NASA

SECTION 32
<table>
<thead>
<tr>
<th>ORBITER 01/09/03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization/Date:</td>
</tr>
<tr>
<td>Preparer:</td>
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</table>

STS-107 FLIGHT READINESS REVIEW
Orbiter Mission Kit Related Modifications:

- MV080864
- MV08864
- MV080694
- MV069694
- MAVN Frame Assembly Redesign
- Sky Gentele Fastener Change
- EDO Pallet Logo
- MV0458A
- MV0225A
- CDR/PLT Seat Actuator Cap Retention Cover
- MV0221A
- New SCM Battery
- MV0221A

STS-107 Flight Readiness Review
Back-up Charts

Special Topic

ORBITER 01/09/03
Organization/Date:

Presenter:

STS-107 FLIGHT READINESS REVIEW
<table>
<thead>
<tr>
<th>13' 500'</th>
<th>11' 600'</th>
<th>7' 700'</th>
<th>7' 700'</th>
<th>7' 700'</th>
<th>3' 000</th>
<th>10' 400</th>
<th>000</th>
<th>LH2</th>
<th>LH2</th>
<th>L.25'</th>
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<tr>
<td>18' 200'</td>
<td>15' 600'</td>
<td>14' 800'</td>
<td>+/-</td>
<td>+/-</td>
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<td>29' 000'</td>
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<td>16' 500'</td>
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<td>22' 500'</td>
<td>15' 000'</td>
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<tr>
<td>1.75'</td>
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</table>

**Thermal / Mechanical Cycle Profiles**

**Rod Assembly Ball Crack**

**MPS 17” Feedingline Ball Stret The**

**STS-107 FLIGHT READINESS REVIEW**
<table>
<thead>
<tr>
<th>Not Cackled</th>
<th>N</th>
<th>WSCF-1.75-2</th>
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<tr>
<td>375 F to 100 F to crack</td>
<td>Y</td>
<td>WSCF-1.25-1</td>
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<tr>
<td>Edgy Current Indications; L/N2 Dvnk</td>
<td>N</td>
<td>WSCF-1.75-2</td>
</tr>
<tr>
<td>Cycles (121 F to 32 F) to crack</td>
<td>Y</td>
<td>WSCF-1.75-1</td>
</tr>
<tr>
<td>EC / CT Indications; Rapid Thermal</td>
<td></td>
<td></td>
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<tr>
<td>300 F to 100 F to crack</td>
<td>N</td>
<td>WSCF-2.4-2</td>
</tr>
<tr>
<td>400 F to 100 F to crack</td>
<td>Y</td>
<td>WSCF-2.4-1</td>
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<tr>
<td>Cycles (121 F to 32 F) to crack</td>
<td>Y</td>
<td>HB-2.4-26</td>
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<tr>
<td>Dual EDM Notches; Rapid Thermal</td>
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<tr>
<td>275 F to 100 F to crack</td>
<td>Y</td>
<td>HB-2.4-24</td>
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**History of Methods to Crack Test Samples**

<table>
<thead>
<tr>
<th>Gage</th>
<th>Test Sample ID</th>
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<tr>
<td>Ball Crack</td>
<td>MPS 17&quot;, Feeding Ball Stilt The</td>
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**Notch**

**Notes**

Orbit: 01/03
Organizational/Date: 09/03
Presenter: N/A
STS-107 Flight Readiness Review
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<th>Material Parent Loss of Material</th>
<th>Branching Islands Material</th>
<th>Branching Crack ID</th>
<th>Test Sample</th>
<th>Ball Test Summary</th>
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<tr>
<td>ECD 1/12/03</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>1/9/03</td>
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<td>No</td>
<td>Yes</td>
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<tr>
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<td>No</td>
<td>Yes</td>
<td>MSFC-1.25-1</td>
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</tbody>
</table>

**Testing Summary**

Rod Assembly Ball Crack

MPS 17“ Feedingline Ball Stut The

STS-107 Flight Readiness Review
<table>
<thead>
<tr>
<th>Organization/Date:</th>
<th>Remarks</th>
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<tr>
<td>STS-107 Flight Readiness Review</td>
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</tr>
</tbody>
</table>

**Logistics Ball Status**

**Rod Assembly Ball Crack**

MPS 177” Feeding Ball Statute
### Team Structure

| Organization/Date: | Rod Assembly Ball Crack | MPS 177 "Feeding" Ball Seat The
| Presented: | STS-107 Flight Readiness Review |

