International Space Station
Ground Handbook
Specific
ISS-3A

Mission Operations Directorate
Operations Division

Final
June 13, 2000

These procedures are available electronically on the SODF Homepage at http://fitproc.jsc.nasa.gov
INTERNATIONAL SPACE STATION
GROUND HANDBOOK - SPECIFIC
ISS-3A

FINAL
June 13, 2000

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This document is under the configuration control of the Systems Operations Data File Control Board (SODFCB).
Incorporates the following:

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C&DH PROCEDURES
NOTE
1. This procedure is used to reconfigure the Node 1 MDMs after an Auto Retry Condition has occurred where the Auto Retry function reconfigures the MDMs back to the nominal states of N1-2 Primary and N1-1 Secondary.

2. N1-2 recovered: perform steps 1, 2, and 3
   N1-1 recovered: perform steps 1 and 3

1. VERIFYING MDM STATES

   PCS2
   Node 1: C&DH: MDM N1-2
   Primary NCS MDM Node 1

   Verify Frame Count – <incrementing>
   Verify MDM ID – N1-2
   Verify MDM State – Primary

   Node 1: C&DH: MDM N1-1
   Secondary NCS MDM Node 1

   Verify Frame Count – <incrementing>
   Verify MDM ID – N1-1
   Verify MDM State – Secondary

   Verifying RS State
   If NCS interface is SM Central Computer
   sel SMCC Control
       [Primary NCS SMCC Control]
   Verify SMCC Frame Count – <incrementing>

   If NCS interface is FGB
   FGB: C&DH: FGB MDM 2(1)
       [FGB MDM]
   Verify FGB Frame Count – <incrementing>

2. RECONFIGURING THE NODE 1-2 MDM

   2.1 Clearing MDM BST Error Latch

   PCS
   Node 1: C&DH: MDM N1-2
       [Primary NCS MDM Node 1]
   ‘Software Control’
   sel MDM Utilities
   ‘Clear Latched Data in BST A’
   cmd Clear Execute
2.2 Configuring MDM Heaters Controlled by the N1-2 MDM

PCS2

Primary NCS MDM Node 1

RPCM N1RS2 C

√RPC 4 Position – Cl

If Open

sel RPC 4

RPCM_N1RS2_C_RPC_4

cmd Close

<Cmd Inv: RPCM_N1RS2_C_RPC_4_N1_1_MDM_SDO_1B_Cl – (M1PR95SM1598K)>

√RPC 4 Position – Cl

‘N1-1 Heaters’

√Sur – Ena BKUP

If Sur – Ena Opr

sel N1-2 Heater Sur

N1_2_MDM_Survival_Heaters

‘Command Status’

cmd Ena_BKUP

<Cmd Inv: MDM_N1_1_Ena_Bu_Srv_Htr – (M1TH96IM0273K)>

√Availbty – Ena BKUP

√Opr – Ena Opr
2.3 Reconfiguring N1-2 MDM EPS Remote Terminals

CRT SM 200 APCU

\[\text{APCU1 OUT VOLTS RES LOW} \geq 121\]

If APCU1 OUT VOLTS RES LOW $\geq 121$

PCS2

Node 1: C&DH: MDM N1-2

Primary NCS MDM Node 1

sel LB Sys Lab – 2

sel RT Status

LB_SYS_LAB_RT_Status

\textbf{cmd} 18_RPCM_N13B_C RT Status – Enable \textbf{Execute}
\textbf{cmd} 19_RPCM_N13B_B RT Status – Enable \textbf{Execute}
\textbf{cmd} 20_RPCM_N13B_A RT Status – Enable \textbf{Execute}

\textless Cmd Inv: N1_2_MDM_Ena_RPCM_N13B_C – (M1DD95SM1179K)\textgreater

\textless Cmd Inv: N1_2_MDM_Ena_RPCM_N13B_B – (M1DD95SM1180K)\textgreater

\textless Cmd Inv: N1_2_MDM_Ena_RPCM_N13B_A – (M1DD95SM1181K)\textgreater

LB_SYS_LAB_RT_Status

\[\sqrt{\text{RT Status 18, 19, 20 – ENA}}\]

\textbf{cmd} 18_RPCM_N13B_C RT FDIR Status – Enable FDIR \textbf{Execute}
\textbf{cmd} 19_RPCM_N13B_B RT FDIR Status – Enable FDIR \textbf{Execute}
\textbf{cmd} 20_RPCM_N13B_A RT FDIR Status – Enable FDIR \textbf{Execute}

\textless Cmd Inv: N1_2_MDM_Ena_FDIR_RPCM_N13B_C – (M1DD95SM1342K)\textgreater

\textless Cmd Inv: N1_2_MDM_Ena_FDIR_RPCM_N13B_B – (M1DD95SM1343K)\textgreater

\textless Cmd Inv: N1_2_MDM_Ena_FDIR_RPCM_N13B_A – (M1DD95SM1344K)\textgreater

LB_SYS_LAB_RT_Status

\[\sqrt{\text{RT FDIR Status 18, 19, 20 – ENA}}\]
2.4 Resetting NCS Auto Retry Counter
On MCC-H GO

PCS2  Node 1: C&DH: MDM N1-1
      Secondary NCS MDM Node 1

sel MDM Utilities

If Auto Retry Counter - 1
  cmd Reset  Execute

  <Cmd Inv: Sec_NCS_Rset_NCS_Retry_Cntr –
  (M1SDD95SM2619K)>

√Auto Retry Counter – 0

2.5 Subsystem Reconfiguration
As required, reactivate the following MDM N1-2 equipment.

√MCC-H for the proper configuration

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>PROCEDURE REFERENCE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node 1 Smoke Detector 2</td>
<td>NODE 1 SMOKE DETECTOR ACTIVATION/DEACTIVATION (SODF: ISS OPS: ECLSS)</td>
<td>Activate Node 1 Smoke Detector 2.</td>
</tr>
<tr>
<td>Node 1 Port Fwd IMV Fan</td>
<td>NODE 1 IMV FAN ACTIVATION/DEACTIVATION (SODF: ISS OPS: ECLSS)</td>
<td>Activate Node 1 Port Fwd IMV Fan only.</td>
</tr>
<tr>
<td>Node 1 Stbd Aft IMV Fan</td>
<td>NODE 1 IMV FAN ACTIVATION/DEACTIVATION (SODF: ISS OPS: ECLSS)</td>
<td>Activate Node 1 Stbd Aft IMV Fan only.</td>
</tr>
<tr>
<td>Node 1 Fwd Port IMV Valve</td>
<td>NODE 1 IMV VALVE RECONFIGURATION (SODF: ISS OPS: ECLSS)</td>
<td>Activate Node 1 Fwd Port IMV Valve only.</td>
</tr>
<tr>
<td>Node 1 Fwd Stbd IMV Valve</td>
<td>NODE 1 IMV VALVE RECONFIGURATION (SODF: ISS OPS: ECLSS)</td>
<td>Activate Node 1 Fwd Stbd IMV Valve only.</td>
</tr>
</tbody>
</table>

