CH 4B(2B) ACTIVATION

1. DCSU ACTIVATION/CHARGE SOURCE BUS CAPACITANCE
   1. Clear DCSU

NOTE
The Clear command must be sent after DCSU Power On to clear the power on reset bit to identify whether or not the bit gets set again.

PCS P6: EPS: DCSU 4B(2B)

DCSU 4B(2B)

sel Firmware
cmd Clear

   2. Verify DCSU Baseplate and Power Supply Temperatures

DCSU 4B(2B)

√Baseplate Temp ≤ 82° C
√PS Temp ≤ 82° C

   3. Power On DCSU Primary Power Bus

NOTE
The RBI 6 Open command must be enabled during activation and after each power on reset to allow the PVCU RBI 6 FDIR algorithm to open the switch if necessary.

sel RBI 6
cmd Open Cmd - Enable
√Open Cmd - Ena

cmd Close Arm
cmd Close
√Position - Cl
√Vbus: 131 --- 149 V

```
*****************************************
*  If position is Op                    *
*     √Command Response                 *
*     √Commanded State Failure          *
*       cmd   Open                      *
*     √Position - Cl                    *
*       cmd   Close Arm                 *
*       cmd   Close                     *
*     √Position - Cl                    *
*       sel   Firmware                  *
*       cmd   Clear                     *
*****************************************
```

4. Activate DDCU

DCSU 4B(2B)

CAUTION
RBI 5 must be the next switch closed after RBI 6 has been successfully closed to prevent the APCU from tripping.

sel RBI 5
cmd Close Arm
cmd Close
√Position - Cl
√Voltage: 131 --- 149 V
√Current < 4 A

```
*********************************************************
*  If position is Op, perform DCSU MALFUNCTION,  *
*    all (SODF: EPS), then:                      *
*********************************************************
```

DCSU 4B(2B)

sel DDCU 4B(2B)
sel Firmware
cmd Clear
√Integ Counter - incrementing
√Input Voltage: 131 --- 149 V

```
*******************************************************************
*  If Integ Counter is static or voltage is out of range          *
*       Perform DDCU MALFUNCTION, all (SODF: EPS), then: *
*******************************************************************
```

5. Activate BCDU 4B1(2B1)

DCSU 4B(2B)

sel RBI 2
cmd Close Arm
cmd Close
√Position - Cl
√Voltage: 131 --- 149 V

```
*******************************************************************
*  If Integ Counter is static or voltage is out of range          *
*       Perform DDCU MALFUNCTION, all (SODF: EPS), then: *
*******************************************************************
```

DCSU 4B(2B)

sel Energy Storage
sel Firmware
cmd Clear
√Integ Counter - incrementing
√Pri Vbus: 131 --- 149 V

```
*********************************************************************
*  If Integ Counter is static or voltage is out of range            *
*       Perform BCDU MALFUNCTION, all (SODF: EPS), then: *
*********************************************************************
```

6. Activate BCDU 4B2(2B2)

DCSU 4B(2B)

sel RBI 3
cmd Close Arm
cmd Close
√Position - Cl
√Voltage: 131 --- 149 V

```
*********************************************************
*  If position is Op, perform DCSU MALFUNCTION,  *
*    all (SODF: EPS), then:                      *
*********************************************************
```

DCSU 4B(2B)

sel Energy Storage
sel Firmware
cmd Clear
√Integ Counter - incrementing
√Pri Vbus: 131 --- 149 V

```
*********************************************************************
*  If Integ Counter is static or voltage is out of range            *
*       Perform BCDU MALFUNCTION, all (SODF: EPS), then: *
*********************************************************************
```

7. Activate SSU 4B(2B)

DCSU 4B(2B)

sel RBI 1
cmd Close Arm
cmd Close
√Position - Cl
√Voltage: 131 --- 149 V

```
*********************************************************
*  If position is Op, perform DCSU MALFUNCTION,  *
*    all (SODF: EPS), then:                      *
*********************************************************
```

DCSU 4B(2B)

sel SSU
sel Firmware
cmd Clear
√Integ Counter - incrementing
√Input Voltage: 131 --- 149 V

```
*******************************************************************
*  If Integ Counter is static or voltage is out of range          *
*       Perform SSU MALFUNCTION, all (SODF: EPS), then:*
*******************************************************************
```