**Web Sites**
- Logistics - Salute
- Vehicle Ops & Line Removal - Young, Albright, Dishel
- Test - Peller, Appleywhite, Templin, Munro
- Stress - Dunnham, Kramar-White, Medera, Rocha
- MWP - Christensen, Jacobs, Curtis, Allisons, Munro
- Inspections - Frazier, Wagener, Allisons
- Build Data - Findberg, Baird
- Qual and Test History - Peller, Baird
- Brown, Reith-Rigby

**Team Members:**
- TMT - Ouellette, Snyder, Sternanovic, Miholland, Crush,
MPS 17" Feedline Ball Strut Tie Rod Assembly Ball Crack

Typical BSTRA Assembly

BALL STRUT TIE ROD ASSY BSTRAY-LO2 & LH2
TYPICAL TYPE I, II, III, & IV

VACUUM JACKET
PRESSURE CARRIER BELLows
FLOW LINER
ENTRAPPED BALL
TETROD ASSEMBLY
VACUUM JACKET
Typical BTA Assembly

Rod Assembly Ball Crack

MPS 17\” Feeding Ball Strut The
With MPTA, the risk of failure was low; recommendations were to continue.

The apparent conclusion reached after all of the above was:

- A set of recommendations resulting in several test programs.
- Numerous discussions were held between the technical.
- Material change materials.
- Cost and schedule considerations made it highly desirable to install in the MPTA and Stoddby #2.
- Bearings were already installed in the MPTA and Stoddby #2.
- Sensitivity microstructure (proprietary material) and extreme cack.
- Testing by MFC in 1978 round Stoddby #2 to have a course.
- Similar application (Stellite Star) to a material used successfully in the Saturn Program in a
  similar environment. This material was selected based on its similarity to the material being uncharacterized for our use.
- Despite the material being developed for use in.
- Stoddby #2 is a cobalt based alloy developed for use in.

MPS: History of Stoddby Bearings in the Space Shuttle

<table>
<thead>
<tr>
<th>Organization/Date:</th>
<th>Present:</th>
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<tbody>
<tr>
<td>STS-107 Flight Readiness Review</td>
<td></td>
</tr>
</tbody>
</table>
sectioning

Defect Tree by penetrant and metallurgical

Results:

- Kips = 423 F
- 1% 100 thermal cycles - 425/150
  100 load cycles 2/20
- 1% 400 thermal cycles - 320/150
- 2% 400 thermal cycles - 320/150
- Kips = 320 F
- 2% 100 thermal cycles - 320/150
  400 load cycles 50/90

1977 Arrowhead Qualification Test Summary

Org/Def 01/09/03
Organizational/Date:

MPS 177 Feedline Ball Strut Tie

Rod Assembly Ball Crack

STS-107 Flight Readiness Review
71/16: No cracks observed during test. Post test eddy current found two balls sectioned to be cracked (5 of 6).

2/5/8: 3 cracks discovered after first five thermal cycles, no growth noted in current (2 of 5).

Results:

5/8 (3) 100 load cycles 1.5 x design max -320°F
2 % (3) 100 load cycles 1.5 x design max -320°F

Follow up testing of cracked balls:

1 % (X2) 100 thermal cycles -423°F +150 100 load cycles 1.1 x design max -423°F
7/16 (X6) 100 combined cycles -300/0°F +600 1.25 x design max + vibration
5/8 (X5) 10 thermal cycles -320°F +212 100 load cycles 1.5 x design max -320°F
2 % (X5) 10 thermal cycles -320°F +212 100 load cycles 1.5 x design max -320°F

1978 MSFC Testing Summary

ROD ASSEMBLY BALL CRACK
MPS 179 FEEDLINE BALL STUD TIE

Orbiter 01/09/03 Organization/Date: Presenter:
STS-107 FLIGHT READINESS REVIEW
Probably due to above cooling stresses

- Cracks detected on receipt in 1978 MSFC test are most
- Supposed to relieve residual stresses to manageable level
- Hours with slow cool to ambient
- Followed by stress relief heat treatment: 1650°F for four
- Residual stresses:
- On casting, cools from roughly 2400°F to ambient; forms