2.6 Resetting ACS Moding
If during Docked Ops, go to ACS PRE-DEPARTURE MODING for N1-2, all (SODF: ISS OPS: MCS).

3.  RECONFIGURING THE NODE 1-1 MDM
3.1 Clearing MDM BST Error Latch
Perform NCS MDM BST CLEAR LATCHED DATA, for the Secondary N1-1 MDM, (SODF: GND: C&DH).
3.2 Configuring MDM Heaters Controlled by the N1-1 MDM

PCS2 Node 1: C&DH: MDM N1-1

<table>
<thead>
<tr>
<th>Secondary NCS MDM Node1</th>
</tr>
</thead>
<tbody>
<tr>
<td>'RPCM N1RS1 A'</td>
</tr>
</tbody>
</table>

\(\sqrt{\text{RPC 5 Position} - \text{Cl}}\)

If Open
- sel RPC 5

\[\text{RPCM}_\text{N1RS1_A_RPC_5}\]

\text{cmd Close}

\(<\text{Cmd Inv: RPCM}_\text{N1RS1_A_RPC_5}_\text{SDO}_1\_\text{N1}_1\_\text{Cl} - (\text{M1PR95SM1329K})\>\)

\(\sqrt{\text{RPC 5 Position} - \text{Cl}}\)

- 'N1-1 Heaters'

\(\sqrt{\text{Opr} - \text{ENA OPR}}\)

- 'N1-2 Heaters'

\(\sqrt{\text{Sur} - \text{Ena BKUP}}\)

If Sur – Ena BKUP
- sel N1-1 Heaters, Sur

\[\text{N1}_1\_\text{Survival Heater}\]

\text{cmd Enable BKUP}

\(<\text{Cmd Inv: N1}_2\_\text{Srv}\_\text{Htr}_\text{Ena}_\text{BU} - (\text{M1TH96IM0271K})\>\)

\(\sqrt{\text{Availbty} - \text{Ena BKUP}}\)

3.3 Reconfiguring N1-1 MDM EPS Remote Terminals

CRT SM 200 APCU

\(\sqrt{\text{APCU2 OUT VOLTS RES LOW} \geq 121}\)

If APCU2 OUT VOLTS RES LOW \(\geq 121\)

PCS2 Node 1: C&DH: MDM N1-1

| Secondary NCS MDM Node1 |

- sel LB Sys Lab – 1
- sel RT Status
LB_SYS_LAB_RT_Status

cmd 18_RPCM_N14B_C RT Status – Enable Execute
cmd 19_RPCM_N14B_B RT Status – Enable Execute
cmd 20_RPCM_N14B_A RT Status – Enable Execute

<Cmd Inv: N1_1_MDM_Ena_RPCM_N14B_C – (M1DD95SM1138K)>

<Cmd Inv: N1_1_MDM_Ena_RPCM_N14B_B – (M1DD95SM1139K)>

<Cmd Inv: N1_1_MDM_Ena_RPCM_N14B_A – (M1DD95SM1140K)>

LB_SYS_LAB_RT_Status

√RT Inhibited 18, 19, 20 – ENA

cmd 18_RPCM_N14B_C RT FDIR Status – Enable FDIR Execute
cmd 19_RPCM_N14B_B RT FDIR Status – Enable FDIR Execute
cmd 20_RPCM_N14B_A RT FDIR Status – Enable FDIR Execute

<Cmd Inv: N1_1_MDM_Ena_FDIR_RPCM_N14B_C – (M1DD95SM1300K)>

<Cmd Inv: N1_1_MDM_Ena_FDIR_RPCM_N14B_B – (M1DD95SM1301K)>

<Cmd Inv: N1_1_MDM_Ena_FDIR_RPCM_N14B_A – (M1DD95SM1302K)>

LB_SYS_LAB_RT_Status

√RT FDIR Status 18, 19, 20 – ENA

3.4 Resetting NCS Auto Retry Counter

On MCC-H GO

PCS2

Node 1: C&DH: MDM N1-2

Primary NCS MDM Node 1

sel MDM Utilities
If Auto Retry Counter – 1
\textbf{cmd Reset} \textbf{Execute}

\texttt{<Cmd Inv: Prim\_NCS\_Rset\_NCS\_Retry\_Cntr \textendash \texttt{(M1DD95SM2500K)>}}

\checkmark Auto Retry Counter – 0

3.5 \textbf{Subsystem Reconfiguration}
As required, reactivate the following MDM N1-1 equipment.

\checkmark \textbf{MCC-H} for proper configuration

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>PROCEDURE REFERENCE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node 1 Cabin Fan</td>
<td>NODE 1 CABIN FAN ACTIVATION, (SODF: ISS OPS: ECLSS)</td>
<td>This procedure will start up the Cabin Fan and both Node 1 Smoke Detectors.</td>
</tr>
<tr>
<td>Node 1 Smoke Detector 1</td>
<td>NODE 1 SMOKE DETECTOR ACTIVATION (SODF: ISS OPS: ECLSS)</td>
<td>Execute only if Node 1 Cabin Fan Activation not performed.</td>
</tr>
<tr>
<td>Node 1 Smoke Detector 2</td>
<td>NODE 1 SMOKE DETECTOR ACTIVATION (SODF: ISS OPS: ECLSS)</td>
<td>Execute only if Node 1 Cabin Fan Activation not performed.</td>
</tr>
<tr>
<td>Node 1 Aft Port IMV Fan</td>
<td>NODE 1 IMV FAN ACTIVATION/DEACTIVATION (SODF: ISS OPS: ECLSS)</td>
<td>Activate Node 1 Aft Port IMV Fan only.</td>
</tr>
<tr>
<td>Node 1 Aft Port IMV Valve</td>
<td>NODE 1 IMV VALVE RECONFIGURATION (SODF: ISS OPS: ECLSS)</td>
<td>Activate Node 1 Aft Port IMV Valve only.</td>
</tr>
<tr>
<td>Node 1 Aft Stbd IMV Valve</td>
<td>NODE 1 IMV VALVE RECONFIGURATION (SODF: ISS OPS: ECLSS)</td>
<td>Activate Node 1 Aft Stbd IMV Valve only.</td>
</tr>
</tbody>
</table>

3.6 \textbf{Resetting ACS Moding}
If during Docked Ops, perform ACS PRE-DEPARTURE MODING for N1-1, all (SODF: ISS OPS: MCS).
MCS PROCEDURES
Identification Section:

Procedure Name: ACS Pre-Arrival Moding - Ground
Applicability: Arrival of Flights 2A.2, 3A, 4A, and 5A.
Frequency: This procedure is performed before entering the Prox Ops timeline.
Objective: To enable Arrival Response software and LEDs.
Description: The Arrival Response software acts upon the APAS Capture Long sensors at orbiter contact and cues the RS GNC to mode to Indicator (Drift). The LED Control software operates the ACS Moding Indicator light assemblies on the PMA to provide the orbiter crew with a visual indication of the RS GNC mode.

