CH 4B(2B) BATTERY THERMAL CONDITIONING

1. If shuttle crew required to execute this procedure using the PCS from the AFD:

   MCC-H ⇒ shuttle, “Go for Channel 4B(2B) Thermal Conditioning.”

2. <u>CONFIGURE BCDU 4B(2B) FUNCTIONAL INHIBITS TO ENABLE BATTERY HEATER CONTROL</u>

   1. <u>Enable Battery Heater Control</u>

PCS

P6: EPS: ENERGY STORAGE 4B(2B)
‘Battery 4B11(2B11)’

sel BSCCM

cmd Battery Heater Control Ena Arm
cmd Battery Heater Control Ena
√Battery Heater Control - Ena

‘Battery 4B12(2B12)’

sel BSCCM

cmd Battery Heater Control Ena Arm
cmd Battery Heater Control Ena
√Battery Heater Control - Ena

‘Battery 4B21(2B21)’

sel BSCCM

cmd Battery Heater Control Ena Arm
cmd Battery Heater Control Ena
√Battery Heater Control - Ena

‘Battery 4B22(2B22)’

sel BSCCM

cmd Battery Heater Control Ena Arm
cmd Battery Heater Control Ena
√Battery Heater Control - Ena

   2. <u>Enable BCDU Heater Power Control</u>

P6: EPS: TBD
TBD

cmd BCDU 4B(2B)1 Heater Power Control Ena Arm
cmd BCDU 4B(2B)1 Heater Power Control Ena
√BCDU 4B(2B)1 Heater Power Control - Ena

cmd BCDU 4B(2B)2 Heater Power Control Ena Arm
cmd BCDU 4B(2B)2 Heater Power Control Ena
√BCDU 4B(2B)2 Heater Power Control - Ena

3. CONFIGURE SSU 4B(2B) PVCEs FOR POWER OUTPUT AND ENABLE LFDP

P6: EPS: SSU 4B(2B)

sel PVCE

1. Command SSU 4B(2B) PVCEs On

cmd PVCE 1 On Arm
cmd PVCE 1 On
√PVCE 1 Stat - On

cmd PVCE 2 On Arm
cmd PVCE 2 On
√PVCE 2 Stat - On

cmd PVCE 3 On Arm
cmd PVCE 3 On
√PVCE 3 Stat - On

√Vehicle is in insolation

****
* If vehicle is not in insolation, wait until vehicle is in insolation. *
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NOTE
Solar Arrays must be in sunlight in order for the SSU to control bus voltage. If the vehicle is in eclipse, pause before using the SSU output voltage check to verify proper SSU operation.

P6: EPS: SSU 4B(2B)

√Output Voltage: 165 --- 169 V

2. Enable SSU 4B(2B) Load Fault Detection Protection

sel LFDP

cmd LFDP 1 On Arm
cmd LFDP 1 On
√LFDP 1 Stat - On

cmd LFDP 2 On Arm
cmd LFDP 2 On
√LFDP 2 Stat - On

cmd LFDP 3 On Arm
cmd LFDP 3 On
√LFDP 3 Stat - On

4. MONITOR BATTERY TEMPERATURES AND PRESSURES DURING BATTERY CONDITIONING AND CLOSE BCDU 4B(2B) CONTROL POWER RBIS

P6: EPS: Energy Storage 4B(2B)

sel Battery 4B(2B)11 Cells
sel Battery 4B(2B)12 Cells
sel Battery 4B(2B)21 Cells
sel Battery 4B(2B)22 Cells

NOTE

1. For step 4.1, the crewmember or ground controller performing this procedure must watch that the heater switches in the BCDU are closed during insolation and are open during eclipse, and that the Battery ORU heater switches are closed when the Battery cells are below 1° C and open when warmer. These are automated functions.
2. For step 4.1, the Battery Cell temperatures should begin increasing shortly after the Battery Cell Heater and Battery Heater Power switches are closed.
3. For step 4, it is advisable that detailed displays for all four Battery ORUs be active, as well as the higher level BCDU/Battery graphical displays.
4. Step 4.3 is listed after 4.1 and 4.2, but can be completed in any sequence after step 3 is complete and before the Battery Cells have reached the temperature and pressure goals shown in steps 4.1 and 4.2. The recommended process is to perform step 4.3 near the middle of an Eclipse or Insolation period when attention would not otherwise be required for the Battery Heater Switch transitions.