- Largest thermal cycle occurs at manufactory
- Stress concentration sites for crack initiation at surface
- Large acicular carbide precipitates
- Results in property variations
- Coarse microstructure

- Brittle material - low resistance to thermal/mechanical shock
- This still applies at cryo
- Stoddy #2 has nil ductility at room temperature; assume

M&F: Interpretation of Material Data

<table>
<thead>
<tr>
<th>Material/Date:</th>
<th>Orttler 91/09/03</th>
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<td>Presurser:</td>
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</table>

Rod Assembly Ball Crack

MPS 17" Feeding Ball Stud The

STS-107 FLIGHT READINESS REVIEW
Not observed in MSFC Failures or on OV-103

Mechanical Impact

Not observed in MSFC Failures or on OV-103

Chipping at the Surface

Herzian Stress would produce spalling which is a localized Service load is compression

Initial cause of cracks is not related to mechanical loads

Failure Mechanism

MPS 17“ Feeding: Ball Strut

Rod Assembly Ball Crack

Opiet 01/09/03

Organizational Date:

Presenter:

STS-107 Flight Readiness Review
As observed in MSFC failures and on OV-103
• Cracks would be circumferential
  Crack initiation
  Imperfections would act as stress concentrations and support
  Any scratches, nicks, casting defects, or other surface
  Produces tensile stresses at outer fibers of bearing
decreases
  Outer surface of bearing is trying to shrink as temperature
  Data to date supports a thermal mechanism

MPF: Failure Mechanism (cont):

<table>
<thead>
<tr>
<th>Organization/Date:</th>
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<tbody>
<tr>
<td>Orbit 01/09/03</td>
<td>STS-107 FLIGHT READINESS REVIEW</td>
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</tbody>
</table>

Rod Assembly Ball Crack
MPS 177 "Feeding Line Ball Stunt The
produce a higher stress at the crack tip.
Subsequent temperature cycles below that delta T could not
ultimately strengthen the material.

In brittle material, with no restrictions, once initiated crack
would propagate until stress at crack tip dropped below the
thermal stress. Thermal stress can only grow crack if delta T increases.

Residual casting stresses would be relieved by crack formation.

Residual casting stresses
Assumed mechanism is thermal stresses with possible

Crack Arrest

MP#: Flight Rationalize Support

Rod Assembly Ball Crack

MPS 17” Feeding Ball Stunt The

STS-107 FLIGHT READINESS REVIEW
Compressive strength is 300,000 psi.

Spall generation would be against the strongest property of this material.

Spallation would be evident if the tensile properties are clean (no FOD).

Anecdotal evidence that fractures are clean (no FOD) has been obtained with two bearing suppliers provided.

Conversationalists with the OV-103 crack have been contacted.

No evidence of spallation at crack edges in what can be seen.

No reports of spall generation (spallation) were recorded.

FOD Generation (Spallation)

MSP: Flight Rationale Support (cont):

MPS 177: Feeding Ball Stretcher.

Rod Assembly Ball Crack

STS-107 Flight Readiness Review
is inadequate to detect cracks for pre-existing cracks or post-acceptance screening.
- Use of dye penetrant inspection as detection method.
- Use of ultrasonic and thermal screening.
- Concur with conclusion that risk of failure is low given a coarse microstructure with extreme crack sensitivity.
- Concur with 1978 MSFC observation that material has MPS 177 "Feeding Ball Strut Tie"

MAP: Conclusions

**ORGANIZATION/DATE:**

**PRESENTER:**

STS-107 FLIGHT READINESS REVIEW
Testing

• Mechanical loads schedule has been defined for work on LO2 and transient environments is ongoing with DFI flight data.

• Vibration in -014 spec and PE analyses is consistent with "17" disconnect verified.

• Vibration environments at the ET attach and on the PE still considered enveloping case model change reduce line loads indicate comparison of LH2 random vibration loads indicate.

• Work flowliner activity; does not impact PE cert loads is in vibration that LH2 line model changes, part of.

Stress / Loads Analyses

<table>
<thead>
<tr>
<th>Organization/Date:</th>
<th>Rod Assembly Ball Crack</th>
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<tbody>
<tr>
<td>Presenter:</td>
<td>MPS 17” Feedline Ball Stretチ</td>
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</table>

STS-107 Flight Readiness Review
Completion

- Checkout runs for 2.24" uncracked balls nearing
- Thermal gradient and mechanical contact loads

Stress Analyses

*Stress Analyses will be performed on BSTR A Ball

STS-107 Flight Readiness Review

MPS 177 Feeding Ball Strut Task

Rod Assembly Ball Crack

Orbiter 01/09/03
Organization/Date:
Presenter:
Bu-79

Support: No BSTRA Related Anomalies.

