

CRITICAL ITEMS LIST (CIL)

SYSTEM: Electrical
 SUBSYSTEM: LH2 Depletion System
 REV & DATE: J, 12-19-97
 DCN & DATE:
 ANALYSTS: R. Lunden/A. Oser

FUNCTIONAL CRIT: 1R
 PHASE(S): b
 HAZARD REF: E.01, P.06

FAILURE MODE: Fails with False Dry Signal
 FAILURE EFFECT: b) Loss of mission and vehicle/crew due to premature MECO.
 TIME TO EFFECT: Seconds
 FAILURE CAUSE(S): Increase in Circuit Resistance
 REDUNDANCY SCREENS: Screen A: PASS
 Screen B: FAIL - Not detectable in flight.
 Screen C: PASS

FUNCTIONAL DESCRIPTION: Harnesses route the excitation current and return functions between the ET/Orbiter interface and each depletion sensor.

<u>FMEA ITEM CODE(S)</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY</u>	<u>EFFECTIVITY</u>
3.6.2.3	80934003704-029 (302W02 P1/Splices)	Harnesses	1	LWT-54 & Up
3.6.3.3	80931003704-420 (305W01 P1/J23/J33) -520	Harnesses	1	LWT-54 thru 88
			1	LWT-89 & Up

REMARKS: These harnesses are grouped since the failure mode and Rationale for Retention are the same.

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CONTINUATION SHEET

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RATIONALE FOR RETENTION

DESIGN:

Engineering Process Specifications, STP6508 establishes the requirements to be met for fabrication and installation of airborne electrical interconnecting wire and cable assemblies. Harness assemblies produced as specified in STP6508 will meet the applicable requirements of MIL-W-81600 and 40M39582A.

The wire is procured from vendors that have qualification approval from Lockheed Martin. The vendors meet material specifications STM E659 and E658.

Crimp type splices are used to connect harness wires within the tank to the pigtail leads furnished with the sensors.

Engineering Process Specifications, STP6501 establishes the requirements for connectors that are not mated to be protected by dust covers at all times.

The connector pins and sockets are copper alloy with a gold finish over an underplate of nickel or gold as stated in Lockheed Martin Standard Drawing 81L2.

For additional weight savings on SLWT, spare wires were eliminated from the harnesses.

Redundancy Description

Since each depletion sensor has its own circuit in the cable harnesses, the redundancy description and effects of loss of redundancy for the high circuit resistance failure mode are the same as described for the fails dry mode of the depletion sensors. Circuits are routed on non-adjacent pins on the connectors to reduce the probability of one failed circuit affecting another. The fails open mode results in a loss of all circuits and is not covered here.

Effect of First Failure

If any one circuit fails so as to produce a false dry indication, there is no effect since two sensors dry are required for the depletion function.

Effect of First Redundancy Loss

If a second circuit fails so as to produce a false dry indication, the effect described above will occur.

TEST:

The harness and harness components are certified. Reference MCS's MMC-ET-TM08-L-E039 (3.6.2.3), MMC-ET-TM08-L-E051 (3.6.3.3).

Vendor:

Piece parts for the electrical system are procured and tested to approved Lockheed Martin Drawing 81L2, Specifications E658 and E659 and Government Specification 40M39569.

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RATIONALE FOR RETENTION

TEST: (cont)

MAF:

Perform DC Resistance Test of Harness from end to end termination points (STP6508 and TM04k).

Perform DC Resistance Test (TM04k).

Launch Site:

Perform Level Sensor Test (OMRSD File II & IV).

INSPECTION:

Vendor:

Surveillance by Lockheed Martin Procurement Quality is performed to ensure compliance with specifications.

MAF Quality Inspection:

Inspect connector, pins or sockets for freedom of damage, are not broken, bent, misaligned or corroded, and the connector is free of foreign material (STP6501).

Witness DC Resistance reading of harness end to end termination points (STP6508 and TM04k).

Witness DC Resistance Test from excitation to return (TM04k).

Launch Site:

Witness sensor DC Resistance Test in dry condition (OMRSD File IV).

Witness sensors change from dry to solid wet condition at completion of slow fill (OMRSD File II).

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.