STS-104

FLIGHT READINESS REVIEW

June 28, 2001

Ground Operations

AGENDA

- Shuttle Processing
  - Integrated Operations — J. Vevera
  - Launch and Landing — M. Leinbach
  - Summary — D. King, E. Adamek, C. Murphy

PROCESSING DIFFERENCES

Presenter:
J. Vevera
Organization/Date:
Ground Ops/06-28-01

- Planned
  - V1078 APU Gearbox Pressurization
  - V1034 Orbiter/SSME Frequency Response Test

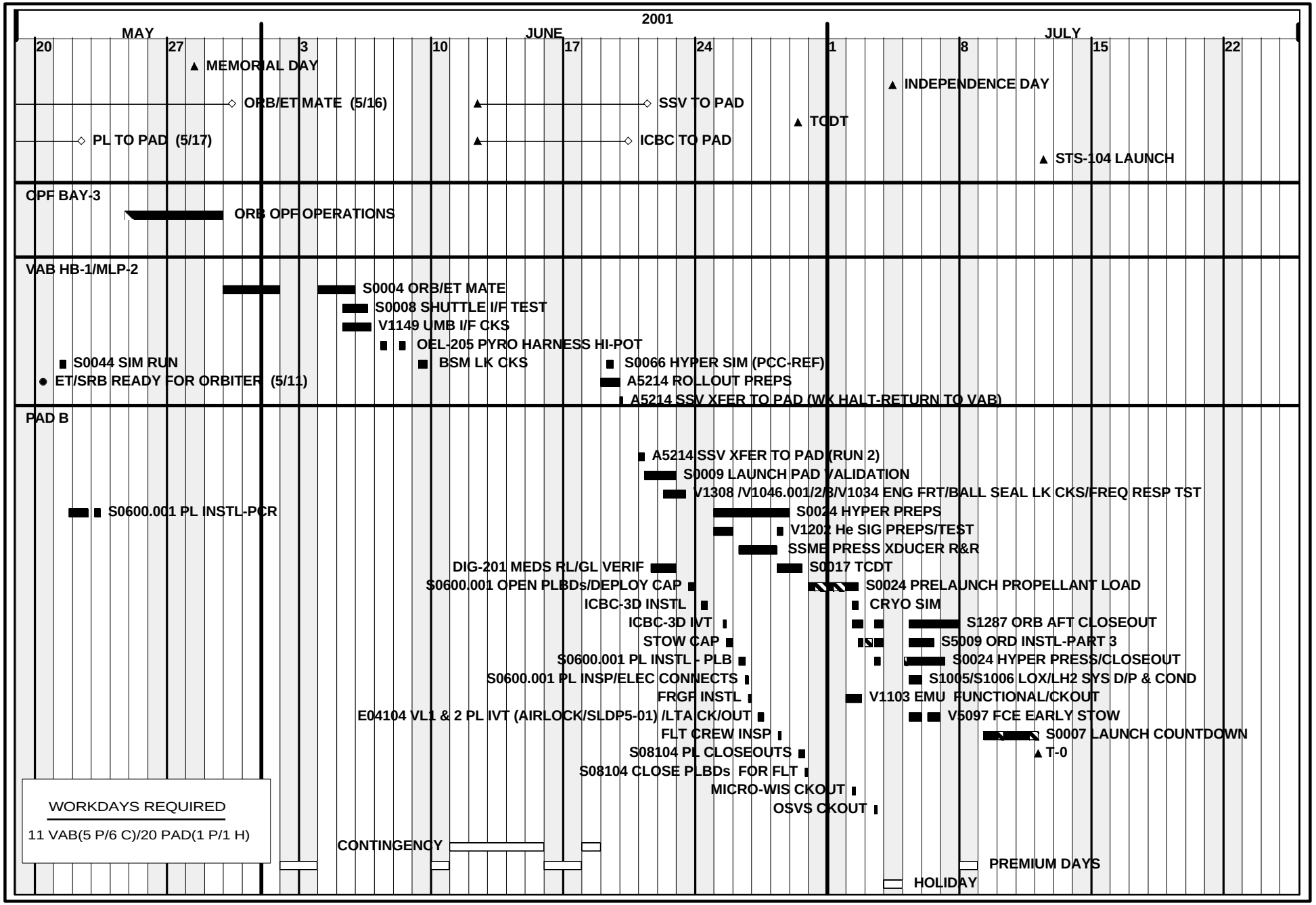
- Unplanned
  - SSME Pressure Transducer R/R
  - Minimum Contingency Time