Post Test Inspection 6/9/82 - Some PC colliding during Implosion testing due to misaligned:
- 5 min @ 63 psig, ambient
  - Burst
  - 140 cycles @ 5, 55 psig @ 500°F
  - Pressure Cycles
  - 30 psig across PC @ ambient
  - Pressure Cycles
  - 22 psig across VJ @ ambient
  - Jacket Implosion
  - LH2 @ 5 psig
  - Heat Transfer
  - 13.9 Horsepower, 400°F @ 20 - 35 psig
  - Vibration
  - 100 cycles, X and Y, 423°F within 10 minutes
  - Temperature Cycles
  - 50 cycles extended @ 90°F, 50 cycles compressed @ 90°F, 5 - 55 psig @ 300°F
  - Pressure Cycles
  - 2000 cycles @ 72°F, 200 cycles @ 90°F, 45 psig @ 300°F
  - Endurance
  - Proof Press / Operational / Elevated Amp Temp / PC Leakage / VJ Pressure Rise
  - ATP

LH2 17” Feedline Qualification Testing Summary

Rod Assembly Ball Crack

MPS 17” Feedline Ball Stunt Tie

ST5-107 FLIGHT READINESS REVIEW
Related anomalies. No mention of actual tear-down.

- Post Test Inspectors 1/16/78 and 6/9/82 – Some movement of one support, No BSTR
- 5 min @ 395 psig, 3 min @ 440 psig, ambient
- Burst
  - 1940 cycles total, 10 - 220 psig @ -300°F
  - Pressure Cycles
  - 22 psig across V/J @ ambient / 30 psig across PC @ ambient
  - Jacket Implosion / Pressure Carrier Implosion
  - LOZ @ 5 psig
  - Heel Transfer
  - Some V/J Leaks noted and corrected
  - 13.3 Hours/axis, -300°F @ -70 - 160 psig

Vibration

- 100 cycles, amb @ 300°F within 10 minutes @ 20 psig
- Temperature Cycles
- 50 cycles extended @ 90%, 50 cycles compressed @ 90%, 5 - 200 psig @ -300°F

Pressure Cycles

- Some excessive operational noise report at 1700 cycles - Cause ??
- 2000 cycles @ 72%, 200 cycles @ 90%, 200 psig @ -300°F

Endurance

- Proof Press / Operational / Elevated Amb / Temp / Elevation / VJ Pressure Rise
- ATP

### LO2 17" Feedline Qualification Testing Summary

**Organizer:** 01/09/03  
**Organizer/Date:** October 01/09/03

**Presenter:**

STS-107 FLIGHT READINESS REVIEW

**MPS 17" Feedline Ball Joint Test**

**Rod Assembly Ball Crack**
January 9, 2003
FERRY READINESS
FLIGHT READINESS REVIEW
STS-107

NASA Johnson Space Center, Houston, Texas
Space Shuttle Vehicle Engineering Office
Space Shuttle Program
Configuration drawings have been released.

- Shuttle Carrier Aircraft (SCA): NASA 911 is ready to support
- Falcon 2 ready to support
- Attach hardware and ferry plugs are ready to support
- Ballast is not required

**NEOM mass properties are within specified limits — Orbiter middeck**

- **NEOM ferry center of gravity (in):**
  - X: 0 1109.7
  - Y: 0.2
  - Z: 0 371.9
  - (no fluids on-board)
- **NEOM ferry weight (lbs):**
  - 231732
- **Orbiter:** OV-102 (Columbia)
- Hardware summary:

**Ferry Plan Summary**

**Ferry Readiness Review**

**STS-107 Ferry Readiness Review**

**Date:** Jan 9, 2003

**Ferry Readiness Review**

**Ferry Plan Summary**

NASA Johnson Space Center, Houston, Texas

Space Shuttle Vehicle Engineering Office

**Space Shuttle Program**
Prior to purge initiation 40°F to avoid the potential for payload heat exchanger/water lines freezing

