CRITICAL ITEMS LIST (CIL)

SYSTEM:	Propulsion/Mechanical	FUNCTIONAL CRIT:	1
SUBSYSTEM:	LO2 Propellant Feed	PHASE(S):	b
REV & DATE:	J, 12-19-97	HAZARD REF:	P.06, S.11
DCN & DATE:			
ANALYSTS:	J. Atter/H. Claybrook		

FAILURE MODE: Loss of Anti-Vortex Capability

FAILURE EFFECT: b) Loss of mission due to gas ingestion resulting in engine explosion or premature engine shutdown.
Loss of mission and vehicle/crew due to gas ingestion resulting in engine explosion.

TIME TO EFFECT: Seconds

FAILURE CAUSE(S): Structural Failure of Anti-Vortex Baffle Support/Attachment Hardware

REDUNDANCY SCREENS: Not Applicable

FUNCTIONAL DESCRIPTION: The anti-vortex baffle, centered over the screen at the LO2 feed outlet, reduces fluid swirl resulting from coriolis effect about the outlet and prevents entrapment of gases in the delivered LO2.

FMEA ITEM CODE(S)	PART NO.	PART NAME	QTY	EFFECTIVITY
2.1.3.1	80912651011-039	Anti-Vortex Baffle Assy	1	LWT-54 & Up

REMARKS:

SYSTEM:	Propulsion/Mechanical	REV & DATE:	J, 12-19-97
SUBSYSTEM:	LO2 Propellant Feed	DCN & DATE:	
FMEA ITEM CODE(S):	2.1.3.1		

RATIONALE FOR RETENTION

DESIGN:

The anti-vortex baffle is designed to prevent LO2 fluid cavitation and reduce fluid swirl. The vortex baffle consists of four vane assemblies each 80.00 inches long at right angles to each other. The vane assemblies are spliced together with a splash plate on top, cruciform splice plate down the center and splice plate at the bottom. The assembly includes four webs with upper and lower caps, and vertical stiffeners stabilized with diagonal straps. The vortex baffle assembly is attached to the LO2 aft dome cap with two fasteners at the lower cap of each vane assembly. The support hardware is fabricated from 2024-T81, T8511 aluminum alloy and was designed for the required ultimate safety factor of 1.4 for loads and the required yield safety factor of 1.1 for loads. (ET Stress Report 826-2188). Materials selected in accordance with MMC-ET-SE16 and controlled per MMMA Approved Vendor Product Assurance Plan assures conformance of composition, material compatibility and properties. Attachment fasteners were selected from the Approved Standard Parts List (ASPL 826-3500), installed and torqued per STP2014 as specified on engineering drawings. Procurement of fasteners is by material, fabrication, processing, and inspection specifications per MMC Standard drawing 2614.

TEST:

The Anti-Vortex Baffle Assy is certified. Reference NCS MMC-ET-TM08-L-P012.

MPTA Firings/Tankings: The anti-vortex baffle assembly has accumulated 62.5 minutes of firing time, 27 cryogenic cycles, and 42 pressurization cycles. There was no evidence of structural damage resulting from these exposures.

INSPECTION:

Lockheed Martin Procurement Quality Representative:

Verify materials selection and verification controls (drawings 80912651013, 80912651014 and Standard drawing 2614).

MAF Quality Inspection:

Inspect (visually) attaching hardware for freedom of damage prior to installation (drawing 80912651011).

Verify installation and witness torque procedure (drawing 80912651011 and STP2014).

Inspect (visually) for no damage during post installation shakedown inspection (MPP 80902000SCL for LWT-54 thru 68 and 80922011900 for LWT-69 & up).

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.