Crew Required: None
Power: N/A
Data: Required telemetry is given in the procedure.
Duration: Concurrent with integrated and arrival Prox Ops timeline.
Location: PMA2 for 2A.2 and 3A. PMA3 for 4A and 5A.
Parts: APAS docking mechanisms; Node 1 MDMs; RS segment MDMs, and Propulsion system.
Materials: N/A
Tools: N/A
Constraints: N/A
Assumptions: The orbiter maintains attitude control over mated stack.
1. ACS MODING PRE-ARRIVAL CONFIGURATION AND STATUS

PCS: ACS Moding

ACS Moding

‘ACS Configuration’

Verify Moding Role Primary, Secondary NCS – Full

********************************************************************

If Primary(Secondary) NCS Moding Role is not set to Full, then the following commands should be sent:

<table>
<thead>
<tr>
<th>Command</th>
<th>Action</th>
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</thead>
<tbody>
<tr>
<td><code>sel Moding Role</code></td>
<td>Moding Role</td>
</tr>
<tr>
<td><code>cmd N1-2(N1-1)</code></td>
<td>Arm</td>
</tr>
<tr>
<td>Verify Arm Status Primary(Secondary) NCS – Arm</td>
<td></td>
</tr>
<tr>
<td><code>cmd N1-2(N1-1)</code></td>
<td>Full</td>
</tr>
<tr>
<td>Verify Moding Role Primary(Secondary) NCS – Full</td>
<td></td>
</tr>
<tr>
<td>Verify Arm Status Primary(Secondary) NCS – Disarm</td>
<td></td>
</tr>
</tbody>
</table>

********************************************************************

Verify RS Mode Primary, Secondary NCS – Cntl

‘Arrival’

Verify PMA2(PMA3) Arrival Response software Primary, Secondary NCS – Inh

2. ACS MODING INDICATOR LIGHTS

**NOTE**

Each of the primary and secondary MDMs command one of the LED units (i.e., two units per PMA, four LEDs per unit). LED configurations: On - Active Attitude Control, Flash - Station in Free Drift, Off – LED Control Software is Inhibited or an MDM loss of comm situation has occurred.

PCS: ACS Moding

ACS Moding

‘ACS Configuration’

 sel LED Control SW

<table>
<thead>
<tr>
<th>Command</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>LED Control SW</code></td>
<td>‘Primary NCS’</td>
</tr>
<tr>
<td><code>cmd</code></td>
<td>Enable</td>
</tr>
<tr>
<td>LED Control SW – Ena</td>
<td></td>
</tr>
<tr>
<td>Verify PMA2, PMA3 LED State – On</td>
<td></td>
</tr>
</tbody>
</table>
3. ARRIVAL RESPONSE SOFTWARE FOR ACS MODING

ACS Moding

‘Arrival’

sel PMA2(PMA3) Arrival Response SW

PMA2(PMA3) Arrival Response SW

‘Primary NCS’

cmd Enable

Verify Arrival Response SW – Ena

‘Secondary NCS’

cmd Enable

Verify Arrival Response SW – Ena

**************************************************************************

If Primary(Secondary) NCS Arrival Response SW needs to be inhibited (wave off, etc.), then the following commands should be sent:

sel PMA2(PMA3) Arrival Response SW

PMA2(PMA3) Arrival Response SW

‘Primary NCS’(‘Secondary NCS’)

cmd Arm

Verify Arm Status Primary(Secondary) NCS – Arm

cmd Inhibit

Verify Arrival Response SW Primary(Secondary) NCS – Inh

**************************************************************************
Identification Section:
Procedure Name: ACS Arrival Moding - Ground
Applicability: Arrival of Flights 2A.2, 3A, 4A, and 5A.
Frequency: This procedure is performed during the Prox Ops timeline.
Objective: To monitor the ACS Moding function during orbiter arrival.
Description: The ACS Moding software declares an Orbiter Arrival Event based on APAS Capture Long sensor signals. The Arrival Event cues the RS GNC to mode to Indicator (Drift). The ACS Moding indicator lights provide orbiter crew with a visual indication of the RS GNC mode.
Crew Required: None
Power: N/A
Data: Required telemetry is given in the procedure.
Duration: Concurrent with integrated and arrival Prox Ops timeline.
Location: PMA2 for 2A.2 and 3A. PMA3 for 4A and 5A.
Parts: APAS docking mechanisms; Node 1 MDMs; RS segment MDMs, and Propulsion system.
Materials: N/A
Tools: N/A
Constraints: N/A
Assumptions: The orbiter maintains attitude control over mated stack.
ACS ARRIVAL MODING
(GND/3A/BAS A) Page 2 of 2 pages

1. **VERIFYING ACS MODING PRE-ARRIVAL CONFIGURATION AND STATUS**

   **PCS**
   - MCS: ACS Moding
     - ACS Moding
     - ‘ACS Configuration’

   Verify Moding Role Primary, Secondary NCS – Full
   Verify RS Mode Primary, Secondary NCS – Cntl

   √ LED Control Software Primary, Secondary NCS – Ena
   Verify PMA2, PMA3 LED State Primary, Secondary NCS – On

   ‘Arrival’

   √ PMA2(PMA3) Arrival Response SW Primary, Secondary NCS – Ena

2. **ACS MODING AT ORBITER DOCKING**

   Perform STATION-ORBITER DOCKING SCRIPT, all (SODF: GND: MCS), then proceed.

