SRB CRITICAL ITEMS LIST

SUBSYSTEM: STRUCTURES AND MISCELLANEOUS ITEMS

ITEM NAME: Booster Cartridge Assembly

PART NO.: 10307-0001-801 FM CODE: A02

ITEM CODE: 60-04-02 REVISION: Basic

CRITICALITY CATEGORY: 1R REACTION TIME: Immediate

NO. REQUIRED: 8 DATE: March 31, 1997 | DCN032

CRITICAL PHASES: Boost SUPERCEDES: March 1, 1996 | DCN032

FMEA PAGE NO.: E-53 ANALYST: H.Longani | DCN032

SHEET 1 OF 4 APPROVED: P. Kalia

FAILURE MODE AND CAUSES: Fails to operate (both booster cartridges on any one holddown assembly) caused by:

- O Excessive gaps at internal interfaces
- O Voids or cracks in charge
- O Insensitive explosive from moisture, contamination, or chemical decomposition
- O Insufficient Charge

FAILURE EFFECT SUMMARY: Loss of mission, vehicle and crew due to vehicle out of control at lift off. One success path remains after the first failure. Operation is not affected until both paths are lost.

REDUNDANCY SCREENS AND MEASUREMENTS

1. N/A
2. N/A
3. Pass- No credible causes.

RATIONALE FOR RETENTION:

A. DESIGN

O Design specification USBI 10SPC-0031

- Leakage control per paragraph 4.4.2.3.1. (Contamination)
- Vibration level per paragraph 3.4.1.3. (Voids, Cracks, Excessive Gaps) | DCN032

O Explosive material (RDX) certified to Type II, Class 7, MIL-R-398. (Contamination)

O Hermetically sealed device prevents entry of moisture and contaminants following manufacturing. (Contamination)

O Qualification documented in Space Ordnance Systems Test Reports QTR 8660, 3F-1884-10 and 3F-1918-10; and HTL/Energy Systems QTR 2-501270, ER-PYR-91-002 and COQ A-PYR-6121. (All Failure) DCN032

- o High (+150°F), low (+20°F) and ambient temperature function test.
- o 8 and 40 foot drop (Shock)
- o Vibration test
- o Eighty-five percent loaded cartridge, standard frangible nut margin functional test.
- o Humidity Test
- o Salt Fog

B. TESTING

O Lot acceptance testing per Space Ordnance Systems Test Procedure per TP8794 or HTL/Energy System Division Test Procedure per ATP 2-501270

- o Leakage Test Entire Lot. (Contamination)
- o Neutron Radiography Test Entire Lot. (All Failure Causes)
- o Lot Sample Firing Test ten percent of the lot. (All Failure Causes)

C. INSPECTION

VENDOR RELATED INSPECTION

O RECEIVING

- o Receiving Inspection: All explosive material certification and test reports are verified by USBI. (Contamination)
- o USBI Source Inspection Plan (SIP) 1363.
- o Space Ordnance System MP 114848-3.
- o HTL/Energy Systems Division MP 2-501270

O Assembly Operation

- o Explosive material moisture content determination, loading and weighing process and tare weight are witnessed one hundred percent by Contractor Quality Assurance and verified by USBI Quality Assurance per: (Contamination, Insufficient Charge)

- USBI SIP 1363
- Space Ordnance System Manufacturing Procedure 114848-3.
- HTL/Energy Systems Division Manufacturing Procedure MP 2-501270

o Lot Acceptance Test

Lot Acceptance Testing is witnessed one hundred percent by USBI Quality Assurance and Contractor Quality Assurance personnel per: (All Failure)

- USBI Source Inspection Plan 1363

- Space Ordnance System Acceptance Test Procedure TP 8794

- HTL/Energy Systems Division Acceptance Test Procedure ATP 2-501270.

o N-ray: Each N-ray film is examined for the following: (All Failure Causes)
- Evidence of contamination in explosive material. DCN032

- Manufacturing residue in explosive material.
- Processing debris or other extraneous contamination in explosive material.
- Excessive gaps at internal interfaces.
- Voids or cracks in explosive charge.
- Insufficient explosive charge

O Lot review and certification per USBI Plan 10PLN-0031. (Improper Material)

O Critical Processes/Inspections:

The following critical processes/inspections are used to assure that explosive material does not have excessive gap at internal face, voids, or cracks in charge, insufficient charge, leaks or improper welds through which contamination may enter. (All Failure Causes)

- o X-ray (Qualification lots only)- Per document 8794, Space Ordnance System Acceptance Test Procedure or per document ATP 2-501270, HTL/Energy Systems Division Acceptance Test Procedure.

- o N-ray - Per document 8794, Space Ordnance System Acceptance Test Procedure or per document ATP 2-501270, HTL/Energy Systems Division Acceptance Test Procedure.

- o Helium Leak Test - Per document 8794, Space Ordnance System Acceptance Test Procedure or per document ATP 2-501270, HTL/Energy Systems Division Acceptance Test Procedure.

KSC RELATED INSPECTION

O Receiving Inspection

- o Ordnance device shelf life is verified one hundred percent by SPC Quality Assurance in accordance with NSTS 08060, Space Shuttle System Pyrotechnic Specification. (Contamination)
- o Visual inspection of pyrotechnic device for damage, degradation, corrosion, misalignment or moisture is performed per OMRSD File V, Vol. 1 Requirement Number B000FL.005. (Contamination)

O Installation Inspection

- o Ordnance device installation is witnessed and verified by SPC Quality Assurance. (Contamination)

D. FAILURE HISTORY

O Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

- o Not applicable to this failure mode.