SRB CRITICAL ITEMS LIST

SUBSYSTEM: RANGE SAFETY COMMAND DESTRUCT

ITEM NAME: CDF Manifold

PART NO.: 10312-0001-106, -107

FM CODE: A02

ITEM CODE: 70-15

REVISION: Basic

CRITICALITY CATEGORY: 1R

REACTION TIME: Immediate

NO. REQUIRED: 2

DATE: March 1, 1995

CRITICAL PHASES: Boost

SUPERCEDES: March 1, 1994

FMEA PAGE NO.: F-55

ANALYST: T.L. Burke/J. Fletcher

SHEET 1 OF 4

APPROVED: P. Kalia

FAILURE MODE AND CAUSES: Fails to operate (both CDF manifolds) caused by:

- Insensitive explosive degraded by moisture, contamination or chemical decomposition
- Voids or cracks in the explosive cord
- Improper gap at external interface
- Contamination or excessive gap at internal interface
- Vibration/shock

FAILURE EFFECT SUMMARY: Failure of both CDF manifolds to operate leads to the loss of the ability to detonate the destruct ordnance during boost, which may result in the loss of life and/or injury to the public or ground personnel. 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) Fail - contamination

RATIONALE FOR RETENTION:

A. DESIGN

O Design specification USBI 10SPC-0036

- Contamination control per paragraphs 3.1.2 and 3.1.3. (Contamination)

- O Predicted temperature will not exceed 172°F per SRB Thermal Design Data Book SE-019-068-2H, Rev C, Table 4.9.1.1.

- O Explosive material (RDX Type I) certified by MIL-R-398C. (Contamination)

- O Hermetically sealed explosive cord prevents the entry of contamination following manufacturing (Contamination)

- O Qualification

  - o Proven design qualified for Saturn V per North American Aviation Qualification Test Summary 67MS1148

  - o Delta Qualification for SRB per Explosive Technology Test Report 3612 (01) QTR, Rev. B 0954(03) DQTR and 10133(01) DQTR. (COQ A-PYR-6101-1)

    - 8 and 40 foot drop (Shock)
    - Vibration (Vibration, Cracks In Cord)
    - Pyroshock (Shock, Cracks In Cord)
    - Temperature, humidity, altitude (Cracks, Gaps, Insensitive Explosive)
    - Thermal Shock (Cracks, Gaps)

B. TESTING

- O Lot acceptance test per Explosive Technology Procedure 4824 (01) ATP

  - o Radiographic tests of the entire lot. (Void or Cracks in Explosive Cord, Improper Gap)

  - o Temperature/humidity/altitude test of all destructive LAT samples. (Insensitive Explosive, Cracks, Gaps)

  - o Low temperature function (-150°F) test of five percent of the lot. (Insensitive Explosive)

- O Explosive material moisture content performed a maximum of thirty days prior to loading per ET 4824(01) ATP. (Contamination)

- O Explosive core load determination performed per ET 4824(01) ATP. (Contamination)

- O Explosive cord detonation velocity test performed per ET 4824(01) ATP. (Contamination)

C. INSPECTION

The following inspections are performed.

VENDOR RELATED INSPECTION

- o Receiving Inspection: All explosive material certifications and test reports are verified one hundred percent. (Contamination)

  - o USBI Quality Assurance

    USBI Source Inspection Plan (SIP) 1136

- o Contractor Quality Assurance

  Explosive Technology Acceptance Test Procedure 4824(01) ATP

O Assembly Operation: Moisture content determination and explosive loading are verified one hundred percent by Contractor Quality Assurance and USBI Quality Assurance. (Contamination)

- o USBI Quality Assurance

  USBI SIP 1136

- o Contractor Quality Assurance

  Explosive Technology Acceptance Test Procedure 4824(01) ATP.

O Lot Acceptance Test: N-ray and X-ray films are examined by certified vendor personnel and verified by USBI personnel. Vibration test is monitored by USBI Quality Assurance and witnessed by Contractor Quality Assurance one hundred percent. High temperature function test is witnessed one hundred percent (All Failure Causes)

- o USBI Quality Assurance

  USBI SIP 1136

- o Contractor Quality Assurance

  Explosive Technology Acceptance Test Procedure 4824(01) ATP

O Lot review and certification per USBI plan 10PLN-0036.

O Critical Processes/Inspections/Operations: The following critical processes/inspections/ operations are used to verify that explosive charge is properly sealed and free from moisture, contamination, cracks, voids or separation at interfaces. (All Failure Causes)

- o N-ray per ET 4824(01) ATP
- o X-ray per ET 4824(01) ATP
- o Helium Leak Test per ET 4824(01) ATP
- o Adhesive application per ET 4824(02) MP

KSC RELATED INSPECTION

O Receiving Inspection

- o Ordnance device shelf life is verified one hundred percent by Shuttle Processing Contractor Quality Assurance per OMRSD File II, Vol. 3, Req. C00CAQ.040-000. (Contamination)

- o Each non-electric pyrotechnic device is visually inspected for evidence of damage, degradation, corrosion, misalignment or moisture per OMRSD File V, Vol. 1, requirement number B000FL.005.

C Installation Inspection

- Verify proper installation of the CDF assemblies to the CDF manifolds per 10REQ-0021, para. 1.1.4.1. (Contamination)

D FAILURE HISTORY

Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

- Not applicable to this failure mode.