Orbit Pocket Checklist

Mission Operations Directorate
Operations Division

Generic, Rev M
October 18, 2006

NOTE
For STS-116 and subsequent flights

AESP: MM101
APCL: MM104
OPCL: MM106
EPCL: MM301
AESP: MM304

National Aeronautics and Space Administration
Lyndon B. Johnson Space Center
Houston, Texas

Verify this is the correct version for the pending operation (training, simulation or flight).
Electronic copies of FDF books are available. URL: http://mod.jsc.nasa.gov/do3/FDF/index.html
List of Implemented Change Requests (482s):
MULTI-1803

Incorporate the following:
1. Replace v and vi
2. Replace 4-13 and 4-14
   Delete TEMP 4-13 and TEMP 4-14

NOTE
For STS-120 and subsequent flights

Prepared by: Mary Ellen
Publication Manager

Approved by: Manager, Shuttle Procedures Management

Accepted by: FDF Manager

Encl: 4 pages

File this PCN immediately behind the front cover as a permanent record
PCN-3 (Sept 20, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1798       OPCL-0494
                 OPCL-0497A
                 OPCL-0498
                 OPCL-0499
                 OPCL-0500
                 OPCL-0501

Incorporate the following:

1. Replace v thru viii, xi and xii
2. Replace 4-17 thru 4-24
4. Replace B10-23 and B10-24, B10-29 and B10-30, B10-35 and B10-36, B10-39 and B10-40,
   B10-43 and B10-44, B10-47 and B10-48, B10-61 and B10-62, B10-71 and B10-72
5. Replace 11-7 and 11-8

Prepared by:  Mary Ellen Suarez
Publication Manager

Approved by:  Jeffrey Johnson
Manager, Shuttle Procedures Management

Accepted by:  Michael Shaw
DF Manager

Encl: 48 pages

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PCN-2 (July 16, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1738A(R)       OPCL-0492
MULTI-1785            OPCL-0493
MULTI-1786            OPCL-0495
MULTI-1790            OPCL-0496
MULTI-1792

R – Remainder

Incorporate the following:

1. Replace v thru x
2. Replace 1-3 and 1-4
3. Replace B4-1 and B4-2, 4-5 thru B4-8 (6 pages), 4-21 thru 4-24
4. Replace 5-1 thru 5-4, 5-7 and 5-8
5. Replace A10-61 and A10-62

Prepared by:  

Approved by:  

Accepted by:  

Encl: 38 pages

File this PCN immediately behind the front cover as a permanent record
List of Implemented Change Requests (482s):
MULTI-1756
MULTI-1769
MULTI-1774

Incorporate the following:
1. Replace v thru x
2. Replace 4-13 and 4-14
   After 4-14, add TEMP 4-13 and TEMP 4-14
3. Replace A10-27 and A10-28
4. Replace B10-27 and B10-28

NOTE
For STS-117 and subsequent flights

Prepared by: Mary Ellen Pink
Publication Manager

Approved by: Dumpy Johnson
Manager, Shuttle Procedures Management

Accepted by: Michael E. Shaw
FDF Manager

Encl: 14 pages

*File this PCN immediately behind the front cover as a permanent record*
MISSION OPERATIONS DIRECTORATE

ORBIT POCKET CHECKLIST

GENERIC, REVISION M
October 18, 2006

PREPARED BY:

Mary E. Bruce
Publication Manager

APPROVED BY:  
Kimberly A. Johnson
Manager, Shuttle Procedures Management

ACCEPTED BY:  
Michael T. Hurt
FDF Manager

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes must be submitted via FDF Workflow Crew Procedure Change Request (CR) to DO3/FDF Manager.

Additional distribution of this book, for official use only, may be requested in writing to DO3/PMO Administrator. The request must include justification and requester's name, organization, position, and phone number. Contractor requests are made through the NASA or DOD organization supported. Deletions, reduction in quantity, or change of address may be submitted to DO3/FDF Management Office, 281-244-1184.
Incorporates the following:

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AREAS OF TECHNICAL RESPONSIBILITY

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NOTES

1. The pocket checklists contain contingency procedures to save a system and continue the flight. Normally, these procedures do not troubleshoot a malfunction to determine its cause.

2. The absence of a procedure implies no immediate action required. The crewmember should proceed to the MAL book as soon as practical.

3. The Orbit Pocket Checklist is generally constrained to include only those procedures that can and must be performed within 5 minutes. All procedures should be completed promptly in the step sequence noted. For longer or less time-critical procedures during the orbit phase, the Malfunction Procedures (MAL) book is available.

4. The procedures in this book are in effect from MM106 transition until transition to MM301 for deorbit.

5. During all on-orbit OMS burns (from TIG-2 min to achievement of required velocity), appropriate OMS and related critical malfunction symptoms and response data are covered by cue cards. For all other on-orbit time periods, OMS procedures contained in this document apply.

6. Critical malfunction symptoms and response data for other orbiter systems are handled by cue cards (if existing), otherwise by procedures included herein.

7. Applicable procedures from the PL PWR book (i.e., Sections 2 and 3) are placed at the end of the flight copies of this book.

8. The ‘♦’ icon preceding a procedural entry indicates one should √MCC and if no comm continue with the procedure.
**LIST OF EFFECTIVE PAGES**

**GENERIC** 04/07/87 PCN-4 09/26/07

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* – Omit from flight book

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* – Omit from flight book
☞ – Highlights reqd
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**HYD ACCUM (RSVR) P LOW**  
(SM2 HYD ACCUM P, ACUM P < 1930)  
(S86 RSVR/ACC P, RSVR P < 28 or ACCUM P < 1930)

**CAUTION**
Hyd MN Pump may be damaged if APU started with low HYD RSVR P

R2  
1. (Aff) HYD CIRC PUMP – ON
2. √MCC
   If no comm, go to MAL, APU/HYD, 1.2a, RSVR P ↓, ACCUM P ↓ [1]

**HYD CIRC PUMP PRESS LOW**  
(S87 CIRC PMP P, PRESS < 100)

**CAUTION**
HYD CIRC PUMP – OFF within 60 sec to avoid damage

R2  
1. HYD CIRC PUMP – OFF
2. √MCC
   If no comm, go to MAL, APU/HYD, 1.3a, HYD CIRC PUMP P ↓ [1]
1-3 OPCL/ALL/GEN M,2

APU FUEL SUPPLY T
(S86 FU TK VLV)
(S88 APU TANK T)
(S88 APU FU LN)

A12 1. (Aff) APU HTR TK/FU LN/H2O SYS A – OFF  
     B – OFF

2. √MCC
   If no comm and ‘S88 APU TANK T’ or ‘APU FU LN’ msg, go to 
   MAL, APU/HYD, 1.1b  [2]
   If no comm and ‘S86 FU TK VLV’ msg, go to MAL, APU/HYD,  
   1.1c [1]

APU FUEL PUMP T
(S88 APU FU PMP)

CRT If APU FUEL T PUMP OUT or BYP LN ↓:
A12 1. (Aff) APU HTR GAS GEN/FU PUMP – A AUTO(B AUTO)
     >>

2. (Aff) APU HTR GAS GEN/FU PUMP – OFF

   NOTE
   Expect ‘S86 GG/FU PMP’
   and ‘S86 GBX P FDA’ msgs

3. √MCC
   If no comm, go to MAL, APU/HYD, 1.1b [2]

APU WATER T
(S88 APU H2O T)

If H2O INJ LN 1 or 2 ↓↓:
A12 1. APU HTR TK/FU LN/H2O SYS 1 A(B) – OFF  
     B(A) – ON

2. √MCC
   If H2O INJ LN 3 ↓↓:
   3. APU HTR TK/FU LN/H2O SYS 3 A(B) – OFF  
      B(A) – ON

4. √MCC

1-3 OPCL/ALL/GEN M,2
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**BCE BYP KU**  
(KU 8=M)

1. **ITEM 8 ENTER**  
   If msg repeats:
   2. If AOS: √MCC for comm config  
   3. If no comm: Go to COMM LOST, steps 6,7 for TDRS mode

**SM 201 ANTENNA**
ICOM LOST

Try following until ICOM AUDIO regained:

1. (Aff) AUD CNTL sel – sel alt
2. AUD CTR – 2
3. Plug into another ATU
4. Try another HDST/CCU
5. \(\sqrt{\text{MCC}}\)

S76 COMM PA 2(1) TEMP

(TEMP > 230)

1. Perform COMM LOST, steps 6,7 for TDRS mode, then:
2. \(\sqrt{\text{Comm with MCC}}\)
   If no comm:
   3. Go to COMM LOST

S76 PA 2(1) OUTPUT LOW

(PWR OUT < 60)

1. Perform COMM LOST, steps 6,7 for TDRS mode, then:
2. \(\sqrt{\text{Comm with MCC}}\)
   If no comm:
   3. Go to COMM LOST

S76 NSP 2(1) BITE

(BITE = ‘FAIL’)

1. Perform COMM LOST, steps 6,7 for TDRS mode, then:
2. \(\sqrt{\text{Comm with MCC}}\)
   If no comm:
   3. Go to COMM LOST

S76 COMSEC 2(1) BITE

(BITE = ‘FAIL’)

1. Perform COMM LOST, steps 6,7 for TDRS mode, then:
2. \(\sqrt{\text{Comm with MCC}}\)
   If no comm:
   3. Perform COMM LOST, step 9, then:
   4. \(\sqrt{\text{Comm with MCC}}\)
   If no comm:
   5. Go to COMM LOST
COMM LOST (mult pnls)   SM 76 COMMUNICATIONS
SM ANTENNA

NOTE
Perform comm checks with MCC after each step

1. AUD CTR – 2(1)
   If all ICOM and A/G failed (check three ATUs): R14:A,F
2. √cb ACCU (two) – cl
3. Go to step 10
4. SM 62 PCMMU/PL COMM
   If PI XMIT PWR not blank: A1L
      Deactivate PI:
      √S-BD PL CNTL – CMD
      PWR SEL – PSP
      CNTL – PNL,CMD
      Wait 2 min for TDRS acquisition
5. If F9 meter < 300, wait for next TDRS in view

NOTE
When selecting between DC Amps and Signal Strength posns, expect fluctuations which will dampen out within 1 min

If no joy on next TDRS or comm required sooner:

6. Verify configured for TDRS mode: A1L
   √NSP UPLK DATA – S-BD
   √S-BD PM MODE sel – TDRS
   √NSP DATA RATE (two) – HI
   √NSP CODING (two) – ON
7. S-BD PM CNTL – PNL C3

NOTE
XMIT may be delayed 140 sec for PA warmup.
Receive not affected

8. Sel best ant, F9 meter > 300. If no joy, return to GPC
9. Bypass encrypt (2 min reqd for MCC reconfig): A1L
   NSP ENCRYPTION MODE – SEL
   SEL – BYP

Cont next page
10. Confirm U/L CMD capability:
   Cue MCC with: ITEM 88 +8 8 8 8 8 8
   Check flashing U/L on GNC display
   Ack with: ITEM 99 +9 9 9 9 9 9
   Check abort light cycling ON/OFF (MCC ack)
   Check no flashing U/L
   If U/L CMD confirmed:
   11. Go to MAL, COMM SSR-1, LOSS OF ALL VOICE
       COMM >>
   If no comm and no U/L CMD:
   12. Go to MAL, COMM, 2.3a, NO S-BD COMM: TDRS

UHF COMM LOST (mult pnls)

NOTE
Perform comm checks with MCC after each step

O6
1. √UHF SPLX/EVA PWR AMPL – ON
2. AUD CTR – 2(1)
Reconfig UHF sys:
3. UHF SPLX SQUELCH – OFF
4. UHF SPLX/EVA XMIT FREQ – 296.8/417.1
   Call site stating "on 296.8", wait 30 sec for site reconfig
5. Roll vehicle HEADS UP to point UHF antenna at ground
6. UHF SPLX/EVA PWR AMPL – OFF (LO PWR XMIT)
7. UHF MODE sel – G T/R
   Call site stating "on 243.0", wait 30 sec for site reconfig
DATA PROCESSING SYSTEM
ALL IDPs ASSIGNED TO FAILED GPC

CAUTION
If GPC/CRT key used to assign IDP1(2,3) to BFS, deassign to avoid dual commanders

1. If no active GNC GPC: Go to GNC RECOVERY VIA G2FD >>
2. (Failed) GPC PWR – OFF
3. IDP/CRT1,2,3 MAJ FUNC – PL
4. √(FD) GPC PWR – ON
   MODE – STBY, RUN (tb-RUN)
5. IDP/CRT1,2,3 MAJ FUNC – as desired
   If FD GPC not needed to recover lost major function:
6. (FD) GPC MODE – STBY (tb-bp), HALT
   – STBY (tb-RUN)
   – HALT (tb-bp)

If GNC GPC failed: Go to PASS GNC GPC (1st FAIL) >>
If SM GPC failed: Go to PASS SM GPC FAIL

DUAL DPS DISPLAY COMMANDERS

If aff IDP assigned to BFS via BFC sw:
1. BFC CRT DISP – OFF, then go to step 3
2. BFC CRT DISP – ON
   SEL – aff IDP
If reqd to clean up display:
3. (Aff) IDP/CRT – OFF, ON

BFS ENGAGE

1. RGAs (four) – ON
2. √(BFS) GPC PWR – ON
   MODE – STBY (tb-RUN)
   OUTPUT – B/U
3. (SM) GPC OUTPUT – NORM
4. BFC CRT DISP – ON
5. L(R) FLT CNTLR PWR – ON
6. √Pri RJDs (sixteen) – ON
7. L(R) RHC BFS engage pb – push

NOTE
BFS will take PL buses from SM GPC
8. (BFS) GNC, OPS 301 PRO
9. OI PCMMU FORMAT – FXD
10. If no comm at AOS: sel best S-BD PM ANT
11. Go to MAL, DPS, GPC FRP-4, PASS RECOVERY AFTER BFS ENGAGE (ASCENT/ORBIT/ENTRY)
SUMWORD ICC 1(2,3,4)

If CS = 2, when time permits:
1. Go to MAL, DPS SSR-2, GPC S/W INITIATED MEM DUMP >>

If only one GPC annun:
   Consider annunciating GPC failed:
2. Go to PASS SM(GNC) GPC FAIL >>

If annun against SM GPC (prior to adding the GPC to redundant set):
3. Go to PASS SM GPC FAIL >>

If annun against single GNC GPC:
4. Go to PASS GNC GPC (1st FAIL)
BCE STRG X (no 'MDM OUTPUT' msg)

If IMU:
1. **GNC 21 IMU ALIGN**
   - IMU – desel
2. √OPER/STBY mode
3. If OPER: Go to step 6
   - **NOTE**
     - If > 3 min since ‘IMU’ msg occurred (poss undetect IMU cage), upon IMU recovery, check att ANG prior to 'resel if IMU'
4. If STBY: Go to MAL, **DPS**, 5.3b, BCE STRG X 1 >>

If MTU:
   - If mult ‘STRG MTU’ msgs:
     5. Go to MAL, **DPS**, 5.2d, TIME MTU 11 >>
6. **GNC I/O RESET**
If recovered:
7. Resel if IMU >>
If NSP and msg repeats:
8. If AOS: √MCC
   - If LOS/no comm:
     9. Go to COMM LOST, step 6 (COMM), 2-3 >>
10. **GNC 1 DPS UTILITY**
    - Aff String – port mode
If recovered:
11. Resel if IMU >>
12. Cycle MDM – OFF,ON (FF: may cage IMU)
   - **NOTE**
     - Cycle FF if ‘A’ or ‘B’ msg; cycle FA if ‘C’ or ‘D’
13. **GNC I/O RESET**

Cont next page
If recovered:
   14. Resel if IMU >>
   15. Orig ports – resel
M16. If IMU or GPS: \MCC >>
   17. If any other:
       Go to MAL, \DPS, 5.3b, BCE STRG X [15]

PL1(2) MDM I/O ERROR; PL1(2) MDM OUTPUT

If mult simo 'I/O ERR' or 'MDM OUTPUT' msgs on PL1 and PL2 (GPC prob):
   1. Go to PASS SM GPC FAIL >>
   2. SM I/O RESET; if recovered:
       If PSP reqd:
       3. [SM 62 PCMMU/PL COMM]
          PSP I/O RESET PSP 1(2) – ITEM 6(7) EXEC (*)
   4. If reqd, go to PL/DPS RECONFIG, Recovery [PL SYS (PL OPS)(SODF: ASSY OPS)] >>
   5. If reqd, perform PL/DPS RECONFIG, Secure [PL SYS(PL OPS) (SODF: ASSY OPS)], then:
      If MCC GO for pwr cycle:
      6. (Aff) MDM PL – OFF,ON
      7. SM I/O RESET; if recovered:
         If PSP reqd:
         8. [SM 62 PCMMU/PL COMM]
            PSP I/O RESET PSP 1(2) – ITEM 6(7) EXEC (*)
      9. If reqd, go to PL/DPS RECONFIG, Recovery [PL SYS (PL OPS)(SODF: ASSY OPS)] >>

If msg repeats:
   10. If PL1 msg and no comm: Go to COMM LOST, steps 5,6,7,8 for TDRS mode (COMM), 2-3
   11. If PL2 msg and no comm: Sel best S-BD PM ANT
   12. Go to MAL, \DPS, 5.3c, I/O ERROR/MDM OUTPUT PL 1(2) [1]
FF(FA) MDM OUTPUT

1. GNC I/O RESET
2. If no ‘MDM OUTPUT’: Re-annun >>
   If single ‘MDM OUTPUT’ msg:
   3. [GNC 1 DPS UTILITY]
      Port mode
   4. If no ‘MDM OUTPUT’: Annun >>

   NOTE
   If dual GNC OPS and ‘MDM OUTPUT’ msg(s)
   annun by:
      Redundant set – failed GPC is commanding
      the aff strings
      Single GNC GPC – failed GPC is annun fault
      msg(s)

   If not recovered:
   5. Go to PASS GNC GPC (1st FAIL)
FF(FA) MDM I/O ERROR

1. GNC I/O RESET; if recovered >>
   If simo 'I/O ERR' msgs for mult MDMs (possible GPC prob):
   3. MCC/restring as reqd >>
   If FF: Check ADI (aff String)
      2. If ADI 'OFF' flag (GPC prob): Go to step 16
   4. If ADI 'OFF' flag (GPC prob): Go to step 16
   5. MCC/restring as reqd >>
   If alt msg on aff string (GPC prob):
   6. Go to step 16

If MCC GO for pwr cycle:
   7. If FF:
      17. GNC 21 IMU ALIGN
      Aff IMU – desel
   8. (Aff) MDM – OFF, ON (FF: may cage IMU)
   9. GNC I/O RESET
   10. If recovered: resel IMU if desel >>
   11. Resel orig ports
   12. If recovered: resel IMU if desel >>
   13. If not: Go to MAL, DPS, 5.3a, I/O ERROR FF(FA) [17] >>

If MCC NO-GO for pwr cycle:
   14. If FF:
      15. If FA1 or FA2, then:
      R OMS TK ISOL A – CL (tb-CL) >>
   16. Sel desired FF/FA MDM:
   17. GNC 1 DPS UTILITY
      Port mode as reqd
   18. If FF MDM not chosen:
      19. When time permits restring (with possible F-T-S):
         Go to MAL, DPS, 5.3a, I/O ERROR FF(FA) [1]

OPCL/ALL/GEN M

FF(FA) MDM OUTPUT 3-7 FF(FA) MDM I/O ERROR
PASS GNC GPC (1st FAIL)

NOTE
If Group B(C) LOW LEVEL (MSN EXT) pwrdn config,
MMU 2 – ON

NOTE
No keyboard entries or sw throws 10 sec:
Before and after moding PASS GPCs to RUN
Before OPS transition or set expansion/contraction
requests until new OPS base page is displayed

If no active GNC GPC and G2FD GPC avail:
1. Go to GNC RECOVERY VIA G2FD >>
If no active GNC GPC and no FD GPC avail:
2. Go to BFS ENGAGE >>
If failure is CS split and GPC config is one GNC and one SM:
3. Go to MAL, √PDS, 5.1a, CS SPLIT [T] >>
If Dual G2 and RS split (CS intact) but both GPCs appear functional
(check DPS and ADI displays, MODE tb):
4. Retain GPC with two IMUs
If Triple G2 and RS split but GPCs appear functional
(check DPS and ADI displays, MODE tb):
5. Retain GPC with two strings
6. (Aff) GPC PWR – OFF
If FF1 PWR cycled:
7. [GNC 2T IMU ALIGN]
   IMU 1 (caged) – desel
8. Reassign failed GPC IDPs: GPC/CRT as reqd
9. [GNC 0 GPC MEMORY]
   Check downlist to active GNC GPC:
   DOWNLIST GPC – ITEM 44 +X EXEC
If redundant GNC GPCs reqd and G2FD avail:
10. [G2FD) GPC MODE – HALT
    OUTPUT – NORM
    PWR – ON
    MODE – STBY (tb-RUN),RUN
11. IDP/CRTX MAJ FUNC – PL
12. GPC/CRT – (G2FD) GPC/X EXEC
If GNC OPS 202:
13. GNC, OPS 201 PRO

Cont next page
If RNDZ NAV Ena:
14. DAP: LVLH
15. [GNC UNIV PTG]
   CNCL – ITEM 21 EXEC (no *)
16. √Tgt set, assign FC strings, CRTs, and MMUs in current MC
   (check PL1/2 and L1,2 deassigned)
17. GNC, OPS 201 PRO
If RNDZ NAV reqd:
18. Perform RNDZ NAV RECOVERY (RNDZ, CONTINGENCY
   OPS)
19. [GNC 22 S TRK/COAS CNTL]
   S TRK -Y,-Z: STAR TRK – ITEM 3,4 EXEC (*)
20. [GNC 21 IMU ALIGN]; RESUME
If redundant GNC GPCs not reqd or G2FD not avail:
21. Assign FC strings, CRTs, and MMUs in current MC
   (check PL1/2 and L1,2 deassigned)
22. GNC, OPS XXX PRO
23. When time permits: Go to MAL, DPS, GPC FRP-1, SINGLE GPC
   FAIL

PASS SM GPC FAIL

NOTE
No keyboard entries or sw throws 10 sec:
Before and after moding PASS GPCs to RUN
Before OPS transition or set expansion/contraction
requests until new OPS base page is displayed

NOTE
Ku-Band sys may be reqd to be taken to STBY
to prevent exceeding radiation constraints of the
PL/EVA crewmember

If AOS:
1. √MCC for comm config and radiation constraints
If no comm:
A1U
2. KU BD PWR – STBY
   CNTL – PNL,CMD
3. Perform COMM LOST, steps 6,7,8 for TDRS mode
   (COMM), 2-3
4. √MMU 2 PWR – ON
If failure is CS split and GPC config is one GNC and one SM:
5. Go to MAL, DPS, 5.1a, CS SPLIT [1] >>

Cont next page  OPCL/ALL/GEN M

PASS GNC GPC (1st)  3-9  PASS SM GPC FAIL
6. If reqd, perform PL/DPS RECONFIG, Secure [PL SYS(PL OPS) (SODF: ASSY OPS)], then:

7. (SM) GPC PWR – OFF

8. MDM PL1,2 PWR (two) – OFF, ON

9. **GNC 1 DPS UTILITY**
   - UL CNTL ENA – ITEM 36 EXEC (*)
   - CKPT RETRVR ENA – ITEM 12 EXEC (*)

If G2FD GPC avail:

10. √(G2FD) GPC MODE – HALT
    - PWR – ON
    - MODE – STBY (tb-RUN), RUN

If G2FD GPC not avail and triple G2:

11. Assign two GNC GPCs strings, CRTs, and MMUs in current MC (verify PL1/2 and LB1 deassigned). Do not change target set

12. GNC, OPS XXX PRO

13. (Tgt) GPC MODE – STBY (tb-bp)
    - RUN (tb-RUN)

14. (Tgt) GPC OUTPUT – TERM

15. IDP/CRTX MAJ FUNC – SM

16. GPC/CRT tgt GPC/X EXEC

17. **SM 0 DPS MEMORY**
    - Assign tgt GPC CRTs, MMUs, PL1/2 and L1B in MC 4(5)

18. SM, OPS 201(401) PRO (Tgt GPC IDP)

19. **SM 1 DPS UTILITY**
    - UL CNTL AUTO – ITEM 35 EXEC (*)
    - CKPT RETRVR ENA – ITEM 12 EXEC (*)

20. Perform LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST), then:

If PSP reqd:

21. **SM 62 PCMMU/PL COMM**
    - PSP I/O RESET PSP 1(2) – ITEM 6(7) EXEC (*)

If PLBD OPS:

R13L 22. PL BAY DR SYS (two) – ENA

If RMS PWR – PRI (MCIU pwrd):

23. **SM 94 PDRS CONTROL**
    - (MA, C/W GPC DATA it on)
    - I/O ON – ITEM 5 EXEC (*) (C/W GPC DATA it off)
    - Update as needed:
      - WR range, PL ID, PL INIT ID, EE ID, SPEC 95 overrides

A8U 24. SAFING – CANCEL (tb-bp if arm desel)

25. If reqd, perform PL/DPS RECONFIG, Recovery [PL SYS(PL OPS) (SODF: ASSY OPS)], then:

26. When time permits: Go to MAL, DPS, GPC FRP-1, SINGLE GPC FAIL
PASS GPC BITE 1(2,3,4)

If SM GPC annun BITE:
1. Go to PASS SM GPC FAIL >>
If single G2 and GNC GPC annun BITE:
2. Go to GNC RECOVERY VIA G2FD >>
If RS ≥ 2 and only one GNC GPC annun BITE (hardware):
3. Go to PASS GNC GPC (1st FAIL) >>
If RS ≥ 2 and all GNC GPCs annun BITE (software):
   If cyclic logging of BITE:
      4. Go to GNC RECOVERY VIA G2FD >>
   If FD GPC not avail:
      5. Check MCC for GO to perform BFS ENGAGE >>
If non-cyclic logging of BITE:
6. When time permits: Go to MAL, DPS SSR-2, GPC S/W INITIATED MEM DUMP
GNC RECOVERY VIA G2FD

NOTE
No keyboard entries or sw throws 10 sec:
Before and after moding PASS GPCs to RUN
Before OPS transition or set expansion/contraction
requests until new OPS base page is displayed

If OPS transition failure:
1. Go to MAL, DPS, 5.2a, I/O ERROR MMU 1(2)
or MAL, DPS, 5.2b, OFF/BUSY MMU 1(2), as reqd >>
2. (Failed) (GNC) GPC(s) PWR – OFF
3. Secure SM:
   A1U  KU BD PWR – STBY
   CNTL – PNL, CMD
   C3  Sel best ant, F9 meter > 300
   SM 62 PCMMU/PL COMM
   FORMAT FXD – ITEM 1 EXEC (*)
   Perform PL/DPS RECONFIG, Secure [PL SYS(PL
   OPS) (SODF: ASSY OPS)], time permitting, then:
4. (SM) GPC MODE – STBY (tb-bp) (expect Big X/Poll
   Fails)
5. Activate Freeze Dry GPC:
   G2FD: √GPC MODE – HALT
   OUTPUT – NORM
   √PWR – ON
   MODE – STBY (tb-RUN), RUN
Verify G2FD grabs three FWD IDP/CRTs (reassign
IDP4 as reqd)
6. If G2FD activation fails, go to step 20
7. MC 2 NBAT Setup for Target GPC (Activated G2FD):
   GNC 0 GPC MEMORY
   NOTE
   If currently active IMU was in STBY or IMU
   currently in STBY was active during time of G2
   freeze-dry, do not assign associated string
   Assign all FC strings (except as noted above), CRTs
   1,2,3, and MMUs to just activated target GPC (verify
   PL1/2 and L1,2 deassigned)
8. Config for GNC OPS Transition:
   Pri RJD DRIVER (eight) – OFF
   \RJD MANF L5/F5/R5 DRIVER – ON

Cont next page
NOTE
If G2FD last freeze-dried while RS in G1(G3),
holding DAP: FREE pb during OPS transition
avoids PRCS false jet fail-off msgs (DAP
defaults to A1/AUTO/PRI)
If reqd, DAP: FREE pb – push and hold during OPS
transition
GNC, OPS 201 PRO
√DAP: FREE
9. Configure IMU and restring:
   GNC 21 IMU ALIGN
Desel aff IMU from step 7
Configure aff IMU to STBY(OPER) as reqd to match
   GROUP B PWRDN(PWRUP) (no * until restring)
   GNC 0 GPC MEMORY
Assign remaining FC string to GNC GPC
GNC, OPS 201 PRO
√MCC for resel of aff IMU
10. Re-establish GNC Operational Config:
   Pri RJD DRIVER (eight) – as reqd
   GNC 20 DAP CONFIG
Load desired DAP A,B
   (see FLIGHT PLAN, ORB OPS FS)
   GNC 22 S TRK/COAS CNTL
   S TRK -Y,-Z: STAR TRK – ITEM 3,4 EXEC (*)
   GNC 21 IMU ALIGN
   RESUME
   GNC 23 RCS
   JET RESET – ITEM 45 EXEC
If L(R) OMS/RCS I’CNCT:
   L(R) OMS – ITEM 5(6) EXEC
11. If Orbiter attitude control reqd:
   DAP: INRTL/VERN(ALT)
12. Restart SM:
   (SM) GPC MODE – RUN (tb-RUN), pause 10 sec
   IDP/CRTX: MAJ FUNC – SM
   GPC/CRT – SM GPC/X EXEC (not reqd if
   performing step 21)
   SM 1 DPS UTILITY
   √CKPT RETRV ENA – ITEM 12 EXEC (no *)
   SM, OPS 201 PRO, pause 10 sec
13. **Re-establish SM Operational Config:**

    **NOTE**
    TFLs reloaded to avoid G2FD GPC utilizing stale downlist-rate status when PGM format is resel

**SM 62 PCMMU/PL COMM**
Perform LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)

**SM 1 DPS UTILITY**
CKPT RETR V ENA – ITEM 12 EXEC (*)
UL CNTL ENA – ITEM 36 EXEC

If RMS PWR – PRI (re-establish MCIU I/O):

14. **SM 94 PDRS CONTROL**
    (MA, GPC DATA lt on)
    I/O ON – ITEM 5 EXEC (*) (GPC DATA lt off)
    SAFING – CANCEL (tb-bp if arm desel)

15. If reqd, perform PL/DPS RECONFIG, Recovery [PL SYS(PL OPS) (SODF: ASSY OPS)], then:

16. Wait for Orbiter SV Uplink:

    **NOTE**
    Auto antenna sel and any auto attitude mnvr may be incorrect until a valid Orbiter SV is uplinked

17. **S-BD ANT – GPC**
    KU BD PWR – ON

**SM 1 DPS UTILITY**
UL CNTL AUTO – ITEM 35 EXEC

18. Re-establish Track Attitude, as reqd:

**UNIV PTG**
Load desired att (see FLIGHT PLAN)
Init TRK(MNVR) – ITEM 19(18) EXEC
DAP: AUTO

19. Go to MAL, DPS GPC FRP-1, SINGLE GPC FAIL >>
If G2FD activation fails:

20. (G2FD) GPC PWR – OFF
21. Perform step 12 for temp IDP and SM interface
    If second G2FD exists: \MCC for GO to step 4
    If a G3FD exists: \MCC for proc
    If no FD: \MCC for GO to perform BFS ENGAGE

3-14 OPCL/ALL/GEN M
## EQUIPMENT COOLING MATRIX

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<td><strong>FREE-FLOW</strong></td>
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<td>AV BAY 1</td>
<td>AV BAY 1</td>
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<tr>
<td>GPC 1,4 ①</td>
<td>BFC 1 (ENGAGE)</td>
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<tr>
<td>MLS RF &amp; DECODER 1</td>
<td>CICU</td>
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<tr>
<td>AA 1,4</td>
<td>PCA(FWD) 1</td>
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<tr>
<td>TACAN 1</td>
<td>RJDF 1A,1B</td>
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<tr>
<td>PROXIMITY SW</td>
<td>MCA(FWD) 1</td>
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<tr>
<td>INVERTER DIST &amp; CNTL</td>
<td>P/L RECORDER</td>
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<tr>
<td>BRK CNTL 1</td>
<td>MDM PL1,OF1,</td>
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<tr>
<td>SMOKE DET A,B</td>
<td>PCMMU 1</td>
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<td>CURRENT SNSR</td>
<td>FF1,LF1</td>
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<td>ADTA 1,3</td>
<td>PDI</td>
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<td>AV BAY FAN A,B</td>
<td>DSC OF1</td>
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<td>PWR SUPPLY/BATT CHARGER</td>
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<td><strong>AV BAY 2</strong></td>
<td><strong>AV BAY 2</strong></td>
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<td>GPC 2,5 ①</td>
<td>BFC 2,3 (ENGAGE)</td>
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<td>MLS RF &amp; DECODER 2,3</td>
<td>AA 2,3</td>
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<td><strong>AV BAY 3A</strong></td>
<td><strong>AV BAY 3A</strong></td>
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<td>GPC 3 ①</td>
<td>S-BAND EQUIP:</td>
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<td>AV BAY FAN A,B</td>
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<td>C/W LIMIT</td>
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<td>INVERTER DIST &amp; CNTL</td>
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<td>SMOKE DET A,B</td>
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<td>S-BAND PA 1,2; PRE-AMP 1,2; XPNDR 1,2; FM XMTR 1,2</td>
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<td>KU-BAND SIGNAL PROCESSOR</td>
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<td>NSP 1,2</td>
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1/13/04  
① GPC INSTALLATION REFERS TO CPU/IOP/MEMORY UNIT.  
② IF FLOWN.
### EQUIPMENT COOLING MATRIX (Continued)

<table>
<thead>
<tr>
<th>FORCED COOLING</th>
<th>WATER-COOLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABIN</td>
<td>ECLSS EQUIPMENT BAY</td>
</tr>
</tbody>
</table>

| MDUs (eleven) | MTR/LTS/IND C/W ANNUN C/W ANNUN C/W ANNUN SPKR UNITS ATUs CAMCORDER COLOR PRINTER PGSC VTR CSA CAM TEMP VTR CNTLR A,B WMS HUMIDITY SEP SMOKE DET: L/R FLT DECK CABIN ADC 1A,1B,2A,2B MDM OF4 |
| CAB FAN A,B | WATER PUMP 1A,1B |
| IMU 1,2,3 | MDM OF4 |
| IMU FANS (3) | MCM |
| TV MONITORS | HUD PDU L,R |
| RCU | DDU 1,2,3 |
| VSU | |
| MCIU | |
| IDP 1,2,3,4 | |
| MADS RCDR | |
| MS & PS STATION | |

#### FREON-COOLED

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<td>MDM FA1</td>
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<td>DBIA 2</td>
<td>DSC</td>
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10/13/04

(3) IMU FANS ARE LOCATED IN AVIONICS BAY 1 BUT CIRCULATE CABIN AIR RATHER THAN FLOW FROM AVIONICS BAY 1 THROUGH THE IMUs FOR COOLING.
# EQUIPMENT COOLING MATRIX

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<tr>
<th></th>
<th>AIR-COOLED</th>
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<td>FORCED FREE-FLOW</td>
<td>FORCED FREE-FLOW</td>
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<tr>
<td>AV BAY 1</td>
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<td>AV BAY 1</td>
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<tr>
<td>GPC 1,4, 7</td>
<td>BFC 1 (ENGAGE) CICU</td>
<td>AC INV 1A,1B,1C</td>
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<tr>
<td>MLS RF &amp;</td>
<td>AA 1,4</td>
<td>LCA(FWD) 1 MMU 1</td>
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<tr>
<td>DECODER 1</td>
<td>PROXIMITY SW GPS 1</td>
<td>PCA(FWD) 1 RJDF 1A,1B</td>
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<tr>
<td></td>
<td>INVERTER DIST &amp; CNTL</td>
<td>MCA(FWD) 1 P/L RECORDER</td>
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<tr>
<td></td>
<td>BRK CNTL 1</td>
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<tr>
<td>MIDDECK PL</td>
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<td>MDM PL1,OF1,PCMMU 1</td>
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<td>AV BAY FAN A,B</td>
<td>CURRENT SNSR ADTA 1,3</td>
<td>FF1,LF1 PDI</td>
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<td>DSC OF1 RADAR ALT 1</td>
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<td>AV BAY 2</td>
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<td>GPC 2,5, 7</td>
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<td>AC INV 2A,2B,2C RJDF 2A,2B</td>
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<td>MCA(FWD) 2 COAX SW</td>
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<td>MDM PL2,OF2,OPS RECORDER</td>
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<td>DSC OF2 RADAR ALT 2</td>
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<tr>
<td>GPC 3, 7</td>
<td>S-BAND EQUIP: FM MLTPLXR QUAD ANT SW ASSEMBLY</td>
<td>AC INV 3A,3B,3C EBIA (BYPASS SWITCH)</td>
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<tr>
<td>AV BAY FAN A,B</td>
<td>FM SIG PRCSR SW BEAM ANT CNTRL ASSY</td>
<td>LCA(FWD) 3 COMSEC 1,2,3</td>
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<td>GPS 3</td>
<td>PCA(FWD) 3 UHF EVA XCVR</td>
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<td>INVERTER DIST &amp; CNTL</td>
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<td>S-BAND PA 1,2; PRE-AMP 1,2; XPNDR 1,2; FM XMTR 1,2</td>
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<td>AV BAY 3B</td>
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<td>HUD ELECT 1,2</td>
<td>GPS 2</td>
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</table>

07/10/07

1 GPC INSTALLATION REFERS TO CPU/IOP/MEMORY UNIT.
2 IF FLOWN.
## Equipment Cooling Matrix (Continued)

<table>
<thead>
<tr>
<th>CABIN</th>
<th>WATER-COOLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDUs (eleven)</td>
<td>WATER PUMP 1A,1B</td>
</tr>
<tr>
<td>CAB FAN A,B</td>
<td>FLIGHT DECK</td>
</tr>
<tr>
<td>IMU 1,2,3</td>
<td>MDM OF4</td>
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<tr>
<td>IMU FANS (3)</td>
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</tr>
<tr>
<td>TV MONITORS</td>
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<tr>
<td>RCU</td>
<td></td>
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<tr>
<td>VSU</td>
<td></td>
</tr>
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<td>MCIU</td>
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<tr>
<td>IDP 1,2,3,4</td>
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</tr>
<tr>
<td>MADS RCDR</td>
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<tr>
<td>MS &amp; PS STATION</td>
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### Freon-Cooled

<table>
<thead>
<tr>
<th>BAY 4</th>
<th>BAY 5</th>
<th>BAY 6</th>
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<tbody>
<tr>
<td>LCA-1</td>
<td>LCA-2</td>
<td>LCA-3</td>
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<tr>
<td>PCA-1,4</td>
<td>PCA-2,5</td>
<td>PCA-3,6</td>
</tr>
<tr>
<td>MCA-1</td>
<td>MCA-2</td>
<td>MCA-3</td>
</tr>
<tr>
<td>MDM FA1</td>
<td>MDM FA2</td>
<td>MDM FA3,4</td>
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<tr>
<td>OA1</td>
<td>OA2</td>
<td>OA3</td>
</tr>
<tr>
<td>APU CNTLR 1</td>
<td>APU CNTLR 2</td>
<td>APU CNTLR 3</td>
</tr>
<tr>
<td>ATVC ELECT 1</td>
<td>ATVC ELECT 2</td>
<td>ATVC ELECT 3,4</td>
</tr>
<tr>
<td>EIU 1</td>
<td>EIU 2</td>
<td>EIU 3</td>
</tr>
<tr>
<td>MPS ULL P SC1</td>
<td>MPS ULL P SC2</td>
<td>MPS ULL P SC3</td>
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<td>ASA 3,4</td>
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<td>RGA 1</td>
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<td>RGA 3,4</td>
</tr>
<tr>
<td>RJDA 1</td>
<td>RJDA 2</td>
<td>RJD2</td>
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<tr>
<td>MEC 1</td>
<td>MEC 2</td>
<td>MPS DP SC</td>
</tr>
<tr>
<td>DSC OA1</td>
<td>DSC OA2</td>
<td>DSC OA3</td>
</tr>
<tr>
<td>DBIA 1</td>
<td>DBIA 2</td>
<td>DBIA 3</td>
</tr>
</tbody>
</table>

10/13/04

**3 IMU fans are located in avionics bay 1 but circulate cabin air rather than flow from avionics bay 1 through the IMUs for cooling.**

**OV105**

B4-2  
OPCL/ALL/GEN M
O2(N2) FLOW HIGH/CAB P LOW/dP/dT

**WARNING**

If -dP/dT is 0.55 psi/min (OSH), loss of vehicle atmosphere imminent

When PPO2 < 2.2, emergency breathing apparatus reqd (dP/dT x 0.2 ~ PPO2 decay rate)

If, after alarm, O2(N2) flow > 1.0 lb/hr:
Assume flow rate exceeds 5.0 lb/hr (OSH)

If docked to ISS and hatches open:
1. Perform JOINT EMERGENCY EGRESS (SODF: JOINT OPS, Cue Card) to isolate ISS, then:
2. If dP/dT EQ positive or zero (ISS leak), \(\sqrt{MCC}=\) 

**MO10W**

3. 14.7 CAB REG INLET SYS 1,SYS 2 vlv (two) – CL

If orbiter dP/dT EQ positive or zero:
4. Go to MAL, ECLS, 6.2a, O2(N2) FLOW ↑

**NOTE**

If orbiter dP/dT EQ positive or zero after any leak isolation step, \(\sqrt{MCC}=\)