STS-104 / OV-104
Integrated Operations Assessment Summary

OPR: USA - J. Vevera, INT FM(1-2568)
NASA - E. Mango, PH (1-9221)

Payload: ISS-10-7A/AIRLOCK/SLDP5-01 (VERT)

25JUN01 08:17



SHUTTLE ENGINEERING OVERVIEW

Presenter:
J. Vevera

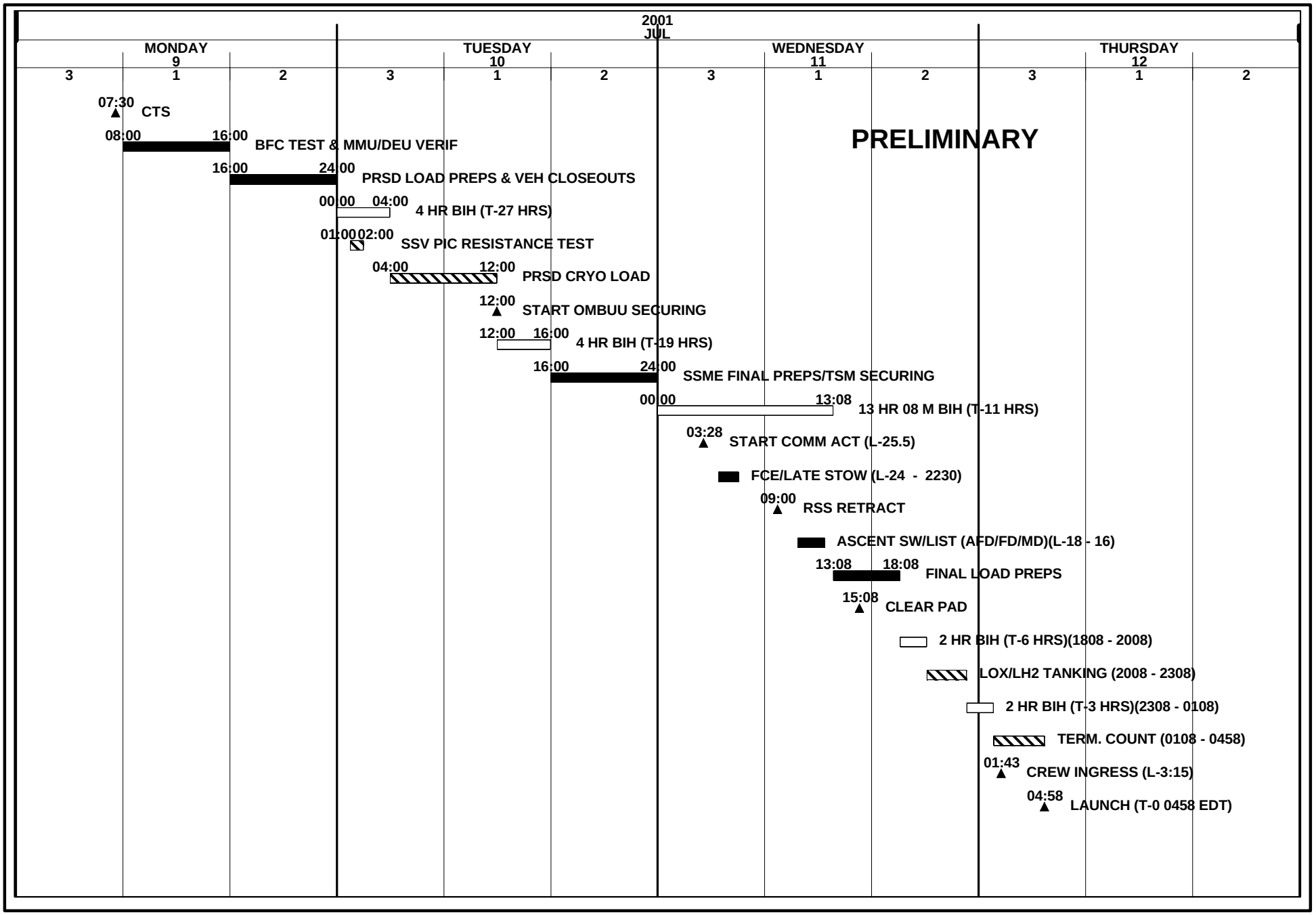
Organization/Date:
Ground Ops/06-28-01

The following Topics have been reviewed:

• Requirements Status – OMRS	No Issues
• TOPS Status	No Issues
• LCC/GLS Status	No Issues (in backup)
• Software, SCAN, and Configuration Status	No Issues
• Vehicle/GSE Modification Status	No Issues
• In-Flight Anomaly Status	No Issues
• Lost Item Problem Reports	No Issues (in backup)
• Time/Life Cycle	No Issues
• Critical Process Changes	No Issues
• Unexplained Anomalies	No Issues (in backup)
• Safety, Quality, and Mission Assurance	No Issues
• Engineering Topic	No Issues
• Nonstandard Work Summary	No Issues

STS-104 / OV-104
Launch Countdown Summary

OPR: J. Spaulding (1-9306)
15JUN01 10:35



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United Space Alliance

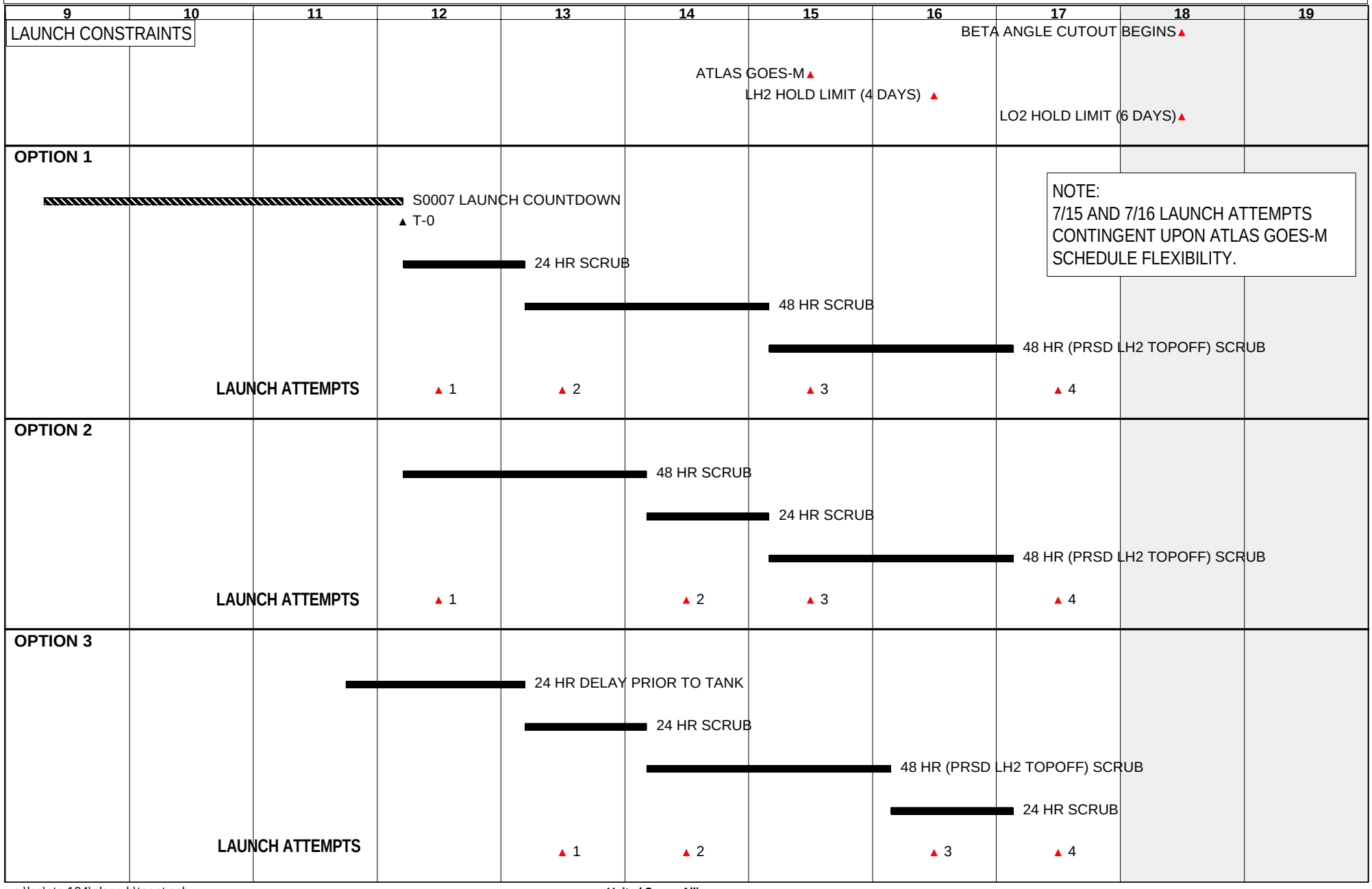
NOTE:
Actual scrub turnaround timelines will be determined realtime based on specific conditions encountered.