3. **STATION ACS MODING POST-DOCKING CONFIGURATION**

   **PCS**
   - MCS: ACS Moding
     - ACS Moding
     - ‘Arrival’

   Verify PMA2(PMA3) Capture Long Primary, Secondary NCS – X
   Verify Arrival Event Primary, Secondary NCS – X

   ‘ACS Configuration’

   Verify RS Mode Primary, Secondary NCS – Drift
   Verify PMA2, PMA3 LED State Primary, Secondary NCS – Flash

   **NOTE**
   The following signals nominally may take up to 13 minutes to occur before hard mate is completed.

   ‘Departure’

   Verify PMA2(PMA3) Interface Sealed Primary, Secondary NCS – X
   Verify PMA2(PMA3) Separation Primary, Secondary NCS – blank
1. **VERIFYING ACS MODING SOFTWARE CONFIGURATION**

   PCS
   MCS: ACS Moding
   ACS Moding
   ‘Departure’

   Verify PMA2(PMA3) Interface Sealed Primary, Secondary NCS – X
   Verify PMA2(PMA3) Separation Primary, Secondary NCS – blank
   Verify PMA2(PMA3) Departure Response SW Primary, Secondary NCS – Ena
   Verify Back Off Time Primary, Secondary NCS: 250 (seconds)
   Verify Time Since Separation Primary, Secondary NCS: 0
   Verify Departure Event Primary, Secondary NCS – blank

2. **MONITORING NCS SEPARATION SIGNALS AND VERIFICATION OF ORBITER DEPARTURE AND POST SEPARATION LED MODE CHANGE**

   **************************************************************************
   If the Primary(Secondary) Time Since Separation is observed to be incrementing any time prior to planned departure, IMMEDIATE ACTION IS REQUIRED.
   sel Moding Role

   Moding Role

   **cmd** N1-2(N1-1) – Arm

   Verify Arm Status Primary(Secondary) NCS – Arm

   **cmd** N1-2(N1-1) – Off

   Verify Moding Role Primary(Secondary) NCS – Off
   Verify Arm Status Primary(Secondary) NCS – Disarm
   **************************************************************************

   **NOTE**

   1. For flights prior to onboard crew, orbiter monitoring of Station telemetry is discontinued when orbiter OIU is disconnected.

   2. The Time Since Separation counter is initiated when Separation is true (X) and Interface Sealed is false (blank).

   3. The Departure Event is set when the Time Since Separation equals the set Back Off Time. When the SM receives the Departure Event request, it will resume active attitude control.

   ‘Departure’

   Monitor the following during vehicle separation.
Verify PMA2(PMA3) Interface Sealed Primary, Secondary NCS – blank
Verify PMA2(PMA3) Separation Primary, Secondary NCS – X
Verify Time Since Separation Primary, Secondary NCS – <Increasing>

When Time Since Separation equals Back Off Time:
Verify Departure Event Primary, Secondary NCS – X

3. **VERIFICATION OF RUSSIAN SEGMENT ATTITUDE CONTROL AND LED STATUS**

PCS

MCS: ACS Moding

ACS Moding

‘ACS Configuration’

Verify RS Mode Primary, Secondary NCS – Cntl
Verify PMA2, PMA3 LED State Primary, Secondary NCS – On

PCS

SM MCS

SM MCS

Verify RS GNC Mode – Thrusters
Identification Section:
Procedure Name: ACS Post Departure Moding - Ground
Applicability: Departure of Flights 2A.2, 3A, and 4A.
Frequency: This procedure is performed after the departure sequence.
Objective: Inhibit the Station ACS Moding indicator lights and Departure Response software.
Description: The ACS Moding indicator lights (LEDs) will be powered off. Then the Departure Response software, which monitors the APAS Interface Sealed and Undocking Complete sensors, will be inhibited.
Crew Required: None
Power: N/A
Data: Required telemetry is given in the procedure.
Duration: Concurrent with integrated and departure Prox Ops timeline.
Location: PMA2 for 2A.2 and 3A. PMA3 for 4A.
Parts: APAS docking mechanisms; Node 1 MDMs; RS segment MDMs, and Propulsion system.
Materials: N/A
Tools: N/A
Constraints: None
Assumptions: N/A
1. **ACS MODING INDICATOR LIGHTS**

   MCS: ACS Moding
   - ACS Moding
   - ACS Configuration

   sel LED Control SW

   LED Control SW
   - Primary NCS

   **cmd Inhibit**
   √ LED Control SW – Inh
   Verify PMA2,PMA3 LED State – Off

   - Secondary NCS

   **cmd Inhibit**
   √ LED Control SW – Inh
   Verify PMA2,PMA3 LED State – Off

2. **DEPARTURE RESPONSE**

   ACS Moding
   - Departure

   sel PMA2(PMA3) Departure Response SW

   PMA2(PMA3) Departure Response SW
   - Primary NCS

   **cmd Inhibit**
   Verify Departure Response SW – Inh
   Verify Arm Status – Disarm

   - Secondary NCS

   **cmd Inhibit**
   Verify Departure Response SW – Inh
   Verify Arm Status – Disarm

   ACS Moding
   - Departure

   Verify Departure Event Primary,Secondary NCS – blank
S&M PROCEDURES
OBJECTIVE:
Verify CBM full functionality after the reinstallation of CBM hardware or as a flight test.

LOCATION:
NOD1/MCC-H

DURATION:
1 hour 15 minutes

REFERENCED PROCEDURE(S):
None

NOTE
1. Forward CBM connectivity is as follows:
   CB GNC 1   A = CPA 1
               B = CPA 4
   CB GNC 2   A = CPA 2
               B = CPA 3

2. Where CDDT HTMLs are used to command, Command Inventory command ops names and CI PUIs are listed beneath each command in parentheses and italics.

1. VERIFYING POWER CONFIGURATION

   N1_Fwd_CBM_Power_Data
   ‘RPCM N13B C’

   √ Integ Counter – <incrementing>

   ‘RPCM N14B A’

   √ Integ Counter – <incrementing>

   ‘APCU-1’

   √ Volts Hi (Res) >122 volts

   ‘APCU-2’

   √ Volts Hi (Res) >122 volts

2. VERIFYING MDM CONFIGURATION

   N1_Fwd_CBM_Power_Data
   ‘Primary MDM’

   √ MDM ID – N1-2

   √ Frame Count – <incrementing>
‘Secondary MDM’

√MDM ID – N1-1

√Frame Count – <incrementing>

√CB GNC N1-1 Bus Channel

Record A or B ____

√CB GNC N1-2 Bus Channel

Record A or B ____

3. **ENABLING PRIMARY RPCS**

[CBM_Cmds.msk]

sel N1 Forward CBM Checkout

[N1 Forward CBM Checkout]

**cmd** RPCM N13B-C RPC [X] CPA [Y] Pri Close – Enable

where [X] = \[03, 04, 05, 06\]

[Y] = \[1, 2, 3, 4\]