**LEAK ISOLATION**

**L2**

5. CAB RELIEF A – CL (tb-CL),pause,
B – CL (tb-CL)
6. \(\sqrt{VENT}\) ISOL – ctr (tb-bp)
\(\sqrt{VENT}\) – ctr (tb-bp)

**ML31C**

7. \(\sqrt{VAC}\) VENT ISOL VLV BUS SEL – MNA
CNTL – CL (tb-CL)

**Side Hatch**

8. NEG PRESS RLF vlv cover (two) – push firmly

**WCS**

9. Remove urinal hose from hose block
10. Check center hole (between hose block filters) in hose block for airflow

If airflow detected (EMU drain induced cabin leak):
11. Using Gray Tape, block center hole in hose block (EMU drain)
12. Go to MAL, ECLS, 6.2b, CABIN PRES ↑↓

**Ext A/L**

13. Reinstall urinal hose
14. NEG PRESS RLF vlv cover (two) – push firmly

Cont next page
If SH HATCH open:
15. Perform SH CABIN LEAK ISOLATION (Cue Card)

Middeck flr 16. Disconnect airlock flex duct from cab floor, stow
MO13Q 17. AIRLK FAN A(B) – OFF
Inner Hatch 18. Close INNER HATCH:
 Position handle to preclosing posn per decal
 Hatch – rotate about hinge and push
 Handle – CCW to LATCH
 Lock lever to LOCKED
 Remove INNER HATCH Equal vlv cap (two)
 Equal vlv (two) – OFF

Middeck flr 19. Install diffuser cap on cab floor outlet (when time permits)

If dP/dT EQ positive or zero (A/L leak; possible loss of
EVA capability and loss of access to ISS/SH):

L2 20. CAB RELIEF (two) – ENA (tb-ENA)
 If 14.7 psi ops:
 MO10W 21. O2/N2 CNTLR VLV SYS 1(2) – AUTO
 ML31C 22. 14.7 CAB REG INLET SYS 1(SYS 2) vlv – OP
 \O2 REG INLET SYS 1(SYS 2) vlv – OP
 23. VAC VENT ISOL VLV CNTL – OP (tb-OP)
 24. \MCC for SH deactivation steps >>

CAUTION
ODS avionics require 8 psia or greater for cooling. \MCC regarding possible repress of ODS prior to ISS undocking

If dP/dT EQ still negative:
 UNISOLATABLE ORBITER LEAK:
 PREPARE FOR DEORBIT

Utilize SH(A/L) Atmosphere

CAUTION
Perform steps 25-28 before determining type of deorbit, to avoid volume-based nomograph errors

Inner Hatch 25. INNER HATCH Equal vlv (two) – EMER
 (vlvs remain in EMER for duration of flt)
If Spacehab:

26. Open INNER HATCH per decal

27. SH HATCH Equal vl (two) – EMER

28. Close INNER HATCH:
   - Position handle to preclosing posn per decal
   - Hatch – rotate about hinge and push
   - Handle – CCW to LATCH
   - Lock lever to LOCKED

Deactivate Spacehab:

[SM 214 SHAB ACT/DEACT]

29. FANS ARS OFF – ITEM 61 EXEC (*)

30. Perform SPACEHAB EMERGENCY DEACT, steps 1-8,10 (Cue Card)

Determine Type of Deorbit

Determine latest poss TIG, Tmax, and avail landing sites using PGSC (preferred) or NOMOGRAPHS, 4-8

If docked to ISS and TIG > 1 hr 30 min and Orbiter Only Tmax does not support PLS, perform UTILIZE ISS ATMOSPHERE, (SODF: JOINT OPS, EMERGENCY RESPONSE) concurrently with remaining steps below

If TIG < 2 hr 40 min and not Orb 2,3 deorbit:

31. CM1,CM2 If docked to ISS, perform JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS, EMERGENCY RESPONSE).
   - If utilizing ISS atmosphere, delay vestibule depress until CDR GO (ISS Press $\approx 9.5$ psia)

32. CM1,CM2 Perform EMERGENCY DEORBIT PREP/ENTRY (CONT DEORB, EMERGENCY)

   CM3 Continue with Cabin Pressure Maintenance

If TIG > 2 hr 40 min or Orb 2,3 deorbit:

33. CM1,CM2 Perform LOSS OF CAB PRESS (PWRDN)

   CM3 Continue with Cabin Pressure Maintenance

\textbackslash MCC for ISS undocking

Cont next page
Cabin Pressure Maintenance

If \(-\frac{dP}{dT}\) EQ > 0.35 (0.18 if SH):

C5 34. DIRECT O2 vlv – OP
C6,MO32M, MO69M 35. Don LES, open LEH O2 vlvs, check tabs, visor – cl, LES O2 – ON
L2 36. O2/N2 CNTLR VLV SYS 1,2 (two) – OP (N2)
R1 37. O2 MANF VLV TK1,TK2 (two) – OP (tb-OP)
     TK1,TK2,TK3 HTRS A (three) – AUTO

If any O2 QTY > 60%:
     38. (Aff) O2 TK HTR B – AUTO
MO10W 39. O2 REG INLET SYS 1 vlv – CL
     2 vlv – CL >>

Flow Max O2

R1 40. O2 MANF VLV TK1,TK2 (two) – OP (tb-OP)
     TK1,TK2,TK3 HTRS A (three) – AUTO

If any O2 QTY > 60%:
     41. (Aff) O2 TK HTR B – AUTO
C5 42. DIRECT O2 vlv – OP
L2 43. O2/N2 CNTLR VLV SYS 1 – CL (O2)
     2 – OP (N2)
     O2 XOVR SYS 1 – CL
     \(\sqrt{2}\) – OP
MO10W 44. 14.7 CAB REG INLET SYS 1 vlv – OP
     2 vlv – CL
     O2 REG INLET SYS 1 vlv – OP
     2 vlv – CL

WARNING

Maintain O2 concentration < 29% (CABIN PRESS > 10.3)
or PPO2 < 3.0 (CABIN PRESS ≤ 10.3)

When PPO2 < 2.2, emergency breathing apparatus reqd

Manage O2 Levels

MO10W,C5 Using O2 REG INLET SYS 1 vlv and DIRECT O2 vlv:
When CABIN PRESS > 10.3:
     45. Maintain PPO2 > 2.2 and O2 conc < 29%
When CABIN PRESS ≤ 10.3:
     46. Maintain PPO2 between 2.2 and 3.0

When PPO2 < 2.2:

C6,MO32M, MO69M 47. Don LES, open LEH O2 vlvs, check tabs, visor – cl, LES O2 – ON
MO10W 48. O2 REG INLET SYS 1 vlv – CL
C5 49. DIRECT O2 vlv – CL
L2 50. O2 XOVR SYS 1 – OP

Cont next page
8 PSI CABIN MAINTENANCE (Flow N2)

When CABIN PRESS reaches 8:

51. Continue O2 mgmt per step 46
52. Verify time to N2 depletion, perform N2 DEPLETION GRAPH, 4-10, then:

If CABIN PRESS does not remain ≥ 7.8 psi (max N2 flow reqd):

MO10W 53. 14.7 CAB REG INLET SYS 1 vlv – CL L2 54. O2/N2 CNTLR VLV SYS 1,2 (two) – OP (N2)
MO10W 55. O2 XOV  SYS 1,2 (two) – OP  REG INLET SYS 1,SYS 2 vlv (two) – CL

56. Reconfig C/W parameters:

<table>
<thead>
<tr>
<th>PARAMETER NAME</th>
<th>C/W CH</th>
<th>H/W C/W LO V(LO EU)</th>
<th>ENA/INH</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAB P</td>
<td>4</td>
<td>1.90(7.56)</td>
<td>INH</td>
</tr>
<tr>
<td>O2 FLOW 1</td>
<td>14</td>
<td>2.20(2.20)</td>
<td>INH</td>
</tr>
<tr>
<td>O2 FLOW 2</td>
<td>24</td>
<td>2.20(2.20)</td>
<td>INH</td>
</tr>
<tr>
<td>PPO2 A</td>
<td>34</td>
<td>2.20(2.20)</td>
<td>INH</td>
</tr>
<tr>
<td>PPO2 B</td>
<td>44</td>
<td>2.20(2.20)</td>
<td>INH</td>
</tr>
<tr>
<td>N2 FLOW 1</td>
<td>54</td>
<td>1.90(7.56)</td>
<td>INH</td>
</tr>
<tr>
<td>N2 FLOW 2</td>
<td>64</td>
<td>2.20(2.20)</td>
<td>INH</td>
</tr>
</tbody>
</table>

57. Once PPO2 < 3.00, reconfig C/W parameters:

<table>
<thead>
<tr>
<th>PARAMETER NAME</th>
<th>C/W CH</th>
<th>H/W C/W HI V(HI EU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAB P</td>
<td>34</td>
<td>3.00(3.00)</td>
</tr>
<tr>
<td>PPO2 A</td>
<td>44</td>
<td>3.00(3.00)</td>
</tr>
<tr>
<td>PPO2 B</td>
<td>44</td>
<td>3.00(3.00)</td>
</tr>
</tbody>
</table>

>>

Cont next page
8 PSI CABIN MAINTENANCE (Flow N2)

When CABIN PRESS reaches 8:
   51. Continue O2 mgmt per step 46
   52. Verify time to N2 depletion, perform N2 DEPLETION GRAPH, 4-10, then:
      If CABIN PRESS does not remain ≥ 7.8 psi (max N2 flow reqd):
      MO10W 53. 14.7 CAB REG INLET SYS 1 vlv – CL
      L2 54. O2/N2 CNTLR VLV SYS 1,2 (two) – OP (N2)
      O2 XOVR SYS 1,2 (two) – OP
      MO10W 55. REG INLET SYS 1,SYS 2 vlv (two) – CL

   56. Reconfig C/W parameters:

<table>
<thead>
<tr>
<th>PARAMETER NAME</th>
<th>C/W</th>
<th>CH</th>
<th>H/W C/W LO V(LO EU)</th>
<th>ENA/INH</th>
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<tbody>
<tr>
<td>CAB P</td>
<td>4</td>
<td>14</td>
<td>1.90(7.56)</td>
<td>INH</td>
</tr>
<tr>
<td>O2 FLOW 1</td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>24</td>
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<td>INH</td>
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<tr>
<td>PPO2 A</td>
<td>34</td>
<td>44</td>
<td>2.20(2.20)</td>
<td>INH</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N2 FLOW 1</td>
<td>54</td>
<td>64</td>
<td>2.20(2.20)</td>
<td>INH</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
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<td></td>
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</table>

   57. Once PPO2 < 3.00, reconfig C/W parameters:

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<thead>
<tr>
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<th>CH</th>
<th>H/W C/W HI V(HI EU)</th>
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</thead>
<tbody>
<tr>
<td>CAB PPO2 A</td>
<td>34</td>
<td>34</td>
<td>3.00(3.00)</td>
</tr>
<tr>
<td>B</td>
<td>44</td>
<td>44</td>
<td>3.00(3.00)</td>
</tr>
</tbody>
</table>
Tmax Computation

SM 66 ENVIRONMENT

Log:
\[ \frac{dP}{dT} \text{ Eq} \quad \text{N2 Qty 1} \]  
\[ \text{CAB P} \quad \text{N2 Qty 2} \]  
\[ \text{MET} \]

Determine latest poss TIG, Tmax, and avail landing sites using PGSC (preferred/applicable NOMOGRAPH).

If docked to ISS, determine latest poss TIG and Tmax utilizing ISS atmosphere using PGSC, or if PGSC unavail, use Tmax DETERMINATION for UTILIZE ISS ATMOSPHERE (SODF: JOINT OPS, EMERGENCY RESPONSE) in conjunction with NOMOGRAPH (on facing page) to determine Tmax

Orbiter Only  Utilizing ISS Atmosphere (if reqd)

Time at 9.5 psi (from SODF: JOINT OPS, UTILIZE ISS ATMOSPHERE, EMERGENCY RESPONSE)  N/A  _____ hrs

Time to 8 psi (facing page)  _____ hrs (from current cab press)  _____ hrs (from 9.5 psi)

Time at 8 psi (facing page)  + _____ hrs  + _____ hrs

(N2 Depletion)

Total Avail Time  = _____ hrs  = _____ hrs

Current MET  + ____/____:___  + ____/____:___

Latest TD MET  = ____/____:___  = ____/____:___

Time, TIG to TD  - 0/01:00  - 0/01:05

Latest TIG, Tmax (MET)  = ____/____:___  = ____/____:___

Landing Site/TIG  ______________/_____________

NOMOGRAPH Basis:
O2 Flow: on/off at 50 lb/hr after 10 min, with PPO2 > 2.2 psi, % O2 < 29
Orbiter Volume = 2703 ft³
Orbiter + SHM = 5255 ft³

CAUTION
If determining Tmax utilizing ISS atmosphere and ISS hatches OPEN, \text{MCC} for proper \( \frac{dP}{dT} \) (Hatch OP \( \frac{dP}{dT} \) Eq = (Orbiter Volume/Total Stack Volume) x Hatch CL \( \frac{dP}{dT} \) Eq)

03/18/05

4-9  OPCL/ALL/GEN M
N2 DEPLETION GRAPH

MET __/____:____ at 8 psia

1. When cabin pressure reaches 8 psia, record MET above, plot total N2 Qty (Sys 1+2) from Spec 66 and start timer.

2. Draw point on graph where selected TD time and appropriate residual line intersect.

3. Draw a line connecting the initial N2 Qty with point defined in step 2.

4. Plot N2 Qty points at various time intervals to verify that N2 will support planned TD time. Note that dispersions in use rate over short time periods are expected.

5. If actual N2 use rate is greater than prediction line, select earlier TD time.
H2O TK QTY LOW AND DECR

SM 66 ENVIRONMENT

L1 1. If PLBD open: FLASH EVAP CNTLR PRI A,B – OFF
MO10W 2. H2O TK N2 ISOL vlv (two) – CL

NOTE
Audible vent and ‘S66 WASTE H2O PRES’ alert
for WASTE H2O PRESS ↓ when performing step 3

ML26C 3. SPLY H2O GN2 TK VENT vlv – VENT
√TKA SPLY vlv – OP
When WASTE H2O PRESS ~0 psig (1-2 min):
4. √MCC

EVAP OUT T HIGH

SM 88 APU/ENVIRON THERM
SM SYS SUMM 2

If temp high in only one loop (snsr failed) >>
If PLBD open and RADS in use:
L1 1. Go to MAL, ECLS, 6.4a, EVAP OUT T ↑↓ [1] >>
If PLBD closed or if PLBD open in RAD BYP:
L1 2. FLASH EVAP CNTLR PRI A(B) – OFF
√B(A) – ON (wait 30 sec)
3. If EVAP OUT T decr: (PRI A(B) CNTL lost) >>
If EVAP OUT T not decr:
L1 4. FLASH EVAP CNTLR PRI B(A) – OFF
SEC – ON (Hi Load Evap ena)
5. Minimize ltg (wait 30 sec)

Cont next page

OV103,104

OPCL/ALL/GEN M

N2 DEPLETION
EMER PLBD OPENING (4-13) A4-11

H2O TK QTY LOW
EVAP OUT T HIGH
If EVAP OUT T decr:
  If in deorb prep:
  O7  6. $\sqrt{\text{TACAN MODE (three) – OFF}}$
  O8  7. $\sqrt{\text{RDR ALTM (two) – OFF}}$
  O8  8. $\sqrt{\text{MLS (three) – OFF}}$
  L1  9. $\sqrt{\text{TOP EVAP HTR NOZ (two) – OFF}}$
      DUCT sel – OFF >>
  If not in deorb prep >>
If EVAP OUT T not decr (Sec Hi Load failed):
  L1  10. HI LOAD EVAP – OFF (Topping Evap ena)
  C3  11. MSTR MADS PWR – OFF (wait 30 sec)
  If EVAP OUT T decr:
  12. Go to LOSS OF HI LOAD EVAP ($\text{PWRDN}$), 10-33 >>
If EVAP OUT T not decr (all FES lost):
  CDR establish RAD flow:
  13. Perform steps 16 thru 19
      If PLBD closed, MS open doors ASAP:
  MS  14. Perform EMER PLBD OPENING, then:
      If in deorb prep:
      15. Go to LOSS OF FES ($\text{PWRDN}$), 10-69 >>
      If not in deorb prep >>
Establish RAD flow:
  CDR L1 16. RAD BYP VLV MODE (two) – AUTO
      CNTLR LOOP (two) – AUTO A(B)
  17. FLASH EVAP CNTLR SEC – OFF
      Wait 90 sec
  18. $\sqrt{\text{RAD BYP VLV tb (two) – RAD}}$
      $\sqrt{\text{CNTLR OUT TEMP – NORM}}$
  19. HI LOAD DUCT HTR sel – OFF
      TOP EVAP HTR NOZ (two) – OFF
      DUCT sel – OFF

OV103,104

A4-12 OPCL/3,4/GEN M
H2O TK QTY LOW AND DECR

SM 66 ENVIRONMENT

L1 1. If PLBD open: FLASH EVAP CNTLR PRI A,B – OFF
MO10W 2. H2O TK N2 ISOL vlv (two) – CL

NOTE
Audible vent and ‘S66 WASTE H2O PRES’ alert for WASTE H2O PRESS ↓ when performing step 3

ML26C 3. SPLY H2O GN2 TK VENT vlv – VENT
√TKA SPLY vlv – OP
When WASTE H2O PRESS ~0 psig (1-2 min):
4. √MCC

EVAP OUT T HIGH

SM 88 APU/ENVIRON THERM
SM SYS SUMM 2

If temp high in only one loop (snsr failed) >>
If PLBD open and RADS in use:
   1. Go to MAL, ECLS, 6.4a, EVAP OUT T ↑↓ [1] >>
If PLBD closed or if PLBD open in RAD BYP:
   L1 2. FLASH EVAP CNTLR PRI A(B) – OFF
       B(A) – ON (wait 30 sec)
   3. If EVAP OUT T decr: (PRI A(B) CNTL lost) >>
If EVAP OUT T not decr:
   L1 4. FLASH EVAP CNTLR PRI B(A) – OFF
       SEC – ON (Hi Load Evap ena)
   5. Minimize ltg (wait 30 sec)

Cont next page

OV105
OPCL/ALL/GEN M

N2 DEPLETION
EMER PLBD OPENING (4-13) B4-11

H2O TK QTY LOW
EVAP OUT T HIGH
If EVAP OUT T decr:
  If in deorb prep:
    O8  6. √RDR ALTM (two) – OFF
    7. √MLS (three) – OFF
    L1  8. TOP EVAP HTR NOZ (two) – OFF
        DUCT sel – OFF >>
  If not in deorb prep >>
If EVAP OUT T not decr (Sec Hi Load failed):
L1  9. HI LOAD EVAP – OFF (Topping Evap ena)
C3  10. MSTR MADS PWR – OFF (wait 30 sec)
If EVAP OUT T decr:
  11. Go to LOSS OF HI LOAD EVAP (PWRDN), 10-33 >>
If EVAP OUT T not decr (all FES lost):
  CDR establish RAD flow:
    CDR 12. Perform steps 15 thru 18
    If PLBD closed, MS open doors ASAP:
  MS  13. Perform EMER PLBD OPENING, then:
    If in deorb prep:
      14. Go to LOSS OF FES (PWRDN), 10-69 >>
    If not in deorb prep >>
  Establish RAD flow:
    CDR L1 15. RAD BYP VLVL MODE (two) – AUTO
                 CNTLR LOOP (two) – AUTO A(B)
    16. FLASH EVAP CNTLR SEC – OFF
        Wait 90 sec
    17. √RAD BYP VLVL tb (two) – RAD
        √CNTLR OUT TEMP – NORM
    18. HI LOAD DUCT HTR sel – OFF
        TOP EVAP HTR NOZ (two) – OFF
        DUCT sel – OFF
EMER PLBD OPENING

R13L 1. PL BAY DR SYS (two) – ENA

CRTX [X: BFS, SM 63 PL BAY DOORS]

2. AC POWER ON – ITEM 1 EXEC (*)
   AUTO MODE SEL – ITEM 3 EXEC (*)
   PBD SW BYPASS – ITEM 14 EXEC (*)
   OPEN – ITEM 15 EXEC (*)

3. CENTER LATCHES 5-8,9-12 (two) – blank, OP (~20 sec)
   1-4,13-16 (two) – blank, OP (~20 sec)
   PORT FWD,AFT LATCHES (two) – blank, OP (~30 sec)
   STBD FWD,AFT LATCHES (two) – blank, OP (~30 sec)
   DOOR – RDY, blank, OP (~63 sec)

4. STOP – ITEM 16 EXEC (*)
   PBD SW BYPASS – ITEM 14 EXEC (no *)
   AC POWER OFF – ITEM 2 EXEC (*)

R13L 5. PL BAY DR SYS (two) – DSBL
1. If temp low in only one loop (snr failed) >>
   L1 2. FREON PUMP LOOP 1,2 (two) – OFF
   3. H2O PUMP LOOP 1,2 (two) – ON
   4. FLOW PROP VLV LOOP 1,2 (two) – PL HX (tb-PL)
   5. RAD CNTLR OUT TEMP – HI
   6. FLASH EVAP CNTLR PRI A,B,SEC (three) – OFF
   L2 7. O2 SYS 1,2 SPLY (two) – CL (tb-CL)

If FREON LOOP RAD OUT T LOW:
   L1 8. (Unaff) FREON PUMP – B
   10. Go to FREON LOOP RAD OUT T LOW, step 9 >>

If FREON LOOP 1(2) leaking (Accum Qty dect ≥ 1.5%/min):
   L1 11. FREON PUMP LOOP 1,2 (two) – B
   If after 60 sec EVAP OUT T = 'L':
      12. RAD BYP VLV MODE 1,2 (two) – MAN
          13. MAN SEL 1,2 (two) – BYP
              (tb-BYP 3 sec)
   14. Go to MAL, ECLS, 6.4a, EVAP OUT T ↑↓ 47 >>

If FREON LOOP 1(2) not leaking:
   If no comm:
      15. FREON PUMP LOOP 1,2 (two) – B
          NH3 CNTLR A,B (two) – SEC/ON
      If after 60 sec EVAP OUT T = 'L':
         16. RAD BYP VLV MODE 1,2 (two) – MAN
         17. MAN SEL 1,2 (two) – BYP
             (tb-BYP 3 sec)
      18. Go to MAL, ECLS, 6.4a, EVAP OUT T ↑↓ 46
If the FC H2O PRI LN T and associated FC H2O VLV T are converging or within 5 degF of each other for multiple FCs:

R11L
If SUPPLY H2O TKB INLET and XOVR VLV closed (tb-CL or bp):

ML86B:A
1. cb MNB SPLY H2O TKB INLET – cl
2. MNC SPLY H2O XOVR VLV – cl

R11L
3. SPLY H2O TKA OUTLET – CL (tb-CL)
4. TKB INLET – OP (tb-OP)
5. XOVR VLV – OP (tb-OP)

ML31C
6. √SPLY H2O TKA,TKB,TKC INLET (three) – OP (tb-OP)
7. √XOVR VLV – OP (tb-OP)

CRT
If SUPPLY H2O PRESS decr or < 40: >>
If SUPPLY H2O PRESS not decr or ≥ 40:

L1
9. FLASH EVAP CNTLR PRI A,B,SEC (three) – OFF

O1
When EVAP OUT T ~50:

L1
11. FLASH EVAP CNTLR PRI B – ON
12. Go to MAL, ECLS, 6.5d, H2O SPLY PRESS ↑

Else:

13. Go to MAL, ECLS, 6.5d, H2O SPLY PRESS ↑ [3]
FREON FLOW LOW

SM 88 APU/ENVIRON THERM

SM SYS SUMM 2

1. Switch pumps in aff loop(s)
   If flow still low in only one loop:
   2. Go to MAL, ECLS, 6.4b, FREON FLOW LOW >>
      If flow still low in both loops:
      L1 3. FLOW PROP VLV LOOP 1,2 (two) – ICH (tb-ICH)
      If not in OPS 2:
      Prepare to deorb:
      4. FREON PUMP LOOP 1,2 (two) – OFF
      L2 5. √O2 SYS 1,2 SPLY (two) – OP (tb-OP)
      C3 6. MSTR MADS PWR – OFF
      R11U 7. FC PURGE HTR – ON
      VLVS (three) – OP
      8. Go to LOSS OF 2 FREON LOOPS (PWRDN), 10-49 >>
      If in OPS 2:
      If AFT cp FLOW in both loops < 200 lb/hr:
      Prepare to deorb:
      L1 9. If AFT cp FLOW < 100 lb/hr:
      FREON PUMP LOOP 1,2 (two) – OFF
      L2 10. √O2 SYS 1,2 SPLY (two) – OP (tb-OP)
      C3 11. MSTR MADS PWR – OFF
      R11U 12. FC PURGE HTR – ON
      VLVS (three) – OP
      13. Go to LOSS OF 2 FREON LOOPS (PWRDN), 10-49 >>
      If AFT cp FLOW in either loop > 200 lb/hr:
      14. Go to MAL, ECLS, 6.4b, FREON FLOW LOW
1. If EVAP OUT T not decr after 60 sec (snsr failed) >>
2. (Aff) FREON PUMP – OFF
3. H2O PUMP LOOP 1,2 (two) – ON
4. If no PL H2O Loop present:
   4. FLOW PROP VLV LOOP 1,2 (two) – PL HX (tb-PL)
5. If PL H2O Loop present:
   5. FLOW PROP VLV LOOP 1,2 (two) – ICH (tb-ICH)
6. Activate PL H2O Loop
7. (Aff) O2 SYS SPLY – CL
8. FLASH EVAP CNTLR PRI A,B,SEC (three) – OFF
9. (Aff) RAD BYP VLV MODE – MAN
10. CNTLR LOOP – AUTO B
After 10 sec:
11. (Aff) RAD BYP VLV MODE – AUTO
12. (Aff) FREON PUMP LOOP – B
13. √(Aff) RAD BYP VLV tb – RAD
If RAD OUT T LOW continues:
14. (Aff) FREON PUMP LOOP – OFF
15. √MCC (mult failures) >>
If FES reqd:
16. Perform TOPPING FES STARTUP (ORB OPS, ECLS), then:
17. (Aff) O2 SYS SPLY – OP

FREON LEAK

CRT  If FREON LOOP ACCUM QTY decr, then immediately:
1. FREON ISOL MODE – MAN
2. (Aff) FREON ISOL LOOP – ISOL (hold for 5 sec)
3. Go to MAL, ECLS, 6.4f, ACCUM QTY ↓ [11]

OPCL/ALL/GEN M,3

FREON FLOW LOW 4-17

FREON LOOP RAD FREON LEAK
LEAKING/EMPTY HALON BOTTLE

If docked to ISS and hatches open:
1. Perform JOINT EMERGENCY EGRESS (SODF: JOINT OPS, Cue Card) to isolate ISS, then:

If FIRE SUPPR AV BAY 1(2,3) pb lt on:
2. Go to POST-FIRE CABIN CLEANUP, steps 16-24 only for Av Bay 1(2,3) >>

If Portable Halon Bottle leaking:
3. Position Halon bottle up to Av Bay 3 fire port.
   Secure body position as reqd

   NOTE
   Halon discharge will be propulsive

4. Discharge portable FIRE EXTGHR into Av Bay 3 fire port. Full discharge will require 90 sec.
   Report actual discharge duration to MCC
5. Stow empty bottle (Wet Trash)
6. Go to POST-FIRE CABIN CLEANUP, steps 16-24 only for Av Bay 3 >>
ODS POST-FIRE ACTIONS

Continue from ODS VOLUME FIRE/SMOKE (Cue Card), on MCC call

CONFIG A

CONFIG B

Cont next page

ODS POST-FIRE ACTIONS
CM1

1. Don QDM with 14-ft extension O2/Comm line
   All other crewmembers: Don QDMs

   **NOTE**
   CM2 can perform cab air monitoring per
   MAL, ECLS FRP-2, POST-FIRE CABIN
   CLEANUP CONTINUATION at any time

C6, MO32M, MO69M

2. LEH O2 vlv (eight) – OP

C7

3. LEH O2 SPLY 1,2 vlv (two) – OP

MO10W

4. 14.7 CAB REG INLET SYS 1(SYS 2) vlv – CL

Inner Hatch

5. Untether Equal vlv cap (one) from INNER HATCH
   vlv, for use in step 6
   Open HATCH per decal

   **NOTE**
   Exit airlock volume IMMED after step 6
   complete. Expect cab dP/dT msg

ON CLOSEST HATCH EXPOSED TO VACUUM,

Hatch

6. Equal vlv cap (one) – vent, remove
   Equal vlv (one) – NORM, then IMMED
   INNER HATCH Equal vlv cap (one) – install
   onto HATCH Equal vlv

Inner Hatch

7. Close HATCH:
   Position handle to preclosing posn per decal
   Hatch – rotate about hinge and push
   Handle – CCW to LATCH
   Lock lever to LOCKED

CRT

8. **SM 177 EXTERNAL AIRLOCK**

   **NOTE**
   Expect ‘S177 EXT A/L PRES’ msg

When EXT AIRLOCK P ≅ 0, on MCC GO,

Inner Hatch

   Equal vlv (two) – EMER

   **NOTE**
   Expect poss ‘S66 CABIN PRES’,
   PPO2 A(B) msgs and KLAXON

Cont next page
CM1  9. When ∆P across INNER HATCH < 0.5 psi, 
Open HATCH per decal, then IMMEDIATELY
ON CLOSEST HATCH EXPOSED TO VACUUM,

Hatch  10. Equal vlv cap (two) – remove
        Equal vlv (two) – OFF
        Equal vlv cap (two) – reinstall orig
        vlv caps

Inner Hatch  11. Retether, reinstall orig Equal vlv cap (one)

CM2  12. Perform cab air monitoring per MAL, ECLS FRP-2, 
POST-FIRE CABIN CLEANUP CONTINUATION if 
not already done. Do not perform cab cleanup 
unless CPA readings out of limits. On MCC call, 
doff QDMs

13. On MCC call, ARLK Fan and ODS avionics may be 
repwrd, PCS reconfigured, and PL ISOL vlv – OP  
(cap removed)
POST-FIRE CABIN CLEANUP (Cab and Av Bay Fires)

Continue from FIRE/SMOKE Cue Card:

**NOTE**
This proc is to be performed simo by two crewmembers

**CM1**

1. √ CAB FAN A(B) – ON
2. Unstow CSA-CP
3. MODE pb – press, hold until ‘RELEASE’ displayed; wait ~1 min for nominal display
4. Sampling Pump sw – ON
5. Monitor cab atmosphere in vicinity of fire and report results to MCC

If HCN > 1.8, HCL > 2.0, or CO > 18 ppm:

6. If HCL < 5 ppm, install ATCO and one fresh LiOH canister
7. If HCL > 5 ppm, install two fresh LiOH canisters
8. CAB TEMP CNTLR – OFF
9. √ Pin Cab temp cntl act link – FULL COOL
10. √ cb MNA,MNB WCS CNTLR (two) – cl
11. √ AC1,2 WCS FAN SEP 1,2 (six) – cl

**CM2**

If Av Bay fire, set up for Av Bay purge:

If docked with ISS:

16. √MCC for attitude control handover
17. Obtain from Cont Hose & Cable Kit (Window Shade Bag):
   Free Fluid Nozzle
   20-ft Y/Y Hose
   Gray Tape
18. Connect Free Fluid Nozzle to Y/Y Hose
19. Insert tip of Free Fluid Nozzle into fire port of Av Bay
20. Secure nozzle and hose with Gray Tape

Cont next page
If attitude control handover reqd:

21. √ Handover complete prior to initiating purge in following step

WCS

22. Mate free end of Y/Y Hose to Vacuum Vent QD

23. √ VAC VLV – OP

ML86B:A

24. √ cb MNA(MNB) H2O LINE HTR A(B) – cl

ML86B:B

25. √ MNA,MNB VAC VENT ISOL VLV (two) – cl

26. √ MNB VAC VENT NOZ HTR – cl

ML31C

25. √ VAC VENT ISOL VLV BUS SEL – MNA

26. √ NOZ HTR – ON

ISS C&W TOX ATM

Report to MCC: “Av Bay purge is initiated”

SM 211 ISS C&W

If docked to ISS and hatches open:

1. Perform JOINT EMERGENCY EGRESS (SODF: JOINT OPS, Cue Card) to isolate ISS, then:

   If ISS AMMONIA LEAK:

2. Go to MAL, ECLS FRP-5, CABIN AMMONIA CONTAMINATION CLEANUP (ISS AMMONIA LEAK) >>

MCC for further actions
ELECTRICAL POWER SYSTEM
If MN VOLTS < 26.4, FC VOLTS < 26.6, FC AMPS > 480 (2 of 3)

(short or degraded FC):

1. MSTR MADS PWR – OFF
   If aff FC/MN BUS tied:
   2. Untie buses
      If short eliminated and MN bus not pwrd after untie:
      3. Go to aff MN BUS LOSS ACTION (MN bus or tie bus short) >>
      If short eliminated and all MN buses pwrd after untie (tie bus short) >>
      If short not eliminated, then:

If aff FC/MN BUS connected to PL PRI BUS:

4. PL PRI (three) – OFF (tb-OFF)
   If short eliminated (pri PL short):
   If a MN bus not pwrd:
   5. Perform BUS TIE (Cue Card), then:
   6. Go to PL PWRDN >>

If aff MN BUS connected to PTU:

7. PTU/MN BUS – OFF (tb-OFF) (pnl A15)
   OPCU CONV – OFF
   If short eliminated (short on PTU/MN Bus connection):
   If a MN bus not pwrd:
   8. Perform BUS TIE (Cue Card) >>
   Otherwise:
   9. >>

10. (Aff) ESS BUS SOURCE FC – OFF
    FC/MN BUS – OFF (tb-OFF)

If aff FC VOLTS < 32 (FC short):

11. (Aff) FC REAC VLV – CL (tb-CL)
12. Go to FC SHUTDN (Cue Card) (do not stop FC until COOL P < 15 and STACK T < 243) >>

If FC VOLTS ≥ 32 (bus short):

CAUTION
Do not bus tie to shorted bus

13. Go to aff MN BUS LOSS ACTION >>
If MN VOLTS < 26.4 and FC VOLTS > 32 and FC AMPS < 20
(FC disconnect, check APUs):
14. MSTR MADS PWR – OFF
If PL PRI BUS pwr lost due to FC disconnect:
15. PL PRI (three) – OFF (tb-OFF)
16. (Aff) FC/MN BUS – ON (tb-ON)
If PL PRI disconnected in step 15:
17. Perform PL PWRDN, then:
If FC3 aff:
18. PL PRI FC3 – ON (tb-ON)
   MNC – ON (tb-ON)
If first FC prob:
19. Perform BUS TIE (Cue Card), then:
   If aff FC VOLTS still > 32:
   20. Go to FC SHUTDN (Cue Card) >>
   21. (Aff) AC BUS SNSR – OFF, AUTO TRIP
   22. GNC I/O RESET >>
If second FC failure and aff MN BUS not recovered:
23. PL PRI (three) – OFF (tb-OFF)
   If aff MN BUS connected to PTU:
   24. PTU/MN BUS – OFF (tb-OFF) (pnl A15)
       OPCU CONV – OFF
   25. Go to 2nd FC SHUTDN >>
If neither:
26. Go to MAL, EPS, 7.3b, FUEL CELL VOLTS ↑↓, FUEL CELL
   AMPS ↑↓, MAIN BUS V A(B,C) ↑↓

**OPCL/ALL/GEN M,2**

**MN BUS UNDERVOLTS/FC VOLTS**

3Φ AC MTR STOPPED (5-4) 5-3 **AC VOLTS (5-5)**
3φ AC MOTORS STOPPED
(No AC VOLTS Alarm: ⌀ Shift)

WARNING
If no FC Coolant Pump within 9 min, go to aff
AC BUS (2 or 3 φs) BUS LOSS ACTION

1. Determine aff AC BUS:
   FC1 and FREON PUMP 2B: AC1
   FC2 and FREON PUMP 1B: AC2
   FC3 and CAB FAN A: AC3

2. (Aff) FC – STOP
   If AC3 aff:
   3. AV BAY 3 FAN B – OFF
       A – ON
       CAB FAN A – OFF
   Isolate aff φB(φC,φA):
   4. (Aff) cb AC CONTR – cl
       INV/AC BUS – OFF (tb-OFF)
       If AC1(2,3) aff and AV BAY FAN 3(2,3) ΔP ≥ 0.5:
       5. Go to step 12 (bad φ isolated)
   6. (Aff) INV/AC BUS – ON (tb-ON)
       cb AC CONTR – op
   7. Repeat from step 4 for φC(φA), then:
Drop aff AC bus (three Φs):
8. (Aff) cb AC CONTR (three) – cl
9. INV/AC BUS – OFF (tb-OFF)
10. INV PWR – OFF (tb-OFF)
11. Go to aff AC BUS (2 or 3 Φs) BUS LOSS ACTION >>

Bad Φ isolated:
12. (Aff) INV PWR – OFF (tb-OFF)
   cb AC CONTR – op
   FC – START (10 sec or ΔP tb-gray)
13. If AC3 aff: CAB FAN B – ON
14. Go to aff MAL, EPS SSR BUS LOSS ACTION

AC VOLTS
1. If AC OVERLOAD F7 light or ‘S67 AC OVLD’ msg: Go to AC OVERLOAD >>
   If single Φ AC VOLTS > 123 or between 10 and 110 (confirm with F9 meter):
2. (Aff) cb AC CONTR – cl
   INV/AC BUS – OFF (tb-OFF)
   INV PWR – OFF (tb-OFF)
   cb AC CONTR – op
   If other Φ AC VOLTS < 110 or AC AMPS > 14:
3. Go to step 6
   If other Φ AC AMPS > 10:
4. Isolate shorted Φ: Open all aff AC1(2,3) three-Φ ganged
   cbs and all aff AC1(2,3) ΦA(B,C) single-Φ cbs as follows:
total number of cbs to open

<table>
<thead>
<tr>
<th>BUS</th>
<th>L4</th>
<th>MA73C</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC1 3Φ</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>ΦA</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>ΦB</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>ΦC</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>AC2 3Φ</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>ΦA</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>ΦB</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>ΦC</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>AC3 3Φ</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>ΦA</td>
<td>15</td>
<td>3</td>
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<tr>
<td>ΦB</td>
<td>16</td>
<td>3</td>
</tr>
<tr>
<td>ΦC</td>
<td>13</td>
<td>3</td>
</tr>
</tbody>
</table>

5. Go to aff MAL, EPS SSR BUS LOSS ACTION >>
If multi Φ AC VOLTS < 110:
  If any AC AMPS > 14 (unannun OVLD):
    6. (Aff) cb AC CONTR (three) – cl
       INV/AC BUS – OFF (tb-OFF)
       INV PWR – OFF (tb-OFF)
       cb AC CONTR (three) – op
    7. Go to aff BUS LOSS ACTION >>
If all AC AMPS < 1 (FPC bus lost):
   8. Go to aff BUS LOSS ACTION >>
If all AC VOLTS between 110 and 123:
   9. Go to MAL, EPS, 7.5a, AC VOLTS 1(2,3) ↓↑ [6]
AC OVERLOAD

SM 67 ELECTRIC
SM SYS SUMM 1

If any AC VOLTS < 110 or AC AMPS > 14 (OVLD):

If single Φ:

1. (Aff) cb AC CONTR – cl
   INV/AC BUS – OFF (tb-OFF)
   INV PWR – OFF (tb-OFF)
   cb AC CONTR – op

If other Φ AC VOLTS < 110 or AC AMPS > 14:

2. Go to step 5
3. Isolate shorted Φ: Open all aff AC1(2,3) three-Φ ganged
   cbs and all aff AC1(2,3) ΦA(B,C) single-Φ cbs as follows:

   total number of cbs to \( \sqrt{ } \) open

<table>
<thead>
<tr>
<th>BUS</th>
<th>L4</th>
<th>MA73C</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC1 3Φ</td>
<td>1</td>
<td>5</td>
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<tr>
<td>ΦA</td>
<td>16</td>
<td>5</td>
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<tr>
<td>ΦB</td>
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<tr>
<td>ΦC</td>
<td>13</td>
<td>5</td>
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<tr>
<td>AC2 3Φ</td>
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<tr>
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<td>16</td>
<td>4</td>
</tr>
<tr>
<td>ΦC</td>
<td>14</td>
<td>5</td>
</tr>
</tbody>
</table>

Cont next page
4. Go to aff MAL, EPS SSR BUS LOSS ACTION >>
If multi Φ (bus short):

5. (Aff) cb AC CONTR (three) – cl
   INV/AC BUS – OFF (tb-OFF)
   INV PWR – OFF (tb-OFF)
   cb AC CONTR (three) – op

6. Go to aff BUS LOSS ACTION >>
If all AC VOLTS between 110 and 123 and AC AMPS < 14:

7. Go to MAL, EPS, 7.5b, AC OVLD 1(2,3) ↓ 6

**ESS BUS VOLTS LOW**
If verified by F9 voltmeter:

<table>
<thead>
<tr>
<th></th>
<th>1BC</th>
<th>2CA</th>
<th>3AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>If aff cb op</td>
<td>MNA CONTR (pln O15:B)</td>
<td>MNB CONTR (pln O16:B)</td>
<td>MNC CONTR (pln O14:B)</td>
</tr>
<tr>
<td>1. (Aff) cb – op</td>
<td>MNA CONTR (pln O13:A)</td>
<td>MNB CONTR (pln O13:C)</td>
<td>MNC CONTR (pln O13:E)</td>
</tr>
<tr>
<td>2. (Aff) cb – cl</td>
<td>MNA CONTR (pln O15:B)</td>
<td>MNB CONTR (pln O16:B)</td>
<td>MNC CONTR (pln O14:B)</td>
</tr>
</tbody>
</table>