STS-104

LAUNCH COUNTDOWN TURNAROUND OPTIONS

OPR: J. Spaulding 1-9306

22JUN01 08:35



LANDING OPERATIONS STATUS

Presenter: Mike Leinbach

Organization/Date: Launch & Landing/06-28-01

- Launch Support
  - **RTLS**: KSC
  - **TAL**:
    - Zaragoza (Prime) — Deploy at L-6 days, Jul 6, 2001
    - Moron (Alt) — Deploy at L-6 days, Jul 6, 2001
    - Ben Guerir (Alt) — Deploy at L-7 days, Jul 5, 2001
  - **AOA**:
    - KSC (Prime)
    - WSSH (Alt) — Deploy at L-2 days, Jul 10, 2001
- Mission Support
  - KSC (Prime EOM)
  - DFRC/EDW — Deploy at L-2 days, Jul 10, 2001
  - WSSH
- Site Status
  - No Issues

Kennedy Space Center
Shuttle Processing Team

STS-104 Readiness Statement

This is to certify that appropriate CoFR items from NSTS-08117 Appendices H and Q, Flight Preparation Process Plan, have been reviewed and dispositioned. Subject to completion of planned work and resolution of any identified constraints, KSC Shuttle Processing and Supporting Organizations are ready to support Launch Operations.

S\J. G. Presnell *for*

Charlie W. Murphy
APM, Integrated Logistics,
USA.

S\Paul E. Adamek

Paul E. Adamek
APM, Ground Operations,
USA.

S\David A. King

David A. King
Director of Shuttle Processing,
NASA

STS-104

FLIGHT READINESS REVIEW

BACKUP

June 28, 2001

Ground Operations

GROUND LAUNCH SEQUENCER

Presenter:
M. Madden
Organization/Date:
Ground Ops/06-28-01

Ground Launch Sequencer Configuration for STS-104

- GLSDD (KLO-82-0071A) Rev 8, Change C, April 2001

SSID / OMRS	Description and Remarks
• Mask	
ECL-40	FC1&2 Payload Heat Exchanger Flow Rate
DPS-23	LH and RH DDU good (MEDS installed)
PAY-02	Payload Auxiliary RPC A & B - ON
PAY-03	Payload Aft Main B & C Power – ON
• Bypass	
SSME-02	ME-2 MFV Downstream Temp 1&2 (Now Block II)

LOST ITEM PROBLEM REPORTS

Presenter:
M. Madden
Organization/Date:
Ground Ops/06-28-01

Lost Items Not Found (3 Total)

Summary/Conclusion for all LAF PR's

- A thorough search of each area was unsuccessful in finding/retrieving the lost items
- System Engineering evaluations have concluded no adverse effect on Orbiter system operations

Crew Module

PR –LAF-4-24-0500:

¼" Drive Breaker Bar #D018-042 was missing during offload at MDD

- Weight: 90 Grams
- Size: ¼" X 6" Long
- Location: Crew Module Area

Review of Tool Logs, Search Efforts and Closeout Process have concluded this tool is not lost in the vehicle

