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

FAILURE MODE: Leakage

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

TIME TO EFFECT: Minutes

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 LO2 cable tray.

FMEA ITEM CODE(S)	PART NO.	PART NAME	QTY	EFFECTIVITY
2.12.9.1	80921021026-040	Tube Assemblies (LO2 Tank C/T)	1	LWT-54 & Up
2.12.10.1	80921021026-049	Tube Assemblies (LO2 Tank C/T)	1	LWT-54 & Up
2.12.11.1	80921021026-050	Tube Assemblies (LO2 Tank C/T)	1	LWT-54 thru 77
	-060	"	1	LWT-78 & Up

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

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SUBSYSTEM:	Nose Cone Purge	DCN & DATE:	
FMEA ITEM CODE(S):	2.12.9.1, 2.12.10.1, 2.12.11.1		

RATIONALE FOR RETENTION

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 and terminate at a diffuser assembly. An orifice located at the diffuser entrance controls the flow rate to approximately 15 pounds per minute.

A, B: The 1/4 inch tube assemblies are located in the LO2 cable tray and are designed to meet the required ultimate (1.5) and yield (1.25) safety factors for pressure (ET Stress Report 826-2188).

The flared tube is fabricated from 321 CRES type 1 and couplings are fabricated from 304 CRES. Material selected in accordance with MMC-ET-SE16, and controlled per MMMA approved product assurance plan assures conformance of composition, material compatibility and properties.

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 Assemblies (LO2 Tank Cable Tray) are 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 80921021026 and Standard drawing 57L8).

MAF:

A, B: Perform proof test of tube assemblies (drawing 80921021026).

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

MAF - (Vehicle Assembly):

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

Launch Site:

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

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RATIONALE FOR RETENTION

INSPECTION:

Vendor Inspection - Lockheed Martin Surveillance:

A, B: Verify materials selection and verification controls (MMC-ET-SE16 and drawings 80921021026, and 57L8 Standards).

MAF Quality Inspection:

A: Inspect flared ends for surface finish (STP2012).

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).

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

B: Witness proof pressure test (drawing 80921021026).

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

A, B: Inspect for freedom of damage (MPP 80911041205).

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

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.