<Cmd Inv: RPCM_N13B_C_RPC_[X]_CPA_[Y]_Pri_Cl_Enable – (M1PR95SM1147K, 1148K, 1149K, 1150K)>

[N1_Fwd_CBM_Power_Data]

‘RPCM N13B C’

√RPC [X] Cl – Ena

Repeat
4. **ENABLING SECONDARY RPCS**

```
cmd RPCM N14B-A RPC [X] CPA [Y] Sec Close – Enable
```

where 

- \[X\] = 02 03 14 15
- \[Y\] = 1 2 3 4

\(<\text{Cmd Inv: RPCM}_N14B_A\_RPC\_\{X\}\_CBM\_N1\_Fwd\_Sec\_\{Y\}\_Cl-\text{Enable} \quad (M1PR95SM1200K, 1201K, 1212K, 1213K)>

\[N1\_Fwd\_CBM\_Power\_Data\]

\[RPCM\_N14B\_A^*\]

\(\sqrt{RPC\_\{X\}\_Cl – Ena}

Repeat

5. **CLOSING SECONDARY RPCS**

```
cmd RPCM N14B-A RPC [X] CPA [Y] Sec Close
```

where 

- \[X\] = 02 03 14 15
- \[Y\] = 1 2 3 4

\(<\text{Cmd Inv: RPCM}_N14B_A\_RPC\_\{X\}\_CBM\_N1\_Fwd\_Sec\_\{Y\}\_Cl-\text{Cl} \quad (M1PR95SM1164K, 1165K, 1176K, 1177K)>

\[N1\_Fwd\_CBM\_Power\_Data\]

\[RPCM\_N14B\_A^*\]

\(\sqrt{RPC\_\{X\}\_Posn – Cl}

Repeat
6. **ACTIVATING FORWARD CBM PRIMARY MASTER CONTROLLER**

   **cmd** Activate Primary Master  **Execute**

   `<Cmd Inv: CBM_Activate_N1_Fwd_Pri_Master – (M1MC95SM1160K)>`

   Wait 20 seconds, then:

   ![Node_1_CBM.msk](image)

   □ Mode – Activated
   □ Master – Primary
   □ CPA – Record # _____
   □ Comm Error – blank

   ![Node_1_CBM.msk](image)

   □ Master Cmd Status – Complete
   □ Active BIT Error – blank
   □ Background BIT Error – blank
   □ Master Cmd Error – blank
   □ Slave Cmd Error – blank
   □ 485 Timeout – blank
   □ Command Rejected – blank
   □ 485 Channel (twenty) – B

7. **INITIALIZING CONTROLLER POSITIONS ZERO**

   **cmd** Set All Zero Ch B  **Execute**

   `<Cmd Inv: CBM_Set_All_Posns_To_Zero_Ch_B – (M1MC96IM0002K)>`

   ![Node_1_CBM.msk](image)

   □ Master Cmd Status – Complete

8. **VERIFYING RS-485 COMM STATUS**

   ![NOTE](image)

   CBM Active BIT may have to be commanded multiple times to clear MSBDs.

   ![Node_1_CBM.msk](image)

   □ Cmd Code (twenty) – RELD
   □ Cmd Stat (twenty) – CPLT
If any Cmd Stat - MSBD

***************************************************************************
N1 Forward CBM Checkout

**cmd** CBM Active BIT **Execute**

<Cmd Inv: CBM_Act_Built_In_Test – (M1MC95SM1027K)>

Node_1_CBM.msk

√ Confirmation Request – Built-in Test

N1 Forward CBM Checkout

**cmd** CBM Active BIT **Execute**

<Cmd Inv: CBM_Act_Built_In_Test – (M1MC95SM1027K)>

Wait 15 seconds, then:

Node_1_CBM.msk

√ Master Cmd Status – Complete
√ Active BIT Error – blank
√ Cmd Code (twenty) – BIT
√ Cmd Stat (twenty) – CPLT
***************************************************************************

9. **VERIFYING CONTROLLER POSITIONS ZERO**

Node_1_CBM.msk

√ Position (twenty): 0 rev | deg

If any position ≠ 0 rev | deg

***************************************************************************
N1 Forward CBM Checkout

**cmd** Set All Zero Ch B **Execute**

<Cmd Inv: CBM_Set_All_Posns_To_Zero_Ch_B – (M1MC96IM0002K)>

Node_1_CBM.msk

√ Master Cmd Status – Complete
√ Background BIT Error – blank
√ Master Cmd Error – blank
√ Slave Cmd Error – blank
√ Cmd Code (twenty) – RELD
√ Cmd Stat (twenty) – CPLT
√ Position (twenty): 0 rev | deg
***************************************************************************
10. **TESTING BOLT DRIVE**
   
   **N1 Forward CBM Checkout**
   
   `cmd DBBoltck Nominal` **Execute**
   
   `<Cmd Inv: CBM_DBBoltck_Nominal – (M1MC95SM1331K)>`
   
   `Node_1_CBM.msk`
   
   √ Confirmation Request – DBBoltck
   
   N1 Forward CBM Checkout
   
   `cmd Confirm Cmd` **Execute**
   
   `<Cmd Inv: CBM_Confirm_Cmd – (M1MC95SM1470K)>`
   
   Wait 30 seconds, then:
   
   `Node_1_CBM.msk`
   
   √ Master Cmd Status – Complete
   √ Bolt Cmd Code (sixteen) – DBCK
   √ Bolt Cmd Stat (sixteen) – CPLT
   √ Bolt Position (sixteen): 50 --- 51 rev

11. **DEACTIVATING FORWARD CBM MASTER CONTROLLER**
   
   **N1 Forward CBM Checkout**
   
   `cmd Deactivate CBM` **Execute**
   
   `<Cmd Inv: CBM_Deactivate_N1_Fwd – (M1MC95SM1006K)>`
   
   `N1_Fwd_CBM_Power_Data`
   
   ‘CBM Status’
   
   √ Mode – Deactivated
OPENING SECONDARY RPCS

\textbf{cmd} RPCM N14B-A RPC [X] CPA [Y] Sec Open

where \([X] = \overline{02\ 03\ 14\ 15}\)
\([Y] = \overline{1\ 2\ 3\ 4}\)

\textless\text{Cmd Inv: RPCM\_N14B\_A\_RPC\_[X]\_CBM\_N1\_Fwd\_Sec\_[Y]\_Op} – (M1PR95SM1812K, 1813K, 18624K, 1825K)\textgreater

\textbf{N1\_Fwd\_CBM\_Power\_Data}

‘RPCM N14B A’