LOST ITEM PROBLEM REPORTS

Presenter:
M. Madden

Organization/Date:
Ground Ops/06-28-01

LH POD

- PR- LAF-LPO3-28-0008:
  - Weight: 0.65 Grams each
  - Size: 1” O.D X 0.030 in Thick
  - Location: LH POD

2 Oxidizer Seal savers were lost into POD during Thruster R/R

MIDBODY

- PR- LAF-4-24-0501:
  - Weight: 15 Grams
  - Size: 3/8 “ X 3.25” Long
  - Location: Midbody

¼” Combination Wrench B120-080 was missing from shop tool box B120.

Review of Tool Logs, Search Efforts and Closeout Process have concluded this tool is not lost in the vehicle

UNEXPLAINED ANOMALIES

Presenter:
M. Madden

Organization/Date:
Ground Ops/06-28-01

- Closed -
  - N/A

- Open -
  - IPR-104V-0022 — Loss of PCMMU-1 Data During Switchover
  - IPR-104V-0047 — ROME GN2 Valved Failed to Cycle

UNEXPLAINED ANOMALIES
LOSS of PCMMU-1 DATA DURING SWITCHOVER

Presenter:
M. Madden
Organization/Date:
Ground Ops/06-28-01

- Observation
  - On 3/22/01, during switchover from PCMMU #2 to PCMMU #1, no data was received in LPS and RPS
    - Switching back to PCMMU #2 restored data flow,
    - Subsequent switching to PCMMU #1 resulted in good data flow to LPS and RPS

- Concerns
  - Loss of data visibility to critical systems performance and function

UNEXPLAINED ANOMALIES
LOSS of PCMMU-1 DATA DURING SWITCHOVER (CONT'D)

Presenter: M. Madden

Organization/Date: Ground Ops/06-28-01

- Discussion
  - PCMMU's have a definite current draw signature when powered on and off
  - The OI PCMMU PWR SW is a 3 pole toggle switch which provides 2 individual power sources to the PCMMU

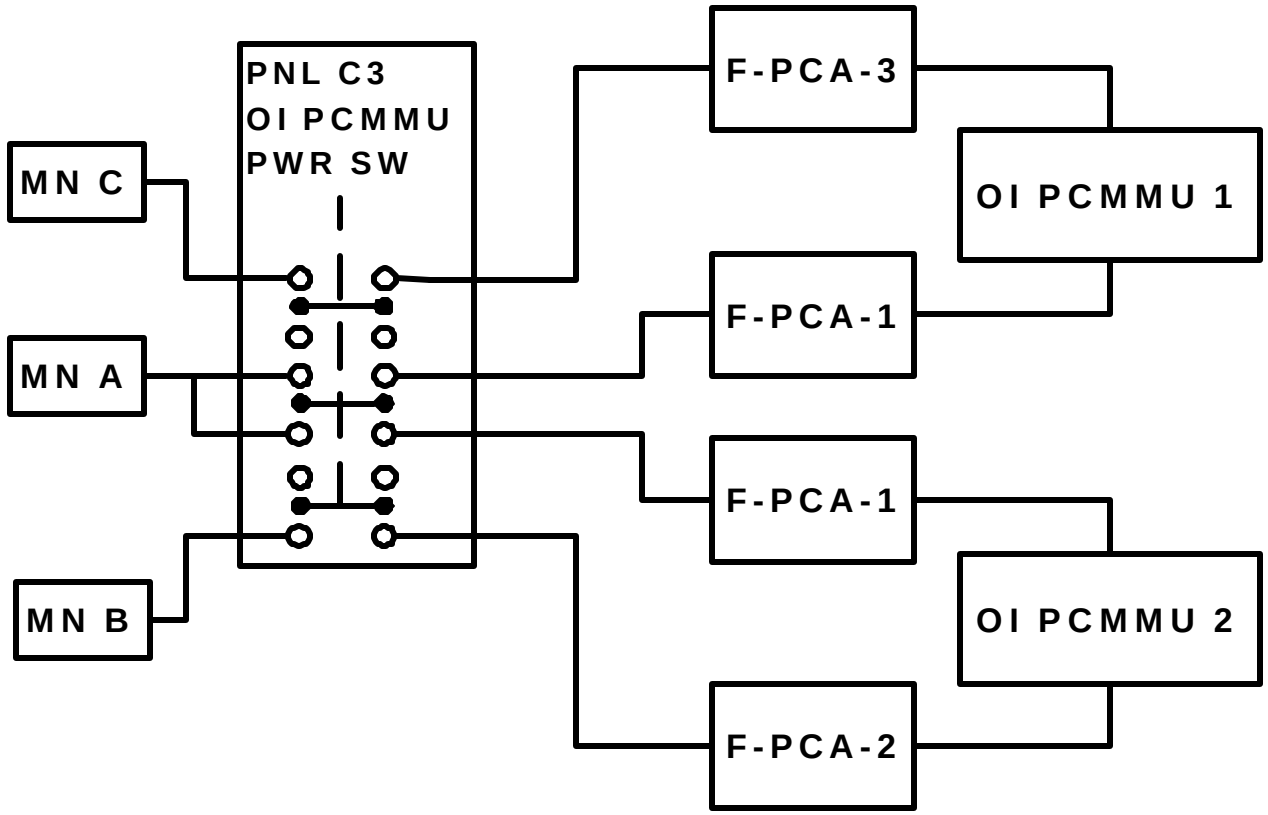
- Actions Taken
  - Data retrievals of the AC bus current at the time of the initial anomaly were reviewed
    - AC Current dropped when PCMMU #2 was switched OFF
    - AC Current did not increase when PCMMU #1 was switched ON