- The Orbiter also requires that the ambient air temperature at landing be above 45°F for greater than 2 hours.
- Pure circuit 2 (Spacehead and Orbiter payload heat exchanger/water lines requirement for ambient air temperature below 50°F)
- Pure circuit 1 (OMS/ RCS - ambient air temperature below 45°F for greater than 4 hours over either stop locations

- Pay attention to ambient temperature
- Pay attention to ambient temperature
- Threatifier: USAF C-141 or C-17 (pure equipment required)
- Prime landing site, weather alternates and emergency landing fields selected

- Three flight legs that will be performed over 2 days
- Flight plan
- DFRC seven day turnaround with ready-to-ferry on the morning of day seven

Ferry Plan Summary - Continued
ST5-107 FERRY READINESS STATEMENT

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<thead>
<tr>
<th>Date</th>
<th>Page 4</th>
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<tbody>
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</tbody>
</table>

Ferry Readiness

STS-107 Flight Readiness Review

Space Shuttle Vehicle Engineering Office

Don L. McCormack, Jr.
Ground Operations

January 9, 2003

Flight Readiness Review

STS-107
The STS-107 action plan is consistent with the STS-113.
Implementation of the action plan:
STS-113 pyro initiation was nominal after STS-112 pyro system failure.
A recurrence control action plan was enacted following the
Hold Down Post / ET/AS Pyro Anomaly.

Unplanned: Complete

PR SB-B1-16-0005 SRB ERA cable connector inspection
PRCDB 062145 - Video Quality Test for Freestar/Mediex
ECLS 02 System Decay Test (FCP-165) during SO09

Planned: Complete

3 APU Confidence Run (Hotfire)

Processing Differences - VAB / Pad

Ground Ops/01-09-03
Organizational/Date:
Jim Taylor
Presenter:
ST-107 Flight Readiness Review
<table>
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The following Topics have been reviewed:

- Nonstandard Work Summary
- Engineering Topic
- Safety, Quality, and Mission Assurance
- Unexpected Anomalies
- Critical Process Changes
- Time/Life Cycle
- Lost Item Problem Reports
- In-Flight Anomaly Status
- Vehicle/GSE Modification Status
- Software, SCAN, and Configuration Status
- LCC/GLS Status
- TOPS Status
- Requirements Status - OMRS

<table>
<thead>
<tr>
<th>Ground Ops/01-09-03</th>
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<tr>
<td>Organization/Date:</td>
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<tr>
<td>Mike Young</td>
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<tr>
<td>Presenter:</td>
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</table>

SHUTTLE ENGINEERING OVERVIEW

STS-107 Flight Readiness Review
detected in 30 minutes.
Pressure: No leakage
Leak check performed
To VECB: 1/10/03

(50V58L826)
break isolation valve #1
Reducer at the outlet side of
Fluid leak at a swaged
V58A10.020-A; Hydraulic
Ref: PR HYD-2-28-1-97

Status

Open Waivers/Exceptions

OMRS STATUS

Ground Ops/01-09-03
Organizational/Date:
Mike Young
Presenter:

ST-5-107 Flight Readiness Review
structure hardware Pad A OAA and Launch detrimental effect on time has had no exceeding min. Retract Requirement. sec. should be between 105 only against the max measured and verified Retract time has been Historically the OAA Retract time is nominally 100 Pad A OBIter Access Arm G51FGPA0.13 FILE VI OMRS Arms Swing 110/0/03 Ref: U70-0503-00-001-0949 EKG10310

Status

Exception System Title: Waiver

Open Waivers/Exceptions (Cont'd)

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<tr>
<th>Ground Ops/01-09-03</th>
<th>Organization/Date:</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Presenter:</td>
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OMS STATUS

STS-107 Flight Readiness Review
### LOGICAL ANOMALY STATUS

<table>
<thead>
<tr>
<th>Ground Ops/01-09-03</th>
<th>Organization/Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mike Young</td>
<td></td>
</tr>
</tbody>
</table>

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**STS-113-K-02:**
Facility Platform, Accessed RMS.