3. Perform FC SHUTDN (Cue Card) [FC/MN BUS A(B,C), and MN BUS TIE A(B,C) tbs lost], then:

4. Go to aff BUS LOSS ACTION (ESS)
**WARNING**
If VISIBLE FIRE/SMOKE AT ANY TIME, cb CNTL BUS AB1/2/3(BC1/2/3,CA1/2/3) – op (pnl R14:B)

**NOTE**
CNTL BUS PWR sws must be held continuously in the RESET posn to unpwr bus(es)

1. Identify BUS (\BUS LOSS ID)
2. If one CNTL BUS RPC tripped (*):

**Aff CNTL BUS:**

### AB1(2,3)

<table>
<thead>
<tr>
<th>Tripped RPC (*)</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>A R1 CNTL BUS PWR MNB – RESET</td>
<td>R1:14:B cb CNTL BUS AB1/2/3 – op</td>
</tr>
<tr>
<td>B R1 CNTL BUS PWR MNA – RESET</td>
<td>R1:14:B cb CNTL BUS AB1/2/3 – op</td>
</tr>
</tbody>
</table>

### BC1(2,3)

<table>
<thead>
<tr>
<th>Tripped RPC (*)</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>B R1 CNTL BUS PWR MNC – RESET</td>
<td>R1:14:B cb CNTL BUS BC1/2/3 – op</td>
</tr>
<tr>
<td>C R1 CNTL BUS PWR MNB – RESET</td>
<td>R1:14:B cb CNTL BUS BC1/2/3 – op</td>
</tr>
</tbody>
</table>

Cont next page

5-9 OPCL/ALL/GEN M
CA1(2,3)

<table>
<thead>
<tr>
<th>Tripped RPC (*)</th>
<th>Action (for RESET, hold w/sw reten device)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C</strong></td>
<td>R1 CNTL BUS PWR MNA – RESET</td>
</tr>
<tr>
<td>R14:B</td>
<td>cb CNTL BUS CA1/2/3 – op</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>R1 CNTL BUS PWR MNC – RESET</td>
</tr>
<tr>
<td>R14:B</td>
<td>cb CNTL BUS CA1/2/3 – op</td>
</tr>
</tbody>
</table>

If no CNTL BUS RPC tripped (no *):

<table>
<thead>
<tr>
<th>aff CNTL BUS</th>
<th>Panel R1 action (hold w/sw reten device)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AB1(2,3)</strong></td>
<td>CNTL BUS PWR MNA,MNB (two) – RESET</td>
</tr>
<tr>
<td><strong>BC1(2,3)</strong></td>
<td>CNTL BUS PWR MNB,MNC (two) – RESET</td>
</tr>
<tr>
<td><strong>CA1(2,3)</strong></td>
<td>CNTL BUS PWR MNA,MNC (two) – RESET</td>
</tr>
</tbody>
</table>

If CNTL BC2 unpwrd:

12. S-BD PM CNTL – PNL, CMD

If CNTL BC1 and BC2 unpwrd, comm will be UHF only

For all CNTL V < 25.0:

13. Perform BUS LOSS ACTION (CNTL), then, on MCC call only, perform MAL, EPS SSR-100 thru SSR-108, then:

14. Perform CONTROL BUS PWRDN (IFM, PROCEDURES A THRU F) for shorted bus, then:

15. If reqd, back out of BUS LOSS ACTION for regained buses, then:

16. Perform MAL, EPS SSR-100 thru SSR-108 for shorted bus, then:

If pwr reqd (<3 sec) for crit function:

17. Hold crit function sw

For tripped RPC:

18. CNTL BUS PWR MNA(MNB,MNC) – RESET (1 sec), then dn
FC COOLANT PUMP $\Delta P$ LOW

If other 3Φ AC motors aff and AC VOLTS OK:
1. Go to 3Φ AC MOTORS STOPPED >>

O14 2. $\sqrt{(Aff)}$ FC CNTLR – ON
(O15,O16) FC – START (10 sec or $\Delta P$ tb-gray)
   If FC EXIT T $> 164$ and not decr, or
   H2 PUMP $< 0.3$ or $> 0.8$, or
   RDY tb – bp (30 sec after START) or
L4:C (aff) FC PUMPS cb(s) – op:
   3. Go to FC SHUTDN (Cue Card) >>
   If FC H2 PUMP status norm, FC EXIT T norm, and RDY
tb – gray:
       N/A (snsr failed)

FC1(2,3) H2 PUMP ↑↓

If other 3Φ AC motors aff and AC VOLTS OK:
1. Go to 3Φ AC MOTORS STOPPED >>
If FC COOL PUMP $\Delta P$ tb – bp:
2. Go to FC COOLANT PUMP $\Delta P$ LOW >>
If FC H2 PUMP between 0.8 and 2.0 or between 3.0 and 4.6:
   3. Perform BUS TIE (Cue Card), then:
   4. Go to MAL, EPS, 7.1c, H2 PUMP ↑↓ [1] >>
If FC H2 PUMP $< 0.2$ or between 2.0 and 3.0 or $> 4.6$:
   5. Note AC1(2,3) φA,B,C AMPS
   6. Perform FC SHUTDN (Cue Card), then:
   7. Go to MAL, EPS, 7.1c, H2 PUMP ↑↓ [7]

OPCL/ALL/GN M
FC REACTANT VLV CLOSED

SM 69 FUEL CELLS
SM SYS SUMM 1

R1 1. FC REAC VLV (three) – OP (tb-OP or hold 1 sec max)
   2. Perform BUS TIE (Cue Card), then:
      If no joy on REAC open:
      C3 3. √cb FC REAC VLV CL ENA (three) – op
R1 4. FC REAC VLV (three) – OP (tb-OP or hold 10 sec)
      If aff FC COOL P decr or < 50 within 7 min:
         5. Go to aff FC SHUTDN (Cue Card) >>
      If aff COOL P > 50 and steady after 7 min:
         6. Aff buses – untie if reqd

FC COOL P

SM 69 FUEL CELLS
SM 66 ENVIRONMENT

1. Perform BUS TIE (Cue Card), then:
   If COOL P > 75, incr, and not 100 (H),
      or FC COOL PUMP = ΔP (intermittent),
      or STACK/EXIT T unstable,
      or FC FLOW O2(H2) > 8.4(1.1):
         2. Go to FC SAFING >>
   If FC COOL P < 25 or > 75 and steady:
      3. Go to MAL, EPS, 7.3e, FUEL CELL COOL P ↑↓ [8] >>
   If FC COOL P between 25 and 50:
      4. Perform FC SHUTDN (Cue Card), then:
         5. Go to MAL, EPS, 7.3e, FUEL CELL COOL P ↑↓ [45] >>
         6. Go to MAL, EPS, 7.3e, FUEL CELL COOL P ↑↓ [30]
FC H2O RLF NOZ TEMP ↑↓

If H2O RLF NOZ T A and B < 150:
  If more than one FC H2O LN T and H2O VLV T converging or within 5 degF of each other (mult FCs relieving):
    If H2O SUPPLY PRESS ≥ 40:
      1. Go to H2O SPLY PRESS HIGH (ECLS), 4-15 >>
    If H2O SUPPLY PRESS < 40:
      2. Initiate preparations for next PLS entry >>
  If one FC H2O LN T and H2O VLV T converging or within 5 degF of each other (single FC relieving):
    3. Go to BUS TIE (Cue Card) >>
  If no FC H2O LN T and H2O VLV T converging (HTR inop, NOZ frozen, or sw failure):
    4. FC H2O RELIEF HTR – A AUTO(B AUTO) >>
If H2O RLF NOZ T A and B (both) > 425 (HTR fail on):
  5. \MCC

OPCL/ALL/GEN M

FC REAC VLV CLOSED
FC COOL P

5-13

FC H2O RLF NOZ T ↑↓
FC DELTA V 1(2,3)  

1. Perform BUS TIE (Cue Card), then:
   If aff FC(H2O LINE) pH ↓ or FC ∆V incr:
   2. Perform FC SAFING, then:
      3. If pH ↓: Go to MAL, EPS, 7.3a, FC/H2O LINE pH HIGH [6] >>
   If no aff FC(H2O LINE) pH ↓ and FC ∆V not incr:
   4. Two min after bus tie, record FC ∆AMPS between aff and tied FC; monitor for 20 min
      If change in FC ∆AMPS > 12 or FC ∆V incr:
      5. Go to FC SAFING >>
      If change in FC ∆AMPS ≤ 12, FC ∆V not incr, and no MCC:
      6. SM 60 SM TABLE MAINT
         Reset limits for (aff) FC ∆AMPS 1(2,3):
         ITEM 1 +0 9 2 2 1 4 2(0922143,0922144) EXEC
         ITEM 2 ±(FC ∆AMPS – 40) EXEC
         ITEM 3 ±(FC ∆AMPS + 40) EXEC

FC pH HIGH or H2O LINE pH HIGH  

If FC1(2,3) pH ↓:
   1. Perform BUS TIE (Cue Card), then:
   If aff FC ∆V SS 1(2,3) ≥ 150 and incr:
   2. Perform FC SAFING, then:
      3. Go to MAL, EPS, 7.3a, FC/H2O LINE pH HIGH [6] >>
   4. SPLY H2O TKA INLET,OUTLET (two) – CL (tb-CL)
      \ TKB INLET – CL [[tb-CL(bp]]
      \ TKC OUTLET – CL (tb-CL)
      \ TKD INLET – CL (tb-CL)
   5. Go to MAL, EPS, 7.3a, FC/H2O LINE pH HIGH [1]
FC SHUTDN (1st)

**WARNING**
If FC Coolant Pump lost, Emergency FC use OK for 9 min

1. MSTR MADS PWR – OFF
2. If not tied: Perform BUS TIE (Cue Card), then:
   If ORB (not deorb prep), kW > 18:
   MN BUS TIE (three) – ON
3. ESS BUS SOURCE FC – OFF
   FC/MN BUS – OFF (tb-OFF)
   FC – STOP (COOL PUMP ΔP tb-bp or 1 sec) (expect FDA msgs)
4. FC REAC VLV – CL (tb-CL)
   Go to LOSS OF 1 FC (PWRDN), 10-39

2nd FC SHUTDN

**WARNING**
If FC Coolant Pump lost, Emergency FC use OK for 6 min

1. MSTR MADS PWR – OFF
2. If aff FC pwrs one MN bus: Go to step 5
3. MN BUS TIE (three) – OFF (tb-OFF)
4. Perform BUS TIE (Cue Card) to good FC/BUS, then:
5. ESS BUS SOURCE FC – OFF
6. FC/MN BUS – OFF (tb-OFF)
7. FC – STOP (COOL PUMP ΔP tb-bp or 1 sec)
8. FC REAC VLV – CL (tb-CL)
9. Go to LOSS OF 2nd FC (PWRDN), 10-41

OPCL/ALL/GEN M

FC DELTA V 1(2,3) FC(SHUTDN 1st)
FC(H2O LINE) pH HIGH 5-15

FC SHUTDN (1st)

2nd FC SHUTDN
BUS TIE (do not tie bus short, check APUs)
If MN Volts > 20: Bus Tie >>
If MN Volts < 20 (do not BUS TIE Pre MECO for 1st FC):
1. (Aff) AC BUS SNSR – OFF
2. cb AC CONTR (three) – cl
3. (Aff) INV/AC BUS – OFF (tb-OFF)
4. (Aff) INV PWR – OFF (tb-OFF)
5. If MNC(B) dn: CAB FAN A(B) – OFF
6. Bus Tie
7. (Aff) INV PWR – ON (tb-ON)
♦
8. (Aff) INV/AC BUS – ON (tb-ON)
9. cb AC CONTR (three) – op
10. GNC I/O RESET
Post MECO:
11. (Aff) AC BUS SNSR – AUTO TRIP
12. If pwrdn not reqd: √CAB FAN A(B) – ON

SM SYS SUMM 1
FC SAFING
If FC already SHUTDN:
1. √FC1(2,3) REAC – CL (O2,H2 tb-CL)
2. FC1(2,3) – START (10 sec or ΔP tb-gray)
3. FC/MN BUS A(B,C) – ON (tb-ON)
   When FC1(2,3) COOL P decr to < 15 or FC1(2,3) AMPS ≤ 0:
   4. FC/MN BUS A(B,C) – OFF (tb-OFF)
   When FC1(2,3) COOL P < 15, then:
   5. FC1(2,3) – STOP (ΔP tb-bp or 1 sec) >>
If FC not SHUTDN:
6. MSTR MADS PWR – OFF
   If not already tied:
   7. Perform BUS TIE (Cue Card), then:
   8. MN BUS TIE (three) – ON (tb-ON)
   9. FC1(2,3) REAC – CL (O2,H2 tb-CL)
   If either FC REAC tb still OP:
   C3
   10. cb FC1(2,3) REAC VLV CL ENA – cl
   11. FC REAC VLV 1(2,3) – CL
   If no joy:
   R1
   12. Install sw reten device FC REAC sw
   When FC1(2,3) COOL P decr to < 15 or FC1(2,3) AMPS < 0:
   13. ESS BUS SOURCE FC1(2,3) – OFF
   14. FC/MN BUS A(B,C) – OFF (tb-OFF)
   When FC1(2,3) COOL P < 15, then:
   L
   15. FC1(2,3) – STOP (ΔP tb-bp or 1 sec)
Go to LOSS OF 1 FC(2nd FC)(PWRDN), 10-39/10-41/10-45
CRYO O2(H2) PRESS/TEMP HIGH

1. (Aff) O2(H2) TK HTRS (two) – OFF
2. O2(H2) MANF VLV TK1,TK2 (two) – OP (tb-OP)
3. If PRESS ↑, go to MAL, EPS, 7.6b, CRYO O2(H2) PRES, TK P ↓↑ 7 >>
4. If O2 T ↑, go to MAL, EPS, 7.6l, O2 HTR T 1 >>
5. If H2 T ↑, go to MAL, EPS, 7.6f, H2 HTR T 1

CRYO O2(H2) LEAK

If only one TK aff and P/TK P disagree:
1. Go to MAL, EPS, 7.6b, CRYO O2(H2) PRES, TK P ↓↑ 7 >>
2. Reconfig TK HTRS A,B – ON (not AUTO) in TK(s) with P < 740(190)
If all TK Ps in a common manf or the only TK P in an isolated manf < 740(190) and still decr:
3. O2(H2) MANF VLV TK1,TK2 (two) – CL
   If either MANF VLV fails to close:
   4. Hold sw in CLOSE posn (install sw reten device if reqd), then:
   5. Reconfig TK HTRS A,B – AUTO in TK(s) with incr P
6. Perform aff MN BUS TIE (Cue Card), then:
   If O2(H2) TK 1(2) aff (open unaff manf):
   7. O2(H2) MANF VLV TK2(1) – OP
   If O2 TK 1(2) aff:
   8. O2 SYS 1(2) SPLY – CL
   If O2 TK 1(2) P now incr (PCS leak):
   9. O2 TK1(2) HTRS A,B (two) – AUTO
      MANF VLV TK1,TK2 (two) – OP >>
10. Perform aff FC SHUTDN (Cue Card), then:
    If aff TK P incr (FC leak):
    11. O2(H2) MANF VLV TK1,TK2 (two) – OP (ASAP if FC3)
    12. (Aff) TK HTRS A,B (two) – AUTO >>

Cont next page
If aff TK P not incr within 2 min (MANF or TK leak):
13. (Aff) TK HTRS A,B (two) – OFF
If TK 1(2) aff and TK P/MANF P diverging (TK leak):
14. O2(H2) MANF VLV TK1,TK2 (two) – OP
15. Go to MAL, EPS SSR-6, FC RESTART >>
If TK 3(4,5) aff or if TK P/MANF P tracking (MANF leak) >>
If any TK P and connected MANF P diverging or Δ > 50:
16. O2(H2) MANF VLV TK1,TK2 (two) – OP
17. (Aff) TK HTRS A,B (two) – OFF (TK leak or blockage)
18. (Other) TK HTRS – AUTO >>
If neither of the above and all TK Ps now steady or incr (small leak or HTR fail):

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not allow P to exceed 920(260)</td>
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19. √MCC
### O2/H2 HTR Loss

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<th>BUS LOSS</th>
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</table>

*IF TK IS PAIRED WITH A FAILED TK(S), AUTO CAPABILITY IN THIS TK IS LOST. AUTO CAPABILITY IN THIS TK CAN BE REGAINED BY TAKING FAILED TK(S) HTR SWITCHES OUT OF AUTO. TK1 PAIRED WITH TK2, AND TK3 PAIRED WITH TK4.*

A/M = AUTO AND MANUAL CAPABILITY LOST

03/27/03
### MAIN DC BUS LOSS ID TABLE

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>MAIN A</th>
<th>MAIN B</th>
<th>MAIN C</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTAGE (AC X Lost)</td>
<td><em>FPC1</em></td>
<td><em>FPC2</em></td>
<td><em>FPC3</em></td>
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<tr>
<td>APU TEMP (~2 min if APU ON &amp; BLR/CNTLR A sel)</td>
<td><em>MPC1</em></td>
<td><em>MPC2</em></td>
<td><em>MPC3</em></td>
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<tr>
<td>(~2 min if APU ON &amp; BLR/CNTLR B sel)</td>
<td><em>APC4</em></td>
<td><em>APC5</em></td>
<td><em>APC6</em></td>
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<td>FREON LOOP (if cooling by FES X only)</td>
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<td>HZO LOOP (if Pump X Active)</td>
<td><em>FPC2</em></td>
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<td>OMS TVC (During OMS PRI GMBL)</td>
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<td><em>LPC</em></td>
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<td>OMS TVC (During OMS SEC GMBL)</td>
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<td>DC AMPS XY = 0 (X: Fwd,Mid,Aft) (Y: A,B,C)</td>
<td>FA</td>
<td>MA</td>
<td>AA</td>
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<td>CNTL BUS RPC X  = 'A' (X: A,B,C)</td>
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For MNA(B,C) FPC 1(2,3) many other indications are present, most of which are associated with the resultant AC1(2,3) loads. Only the additional indications that positively identify the FPC bus loss are listed.

**DATE 07/29/05**
### MAIN DC BUS LOSS ID TABLE

<table>
<thead>
<tr>
<th>INDICATION</th>
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<th>MAIN B</th>
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<td>MIDDECK FLOODS X: 1,2,3,4,5,6,7,8</td>
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<td>ATU PS,MS,MD,AL</td>
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<td>TIMERS X MISSION TIMER (X: Fwd,Aft)</td>
<td>F</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X EVENT TIMER (X: Fwd,Aft)</td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>FWD MDUs</td>
<td>MFD2 MFD1</td>
<td>CDR2 CDR1</td>
</tr>
<tr>
<td></td>
<td>AFT MDU</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>L1 CAB RELIEF X tb – bp</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>ATM N2 SYS X SPLY, REG INLET tb – bp</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>O1 CAB dp/dt 0.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAB PRESS 0 psia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PPO2 SNSR X 0 psia</td>
<td>A</td>
<td>BC</td>
</tr>
<tr>
<td></td>
<td>RCS/OMS PRPLT QTY Disp Blanks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>O3 SPLY H2O TK X INLET tb – bp</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>SPLY H2O TK X OUTLET tb – bp</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>SPLY H2O DUMP ISOL, B SPLY ISOL VLV tb – bp</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SPLY H2O DUMP, XOVR, GALLEY SPLY VLV tb – bp</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A8U RMS EE (6), SAFING, S/W STOP tb – bp, BRAKES tb – OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ML31C WASTE H2O TK X VLV tb – bp</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>WASTE H2O DUMP ISOL VLV tb – bp</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SPLY H2O TK D X tb – bp (X: INLET,OUTLET)</td>
<td>O</td>
<td>I</td>
</tr>
</tbody>
</table>

**DATE 12/09/03**
## ESS DC BUS LOSS ID TABLE

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>ESS1BC</th>
<th>ESS2CA</th>
<th>ESS3AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS</td>
<td>MP &amp; C</td>
<td>MP &amp; C</td>
<td>MP &amp; C</td>
</tr>
<tr>
<td>MA, but no F7 C/W Lts</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>O2 PRESS</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>H2 PRESS</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>FC REAC</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>FC PUMP</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>PRIMARY C/W (Cannot be Reset)</td>
<td></td>
<td></td>
<td>•</td>
</tr>
<tr>
<td>BACKUP C/W (Cannot be Reset)</td>
<td></td>
<td></td>
<td>•</td>
</tr>
<tr>
<td>F9 METER</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>All Voice via AUDIO CTR 1</td>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>O2, H2 TK X QTY = 0% (X: 1,2,3,4)</td>
<td>24</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>R1 F/C/MN BUS X tb – OFF</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>PL PRI MNC tb – OFF</td>
<td></td>
<td></td>
<td>•</td>
</tr>
<tr>
<td>INV PWR X tb – OFF (Inv OK)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>INV/AC BUS X tb – OFF (Bus OK)</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>O2, H2 MANF VLV TK X tb – CL</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>FC X REAC tb – CL</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>FC X RDY tb – bp</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>FC X COOL PUMP ∆P tb – bp</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>A12 F/C3 STRUCT RTN tb – OFF</td>
<td></td>
<td></td>
<td>•</td>
</tr>
</tbody>
</table>

*Date: 05/23/00*
CNTL AB1
MDU CRT 1 Blanks
C/W – FREON LOOP if FES active (Pri B GPC)

CNTL AB2
L HUD lost
C/W – FREON LOOP if FES active (Pri B ON)

CNTL AB3
(O8) – FWD RCS TK ISOL 3/4/5 (tb-bp)
MANF ISOL 1 (tb-bp)
(L1) – FLOW PROP VLV LOOP 1 (tb-bp)

CNTL BC1
(L1) – RAD BYP VLV MAN SEL 2 (tb-bp)
S-BD SYS 1 Comm
PL SYS 1
R HUD lost

CNTL BC2
MDU CRT 2 Blanks
C/W – H2O LOOP (if Pump 1B ON)
S-BD SYS 2 Comm
PL SYS 2

CNTL BC3
(O8) – FWD RCS MANF ISOL 2 (tb-bp)
C/W – H2O LOOP (if Pump 1B ON)

NOTE
If CNTL Bus Loss suspected, check SM1 DC V CNTL for confirming cue
**BUS LOSS ACTION**

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>PWRUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS</td>
<td>LOW LEVEL (Group B)</td>
</tr>
<tr>
<td>BUS LOSS</td>
<td>MSN EXT (Group C)</td>
</tr>
</tbody>
</table>

| EPS BUS LOSS   | N/A                    | ALL FF&FA MDMs |

**BUS LOSS ID** (5-21)  5-25  **BUS LOSS ACTION**
AC1 (2 or 3Φs)

1. Perform FC1 SHUTDN (Cue Card), then:
   L1
   2. IMU FAN A – OFF
      B(C) – ON
      AV BAY 1 FAN A – OFF
      B – ON
      3 FAN A – ON
      B – OFF
      FREON PUMP LOOP 1 – B
      2 – A
   If MNA FPC1 bus lost, return to MNA FPC1 BUS
   LOSS ACTION >>
   3. Go to MAL, EPS SSR-110, BUS LOSS: AC1
MNA DA1 (Entire Bus) (Includes AC1)

NOTE
Loss of UHF SPLX Hi Pwr Xmit

1. Perform FC1 SHUTDN (Cue Card), then:
   R1 2. PL CAB – MNB
   L1 3. IMU FAN B(C) – ON
       AV BAY 1 FAN B – ON
       3 FAN A – ON
       FREON PUMP LOOP 1 – B
       2 – A
       TOP EVAP HTR DUCT sel – B
If HI LOAD EVAP ENA:
   4. HI LOAD DUCT HTR sel – B
   O6 5. ANNUN BUS SEL ACA 1 – MNB
   A12 6. APU HTR
       GAS GEN/FU PUMP 1 – B AUTO
       3 – A AUTO
       TK/FU LN/H2O SYS 1B – AUTO
       3A – AUTO
   7. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:
   8. Go to MAL, EPS SSR-10, BUS LOSS:
      MNA DA1
MNA FPC1
1. Perform AC1 (2 or 3 phases) (omit MAL, EPS SSR-110, BUS LOSS: AC1), then:
2. Go to MAL, EPS SSR-11, BUS LOSS: MNA FPC1

MNA FLC1
1. GNC 23 RCS
   Ovrd F1 MANF STAT – CL
2. Go to MAL, EPS SSR-11, BUS LOSS: MNA FLC1

MNA FMC1
If reqd for att control:
1. GNC 23 RCS
   Ovrd F1 MANF STAT – OP
2. Go to MAL, EPS SSR-11, BUS LOSS: MNA FMC1

MNA MPC1
L1  1. TOP EVAP HTR DUCT sel – B
    If HI LOAD EVAP ENA:
    2. HI LOAD DUCT HTR sel – B
R1  3. PL CAB – MNB
4. Go to MAL, EPS SSR-12, BUS LOSS: MNA MPC1

MNA APC4
L1  1. TOP EVAP HTR DUCT sel – B
    If HI LOAD EVAP ENA:
    2. HI LOAD DUCT HTR sel – B
A12 3. APU HTR
    GAS GEN/FU PUMP 1 – B AUTO
    3 – A AUTO
    TK/FU LN/H2O SYS 1B – AUTO
    3A – AUTO
4. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:
5. Go to MAL, EPS SSR-14, BUS LOSS: MNA APC4
MNA ALC1

L1  
1. TOP EVAP HTR DUCT sel – B  
   If HI LOAD EVAP ENA:  
   2. HI LOAD DUCT HTR sel – B  

A12  
3. APU HTR  
   GAS GEN/FU PUMP 1 – B AUTO  
   3 – A AUTO  
   TK/FU LN/H2O SYS 1B – AUTO  
   3A – AUTO  

4. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:  
5. Go to MAL, EPS SSR-16, BUS LOSS:  
   MNA ALC1

MNA O14

O6  
1. ANNUN BUS SEL ACA 1 – MNB  
2. Go to MAL, EPS SSR-23, BUS LOSS:  
   MNA O14

MNA R14

NOTE  
Loss of UHF SPLX Hi Pwr Xmit  

Go to MAL, EPS SSR-21, BUS LOSS:  MNA R14
AC2 (2 or 3Φs)

1. Perform FC2 SHUTDN (Cue Card), then:

   L1 2. CAB FAN A – ON
       B – OFF
     IMU FAN A(C) – ON
       B – OFF
     AV BAY 1 FAN A – ON
       B – OFF
     2 FAN A – OFF
       B – ON
     FREON PUMP LOOP 1 – A

   O17:C 3. SIG CONDR FREON A – AC3
       If MNB FPC2 bus lost, return to MNB FPC2 BUS
       LOSS ACTION >>

   4. Go to MAL, EPS SSR-120, BUS LOSS: AC2
MNB DA2 (Entire Bus) (Includes AC2)

CAUTION
Do not sw S-BD PM CNTL to PNL if subs Fault Msg – ‘BCE STRG 3 NSP’ or loss of comm

1. Perform FC2 SHUTDN (Cue Card), then:
   L1 2. CAB FAN A – ON
       IMU FAN A(C) – ON
       AV BAY 1 FAN A – ON
       2 FAN B – ON
       FREON PUMP LOOP 1 – A
       TOP EVAP HTR DUCT sel – A
   If HI LOAD EVAP ENA:
   3. HI LOAD DUCT HTR sel – A
   O6 4. ANNUN BUS SEL ACA 1 – MNA
       2/3 – MNC
   O17:C 5. SIG CONDR FREON A – AC3
   A12 6. APU HTR
          GAS GEN/FU PUMP 1 – A AUTO
          2 – B AUTO
          TK/FU LN/H2O SYS 1A – AUTO
          2B – AUTO
   If PL comm reqd:
   A1L 7. S-BD PL PWR SYS – 2
          CNTL – PNL,CMD
   8. To reconfig PSP, √MCC
   9. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:
   10. Go to MAL, EPS SSR-30, BUS LOSS: MNB DA2
MNB FPC2

CAUTION
Do not sw S-BD PM CNTL to PNL if subs Fault Msg – ‘BCE STRG 3 NSP’ or loss of comm

If PL comm reqd:

If OIU reqd (√MCC):

SSP 2. OIU PWR – OIU 2 ON (tb-DN)
3. To reconfig PSP/OIU, √MCC
4. Perform AC2 (2 or 3 Φs) (omit MAL, EPS SSR-120, BUS LOSS: AC2), then:
5. Go to MAL, EPS SSR-31, BUS LOSS: MNB FPC2

MNB FLC2

CAUTION
Do not sw S-BD PM CNTL to PNL if subs Fault Msg – ‘BCE STRG 3 NSP’ or loss of comm

1. **GNC 23 RCS**
   Ovrd F2 MANF STAT – CL
If PL comm reqd:

If OIU reqd (√MCC):

SSP 3. OIU PWR – OIU 2 ON (tb-DN)
4. To reconfig PSP/OIU, √MCC
5. Go to MAL, EPS SSR-35, BUS LOSS: MNB FLC2

MNB FMC2

If reqd for att control:

1. **GNC 23 RCS**
   Ovrd F2 MANF STAT – OP
2. Go to MAL, EPS SSR-37, BUS LOSS: MNB FMC2

MNB MPC2

L1 1. TOP EVAP HTR DUCT sel – A
If HI LOAD EVAP ENA:
   2. HI LOAD DUCT HTR sel – A
A1U 3. KU BD PWR – OFF CNTL – PNL
4. Go to MAL, EPS SSR-32, BUS LOSS: MNB MPC2

5-32 OPCL/ALL/GEN M
MNB APC5

L1  1. TOP EVAP HTR DUCT sel – A
   If HI LOAD EVAP ENA:
      2. HI LOAD DUCT HTR sel – A

A12  3. APU HTR
         GAS GEN/FU PUMP 1 – A AUTO
               2 – B AUTO
         TK/FU LN/H2O SYS 1A – AUTO
               2B – AUTO

4. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:

5. Go to MAL, **EPS** SSR-34, BUS LOSS:
   MNB APC5

MNB ALC2

L1  1. TOP EVAP HTR DUCT sel – A
   If HI LOAD EVAP ENA:
      2. HI LOAD DUCT HTR sel – A

A12  3. APU HTR
         GAS GEN/FU PUMP 1 – A AUTO
               2 – B AUTO
         TK/FU LN/H2O SYS 1A – AUTO
               2B – AUTO

4. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:

5. Go to MAL, **EPS** SSR-36, BUS LOSS:
   MNB ALC2

MNB O15

O6  1. ANNUN BUS SEL ACA 1 – MNA
      2/3 – MNC

2. Go to MAL, **EPS** SSR-45, BUS LOSS:
   MNB O15
AC3 (2 or 3Φs)

1. Perform FC3 SHUTDN (Cue Card), then:
   L1 2. CAB FAN A – OFF
   B – ON
   IMU FAN B(A) – ON
   C – OFF
   L4:F cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
   H2O PUMP LOOP 1 – ON
   2 – GPC
   AV BAY 2 FAN A – ON
   B – OFF
   3 FAN A – OFF
   B – ON
   FREON PUMP LOOP 2 – B
   O17:C 3. SIG CONDR FREON B – AC2
   If MNC FPC3 bus lost, return to MNC FPC3 BUS
   LOSS ACTION >>
   4. Go to MAL, EPS SSR-130, BUS LOSS: AC3
**MNC DA3** (Entire Bus) (Includes AC3)

1. Perform FC3 SHUTDN (Cue Card), then:
   - CAB FAN B – ON
   - IMU FAN B(A) – ON
   - H2O PUMP LOOP 1 – ON
   - AV BAY 2 FAN A – ON
   - 3 FAN B – ON
   - FREON PUMP LOOP 2 – B
   - FLASH EVAP CNTLR PRI A – OFF
   - B – ON

2. L1 CAB FAN B – ON

3. C3 S-BD PM CNTL – PNL, CMD

   **NOTE**
   
   If S-BD mode TDRS or STDN HI, xmit may be delayed 140 sec for PA warmup. Receive not affected

4. O6 AUD CTR – 1

5. O17:C ANNUN BUS SEL ACA 2/3 – MNB

6. A12 SIG CONDR FREON B – AC2

7. APU HTR
   - GAS GEN/FU PUMP 2 – A AUTO
   - 3 – B AUTO
   - TK/FU LN/H2O SYS 2A – AUTO
   - 3B – AUTO

8. 8. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:

9. 9. Go to MAL, EPS SSR-50, BUS LOSS: MNC DA3
MNC FPC3

C3  1. S-BD PM CNTL – PNL,CMD

   NOTE
   If S-BD mode TDRS or STDN HI, xmit
   may be delayed 140 sec for PA warmup.
   Receive not affected

2. Perform AC3 (2 or 3 Φs) (omit MAL, EPS
   SSR-130, BUS LOSS: AC3), then:
3. Perform LOSS OF VERNIERS (ORB OPS,
   RCS), then:
4. Go to MAL, EPS SSR-51, BUS LOSS:
   MNC FPC3

MNC FLC3

C3  1. S-BD PM CNTL – PNL,CMD

   NOTE
   If S-BD mode TDRS or STDN HI, xmit
   may be delayed 140 sec for PA warmup.
   Receive not affected

2. [GNC 23 RCS]
   Ovrd F4 MANF STAT – CL
3. Perform LOSS OF VERNIERS (ORB OPS,
   RCS), then:
4. Go to MAL, EPS SSR-55, BUS LOSS:
   MNC FLC3

MNC APC6

L1  1. FLASH EVAP CNTLR PRI A – OFF
    B – ON

A12 2. APU HTR
    GAS GEN/FU PUMP 2 – A AUTO
    3 – B AUTO
    TK/FU LN/H2O SYS 2A – AUTO
    3B – AUTO

3. Go to MAL, EPS SSR-54, BUS LOSS:
   MNC APC6
MNC ALC3

L1 1. FLASH EVAP CNTLR PRI A – OFF
    B – ON

A12 2. APU HTR
    GAS GEN/FU PUMP 2 – A AUTO
    3 – B AUTO
    TK/FU LN/H2O SYS 2A – AUTO
    3B – AUTO

3. Go to MAL, EPS SSR-56, BUS LOSS:
   MNC ALC3

MNC O16

O6 1. ANNUN BUS SEL ACA 2/3 – MNB

2. Go to MAL, EPS SSR-63, BUS LOSS:
   MNC O16

MNC R14

C3 1. AUD CTR – 1

2. Go to MAL, EPS SSR-61, BUS LOSS:
   MNC R14

CNTL
CNTL AB1
L1 1. TOP EVAP HTR DUCT sel – B
   If HI LOAD EVAP ENA:
   2. HI LOAD DUCT HTR sel – B
A12 3. APU HTR
     GAS GEN/FU PUMP 1 – B AUTO
     3 – A AUTO
     TK/FU LN/H2O SYS 1B – AUTO
     3A – AUTO
If AB1,2,3 unpwrdd:
4. [GNC 23 RCS]
   Ovrd F1 MANF STAT – CL
5. Go to MAL, EPS SSR-100, BUS LOSS:
   CNTLAB1

CNTL AB2
L1 1. TOP EVAP HTR DUCT sel – B
   If HI LOAD EVAP ENA:
   2. HI LOAD DUCT HTR sel – B
   3. [GNC 23 RCS]
      Ovrd F1 MANF STAT – CL
A12 4. APU HTR
     GAS GEN/FU PUMP 1 – B AUTO
     TK/FU LN/H2O SYS 1B – AUTO
     3A – AUTO
5. Go to MAL, EPS SSR-101, BUS LOSS:
   CNTLAB2

CNTL AB3
NOTE
CDR’s BFS engage capability lost

L1 1. TOP EVAP HTR DUCT sel – B
   If HI LOAD EVAP ENA:
   2. HI LOAD DUCT HTR sel – B
Do not perform next step if AB1,2,3 unpwrdd:
   If reqd for att control:
   3. [GNC 23 RCS]
      Ovrd F1 MANF STAT – OP
A12 4. APU HTR
     GAS GEN/FU PUMP 1 – A AUTO
     TK/FU LN/H2O SYS 1B – AUTO
     3A – AUTO

Cont next page
A6U  If DAP MAN MODE reqd:
5. Use aft station
If BFS engage reqd:
6. Use PLT’s RHC
O6
   GPC MODE 1,2,4 (three) – STBY,HALT
   BFS I/O RESET
7. Go to MAL, **EPS SSR-102, BUS LOSS:** CNTLAB3

**CNTL BC1**

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not sw S-BD PM CNTL to PNL if subs Fault Msg – ‘BCE STRG 3 NSP’ or loss of comm</td>
</tr>
</tbody>
</table>

**L1**
1. TOP EVAP HTR NOZ L – B AUTO
   DUCT sel – A
If HI LOAD EVAP ENA:
2. HI LOAD DUCT HTR sel – A
A12 3. APU HTR
   GAS GEN/FU PUMP 1 – A AUTO
   2 – B AUTO
   TK/FU LN/H2O SYS 1A – AUTO
   2B – AUTO
If PL comm reqd:
A1L 4. S-BD PL PWR SYS – 2
   CNTL – PNL,CMD
If OIU reqd (√MCC):
SSP 5. OIU PWR – OIU 2 ON (tb-DN)
6. To reconfig PSP/OIU, √MCC
If BC1,2,3 unpwrd:
7. **GNC 23 RCS**
   Ovrd F2 MANF STAT – CL
8. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:
9. Go to MAL, **EPS SSR-103, BUS LOSS:** CNTLBC1
CNTL BC2

L1 1. TOP EVAP HTR DUCT sel – A
   If HI LOAD EVAP ENA:
   2. HI LOAD DUCT HTR sel – A

C3 3. S-BD PM CNTL – PNL,CMD

NOTE
If S-BD mode TDRS or STDN HI, xmit may be delayed 140 sec for PA warmup.
Receive not affected

4. [GNC 23 RCS]
   Ovrd F2 MANF STAT – CL

A12 5. APU HTR
   GAS GEN/FU PUMP 2 – B AUTO
   TK/FU LN/H2O SYS 1A – AUTO
   2B – AUTO

C3 6. If DAP MAN MODE reqd: Use fwd station

7. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:

8. Go to MAL, EPS SSR-104, BUS LOSS: CNTLBC2

CNTL BC3

L1 1. TOP EVAP HTR NOZ R – B AUTO
   DUCT sel – A
   If HI LOAD EVAP ENA:
   2. HI LOAD DUCT HTR sel – A
   If reqd for att control:
   Do not perform next step if BC1,2,3 unpwr:
   3. [GNC 23 RCS]
      Ovrd F2 MANF STAT – OP

A12 4. APU HTR
   GAS GEN/FU PUMP 2 – A AUTO
   TK/FU LN/H2O SYS 1A – AUTO
   2B – AUTO

A6 5. If DAP MAN MODE reqd: Use aft station

6. Go to MAL, EPS SSR-105, BUS LOSS: CNTLBC3
NOTE
GPC 3,5 – no BFS engage capability. \(\vee\) MCC for possible move of BFS FUNCTION

A12 1. APU HTR
   GAS GEN/FU PUMP 2 – A AUTO
   3 – B AUTO
   TK/FU LN/H2O SYS 2A – AUTO
   3B – AUTO

   If CA1,2,3 unpwrd:
   2. \([\text{GNC 23 RCS}]\)
      Ovrd F3 MANF STAT – CL
   3. Go to MAL, EPS SSR-106, BUS LOSS:
      CNTLCA1

CNTL CA2

L1 1. FLASH EVAP CNTLR PRI A – OFF
   B – ON

   2. \([\text{GNC 23 RCS}]\)
      Ovrd F3 MANF STAT – CL

A12 3. APU HTR
   GAS GEN/FU PUMP 3 – B AUTO
   TK/FU LN/H2O SYS 2A – AUTO
   3B – AUTO

C3 4. If DAP MAN MODE reqd: Use fwd station

5. Go to MAL, EPS SSR-107, BUS LOSS:
   CNTLCA2

ESS

CNTL CA3

A12 1. APU HTR
   GAS GEN/FU PUMP 3 – A AUTO
   TK/FU LN/H2O SYS 2A – AUTO
   3B – AUTO

2. Go to MAL, EPS SSR-108, BUS LOSS:
   CNTLCA3
ESS 1BC DA1 (Entire Bus)

NOTE
Pri C/W Sys & Matrix lost (B/U C/W Tone remains). GPC 1,4 lost if pwr cycled OFF or ON

1. Perform FC1 SHUTDN (Cue Card), then:
   If calling proc complete:
2. Go to MAL, EPS SSR-70, BUS LOSS:
   ESS1BC DA1

ESS 1BC MPC1

1. Perform FC1 SHUTDN (Cue Card), then:

2. Go to MAL, EPS SSR-72, BUS LOSS:
   ESS1BC MPC1

ESS 1BC FD

NOTE
GPC 1,4 lost if pwr cycled OFF or ON

1. Perform FC1 SHUTDN (Cue Card), then:

2. Go to MAL, EPS SSR-74, BUS LOSS:
   ESS1BC FD

ESS 1BC O13&R14

NOTE
Pri C/W Sys & Matrix lost (B/U C/W Tone remains)

Go to MAL, EPS SSR-75, BUS LOSS:
ESS1BC O13&R14
ESS 2CA DA2 (Entire Bus)

NOTE
C/W B PWR SPly lost (Pri C/W remains). FAULT SUMM MSGs must be reset to avoid C/W Tone masking.