UNEXPLAINED ANOMALIES
LOSS of PCMMU-1 DATA DURING SWITCHOVER

Presenter:
M. Madden

Organization/Date:
Ground Ops/06-28-01

PCMMU 1 and 2 Power Circuit Diagram



UNEXPLAINED ANOMALIES
LOSS of PCMMU-1 DATA DURING SWITCHOVER (CONT'D)

Presenter:
M. Madden

Organization/Date:
Ground Ops/06-28-01

- Actions Taken (Cont'd)
  - Review of Data retrievals of the AC bus current during subsequent PCMMU switchovers were nominal
    - AC Current dropped when PCMMU #2 was switched OFF
    - AC Current increased when PCMMU #1 was switched ON
  - Performed Troubleshooting of the OI PCMMU PWR SW
    - Cycling from OFF position to PCMMU #1 Position - 10 times
    - No discrepancies were noted
    - Observed Nominal AC Current traces for all cycles

UNEXPLAINED ANOMALIES
LOSS of PCMMU-1 DATA DURING SWITCHOVER (CONT'D)

Presenter:
M. Madden
Organization/Date:
Ground Ops/06-28-01

- Actions Taken (Cont'd)
  - Physical analysis of the OI PCMMU PWR SW was performed by USA and NASA system engineers by comparison to the PCM FORMAT SW
    - Switch "FEEL" and "DETENT" were analyzed
    - No differences or discrepancies were noted

- Possible Causes
  - Human Error by failing to place the OI PCMMU SW to the PCMMU-1 Detent Position
  - Mechanical Failure of the OI PCMMU PWR SW for both sets of contacts from Control Bus AB1 and CA1
  - Simultaneous Intermittent wiring failure of two isolated paths

UNEXPLAINED ANOMALIES
LOSS of PCMMU-1 DATA DURING SWITCHOVER (CONT'D)

Presenter:
M. Madden
Organization/Date:
Ground Ops/06-28-01

- Conclusions
  - PCMMU #1 did not receive power during initial anomaly from 2 separate circuits
  - OI PCMMU PWR SW is working nominally

- Most Probable Cause
  - Switch was not correctly positioned during anomaly

UNEXPLAINED ANOMALIES
LOSS of PCMMU-1 DATA DURING SWITCHOVER (CONT'D)

Presenter:
M. Madden
Organization/Date:
Ground Ops/06-28-01

- Risk Assessment
  - No risk to Mission success or Flight and crew safety

- Flight Rationale
  - PCMMU #2 is redundant to PCMMU #1 and each has redundant power supplies
  - Function and feel of OI PCMMU PWR SW has been verified nominal
  - PCMMU #1 and #2 have been functionally tested and verified fully operational