2. DDCU 4B(2B) ACTIVATION
   1. Verify DDCU 4B(2B) Input and Output Power

DCSU 4B(2B)

sel DDCU 4B(2B)
√Vin: 131 --- 149 V
√Iin < 4 Amps
√Vout < 5 V
√Iout < 4 Amps

   2. Turn DDCU 4B(2B) Converter On

sel Converter
cmd Conv On - Arm
cmd Conv On
√Vout: 121 --- 128 V
√Iout < 4 Amps
√Converter Temp < 87° C
√Pwr Temp < 87° C
√Baseplate Temp < 87° C

```
*************************************************************************
*  If DDCU output voltage, current, or temperatures go out of range *
*       Perform DDCU MALFUNCTION, all (SODF: EPS), then:        *
*************************************************************************
```

3. Verify RPCM A Operation

DDCU 4B(2B)

sel RPCM A
sel Firmware
cmd Clear
√Integ Counter - incrementing
√RPCs (1 --- 8) Open
√Input Voltage: 121 --- 128 V
√Input Current < 4 Amps
√Baseplate Temp < 49° C

4. Verify RPCM B Operation

DDCU 4B(2B)

sel RPCM B
sel Firmware
cmd Clear
√Integ Counter - incrementing
√RPC 1 Open
√Input Voltage: 121 --- 128 V
√Input Current < 4 Amps
√Baseplate Temp < 49° C

3. CHANNEL 4B(2B) PVTCS ACTIVATION

1. Configure PVTCS 4B(2B) Algorithms for Initial Activation

P6: EPS: PVTCS 4B(2B)

PVTCS 4B(2B)

'PFCS'

sel Pumps
cmd Pump Auto Switchover - Inhibit Arm
cmd Pump Auto Switchover - Inhibit

PVTCS 4B(2B)

'PFCS'

sel FCV
cmd FCV Control - Inhibit Arm
cmd FCV Control - Inhibit

PVTCS 4B(2B)

'PFCS'

sel Software Inhibits
cmd Min Inlet Temp Shutdown - Inhibit Arm
cmd Min Inlet Temp Shutdown - Inhibit

2. Assess Battery Temp

PVTCS 4B(2B)
'Batteries'

√Batt 4B11(2B11) Avg Temp < 7.2° C
√Batt 4B12(2B12) Avg Temp < 7.2° C
√Batt 4B21(2B21) Avg Temp < 7.2° C
√Batt 4B22(2B22) Avg Temp < 7.2° C

```
**********************************************
*  If any Batt Avg Temp ≥ 7.2° C             *
*                                            *
*      'PFCS'                                *
*                                            *
*      sel    FCV                            *
*      cmd    FCV Recovery - Inhibit Arm     *
*      cmd    FCV Recovery - Inhibit         *
**********************************************
```

3. Apply Power to PFCS 4B(2B)

NOTE
Upon application of power to the PFCS, the FCV executes power on recalibration which will last approximately 93 seconds. The caution message expected upon successful completion of this recalibration is 'PFCS 4B(2B) FCV Recal Complete'.

PVTCS 4B(2B)

sel RPCM 4B(2B) A RPC 03
cmd Close
√Position - Cl

4. Issue Common Clear to PFCS

PVTCS 4B(2B)

sel Firmware
cmd Common Clear

5. Verify FCV 4B(2B) Recalibration

PVTCS 4B(2B)

√FCV Position: 0 ± 5.3 Degrees (Full bypass)

```
*****************************************************************************
*  If warning message 'PFCS 4B(2B) FCV Failure-High Temp' received  *
*       P6: EPS: PVTCS 4B(2B)                                       *
*       [PVTCS 4B(2B)]                                              *
*       'PFCS'                                                      *
*                                                                   *
*       sel     FCV                                                 *
*       cmd     FCV - Recal Arm                                     *
*       cmd     FCV Recal                                           *
*                                                                   *
*  If warning message occurs again                                  *
*       Perform FCV MANUAL RECALIBRATION, all (SODF: EPS),          *
*         then:                                                     *
*                                                                   *
*     √MCC-H                                                        *
*****************************************************************************
```

6. Verify PFCS 4B(2B) Parameters Prior to Pump Activation

   PVTCS 4B(2B)
   'PFCS Data'