\checkmark RPC [X] Posn – Op

Repeat

CLOSING PRIMARY RPCS

\textbf{cmd} RPCM N13B-C RPC [X] CPA [Y] Pri Close

where \([X] = \overline{03\ 04\ 05\ 06}\)
\([Y] = \overline{1\ 2\ 3\ 4}\)

\textless\text{Cmd Inv: RPCM\_N13B\_C\_RPC\_[X]\_CBM\_N1\_Fwd\_Pri\_[Y]\_Cl} – (M1PR95SM1111K, 1112K, 1113K, 1114K)\textgreater

\textbf{N1\_Fwd\_CBM\_Power\_Data}

‘RPCM N13B C’

\checkmark RPC [X] Posn – Cl

Repeat

ACTIVATING FORWARD CBM SECONDARY MASTER CONTROLLER

\textbf{N1 Forward CBM Checkout}

\textbf{cmd} Activate Secondary Master  \textbf{Execute}

\textless\text{Cmd Inv: CBM\_Activate\_N1\_Fwd\_Sec\_Master} – (M1MC95SM1161K)\textgreater

Wait 20 seconds, then:

\textbf{N1\_Fwd\_CBM\_Power\_Data}

‘CBM Status’

\checkmark Mode – Activated
\checkmark Master – Secondary
\checkmark CPA – Record # ______
\checkmark Comm Error – blank
15. **SWITCHING RS-485 BUS TO CHANNEL A**

**cmd** Set Last State to Stop Ch A  **Execute**

<Cmd Inv:  CBM_Set_Last_State_To_Stop_Ch_A – (M1MC95SM1491K)>

**Node_1_CBM.msk**

\~ / Master Cmd Status – Complete
\~ / Active BIT Error – blank
\~ / Background BIT Error – blank
\~ / Master Cmd Error – blank
\~ / Slave Cmd Error – blank
\~ / 485 Timeout – blank
\~ / Command Rejected – blank
\~ / 485 Ch (twenty) – B

16. **SETTING CONTROLLER POSITIONS ZERO**

**cmd** Set All Zero Ch A  **Execute**

<Cmd Inv:  CBM_Set_All_Posns_To_Zero_Ch_A – (M1MC96IM0004K)>

**Node_1_CBM.msk**

\~ / Master Cmd Status – Complete
\~ / 485 Ch (twenty) – A

17. **VERIFYING RS-485 COMM STATUS**

**NOTE**
CBM active BIT may have to be commanded multiple times to clear MSBDs.

**Node_1_CBM.msk**

\~ / Cmd Code (twenty) – RELD
\~ / Cmd Stat (twenty) – CPLT
If any Cmd Stat - MSBD

******************************************************************************

N1 Forward CBM Checkout

**cmd CBM Active BIT Execute**

<Cmd Inv: CBM_Act_Built_In_Test - (M1MC95SM1027K)>

Node_1_CBM.msk

√ Confirmation Request – Built-in Test

N1 Forward CBM Checkout

**cmd CBM Active BIT Execute**

<Cmd Inv: CBM_Act_Built_In_Test - (M1MC95SM1027K)>

Wait 15 seconds, then:

Node_1_CBM.msk

√ Master Cmd Status – Complete
√ Active BIT Error – blank
√ Cmd Code (twenty) – BIT
√ Cmd Stat (twenty) – CPLT

******************************************************************************

18. **VERIFYING CONTROLLER POSITIONS ZERO**

Node_1_CBM.msk

√ Position (twenty): 0 rev | deg

If any position ? 0 rev | deg

******************************************************************************

N1 Forward CBM Checkout

**cmd Set All Zero Ch A Execute**

<Cmd Inv: CBM_Set_All_Posns_To_Zero_Ch_A - (M1MC96IM0004K)>

Node_1_CBM.msk

√ Master Cmd Status – Complete
√ Background BIT Error – blank
√ Master Cmd Error – blank
√ Slave Cmd Error – blank
√ Cmd Code (twenty) – RELD
√ Cmd Stat (twenty) – CPLT
√ Position (twenty): 0 rev | deg

******************************************************************************
19. **DEPLOYING LATCH 1 TO 210**  

   **N1 Forward CBM Checkout**

   **cmd** Deploy Latch 1 to 210  **Execute**

   <Cmd Inv: CBM_Deploy_Latch_1_to_210_Degrees – (M1MC96IM0027K)>

   ![Node_1_CBM.msk](image)

   √ Confirmation Request – Deploy

   **N1 Forward CBM Checkout**

   **cmd** Confirm Cmd  **Execute**

   <Cmd Inv: CBM_Confirm_Command – (M1MC95SM1470K)>

   Wait 90 seconds, then:

   ![Node_1_CBM.msk](image)

   √ Master Cmd Status – Failed  
   √ Latch 1 Cmd Code – DPLY  
   √ Latch 1 Cmd Stat – BIND  
   √ Latch 1 Position: 200 --- 210 deg  
   √ Latch 1 Capture Switch Cl – X

20. **DEPLOYING LATCH 2 TO 210**

   **N1 Forward CBM Checkout**

   **cmd** Deploy Latch 2 to 210  **Execute**

   <Cmd Inv: CBM_Deploy_Latch_2_to_210_Degrees – (M1MC96IM0028K)>

   ![Node_1_CBM.msk](image)

   √ Confirmation Request – Deploy

   **N1 Forward CBM Checkout**

   **cmd** Confirm Cmd  **Execute**

   <Cmd Inv: CBM_Confirm_Command – (M1MC95SM1470K)>

   Wait 90 seconds, then:
21. **DEPLOYING LATCH 3 TO 210**

   **cmd** Deploy Latch 3 to 210  **Execute**

   <Cmd Inv:  CBM_Deploy_Latch_3_to_210_Degrees – (M1MC96IM0029K)>

   **确认** Require Confirmation – Deploy

   **cmd** Confirm Cmd  **Execute**

   <Cmd Inv:  CBM_Confirm_Command – (M1MC95SM1470K)>

   Wait 90 seconds, then:

22. **DEPLOYING LATCH 4 TO 210**

   **cmd** Deploy Latch 4 to 210  **Execute**

   <Cmd Inv:  CBM_Deploy_Latch_4_to_210_Degrees – (M1MC96IM0030K)>

   **确认** Require Confirmation – Deploy
N1 Forward CBM Checkout

**cmd** Confirm **Cmd** Execute

<Cmd Inv: CBM_Confirm_Command – (M1MC95SM1470K)>

Wait 90 seconds, then:

Node_1_CBM.msk

√ Master Cmd Status – Failed
√ Latch 4 Cmd Code – DPLY
√ Latch 4 Cmd Stat – BIND
√ Latch 4 Position: 200 --- 210 deg
√ Latch 4 Capture Switch Cl – X

### 23. CLEARING LATCH BIND INDICATIONS

NOTE
Stop command may nominally need to be issued multiple times to clear binding indications.