**STS-113-K-01:**
Closed

**Orbiter Access Arm Manual Valves out of ECD**

Issue is not applicable to STS-107

1/6/03

Procedural error/commission. Procedure has been corrected and issue closed at PRCB

Configuration, investigation revealed a

Closed
Site Status

- WSS
- DFRG/EDW
- KSC (Prime EOM)

Mission Support

- Deploy at L-2 days, Jan 14, 2002
- Deploy at L-6 days, Jan 10, 2002
- AOA

Launch Support

- Zaragoza (All)
- Moron (Prime)

<table>
<thead>
<tr>
<th>Organization/Date:</th>
<th>Mike Leimbach</th>
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<tbody>
<tr>
<td>Presenter:</td>
<td>STS-107 Flight Readiness Review</td>
</tr>
</tbody>
</table>
STS-107 Readiness Statement

Shuttle Processing Team
Kennedy Space Center
Ground Operations

January 9, 2003

Backup Flight Readiness Review

STS-107
8 Range Suppression Pulse Present (Could)

TACAN 1, 2 & 3 Range Built in Status Word

CT-01 Payload At Main BGC Power - On
Pay-03 Payload Auxiliary RPC AGB - On
Pay-02 FCL-40 Payload Heat Exchanger Flow Rate

Description and Remarks

Mask

OMRS

SSID

GLSDD (KLO-82-00714) Rev. 9, Change E, November 2002

Ground Launch Sequencer Configuration for STS-107

Organizational/Date:

Mike Young

Presenter:

STS-107 Flight Readiness Review
<table>
<thead>
<tr>
<th>Description and Remarks</th>
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<tr>
<td><strong>Bypass</strong></td>
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**Remarks**:

- STS-107 Flight Readiness Review

**Ground Launch Sequencer**

<table>
<thead>
<tr>
<th>Ground Launch Sequencer Configuration for STS-107</th>
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<tr>
<td>Ground Ops/01-09-03 Organizational/Date:</td>
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<td>Mike Young Presenter:</td>
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</table>
Summary/Conclusion for all LAF PR's

Lost Items Not Found (18 Total)

<table>
<thead>
<tr>
<th>Ground OPR/0-1-09-03</th>
<th>Organization/Date:</th>
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- System Engineering evaluations have concluded no adverse effect on Orbiter system operations.
- Finding/retrieving the lost items in a thorough search of each area was unsuccessful.
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<th>Presenter:</th>
<th>STS-107 Flight Readiness Review</th>
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</table>

**Lost Item Problem Reports**

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Description</th>
<th>Location</th>
<th>Comment</th>
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<tr>
<td>1</td>
<td>Ground Ops/01-09-03</td>
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</table>
Mission
No concerns after engine start through remainder of
cruise.

Concerns

- No concerns during countdown hold
- Redundant open B, indication at T-7 seconds (s)
- A repeat of the anomaly coupled with a failure of the

Observation

- No data dropout occurred during troubleshooting
- The open B, indication operated nominally (remained ON)
- L2H dump
- Drop out occurred 14 minutes after valve was opened for
  L2H dump
- Shut down
- Open A, indication experienced a drop out after SSME
- During STS-109 ascent the Engine #1 L2H Prevalve
- Unexplained anomalies
Indications not used for remainder of mission

Indications at T-7 s - Valve opening
Launch Commit Criteria Requirement is for 1 of 2 open

All occurred during times of heavy work traffic, or on ascent
Short or open in the Indicator Electrical Circuit
Most probable cause for all 5 U/A's was an intermittent

No occurrences during cryogenic loading or launch count

Processing and 1 on STS-104 ascents
3 on OV-104 Engine #1 LH2 (2 during STS-044/079)
2 on OV-102 Engine #3 LH2 (during STS-035 processing)

Prevalent open indication signal drop outs
5 prior Unexplained Anomaly (U/A) occurrences of

Discussion

DROP OUT (CONT'D)

ORGANIZATION/DATE: MIKE YOUNG
PRESENTER: STS-107 Flight Readiness Review
No drop outs
- Open, No indication monitored during daily power-up
- No damage
- Convolute tubing removed and wire harness inspected near valve connector
- Convolute tubing wiggled while monitoring voltage — no signal noise
- Vehicle wiggled while monitoring voltage — no signal noise
- Micro switch was tested — no anomalies
- Isolated valve from vehicle wiggling
- No anomalies noted
- Valve electrical connector was de-mated and inspected
- No drop outs
- A tap check was performed on the Prevalve actuator

Actions Taken

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Ground Ops/01-09-03
Organizational Date:
Presented:
Mike Young

DROP OUT (CONT'D)
ENGINE #1 PREVALVE INDICATION
UNEXPLAINED ANOMALIES