1. Monitor Battery Temperatures Until Cells Reach a Minimum of 0° C

√Batt 4B(2B)11 Cell 02 Temp > -2 --- 4° C
√Batt 4B(2B)11 Cell 08 Temp > -2 --- 4° C
√Batt 4B(2B)11 Cell 20 Temp > -2 --- 4° C
√Batt 4B(2B)11 Cell 28 Temp > -2 --- 4° C

√Batt 4B(2B)12 Cell 02 Temp > -2 --- 4° C
√Batt 4B(2B)12 Cell 08 Temp > -2 --- 4° C
√Batt 4B(2B)12 Cell 20 Temp > -2 --- 4° C
√Batt 4B(2B)12 Cell 28 Temp > -2 --- 4° C

√Batt 4B(2B)21 Cell 02 Temp > -2 --- 4° C
√Batt 4B(2B)21 Cell 08 Temp > -2 --- 4° C
√Batt 4B(2B)21 Cell 20 Temp > -2 --- 4° C
√Batt 4B(2B)21 Cell 28 Temp > -2 --- 4° C

√Batt 4B(2B)22 Cell 02 Temp > -2 --- 4° C
√Batt 4B(2B)22 Cell 08 Temp > -2 --- 4° C
√Batt 4B(2B)22 Cell 20 Temp > -2 --- 4° C
√Batt 4B(2B)22 Cell 28 Temp > -2 --- 4° C

2. <u>Ensure Battery Cell Pressures Are Within Acceptable Range</u>

√Batt 4B(2B)11 Cell A Press < 1.03×10^4 kPa
√Batt 4B(2B)11 Cell B Press < 1.03×10^4 kPa
√Batt 4B(2B)11 Cell C Press < 1.03×10^4 kPa
√Batt 4B(2B)11 Cell D Press < 1.03×10^4 kPa

√Batt 4B(2B)12 Cell A Press < 1.03×10^4 kPa
√Batt 4B(2B)12 Cell B Press < 1.03×10^4 kPa
√Batt 4B(2B)12 Cell C Press < 1.03×10^4 kPa
√Batt 4B(2B)12 Cell D Press < 1.03×10^4 kPa

√Batt 4B(2B)21 Cell A Press < 1.03×10^4 kPa
√Batt 4B(2B)21 Cell B Press < 1.03×10^4 kPa
√Batt 4B(2B)21 Cell C Press < 1.03×10^4 kPa
√Batt 4B(2B)21 Cell D Press < 1.03×10^4 kPa

√Batt 4B(2B)22 Cell A Press < 1.03×10^4 kPa
√Batt 4B(2B)22 Cell B Press < 1.03×10^4 kPa
√Batt 4B(2B)22 Cell C Press < 1.03×10^4 kPa
√Batt 4B(2B)22 Cell D Press < 1.03×10^4 kPa

3. <u>Enable DC Control Power to Channel 2B(4B) EPS</u>

P6: EPS: Energy Storage 4B(2B)

<u>Close BCDU 4B(2B)1 CP RBI</u>
'BCDU 4B(2B)1'

sel CP RBI

cmd CP RBI Close Arm
cmd CP RBI Close
√CP RBI Position - Closed
√CP RBI Voltage < 3.0 V
√CP RBI Current < 1.0 A

<u>Close BCDU 4B(2B)2 CP RBI</u>
'BCDU 4B(2B)2'

sel CP RBI

cmd CP RBI Close Arm
cmd CP RBI Close
√CP RBI Position - Closed
√CP RBI Voltage < 3.0 V
√CP RBI Current < 1.0 A