CPC 2,5 lost if pwr cycled OFF or ON

1. AUD CTR – 2
2. Perform FC2 SHUTDN (Cue Card), then: If calling proc complete:
   3. Go to MAL, EPS SSR-80, BUS LOSS: ESS2CA DA2

ESS 2CA MPC2

1. Perform FC2 SHUTDN (Cue Card), then:
2. Go to MAL, EPS SSR-82, BUS LOSS: ESS2CA MPC2

ESS 2CA FD

NOTE
GPC 2,5 lost if pwr cycled OFF or ON

1. Perform FC2 SHUTDN (Cue Card), then:
2. Go to MAL, EPS SSR-83, BUS LOSS: ESS2CA FD

ESS 2CA O13&R14

NOTE
C/W B PWR SPly lost (Pri C/W remains). FAULT SUMM MSGs must be reset to avoid C/W Tone masking

C3
1. AUD CTR – 2
2. Go to MAL, EPS SSR-84, BUS LOSS: ESS2CA O13&R14
ESS 3AB DA3 (Entire Bus)

NOTE
Do not engage BFS. Computer Status Matrix lost. GPC 3 lost if pwr cycled OFF or ON

1. Perform FC3 SHUTDN (Cue Card), then:
   If calling proc complete:
2. Go to MAL, EPS SSR-90, BUS LOSS:
   ESS3AB DA3

ESS 3AB MPC3

1. Perform FC3 SHUTDN (Cue Card), then:
2. Go to MAL, EPS SSR-92, BUS LOSS:
   ESS3AB MPC3

ESS 3AB FD

NOTE
Do not engage BFS. GPC 3 lost if pwr cycled OFF or ON

1. Perform FC3 SHUTDN (Cue Card), then:
2. Go to MAL, EPS SSR-93, BUS LOSS:
   ESS3AB FD
GUIDANCE, NAVIGATION, AND CONTROL
SINGLE STRING GPS TROUBLESHOOTING

1. VERIFY GPS FUNCTIONING PROPERLY

   [GNC 55 GPS STATUS]
   CRT
   √STAT = BLANK or BATT
   √MODE = INS
   √DG FAIL = BLANK
   √QA1 P 1σ ≤ 175 (can be > 175 for no more than 5 min)
   √LAST SEL FIL UPDATE < 30 min

   If GPS functioning properly for 10 min, √MCC >>
   (if no comm, go to GPS INCORPORATION (ORBIT
   OPS, GNC)) >>

2. GPS TROUBLESHOOTING
   √GPS TO NAV INH – ITEM 36 EXEC (*)

   A. GPS sw Config
   A13
   √GPS PWR – ON

   If OV103:
   √GPS PRE AMPL UC – MNC
   √LC – MNC

   If OV104:
   √GPS PRE AMPL UC – ON
   √LC – ON

   * If receiver not pwrd,
   * GPS PWR – ON
   * √GPS ENCRYPT – NORM
   * Wait at least 30 sec
   * GNC I/O RESET
   * [GNC 55 GPS STATUS]
   * INIT – ITEM 15 EXEC (*)
   * √MODE – INIT
   * NAV – ITEM 18 EXEC (*)
   * √MODE – INS

   B. GPS Filter Restart
   √MODE – INS
   If not in INS MODE, go to GPS INIT, step C,
   next page

   CRT
   RESTART – ITEM 21 EXEC (*)
   Wait 5 sec
   √RESTART – ITEM 21 (no *)

   Cont next page  **OV103,104**
NOTE
GPS may take up to 1 min for steady state performance

Repeat step 1. If GPS not functioning properly within 1 min, perform step C below

C. GPS INIT
INIT – ITEM 15 EXEC (*)
\MODE – INIT
NAV – ITEM 18 EXEC (*)
\MODE – INS

NOTE
GPS may take up to 5 min for steady state performance

Repeat step 1. If GPS not functioning properly within 5 min, perform step D below

D. GPS Long Pwr Cycle
NAV – ITEM 18 (*)
A13
GPS PWR – OFF (at least 30 sec), ON (expect ‘BCE STRG 2 GPS’ msg)
Wait at least 30 sec
CRT
GNC I/O RESET
INIT – ITEM 15 EXEC (*)
\MODE – INIT
NAV – ITEM 18 EXEC (*)
\MODE – INS

NOTE
May take up to 12 min to acquire 4 or more satellites

Check SATELLITES – tracking at least 4 satellites

Repeat step 1. If GPS not functioning properly within 12 min, perform step E next page
E. GPS S/TEST
\nNAV – ITEM 18 (*)
S/TEST – ITEM 12 EXEC (*)
\'BIT\' in STAT field after ~6 sec
Wait for \'BIT\' to clear after ~2 min
S/TEST \(^↑\); if \(^↓\), go to GPS SAFING (step 3)
NAV – ITEM 18 EXEC (*)
\MODE – INS

Repeat step 1. If GPS not functioning properly,
perform step 3 below

3. GPS SAFING

[**GNC 55 GPS STATUS**]

**CRT**
\GPS TO G&C INH – ITEM 33 EXEC (*)
\GPS TO NAV INH – ITEM 36 EXEC (*)
THREE STRING GPS TROUBLESHOOTING

1. VERIFY GPS FUNCTIONING PROPERLY

GNC 55 GPS STATUS

CRT
√ STAT = BLANK or BATT
√ MODE = INS
√ DG FAIL = BLANK
√ QA1 P 1σ ≤ 650 (can be > 650 for no more than 5 min)
√ LAST SEL FIL UPDATE < 30 min

If GPS functioning properly for 10 min, √ MCC >>
(if no comm, go to GPS INCORPORATION (ORBIT
OPS, GNC)) >>

2. GPS TROUBLESHOOTING

√ GPS TO NAV INH – ITEM 36 EXEC (*)

A. GPS sw Config

O7
√ GPS PWR (three) – ON
√ PRE AMPL (six) – ON

* If receiver not pwrd, *
O7
* GPS PWR – ON *
* \GPS ENCRYPT – NORM *
* Wait at least 30 sec *

CRT
* GNC I/O RESET *
* *
* GNC 55 GPS STATUS *
* INIT – ITEM 14(15,16) EXEC (*) *
* \MODE – INIT *
* NAV – ITEM 17(18,19) EXEC (*) *
* \MODE – INS *

B. GPS Filter Restart

\MODE – INS

If not in INS MODE, go to GPS INIT, step C,
next page

CRT
RESTART – ITEM 20(21,22) EXEC (*)
Wait 5 sec
\RESTART – ITEM 20(21,22) (no *)

NOTE
GPS may take up to 1 min for steady
state performance

Repeat step 1. If GPS not functioning properly
within 1 min, perform step C, next page

Cont next page
C. GPS INIT
  INIT – ITEM 14(15,16) EXEC (*)
  MODE – INIT
  NAV – ITEM 17(18,19) EXEC (*)
  MODE – INS

  NOTE
  GPS may take up to 5 min for steady state performance

  Repeat step 1. If GPS not functioning properly within 5 min, perform step D below

D. GPS Long Pwr Cycle
  NAV – ITEM 17(18,19) (*)
  O7 GPS PWR – OFF (at least 30 sec), ON
  (expect ‘BCE STRG X GPS’ msg)
  Wait at least 30 sec
  CRT GNC I/O RESET
  INIT – ITEM 14(15,16) EXEC (*)
  MODE – INIT
  NAV – ITEM 17(18,19) EXEC (*)
  MODE – INS

  NOTE
  May take up to 12 min to acquire 4 or more satellites

  Check SATELLITES – tracking at least 4 satellites

  Repeat step 1. If GPS not functioning properly within 12 min, perform step E

E. GPS S/TEST
  NAV – ITEM 17(18,19) (*)
  S/TEST – ITEM 12 EXEC (*)
  ‘BIT’ in STAT field after ~6 sec
  Wait for ‘BIT’ to clear after ~2 min
  S/TEST ‘↑’; if ‘↓’, go to GPS SAFING (step 3)
  NAV – ITEM 17(18,19) EXEC (*)
  MODE – INS

  Repeat step 1. If GPS not functioning properly, perform step 3, next page
3. **GPS SAFING**
   If GPS not functioning properly, desel aff GPS

   **[GNC 55 GPS STATUS]**
   CRT
   DES RCVR 1(2,3) – ITEM 26(27,28) EXEC (*)

   If no GPS functioning properly:
   √ GPS TO G&C INH – ITEM 33 EXEC (*)
   √ GPS TO NAV INH – ITEM 36 EXEC (*)
OMS SECURE

1. OMS ENG (two) – OFF
   If OMS XFEED config:
   2. (Receiving) OMS XFEED (two) – CL (tb-CL)
   3. (Aff) OMS XFEED (two) – CL (tb-CL)
      TK ISOL (two) – CL (tb-CL)
      He PRESS/VAP ISOL (two) – CL

OMS TK P (FU and OX) HIGH

1. √(Aff) OMS He PRESS/VAP ISOL (two) – CL
2. L(R) OMS DUAL He REG failed open

XFEED: R OMS to L OMS

NOTE
Proc only to be used preburn

1. DAP: FREE
2. √L,R OMS XFEED (four) – CL (tb-CL)
3. RCS TK ISOL (six) – CL (tb-CL)
   XFEED (four) – OP (tb-OP)
4. If RCS MANF P (OX and FU) > 130, continue; otherwise, √MCC >>
5. √R OMS TK ISOL (two) – OP (tb-OP)
   L OMS TK ISOL (two) – CL (tb-CL)
   L,R OMS XFEED B (two) – OP (tb-OP)
6. RCS XFEED (four) – CL (tb-CL)
   TK ISOL (six) – OP (tb-OP)
7. DAP: as reqd

XFEED: L OMS to R OMS

NOTE
Proc only to be used preburn

1. DAP: FREE
2. √L,R OMS XFEED (four) – CL (tb-CL)
3. RCS TK ISOL (six) – CL (tb-CL)
   XFEED (four) – OP (tb-OP)
4. If RCS MANF P (OX and FU) > 130, continue; otherwise, √MCC >>
5. √L OMS TK ISOL (two) – OP (tb-OP)
   R OMS TK ISOL (two) – CL (tb-CL)
   L,R OMS XFEED B (two) – OP (tb-OP)
6. RCS XFEED (four) – CL (tb-CL)
   TK ISOL (six) – OP (tb-OP)
7. DAP: as reqd
XFEED RETURN: OMS

L,R OMS XFEED (four) – CL (tb-CL)
TK ISOL (four) – OP (tb-OP)

OMS N2 TK P LOW

1. √N2 TK P < 1200 or decr (OMS/MPS and SPEC)
   If [OMS/MPS] and SPEC disagree (inst prob):
   2. Go to MAL, OMS, 11.1a, L(R) OMS TK P [1] >>
   If [OMS/MPS] and SPEC agree:
   3. √(Aff) OMS ENG – OFF
   4. Go to MAL, OMS, 11.1a, L(R) OMS TK P [4]

OMS N2 REG P LOW

1. √OMS ENG (two) – OFF
2. Go to MAL, OMS, 11.1a, L(R) OMS TK P [10]

OMS N2 REG P HIGH

1. √OMS ENG (two) – OFF
2. Go to MAL, OMS, 11.1a, L(R) OMS TK P [21]

OPCL/ALL/GEN M

OMS SECURE/TK P HI
XFEED: R OMS/L OMS

XFEED RETURN
OMS N2 TK/REG P

7-3
OMS TK P (FU or OX) LOW

1. Check with corresp ENG IN P
   If ENG IN P disagrees:
   2. Go to MAL, OMS, 11.1a, L(R) OMS TK P 29 >>
   If aff OMS feeding OMS/RCS I’CNCT:
   If both OX and FU TK P LOW:
   3. (Aff) OMS He PRESS/VAP ISOL A – OP
      Wait 10 sec
      OMS He PRESS/VAP ISOL A – CL
   4. If TK P incr >>
   5. If TK P not incr:
      (Aff) OMS He PRESS/VAP ISOL B – OP
      Wait 10 sec
      OMS He PRESS/VAP ISOL B – CL
   If TK P incr:
   6. Go to step 8
   If TK P still not incr:
   7. Perform I’CNCT RETURN (RCS), 8-4, then:
   8. Go to MAL, OMS, 11.1a, L(R) OMS TK P 22 >>
   If OX or FU (not both) TK P LOW:
   : Secure RCS and OMS:
   : DAP: FREE
   : L,R RCS MANF ISOL (ten) – CL (tb-CL)
   : XFEED (four) – CL (tb-CL)
   11. (Aff) OMS XFEED (two) – CL (tb-CL)
   : TK ISOL (two) – CL (tb-CL)
   L He PRESS/VAP ISOL (two) – CL

SINGLE MANF (√MANF P)
12. If leak found: Return to desired config except leave aff MANF closed >>

TK LEG (√TWO MANF P)
13. If leak found: Return to desired config except leave TK ISOL (1/2 or 3/4/5), MANFs, and corresp XFEED vlv closed
14. If MANF 3/4/5 Leg leak: Go to LOSS OF VERNIERS (ORB OPS, RCS) >>

Cont next page
√OMS TK and OMS INLET LINE (√OMS TK P and OMS IN P)

If leak found:
15. √L,R RCS He PRESS A(B) (two) – GPC (tb-OP)
    B(A) (two) – CL (tb-CL)
    TK ISOL (six) – OP (tb-OP)
    MANF ISOL (ten) – OP (tb-OP), GPC

16. GNC 23 RCS
    OMS PRESS ENA OFF – ITEM 7 EXEC

17. DAP: as reqd

18. If OMS PRPLT TK P decr:
    | Go to LEAKING OMS PRPLT/He BURN >>

19. If OMS IN P decr >>

√XFEED LINES

20. GNC 23 RCS
    RCS L – ITEM 2 EXEC

If XFEED P decr or zero:
21. √L,R RCS He PRESS A(B) (two) – GPC (tb-OP)
    B(A) (two) – CL (tb-CL)
    TK ISOL (six) – OP (tb-OP)
    MANF ISOL (ten) – OP (tb-OP), GPC

22. GNC 23 RCS
    OMS PRESS ENA OFF – ITEM 7 EXEC

23. DAP: as reqd

24. Do not XFEED/I’CNCT >>

If leak not found:
25. √L,R RCS He PRESS A(B) (two) – GPC (tb-OP)
    B(A) (two) – CL (tb-CL)
    TK ISOL (six) – OP (tb-OP)
    MANF ISOL 1,2,3,4 (eight) – OP (tb-OP), GPC

26. GNC 23 RCS
    OMS PRESS ENA OFF – ITEM 7 EXEC

27. DAP: as reqd, PRI(ALT) only

28. Go to MAL, OMS, 11.1a, L(R) OMS TK P 36 >>

If aff OMS not feeding OMS/RCS I’CNCT:
29. Perform OMS SECURE, then:
30. If OMS PRPLT TK P decr:
    Go to LEAKING OMS PRPLT/He BURN >>

31. If either OMS IN P decr >>
If leak not found:
32. Go to MAL, OMS, 11.1a, L(R) OMS TK P 47

OPL/ALL/GEN M

OMS TK P (FU or OX) LOW  7-5
OMS He TK P LOW

1. √He TK P < 1500 or decr abnormal (OMS/MPS and SPEC)
   If [OMS/MPS] and SPEC disagree (inst prob):
   2. Go to MAL, OMS, 11.1a, L(R) OMS TK P [63] >>
   3. √OMS He PRESS/VAP ISOL (two) – CL
   If He TK P still decr:
   4. (Aff) OMS He PRESS/VAP ISOL (two) – OP
   5. If not at max blowdown (QTY > 39%):
      Go to LEAKING OMS PRPLT/He BURN >>
   6. If I’cnct: Perform I’CNCT RETURN (RCS), 8-4, then:
      If OMS TK P FU/OX decr:
      7. Go to OMS TK P (FU or OX) LOW >>
      If neither decr (He leg leak):
      8. √MCC for OMS Burn deltas
LEAKING OMS PRPLT/He BURN

1. Install LEAKING OMS PRPLT/He BURN (Cue Card) and ON-ORBIT OMS BURN MONITOR (Cue Card) (C2 wedge)

2. [GNC 55 GPS STATUS]
   √GPS TO NAV – INH (*)

3. If MM106: PASS, OPS 301 PRO
   BFS, OPS 301 PRO

4. GNC, OPS 202(302) PRO

5. [GNC XXXXX MNVR EXEC] leaking OMS – sel, and determine out-of-plane or retrograde burn based on TIG (MCC or msg)

6. Enter PEG 7 TARGET data:
   - If out-of-plane:
     - Enter ∆VX and ∆VZ = 0.0
     - For PRPLT LK, enter ∆VY ±500
     - For He LK, enter ∆VY from LEAKING OMS He ∆V TABLE
   - If retrograde:
     - Enter ∆VY and ∆VZ = 0.0
     - For PRPLT LK, enter -∆VX from ∆VX vs ORB ALT chart
     - For He LK, enter -∆VX from LEAKING OMS He ∆V TABLE, steps 1-4

7. Load TARGET DATA:
   - LOAD – ITEM 22 EXEC (if retrograde burn, √TGT HP = 95±1; adjust ∆VX as reqd)
   - TIMER – ITEM 23 EXEC

If OPS 2:
8. √Pri RJD LOGIC, DRIVER (sixteen) – ON
   √cb L,R DDU (four) – cl
   DAP: B/AUTO/PRI
   DAP TRANS: NORM/PULSE/PULSE

If OPS 3:
9. [GNC 23 RCS]
   L1A or L3A – desel (N/A He leak)
   R1A or R3A – desel (N/A He leak)

10. Mnvr to burn att. When mnvr complete, update TIG if appropriate

11. GMBL CK sel sys

Cont next page
At TIG-4, perform OMS burn prep:

12. (Leaking) OMS TK ISOL (two) – OP (tb-OP)
   \sqrt{XFEED (four)} – CL (tb-CL)
   He PRESS/VAP ISOL A – OP (wait 2 sec),
   B – OP

13. Perform burn using LEAKING OMS PRPLT/He BURN (Cue Card),
    then postburn:

If OPS 3:

14. [GNC 23 RCS]
    AFT jets – resel (N/A He leak)
15. FLT CNTLR PWR (two) – OFF
    cb L,R DDU (four) – as reqd
16. (Aff) OMS He PRESS/VAP ISOL (two) – CL
    TK ISOL (two) – CL (tb-CL)
17. DAP: INRTL
18. If OPS 2: DAP TRANS: PULSE/PULSE/PULSE
    GNC, OPS 201 PRO
    If MM 302: GNC, OPS 301 PRO
19. DAP – as reqd
**LEAKING OMS He \( \Delta V \) TABLE**

1. Pick \( \Delta V \) from table to achieve MAX BLOWDOWN

<table>
<thead>
<tr>
<th>Affected OMS % (QTY)</th>
<th>( \Delta V )</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>352</td>
</tr>
<tr>
<td>90</td>
<td>320</td>
</tr>
<tr>
<td>85</td>
<td>289</td>
</tr>
<tr>
<td>80</td>
<td>257</td>
</tr>
<tr>
<td>75</td>
<td>226</td>
</tr>
<tr>
<td>70</td>
<td>195</td>
</tr>
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<td>65</td>
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<td>60</td>
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<td>102</td>
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<tr>
<td>50</td>
<td>71</td>
</tr>
<tr>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>40</td>
<td>10</td>
</tr>
</tbody>
</table>

If retrograde burn:

2. Verify \( \Delta V_X \) vs ORB ALT

   - If \( \Delta V \) from table < \( \Delta V_X \) from chart:
     3. Use \( \Delta V \) from table (Hp will be above 95 nm)

   - If \( \Delta V \) from table > \( \Delta V_X \) from chart:
     4. Use \( \Delta V_X \) from chart to take Hp to 95 nm, then repeat proc to burn out-of-plane to achieve max blowdown (39%)
RCS SECURE (FWD,AFT)

If normal config:
1. RCS MANF ISOL (five) – CL (tb-CL)
   XFEED (two) – CL (tb-CL)
   TK ISOL (all) – CL (tb-CL)
   He PRESS (two) – CL (tb-CL) >>

If (feeding) XFEED:
2. L,R RCS MANF ISOL (ten) – CL (tb-CL)
   (Receiving) XFEED (two) – CL (tb-CL)
   (Feeding) XFEED (two) – CL (tb-CL)
   TK ISOL (three) – CL (tb-CL)
   He PRESS (two) – CL (tb-CL) >>

If (receiving) XFEED or OMS/RCS I’CNCT:
3. √ RCS TK ISOL (three) – CL (tb-CL)
   He PRESS (two) – CL (tb-CL)
I'CNCT:  L OMS to RCS

NOTE
Gauging not avail in OPS 3

1. DAP: FREE
2. L,R RCS TK ISOL (six) – CL (tb-CL)
   XFEED (four) – OP (tb-OP)
3. If RCS MANF P (OX and FU) > 130 continue;
   otherwise, \sqrt{MCC} >>
4. \sqrt{L} OMS He PRESS/VAP ISOL (two) – CL
   TK ISOL (two) – OP (tb-OP)
   \sqrt{R} OMS XFEED (two) – CL (tb-CL)
   L OMS XFEED A – CL (tb-CL)
   B – OP (tb-OP)
5. L OMS TO AFT – ITEM 5 EXEC
6. DAP: as reqd

I'CNCT:  R OMS to RCS

NOTE
Gauging not avail in OPS 3

1. DAP: FREE
2. L,R RCS TK ISOL (six) – CL (tb-CL)
   XFEED (four) – OP (tb-OP)
3. If RCS MANF P (OX and FU) > 130 continue;
   otherwise, \sqrt{MCC} >>
4. \sqrt{R} OMS He PRESS/VAP ISOL (two) – CL
   TK ISOL (two) – OP (tb-OP)
   \sqrt{L} OMS XFEED (two) – CL (tb-CL)
   R OMS XFEED A – CL (tb-CL)
   B – OP (tb-OP)
5. R OMS TO AFT – ITEM 6 EXEC
6. DAP: as reqd
I'CNCT TK SWITCH:
From L to R OMS FEED

1. DAP: FREE
2. L OMS XFEED B – CL (tb-CL)
   R OMS XFEED B – OP (tb-OP)
3. R OMS TO AFT – ITEM 6 EXEC
4. DAP: as reqd

I'CNCT TK SWITCH:
From R to L OMS FEED

1. DAP: FREE
2. R OMS XFEED B – CL (tb-CL)
   L OMS XFEED B – OP (tb-OP)
3. L OMS TO AFT – ITEM 5 EXEC
4. DAP: as reqd

I'CNCT RETURN (OPS 2,3)

1. DAP: FREE
2. OMS OFF – ITEM 7 EXEC
3.  OMS TK ISOL (four) – OP (tb-OP)
   XFEED (four) – CL (tb-CL)
4. L,R RCS XFEED (four) – CL (tb-CL)
   TK ISOL (six) – OP (tb-OP)
5. DAP: as reqd
XFEED: R RCS to L RCS

1. DAP: FREE
2. √L,R OMS XFEED (four) – CL (tb-CL)
3. RCS TK ISOL (six) – CL (tb-CL)
   XFEED (four) – OP (tb-OP)
4. If RCS MANF P (OX and FU) > 130, continue; otherwise, √MCC >>
5. R RCS: √He PRESS A(B) – GPC (tb-OP)
   √B(A) – CL (tb-CL)
   TK ISOL (three) – OP (tb-OP)
6. MSTR RCS XFEED – FEED FROM R
7. DAP: as reqd

XFEED: L RCS to R RCS

1. DAP: FREE
2. √L,R OMS XFEED (four) – CL (tb-CL)
3. RCS TK ISOL (six) – CL (tb-CL)
   XFEED (four) – OP (tb-OP)
4. If RCS MANF P (OX and FU) > 130, continue; otherwise, √MCC >>
5. L RCS: √He PRESS A(B) – GPC (tb-OP)
   √B(A) – CL (tb-CL)
   TK ISOL (three) – OP (tb-OP)
6. MSTR RCS XFEED – FEED FROM L
7. DAP: as reqd

XFEED RETURN: RCS

1. DAP: FREE
2. MSTR RCS XFEED – OFF
3. AFT L,R RCS XFEED (four) – CL (tb-CL)
   TK ISOL (six) – OP (tb-OP)
   √He PRESS A(B) (two) – GPC (tb-OP)
   √B(A) (two) – CL (tb-CL)
4. DAP: as reqd

OPCL/ALL/GEN M

I’CNCT TK SW
I’CNCT RETURN 8-5 XFEED: RCS to RCS
XFEED RETURN
RCS RM LOSS

If vernier jets:
  If loss of FAIL OFF detection:
    1. Resel >>
   If BCE BYP (B or D), MDM fail, or loss of Lk detection:
    If only L5L and/or R5R aff:
      2. Aff jet – desel >>
    If L5D, R5D, F5L, and/or F5R aff:
      3. (Aff) RCS MANF ISOL 5 – CL (tb-CL)
      4. Go to LOSS OF VERNIERS (ORB OPS, RCS) >>

If primary jets:
  If loss of FAIL OFF or Lk detection:
    5. Aff jet – DES INH (*) (re prioritize)
    6. If auto deselected: resel
    7. At seat ingress: Go to AFT(FWD) RCS RM LOSS
       (ENT PKT, RCS) >>
  If loss of FAIL ON detection:
    8. If att control still avail: Ovrd STAT closed for all MANFs on
       (aff) RJD and (aff) RJD – OFF
    9. Aff jet – DES INH twice (re prioritize, reset RM)
   10. At seat ingress: Go to AFT(FWD) RCS RM LOSS
       (ENT PKT, RCS) >>
If BCE BYP (B or D), or MDM fail:
  11. If att control still avail: Leave STAT closed for all MANFs on
      (aff) RJD and (aff) RJD – OFF
   12. Aff jet – DES INH twice (re prioritize, reset RM)
   13. At seat ingress: Go to AFT(FWD) RCS RM LOSS
       (ENT PKT, RCS)

RM DLMA MANF

1. √(Aff) RCS MANF ISOL – GPC
2. RCS MANF VLVS OVRD – ITEM 40(41,42,43,44) EXEC
3. Go to MAL, RCS, 10.1b, RM DLMA MANF [T]
RCS TK P LOW (FU or OX)  
1. √FU(OX) He P (CRT & meter)  
   If decr:  
   2. Go to RCS LEAK ISOL, step 1 >>  
   If not decr:  
   3. (Aff) RCS He PRESS A(B) – CL (tb-CL)  
      B(A) – OP (tb-OP), GPC (tb-OP)  
   4. Go to MAL, RCS, 10.1a 64

RCS TK P HIGH (FU or OX)  
1. (Aff) RCS He PRESS (two) – CL (tb-CL)  
2. Go to MAL, RCS, 10.1a 55

RCS JET FAIL (ON)  
1. (Aff) RCS MANF ISOL – CL (tb-CL)  
2. Go to MAL, RCS, 10.1a 13

RCS JET FAIL (LEAK)  
If RCS FU and OX qty diverging:  
1. (Aff) RCS MANF ISOL – CL (tb-CL)  
2. Go to MAL, RCS, 10.1a 21

RCS JET FAIL (OFF)  
If FAIL OFF(s) caused by pwrdn of RJDs:  
1. RJD LOGIC,DRIVER – ON  
2. JET RESET – ITEM 45 EXEC  
3. Reset all FAIL OFF jets  
4. JET RESET – ITEM 45 EXEC  
Otherwise:  
5. Go to MAL, RCS, 10.1a 1

RCS RM LOSS  
RCS RM DLMA MANF  
8-7

RCS TK P LO/HI  
RCS JET FAIL
1. If FU or OX TK P high, go to RCS TK P HIGH (FU or OX) >>
   If FU or OX TK P normal:
   2. √FU(OX) He P (CRT and O3 meter) decr
   3. DAP: FREE
   When proc complete:
   4. If not loss of VERNs: DAP as reqd

SECURE RCS
5. Perform aff RCS SECURE, then:
   If aff RCS was receiving XFEED/I’CNCT when leak occurred:
   6. Go to step 10

√SINGLE MANF
If only one MANF P decr:
7. Return to normal config except leave aff MANF closed >>

√PRPLT TK LEG (TWO MANF P)
If MANF 1,2 or MANF 3,4 P decr:
8. Return to normal config except leave aff TK ISOL (1/2 or 3/4/5),
   MANFs, and corresp XFEED vlvs closed
If MANF 3/4/5 leg leak:
9. Go to LOSS OF VERNIERS (ORB OPS, RCS) >>

Cont next page
\( \sqrt{\text{He TK}} \)
If He P decr:

10. \( \sqrt{\text{MCC for use of MAL, RCS SSR-5, LEAKING RCS PRPLT/He BURN}} \)

If no comm or burn not performed:

If AFT RCS:

11. Perform XFEED from leaking RCS, then:
   When He TK P < 456:
   12. (Aff) RCS He PRESS A,B – CL (tb-CL)
   13. Go to I’CNCT: L(R) OMS to RCS >>

If FWD RCS:

14. Return to normal config
   When He TK P < 456:
   15. FWD RCS He PRESS A,B – CL (tb-CL)
   When PRPLT TK P < 190:
   16. Perform RCS SECURE (FWD), then:
   17. Go to LOSS OF VERNIERS (ORB OPS, RCS) >>

If burn performed:

If AFT RCS >>
If FWD RCS:

   When PRPLT TK P < 190:
   18. Perform RCS SECURE (FWD), then:
   19. Go to LOSS OF VERNIERS (ORB OPS, RCS) >>

\( \sqrt{\text{PRPLT TK}} \)
If PRPLT TK P decr:

20. Go to MAL, RCS SSR-5, LEAKING RCS PRPLT/He BURN >>

\( \sqrt{\text{He LEG}} \)
21. (Aff) RCS He PRESS A,B – OP (tb-OP)
If He P decr:

If AFT RCS:

22. (Aff) RCS He PRESS A,B – CL (tb-CL)
23. Perform I’CNCT: L(R) OMS to RCS, then:
24. (Aff) MANFs (all) – OP (tb-OP), GPC
Prior to deorb TIG:
25. Return to RCS straight feed
26. (Aff) RCS He PRESS A,B – CL (tb-CL)
27. Cycle He PRESS A(B) to maintain PRPLT TK P 220-245

When He TK P < 456:
28. Perform I’CNCT: L(R) OMS to RCS, then:
   At El:
29. Go to XFEED: L(R) RCS to R(L) RCS >>

Cont next page

OPCL/ALL/GEN M

\textbf{RCS LEAK ISOL}
If FWD RCS:

30. Return to normal config
31. (Aff) RCS He PRESS A,B – CL (tb-CL)
32. Cycle He PRESS A(B) to maintain PRPLT TK P 220-245
   When He TK P < 456:
   33. [GNC 23 RCS]
       Ovrd FWD MANFs STAT – CL
   34. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:
       Prior to deorb:
       35. Ovrd FWD MANFs STAT – OP
   When PRPLT TK P < 190:
   36. Go to RCS SECURE >>

XFEED LINES
If aff RCS was feeding XFEED when leak occurred:

37. [GNC 23 RCS]
    RCS L – ITEM 2 EXEC
    If XFEED P decr or zero:
    38. L,R RCS He PRESS A(B) (two) – GPC (tb-OP)
        B(A) (two) – CL (tb-CL)
        TK ISOL (six) – OP (tb-OP)
        MANF ISOL (ten) – OP (tb-OP), GPC
    39. Do not XFEED/I’CNCT >>

RCS MANF ISOL 5
If leak not found above:

40. Reconfig sys as reqd
41. (Aff) RCS MANF ISOL 5 – CL
    – GPC (tb-CL)
42. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:
43. Go to MAL, RCS, 10.1a [75]
MAIN PROPULSION SYSTEM
MPS C/W
MPS PNEU He ISOL – OP
  FILL/DRAIN LH2 OUTBD – OP
  INBD – OP
  LO2 OUTBD – OP
  INBD – OP
√MCC
PWRDN

LOSS OF 2 CAB FANS ................................................................. 10-2
2 H2O LOOPS ......................................................................... 10-7
CAB PRESS ............................................................................ 10-27
HI LOAD EVAP ....................................................................... 10-33
1 FREON LOOP ....................................................................... 10-35
1 FC ....................................................................................... 10-39
2nd FC ON-ORBIT (TIG < 4 hr) ........................................... 10-41
(TIG > 4 hr) ......................................................................... 10-45
2 FREON LOOPS ..................................................................... 10-49
FES ....................................................................................... 10-69
AV BAY FIRE .......................................................................... 10-73
1 ......................................................................................... 10-73
2 ......................................................................................... 10-77
3A....................................................................................... 10-81

OV103,104

A10-1 OPCL/ALL/GEN M
LOSS OF 2 CAB FANS

MS1,2 1. Perform MS PWRDN, 10-5, ASAP

   NOTE
   Normal CO2 removal and humidity control lost.
   Wipe off any visible moisture with towel.

   Cab press increase due to air heating may
   cause CAB PRESS RELIEF vlv cycling

C3 2. MSTR MADS PWR – OFF
3. Minimize ltg

FWD 4. All MDU PWR (nine) – OFF
C2 All IDP/CRTs (three) – OFF
F6/F8 √FLT CNTRL PWR (two) – OFF
If FLT CNTRL PWR not reqd:
O14,O15, 5. cb DDU L,R,AFT (six) – op
O16:E
L1 6. CAB FAN A,B (two) – OFF
   TEMP CNTRL – OFF
7. HUM SEP A,B (two) – OFF
8. Use one PGSC
W1-10 9. Install Window Shades or mnvr to tail Sun att

   GNC 201 UNIV PTG
   TGT ID – ITEM 8 +4 EXEC
   BODY VECT – ITEM 14 +5 EXEC
   P – ITEM 15 +184 EXEC
   Y – ITEM 16 +0 EXEC
   OM – blank (MCC-provided if reqd)

C3 DAP: A/AUTO/VERN
CRT START TRK – ITEM 19 EXEC (*)
10. Cycle MDUs. If ON at loss of cooling, turn OFF within
   30 min. Allow 3 min OFF prior to each 1 min ON (30
   min max ON time). Save two MDUs that interface with
   a single IDP for entry

Cont next page  OV103,104
NOTE
Don QDM for temp > 90 degF and discomfort.
If cab temp > 95 degF and no evaporative cooling is sensed, don LES, check tabs, close visor, LES O2 – ON.

Inflate anti-g suit as needed for on-orbit circulatory support.

Begin drinking H2O (one 8-oz container every 15 min with a salt tablet in every other container) and continue through entry

11. Go to LOSS OF 2 CAB FANS (DEORB PREP, CONTINGENCY DELTAS) and perform at next PLS opportunity. Expedite NOMINAL DEORBIT PREP proc if time-to-TIG < 3.5 hr
MS PULLOUT PAGE

MS1   Perform PLB EQUIP PWRDN, 10-6
MS2   Perform MS PWRDN ASAP

MS PWRDN

1. Minimize light
   O14:B 2. cb MNA EVENT TIMER AFT – op
         :C      SMOKE DETN L/R FLT DK – op
   O15:B 3. MNB OI H2O BYP LOOP 2 SNSR – op
         MSN TIMER AFT – op
   O16:C 4. MNC SMOKE DETN CAB – op
   L5:J   5. AC3 ΦA SIG CONDR HUM SEP – op
   A6U    6. ANNUN BUS SEL – OFF
   A13    7. OS AUD SPKR PWR – OFF

NOTE
Galley OVEN/RHS sw should be
OFF unless dispensing H2O

GALLEY 8. OVEN/RHS – ON, as reqd
         H2O HTRS (two) – OFF
MA73C:G 9. cb AC3 GALLEY FAN (three) – op
ML86B:B 10. MNB GALLEY H2O HTR – op
If CO2 RMVL SYS flown:
   MO51F 11. CO2 RMVL SYS CNTLR 1(2) MODE – STBY
            (hold 3 sec)
If RMS pwrd dn:
   A3    12. MON 1,2 PWR (two) – OFF
   A7U   13. TV PWR CNTL – PNL
            CONTR UNIT – OFF
   O19   14. VID OUT MON1,MON2 pb (two) – push
            (MON1,MON2 lt on)
   R12L  15. TV PWR – OFF
   MO58F 16. VTR PWR – OFF
   R11L  17. TV PWR – OFF
If not reqd:
   R11L  18. IDP/CRT4 PWR – OFF
         CRT4,AFD1 MDU PWR – OFF
   A6U   19. FLT CNTLR PWR – OFF

LOSS OF 2 CAB FANS
ON-ORBIT
MS PAGE

OV103,104
PLB EQUIP PWRDN

1. Perform PL SAFING, then:

   CAUTION
   If stow prob occurs with either RMS and/or
   KU-BD ANT, perform aff sys QUICK
   RESPONSE JETTISON (CONT DEORB)

   If RMS grappled to OBSS:
   2. Perform OBSS JETTISON (PDRS OPS FS,
      OBSS CONTINGENCY), then:

      If RMS-only:
      3. Perform RMS PWRDN (PDRS OPS), then:

      If KU-BD ANT deployed:
      4. Perform KU-BD ANT STOW (ORB OPS,
         COMM/INST), then:

      If radiators deployed:
      5. Go to RAD STOW (ORB OPS, ECLS)
LOSS OF 2 H2O LOOPS

NOTES

- THIS PROCEDURE IS TIME CRITICAL
- Proc requires > 45 min, but time critical steps should be done ASAP
- Loss of H2O cooling aff both water and air cooled equipment
- Proc pwrs dn all comm. If comm reqd, preferred comm config in order of heat production:
  1. UHF only
  2. SGLS/STDN LO PWR if reqd
  3. TDRS only if mandatory (10 min max)
- Call ground at every avail UHF site
- Tear out COMM pages from proc and use until touchdown
- Cab depress/repress cycles to 10.2 psia are used for cab temp and humidity control
- If docked to ISS, proc is to be worked simo with JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS)
- When pwrdns complete, perform actions on 10-19 and 10-20 as time permits at crew discretion

1. Perform PART 1 of this pwrdn and, based on TIG, complete PART 2 or PART 3
LOSS OF 2 H2O LOOPS, PART 1 – INITIAL PWRDN

TIME CRITICAL PROCEDURES (execute simo)

1. Record MET of 2nd H2O Loop Fail __ __ __/ __ __: __ __: __ __
2. Establish comm plan with MCC, determine best TIG opportunities, then have MS3 perform COMM PWRDN, 10-23, ASAP (S-Bd Pwr Amp may fail in 10 min with no cooling)
3. Have MS perform MS OVHD PNL PWRDN, 10-19, ASAP
4. Have second MS perform MCA CONFIG, 10-17, and PLB EQUIP PWRDN, 10-17, ASAP
5. If docked to ISS, have CDR perform JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS)
6. Have PLT proceed with CDR AND PLT PWRDN, ASAP

DETERMINE MAXIMUM TIME TO TIG, NUMBER OF DEP/REP, FROM N2 QTY FROM SPEC 66. Sel best landing site and deorbit TIG from PGSC. Set Wristwatch Timer (A17) counting down to TIG.

Enter TARGETS in LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP)

<table>
<thead>
<tr>
<th>IF TOTAL N2</th>
<th>NUMBER OF DEP/REP</th>
<th>SEL BEST TIG WITHIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;160 LB</td>
<td>3</td>
<td>45M - 4H:00M</td>
</tr>
<tr>
<td>&gt;120 LB</td>
<td>2</td>
<td>45M - 2H:50M</td>
</tr>
</tbody>
</table>

CDR AND PLT PWRDN

O14,O15, 7. √Pri RJD LOGIC, DRIVER (sixteen) – ON
O16:F DAP: ALT (proc results in loss of VERNs)
O16:F RJD MANF L5/F5/R5 DRIVER – OFF
C3 8. √MSTR MADS PWR – OFF
9. Minimize ltg
10. Use only one IDP with two MDUs, one PGSC

NOTE
Cycle MDUs. If ON at loss of cooling, turn OFF within 30 min. Allow 2 min OFF prior to each 1 min ON (30 min max ON time). Save two MDUs that interface with a single IDP for entry. IDPs do not require cycling.

