport the gas through the Intertank, up the LO2 cable tray, into the nose cone terminating at a diffuser assembly. An orifice located at the diffuser entrance controls the flow rate to approximately 15 pounds per minute.

- A, B: The tube assemblies within the Intertank are 3/8 inch diameter reducing to 1/4 inch for the line assembly prior to entrance into the cable tray. The assemblies are designed to meet the required ultimate (1.5) and yield (1.25) safety factors for pressure (ET Stress Report 826-2188). 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 MPMIA approved product assurance plan assures conformance of composition, material compatibility and properties.
- B: The couplings were selected from the Approved Standard Parts List (ASPL 826-3500) and torques are specified on the engineering installation drawing. Installation loads are sufficient to provide screening for major flaws.

TEST:

The Tube Assembly is certified. Reference HCS MMC-ET-TM08-L-P014.

MPTA Firings/Tankings: The nose cone purge system was installed on MPTA and supported all cryogenic loadings/detankings and accumulated 62.5 minutes of firing time. There was no evidence of leakage or structural damage.

Acceptance:

Vendor:

- A, B: Perform material properties strength and proof pressure (drawing 80923021036 and Standard drawing 57LB).

MAF:

- A, B: Perform proof test of tube assemblies (drawings 80921021026 and 80923021036).
- A, B: Perform leak test of tube assemblies (STP2012)(UCN J31174).
- A, B: Perform flow test (MMC-ET-TM04k).

Launch Site:

- A, B: Perform audible flow test (DMASD File IV).

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INSPECTION:

Vendor Inspection - Lockheed Martin Surveillance:

A, B: Verify material selection and verification controls (MMC-ET-8E16, drawing 80923021036, 80921021026 and Standard drawing 57LB).

MAF Quality Inspection:

A: Inspect flared ends for surface finish (drawings 80921021026, 80923021036 and STP2012).

A: Inspect tube bend radius for FMEA Item Codes 2.12.1.1 thru 2.12.4.1 (drawings 80921021026, 80923021026 and STP2012).

A, B: Witness proof pressure test (drawings 80921021026 and 80923021036).

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

A, B: Witness flow test (MMC-ET-TM04k).

A, B: Inspect for freedom of damage (MPP 80901010000 for intertank, 80911041205 for cable tray).

A, B: Inspect fittings and flare mating surfaces for freedom of nicks, scratches and other physical damage and that sleeves and nuts are free to rotate a minimum of three complete turns using finger pressure (MPP 80921021009 and 80923021009).

B: Verify installation and witness torque (drawing 80921021009 and 80923021009).

Launch Site:

A, B: Witness flow test (OMRSD File IV).

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.