UNEXPLAINED ANOMALIES
ROME GN2 VALVE FAILED TO CYCLE

Presenter:
M. Madden

Organization/Date:
Ground Ops/06-28-01

- Observation
  - During LCA Retest, the Right OME Fill Valve (LV001) did not cycle open when commanded. Valve operation is normally verified by audible means. A total of 5 attempts were made and no positive results were observed
    - IPR 104V-0047 was initiated to document and troubleshoot the condition

- Concerns
  - Inability to command and operate ROME GN2 Valve (Ground Function Only)

UNEXPLAINED ANOMALIES
ROME GN2 VALVE FAILED TO CYCLE (CONT'D)

Presenter:
M. Madden

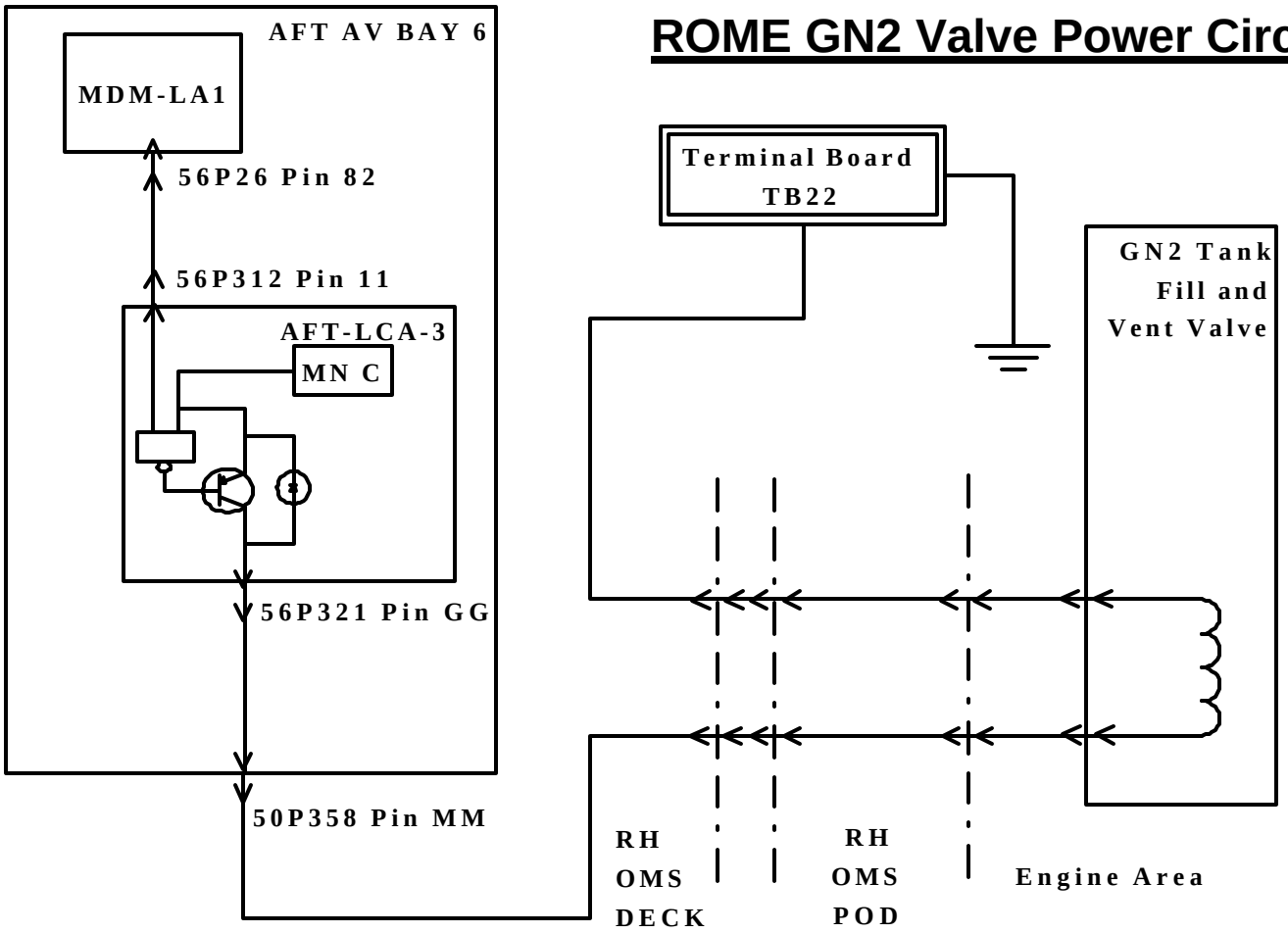
Organization/Date:
Ground Ops/06-28-01

- Discussion
  - This circuit does not have electrical power to the valve coil during flight
  - Three items in this circuit were reworked during this STS-104 flow since the last usage of the GN2 Fill Valve during the STS-98 flow
    - Aft LCA #3
      - Due to another system problem
    - Connector 56P321
      - Due to connector issues with R/R of the LCA
    - Connector 56P312
      - Due to connector issues with R/R of the LCA

UNEXPLAINED ANOMALIES
ROME GN2 VALVE FAILED TO CYCLE (CONT'D)

Presenter:
M. Madden
Organization/Date:
Ground Ops/06-28-01

ROME GN2 Valve Power Circuit



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UNEXPLAINED ANOMALIES
ROME GN2 VALVE FAILED TO CYCLE (CONT'D)

Presenter: M. Madden

Organization/Date: Ground Ops/06-28-01

- Actions Taken (Cont'd)
  - Troubleshooting was performed by installing a BOB at connector 56P321
    - The valve was commanded with the BOB in-place and there was 28.8 VDC coming from LCA #3
    - A resistance check towards the valve coil read 17 ohms
    - Both indications are nominal performance of the system
  - The BOB was removed and a "Pull" test was performed at 56P321
    - Pin GG passed - showing no signs of being loose

UNEXPLAINED ANOMALIES
ROME GN2 VALVE FAILED TO CYCLE (CONT'D)