N1 Forward CBM Checkout

**cmd** Stop **Execute**

<Cmd Inv: CBM_Stop_AllControllers – (M1MC95SM1435K)>

Node_1_CBM.msk

√ Master Cmd Status – Complete
√ Latch Cmd Code (four) – STOP
√ Latch Cmd Stat (four) – CPLT

### 24. SETTING BOLT/LATCH START POSITIONS

N1 Forward CBM Checkout

**cmd** Set Deberthing Start Posns Ch A **Execute**

<Cmd Inv: CBM_Set Deberthing_Start_Posns_Ch A – (M1MC96IM0024K)>

Node_1_CBM.msk
√Master Cmd Status – Complete
√Cmd Code (twenty) – RELD
√Cmd Stat (twenty) – CPLT
√Bolt Position (sixteen): 51 rev
√Latch Position (four): 202 deg

25. **MOVING LATCHES TO CAPTURE POSITIONS**

**cmd** Capture for Deberth  **Execute**

<Cmd Inv: CBM_Capture_For_Debirth – (M1MC96IM0033K)>

[Node_1_CBM.msk]

√Confirmation Request – Capture

[Node_1_CBM.msk]

**cmd** Confirm Cmd  **Execute**

<Cmd Inv: CBM_Confirm_Cmd – (M1MC95SM1470K)>

Wait 90 seconds, then:

√Master Cmd Status – Complete
√Latch Cmd Code (four) – DPLY
√Latch Cmd Stat (four) – CPLT
√Latch Position (four): 200 --- 210 deg
√Latch Capture Switch Cl (four) – X

26. **CLOSING LATCHES**

**cmd** Close Nominal  **Execute**

<Cmd Inv: CBM_Close_Nominal – (M1MC96IM0036K)>

[Node_1_CBM.msk]

√Confirmation Request – Close

[Node_1_CBM.msk]

**cmd** Confirm Cmd  **Execute**

<Cmd Inv: CBM_Confirm_Cmd – (M1MC95SM1470K)>
Wait 90 seconds, then:

Node_1_CBM.msk

√Master Cmd Status  – Complete
√Latch Cmd Code (four) – CLOS
√Latch Cmd Stat (four) – CPLT
√Latch Position (four): 0 --- 1 deg

27. **DEACTIVATING FORWARD CBM MASTER CONTROLLER**

N1 Forward CBM Checkout

**cmd** Deactivate CBM  **Execute**

<Cmd Inv:  CBM_Deactivate_N1_Fwd – (M1MC95SM1006K)>

N1_Fwd_CB_GNC_Power_Data

‘CBM Status’

√Mode – Deactivated

28. **PERFORMING CB-GNC N1-1 BUS CHANNEL SWITCH (C&DH)**

**NOTE**

Steps 28 and 29 check out remaining CBM master controllers and 1553 channels.

√CB-GNC N1-1 Bus Channel

Record A or B ______

If Bus Channel recorded was A, then:

<Cmd Inv:  N1_1_MDM_CB_GNC_1_Sel_Ch_B – (M1DD95SM1396K)>

√CB-GNC N1-1 Bus Channel – B

If Bus Channel recorded was B, then:

<Cmd Inv:  N1_1_MDM_CB_GNC_1_Sel_Ch_A – (M1DD95SM1395K)>

√CB-GNC N1-1 Bus Channel – A
29. PERFORMING CB-GNC N1-2 BUS CHANNEL SWITCH (C&DH)
   √CB-GNC N1-2 Bus Channel

   Record A or B _____

   If Bus Channel recorded was A, then:
   <Cmd Inv:  N1_2_MDM_CB_GNC_2_Sel_Ch_B – (M1DD95SM1402K)>
   √CB-GNC N1-2 Bus Channel – B

   If Bus Channel recorded was B, then:
   <Cmd Inv:  N1_2_MDM_CB_GNC_2_Sel_Ch_A – (M1DD95SM1401K)>
   √CB-GNC N1-2 Bus Channel – A

30. CHECKING OUT CBM PRIMARY MASTER CONTROLLER, OPPOSITE CHANNEL

   N1 Forward CBM Checkout

   cmd Activate Primary Master   Execute

   <Cmd Inv:  CBM_Activate_N1_Fwd_Pri_Master – (M1MC95SM1160K)>

   Wait 20 seconds, then:

   N1_Fwd_CBM_Power_Data
   ‘CBM Status’

   √Mode – Activated
   √Master – Primary
   √CPA – Record # _____
   √Comm Error – blank

   Node_1_CBM.msk

   √Master Cmd Status – Complete
   √Active BIT Error – blank
   √Background BIT Error – blank
   √Master Cmd Error – blank
   √Slave Cmd Error – blank
   √485 Timeout – blank
   √Command Rejected – blank
   √485 Ch (twenty) – B
31. **CHECKING OUT CBM SECONDARY MASTER CONTROLLER, OPPOSITE CHANNEL**

   N1 Forward CBM Checkout

   **cmd** Activate Secondary Master  **Execute**

   `<Cmd Inv: CBM_Activate_N1_Fwd_Sec_Master – (M1MC95SM1161K)>`

   Wait 20 seconds, then:

<table>
<thead>
<tr>
<th>'CBM Status'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
</tr>
<tr>
<td>Master</td>
</tr>
<tr>
<td>CPA</td>
</tr>
<tr>
<td>Comm Error</td>
</tr>
</tbody>
</table>

   Node_1_CBM.msk

   | Master Cmd Status |
   | Active BIT Error |
   | Background BIT Error |
   | Master Cmd Error |
   | Slave Cmd Error |
   | 485 Timeout |
   | Command Rejected |
   | 485 Ch (sixteen bolts, four latches) |

32. **DEACTIVATING FORWARD CBM MASTER CONTROLLER**

   N1 Forward CBM Checkout

   **cmd** Deactivate CBM  **Execute**

   `<Cmd Inv: CBM_Deactivate_N1_Fwd – (M1MC95SM1006K)>`

   N1_FWD_CBM_Power_Data

   `CBM Status`

   Mode – Deactivated
33. **OPENING PRIMARY RPCs**

N1 Forward CBM Checkout

**cmd** RPCM N13B-C RPC [X] CPA [Y] Pri Open

\[\begin{align*}
\text{where } [X] &= \{03, 04, 05, 06\} \\
\text{[Y]} &= \{1, 2, 3, 4\}
\end{align*}\]