Cont next page OV103,104

A10-8 OPCL/ALL/GEN M
F6,F8,A6 11. FLT CNTLR PWR (three) – OFF, use one as reqd
O7 12. √TACAN MODE sel (three) – OFF
O8 13. √RDR ALTM (two) – OFF
14. √MLS (three) – OFF
L1 15. √H2O PUMP LOOP 1,2 (two) – OFF
(leave ON if any loop running)
HUM SEP (two) – OFF
(leave HUM SEP A ON if any loop running)
If any loop running, minimize bypass:
16. H2O LOOP 1(2) BYP MODE – MAN
   MAN – DECR (30 sec)
If H2O PUMP LOOP 1 A(B) ON, inform MS:
MA73C:A 17. √MCA LOGIC MNA FWD 1 – ON
   (MNB FWD 2 – ON)
L1 18. CAB FAN (two) – OFF
   TEMP CNTLR – OFF
19. √FLOW PROP VLV LOOP tb (two) – ICH
20. FREON PUMP LOOP 1 – OFF
   √2 – B
21. HI LOAD DUCT HTR sel – A/B
   √TOP EVAP HTR NOZ L,R (two) – B AUTO(A AUTO)
   √DUCT sel – B(A)
L2 22. O2 SYS 1 SPLY – CL (tb-CL)
L4:J 23. cb AC3 √A SIG CONDR HUM SEP – op
If not currently single G2, reassign strings to GPC 1 in MC 2:
24. [GNC 0 GPC MEMORY]
   CONFIG – ITEM 1 +2 EXEC
   Modify MC 2 per table – – – – – – – – – –
   CRT 25. GNC, OPS 201 PRO
   O6 26. GPC MODE 2 – STBY
   (tb-bp) – HALT
   – STBY
   (tb-RUN) – HALT
   (tb-bp) – HALT
   √GPC MODE 3,5 (two) – HALT
   √OUTPUT 5 – NORM
   L1 28. AV BAY 1 FAN A – ON
   B – OFF
   2,3 FAN A,B (four) – OFF
   29. IMU FAN A – ON
   B – OFF
   √C – OFF
   For any fwd IDP/CRT that is OFF:
   30. GPC/CRT1/X EXEC
R2 31. HYD CIRC PUMP (three) – ON
Cont next page OV103,104
32. C/W MODE – ACK

**NOTE**
For F7 lights, hold in F2 or F4 MA

If current time to TIG < 50 min:

33. Go to LOSS OF 2 H2O LOOPS, PART 2 – SHORT
ON-ORBIT WAIT, next page >>

L1 34. Cycle CAB FAN A(B) – ON (7 min)/OFF (1 hr)
(to control PPC02)

L4:P 35. cb AC2,3 φA LG SNSR (two) – op

**WARNING**
Do not unpwr all IMU/FF MDM's pairs

If IMU 2 in OPER:

36. **GNC 21 IMU ALIGN**
IMU 1,3 (two) – desel

37. IMU 1,3 (two) – OFF

If IMU 2 in STBY:

38. **GNC 21 IMU ALIGN**
IMU 2,3 (two) – desel

39. IMU 2,3 (two) – OFF

O6 40. MDM FF3,FF4 (two) – OFF

41. Verify MS OVHD PWRDN complete

**NOTE**
Both MMUs are OFF. If a ROLL-IN DISPLAY
is reqd: turn MMU 1 ON, try transaction, turn
MMU 1 OFF again

If time from failure to TIG < 2 hr 30 min:

42. Go to LOSS OF 2 H2O LOOPS, PART 2 – SHORT
ON-ORBIT WAIT, next page >>

If time from failure to TIG > 2 hr 30 min:

43. Go to LOSS OF 2 H2O LOOPS, PART 3 –
EXTENDED ON-ORBIT WAIT, 10-13
LOSS OF 2 H2O LOOPS, PART 2 – SHORT ON-ORBIT WAIT

If Undocking from ISS, delay step 1 until after Undocking and Post Final Sep, but continue with steps 2 through 19 of PART 2 – SHORT ON-ORBIT WAIT:

1. Perform POST UNDOCKING AND FINAL SEP RECONFIG, 10-15

BYPASS RADS/FES ACT

ML86B:A 2. cb MNC SPLY H2O XOVR VLV – cl
R11L 3. SPLY H2O XOVR VLV – OP (tb-OP)

\(\sqrt{TKA}\) OUTLET – CL (tb-CL)

L1 4. FLASH EVAP CNTLR (three) – OFF
5. HI LOAD EVAP – ENA
RAD BYP VLV MODE 1,2 (two) – MAN
MAN SEL 1,2 (two) – BYP,

wait 3 sec (tb-BYP)

CNTLR LOOP 1,2 (two) – OFF

When EVAP OUT T > 65:

6. FLASH EVAP CNTLR PRI A(B) – ON
7. Wait 1 min, verify EVAP OUT T = 39 degF
8. Give MS GO to perform PLBD CLOSURE, 10-18

If current time to TIG < 50 min, at TIG-30 min:

9. Go to LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP) >>

NOTE
Limit operation of each GPC (1 hr max ON time from second H2O Loop failure)

If reqd, perform steps 10 thru 13:

O6 10. GPC MODE 2 – STBY (tb-RUN), hands off 10 sec
– RUN (OUTPUT tb-gray), hands off 10 sec

IDPX 11. In MCX add GPC 2 to tgt set (leave GPC 1 in tgt set)
Assign all strings to GPC2
(if SM GPC active, \(\sqrt{PL}\) 1/2 not assigned)
GNC, OPS X01 PRO
\(\sqrt{All}\) IDPs deassigned from GPC1

O6 12. GPC MODE 1 – STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT (tb-bp)

L1 13. AV BAY 1 FAN A(B) – OFF
2 FAN A(B) – ON

Wherever GPC 1 is referenced, replace with GPC 2 in the LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP)

Cont next page OV103,104
SM GPC/PL MDM Deact – Delay SM GPC/PL MDM Deact (steps 14-21) until PLBD are closed. Then perform ASAP:

14. **SM T DPS UTILITY**
   - UL CNTL ENA – ITEM 36 EXEC

15. UPLK – GPC BLK

16. IDP/CRT1,2,3 MAJ FUNC (three) – GNC

17. GPC MODE 4 – STBY (tb-bp)
   - HALT
   - PWR 4 – OFF

18. **GNC 0 GPC MEMORY**
   - CONFIG – ITEM 1 +2 EXEC

19. Assign PL1/2 to GPC 1 in MC2

20. GNC, OPS 201 PRO

21. MDM PL1,PL2 (two) – OFF

22. Perform first cab depress/repress cycle starting at approx 1 hr 15 min after the failure, the final cycle at TIG-20 min. Procs in the 20 MINUTE DE/REPRESS MS PULLOUT PAGE (CONT DEORB, LOSS OF 2 H2O LOOPS); use until last depress/repress is complete

**NOTE**
Possible cab air OVBD RLF due to loss of cab cooling.

Use Quick Don mask as needed to provide additional respirator cooling during periods of high cab temp and humidity. To determine health of crewmember, place temp strip (MED Kit) on forehead. If any crewmember temp greater than 99 degF and crew feels ill, begin cab depress/repress cycle ASAP

At TIG-30 min:

23. Go to LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP) >>

**OV103,104**
LOSS OF 2 H₂O LOOPS, PART 3 – EXTENDED ON-ORBIT WAIT

If Undocking from ISS, delay step 1 until after undocking and Post Final Sep, but continue with steps 2 thru 6:

1. Perform POST UNDOCKING AND FINAL SEP RECONFIG, 10-15

2. √GPC MODE 2,3,5 (three) – HALT
3. PWR 2,3,5 (three) – OFF

When RMS PWRDN (PDRS OPS) complete, perform steps 4 thru 6 ASAP:

4. GPC MODE 4 – STBY (tb-bp), hands off 10 sec
   – RUN (tb-RUN), hands off 10 sec
   OUTPUT 4 – NORM (tb-gray)
5. [GNC 0 GPC MEMORY]
   CONFIG – ITEM 1 +2 EXEC
   Modify MC 2 per table
   GNC, OPS 201 PRO

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6. GPC MODE 4 – STBY (tb-bp)
   – HALT
   – STBY (tb-RUN)
   – HALT (tb-bp)

   PWR 4 – OFF

Delay steps 7 thru 20 of PART 3 – EXTENDED ON-ORBIT WAIT, 10-14, until POST UNDOCKING AND FINAL SEP RECONFIG is complete (perform step 19 as reqd):
Establish free drift:

F8  7. Verify att mnvr complete
    ADI ATT – INRTL
C3  8. DAP: B/AUTO/PRI (wait 30 sec)
    FREE
O6  9. Wrist watch set to MET

Pwr dn remaining GPC:
10. GNC, OPS 000 PRO
11. GPC MODE 1 – STBY (tb-bp)
    – HALT
    – STBY (tb-RUN)
    – HALT (tb-bp)
12. GPC PWR 1 – OFF

FWD,AFT 13. All MDU PWR (eleven) – OFF
C2,R11L 14. IDP/CRT PWR (four) – OFF
L1  15. AV BAY FAN (six) – OFF
O13:C  16. cb ESS 2CA MTU B – op
    :E  3AB GPC STAT – op
O14:B  17. MNA MSN TIMER FWD – op
    :C  SMOKE DETN L/R FLT DK – op

W1-10 18. Install Window Shades
19. Check all pwrdns complete

20. Go to LOSS OF 2 H2O LOOPS, ON-ORBIT Wait
    (CONT DEORB, LOSS OF 2 H2O LOOPS)

NOTE
Possible cab air OVBD RLF due to loss of cab cooling.

Use QDM as needed to provide additional respirator cooling during periods of high cab temp and humidity. To determine health of crewmember, place temp strip (MED Kit) on forehead of CDR and PLT

OV103,104
POST UNDOCKING AND FINAL SEP RECONFIG

If Undocking with ISS and Final Sep complete or if not docked with ISS:

1. GNC 20 DAP CONFIG
   DAP A,B set to A1,B1 except:
   (A) ITEM 10 +1.0 0 EXEC
   ITEM 11 +3.0 0 EXEC
   ITEM 15 EXEC (TAIL)
   ITEM 16 EXEC (TAIL)
   (B) ITEM 30 +0.2 0 EXEC
   ITEM 31 +1.0 0 EXEC
   ITEM 35 EXEC (TAIL)
   ITEM 36 EXEC (TAIL)

   CAUTION
   DO NOT mnvr on PRCS until MS has completed RMS JETT or STOW

2. Mnvr to tail Sun att:
   GNC 201 UNIV PTG
   TGT ID – ITEM 8 +4 EXEC
   BODY VECT – ITEM 14 +5 EXEC
   P – ITEM 15 +2 2 5 EXEC
   Y – ITEM 16 +0 EXEC
   OM – blank (MCC-provided as reqd)
   DAP: A/AUTO/PRI
   START TRK – ITEM 19 EXEC (CUR-*)

   If IMU 2 in OPER:
   O6 3. MDM FF1 – OFF
   If IMU 2 in STBY:
   O6 4. MDM FF2 – OFF
   O14, O15, O16:F 5. RJDF LOGIC, DRIVER (eight) – OFF

   NOTE
   Expect FRCS jet(s) to false fail leak when OF DSC cbs are opened

   O14:B 6. cb MNA OI SIG CONDR OF 1/4 A – op
   O15:B 7. cb MNB OI SIG CONDR OF 1/4 B – op
   O16:B 8. cb MNC OI SIG CONDR OF 2/3 B – op
   O16:E 9. DDU AFT – op

OV103,104
MCA CONFIG (Execute ASAP)

L1 If either H2O PUMP LOOP 1 A(B) – ON:

MA73C:A 1. Leave MCA LOGIC MNA FWD 1(MNB FWD 2) ON in next step

CAUTION
Coordinate steps 2 and 3 with CDR. FRCS is lost with step 2 and recovered with step 3

MA73C:A,

2. MCA LOGIC MNA,B,C (fourteen) – OFF

B 3. GNC 23 RCS
ITEM 1 EXEC (FRCS page)
OVRD FRCS MANF(s) – OP

4. For PLB EQUIP PWRDN, use following MCA config:
   MCA LOGIC MNA MID 1,3 (two) – ON
   MNB MID 2,3,4 (three) – ON
   MNC MID 2,4 (two) – ON

CAUTION
Retain this MCA sw config until step 8 of the PLB EQUIP PWRDN. Disregard MCA sw throws in the PL SAFING, RAD STOW, KU-BD ANT STOW, and RMS PWRDN procs

MO13Q 5. √AIRLK FAN A,B (two) – OFF

PLB EQUIP PWRDN (Execute ASAP)

1. Perform PL SAFING, then:

CAUTION
If stow prob occurs with either RMS and/or KU-BD ANT, perform aff sys QUICK RESPONSE JETTISON (CONT DEORB)

2. If TV reqd for OBSS jettison or RMS/Ku stow, perform ACTIVATION and OPERATION (Auto Ops only) (Cue Card, TV)
If RMS grappled to OBSS:
3. Perform OBSS JETTISON (PDRS OPS FS, OBSS CONTINGENCY), then:
If RMS-only:
4. Perform RMS PWRDN (PDRS OPS), then:

Cont next page
If KU-BD ANT deployed:

5. Perform KU-BD ANT STOW (ORB OPS, COMM/INST), then:

If radiators deployed:

6. Perform RAD STOW (ORB OPS, ECLS), then:

7. Notify CDR: RMS stowed (jettisoned)

If performing PART 2 – SHORT ON-ORBIT WAIT:

8. Perform PLBD CLOSURE, below, on GO from CDR, then:

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<th>9. MCA LOGIC MNA MID 1,3 (two) – OFF</th>
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<td>B MNB MID 2,3,4 (three) – OFF</td>
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<td>MNC MID 2,4 (two) – OFF</td>
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**PLBD CLOSURE** (Short On-Orbit Wait only)

**WARNING**
Verify no obstructions before closing and latching PLBD (Ku ANT, RAD, RMS, etc)

1. Notify CDR: Beginning PLBD CLOSURE

O6

2. √ MDM PL1,PL2 (two) – ON

3. SM I/O RESET

CRT4

4. SM, OPS 202 PRO – close PLBD ASAP

5. [SM PL BAY DOORS]

R13L

6. PL BAY DR SYS (two) – ENA

CRT4

7. SM, OPS 202 PRO – close PLBD ASAP

5. AC POWER ON – ITEM 1 EXEC

AUTO MODE SEL – ITEM 3 EXEC

PBD SW BYPASS – ITEM 14 EXEC

CLOSE – ITEM 17 EXEC

If 'PLB SEQ FAIL' msg during door closure and aft latches for:

8. Check door scallop on or below tgt line before continuing in MAN mode; otherwise:

L CONTINGENCY PLBD CLOSURE, then:

After PLBD closed:

CRT4

9. PBD STOP – ITEM 16 EXEC

AC POWER OFF – ITEM 2 EXEC

R13L

10. PL BAY DR SYS (two) – DSBL

GPC/CRT 0/4 EXEC

R11L

11. IDP/CRT4 PWR – OFF

A7U

12. √ PL BAY FLOOD (all) – OFF

If either H2O PUMP LOOP 1 A(B) – ON:

MA73C:A

13. Leave MCA LOGIC MNA FWD 1 (MNB FWD 2) – ON in next step

MA73C

14. MCA LOGIC MNA,B,C (fourteen) – OFF

15. Notify CDR: PLBDs closed

LOSS OF 2 H2O LOOPS

ON-ORBIT

MS PAGE

**OV103,104**

A10-18

OPCL/ALL/GEN M
MS OVHD PNL PWRDN

1. Set wrist watches as accurately as possible to MET (set one to GMT). The MET may be used for deorbit burn execution. Record GMT day of year __ __ __/ __ __: __ __._

2. Minimize ltg on Aft Flt Deck

O13:A 3. cb ESS 1BC MTU A – op

: C 2CA C/W B – op

O14:A 4. √ BRAKES MNA – OFF

:B 5. cb MNA OI H2O BYP LOOP 1 SNSR – op

EVENT TIMER AFT – op

:E √ADTA 1 – op

DDU L,AFT (two) – op

O15:A 6. √ BRAKES MNB – OFF

:B 7. cb MNB OI H2O BYP LOOP 2 SNSR – op

MSN TIMER AFT – op

EVENT TIMER FWD – op

:E √ADTA 2 – op

DDU L,R (two) – op

:F 8. MMU 2 – OFF

O16:A 9. √ BRAKES MNC – OFF

:E 10. √ cb MNC ADTA 3,4 (two) – op

DDU R – op

When N2 QTY and TIG determined by CDR:

O14:B 11. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op

O15:B MNB OI MDM OF 1/2 B – op

O16:B MNC OI MDM OF 3/4 B – op

O14:F MMU 1 – OFF

A13 12. GPS PWR – OFF

13. Notify CDR: MS OVHD PNL PWRDN complete

14. Assist other MS with completion of PLB EQUIP PWRDN, 10-17

LOSS OF 2 H2O LOOPS

OV103,104

ON-ORBIT

MS PAGE
When pwrdns complete, perform following at crew discretion:

**FLUID LOADING PREP**

**GALLEY**
1. OVEN/RHS – ON
2. Unstow, fill 4 water containers (per crewmember) with 8 oz of water each. Temp stow near seat
3. Unstow 8 salt tablets (per crewmember). Temp stow in Flt Suit pocket
4. OVEN/RHS – OFF
5. √ H2O HTRS (two) – OFF
6. √ OVEN FAN – OFF
7. Stow Personal Hygiene Hose

**NOTE**
Ensure sufficient containers and salt tablets are prepared to continue fluid loading thru entry

**FLUID LOADING**
1. Immed begin drinking H2O (one 8-oz container every 15 min with a salt tablet in every other container) and continue through entry

**CLOTHING CONFIG**
1. Don QDM for temp > 90 degF and discomfort

**FDF CONFIG**
1. Unstow: ENT, ENT PKT, Deor b Burn Cards, ENT Cue Cards

**CAB CONFIG**
1. Stow loose equipment, Backup PGSC
2. Remove and stow side hatch UV filter, locking device, and pyro box safing pin
3. Tape foot loops in egress routes
4. Remove and stow Window Shades (if not needed for cab T control)

**LOSS OF 2 H2O LOOPS**

**OV103,104**

**ON-ORBIT**

**MS PAGE**

A10-20

OPCL/ALL/GEN M
WCS DEACT

WCS 1. Foot Restraints – up, locked
ML31C 2. √VAC VENT ISOL VLV CNTL – OP (tb-OP)
     If EDO WCS:
WCS 3. URINAL SEL – OFF
     4. WCS PWR SEL (two) – OFF1, OFF2
     5. FAN PWR – AUTO

INSTALL SEATS

POLE SETUP

1. **ESCAPE POLE SETUP:**
   - Reinstall Stbd pip pin and Large Port pin
   - Retract and hold Locking Pin(Ring)
   - Reinstall Large pin
   - Release Locking Pin(Ring)
   - Slide forward Safing latch
   - Verify pole straps secure

2. Check minimum ltg on Middeck
NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN

MS After comm plan established with MCC, perform COMM PWRDN ASAP (delay 10 min max)

CAUTION
Must complete steps 1 thru 3 within 10 min. TDRS or STDN – HI AOS is limited to 10 min or power amp will overheat

NOTE
Proc pwrps off ALL ground comm

COMM PWRDN

A1L 1. S-BD PM ANT SW ELEC – OFF
     PRE AMP – OFF
     PWR AMPL STBY – OFF
     OPER – OFF
     MODE sel – STDN LO
     XPNDR – OFF

CAUTION
Verify CDR ready for COMM PWRDN prior to performing step 3

C3 3. S-BD PM CNTL – PNL

NOTE
Ensure CDR has recorded N2 quantities before powering down PCMMU. Other steps may be performed

4. OI PCMMU PWR – OFF
   FORMAT – FXD

5. AUD CTR – OFF (turn ON as reqd for ICOM audio)

LOSS OF 2 H2O LOOPS
OV103,104
ON-ORBIT
MS PAGE
A10-23
OPCL/ALL/GEN M
NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN

O5 6. LAUD PWR – OFF (turn ON as reqd for ICOM audio)
O6 7. UHF MODE sel – OFF
O9 8. RAUD PWR – OFF (turn ON as reqd for ICOM audio)
               √PWR SYS – OFF
10. PL DATA INTLVR PWR – OFF
A1R 11. S-BD FM CNTL – PNL
               PWR – OFF
A3 12. MON 1,2 PWR (two) – OFF
A7U 13. TV PWR CONTR UNIT – OFF
R14:B 14. cb MNA,MNC GCILC (two) – op
               :D
               TV (fourteen) – op
               MNB VPU – op
               :E
               CAMR (six) – op
L9,R10 15. PS,MS AUD PWR (two) – OFF
A13 16. OS AUD SPKR PWR – OFF
MO42F 17. MIDDECK SPKR AUD SPKR PWR – OFF
18. Call ground at every avail UHF site per COMM
    POWERUP, 10-25; voice down cab temp, crew body
    temps, heart rates, and words to indicate severity of cab
    humidity
If MCC request data on cab environ or Av bays:
19. Perform CABIN ENVIRONMENT MONITOR (CONT
    DEORB, LOSS OF 2 H2O LOOPS), then:
If after TIG-10 min:
20. Perform AFT PNL CONFIG FOR ENTRY COMM
    (CONT DEORB, LOSS OF 2 H2O LOOPS D/O
    PREP)
NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN

COMM POWERUP (If comm reqd prior to landing site coverage)

Pwr up audio sys:

C3 1. AUD CTR – 1
O5 L AUD PWR – AUD
O9 R AUD PWR – AUD

If UHF avail, config for UHF comm (voice only):

O6 2. UHF MODE sel – SPLX
   \SPLX/EVA PWR AMPL – ON

3. After comm with MCC complete: Go to COMM PWRDN, steps 5 thru 8, 10-23 >>

If UHF site unavail or if MCC requests data (config for GSTDN(SGLS) S-BD):

C3 4. \S-BD PM CNTL – PNL
A1L ANT SW ELEC – 2
   MODE sel – STDN LO(SGLS)
   XPNDR – 2

5. NSP PWR – 2
   \DATA RATE XMIT – HI
   \RCV – HI
   CODING XMIT – OFF
   RCV – OFF
   \UPLK DATA – S-BD

C3/F9 6. Sel best S-BD PM ANT
If MCC requests data:

O15:B 7. cb MNB OI SIG CONDR OF 1/4 B,2/3 A
   (two) – cl
O14:B 8. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
C3 9. OI PCMMU PWR – 1
O6 10. MDM PL2 – ON
11. BFS, GNC I/O RESET
   At end of data transmission:
O14:B 12. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
O15:B 13. cb MNB OI SIG CONDR OF 1/4 B,2/3 A
   (two) – op

If not reqd for PLBD CLOSURE:

O6 14. MDM PL2 – OFF
   After comm/data complete:
L 15. Go to COMM PWRDN, 10-23 >>

Cont next page

LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE

OV103,104
NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN

If UHF site and GSTDN unavail and comm/data critical:
Config for TDRS S-BD during AOS

CAUTION
This is a High Power Mode. On-time should be limited to 10 min max due to Pwr Amp Thermal constraints. A 3-min delay occurs before Pwr Amp comes on. Uplink not aff. Proceed with sel of best S-BD PM ANT

C3
16. √S-BD PM CNTL – PNL
ANT SW ELEC – 2
PRE AMP – 2
PWR AMPL OPER – 2
MODE sel – TDRS DATA
XPNDR – 2

17. √NSP PWR – 2
√DATA RATE XMIT – HI
√RCV – HI
CODING XMIT – ON
RCV – ON
√UPLK DATA – S-BD

C3/F9
18. Sel best S-BD PM ANT
If MCC requests data:

O15:B
19. cb MNB OI SIG CONDR OF 1/4 B,2/3 A
(two) – cl

O14:B
20. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl

C3
21. OI PCMMU PWR – 1

O6
22. MDM PL2 – ON
23. BFS, GNC I/O RESET
At end of data transmission:

O15:B
24. cb MNB OI SIG CONDR OF 1/4 B,2/3 A
(two) – op

O14:B
25. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
If not reqd for PLBD CLOSURE:

O6
26. MDM PL2 – OFF
After comm/data complete:
27. Go to COMM PWRDN, 10-23

LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE

OV103,104
LOSS OF CAB PRESS

CDR  Perform JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS)
MS1,MS2 Perform procs on 10-30
PLT  Perform following pwrdn

NOTE
Cab press will stabilize at 8 psia for following EQ dP/dT values:
< 0.6 for Orbiter + Airlock
< 0.4 for Orbiter + Airlock + Spacehab.

If docked to ISS, undocking will be performed with Single G2 (i.e., no +Z redundancy)

C3 1. MSTR MADS PWR – OFF
    2. Minimize ltg
    3. Use one IDP/CRT with two MDUs, as reqd (IDP4 preferable)
    4. Use one PGSC, FLT CNTLR PWR as reqd

If FLT CNTLR PWR not reqd:

O14,O15, O16:E

O7 6. √TACAN MODE sel (three) – OFF
O8 7. √MLS (three) – OFF
     √RDR ALTM (two) – OFF
L1 8. CAB TEMP CNTLR – OFF
     9. HUM SEP (two) – OFF
     10. H2O LOOP 2(1) BYP MODE – MAN
         MAN – DECR (30 sec)
     11. √FLOW PROP VLV LOOP tb (two) – ICH

If FES not ena:

    If EVAP OUT T 41 to 47 degF:
        12. RAD CNTLR OUT TEMP – HI
            When EVAP OUT T > 50 degF:
                13. FLASH EVAP CNTLR PRI A(B) – ON, then
                immed:
                14. RAD CNTLR OUT TEMP – NORM
                If EVAP OUT T < 41 or > 47 degF:
L    15. FLASH EVAP CNTLR PRI A(B) – ON
L2 16. √ANTISKID – OFF
     √NWS – OFF
L4:L 17. cb ΦA CAB T CNTLR 1,2 (two) – op

Cont next page  OV103,104

A10-27  OPCL/3,4/GEN M
If orbit 2,3 deorbit due to cab leak:
18. Use DEORB PREP/ENTRY DELTAS PULLOUT PAGE, 10-31, then go to LAUNCH DAY DEORB
PREP (ORBIT 2(3)) (CONT DEORB, LAUNCH DAY ORBIT 2(3)) >>
If orbit 3 deorbit due to fire, tox spill, or glass in cabin:
19. Go to LAUNCH DAY DEORB PREP (ORBIT 3)
(CONT DEORB, LAUNCH DAY ORBIT 3) >>
W1-10 20. Install Window Shades (ten) or mnvr to tail Sun att:

GNC UNIV PTG
TGT ID – ITEM 8 +4 EXEC
BODY VECT – ITEM 14 +5 EXEC
P – ITEM 15 +184 EXEC
Y – ITEM 16 +0 EXEC
OM – blank (MCC-provided if reqd)

C3 DAP: A/AUTO/VERN
CRT START TRK – ITEM 19 EXEC

If time to TIG < 4 hr:
21. Go to 8 PSI DEORBIT PREP (DEORB PREP,
CONTINGENCY DELTAS) >>
If time to TIG > 4 hr:
If currently in single G2 GPC OPS:
22. Perform G2 SET EXPANSION, target Dual G2
(ORB OPS, DPS), then:

Cont next page  OV103,104
REASSIGN STRINGS TO GPC 2 IN MC 2

NOTE
If Av Bay 2 fire and TIG > 4 hr:
  Reassign strings to GPC in unaffected Av Bay

23. **GNC 0 GPC MEMORY**
    CONFIG – ITEM 1 +2 EXEC
    Modify MC 2 per table – – – – –
    DOWNLIST GPC –
    ITEM 44 +2 EXEC

24. CRT O6
    GNC, OPS 201 PRO

25. GPC MODE 1(3) – STBY
    – HALT
    – STBY (tb-RUN)
    – HALT (tb-bp)
    PWR 1(3) – OFF
    √MODE 3,5 (two) –
    HALT (tb-bp)

26. Go to 8 PSI DEORBIT PREP (DEORB PREP, CONTINGENCY DELTAS)

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MS PWRDN

CDR, MS1  Perform PLB EQUIP PWRDN (below)
MS2  Perform remaining pwrdn

O14, O15, 1. cb ADTA (four) – op
O16:E 2. cb MNC RCS/OMS PRPLT QTY GAUGE – op
If TIG > 2 hr 40 min:
O14:B 3. cb MNA EVENT TIMER AFT – op
O15:B 4. MNB MSN TIMER AFT – op
A7U 5. TV PWR CNTL – PNL

CONTR UNIT – OFF
A13 6. OS AUD SPKR PWR – OFF
L9 7. PS AUD PWR – OFF
MO42F 8. MIDDECK SPKR AUD SPKR PWR – OFF
MO58F 9. TV PWR – OFF

When RMS pwrd dn:
A3 10. MON PWR (two) – OFF
R14:E 11. cb CAMR (six) – op
MD44F 12. Cab temp cntl act link – pin to FULL COOL, stow

PLB EQUIP PWRDN

13. If orbit 2,3 deorbit >>
14. Perform PL SAFING, then:

CAUTION
If stow prob occurs with either RMS and/or
KU-BD ANT, perform aff sys QUICK
RESPONSE JETTISON (CONT DEORB)

If RMS grappled to OBSS:
15. Perform OBSS JETTISON (PDRS OPS FS,
OBSS CONTINGENCY), then:
If RMS-only:
16. Perform RMS PWRDN (PDRS OPS), then:
If KU-BD ANT deployed:
17. Perform KU-BD ANT STOW (ORB OPS,
COMM/INST), then:
If radiators deployed:
18. Go to RAD STOW (ORB OPS, ECLS)

LOSS OF CAB PRESS
ON-ORBIT
MS PAGE

OV103,104
DEORB PREP/ENTRY DELTAS PULLOUT PAGE

NOTE
Incorporate following changes or remove this page for use with the indicated checklist or cue card.

Single fault tolerance used for most cab air-cooled equipment. Addl LRUs may be activated if reqd and if CAB PRESS stable ≥ 8 psia

A. Deltas to the LAUNCH DAY ORBIT 2(3) (CONT DEORB)
1. Minimize use of IDPs, MDUs, FLT CNTLR PWR, DDU. Use one PGSC
   If rev 2:
   2. APU HTRS & DED DISP ENT CONFIG
      Do not pwr TACANs
   If rev 3:
   3. ENT FWD FLT DECK CONFIG
      Do not pwr MLS, TACANs
   4. In ENT SW LIST/VER, do not activate pwrn items

B. Deltas to DEORBIT BURN (ENT)
At TIG-4:
1. Use two IDP/CRTs with four MDUs as reqd for deorbit burn

   O14,O15,
   O16:E
   F6,F8

   2. cb DDU L,R (four) – cl

   3. L,R FLT CNTLR PWR (two) – ON

C. Deltas to POST BURN (ENT)
1. Use one IDP/CRT with two MDUs as reqd

   F6,F8
   O14,O15,
   O16:E

   2. L,R FLT CNTLR PWR (two) – OFF

   3. cb DDU L,R,AFT (six) – op

   4. Delete ANTISKID, NWS callouts (ENTRY SW CHECK)

Cont next page
D. Deltas to ENTRY MANEUVERS (Cue Card)

At EI:
1. Use two IDP/CRTs with four MDUs as reqd
2. cb DDU L,R (four) – cl
3. L,R FLT CNTLR PWR (two) – ON
4. cb ADTA 1,2,3 (three) – cl
5. BFS, GNC I/O RESET

At V = 15K:
   If CAB P < 8 psia:
       6. Delete NAVAIDS callout
   If CAB P ≥ 8 psia:
       7. Activate all TACANs, RAs, MLSs
           GNC I/O RESET
           At M < 1.0, go to step 11

At V = 10K:
8. TACAN 2,3 MODE sel (two) – GPC

At M = 2.7:
9. Use two HUDs, MLSs, and RAs as reqd
10. GNC I/O RESET

At M < 1.0:
11. ANTISKID – ON
12. NWS – 1
LOSS OF HI LOAD EVAP

NOTE
MAL, ECLS SSR-2, FES CORE FLUSH
PROCEDURE should be performed if core icing is suspected. If unsuccessful, perform pwrdn prior to RAD BYPASS at TIG-2:50 during deorb prep. If already in deorb prep, perform pwrdn and review activities already performed for changes.

C3
1. MSTR MADS PWR – OFF
2. Minimize ltg
3. Use one IDP/CRT with two MDUs, one FLT CNTLR PWR, and one PGSC as reqd
4. Perform PL PWRDN, then:

O7
5. TACAN MODE sel (three) – OFF
O8
6. RDR ALTM (two) – OFF
7. MLS (three) – OFF
L1
8. FLOW PROP VLV LOOP tb (two) – ICH
9. HI LOAD DUCT HTR sel – OFF
A3
10. TV MON (two) – OFF
If FLT CNTLR PWR not reqd:
11. cb DDU L,R,AFT (six) – op

O14,O15, O16:E
12. Reset EVAP OUT T C&W upper limit (ch 107,117) to 2.15V (70 degF). Change B/U C&W parameter, 631207, 631407 upper limit to 70 A.

Deltas to NOMINAL DEORBIT PREP (DEORB PREP)
if not already performed
At TIG-03:00, prior to RAD BYP:
L1
1. H2O LOOP 2(1) BYP MODE – MAN
   MAN – DECR (hold 30 sec)
   FLASH EVAP CNTLR PRI A – OFF
   B – OFF
   SEC – ON
   HI LOAD EVAP – OFF
   Perform RAD BYPASS/FES C/O (ORB OPS, ECLS):
      Delete steps 3 and 5 thru 8 (SEC FES C/O)
At TIG-03:15 in DED DISP ENT CONFIG:
2. Do not pwr NAV/LDG AIDS, ADTAs
   Pwr DDUs, MDUs only as reqd
At TIG-01:50, ENT SWITCH LIST/VERIF:

3. Do not pwr NAVAIDS, ADTAs
   Delete BRAKE/ANTISKID ACT
4. Go to LOSS OF HI LOAD EVAP DEORB OR
   ENTRY PULLOUT PAGE (ENT PKT, PWRDN)

B. Deltas to DEORBIT BURN (ENT)
   At TIG-10:
   O14, O15, O16:E
   1. cb DDU L,R (four) – cl
   2. Use two IDP/CRTs with four MDUs, and two FLT
      CNTLR PWR for burn
   At TIG-5:
   L1
   3. TOP EVAP HTR NOZ (two) – OFF
      DUCT sel – OFF

C. Deltas to POST BURN (ENT)
   F6, F8 O14, O15, O16:E
   1. L,R FLT CNTLR PWR (two) – OFF
   2. cb DDU L,R (four) – op (save for entry)
   3. Use one IDP/CRT with two MDUs
   4. Delete ANTISKID, NWS callouts (ENTRY SW
      CHECK)

D. Deltas to ENTRY MANEUVERS (Cue Card)
   At EI:
   O14, O15, O16:E
   F6
   1. cb DDU L,R (four) – cl
   2. L FLT CNTLR PWR – ON
   3. Use two IDP/CRTs with ON
   O14, O15, O16:A
   4. BRAKES (three) – ON
   O14, O15, O16:E
   5. cb ADTA 1,2,3 (three) – cl
   6. GNC I/O RESET
   7. NWS – 1
   8. ANTISKID – ON
   At V = 15K:
   O7
   9. Delete NAVAIDS callout
   10. TACAN 2,3 MODE sel (two) – GPC
   At M = 2.7:
   11. Use two HUDs, MLSs, and RAs
   12. GNC I/O RESET

OV103,104
LOSS OF 1 FREON LOOP

MS  Perform MS PWRDN, 10-36

C3  1.  MSTR MADS PWR – OFF
    2.  Minimize itg
    3.  Use one IDP/CRT with two MDUs as reqd, and one PGSC

If FLT CNTLR PWR not reqd:

O14,O15,  4.  cb DDU L,R,AFT (six) – op
O16:E

5.  If reqd, perform PL PWRDN, then:

L1  6.  √FLOW PROP VLV LOOP tb (two) – ICH
    7.  H2O LOOP 2(1) BYP MODE – MAN
        MAN – DECR (hold 30 sec)

[SM SYS SUMM 2]

If EVAP OUT T not ~39 degF and stable:

8.  Perform TOPPING FES STARTUP (ORB OPS, ECLS), then:

If prior to deorb prep:

If dual or triple G2:

9.  Perform G2 SET CONTRACTION (ORB OPS, DPS) to single G2, then:

O15:F  10.  MMU 2 – OFF
W1-10  11.  Mnvr to shade windows from sun or install
        Window Shades

[SM SYS SUMM 1]

12.  Check kW; if >14 kW: Perform PRIOR PWRDN (numbered) (except FES and one PGSC) until
    ≤ 14 kW, then:

13.  Use UNDOCKING/DEORB/ENTRY DELTAS PULLOUT PAGE, 10-37, for changes to
    UNDOCKING/DEORB PREP and ENT >>

If in deorb prep:

F6,F8  14.  √FLT CNTLR PWR (two) – OFF

O7  15.  Use one IDP/CRT with two MDUs, as reqd

O8  16.  TACAN MODE sel (three) – OFF

17.  RDR ALTM (two) – OFF

18.  MLS (three) – OFF

L2  19.  ANTISKID – OFF
        NWS – OFF

20.  Continue with DEORB PREP; use UNDOCKING/DEORB/ENTRY DELTAS PULLOUT PAGE, 10-37, for changes

OV103,104
MS PWRDN

1. Minimize lgt on Aft Flt Deck and Middeck

R14:D  2. cb TV (fifteen) – op
        :E  3. CAMR (six) – op
        A3  4. MON 1,2 PWR (two) – OFF

If CO2 RMVL SYS flown:

MO51F  5. CO2 RMVL SYS CNTLR 1(2) MODE – STBY
        (hold 3 sec)
        6. Remove current cans, install two fresh LiOH cans

If in deorb prep:

O14,O15,  7. BRAKES (three) – OFF
          O16:A
O14,O15,  8. cb ADTA (four) – op
          O16:E
UNDOCKING/DEORB/ENTRY DELTAS PULLOUT PAGE

NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN.

Incorporate following changes or remove these pages for use with the indicated checklist or cue card.