Presenter: M. Madden

Organization/Date: Ground Ops/06-28-01

- Actions Taken (Cont'd)
  - The back shell of connector 56P312 was removed and a pull test was performed
    - Pin 11 passed - showing no signs of being loose
  - The system was returned to flight configuration and retested completely
    - Nominal Retest – no recurrence of the anomaly

UNEXPLAINED ANOMALIES
ROME GN2 VALVE FAILED TO CYCLE (CONT'D)

Presenter: M. Madden

Organization/Date: Ground Ops/06-28-01

- Possible Causes
  - GN2 Fill Valve Sticking
    - No prior history of these valves sticking
  - Defective Circuit in Aft LCA #3
    - New LCA was installed and passed ADP and Functional Retest
  - MDM LA1 did not issue command to LCA #3
    - Subsequent cycles were verified by a Bite Test 4 check
  - Intermittent connection, loose pin or contamination in connectors 56P321 or 56P312

UNEXPLAINED ANOMALIES
ROME GN2 VALVE FAILED TO CYCLE (CONT'D)

Presenter: M. Madden

Organization/Date: Ground Ops/06-28-01

- Most Probable Cause
  - Intermittent connection, unseated pin or contamination preventing proper mate of connector 56P321, which was cleared by the troubleshooting and BOB installation
    - This was the only component disturbed since the failure of the GN2 valve and it's subsequent nominal operation
- Risk Assessment
  - No risk to Mission success or Flight and crew safety
- Flight Rationale
  - The valve has been fully retested successfully
  - The valve is only used for ground operations
  - Loss of power causes the valve to fail closed

FUEL CELL RUNTIME

Presenter:
M. Madden

Organization/Date:
Ground Ops/06-28-01

- Fuel Cell (FC) Runtime Contingency
  - Present Runtime Hours
    - FC1 s/n 106 971
    - FC2 s/n 108 1289
    - FC3 s/n 120 641
  - Planned Runtime Usage - 366 hours
    - 11+1 day mission + 2 weather contingency + 30 FC start/landing
  - Available Contingency Runtime
    - FC1 1263 hours
    - FC2 945 hours
  - FC3 1593 hours