SRB CRITICAL ITEMS LIST

SUBSYSTEM: THRUST VECTOR CONTROL

ITEM NAME: Hydraulic Bootstrap Reservoir

PART NO: 10203-0008
1711016-350 (Fluid Quantity Transducer)

FM CODE: A11

ITEM CODE: 20-01-28B

REVISION: Basic

CRITICALITY CATEGORY: 1R

REACTION TIME: Seconds

NUMBER REQUIRED: 2

DATE: March 31, 2000 CN 038

CRITICAL PHASES: Boost, Separation

SUPERCEDES: March 31, 1997 CN 038

FMEA PAGE NUMBER: A-100C

ANALYST: B. Snook/S. Parvathaneni CN 038

SHEET 1 OF 3

APPROVED: S. Parvathaneni CN 038

FAILURE MODE AND CAUSES: Erroneous fluid level indication (System A and B) caused by:

o Electrical short circuit (power to ground, power to return)

FAILURE EFFECT SUMMARY: Failure of hydraulic reservoir LVDT will result in loss of TVC control and separation capability due to loss of redundant power buses (A and B) which leads to loss of mission, vehicle, and crew.

REDUNDANCY SCREENS AND MEASUREMENTS:

1) Pass - All units are subject to ATP during turnaround and refurbishment.

2) Pass - Bus voltage measurements B76V1600C, B76V1601C

3) Pass - No single credible cause.

RATIONALE FOR RETENTION:

A. DESIGN

o The Hydraulic Bootstrap Reservoir is designed and qualified in accordance with end item specification 10SPC-0052. (Electrical Short Circuit)

o The connector input wiring is fully potted. (Electrical Short Circuit)

o Qualification testing verified design requirements as reported in Arkwin Qualification Test Report QTR-1711016-1, Rev. A. (Electrical Short Circuit)

B. TESTING

o Acceptance testing is performed per Arkwin ATP 1711016-1, on each new flight hardware item which includes insulation resistance and verification of proper function. (Electrical Short Circuit)

o During refurbishment and prior to reuse the hydraulic reservoir is processed for rework per 10SPC-0131 and acceptance tested per the criteria of 10SPC-0052 at USA SRBE/TBE Florida Operations. This includes visual examination, insulation resistance and verification of proper function. (Electrical Short Circuit)

o Hydraulic fluid level is monitored during test operations per 10REQ-0021: (Electrical Short Circuit)

- Low speed GN2 spin, para. 2.3.11
- High speed GN2 spin, para. 2.3.15
- Hotfire, para. 2.3.16

The above referenced OMRSD testing is performed every flight.

o ESD Protection Requirements are imposed per OMRS 10REQ-0021, Para. 4.11 CN 038

C. INSPECTION

I. VENDOR RELATED INSPECTIONS

o Witnessing of final ATP by USA SRBE PQAR per SIP 1140.

o Critical Operations

- Soldering per CQ1-1620 and NHB5300.4 (3A-1).

II. KSC RELATED REFURBISHMENT INSPECTIONS

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o Visual inspection of Hydraulic Bootstrap Reservoir will be performed per 10SPC-0131, para. II. (All Failure Causes)

o Functional testing of Hydraulic Bootstrap Reservoir will be performed per 10SPC-0131, paragraph IV.

All manual tests will be witnessed by Quality or verified for those instances when controlled software is utilized and a test report is generated. (All Failure Causes)

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III. KSC RELATED ASSEMBLY & OPERATIONS INSPECTIONS

o Proper function of TVC System is demonstrated during hotfire operations per 10REQ-0021 to include: (Electrical Short Circuit)

- Low speed GN2 spin, para. 2.3.11
- High speed GN2 spin, para. 2.3.15
- Hotfire, para. 2.3.16

o Reservoir LVDT is verified as functional during hydraulic fluid level check per OMRSD File V, Vol. 1, Requirement Number B42HP0.030 (Electrical Short Circuit)

D. FAILURE HISTORY

Criticality Category 1R

- Failure Histories may be obtained from the PRACA database

E. OPERATIONAL USE

- Not applicable to this failure mode.