Undocking from ISS will be performed with Single G2 (i.e., no +Z redundancy)

Perform NOMINAL DEORBIT PREP (DEORB PREP) with the following contingency deltas to the procedure

A. Deltas to DEORB PREP
   1. Use one FLT CNTLR PWR, DDU, PGSC, and one IDP/CRT with two MDUs, as reqd
   2. Minimize ltg
   3. Minimize sun in cab if possible
   If rev 3 deorb, deltas to LAUNCH DAY ORBIT 3 (CONT DEORB):
      4. ENT FWD FLT DECK CONFIG [10]
         Do not pwr MLS,TACANs
   If nominal deorb prep:
      Deltas to NOMINAL DEORBIT PREP (DEORB PREP):
      5. Verfiy steps 14 thru 20, 10-35, MS, steps 7,8, 10-36
      6. DED DISP ENT CONFIG [6]
         Do not pwr ADTAs,TACANs
         Add: Pwr NAV/LDG AIDS per ENTRY MANEUVERS (Cue Card)
         Minimize MDU use
      7. ENT SWITCH LIST/VERIF
         Do not pwr LRUs previously pwrd dn

B. Deltas to DEORBIT BURN (ENT)
   1. Maintain window shading att until TIG-15
      At TIG-15:
      2. Remove Window Shades if installed
      At TIG-10:
      O14,O15,O16:E
      3. cb DDU L,R (four) – cl
      4. Use two IDP/CRTs with four MDUs, two FLT CNTLR PWR for burn

Cont next page
C. Deltas to POST BURN (ENT)

F6,F8
1. L, R FLT CNTLR PWR (two) – OFF
O14,O15, O16:E
2. cb DDU L, R (four) – op
3. Use one IDP/CRT with two MDUs
4. Delete ANTISKID, NWS callouts
   (ENTRY SW CHECK)

D. Deltas to ENTRY MANEUVERS (Cue Card)

At EI:
O14,O15, O16:E
1. cb DDU L, R (four) – cl
O16:E
2. L FLT CNTLR PWR – ON
O14,O15, O16:A
3. Use two IDP/CRTs with four MDUs
O14,O15, O16:E
4. BRAKES (three) – ON

At V = 15K:
O7
5. Delete NAVAIDS callout
TACAN MODE sel (two) – GPC
At V = 12K:
6. Perform RAD FLOW in unfailed loop
At M = 2.7:
7. Use two HUDs, MLSs, and RAs
   GNC I/O RESET

E. Deltas to POST LDG (ENT)

If EVAP OUT T high and incr, go to EMER PWRDN
   (Cue Card)

F. Deltas to EVAP OUT TEMP HIGH (Cue Card)

If EVAP OUT T HIGH and V > 12K:
   Establish RAD FLOW in unaff loop:
L1
1. RAD BYP VLV MODE 1(2) – AUTO
   CNTLR LOOP 1(2) – AUTO A(B)
2. Perform EVAP OUT T HIGH (Rads
   Coldsoaked), steps 2 thru 4
If EVAP OUT T HIGH and V < 12K:
   If loop 1(2) lost:
L1
3. NH3 CNTLR B(A) – PRI/GPC

OV103,104
LOSS OF 1 FC

If before deorb prep:

L1 1. √CAB FAN A(B) – ON
   If total Orb kW > 18:
   2. Perform PRIOR PWRDN, GROUP 1,2 (except FES), then:
   3. Perform PL PWRDN
   If FC 1 or 2 failed:
      R1 4. √MN BUS TIE A,B (two) – ON
           √C – OFF
   If FC 3 failed:
      5. PL PRI MNB – ON
         MNC – OFF
         FC3 – OFF
      6. √MN BUS TIE C,A (two) – ON
          √B – OFF
   If any FC AMPS > 330 or ∆AMPS > 100:
      7. Perform MAL, EPS SSR-8, BUS LOADING – LRU SELECT, then:
      8. Go to step 18
If in deorb prep:

L1 14. √CAB FAN A(B) – ON
         R14:D 15. cb TV (fifteen) – op
         R14:E cb CAMR (six) – op
   O7 11. TACAN MODE sel (three) – OFF
   O8 12. RDR ALTM (two) – OFF
   13. MLS (three) – OFF
   A3 16. MON 1,2 PWR (two) – OFF
   A11 17. CRYO TK HTR (four) – OFF
If FC recoverable:

L1 18. Go to MAL, EPS SSR-3, FC SHUTDN C&W LIMIT CHANGE >>
If FC unrecoverable:

L1 19. Make FDF Delta changes as given (next page), then as time permits reconfig C/W limits per MAL, EPS SSR-3, FC SHUTDN C&W LIMIT CHANGE

Cont next page  OV103,104
FDF changes:

A. Deltas to DEORBIT BURN (ENT)

TIG-5:

L1
1. TOP EVAP HTR NOZ (two) – OFF
   DUCT sel – OFF
   HI LOAD DUCT HTR sel – OFF
   HUM SEP (two) – OFF

L2
FLASH EVAP FDLN HTR SPLY (two) – OFF

B. Deltas to EPS procs in this book

1. FC REACTANT VLV CLOSED: Delete step 6; Change step 2 to read:
   If aff FC/MN bus tied and COOL P > 40:
   2. MN BUS TIE (three) – ON (ASAP)
      (Aff) MN BUS TIE (one) – OFF (ASAP)

2. FC COOL P: Delete step 1

3. BUS TIE, steps 1, 7: Delete ‘(A to...A)’

4. FC1(2,3) H2 PUMP ↑↓: Replace step 3 with:
   If aff FC/MN bus tied:
   3. MN BUS TIE (three) – ON
      (Aff) MN BUS TIE (one) – OFF

5. FC SAFING: Replace steps 7, 8 with:
   If aff FC/MN bus tied:
   7. MN BUS TIE (three) – ON
   8. (Aff) MN BUS TIE (one) – OFF

6. FC H2O RLF NOZ TEMP ↑↓: Replace step 3 with:
   If aff FC/MN bus tied:
   3. MN BUS TIE (three) – ON
      (Aff) MN BUS TIE (one) – OFF

7. FC DELTA V 1(2,3):
   Delete step 1
   Add ‘MN BUS TIE (three) – ON, then:’ to beginning of step 4

C. Deltas to EPS (ENT PKT)

1. Perform LOSS OF 1 FC, part B, steps 1 thru 8 (ENT PKT, PWRDN), then:
   If in deorb prep:
   2. Go/return to NOMINAL DEORBIT PREP (DEORB PREP) >>

D. Deltas to FLIGHT PLAN at 10 min prior to ‘Go to DEORB PREP’, add: ‘perform LOSS OF 1 FC, steps 9 thru 17 (ORB PKT, PWRDN)’
LOSS OF 2nd FC ON-ORBIT (TIG < 4 hr)

If Rev 2,3 deorbit:
1. Go to LOSS OF 2nd FC (ASC PKT, PWRDN) >>
2. If TIG < 1.5 hr: Sel new TIG > 1.5 hr
   (this pwrdn and the deorbit prep require 1.5 hr)

NOTE
Do NOT perform BUS LOSS ACTION unless bus shorted (step 29 regains bus)

* FC capability is ~12 kW for sustained operations, *
* ~13 kW for short duration (~4 hr), ~16 kW for   *
* contingency situations (~10 min). Purge FC at   *
* 430 amps or less   *

MS 3. Perform AFT PNL PWRDN, 10-43, immed
   C3 4. √MSTR MADS PWR – OFF
   5. Minimize ltg
   6. Use only one DDU, PGSC, and FLT CNTLR PWR as
      reqd. One IDP/CRT off as reqd
   O7 7. √TACAN MODE sel (three) – OFF
   O8 8. √RDR ALTM (two) – OFF
   MS 9. √MLS (three) – OFF

If GPC 2 on:
10. GNC 0 GPC MEMORY
    CONFIG – ITEM 1 +2 EXEC
    Modify MC 2 per table – – – –
    For any IDP that is OFF:
    11. GPC/CRT1/X EXEC
    12. √DOWNLIST GPC (ITEM 44) – 1
        GNC, OPS 201 PRO
    O6 13. GPC MODE 2 – STBY (tb-bp)
           – HALT
           PWR 2 – OFF
    14. √MODE 3,5 (two) – HALT
        (tb-bp)
           PWR 3 – OFF
    O15:F 15. √MMU 2 – OFF

Cont next page  **OV103,104**
16. **GNC 20 DAP CONFIG**
   - Sel TAIL PRI P,Y OPTION
   - Sel PRI JETS

O7 17. AFT L,R RCS MANF ISOL 4 (two) – CL
O14,O15, 18. RJDF DRIVER (four) – OFF
O16:F 19. MDM FF4 – OFF
O14:F 20. RJDA 2A L4/R4 DRIVER – OFF

L1 21. √FLOW PROP VLV LOOP tb (two) – ICH
22. [SM 88 APU/ENVIRON THERM]
23. H2O LOOP 2 BYP MODE – MAN
   - MAN – INCR(DECR)
   - (adjust until ICH FLOW ~950)

If no MANF leak:

R1 24. √O2,H2 MANF VLV (four) – OP
   - TK1 HTRS B – AUTO (MNA or MNB ↓) or
   - TK2 HTRS B – AUTO (MNC or no
   - MN BUS ↓), then:
   - All others OFF

If MANF leak:

R2 25. √O2/H2 HTR LOSS TABLE (EPS), 5-20
   - Sel one htr in one O2,H2 TK

L4:L 26. HYD CIRC PUMP (three) – OFF
   - cb AC1,2 φA CAB T CNTLR 1,2 (two) – op

If not MN bus short, tie three MN BUSES:

   28. Perform BUS TIE (Cue Card), then:
Post BUS TIE config check:

   29. √CAB FAN A(B) – ON

L1 30. Perform RCS SECURE, FWD RCS only (RCS), 8-2, then:
31. Perform MAL, EPS SSR-3, FC SHUTDN C&W LIMIT
CHANGE, then:
32. Go to LOSS OF 2 FC (CONT DEORB). Refer to
Activities Priority Table for activities to be performed in the CONT DEORB
AFT PNL PWRDN

A11 1. CRYO TK HTR (four) – OFF
2. APU HTR LUBE OIL LN (three) – OFF
3. HYD HTR (eight) – OFF
A14 4. RCS/OMS HTR FWD RCS – OFF
        RCS JET (five) – OFF
5. Perform PL SAFING, then:

CAUTION
If stow prob occurs with either RMS and/or
KU-BD ANT, perform aff sys QUICK
RESPONSE JETTISON (CONT DEORB)

If RMS grappled to OBSS:
6. Perform OBSS JETTISON (PDRS OPS FS,
   OBSS CONTINGENCY), then:
If RMS-only:
7. Perform RMS PWRDN (PDRS OPS), then:
If KU-BD ANT deployed:
8. Perform KU-BD ANT STOW (ORB OPS,
   COMM/INST), then:
If radiators deployed:
9. Perform RAD STOW (ORB OPS, ECLS), then:
A3 10. MON PWR (two) – OFF
R14:D 11. cb TV (fifteen) – op
        :E CAMR (six) – op
ML86B:C 12. √cb MNB EXT AIRLK HTR VEST Z1/2/3 – op
If MMU is pwrd:
    :D 13. cb MNA MMU PORT HTR A – op
            STBD HTR A – op
            MNB MMU PORT HTR B – op
            STBD HTR B – op
MD44F 14. Cab temp cntl act link – pin to FULL COOL
If CO2 RMVL SYS flown:
MO51F 15. CO2 RMVL SYS CNTLR 1(2) MODE – STBY
            (hold 3 sec)
16. Remove current cans and install two fresh LiOH cans

LOSS OF 2nd FC
ON-ORBIT (TIG < 4 hr)
MS PAGE  OV103,104
LOSS OF 2nd FC ON-ORBIT (TIG > 4 hr)

NOTE
Do NOT perform BUS LOSS ACTION unless
bus shorted (step 8 regains bus).

If docked with ISS, perform PWRDN completely
prior to undocking

* FC capability is ~12 kW for sustained operations,
* ~13 kW for short duration (~4 hr), ~16 kW for
* contingency situations (~10 min). Purge FC at
* 430 amps or less

MS 1. Perform MS OVHD AND AFT PNL PWRDN, 10-47,
immed
C3 2. MSTR MADS PWR – OFF
   GNC 21 IMU ALIGN
3. IMU 1,2 (two) – desel
   If GPC 2(3) on:
4. GPC 0 GPC MEMORY
   CONFIG – ITEM 1 +2 EXEC
   \DOWNLIST GPC
   (ITEM 44) – 1
C3 5. GNC, OPS 201 PRO
CRT For any IDP that is OFF:
   GPC/CRT1/X EXEC
O6 6. GPC MODE 2 – STBY (tb-bp)
   – HALT
   PWR 2 – OFF
   \MODE 3,5 (two) – HALT
   (tb-bp)
   \PWR 3 – OFF
O15:F 7. MMU 2 – OFF
   If not MN bus short, tie three MN buses:
   Perform BUS TIE (EPS),
5-16, then:
9. Minimize ltg
10. Use one DDU, PGSC, and FLT CNTLR PWR as reqd.
   Use one IDP/CRT with four MDUs
O7 11. TACAN MODE sel (three) – OFF
O8 12. RDR ALTM (two) – OFF
13. MLS (three) – OFF

Cont next page
L1
14. √FLOW PROP VLV LOOP tb (two) – ICH
15. AV BAY 2 FAN A,B (two) – OFF
16. √CAB FAN A(B) – ON

L4:L
17. cb AC1,2 φA CAB T CNTLR 1,2 (two) – op
18. Perform GG FREE DRIFT, ATT ID B (mnvr in PRI, establish drift in VERN) (ORB OPS, RCS), then:
   If docked with ISS, have ISS establish mated att control
19. Set event timer for 30 min (for FES duct htr deact)

O14,O15, O16:F
20. RJD LOGIC,DRIVER (seventeen) – OFF

O6
21. MDM FF1,FF2,FF4 (three) – OFF
   FA1,FA2,FA3,FA4 (four) – OFF

L1
22. TOP EVAP HTR NOZ L,R (two) – OFF
23. √HI LOAD DUCT HTR sel – OFF
24. SM 88 APU/ENVIRON THERM
25. H2O LOOP 2 BYP MODE – MAN
   MAN – INCR(DECR)
   (adjust until ICH FLOW ~950)

R1
26. √O2,H2 MANF VLV (four) – OP
   TK1 HTRS B – AUTO (MNA or MNB ↓) or
   TK2 HTRS B – AUTO (MNC or no
   MN BUS ↓), then:
   All others OFF

If no MANF leak:
27. √O2/H2 HTR LOSS TABLE (EPS), 5-20
   Sel one htr in one O2,H2 TK

If MANF leak:
28. √O2/H2 HTR LOSS TABLE (EPS), 5-20

R2
29. BLR CNTLR/HTR (three) – OFF
30. HYD CIRC PUMP (three) – OFF

R4
30. Verify RMS, KU-BD ANT, and RADS stowed, then:
   MCA LOGIC (fourteen) – OFF

MA73C:A, B
31. MCA LOGIC MNB FWD 2 – ON

If H2O LOOP 2 failed:
32. √TOP EVAP HTR DUCT sel – OFF
33. Perform MAL, EPS SSR-3, FC SHUTDN C&W LIMIT
   CHANGE, then:
   If docked with ISS, perform UNDOCKING DELTAS
   prior to undocking
34. Go to LOSS OF 2 FC (CONT DEORB)

OV103,104
MS OVHD AND AFT PNL PWRDN

1. IMU 1 – OFF (confirm IMU desel)
2. IMU 2 – OFF (confirm IMU desel)
3. cb MNC RCS/OMS PRPLT QTY GAUGE – op
4. TV (fifteen) – op
5. CRYO TK HTR (four) – OFF
6. APD HTR LUBE OIL LN (three) – OFF
7. HYD HTR (eight) – OFF
8. RCS/OMS HTR FWD RCS JET 1,2,3,4 (four) – OFF
9. VAC VENT NOZ HTR – OFF
10. cb MNA H2O LN HTR A – op
11. cb MNA H2O LN HTR B – op
12. √cb MNB EXT AIRLK HTR VEST Z1/2/3 – op
13. cb MNA MMU PORT HTR A – op
14. Cab temp cntl act link – pin to FULL COOL
15. Perform PL SAFING, then:
   CAUTION
   If stow prob occurs with either RMS and/or KU-BD ANT, perform aff sys QUICK RESPONSE JETTISON (CONT DEORB)

If RMS grappled to OBSS:
16. Berth OBSS or perform OBSS JETTISON (PDRS OPS FS, OBSS CONTINGENCY), then:
   If RMS-only:
   17. Perform RMS PWRDN (PDRS OPS), then:
   If KU-BD ANT deployed:
   18. Perform KU-BD ANT STOW (ORB OPS, COMM/INST), then:
   If radiators deployed:
   19. Perform RAD STOW (ORB OPS, ECLS), then:
20. Report to CDR: RMS, KU-BD ANT, and RADS stowed
21. MMU 1 – OFF
22. cb CAMR (six) – op
23. MON PWR (two) – OFF
   If CO2 RMVL SYS flown:
24. CO2 RMVL SYS CNTLR 1(2) MODE – STBY (hold 3 sec)
25. Remove current cans and install two fresh LiOH cans

LOSS OF 2nd FC
ON-ORBIT (TIG > 4 hr)

OV103,104

MS PAGE

A10-47 OPCL/ALL/GEN M,3
UNDOCKING DELTAS

NOTE
Following steps reqd to recover RCS functionality prior to undock

1. One hour prior to undock:
   A14  RCS/OMS HTR FWD RCS JET 1,2,3,4 (four) – ON
   O14,O15, 2. RJD LOGIC, DRIVER (seventeen) – ON
     O16:F
   O6  3. MDM FF1, FF2, FA1, FA2 (four) – ON

After undocking complete and post Final Sep:
4. Perform GG FREE DRIFT, ATT ID B (mnvr in PRI. Establish drift in VERN) (ORB OPS, RCS), then:
   O14,O15, 5. RJD LOGIC, DRIVER (seventeen) – OFF
     O16:F
   O6  6. MDM FF1, FF2, FA1, FA2 (four) – OFF
   A14  7. RCS/OMS HTR FWD RCS JET 1,2,3,4 (four) – OFF
LOSS OF 2 FREON LOOPS

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC purge must be started and loads pwr'd dn ASAP</td>
</tr>
<tr>
<td>Orbiter lifetime is expected to be 120 min from LOSS OF 2nd FREON LOOP with all three FCs running. This assumes three FCs are pwr'd dn to a total level of 8 kW immed and are continuously purged</td>
</tr>
<tr>
<td>Earliest possible landing is req'd</td>
</tr>
</tbody>
</table>

NOTES
- Failure assumed to occur after GO for On-orbit and before Deorbit TIG-2:05
- COMM proc's, 10-65 thru 10-68, should be used throughout this proc and CONT DEORB
- Preferred comm config is:
  A. UHF only
  B. GSTDN S-BD if reqd
  C. TDRS only if mandatory
- If docked to ISS, this proc is to be worked simo with JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS)
TIME CRITICAL PROCEDURES

NOTE
Undocking will be performed with Single G2
(i.e., no +Z redundancy)

1. If in OPS 1: Go to LOSS OF 2 FREON LOOPS (POST OMS-2)
   (ASC PKT, PWRDN) >>
2. Have CDR perform JOINT EXPEDITED UNDOCKING AND
   SEPARATION (SODF: JOINT OPS)
3. Have MS exec RAD STOW, KU-BD ANT STOW, and PLBD
   CLOSE, 10-57, ASAP
4. Have second MS exec RMS STOW and MS OVHD AND AFT PNL
   CONFIG, 10-59 thru 10-62, ASAP
5. Have third MS exec COMM PWRDN, 10-65; delay 10 min max if
   AOS

Perform following steps ASAP:
O14,O15, 6. \sqrt{Pri RJD LOGIC, DRIVER (sixteen) – ON
O16:F    DAP: ALT (this proc results in loss of VERNs)
O16:F    RJD MANF L5/F5/R5 DRIVER – OFF
7.    Record MET of failure of 2nd FREON LOOP:
        / __/ __:__ __:___
C3 8. MSTR MADS PWR – OFF
MS R11U 9. FC PURGE HTR – ON
10.    \sqrt{VLVS 1,2,3 (three) – OP
11.    Minimize Itg
CRTX 12. Use only one fwd IDP/CRT with one MDU (save IDP3
        for entry)
F6/F8 13. Use only one PGSC
14. \sqrt{FLT CNTLR PWR (two) – OFF, as reqd

Cont next page OV103,104
Config GPC 1 to MC 2:
15. **GNC 0 GPC MEMORY**
16. CONFIG – ITEM 1 + 2 EXEC
   If not GNC 201, then:
   17. GNC, OPS 201 PRO
   18. Modify MC 2 per table

**NOTE**
The following must be an OPS mode recall:
GNC, OPS 201 PRO

For any IDP that is OFF:
19. GPC/CRT1/X EXEC
20. √BFC CRT DISP – OFF
21. GPC MODE 2,3 (two) – STBY (tb-bp), HALT
    – STBY (tb-RUN)
    – HALT (tb-bp)
    PWR 2,3 (two) – OFF
    MODE 5 – STBY (tb-RUN)
    – HALT (tb-bp)
    OUTPUT 5 – NORM
    PWR 5 – OFF
22. √TACAN MODE sel (three) – OFF
23. √RDR ALTM (two) – OFF
24. √MLS (three) – OFF
25. FCS CH (four) – AUTO
26. MPS MANF PRESS (two) – CL
27. HYD CIRC PUMP (three) – OFF
28. MPS He ISOL (six) – CL
    PNEU He ISOL – CL
    L ENG He XOVR – CL
29. HUM SEP (two) – OFF
30. √IMU FAN B – ON
    A,C (two) – OFF
31. Cab temp cntl act link – pin to FULL COOL
32. CAB FAN A,B (two) – OFF
33. √AV BAY 1 FAN A – OFF
   √2,3 FAN A,B (four) – OFF
   √1 FAN B – ON
34. FREON PUMP LOOP 1,2 (two) – OFF (one-ON, if any flow)
35. RAD CNTLR LOOP 1,2 (two) – OFF
36. √NH3 CNTLR A,B (two) – OFF
   If no FREON PUMPS ON, then:
37. O2 SYS 1,2 SPLY (two) – OP (tb-OP)
38. FLASH EVAP CNTLR PRI A,B (two) – OFF
    TOP EVAP HTR NOZ (two) – OFF
    DUCT sel – OFF
39. HI LOAD DUCT HTR sel – OFF
40. FLASH EVAP FDLN HTR SPLY (two) – OFF
   If one FREON PUMP ON:
41. FLASH EVAP CNTLR PRI A – ON
42. TOP EVAP HTR NOZ (two) – OFF
    DUCT sel – ON
43. HI LOAD DUCT HTR sel – ON
44. FLASH EVAP FDLN HTR B SPLY – OFF
45. √ANTISKID – OFF
46. √NWS – OFF
47. S TRK PWR -Y,-Z (two) – OFF
48. ANNUN BUS SEL ACA 2/3 – OFF
49. IMU 1,2 (two) – desel
   – OFF
50. IDP/CRT MAJ FUNC (three) – GNC
51. GPC MODE 4 – STBY (tb-bp)
    – HALT
    PWR 4 – OFF
52. CONFIG – ITEM 1 +2 EXEC
53. Assign PL1/2 to GPC 1 (provides Uplk path)
54. GNC, OPS 201 PRO

CAUTION
Do not perform steps 50 thru 56 until PLBDs are closed
55. All IDPs, MDUs – OFF (use one IDP/CRT with one MDU as reqd until CONT DEORB proc, 3 min OFF for each min ON)

O6 56. MDM FF1,4 (two) – OFF
    FA1,4 (two) – OFF

F6 57. CDR disp sws – green dot

NOTE
If no site avail, bailout will be reqd; TIG will = MET of 2nd FREON LOOP failure + 1 hr

58. Sel ELS TIG ≤ 1 hr after MET of 2nd FREON LOOP failure (from MCC or PGSC):
   Selected TIG ___:___:___ MET
   (-) Present TIME ___:___:___ MET
   (=) Time to TIG ___:___:___ MET

If PL MDMs not currently being used for comm:

59. Verify PLBDs are closed, then:
   √ MDM PL1,PL2 (two) – OFF

L4:J 60. cb AC3 ΦA SIG CONDR HUM SEP – op
   ΦB SIG CONDR IMU FAN – op
   ΦA SIG CONDR HUM SEP – op
   ΦB SIG CONDR IMU FAN – op

:L 61. AC1 ΦA CAB T CNTLR 2 – op
   ΦB AV BAY 2 S/C – op
   AC2 ΦA CAB T CNTLR 1 – op
   ΦB AV BAY 3 S/C – op
   AC3 ΦA H2O CNTLR 1 – op

R1 63. MN BUS TIE (three) – ON

R2 64. √ O2,H2 MANF VLV TK1,TK2 (four) – op
   TK2 HTRS A,B (four) – OFF
   TK1,TK3 HTRS A,B (eight) – AUTO
   If O2 TK1(TK3) QTY < 80%:
   65. O2 TK1,TK3 HTRS A (two) – OFF

If not docked with ISS or when undocking complete and Post Final Sep:

66. BLR CNTLR/HTR 2 – OFF
   PWR 2 – OFF
   Perform POST UNDOCKING AND FINAL SEP RECONFIG, 10-55

67. Go to ENTRY CONFIG (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP) by ~ TIG-15 >>

OV103,104
POST UNDOCKING AND FINAL SEP RECONFIG

1. DAP: FREE
2. RJD LOGIC, DRIVER (seventeen) – OFF
3. cb MNA OI SIG CONDR OF 1/4 A – op
4. cb MNB OI SIG CONDR OF 1/4 B – op
   2/3 A – op
5. cb MNC OI SIG CONDR OF 2/3 B – op
6. √cb L,R,AFT DDU (six) – op
MS PULLOUT PAGE

MS
 Execute ASAP

R11U
  1. FC PURGE HTR – ON
     VLVS (three) – OP
  2. Minimize Itg on Aft Flt Deck
     If CO2 RMVL SYS flown:

MO51F
  3. CO2 RMVL SYS CNTLR 1(2) MODE – STBY
     (hold 3 sec)

NOTE
For following RAD STOW, KU-BAND ANT
STOW, and PLBD CLOSE procs, use the
following MCA config. Disregard MCA sw
throws in other procs until PLB doors closed

MCA LOGIC CONFIG

MA73C:A, B
  4. √All MCA LOGIC (fourteen) – ON
  5. MCA LOGIC MNA FWD 1 – ON
     MNB FWD 2 – OFF
     MID 1 – OFF
     MNC FWD 3 – OFF
  :A
  6. MNA AFT 1 – OFF
     MNB AFT 2 – OFF
     MID 3 – OFF
     MNC AFT 3 – OFF
  :B

MA73C:B
  5. MCA LOGIC MNA FWD 1 – ON
     MNB FWD 2 – OFF
     MID 1 – OFF
     MNC FWD 3 – OFF

CAUTION
If stow prob occurs with KU-BD ANT,
perform QUICK RESPONSE JETTISON
(CONT DEORB)

If KU-BD ANT deployed:
  7. Perform KU-BD ANT STOW (ORB OPS,
     COMM/INST), then:
If radiators deployed:
  8. Perform RAD STOW (ORB OPS, ECLS), then:

Cont next page

LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE

OV103,104

A10-57
OPCL/ALL/GEN M
PLBD CLOSURE

WARNING
Verify no obstructions before closing and latching PLBD (Ku ANT, RAD, RMS, etc)

1. √MDM PL1, PL2 (two) – ON
   SM I/O RESET
2. Verify PL SAFING complete
3. SM, OPS 202 PRO – close PLBD ASAP
4. SM PL BAY DOORS
5. PL BAY DR SYS 1, 2 (two) – ENA
6. AC POWER ON – ITEM 1 EXEC
   AUTO MODE SEL – ITEM 3 EXEC
   PBD SW BYPASS – ITEM 14 EXEC
   CLOSE – ITEM 17 EXEC
   If ‘PLB SEQ FAIL’ msg during door closure and aft latches
   for that door are not ‘CL’:
7. Check door scallop on or below tgt line before
   continuing in MAN mode; otherwise:
8. Perform MAL, MECH SSR-2, CONTINGENCY PLBD CLOSURE, then:
9. PBD STOP – ITEM 16 EXEC
10. AC POWER OFF – ITEM 2 EXEC
    GPC/CRT 04 EXEC
11. IDP/CRT4 PWR – OFF
12. PL BAY DR SYS (two) – DSBL
    √FLOOD (all) – OFF
    All MCA LOGIC sw except MNA FWD 1 (thirteen) – OFF
13. GNC 23 RCS
    ITEM 1 EXEC (FRCS page)
    OVRD FRCS MANF(s) – OP
14. Report to CDR: RMS, KU-BD ANT, and RADS stowed; PLBD closed
15. Go to FLUID LOADING PREP, 10-63

LOSS OF 2 FREON LOOPS
ON-ORBIT MS PAGE

OV103,104
RMS STOW

NOTE
For following RMS STOW, use following MCA config. Disregard MCA sw throws in other procs until PLB doors closed

MA73C:A, 1. √MCA LOGIC MNA MID 1 – ON
B √3 – ON
√MNB MID 2 – ON
√4 – ON
√MNC MID 2 – ON
√4 – ON
2. Perform PL SAFING, then:

CAUTION
If stow prob occurs with RMS, perform QUICK RESPONSE JETTISON (CONT DEORB)

If RMS grappled to OBSS:
3. Perform OBSS JETTISON (PDRS OPS FS, OBSS CONTINGENCY), then:
If RMS-only:
4. Perform RMS PWRDN (PDRS OPS), then:

MS OVHD AND AFT PNL CONFIG

O13:A 1. cb ESS 1BC C/W A – op
:B CRYO QTY O2,H2 TK2 (two) – op
:C 2CA C/W B – op
(all SM tones and C/W lights and tones lost; CRT FAULT SUMM and SM ALERT light remains)
:E cb ESS 2CA MTU B – op
O13:B cb ESS 1BC CRYO QTY O2,H2 TK2 (two) – op
O13:C cb ESS 2CA C/W B – op
O13:E cb ESS 3AB GPC STAT – op

O14:A 2. √BRAKES MNA – OFF
3. √RGA 1 – OFF
:B 4. cb MNA OI SIG CONDR OM 1/2 A – op
:M DM OF 1/2 A – op
:3/4 A – op
:H2O BYP LOOP 1 SNSR – op
:MSN TIMER FWD – op
:EVENT TIMER AFT – op

Cont next page

LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE

OV103,104

OV103,104

OPCL/ALL/GEN M
O14:C 5. cb MNA UTIL PWR O19/MO52J – op
   :D FREON RAD CNTLR 1,2 (two) – op
   O2/N2 CNTLR 1 – op (leave cl if PCS 1 active)
   CAB VENT – op
   VENT ISOL – op
   :E √ADTA 1 – op
   √ACCEL 1 – op
   DDU L,AFT (two) – op
   :F 6. MMU 1 – OFF
   7. ASA 1 – OFF
O15:A 8. √BRAKES MNB – OFF
   9. √RGA 2 – OFF
   4 – OFF
   :B 10. cb MNB OI MDM OF 1/2 B – op
          H2O BYP LOOP 2 SNSR – op
          MSN TIMER AFT – op
          EVENT TIMER FWD – op
   :C UTIL PWR F1/MO13Q – op (leave cl if
          PGSC reqd)
   :D FREON RAD CNTLR 1,2 (two) – op
          O2/N2 CNTLR 2 – op (leave cl if PCS 2 active)
   :E ADTA 2 – op
          ACCEL 2 – op
          DDU L,R (two) – op
   :F 11. MMU 2 – OFF
   12. ASA 2 – OFF
   13. ACCEL 4 – OFF
O16:A 14. √BRAKES MNC – OFF
   15. √RGA 3 – OFF
   :B 16. cb MNC OI MDM OF 3/4 B – op
          AUX TIMING BUFF – op
   :C 17. CRYO O2 HTR TK2 SNSR 1 – op
       If GALLEY:
   18. cb MNC UTIL PWR A11/A15/MO30F – op

Cont next page

LOSS OF 2 FREON LOOPS
ON-ORBIT MS PAGE

OV103,104

A10-60 OPCL/ALL/GEN M
19. cb MNC ANNUN AFT ACA 4/5 – op
   O2 EMER – op
   :E ADTA 3,4 (two) – op
   DDU R,AFT (two) – op
   RCS/OMS PRPLT QTY GAUGE – op

20. ASA 3,4 (two) – OFF
21. ACCEL 3 – OFF
22. ATVC (four) – OFF
23. EIU (three) – OFF
24. SIG CONDR FREON A,B (two) – OFF
   :D OA 1/2/3 – OFF
25. MDC OA 1/2/3 – OFF
26. MEC 1 – OFF, wait 2 sec, then
   2 – OFF

27. TV PWR – OFF
28. COAS – OFF
29. CRYO TK4 HTR O2,H2 A,B (four) – OFF
30. APU HTR GAS GEN/FU PUMP 2 – OFF
   LUBE OIL LN 1,2,3 (three) – OFF
   APU HTR TK/FU LN/H2O SYS
   1B,2A,2B,3A (four) – OFF
   1A,3B (two) – AUTO
31. HYD HTR (eight) – OFF
32. OS AUD SPKR PWR – OFF
33. GPS PWR – OFF
   PRE AMPL (two) – OFF
34. RCS/OMS HTR FWD RCS – OFF
   L.R.POD (four) – OFF
   OMS CRSFD LN (two) – OFF
   FWD RCS JET (five) – OFF
   AFT RCS JET (five) – OFF
35. PTU/MAIN BUS A,B (two) – OFF (tb-OFF)
36. FLT CNTLR PWR – OFF, as reqd
37. ANNUN BUS SEL – OFF

If OV-103:

35. PTU/MAIN BUS A,B (two) – OFF (tb-OFF)

36. FLT CNTLR PWR – OFF, as reqd
37. ANNUN BUS SEL – OFF

Cont next page

LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE

OV103,104

A10-61
OPCL/3,4/GEN M,2
R14:A  38.  cb MNA ADC 1A/2A – op
       MNB ADC 1B/2B – op
R14:B  39.  MNA,MNB,MNC PALLET DSC (three) – op
R14:E  40.  TV (fifteen) – op
L9,R10 41.  MINIMIZE MIDDECK LTG
ML31C  42.  VAC VENT NOZ HTR – OFF
ML86B:A 43.  cb MNB H2O LN HTR B – op
ML86B:D 44.  cb MNA MMU PORT HTR A – op
       STBD HTR A – op
       MNB MMU PORT HTR B – op
       STBD HTR B – op
MO39M  45.  MIDDECK COMM CCU PWR – OFF
MO42F  46.  SPKR AUD PWR – OFF
        If no GALLEY:
        47.  Go to step 49
GALLEY 48.  OVEN/RHS – OFF
       H2O HTR (two) – OFF
       OVEN FAN – OFF
       Go to step 51
MO13Q  49.  FOOD WARMER – OFF
MD44F  50.  H2O DISPENSER PWR pb – OFF
        Cab temp cntl act link – pin to FULL COOL
MO13Q  52.  All MIDDECK Lts – lt off
FLUID LOADING PREP

GALLEY 1. OVEN/RHS – ON
2. Unstow, fill 4 water containers (per crewmember) with 8 oz of water each. Temp stow near seat
3. Unstow 8 salt tablets (per crewmember). Temp stow in Flt Suit pocket
4. OVEN/RHS – OFF
5. √H2O HTR (two) – OFF
6. √OVEN FAN – OFF
7. Stow Personal Hygiene Hose

NOTE
Ensure sufficient containers and salt tablets are prepared to continue fluid loading thru entry

FLUID LOADING

Immed (or as soon as time permits), begin drinking H2O (one 8-oz container every 15 min with a salt tablet in every other container); continue thru entry

CLOTHING CONFIG

Don QDM for temp > 90 degF and discomfort. If cab temp > 95 degF and no evaporative cooling is sensed, don LES, check tabs, close visor, LES O2 – ON

NOTE
Inflate anti-g suit as needed for on-orbit circulatory support

FDF CONFIG

1. Unstow: ENT, ENT PKT, ENT Cue Cards
2. Use DEORBIT BURN MONITOR and ENTRY MANEUVERS Cue Card (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP)

CAB CONFIG

1. Stow loose equipment
After Deorbit Targeting complete:
2. Stow Backup PGSC
3. Remove and stow Side hatch UV filter, locking device, and pyro box safing pin
4. Tape foot loops in egress routes
5. Remove and stow Window Shades (if not needed for cab T control)

LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE

OV103,104

A10-63 OPCL/ALL/GEN M
WCS DEACT

WCS 1. Foot Restraints – up, locked
ML31C 2. VAC VENT ISOL VLV CNTL – CL (tb-CL)
   If EDO WCS:
WCS 3. URINAL SEL – OFF
   4. WCS PWR SEL (two) – OFF1,OFF2
   5. \FAN PWR – AUTO

POLE SETUP

Perform ESCAPE POLE STOWAGE/SETUP (Cue Card), then:

SEAT INSTALLATION

1. Confirm minimum Itg on Middeck
2. Unstow LOSS OF 2 FREON LOOPS D/O PREP (CONT DEORB);
   perform MS PAGE procs
NOTE
The COMM PWRDN and POWERUP procs on this and following pages should be used until Touchdown

COMM PWRDN

MS
Pwr dn comm ASAP after comm with MCC no longer reqd.
Delay 10 min max if AOS. Use COMM POWERUP, 10-67, if MCC comm reqd. Comm will be pwr'd on entry by AFT PNL
CONFIG FOR ENTRY COMM, MS PULLOUT PAGE (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP) and special
ENTRY MANEUVERS Cue Card

1. S-BD PM ANT SW ELEC – OFF
   PRE AMP – OFF
   PWR AMPL STBY – OFF
   OPER – OFF
   MODE sel – STDN LO
   XPNDR – OFF
2. NSP PWR – OFF
   ENCRYPTION PWR – OFF
   (Encrypt disabled rest of flt)
   ENCRYPTION MODE – SEL
   SEL – BYP
3. S-BD PM CNTL – PNL,CMD
   OI PCMMU FORMAT – FXD
   PWR – OFF
   AUD CTR – OFF (pwr up as reqd for cockpit audio)
4. √S-BD PL CNTL – PNL
   √PWR SYS – OFF
   PL DATA INTLVR PWR – OFF
5. S-BD FM CNTL – PNL
   PWR – OFF
6. MON PWR (two) – OFF
7. TV PWR CONTR UNIT – OFF
8. UHF MODE sel – OFF
9. MDM PL1,PL2 (two) – OFF
10. VTR PWR – OFF
11. cb MNA,MNC GCILC (two) – op

Cont next page

LOSS OF 2 FREON LOOPS ON-ORBIT
MS COMM PAGE

OV103,104
NOTE
During each comm window, voice down cab temp, crew body temps and heart rates, per COMM POWERUP, 10-67; indicate severity of cab humidity.

If after TIG-10:
12. Go to AFT PNL CONFIG FOR ENTRY COMM, MS PULLOUT PAGE (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP)
COMM POWERUP (If comm reqd prior to landing site coverage)

Pwr up audio sys:
C3 1. AUD CTR – 1
O5 \( L \) AUD PWR – AUD
O9 \( R \) AUD PWR – AUD

If UHF avail, config for UHF comm (voice only):
O6 2. UHF MODE sel – SPLX \\
\( \sqrt{\text{SPLX/EVA PWR AMPL}} \) – ON
3. After comm with MCC complete: Go to COMM PWRDN, 10-65 >>

If UHF site unavail or if MCC requests data
(config for GSTDN(SGLS) S-BD):
C3 4. \( \sqrt{\text{S-BD PM CNTL}} \) – PNL
A1L \( \sqrt{\text{ANT SW ELEC}} \) – 2 \\
\( \sqrt{\text{MODE sel – STDN LO(SGLS)}} \)
\( \sqrt{\text{XPNDR}} \) – 2

5. NSP PWR – 2 \\
\( \sqrt{\text{DATA RATE XMIT}} \) – HI \\
\( \sqrt{\text{RCV – HI}} \)
\( \sqrt{\text{CODING XMIT}} \) – OFF \\
\( \sqrt{\text{RCV – OFF}} \)
\( \sqrt{\text{UPLK DATA}} \) – S-BD

C3/F9 6. Sel best S-BD PM ANT

If MCC requests data:
O14:B : 7. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
O17:D : 8. SIG CONDR OA 1/2/3 – ON
 : 9. MDM OA 1/2/3 – ON
C3 : 10. OI PCMMU PWR – 1
O6 : 11. MDM PL2 – ON
 : 12. GNC I/O RESET

At end of data transmission:
O14:B : 13. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
O17:D : 14. SIG CONDR OA 1/2/3 – OFF
 : 15. MDM OA 1/2/3 – OFF
After comm/data complete:
L 16. Go to COMM PWRDN, 10-65
If UHF site and GSTDN unavail and comm/data critical:
Config for TDRS S-BD:

CAUTION
This is a High Pwr Mode. On-time should be limited to 10 min max due to Pwr Amp Thermal constraints. A 3-min delay occurs after S-BD PM PNL/CMD before Pwr Amp is active. Uplink not affected. Proceed with selection of best antenna

- S-BD PM CNTL – PNL
- ANT SW ELEC – 2
- PRE AMP – 2
- PWR AMPL OPER – 2
- MODE sel – TDRS DATA
- XPANDR – 2
- NSP PWR – 2
- DATA RATE XMIT – HI
- RCV – HI
- CODING XMIT – ON
- RCV – ON
- UPLK DATA – S-BD
- Sel best S-BD PM ANT

If MCC requests data:
- cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
- SIG CONDR OA 1/2/3 – ON
- MDM OA 1/2/3 – ON
- OI PCMMU PWR – 1
- MDM PL2 – ON
- GNC I/O RESET
- At end of data transmission:
- cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
- SIG CONDR OA 1/2/3 – OFF
- MDM OA 1/2/3 – OFF

After comm/data complete:
- Go to COMM PWRDN, 10-65

LOSS OF 2 FREON LOOPS
ON-ORBIT
MS COMM PAGE

OV103,104
LOSS OF FES

MS
Perform MS PWRDN, 10-71, immed

C3
1. √MSTR MADS PWR – OFF
2. Minimize ltg
3. Use one PGSC, and one IDP/CRT with two MDUs only as reqd

If FLT CNTLR PWR not reqd:

O14,O15,
4. cb DDU L,R,AFT (six) – op

O16:E

O7
5. √TACAN MODE sel (three) – OFF

O8
6. √RDR ALTM (two) – OFF
7. √MLS (three) – OFF
8. Perform PL PWRDN, then:

L1
9. CAB TEMP CNTLR – OFF
10. H2O LOOP 2 BYP MODE – MAN
MAN – DECR (hold 30 sec)
PUMP LOOP 1 (two) – OFF, B
11. √FLOW PROP VLV LOOP tb (two) – ICH
12. √TOP EVAP HTR NOZ L,R (two) – OFF
   √DUCT sel – OFF
13. √HI LOAD DUCT HTR sel – OFF

L2
14. √NWS – OFF
15. √ANTISKID – OFF

L4:L
16. cb CAB T CNTLR 1,2 (two) – op

R2
17. BLR CNTLR/HTR (three) – OFF
MMU 2 deact:
18. [SM 1 DPS UTILITY]
   √MMU ASSIGN 1 SM – ITEM 3 EXEC
   MMU 2 – OFF

O15:F
If IMU ALIGN not reqd, mnvr to tail Sun att:
19. [GNC UNIV PTG]
   TGT ID – ITEM 8 +4 EXEC
   BODY VECT – ITEM 14 +5 EXEC
   P – ITEM 15 +1 8 4 EXEC
   Y – ITEM 16 +0 EXEC
   OM – ITEM 17 +9 0 EXEC (β < 0)
   +2 7 0 EXEC (β > 0)
   START TRK – ITEM 19 EXEC

20. Confirm MS pwrdn activities complete, then:
For deorbit prep:
21. Go to LOSS OF FES (CONT DEORB)
MS PULLOUT PAGE

MS2 Deploy rads, RAD DEPLOY (ORB OPS, ECLS)
MS1 Perform pwrdn below

MS PWRDN

1. Minimize Itg
2. √ BRAKES (three) – OFF
3. √ cb ADTA (four) – op
4. MSN TIMER FWD – op
5. MSN TIMER AFT – op
6. PL DATA INTLVR PWR – OFF
7. APU HTR LUBE OIL LN (three) – OFF
8. HYD HTR (eight) – OFF
9. RCS/OMS HTR FWD RCS – OFF
   and
   RCS/OMS HTR L,R POD (four) – OFF
10. cb TV (fifteen) – op
11. MON 1,2 PWR (two) – OFF
12. VAC VENT NOZ HTR – OFF
   If Manned Mnvr Unit is pwr’d:
13. cb MNA,MNB STBD HTR A,B (two) – op
   PORT HTR A,B (two) – op
14. Cab temp cntl act link – pin to FULL COOL

LOSS OF FES ON-ORBIT
MS COMM PAGE

OV103,104
AV BAY FIRE

AV BAY 1

NOTE
While performing proc, note any cbs open.

Equipment still pwrd in Av Bay following pwrdn:
- FPCA 1 MDM OF1
- FLCA 1 DSC OF1
- IMU FAN ACCU

If docked with ISS, proc results in loss of Lo Z Translation.

If no active GNC GPC: Perform GNC RECOVERY VIA G2FD (DPS), 3-12, concurrent with remainder of this proc.