   √Inlet Press: 690 --- 2000 kPa
   √Outlet Press: 690 --- 2000 kPa
   √Byp In temp: -5 --- 10° C
   √Outlet Temp 1,2 > -42.7° C
   √Outlet Temp 1,2: -5 --- 10° C
   √Accum Avg Qty: 30.9 --- 74.1%

```
*************************************************************
*  If PVTCS temperatures out of range                       *
*       Perform PVTCS TEMP OUT OF RANGE, all                *
*         (SODF: EPS), then:                                *
*                                                           *
*  If PVTCS pressures out of range                          *
*       Perform PVTCS PRESSURE OUT OF RANGE,                *
*         all (SODF: EPS), then:                            *
*************************************************************
```

7. Activate PFCS 4B(2B) Pump

   WARNING

   Both pumps are not allowed to operate simultaneously.

   NOTE
   The PFCS pump will spin up within 10 seconds.

   PVTCS 4B(2B)
   'PFCS'

sel Pumps
cmd Pump A - On
√Pump A Conv Speed > 11025 --- 12975 rpm

```
*************************************************************************
*  If caution message 'PFCS 4B(2B) Pump A Failure' received            *
*  |  and Pump A Speed < 12000 rpm                                     *
*  |                                                                   *
*  |  'PFCS'                                                           *
*  |                                                                   *
*  |  sel     Pumps                                                    *
*  |  cmd     Pump A - Off                                             *
*  |  cmd     Pump B - On                                              *
*  |  √Pump A Conv Speed > 12000 rpm                                   *
*  |                                                                   *
*  If caution message occurs for Pump B(A)                             *
*     Perform PFCS PUMP FAILURE, all (SODF: EPS), then:                *
*    √MCC-H                                                            *
*************************************************************************
```

8. <u>Verify PVTCS 4B(2B) Parameters Post Activation</u>

PVTCS 4B(2B)
'PFCS Data'

√Inlet Press: 1241 --- 1448 kPa
√Outlet Press: 1379 --- 1482 kPa
√Flow Rate: 765 --- 1176 Kg/hr
√Pump A Conv Spd > 12000 rpm
√Byp In temp: -5 --- 10° C
√InletTemp > -42.7° C
√Outlet Temp 1,2: -5 --- 10° C
√Accum Avg Qty: 30.9 --- 74.1%

```
*************************************************************
*  If PVTCS temperatures out of range                       *
*     Perform PVTCS TEMP OUT OF RANGE, all                  *
*       (SODF: EPS), then:                                  *
*                                                           *
*  If PVTCS pressures out of range                          *
*     Perform PVTCS PRESSURE OUT OF RANGE,                  *
*       all (SODF: EPS), then:                              *
*************************************************************
```

9. <u>Apply RPC Open Command - Inhibit</u>

PVTCS 4B(2B)

sel RPCM 4B(2B) A RPC 03
cmd Open Cmd - Inh
√Open cmd - Inh

10. Enable PVTCS Closed Loop Control Algorithms

PVTCS 4B(2B)
'PFCS'

NOTE
Enabling the FCV Control algorithm will initiate the PVTCS close loop control, which may cause the present FCV position to change.

sel FCV
cmd FCV Control - Enable Arm
cmd FCV Control - Enable

PVTCS 4B(2B)

sel Pumps
cmd Pump Auto Switchover - Enable Arm
cmd Pump Auto Switchover - Enable

11. Configure PFCS Outlet Temp Algorithm for Nominal Operations

NOTE
The following steps may require additional time for thermal stabilization.

If PFCS Outlet Temp 1,2 < 10° C

PVTCS 4B(2B)

sel Software Inhibits
cmd Max Outlet Temp Shutdown - Enable Arm
cmd Max Outlet Temp Shutdown - Enable

12. Configure PFCS Inlet Temp Algorithm for Nominal Operations

NOTE
The following steps may require additional time for thermal stabilization.

If PFCS Inlet Temp > -47.2° C

PVTCS 4B(2B)

sel Software Inhibits
cmd Min Inlet Temp Shutdown - Enable Arm
cmd Min Inlet Temp Shutdown - Enable

13. <u>Configure FCV Recovery Algorithm for Nominal Operations</u>
If FCV Recovery Inhibited (in step 3) and all batteries Avg Temp < 7.2° C

PVTCS 4B(2B)

sel FCV
cmd FCV Recovery - Enable Arm
cmd FCV Recovery - Enable