\(<\text{Cmd Inv: RPCM_N13B_C_RPC_[X]_CBM_N1_Fwd_Pri_[Y]_Op} - (\text{M1PR95SM1759K, 1760K, 1761K, 1762K})>\)

\[\begin{align*}
\text{N1_Fwd_CBM_Power_Data} \\
\text{‘RPCM N13B C’}
\end{align*}\]

\(\sqrt{\text{RPC [X] Posn – Op}}\)

Repeat

34. **INHIBITING PRIMARY RPCs**

**cmd** RPCM N13B-C RPC [X] CBM N1 Fwd Pri [Y] Cl Inhib On

\[\begin{align*}
\text{where } [X] &= \{03, 04, 05, 06\} \\
\text{[Y]} &= \{1, 2, 3, 4\}
\end{align*}\]

\(<\text{Cmd Inv: RPCM_N13B_C_RPC_[X]_CBM_N1_Fwd_Pri_[Y]_Cl_Inhib_On} - (\text{M1PR95SM1129K, 1130K, 1131K, 1132K})>\)

\[\begin{align*}
\text{N1_Fwd_CBM_Power_Data} \\
\text{‘RPCM N13B C’}
\end{align*}\]

\(\sqrt{\text{RPC [X] Cl – Inh}}\)

Repeat
35. INHIBITING SECONDARY RPCS

**cmd** RPCM_N14B_A_RPC_[X]_CBM_N1_Fwd_Sec_[Y]_Cl_Inhib_On

where [X] = 02 03 04 05

[Y] = 1 2 3 4

<Cmd Inv: RPCM_N14B_A_RPC_[X]_CBM_N1_Fwd_Sec_[Y]_Cl_Inhib_On – M1PR95SM1182K, 1183K, 1194K, 1195K>

N1_Fwd_CBM_Power_Data

√RPCM N14B A

√RPC [X] Cl – Inh

Repeat
This Page Intentionally Blank
Identification Section:
Procedure Name: PMA3 Heater Checkout
Applicability: 3A
Frequency: Rare
Objective: To verify the PMA 3 shell heater functionality.
Description: This procedure verifies the PMA 3 shell heater functionality.
               VSS2 version 14.
Crew Required: Ground
Power: TBD
Data: Cyclic Telemetry
Duration: 30 minutes
Location: MCC-H
Parts: None
Materials: None
Tools: None
Constraints: None
Reference Materials: Node Control Software SRS
Assumptions: None
Definitions: X = Heater Designator (i.e., 1B)
            Y = the RPC corresponding to the heater you are enabling (i.e., 2)
PMA 3 HEATER CHECKOUT

1. RECORDING AVAILABILITY OF HEATER TO BE CHECKED OUT

Prior to the execution of this procedure, the MCC-H will have built the appropriate commands from the Command Inventory interface using the following procedures:

**PMA 3 HEATER INHIBIT TEMPLATE COMMAND BUILD: TCS CONSOLE HANDBOOK**

**PMA 3 HEATER ENABLE TEMPLATE COMMAND BUILD: TCS CONSOLE HANDBOOK**

**SHELL HEATER - UPDATE TEMPERATURE SENSOR SETPOINTS: GND HANDBOOK: TCS**

All commands should be sent from the Command Inventory interface. CDDT/PCS should not be used for this procedure due to identified display problems.

**Availability = __________**

Failure Upper Limit, degC: _______
Upper Setpoint, degC: _______
Lower Setpoint, degC: _______
Failure Lower Limit, degC: _______
Cyclic Load Delta, degC: _______

2. INHIBITING HEATER TO BE CHECKED OUT

<Cmd Inv: PMA3 Htr[X] Inh Fixed>
where X = heater designator (i.e., 1B)
√Availability – Inh

3. UPDATING HEATER SETPOINTS

**NOTE**
The temperature of the heater to be checked out must be below the lower setpoint.

<Cmd Inv: Update PMA3 Htr[X] Temp_Snsr_Setpoints_[Descriptor] Uplink Crit 4>
where X = heater designator (i.e., 1B)

Verify new setpoints are received onboard.

4. ENABLING HEATER TO BE CHECKED OUT

PCS
RPCM N1RS2 B RPC Y where Y - the RPC corresponding to the heater you are enabling (i.e., 2)
√Close Cmd – Ena
5. **VERIFYING HEATER TURNED ON**
   Verify PMA3 Htr[X] Cmd Stat – On
   Verify PMA3 Htr[X] RPC Posn – Closed
   where X = heater designator (i.e., 1B)

   Wait 30 minutes.

   **NOTE**
   Temperature and RPCM Current changes will be plotted to determine successful heater operation.

6. **INHIBITING HEATER**
   <Cmd Inv: PMA3 Htr[X] Inh Fixed>
   where X = heater designator (i.e., 1B)

   √Availability – Inh

7. **RETURNING HEATER SETPOINTS TO ORIGINAL VALUES**
   <Cmd Inv: Update PMA3 Htr[X] Temp Snsr Setpoints [Descriptor> Uplink Crit 4
   where X = heater designator (i.e., 1B)

   Verify new setpoints are received onboard.

8. **RETURNING HEATER AVAILABILITY TO ORIGINAL VALUE**
   <Cmd Inv: PMA3 Htr[X] Value in Step 1 Uplink Crit 4>
   where X = heater designator (i.e., 1B)

9. **MODIFYING SETPOINTS FOR PMA 3 HEATERS 5A AND 5B**
   Steps 9 and 10 should not be performed until all 10 PMA 3 heaters have been checked out per steps 1 through 8.

   Modify setpoints for PMA3 Htr 5A and PMA3 Htr 5B to the values listed below.
Specific values to be entered in the template command for both PMA3 Htr 5A and PMA3 Htr 5B are listed below. Values are provided for each of the five items in the template: Upper Setpoint, Failure Upper Limit, Lower Setpoint, Failure Lower Limit, and Cyclic Load Delta.

Failure Upper Limit, degC: 45
Upper Setpoint, degC: -28
Lower Setpoint, degC: -33
Failure Lower Limit, degC: -45
Cyclic Load Delta, degC: 2.24

<Cmd Inv: Update PMA3 Htr[x] Temp Snsr Setpoints [Descriptor]> Uplink Crit 4
where X = heater designator (i.e., 1B)

Verify setpoints are received onboard.

10. ENABLING TO OPERATE PMA3 HEATERS 5A AND 5B

PCS
<Cmd Inv: PMA3 Htr5A Ena Opr> Uplink Crit 4
√Availability – Ena Opr

<Cmd Inv: PMA3 Htr5B Ena Opr> Uplink Crit 4
√Availability – Ena Opr