R1  
1. cb AC CONTR AC1 (three) – cl
2. INV/AC BUS 1 – OFF (tb-OFF)
   INV PWR 1 – OFF (tb-OFF)
3. cb AC CONTR AC1 (three) – op
4. Perform FC1 SHUTDN, except PWRDN (Cue Card), then:

L1  
5. √AV BAY 1 FAN A,B (two) – OFF
6. FREON PUMP LOOP 2 – A
7. AV BAY 3 FAN A – ON
   B – OFF

C3  
8. OI PCMMU FORMAT – FXD
   PWR – 2
9. BFC CRT DISP – ON

O6  
10. √GPC PWR 5 – ON
   \OUTPUT 5 – NORM
   MODE 5 – STBY (tb-RUN), RUN
   4 – STBY (tb-bp), HALT
   PWR 4 – OFF

If GNC RECOVERY VIA G2FD (DPS), 3-12, performed:
12. Go to step 15

If Single G2 GPC OPS:
13. Perform G2 SET EXPANSION, target Dual G2 (ORB OPS, DPS), then:
If/when in Multiple GPC OPS:
14. Reassign strings to GPC 2 in MC 2
   [GNC 0 GPC MEMORY]

Cont next page
CRT CONFIG – ITEM 1 +2 EXEC
Modify MC 2 per table
DOWNLIST GPC – ITEM 44 +2 EXEC
GNC, OPS 201 PRO

O6 15. GPC MODE 1(3) – STBY (tb-bp)
   – HALT
   PWR 1 – OFF
   MDM FF1 – OFF
   PL1 – OFF
O7 17. TACAN 1 MODE sel – OFF
O8 18. RDR ALTM 1 – OFF
   MLS 1 – OFF
20. GNC 23 RCS
   CRT RCS FWD – ITEM 1 EXEC (*)
   MANF VLVS STAT OVRD – ITEM 41 EXEC – CL (MANF 2)

O13:A 21. cb ESS 1BC AC1 SNSR – op
   :E 3AB GPC STAT – op
O14:A 22. BRAKES MNA – OFF
   :C 23. cb MNA TACAN 1 – op
   :E 24. RDR ALTM 1 – op
   MLS 1 – op
   ADTA 1 – op
   ACCEL 1 – op
   F 25. MMU 1 – OFF
   26. RJDF 1B F1 LOGIC – OFF
      DRIVER – OFF
O15:F 27. RJDF 1A F2 LOGIC – OFF
      DRIVER – OFF
   28. ACCEL 4 – OFF
O16:A 29. BRAKES MNC – OFF
   :E 30. cb MNC ADTA 3 – op
A1R 31. PL DATA INTLVR PWR – OFF
   S-BD PL CNTL – PNL, CMD
MA73C:A 33. MCA LOGIC MNA FWD 1 – OFF
AW18H 34. PWR/BATT CHGR EMU 1,2 BUS SEL (two) – OFF
A12 35. HYD CIRC PUMP PWR 1 – MNB
   2 – MNC
   3 – MNA

Cont next page

OV103, 104
36. cb AC2 ΦA,ΦB,ΦC AV BAY 1 FAN B (three) – op
37. Perform MAL, EPS SSR-110, BUS LOSS: AC1, except:
   L1 √AV BAY 1 FAN A,B (two) – OFF, then:
38. Reassign SM into GPC 3, per MAL, DPS SSR-4, SM REASSIGNMENT
39. Perform LOAD PCMMU FORMAT, using TFL 161/103 (ORB OPS FS, COMM/INST), then:
40. BFC CRT DISP – OFF
    SEL – 3+1
    Check all IDPs deassigned from BFS
41. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3) (CONT DEORB) >>
42. Perform MAL, ECLS SSR-12, AV BAY FIRE RECOVERY/RECONFIG, Checkout and Recovery, then:
   For deorb prep:
   If orbit 3 deorbit:
43. Perform P&I nominal POST INSERTION, DEORB PREP (POST INSERT, ORBIT 7 D/O), then:
44. Go to AV BAY FIRE (DEORB PREP, CONTINGENCY DELTAS)
This Page Intentionally Blank
AV BAY 2

NOTE
While performing proc, note any cbs open.

Equipment still pwrd in Av Bay following pwrdn:
- FPCA 2 MDM OF2
- FLCA 2 DSC OF2
- BFC 3A (When GPC 3 is powered).

If docked with ISS, proc will require ISS to control mated attitude or result in loss of mated attitude control. Proc also results in loss of Lo Z Translation

R1
1. cb AC CONTR AC2 (three) – cl
2. INV/AC BUS 2 – OFF (tb-OFF)
   INV PWR 2 – OFF (tb-OFF)
3. cb AC CONTR AC2 (three) – op
4. Perform FC2 SHUTDN, except PWRDN (Cue Card), then:

L1
5. IMU FAN A(C) – ON
   B – OFF
6. AV BAY 1 FAN A – ON
   B – OFF
7. FREON PUMP LOOP 1 – A
8. \(\sqrt{\text{CAB FAN A – ON}}\)
   \(\sqrt{\text{B – OFF}}\)
9. \(\sqrt{\text{AV BAY 2 FAN A,B (two) – OFF}}\)

C3
10. \(\sqrt{\text{OI PCMMU PWR – 1}}\)

A1L
11. \(\sqrt{\text{S-BD PM MODE sel – TDRS DATA}}\)
    \(\sqrt{\text{NSP DATA RATE XMIT – HI}}\)
    \(\sqrt{\text{RCV – HI}}\)
    \(\sqrt{\text{CODING XMIT – ON}}\)
    \(\sqrt{\text{RCV – ON}}\)
    \(\sqrt{\text{PWR – 1}}\)
    \(\sqrt{\text{UPLK DATA – S-BD}}\)

C3
12. \(\sqrt{\text{S-BD PM CNTL – PNL,CMD}}\)

Cont next page
### REASSIGN STRINGS TO GPC 1 IN MC 2

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#### CRT
- **Config** – Item 1 +2 Exec
- Modify MC 2 per table

#### O6
- **GNC 0 GPC Memory**
- CRT Config – Item 1 +2 Exec

#### O13:C
- **cb ESS 2CA AC2 SNSR – op**

#### O15:A
- **cb BRAKES MNB – off**

#### O7
- **TACAN 2 MODE SEL – OFF**
- **PL2 – OFF**

#### O8
- **RDR ALTM 2 – OFF**
- **MLS 2.3 (two) – OFF**

#### O15:E
- **cb MNB MLS 3 – op**
- **ADTA 4 – op**
- **ACCEL 3 – OFF**

#### O14,O15
- **MMU 2 – OFF**
- **RJDA Logic, DRIVER (eight) – ON**

#### O16:A
- **cb BRAKES MNC – off**
- **cb MNC MLS 3 – op**
- **ADTA 4 – op**

#### O16:F
- **RJDF 2A F3 Logic – OFF**
- **DRIVER – OFF**
- **F4 DRIVER – OFF**
- **ACCEL 3 – OFF**
- **RJDF 2B F4/F5 Logic – OFF**
- **RJDF 2B F4 DRIVER – OFF**
- **ACCEL 3 – OFF**
- **RJD MANF L5/F5/R5 DRIVER – OFF**

#### A1L
- **S-BD PL POWR SYS – OFF**
- **CNTL – PNL, CMD**

---

### Table

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**OV103, 104**
35. √HYD CIRC PUMP PWR 1 – MNA
   2 – MNB
   3 – MNC

36. MCA LOGIC MNB FWD 2 – OFF

37. cb AC3 AV BAY 2 FAN B (three) – op

38. Perform MAL, EPS SSR-120, BUS LOSS: AC2, except:
   L1 √AV BAY 2 FAN A,B (two) – OFF, then:

39. Reassign BFS into GPC 3, per MAL, DPS SSR-7, GPC IPL MENU OPTION (PASS/BFS)

For deorb prep:
   If orbit 3 deorbit:
      40. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3) (CONT DEORB) >>

   If orbit 7 deorbit:
      42. Perform Deltas to nominal POST INSERTION, DEORB PREP (POST INSERT, ORBIT 7 D/O), then:

   For deorb prep:
      43. Go to AV BAY FIRE (DEORB PREP, CONTINGENCY DELTAS)
AV BAY 3A

NOTE
While performing proc, note any cbs open.

Equipment still pwrd in Av Bay following pwrdn:
FPCA 3  MDM OF3  GCIL
FLCA 3  DSC OF3
Active comm sys equipment
S-BD PWR-AMP stby (alt sys)

R1  1. cb AC CONTR AC3 (three) – cl
    2. INV/AC BUS 3 – OFF (tb-OFF)
       INV PWR 3 – OFF (tb-OFF)
    3. cb AC CONTR AC3 (three) – op
    4. Perform FC3 SHUTDN, except PWRDN (Cue Card), then:

L1  5. AV BAY 3 FAN A, B (two) – OFF
    6. CAB FAN B – ON
       A – OFF

L4:F  7. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
L1  8. H2O PUMP LOOP 1 – ON
       2 – GPC

If Triple G2:

CRT  8. CONFIG – ITEM 1 +2 EXEC
    Modify MC 2 per table

9. GNC, OPS 201 PRO

O6  10. √GPC MODE 3 – HALT
       √OUTPUT 3 – NORM
       √PWR 3 – OFF

11. MDM FF3 – OFF

O7  12. √TACAN 3 MODE sel – OFF

O13:A  13. cb ESS 1BC C/W A – op
        2CA C/W B – op
        (all SM tones and C/W lights and
         tones lost; CRT FAULT SUMM
         and SM ALERT light remains)

C  14. cb ESS 3AB AC3 SNSR – op

O13:E  15. Perform LOSS OF VERNIERS
        (ORB OPS, RCS) while continuing
        with pwrdn, then:

<table>
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Cont next page  OV103,104
If comm not working:

A1L  16. S-BD PM MODE sel – TDRS DATA
     √NSP DATA RATE XMIT – HI
     √RCV – HI
     √CODING XMIT – ON
     √RCV – ON
     √PWR – 1
     √UPLK DATA – S-BD

C3  17. S-BD PM CNTL – PNL, CMD

If comm still not working:

     PWR SYS – OFF

C3  19. PL DATA INTLVR PWR – OFF

A1L  20. S-BD PM CNTL – PNL
     ANT SW ELEC – OFF
     PRE AMP – OFF
     PWR AMPL STBY – OFF
     OPER – OFF
     XPNDR – OFF

MA73C:A  21. NSP PWR – OFF
     ENCRYPTION PWR – OFF

NOTE
If comm presently working, performing a
PNL, CMD may result in loss of comm (if fire
has aff alt comm sys)

L4:H  23. cb AC1 AV BAY 3 FAN B (three) – op

O16:C  24. MNC TACAN 3 – op

25. Perform MAL, EPS SSR-130, BUS LOSS: AC3, except:

L1  AV BAY 3 FAN A, B (two) – OFF, then:

For deorb prep:

If orbit 3 deorbit:

26. Go to LAUNCH DAY DEORBIT PREP

(ORBIT 3) (CONT DEORB, LAUNCH DAY
ORBIT 3) >>

27. Perform MAL, ECLS SSR-12, AV BAY FIRE

RECOVERY/RECONFIG, Checkout and Recovery,
then:

For deorb prep:

If orbit 7 deorbit:

28. Perform Deltas to nominal POST INSERTION,

DEORB PREP (POST INSERT, ORBIT 7 D/O),
then:

29. Go to AV BAY FIRE (DEORB PREP,

CONTINGENCY DELTAS)

OV103,104

A10-82 OPCL/3,4/GEN M
PWRDN

LOSS OF 2 CAB FANS ............................................................... 10-2
2 H2O LOOPS ..................................................................... 10-7
CAB PRESS ......................................................................... 10-27
HI LOAD EVAP ..................................................................... 10-33
1 FREON LOOP ..................................................................... 10-35
1 FC ....................................................................................... 10-39
2nd FC ON-ORBIT (TIG < 4 hr) ........................................... 10-41
(TIG > 4 hr) ........................................................................ 10-45
2 FREON LOOPS ................................................................... 10-49
FES ....................................................................................... 10-69
AV BAY FIRE ......................................................................... 10-73
1 ......................................................................................... 10-73
2 ......................................................................................... 10-77
3A....................................................................................... 10-81
LOSS OF 2 CAB FANS

MS1,2  1. Perform MS PWRDN, 10-5, ASAP

   NOTE
   Normal CO2 removal and humidity control lost.
   Wipe off any visible moisture with towel.
   Cab press increase due to air heating may
   cause CAB PRESS RELIEF vlv cycling

C3   2. MSTR MADS PWR – OFF
     3. Minimize ltg

FWD   4. All MDU PWR (nine) – OFF
C2     All IDP/CRTs (three) – OFF
F6/F8  √FLT CNTLR PWR (two) – OFF
If FLT CNTLR PWR not reqd:
O14,O15,     5. cb DDU L,R,AFT (six) – op
O16;E
L1   6. CAB FAN A,B (two) – OFF
     TEMP CNTLR – OFF
    7. HUM SEP A,B (two) – OFF
     8. Use one PGSC
W1-10 9. Install Window Shades or mnvr to tail Sun att

[ ] GNC 201 UNIV PTG
   TGT ID – ITEM 8 +4 EXEC
   BODY VECT – ITEM 14 +5 EXEC
   P – ITEM 15 +184 EXEC
   Y – ITEM 16 +0 EXEC
   OM – blank (MCC-provided if reqd)
C3   DAP: A/AUTO/VERN
CRT   START TRK – ITEM 19 EXEC (*)
10. Cycle MDUs. If ON at loss of cooling, turn OFF within
    30 min. Allow 3 min OFF prior to each 1 min ON (30
    min max ON time). Save two MDUs that interface with
    a single IDP for entry

Cont next page
NOTE
Don QDM for temp > 90 degF and discomfort.
If cab temp > 95 degF and no evaporative cooling is sensed, don LES, check tabs, close visor, LES O2 – ON.

Inflate anti-g suit as needed for on-orbit circulatory support.

Begin drinking H2O (one 8-oz container every 15 min with a salt tablet in every other container) and continue through entry

11. Go to LOSS OF 2 CAB FANS (DEORB PREP, CONTINGENCY DELTAS) and perform at next PLS opportunity. Expedite NOMINAL DEORBIT PREP proc if time-to-TIG < 3.5 hr
MS PULLOUT PAGE

MS1 Perform PLB EQUIP PWRDN, 10-6
MS2 Perform MS PWRDN ASAP

MS PWRDN

1. Minimize ltg
   O14:B 2. cb MNA EVENT TIMER AFT – op
   :C      SMOKE DETN L/R FLT DK – op
   O15:B 3. MNB OI H2O BYP LOOP 2 SNSR – op
           MSN TIMER AFT – op
   O16:C 4. MNC SMOKE DETN CAB – op
   L4:J   5. AC3 φA SIG CONDR HUM SEP – op
   A6U 6. ANNUN BUS SEL – OFF
   A13 7. OS AUD SPKR PWR – OFF

NOTE
Galley OVEN/RHS sw should be
OFF unless dispensing H2O

GALLEY
8. OVEN/RHS – ON, as reqd
   H2O HTRS (two) – OFF
9. cb AC3 GALLEY FAN (three) – op
10. MNB GALLEY H2O HTR – op
   If CO2 RMVL SYS flown:
   MO51F 11. CO2 RMVL SYS CNTLR 1(2) MODE – STBY
           (hold 3 sec)
   If RMS pwrd dn:
   A3 12. MON 1,2 PWR (two) – OFF
   A7U 13. TV PWR CNTL – PNL
           CONTR UNIT – OFF
           14. VID OUT MON1,MON2 pb (two) – push
               (MON1,MON2 lt on)
   O19 15. TV PWR – OFF
   R12L 16. VTR PWR – OFF
   MO58F 17. TV PWR – OFF
   If not reqd:
   R11L 18. IDP/CRT4 PWR – OFF
           CRT4,AFD1 MDU PWR – OFF
   A6U 19. FLT CNTLR PWR – OFF

LOSS OF 2 CAB FANS
ON-ORBIT
MS PAGE

OV105
PLB EQUIP PWRDN

1. Perform PL SAFING, then:

   **CAUTION**
   If stow prob occurs with either RMS and/or KU-BD ANT, perform aff sys QUICK RESPONSE JETTISON (CONT DEORB)

   If RMS grappled to OBSS:
   2. Perform OBSS JETTISON (PDRS OPS FS, OBSS CONTINGENCY), then:

   If RMS-only:
   3. Perform RMS PWRDN (PDRS OPS), then:

   If KU-BD ANT deployed:
   4. Perform KU-BD ANT STOW (ORB OPS, COMM/INST), then:

   If radiators deployed:
   5. Go to RAD STOW (ORB OPS, ECLS)
LOSS OF 2 H2O LOOPS

NOTES

• THIS PROCEDURE IS TIME CRITICAL
• Proc requires > 45 min, but time critical steps should be done ASAP
• Loss of H2O cooling aff both water and air cooled equipment
• Proc pwrs dn all comm. If comm reqd, preferred comm config in order of heat production:
  1. UHF only
  2. SGLS/STDN LO PWR if reqd
  3. TDRS only if mandatory (10 min max)
• Call ground at every avail UHF site
• Tear out COMM pages from proc and use until touchdown
• Cab depress/repress cycles to 10.2 psia are used for cab temp and humidity control
• If docked to ISS, proc is to be worked simo with JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS)
• When pwrdns complete, perform actions on 10-19 and 10-20 as time permits at crew discretion

1. Perform PART 1 of this pwrdn and, based on TIG, complete PART 2 or PART 3
LOSS OF 2 H2O LOOPS, PART 1 – INITIAL PWRDN

TIME CRITICAL PROCEDURES (execute simo)

1. Record MET of 2nd H2O Loop Fail
   __ __ __/__ __:__ __:__ __

2. Establish comm plan with MCC, determine best TIG opportunities, then have MS3 perform COMM PWRDN, 10-23, ASAP (S-Bd Pwr Amp may fail in 10 min with no cooling)

3. Have MS perform MS OVHD PNL PWRDN, 10-19, ASAP

4. Have second MS perform MCA CONFIG, 10-17, and PLB EQUIP PWRDN, 10-17, ASAP

5. If docked to ISS, have CDR perform JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS)

6. Have PLT proceed with CDR AND PLT PWRDN, ASAP

DETERMINE MAXIMUM TIME TO TIG, NUMBER OF DEP/REP, FROM N2 QTY FROM SPEC 66. Sel best landing site and deorbit TIG from PGSC. Set Wristwatch Timer (A17) counting down to TIG.

Enter TARGETS in LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP)

| TIG: | _____________ |
| TGTS: | _____________ |
| C1 | _____________ |
| C2 | _____________ |
| HT | _____________ |
| ØT | _____________ |

IF TOTAL N2 NUMBER OF SEL BEST TIG
>160 LB 3 45M - 4H:00M
>120 LB 2 45M - 2H:50M

CDR AND PLT PWRDN

O14, O15, 7. √Pri RJD LOGIC, DRIVER (sixteen) – ON
O16:F
DAP: ALT (proc results in loss of VERNs)
O16:F RJD MANF L5/F5/R5 DRIVER – OFF
C3 8. √MSTR MADS PWR – OFF
9. Minimize ltg
10. Use only one IDP with two MDUs, one PGSC

NOTE
Cycle MDUs. If ON at loss of cooling, turn OFF within 30 min. Allow 2 min OFF prior to each 1 min ON (30 min max ON time). Save two MDUs that interface with a single IDP for entry. IDPs do not require cycling

Cont next page
F6,F8,A6 11. FLT CNTLR PWR (three) – OFF, use one as reqd
O7 12. GPS PWR (three) – OFF
O8 13. √RDR ALTM (two) – OFF
14. √MLS (three) – OFF
L1 15. √H2O PUMP LOOP 1,2 (two) – OFF
(leave ON if any loop running)
HUM SEP (two) – OFF
(leave HUM SEP A ON if any loop running)
If any loop running, minimize bypass:
16. H2O LOOP 1(2) BYP MODE – MAN
MAN – DECR (30 sec)
MA73C:A 17. √MCA LOGIC MNA FWD 1 – ON
(MNB FWD 2 – ON)
L1 18. CAB FAN (two) – OFF
TEMP CNTLR – OFF
19. √FLOW PROP VLV LOOP tb (two) – ICH
20. FREON PUMP LOOP 1 – OFF
√2 – B
21. HI LOAD DUCT HTR sel – A/B
√TOP EVAP HTR NOZ L,R (two) – B AUTO(A AUTO)
√DUCT sel – B(A)
L2 22. O2 SYS 1 SPLY – CL (tb-CL)
L4:J 23. cb AC3 ∅A SIG CONDR HUM SEP – op
If not currently single G2, reassign strings to GPC 1 in MC 2:
24. GNC 0 GPC MEMORY
CONFIG – ITEM 1 +2 EXEC
Modify MC 2 per table
CRT 25. GNC, OPS 201 PRO
O6 26. GPC MODE 2 – STBY
(tb-bp)
– HALT
– STBY
(t-b-RUN)
– HALT
(t-b-bp)
27. √GPC MODE 3,5 (two) – HALT
√OUTPUT 5 – NORM
L1 28. AV BAY 1 FAN A – ON
B – OFF
2,3 FAN A,B (four) – OFF
29. IMU FAN A – ON
B – OFF
√C – OFF
For any fwd IDP/CRT that is OFF:
30. GPC/CRT1/X EXEC
R2 31. HYD CIRC PUMP (three) – ON
Cont next page

OV105
OPCL/5/GEN M
C3  32. C/W MODE – ACK

NOTE
For F7 lights, hold in F2 or F4 MA

If current time to TIG < 50 min:
33. Go to LOSS OF 2 H2O LOOPS, PART 2 – SHORT
    ON-ORBIT WAIT, next page >>

L1  34. Cycle CAB FAN A(B) – ON (7 min)/OFF (1 hr)
    (to control PPCO2)

L4:P  35. cb AC2,3 ΦA LG SNSR (two) – op

WARNING
Do not unpwr all IMU/FF MDM’s pairs

If IMU 2 in OPER:
36. [GNC 21 IMU ALIGN]
    IMU 1,3 (two) – desel

O14,O16:A  37. IMU 1,3 (two) – OFF
If IMU 2 in STBY:
38. [GNC 21 IMU ALIGN]
    IMU 2,3 (two) – desel

O15,O16:A  39. IMU 2,3 (two) – OFF

O6  40. MDM FF3,FF4 (two) – OFF

41. Verify MS OVHD PWRDN complete

NOTE
Both MMUs are OFF. If a ROLL-IN DISPLAY
is reqd: turn MMU 1 ON, try transaction, turn
MMU 1 OFF again

If time from failure to TIG < 2 hr 30 min:
42. Go to LOSS OF 2 H2O LOOPS, PART 2 – SHORT
    ON-ORBIT WAIT, next page >>
If time from failure to TIG > 2 hr 30 min:
43. Go to LOSS OF 2 H2O LOOPS, PART 3 –
    EXTENDED ON-ORBIT WAIT, 10-13
LOSS OF 2 H2O LOOPS, PART 2 – SHORT ON-ORBIT WAIT

If Undocking from ISS, delay step 1 until after Undocking and Post Final Sep, but continue with steps 2 through 19 of PART 2 – SHORT ON-ORBIT WAIT:

1. Perform POST UNDOCKING AND FINAL SEP RECONFIG, 10-15

BYPASS RADS/FES ACT

ML86B:A
R11L
L1
2. cb MNC SPLY H2O XOVR VLV – cl
3. SPLY H2O XOVR VLV – OP (tb-OP)
   √TKA OUTLET – CL (tb-CL)
4. FLASH EVAP CNTLR (three) – OFF
5. HI LOAD EVAP – ENA
   RAD BYP VLV MODE 1,2 (two) – MAN
   MAN SEL 1,2 (two) – BYP,
   wait 3 sec (tb-BYP)
   CNTLR LOOP 1,2 (two) – OFF
When EVAP OUT T > 65:
6. FLASH EVAP CNTLR PRI A(B) – ON
7. Wait 1 min, verify EVAP OUT T = 39 degF
8. Give MS GO to perform PLBD CLOSURE, 10-18

If current time to TIG < 50 min, at TIG-30 min:
9. Go to LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP) >>

NOTE
Limit operation of each GPC (1 hr max ON time from second H2O Loop failure)

If reqd, perform steps 10 thru 13:

O6
10. GPC MODE 2 – STBY (tb-RUN), hands off 10 sec
    – RUN (OUTPUT tb-gray), hands off 10 sec
IDPX
11. In MCX add GPC 2 to tgt set (leave GPC 1 in tgt set)
    Assign all strings to GPC2
    (if SM GPC active, √PL 1/2 not assigned)
    GNC, OPS X01 PRO
    √All IDPs deassigned from GPC1
O6
12. GPC MODE 1 – STBY (tb-bp)
    – HALT
    – STBY (tb-RUN)
    – HALT (tb-bp)
L1
13. AV BAY 1 FAN A(B) – OFF
    2 FAN A(B) – ON

Wherever GPC 1 is referenced, replace with GPC 2 in the LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP)

Cont next page

OV105
SM GPC/PL MDM Deact – Delay SM GPC/PL MDM Deact (steps 14-21) until PLBD are closed. Then perform ASAP:

14. [SM 1 DPS UTILITY]
   UL CNTL ENA – ITEM 36 EXEC
C3
15. UPLK – GPC BLK
C2
16. IDP/CRT1,2,3 MAJ FUNC (three) – GNC
O6
17. GPC MODE 4 – STBY (tb-bp)
   – HALT
   PWR 4 – OFF

18. [GNC 0 GPC MEMORY]
   CONFIG – ITEM 1 +2 EXEC

19. Assign PL1/2 to GPC 1 in MC2

20. GNC, OPS 201 PRO

21. MDM PL1,PL2 (two) – OFF

22. Perform first cab depress/repress cycle starting at approx 1 hr 15 min after the failure, the final cycle at TIG-20 min. Procs in the 20 MINUTE DE/REPRESS MS PULLOUT PAGE (CONT DEORB, LOSS OF 2 H2O LOOPS); use until last depress/repress is complete

**NOTE**
Possible cab air OVBD RLF due to loss of cab cooling.

Use Quick Don mask as needed to provide additional respirator cooling during periods of high cab temp and humidity. To determine health of crewmember, place temp strip (MED Kit) on forehead. If any crewmember temp greater than 99 degF and crew feels ill, begin cab depress/repress cycle ASAP

At TIG-30 min:

23. Go to LOSS OF 2 H2O LOOPS DEORB
    PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP) >>
LOSS OF 2 H2O LOOPS, PART 3 – EXTENDED ON-ORBIT WAIT

If Undocking from ISS, delay step 1 until after undocking and Post Final Sep, but continue with steps 2 thru 6:

1. Perform POST UNDOCKING AND FINAL SEP RECONFIG, 10-15

O6 2. √GPC MODE 2,3,5 (three) – HALT
3. PWR 2,3,5 (three) – OFF

When RMS PWRDN (PDRS OPS) complete, perform steps 4 thru 6 ASAP:

4. GPC MODE 4 – STBY (tb-bp), hands off 10 sec
   – RUN (tb-RUN), hands off 10 sec
   OUTPUT 4 – NORM (tb-gray)

5. [GPC 0 GPC MEMORY]
   CONFIG – ITEM 1 +2 EXEC
   Modify MC 2 per table
   GNC, OPS 201 PRO

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</table>

O6 6. GPC MODE 4 – STBY (tb-bp)
   – HALT
   – STBY (tb-RUN)
   – HALT (tb-bp)
   PWR 4 – OFF

Delay steps 7 thru 20 of PART 3 – EXTENDED ON-ORBIT WAIT, 10-14, until POST UNDOCKING AND FINAL SEP RECONFIG is complete (perform step 19 as reqd):

Cont next page

OV105

B10-13 OPCL/ALL/GEN M
Establish free drift:

F8  7. Verify att mnvr complete
   ADI ATT – INRTL
C3  8. DAP: B/AUTO/PRI (wait 30 sec)
     FREE
O6  9. Wrist watch set to MET

Pwr dn remaining GPC:
  10. GNC, OPS 000 PRO
  11. GPC MODE 1 – STBY (tb-bp)
      – HALT
      – STBY (tb-RUN)
      – HALT (tb-bp)
  12. GPC PWR 1 – OFF

FWD,AFT  13. All MDU PWR (eleven) – OFF
C2,R11L  14. IDP/CRT PWR (four) – OFF
L1  15. AV BAY FAN (six) – OFF
O13:C  16. cb ESS 2CA MTU B – op
       3AB GPC STAT – op
O14:B  17. MNA MSN TIMER FWD – op
       SMOKE DETN L/R FLT DK – op
W1-10  18. Install Window Shades
  19. Check all pwrdns complete

  20. Go to LOSS OF 2 H2O LOOPS, ON-ORBIT WAIT

NOTE
Possible cab air OVBD RLF due to loss of cab cooling.

Use QDM as needed to provide additional respirator cooling during periods of high cab temp and humidity. To determine health of crewmember, place temp strip (MED Kit) on forehead of CDR and PLT.
POST UNDOCKING AND FINAL SEP RECONFIG

If Undocking with ISS and Final Sep complete or if not docked with ISS:

1. **GNC 20 DAP CONFIG**
   - DAP A,B set to A1,B1 except:
     - (A) ITEM 10 +1.0 0 EXEC
     - ITEM 11 +3.0 0 EXEC
     - ITEM 15 EXEC (TAIL)
     - ITEM 16 EXEC (TAIL)
     - (B) ITEM 30 +0.2 0 EXEC
     - ITEM 31 +1.0 0 EXEC
     - ITEM 35 EXEC (TAIL)
     - ITEM 36 EXEC (TAIL)

   **CAUTION**
   - DO NOT mnvr on PRCS until MS has completed RMS JETT or STOW

2. Mnvr to tail Sun att:
   - **GNC 201 UNIV PTG**
   - TGT ID – ITEM 8 +4 EXEC
   - BODY VECT – ITEM 14 +5 EXEC
   - P – ITEM 15 +2 2 5 EXEC
   - Y – ITEM 16 +0 EXEC
   - OM – blank (MCC-provided as reqd)
   - DAP: A/AUTO/PRI
   - START TRK – ITEM 19 EXEC (CUR-*)

   If IMU 2 in OPER:
   - O6
   -  3. MDM FF1 – OFF

   If IMU 2 in STBY:
   - O6
   -  4. MDM FF2 – OFF
   - O14,O15, O16:F
   -  5. RJDF LOGIC, DRIVER (eight) – OFF

   **NOTE**
   - Expect FRCS jet(s) to false fail leak when OF DSC cbs are opened

   O14:B
   -  6. cb MNA OI SIG CONDR OF 1/4 A – op
   O15:B
   -  7. cb MNB OI SIG CONDR OF 1/4 B – op
   O16:B
   -  8. cb MNC OI SIG CONDR OF 2/3 B – op
   O16:E
   -  9. DDU AFT – op

**OV105**
MCA CONFIG (Execute ASAP)

L1  If either H2O PUMP LOOP 1 A(B) – ON:

1. Leave MCA LOGIC MNA FWD 1(MNB FWD 2) ON in next step

CAUTION
Coordinate steps 2 and 3 with CDR. FRCS is lost with step 2 and recovered with step 3

2. MCA LOGIC MNA, B, C (fourteen) – OFF

3. GNC 23 RCS
   ITEM 1 EXEC (FRCS page)
   OVRD FRCS MANF(s) – OP

4. For PLB EQUIP PWRDN, use following MCA config:
   MCA LOGIC MNA MID 1,3 (two) – ON
   MNB MID 2,3,4 (three) – ON
   MNC MID 2,4 (two) – ON

CAUTION
Retain this MCA sw config until step 8 of the PLB EQUIP PWRDN. Disregard MCA sw throws in the PL SAFING, RAD STOW, KU-BD ANT STOW, and RMS PWRDN procs

5. √AIRLK FAN A,B (two) – OFF

PLB EQUIP PWRDN (Execute ASAP)

1. Perform PL SAFING, then:

   CAUTION
   If stow prob occurs with either RMS and/or KU-BD ANT, perform aff sys QUICK RESPONSE JETTISON (CONT DEORB)

2. If TV reqd for OBSS jettison or RMS/Ku stow, perform ACTIVATION and OPERATION (Auto Ops only) (Cue Card, TV)
   If RMS grappled to OBSS:

   3. Perform OBSS JETTISON (PDRS OPS FS, OBSS CONTINGENCY), then:

   If RMS-only:

   4. Perform RMS PWRDN (PDRS OPS), then:

Cont next page

LOSS OF 2 H2O LOOPS ON-ORBIT MS PAGE

B10-17 OPCL/ALL/GEN M

OV105
If KU-BD ANT deployed:
5. Perform KU-BD ANT STOW (ORB OPS, COMM/INST), then:

If radiators deployed:
6. Perform RAD STOW (ORB OPS, ECLS), then:
7. Notify CDR: RMS stowed (jettisoned)

If performing PART 2 – SHORT ON-ORBIT WAIT:
8. Perform PLBD CLOSURE, below, on GO from CDR, then:

MA73C:A, 9. MCA LOGIC MNA MID 1,3 (two) – OFF
   B MNB MID 2,3,4 (three) – OFF
   MNC MID 2,4 (two) – OFF

PLBD CLOSURE (Short On-Orbit Wait only)

1. Notify CDR: Beginning PLBD CLOSURE
O6 2. √ MDM PL1,PL2 (two) – ON
3. SM I/O RESET
CRT4 4. SM, OPS 202 PRO – close PLBD ASAP
5. [SM PL BAY DOORS]
R13L 6. PL BAY DR SYS (two) – ENA
CRT4 7. AC POWER ON – ITEM 1 EXEC
6. AUTO MODE SEL – ITEM 3 EXEC
   PBD SW BYPASS – ITEM 14 EXEC
   CLOSE – ITEM 17 EXEC
   WARNING
   Verify no obstructions before closing and
   latching PLBD (Ku ANT, RAD, RMS, etc)

If ‘PLB SEQ FAIL’ msg during door closure and aft latches for
that door are not ‘CL’:
7. Check door scallop on or below tgt line before
   continuing in MAN mode; otherwise:
   8. Perform MAL, MECH SSR-2,
L CONTINGENCY PLBD CLOSURE, then:
After PLBD closed:
CRT4 9. PBD STOP – ITEM 16 EXEC
   AC POWER OFF – ITEM 2 EXEC
R13L 10. PL BAY DR SYS (two) – DSBL
   GPC/CRT 0/4 EXEC
R11L 11. IDP/CRT4 PWR – OFF
A7U 12. √ PL BAY FLOOD (all) – OFF
   If either H2O PUMP LOOP 1 A(B) – ON:
MA73C:A 13. Leave MCA LOGIC MNA FWD 1
   (MNB FWD 2) – ON in next step
MA73C 14. MCA LOGIC MNA,B,C (fourteen) – OFF
15. Notify CDR: PLBDs closed

LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE

OV105
MS OVHD PNL PWRDN

1. Set wrist watches as accurately as possible to MET (set one to GMT). The MET may be used for deorbit burn execution. Record GMT day of year __ __ __/ __ __: __ __

2. Minimize ltg on Aft Flt Deck

O13:A 3. cb ESS 1BC MTU A – op

O14:A 4. √BRAKES MNA – OFF

O14:B 5. cb MNA OI H2O BYP LOOP 1 SNSR – op

O14:E 6. √ADTA 1 – op

O15:A 7. cb MNB OI H2O BYP LOOP 2 SNSR – op

O15:B 8. √BRAKES MNB – OFF

O15:E 9. √ADTA 2 – op

O16:A 10. √BRAKES MNC – OFF

O16:E 11. √cb MNC ADTA 3,4 (two) – op

When N2 QTY and TIG determined by CDR:

O14:B 12. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op

O15:B 13. cb MNB OI MDM OF 1/2 B – op

O16:B 14. cb MNC OI MDM OF 3/4 B – op

O14:F 15. MMU 1 – OFF

12. Notify CDR: MS OVHD PNL PWRDN complete

13. Assist other MS with completion of PLB EQUIP PWRDN, 10-17
When pwrdns complete, perform following at crew discretion:

**FLUID LOADING PREP**

**GALLEY**
1. OVEN/RHS – ON
2. Unstow, fill 4 water containers (per crewmember) with 8 oz of water each. Temp stow near seat
3. Unstow 8 salt tablets (per crewmember). Temp stow in Flt Suit pocket
4. OVEN/RHS – OFF
5. √H2O HTRS (two) – OFF
6. √OVEN FAN – OFF
7. Stow Personal Hygiene Hose

**NOTE**
Ensure sufficient containers and salt tablets are prepared to continue fluid loading thru entry

**FLUID LOADING**
1. Immed begin drinking H2O (one 8-oz container every 15 min with a salt tablet in every other container) and continue through entry

**CLOTHING CONFIG**
1. Don QDM for temp > 90 degF and discomfort

**FDF CONFIG**
1. Unstow: ENT, ENT PKT, Deor b Burn Cards, ENT Cue Cards

**CAB CONFIG**
1. Stow loose equipment, Backup PGSC
2. Remove and stow side hatch UV filter, locking device, and pyro box safing pin
3. Tape foot loops in egress routes
4. Remove and stow Window Shades (if not needed for cab T control)

**LOSS OF 2 H2O LOOPS**

**OV105**

**ON-ORBIT**

**MS PAGE** B10-20

**OPCL/ALL/GEN M**
WCS DEACT

WCS 1. Foot Restraints – up, locked
ML31C 2. VAC VENT ISOL VLV CNTL – OP (tb-OP)

If EDO WCS:

WCS 3. URINAL SEL – OFF
4. WCS PWR SEL (two) – OFF1, OFF2
5. FAN PWR – AUTO

INSTALL SEATS

POLE SETUP

1. ESCAPE POLE SETUP:
   Reinstall Stbd pip pin and Large Port pin
   Retract and hold Locking Pin(Ring)
   Reinstall Large pin
   Release Locking Pin(Ring)
   Slide forward Safing latch
   Verify pole straps secure

2. Check minimum ltg on Middeck
NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN

MS
After comm plan established with MCC, perform COMM PWRDN ASAP (delay 10 min max)

CAUTION
Must complete steps 1 thru 3 within 10 min. TDRS or STDN – HI AOS is limited to 10 min or power amp will overheat

NOTE
Proc pwrs off ALL ground comm

COMM PWRDN

A1L
1. S-BD PM ANT SW ELEC – OFF
   PRE AMP – OFF
   PWR AMP – OFF STBY – OFF 
   OPER – OFF
   MODE sel – STDN LO
   XPNDR – OFF

2. NSP PWR – OFF
   ENCRYPTION PWR – OFF
   (Encrypt OFF rest of flt)
   MODE – SEL
   SEL – BYP

NOTE
Verify CDR ready for COMM PWRDN prior to performing step 3

C3
3. S-BD PM CNTL – PNL

NOTE
Ensure CDR has recorded N2 quantities before powering down PCMMU. Other steps may be performed

4. OI PCMMU PWR – OFF
   FORMAT – FXD

5. AUD CTR – OFF (turn ON as reqd for ICOM audio)
NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN

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<tr>
<td>O5</td>
<td>6. L AUD PWR – OFF (turn ON as reqd for ICOM audio)</td>
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<td>7. UHF MODE sel – OFF</td>
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<td>8. R AUD PWR – OFF (turn ON as reqd for ICOM audio)</td>
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<td>√ PWR SYS – OFF</td>
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<td>A1R</td>
<td>10. PL DATA INTLVR PWR – OFF</td>
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<td>A1R</td>
<td>11. S-BD FM CNTL – PNL</td>
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<td>PWR – OFF</td>
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<td>A3</td>
<td>12. MON 1,2 PWR (two) – OFF</td>
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<td>A7U</td>
<td>13. TV PWR CONTR UNIT – OFF</td>
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<td>R14:B</td>
<td>14. cb MNA,MNC GCILC (two) – op</td>
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<td>TV (fourteen) – op</td>
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<td>MNB VPU – op</td>
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<td>CAMR (six) – op</td>
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<td>L9,R10</td>
<td>15. PS,MS AUD PWR (two) – OFF</td>
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<td>A13</td>
<td>16. OS AUD SPKR PWR – OFF</td>
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<td>17. MIDDECK SPKR AUD SPKR PWR – OFF</td>
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<td>18. Call ground at every avail UHF site per COMM POWERUP, 10-25; voice down cab temp, crew body temps, heart rates, and words to indicate severity of cab humidity</td>
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<td>If MCC request data on cab environ or Av bays:</td>
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<td>19. Perform CABIN ENVIRONMENT MONITOR (CONT DEORB, LOSS OF 2 H2O LOOPS), then:</td>
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<td>If after TIG-10 min:</td>
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<td>20. Perform AFT PNL CONFIG FOR ENTRY COMM (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP)</td>
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NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN

COMM POWERUP (If comm reqd prior to landing site coverage)

Pwr up audio sys:

C3
1. AUD CTR – 1
O5 L AUD PWR – AUD
O9 R AUD PWR – AUD

If UHF avail, config for UHF comm (voice only):

O6
2. UHF MODE sel – SPLX
   \$/SPLX/EVA PWR AMPL – ON
3. After comm with MCC complete: Go to COMM
   PWRDN, steps 5 thru 8, 10-23 >>

If UHF site unavail or if MCC requests data
(config for GSTDN(SGLS) S-BD):

C3
4. \$/S-BD PM CNTL – PNL
   ANT SW ELEC – 2
   MODE sel – STDN LO(SGLS)
   XPNDR – 2

A1L
5. NSP PWR – 2
   \$/DATA RATE XMIT – HI
   \$/RCV – HI
   CODING XMIT – OFF
   RCV – OFF
   \$/UPLK DATA – S-BD

C3/F9
6. Sel best S-BD PM ANT
   If MCC requests data:
   O15:B 7. cb MNB OI SIG CONDR OF 1/4 B,2/3 A
          (two) – cl
   O14:B 8. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
   C3 9. OI PCMMU PWR – 1
   O6 10. MDM PL2 – ON
          11. BFS, GNC I/O RESET
          At end of data transmission:
          O14:B 12. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
          O15:B 13. cb MNB OI SIG CONDR OF 1/4 B,2/3 A
          (two) – op
          If not reqd for PLBD CLOSURE:
          O6 14. MDM PL2 – OFF
          After comm/data complete:
          L 15. Go to COMM PWRDN, 10-23 >>

Cont next page
NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN

If UHF site and GSTDN unavail and comm/data critical:
Config for TDRS S-BD during AOS

CAUTION
This is a High Power Mode. On-time should be limited to 10 min max due to Pwr Amp Thermal constraints. A 3-min delay occurs before Pwr Amp comes on. Uplink not aff. Proceed with sel of best S-BD PM ANT

C3 16. S-BD PM CNTL – PNL
A1L 17. NSP PWR – 2
C3/F9 18. Sel best S-BD PM ANT

If MCC requests data:
O15:B 19. cb MNB OI SIG CONDR OF 1/4 B,2/3 A (two) – cl
O14:B 20. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
O6 21. OI PCMMU PWR – 1
O6 22. MDM PL2 – ON
O6 23. BFS, GNC I/O RESET

At end of data transmission:
O15:B 24. cb MNB OI SIG CONDR OF 1/4 B,2/3 A (two) – op
O14:B 25. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
O6 26. MDM PL2 – OFF

If not reqd for PLBD CLOSURE:
O6 L 27. Go to COMM PWRDN, 10-23
LOSS OF CAB PRESS

CDR Perform JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS)
MS1,MS2 Perform procs on 10-30
PLT Perform following pwrdn

NOTE
Cab press will stabilize at 8 psia for following EQ dP/dT values:
< 0.6 for Orbiter + Airlock
< 0.4 for Orbiter + Airlock + Spacehab.

If docked to ISS, undocking will be performed with Single G2 (i.e., no +Z redundancy)

C3 1. MSTR MADS PWR – OFF
2. Minimize ltg
3. Use one IDP/CRT with two MDUs, as reqd (IDP4 preferable)
4. Use one PGSC, FLT CNTLR PWR as reqd
   If FLT CNTLR PWR not reqd:
   O14,O15, 5. cb DDU L,R,AFT (six) – op
   O16:E
   O7 6. √GPS 1,3 PWR (two) – OFF
   O8 7. √MLS (three) – OFF
   √RDR ALTM (two) – OFF
   L1 8. CAB TEMP CNTLR – OFF
   9. HUM SEP (two) – OFF
   10. H2O LOOP 2(1) BYP MODE – MAN
       MAN – DECR (30 sec)
   11. √FLOW PROP VLV LOOP tb (two) – ICH
       If FES not ena:
       : 12. RAD CNTLR OUT TEMP – HI
       : When EVAP OUT T > 50 degF:
       : 13. FLASH EVAP CNTLR PRI A(B) – ON, then
       : immed:
       : 14. RAD CNTLR OUT TEMP – NORM
       : If EVAP OUT T < 41 or > 47 degF:
       L 15. FLASH EVAP CNTLR PRI A(B) – ON
       L2 16. √ANTISKID – OFF
       √NWS – OFF
       L4:L 17. cb ΦA CAB T CNTLR 1,2 (two) – op

Cont next page

OV105
OPCL/5/GEN M
If orbit 2,3 deorbit due to cab leak:

18. Use DEORB PREP/ENTRY DELTAS PULLOUT
    PAGE, 10-31, then go to LAUNCH DAY DEORBIT
    PREP (ORBIT 2(3)) (CONT DEORB, LAUNCH DAY
    ORBIT 2(3)) >>

If orbit 3 deorbit due to fire, tox spill, or glass in cabin:

19. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3)
    (CONT DEORB, LAUNCH DAY ORBIT 3) >>

W1-10 20. Install Window Shades (ten) or mnvr to tail Sun att:

   GNC UNIV PTG
   TGT ID – ITEM 8 +4 EXEC
   BODY VECT – ITEM 14 +5 EXEC
   P – ITEM 15 +1 8 4 EXEC
   Y – ITEM 16 +0 EXEC
   OM – blank (MCC-provided if reqd)

C3 DAP: A/AUTO/VERN
CRT START TRK – ITEM 19 EXEC

If time to TIG < 4 hr:

21. Go to 8 PSI DEORBIT PREP (DEORB PREP,
    CONTINGENCY DELTAS) >>

If time to TIG > 4 hr:

If currently in single G2 GPC OPS:

22. Perform G2 SET EXPANSION, target Dual G2
    (ORB OPS, DPS), then:
REASSIGN STRINGS TO GPC 2 IN MC 2

NOTE
If Av Bay 2 fire and TIG > 4 hr:
Reassign strings to GPC in unaffected Av Bay

23. **GNC 0 GPC MEMORY**
   CONFIG – ITEM 1 +2 EXEC
   Modify MC 2 per table – – – –
   DOWNLIST GPC –
   ITEM 44 +2 EXEC

   CRT
   O6

   24. GNC, OPS 201 PRO
   25. GPC MODE 1(3) – STBY
       – HALT
       – STBY (tb-RUN)
       – HALT (tb-bp)
   PWR 1(3) – OFF
   √MODE 3,5 (two) –
   HALT (tb-bp)

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<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>MM</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

26. Go to 8 PSI DEORBIT PREP (DEORB PREP, CONTINGENCY DELTAS)
MS PWRDN

CDR, MS1  Perform PLB EQUIP PWRDN (below)
MS2  Perform remaining pwrdsn

O14, O15, 1. cb ADTA (four) – op
O16:E 2. cb MNC RCS/OMS PRPLT QTY GAUGE – op
If TIG > 2 hr 40 min:
O14:B 3. cb MNA EVENT TIMER AFT – op
O15:B 4. cb MNB MSN TIMER AFT – op
A7U 5. TV PWR CNTL – PNL
    CONTR UNIT – OFF
A13 6. OS AUD SPKR PWR – OFF
L9 7. PS AUD PWR – OFF
MO42F 8. MIDDECK SPKR AUD SPKR PWR – OFF
MO58F 9. TV PWR – OFF

When RMS pwr dn:
A3 10. MON PWR (two) – OFF
R14:E 11. cb CAMR (six) – op
MD44F 12. Cab temp cntl act link – pin to FULL COOL, stow
    linkage >>

PLB EQUIP PWRDN

13. If orbit 2,3 deorbit >>
14. Perform PL SAFING, then:

CAUTION
If stow prob occurs with either RMS and/or
KU-BD ANT, perform aff sys QUICK
RESPONSE JETTISON (CONT DEORB)

If RMS grappled to OBSS:
15. Perform OBSS JETTISON (PDRS OPS FS,
    OBSS CONTINGENCY), then:
If RMS-only:
16. Perform RMS PWRDN (PDRS OPS), then:
If KU-BD ANT deployed:
17. Perform KU-BD ANT STOW (ORB OPS,
    COMM/INST), then:
If radiators deployed:
18. Go to RAD STOW (ORB OPS, ECLS)

LOSS OF CAB PRESS
ON-ORBIT
MS PAGE  B10-30

OV105  OPCL/ALL/GEN M,3
NOTE
Incorporate following changes or remove this page for use with the indicated checklist or cue card.

Single fault tolerance used for most cab air-cooled equipment. Add'l LRUs may be activated if reqd and if CAB PRESS stable $\geq 8$ psia

A. Deltas to the LAUNCH DAY ORBIT 2(3) (CONT DEORB)
   1. Minimize use of IDPs, MDUs, FLT CNTLR PWR, DDU. Use one PGSC
      If rev 3:
      2. ENT FWD FLT DECK CONFIG [T0]
         Do not pwr MLS
      3. In ENT SW LIST/VER, do not activate pwr dn items

B. Deltas to DEORBIT BURN (ENT)
   At TIG-4:
   1. Use two IDP/CRTs with four MDUs as reqd for deorbit burn
   O14,O15, O16:E
   F6,F8
   2. cb DDU L,R (four) – cl
   3. L,R FLT CNTLR PWR (two) – ON

C. Deltas to POST BURN (ENT)
   1. Use one IDP/CRT with two MDUs as reqd
   F6,F8
   O14,O15, O16:E
   2. L,R FLT CNTLR PWR (two) – OFF
   3. cb DDU L,R,AFT (six) – op
   4. Delete ANTISKID, NWS callouts (ENTRY SW CHECK)
      At EI-15:
   O7
   5. GPS 3 PWR – ON
      PRE AMPL (two) – ON
      Wait 30 sec
      GNC I/O RESET
      [GNC 55 GPS STATUS]
      INIT – ITEM 16 EXEC
      NAV – ITEM 19 EXEC

Cont next page
D. Deltas to ENTRY MANEUVERS (Cue Card)

At EI:
1. Use two IDP/CRTs with four MDUs as reqd

O14, O15, O16:E

2. cb DDU L, R (four) – cl

F6, F8

3. L, R FLT CNTLR PWR (two) – ON

O14, O15, O16:E

4. cb ADTA 1, 2, 3 (three) – cl

5. BFS, GNC I/O RESET

At V = 15K:
   If CAB P < 8 psia:
      6. Delete NAVAIDS callout
   If CAB P ≥ 8 psia:
      7. Activate all RAs, MLSs
         GNC I/O RESET
         At M < 1.0, go to step 10

At M = 2.7:
8. Use two HUDs, MLSs, and RAs as reqd
9. GNC I/O RESET

At M < 1.0:
L2
10. ANTISKID – ON
11. NWS – 1
LOSS OF HI LOAD EVAP

NOTE
MAL, ECLS SSR-2, FES CORE FLUSH
PROCEDURE should be performed if core icing is suspected. If unsuccessful, perform pwrdn prior to RAD BYPASS at TIG-2:50 during deorb prep. If already in deorb prep, perform pwrdn and review activities already performed for changes

C3 1. √MSTR MADS PWR – OFF
2. Minimize ltg
3. Use one IDP/CRT with two MDUs, one FLT CNTRL PWR, and one PGSC as reqd
4. Perform PL PWRDN, then:
   If not in deorb prep:
   O7 5. √GPS 1,3 PWR (two) – OFF
       √PRE AMPL (four) – OFF
   O8 6. √RDR ALTM (two) – OFF
   7. √MLS (three) – OFF
   L1 8. √FLOW PROP VLV LOOP tb (two) – ICH
   9. √HI LOAD DUCT HTR sel – OFF
   A3 10. TV MON (two) – OFF
   If FLT CNTRL PWR not reqd:
   O14,O15, 11. cb DDU L,R,AFT (six) – op
   O16:E 12. Reset EVAP OUT T C&W upper limit (ch 107,117) to 2.15V (70 degF). Change B/U C&W parameter, 0631207, 0631407 upper limit to 70

A. Deltas to NOMINAL DEORBIT PREP (DEORB PREP)
if not already performed
At TIG-03:00, prior to RAD BYP:
L1 1. H2O LOOP 2(1) BYP MODE – MAN
   MAN – DECR (hold 30 sec)
   FLASH EVAP CNTRL PRI A – OFF
   B – OFF
   SEC – ON
   √HI LOAD EVAP – OFF
   Perform RAD BYPASS/FES C/O (ORB OPS, ECLS):
   Delete steps 3 and 5 thru 8 (SEC FES C/O)
At TIG-03:15 in DED DISP ENT CONFIG:
2. Do not pwr NAV/LDG AIDS, ADTAs
   Pwr DDUs, MDUs only as reqd

Cont next page

OV105

B10-33
At TIG-01:50, ENT SWITCH LIST/VERIF:
3. Do not pwr NAVAIDS, ADTAs
   Delete BRAKE/ANTISKID ACT
4. Go to LOSS OF HI LOAD EVAP DEORB OR
   ENTRY PULLOUT PAGE (ENT PKT, PWRDN)

B. Deltas to DEORBIT BURN (ENT)
   At TIG-10:
   O14,O15, O16:E
   1. cb DDU L,R (four) – cl
   2. Use two IDP/CRTs with four MDUs, and two FLT
      CNTLR PWR for burn
   At TIG-5:
   L1
   3. TOP EVAP HTR NOZ (two) – OFF
      DUCT sel – OFF

C. Deltas to POST BURN (ENT)
   F6,F8
   O14,O15, O16:E
   1. L,R FLT CNTLR PWR (two) – OFF
   2. cb DDU L,R (four) – op (save for entry)
   3. Use one IDP/CRT with two MDUs
   4. Delete ANTISKID, NWS callouts (ENTRY SW
      CHECK)

D. Deltas to ENTRY MANEUVERS (Cue Card)
   At EI:
   O14,O15, O16:E
   F6
   1. cb DDU L,R (four) – cl
   2. L FLT CNTLR PWR – ON
   3. Use two IDP/CRTs with four MDUs
   O14,O15, O16:A
   O14,O15, O16:E
   4. BRAKES (three) – ON
   5. cb ADTA 1,2,3 (three) – cl
   L2
   6. GNC I/O RESET
   7. NWS – 1
   8. ANTISKID – ON
   At M = 2.7:
   O14,O15, O16:E
   9. Use two HUDs, MLSs, and RAs
   10. GNC I/O RESET

OV105
B10-34
OPCL/5/GEN M
LOSS OF 1 FREON LOOP

MS  Perform MS PWRDN, 10-36

C3  1.  MSTR MADS PWR – OFF
    2.  Minimize ltg
    3.  Use one IDP/CRT with two MDUs as reqd, and one PGSC

If FLT CNTLR PWR not reqd:

O14,O15,  4.  cb DDU L,R,AFT (six) – op
O16:E

L1  5.  If reqd, perform PL PWRDN, then:

O14,O15,  6.  √FLOW PROP VLV LOOP lb (two) – ICH
    7.  H2O LOOP 2(1) BYP MODE – MAN
         MAN – DECR (hold 30 sec)

[SM SYS SUMM 2]

If EVAP OUT T not ~39 degF and stable:

8.  Perform TOPPING F ES STARTUP (ORB OPS, ECLS), then:

If prior to deorb prep:

If dual or triple G2:

9.  Perform G2 SET CONTRACTION (ORB OPS, DPS) to single G2, then:

O15:F  10.  MMU 2 – OFF

W1-10  11.  Mnvr to shade windows from sun or install
            Window Shades

[SM SYS SUMM 1]

12.  Check kW; if >14 kW: Perform PRIOR PWRDN
     (numbered) (except FES and one PGSC) until
     ≤ 14 kW, then:

13.  Use UNDOCKING/DEORB/ENTRY DELTAS
     PULLOUT PAGE, 10-37, for changes to
     UNDOCKING/DEORB PREP and ENT >>

If in deorb prep:

F6,F8  14.  √FLT CNTLR PWR (two) – OFF

O7  15.  Use one IDP/CRT with two MDUs, as reqd
    16.  GPS 1,3 PWR (two) – OFF
         PRE AMPL (four) – OFF

O8  17.  RDR ALTM (two) – OFF
    18.  MLS (three) – OFF

L2  19.  ANTISKID – OFF
        NWS – OFF

20.  Continue with DEORB PREP; use UNDOCKING/
     DEORB/ENTRY DELTAS PULLOUT PAGE, 10-37, for changes

OV105

B10-35  OPCL/5/GEN M
MS PWRDN

1. Minimize lgt on Aft Flt Deck and Middeck

R14:D 2. cb TV (fifteen) – op

:E 3. CAMR (six) – op

A3 4. MON 1,2 PWR (two) – OFF

If CO2 RMVL SYS flown:

MO51F 5. CO2 RMVL SYS CNTLR 1(2) MODE – STBY

(hold 3 sec)

6. Remove current cans, install two fresh LiOH cans

If in deorb prep:

O14,O15, 7. BRAKES (three) – OFF

O16:A

O14,O15, 8. cb ADTA (four) – op

O16:E

OV105

B10-36 OPCL/ALL/GEN M,3
UNDOCKING/DEORB/ENTRY DELTAS PULLOUT PAGE

NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN.

Incorporate following changes or remove these pages for use with the indicated checklist or cue card.

Undocking from ISS will be performed with Single G2 (i.e., no +Z redundancy)

Perform NOMINAL DEORBIT PREP (DEORB PREP) with the following contingency deltas to the procedure

A. Deltas to DEORB PREP
1. Use one FLT CNTLR PWR, DDU, PGSC, and one IDP/CRT with two MDUs, as reqd
2. Minimize Itg
3. Minimize sun in cab if possible
   If rev 3 deorb, deltas to LAUNCH DAY ORBIT 3 (CONT DEORB):
   4. ENT FWD FLT DECK CONFIG 10
      Do not pwr MLS
   If nominal deorb prep:
      Deltas to NOMINAL DEORBIT PREP (DEORB PREP):
      5. Verify steps 14 thru 20, 10-35, MS, steps 7,8, 10-36
      6. DED DISP ENT CONFIG 6
         Do not pwr ADTAs
         Add: Pwr NAV/LDG AIDS per ENTRY MANEUVERS (Cue Card)
         Minimize MDU use
      7. ENT SWITCH LIST/VERIF
         Do not pwr LRUs previously pwrd dn

B. Deltas to DEORBIT BURN (ENT)
1. Maintain window shading att until TIG-15
   At TIG-15:
   2. Remove Window Shades if installed
   At TIG-10:
      O14,O15,O16:E 3. cb DDU L,R (four) – cl
      4. Use two IDP/CRTs with four MDUs, two FLT CNTLR PWR for burn

Cont next page
C. Deltas to POST BURN (ENT)

1. L,R FLT CNTLR PWR (two) – OFF
2. cb DDU L,R (four) – op
3. Use one IDP/CRT with two MDUs
4. Delete ANTISKID, NWS callouts
   (ENTRY SW CHECK)

At El-15:

5. GPS 3 PWR – ON
   PRE AMPL (two) – ON
   Wait 30 sec
   GNC I/O RESET
   GNC 55 GPS STATUS
   INIT – ITEM 16 EXEC
   NAV – ITEM 19 EXEC

D. Deltas to ENTRY MANEUVERS (Cue Card)

At El:

1. cb DDU L,R (four) – cl
2. L FLT CNTLR PWR – ON
3. Use two IDP/CRTs with four MDUs
4. BRAKES (three) – ON
5. CB ADTA 1,2,3 (three) – cl
6. GNC I/O RESET
7. L2 ANTISKID – ON
   NWS – 1

At V = 12K:
5. Perform RAD FLOW in unfailed loop

At M = 2.7:
6. Use two HUDs, MLSs, and RAs
   GNC I/O RESET

E. Deltas to POST LDG (ENT)

If EVAP OUT T high and incr, go to EMER PWRDN
   (Cue Card)

F. Deltas to EVAP OUT TEMP HIGH (Cue Card)

If EVAP OUT T HIGH and V > 12K:
   Establish RAD FLOW in unaff loop:
1. RAD BYP VLV MODE 1(2) – AUTO
   CNTLR LOOP 1(2) – AUTO A(B)
2. Perform EVAP OUT T HIGH (Rads
   Coldsoaked), steps 2 thru 4

If EVAP OUT T HIGH and V < 12K:
   If loop 1(2) lost:
3. NH3 CNTLR B(A) – PRI/GPC

LOSS OF 1 FREON LOOP
PULLOUT PAGE

OV105

B10-38
LOSS OF 1 FC

If before deorb prep:

L1

1. \( \sqrt{\text{CAB FAN A(B) – ON}} \)
   If total Orb kW > 18:
   2. Perform PRIOR_PWRDN, GROUP 1,2 (except FES), then:
   3. Perform PL_PWRDN

   If FC 1 or 2 failed:
   R1
   4. \( \sqrt{\text{MN BUS TIE A,B (two) – ON \quad \sqrt{C – OFF}}} \)

   If FC 3 failed:
   5. PL_PRI_MNB – ON
      MNC – OFF
      FC3 – OFF
   6. \( \sqrt{\text{MN BUS TIE C,A (two) – ON \quad \sqrt{B – OFF}}} \)

   If any FC AMPS > 330 or \( \Delta \)AMPS > 100:
   7. Perform MAL, EPS SSR-8, BUS
      LOADING – LRU SELECT, then:
   8. Go to step 18

If in deorb prep:

9. Minimize ltg
10. Use only one DDU, and FLT_CNTL PWR as reqd.
    One IDP/CRT off as reqd
O7 11. GPS 1,3 PWR (two) – OFF
      PRE AMPL (four) – OFF
O8 12. RDR_ALTM (two) – OFF
13. MLS (three) – OFF
L1 14. \( \sqrt{\text{CAB FAN A(B) – ON}} \)
R14:D 15. cb TV (fifteen) – op
        :E cb CAMR (six) – op
A3 16. MON 1,2 PWR (two) – OFF
A11 17. CRYO TK HTR (four) – OFF

If FC recoverable:

18. Go to MAL, EPS SSR-3, FC SHUTDN C&W LIMIT
    CHANGE >>

If FC unrecoverable:

19. Make FDF Delta changes as given (next page), then
    as time permits reconfig C/W limits per MAL, EPS
    SSR-3, FC SHUTDN C&W LIMIT CHANGE
FDF changes:

A. Deltas to DEORBIT BURN (ENT)

TIG-5:

L1 1. TOP EVAP HTR NOZ (two) – OFF
   DUCT sel – OFF
   HI LOAD DUCT HTR sel – OFF
   HUM SEP (two) – OFF

L2  FLASH EVAP FDLN HTR SPLY (two) – OFF

B. Deltas to POST BURN (ENT)

At EI-15:

O7 1. GPS 1,3 PWR (two) – ON
    PRE AMPL (four) – ON
    Wait 30 sec
    GNC I/O RESET
    GNC 55 GPS STATUS
    INIT – ITEM 14,16 EXEC
    NAV – ITEM 17,19 EXEC

O8 2. MLS (three) – ON
3. RDR ALTM (two) – ON

C. Deltas to EPS procs in this book

1. FC REACTANT VLV CLOSED: Delete step 6;
   Change step 2 to read:
   If aff FC/MN bus tied and COOL P > 40:
   2. MN BUS TIE (three) – ON (ASAP)
      (Aff) MN BUS TIE (one) – OFF (ASAP)

2. FC COOL P: Delete step 1

3. BUS TIE, steps 1,7: Delete ‘(A to...A)’

4. FC1(2,3) H2 PUMP ↑↓: Replace step 3 with:
   If aff FC/MN bus tied:
   3. MN BUS TIE (three) – ON
      (Aff) MN BUS TIE (one) – OFF

5. FC SAFING: Replace steps 7,8 with:
   If aff FC/MN bus tied:
   7. MN BUS TIE (three) – ON
   8. (Aff) MN BUS TIE (one) – OFF

6. FC H2O RLF NOZ TEMP ↑↓: Replace step 3 with:
   If aff FC/MN bus tied:
   3. MN BUS TIE (three) – ON
      (Aff) MN BUS TIE (one) – OFF

7. FC DELTA V 1(2,3):
   Delete step 1
   Add ‘MN BUS TIE (three) – ON, then;’ to
   beginning of step 4

Cont next page
D. Deltas to EPS (ENT PKT)
   1. Perform LOSS OF 1 FC, part B, steps 1 thru 8 (ENT PKT, PWRDN), then:
      If in deorb prep:
      2. Go/return to NOMINAL DEORBIT PREP (DEORB PREP) >>

E. Deltas to FLIGHT PLAN at 10 min prior to ‘Go to DEORB PREP’, add: ‘perform LOSS OF 1 FC, steps 9 thru 17 (ORB PKT, PWRDN)’
LOSS OF 2nd FC ON-ORBIT (TIG < 4 hr)

If Rev 2,3 deorbit:
1. Go to LOSS OF 2nd FC (ASC PKT, PWRDN) >>
2. If TIG < 1.5 hr: Sel new TIG > 1.5 hr
   (this pwrdn and the deorbit prep require 1.5 hr)

NOTE
Do NOT perform BUS LOSS ACTION unless
bus shorted (step 29 regains bus)

* FC capability is ~12 kW for sustained operations,
* ~13 kW for short duration (~4 hr), ~16 kW for
* contingency situations (~10 min). Purge FC at
* 430 amps or less

MS
3. Perform AFT PNL PWRDN, 10-43, immed
C3
4. √MSTR MADS PWR – OFF
5. Minimize ltg
6. Use only one DDU, PGSC, and FLT CNTLR PWR as
   reqd. One IDP/CRT off as reqd
O7
7. GPS PWR (three) – OFF
   PRE AMPL (six) – OFF
O8
8. √RDR ALTM (two) – OFF
MS
9. √MLS (three) – OFF

If GPC 2 on:
10. [GNC 0 GPC MEMORY]
    CONFIG – ITEM 1 +2 EXEC
    Modify MC 2 per table
For any IDP that is OFF:
11. GPC/CRT1/X EXEC
12. √DOWNLIST GPC (ITEM 44) – 1
    GNC, OPS 201 PRO
O6
13. GPC MODE 2 – STBY (tb-bp)
    – HALT
    PWR 2 – OFF
14. √MODE 3,5 (two) – HALT
    (tb-bp)
    PWR 3 – OFF
O15:F
15. √MMU 2 – OFF

Cont next page
16. **GNC 20 DAP CONFIG**
   Sel TAIL PRI P,Y OPTION
   Sel PRI JETS

O7 17. AFT L,R RCS MANF ISOL 4 (two) – CL
O14,O15, 18. RJDF DRIVER (four) – OFF
O16:F   LOGIC (four) – OFF
O6 19. MDM FF4 – OFF
O14:F 20. RJDA 2A L4/R4 DRIVER – OFF
       LOGIC – OFF

L1 21. √FLOW PROP VLV LOOP tb (two) – ICH
22. [SM 88 APU/ENVIRON THERM]
23. H2O LOOP 2 BYP MODE – MAN
       MAN – INCR(DECR)
       (adjust until ICH FLOW ~950)
   If no MANF leak:
   R1 24. √O2,H2 MANF VLV (four) – OP
       TK1 HTRS B – AUTO (MNA or MNB ↓)
       TK2 HTRS B – AUTO (MNC or no
       MN BUS ↓), then:
       All others OFF
   If MANF leak:
       R2 25. √O2/H2 HTR LOSS TABLE (EPS), 5-20
               Sel one htr in one O2,H2 TK
       L4:L 26. HYD CIRC PUMP (three) – OFF
               cb AC1,2 φA CAB T CNTLR 1,2 (two) – op
   If not MN bus short, tie three MN BUSES:
   28. Perform BUS TIE (Cue Card), then:
       Post BUS TIE config check:
   L1 29. √CAB FAN A(B) – ON

30. Perform RCS SECURE, FWD RCS only (RCS), 8-2,
   then:
31. Perform MAL, EPS SSR-3, FC SHUTDN C&W LIMIT
    CHANGE, then:
32. Go to LOSS OF 2 FC (CONT DEORB). Refer to
    Activities Priority Table for activities to be performed in
    the CONT DEORB
AFT PNL PWRDN

A11  1. CRYO TK HTR (four) – OFF
A12  2. APU HTR LUBE OIL LN (three) – OFF
     3. HYD HTR (eight) – OFF
A14  4. RCS/OMS HTR FWD RCS – OFF
     RCS JET (five) – OFF
     5. Perform PL SAFING, then:

CAUTION
If stow prob occurs with either RMS and/or
KU-BD ANT, perform aff sys QUICK
RESPONSE JETTISON (CONT DEORB)

If RMS grappled to OBSS:
  6. Perform OBSS JETTISON (PDRS OPS FS,
     OBSS CONTINGENCY), then:
If RMS-only:
  7. Perform RMS PWRDN (PDRS OPS), then:
If KU-BD ANT deployed:
  8. Perform KU-BD ANT STOW (ORB OPS,
     COMM/INST), then:
If radiators deployed:
  9. Perform RAD STOW (ORB OPS, ECLS), then:
A3  10. MON PWR (two) – OFF
R14:D 11. cb TV (fifteen) – op
     :E  CAMR (six) – op
ML86B:C 12. √cb MNB EXT AIRLK HTR VEST Z1/2/3 – op
If MMU is pwrd:
     :D  13. cb MNA MMU PORT HTR A – op
            STBD HTR A – op
            MNB MMU PORT HTR B – op
            STBD HTR B – op
MD44F 14. Cab temp cntl act link – pin to FULL COOL
If CO2 RMVL SYS flown:
MO51F 15. CO2 RMVL SYS CNTLR 1(2) MODE – STBY
         (hold 3 sec)
         16. Remove current cans and install two fresh LiOH cans

LOSS OF 2nd FC
ON-ORBIT (TIG < 4 hr)
MS PAGE

OV105
OPCL/ALL/GEN M,3
LOSS OF 2nd FC ON-ORBIT (TIG > 4 hr)

NOTE
Do NOT perform BUS LOSS ACTION unless bus shorted (step 8 regains bus).

If docked with ISS, perform PWRDN completely prior to undocking

* FC capability is ~12 kW for sustained operations,
* ~13 kW for short duration (~4 hr), ~16 kW for
* contingency situations (~10 min). Purge FC at
* 430 amps or less

MS 1. Perform MS OVHD AND AFT PNL PWRDN, 10-47, immed
   C3 2. √MSTR MADS PWR – OFF
   GNC 21 IMU ALIGN
   3. IMU 1,2 (two) – desel
   If GPC 2(3) on:
   4. [GNC 0 GPC MEMORY
      CONFIG – ITEM 1 +2 EXEC
      Modify MC 2 per table – – – – – –
      \DOWNLIST GPC
      (ITEM 44) – 1
      CRT
      GNC, OPS 201 PRO
      For any IDP that is OFF:
   5. GPC/CRT1/X EXEC
   O6 6. GPC MODE 2 – STBY (tb-bp)
       – HALT
       PWR 2 – OFF
       \MODE 3,5 (two) – HALT
       (tb-bp)
       \PWR 3 – OFF
   O15:F  7. MMU 2 – OFF
   If not MN bus short, tie three MN buses:
   8. Perform BUS TIE (EPS), 5-16, then:
   9. Minimize ltg
   10. Use one DDU, PGSC, and FLT CNTLR PWR as reqd.
      Use one IDP/CRT with four MDUs
   O7 11. GPS PWR (three) – OFF
      PRE AMPL (six) – OFF
   O8 12. RDR ALTM (two) – OFF
   13. MLS (three) – OFF

Cont next page

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B10-45

OPCL/5/GEN M
L1 14. √FLOW PROP VLV LOOP tb (two) – ICH
15. AV BAY 2 FAN A,B (two) – OFF
16. √CAB FAN A(B) – ON
L4:L 17. cb AC1,2 φA CAB T CNTLR 1,2 (two) – op
18. Perform GG FREE DRIFT, ATT ID B (mnvr in PRI, establish drift in VERN) (ORB OPS, RCS), then:
   If docked with ISS, have ISS establish mated att control
19. Set event timer for 30 min (for FES duct htr deact)
O14,O15, 20. RJD LOGIC,DRIVER (seventeen) – OFF
O16:F
O6 21. MDM FF1,FF2,FF4 (three) – OFF
   FA1,FA2,FA3,FA4 (four) – OFF
L1 22. TOP EVAP HTR NOZ L,R (two) – OFF
23. √HI LOAD DUCT HTR sel – OFF
24. SM 88 APU/ENVIRON THERM
25. H2O LOOP 2 BYP MODE – MAN
   MAN – INCR(DECR)
   (adjust until ICH FLOW ~950)

If no MANF leak:
R1 26. √O2,H2 MANF VLV (four) – OP
   TK1 HTRS B – AUTO (MNA or MNB ↓) or
   TK2 HTRS B – AUTO (MNC or no
   MN BUS ↓), then:
   All others OFF
If MANF leak:
27. √O2/H2 HTR LOSS TABLE (EPS), 5-20
   Sel one htr in one O2,H2 TK
R2 28. BLR CNTLR/HTR (three) – OFF
29. HYD CIRC PUMP (three) – OFF
R4 30. Verify RMS, KU-BD ANT, and RADS stowed, then:
   MCA LOGIC (fourteen) – OFF
   MA73C:A, B
   If H2O LOOP 2 failed:
   31. MCA LOGIC MNB FWD 2 – ON
   30 min after FES deact:
L1 32. TOP EVAP HTR DUCT sel – OFF
33. Perform MAL, EPS SSR-3, FC SHUTDN C&W LIMIT CHANGE, then:
   If docked with ISS, perform UNDOCKING DELTAS prior to undocking
34. Go to LOSS OF 2 FC (CONT DEORB)
MS OVHD AND AFT PNL PWRDN

O14:A 1. IMU 1 – OFF (confirm IMU desel)
O15:A 2. IMU 2 – OFF (confirm IMU desel)
O16:E 3. cb MNC RCS/OMS PRPLT QTY GAUGE – op
R14:D 4. TV (fifteen) – op
A11 5. CRYO TK HTR (four) – OFF
A12 6. APU HTR LUBE OIL LN (three) – OFF
A14 7. HYD HTR (eight) – OFF
ML31C 8. RCS/OMS HTR FWD RCS JET 1,2,3,4 (four) – OFF
ML86B:A 9. VAC VENT NOZ HTR – OFF
ML86B:C 10. cb MNA H2O LN HTR A – op
ML86B:D 11. MNB H2O LN HTR B – op
 :C 12. √cb MNB EXT AIRLK HTR VEST Z1/2/3 – op
If MMU is pwrd:
 :D 13. cb MNA MMU PORT HTR A – op
      STBD HTR A – op
      MNB MMU PORT HTR B – op
      STBD HTR B – op
MD44F 14. Cab temp cntl act link – pin to FULL COOL
15. Perform PL SAFING, then:

CAUTION
If stow prob occurs with either RMS and/or
KU-BD ANT, perform aff sys QUICK
RESPONSE JETTISON (CONT DEORB)

If RMS grappled to OBSS:
16. Berth OBSS or perform OBSS JETTISON (PDRS
OPS FS, OBSS CONTINGENCY), then:
If RMS-only:
17. Perform RMS PWRDN (PDRS OPS), then:
If KU-BD ANT deployed:
18. Perform KU-BD ANT STOW (ORB OPS,
COMM/INST), then:
If radiators deployed:
19. Perform RAD STOW (ORB OPS, ECLS), then:
20. Report to CDR: RMS, KU-BD ANT, and RADS stowed
O14:F 21. MMU 1 – OFF
R14:E 22. cb CAMR (six) – op
A3 23. MON PWR (two) – OFF
If CO2 RMVL SYS flown:
MO51F 24. CO2 RMVL SYS CNTLR 1(2) MODE – STBY
      (hold 3 sec)
25. Remove current cans and install two fresh LiOH cans
	
LOSS OF 2nd FC
ON-ORBIT (TIG > 4 hr)
MS PAGE
UNDOCKING DELTAS

NOTE
Following steps reqd to recover RCS functionality prior to undock

1. One hour prior to undock:
   A14
   RCS/OMS HTR FWD RCS JET 1,2,3,4 (four) – ON
   O14,O15,
   2. RJD LOGIC, DRIVER (seventeen) – ON
   O16:F
   3. MDM FF1, FF2, FA1, FA2 (four) – ON

After undocking complete and post Final Sep:
   4. Perform GG FREE DRIFT, ATT ID B (mnvr in PRI.
   Establish drift in VERN) (ORB OPS, RCS), then:
   O14, O15,
   5. RJD LOGIC, DRIVER (seventeen) – OFF
   O16:F
   O6
   6. MDM FF1, FF2, FA1, FA2 (four) – OFF
   A14
   7. RCS/OMS HTR FWD RCS JET 1,2,3,4 (four) – OFF
## LOSS OF 2 FREON LOOPS

<table>
<thead>
<tr>
<th>WARNING</th>
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<tbody>
<tr>
<td>FC purge must be started and loads pwr'd dn ASAP</td>
</tr>
<tr>
<td>Orbiter lifetime is expected to be 120 min from LOSS OF 2nd FREON LOOP with all three FCs running. This assumes three FCs are pwr’d dn to a total level of 8 kW immed and are continuously purged</td>
</tr>
<tr>
<td>Earliest possible landing is reqd</td>
</tr>
</tbody>
</table>

### NOTES
- Failure assumed to occur after GO for On-orbit and before Deorbit TIG-2:05
- COMM procs, 10-65 thru 10-68, should be used throughout this proc and CONT DEORB
- Preferred comm config is:
  - A. UHF only
  - B. GSTDN S-BD if reqd
  - C. TDRS only if mandatory
- If docked to ISS, this proc is to be worked simo with JOIN EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS)
TIME CRITICAL PROCEDURES

NOTE
Undocking will be performed with Single G2
(i.e., no +Z redundancy)

1. If in OPS 1:  Go to LOSS OF 2 FREON LOOPS (POST OMS-2)
   (ASC PKT, PWRDN) >>
2. Have CDR perform JOINT EXPEDITED UNDOCKING AND
   SEPARATION (SODF: JOINT OPS)
3. Have MS exec RAD STOW, KU-BD ANT STOW, and PLBD
   CLOSE, 10-57, ASAP
4. Have second MS exec RMS STOW and MS OVHD AND AFT PNL
   CONFIG, 10-59 thru 10-62, ASAP
5. Have third MS exec COMM PWRDN, 10-65; delay 10 min max if
   AOS

Perform following steps ASAP:
O14,O15,

6. √Pri RJD LOGIC, DRIVER (sixteen) – ON
O16:F
   DAP: ALT (this proc results in loss of VERNs)
O16:F
   RJD MANF L5/F5/R5 DRIVER – OFF
7. Record MET of failure of 2nd FREON LOOP:
   ___/___ ___:___ ___:___ ___
C3 8. MSTR MADS PWR – OFF
MS R11U 9. √FC PURGE HTR – ON
10. √VLVS 1,2,3 (three) – OP
11. Minimize ltg
CRTX

12. Use only one fwd IDP/CRT with one MDU (save IDP3
    for entry)
13. Use only one PGSC
F6/F8
14. √FLT CNTLR PWR (two) – OFF, as reqd

Cont next page
Config GPC 1 to MC 2:

15. **[GNC 0 GPC MEMORY]**
16. **CONFIG – ITEM 1 +2 EXEC**

If not GNC 201, then:

17. GNC, OPS 201 PRO
18. Modify MC 2 per table

**NOTE**
The following must be an OPS mode recall:
GNC, OPS 201 PRO

For any IDP that is OFF:
19. GPC/CRT1/X EXEC

<table>
<thead>
<tr>
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<th>GPC</th>
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</tr>
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<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td></td>
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</tbody>
</table>

20. √BFC CRT DISP – OFF

21. GPC MODE 2,3 (two) – STBY (tb-bp), HALT
   - STBY (tb-RUN)
   - HALT (tb-bp)

   PWR 2,3 (two) – OFF
   MODE 5 – STBY (tb-RUN)
   – HALT (tb-bp)

   OUTPUT 5 – NORM
   PWR 5 – OFF

O7 22. GPS PWR (three) – OFF
     PRE AMPL (six) – OFF

O8 23. √RDR ALTM (two) – OFF
24. √MLS (three) – OFF

C3 25. FCS CH (four) – AUTO

R4 26. MPS MANF PRESS (two) – CL

R2 27. HYD CIRC PUMP (three) – OFF
28. MPS He ISOL (six) – CL
   PNEU He ISOL – CL
   L ENG He XOVR – CL

L1 29. HUM SEP (two) – OFF
30. √IMU FAN B – ON
   A,C (two) – OFF

Cont next page
31. Cab temp cntl act link – pin to FULL COOL
32. CAB FAN A,B (two) – OFF
33. √AV BAY 1 FAN A – OFF
   √2,3 FAN A,B (four) – OFF
   √1 FAN B – ON
34. FREON PUMP LOOP 1,2 (two) – OFF (one-ON, if any flow)
35. RAD CNTLR LOOP 1,2 (two) – OFF
36. √NH3 CNTLR A,B (two) – OFF
   If no FREON PUMPS ON, then:
37. O2 SYS 1,2 SPLY (two) – OP (tb-OP)
38. FLASH EVAP CNTLR PRI A,B (two) – OFF
   TOP EVAP HTR NOZ (two) – OFF
   DUCT sel – OFF
39. HI LOAD DUCT HTR sel – OFF
40. FLASH EVAP FDLN HTR SPLY (two) – OFF
   If one FREON PUMP ON:
41. FLASH EVAP CNTLR PRI A – ON
42. TOP EVAP HTR NOZ (two) – OFF
   DUCT sel – ON
43. √HI LOAD DUCT HTR sel – ON
44. FLASH EVAP FDLN HTR B SPLY – OFF
45. √ANTISKID – OFF
46. √NWS – OFF
47. S TRK PWR -Y,-Z (two) – OFF
48. ANNUN BUS SEL ACA 2/3 – OFF
   GNC 21 IMU ALIGN
49. IMU 1,2 (two) – desel
   – OFF
50. IDP/CRT MAJ FUNC (three) – GNC
51. GPC MODE 4 – STBY (tb-bp)
   – HALT
   PWR 4 – OFF
   GNC 0 GPC MEMORY
52. CONFIG – ITEM 1 +2 EXEC
53. Assign PL1/2 to GPC 1 (provides Uplk path)
54. GNC, OPS 201 PRO

Do not perform steps 50 thru 56 until PLBDs are closed
55. All IDPs, MDUs – OFF (use one IDP/CRT with one MDU as reqd until CONT DEORB proc, 3 min OFF for each min ON)

56. MDM FF1,4 (two) – OFF
    FA1,4 (two) – OFF

57. CDR disp sws – green dot

**NOTE**
If no site avail, bailout will be reqd; TIG will = MET of 2nd FREON LOOP failure + 1 hr

58. Sel ELS TIG ≤ 1 hr after MET of 2nd FREON LOOP failure (from MCC or PGSC):
   Selected TIG ___:___:___ MET
   (-) Present TIME ___:___:___ MET
   (=) Time to TIG ___:___:___ MET

If PL MDMs not currently being used for comm:
59. Verify PLBDs are closed, then:

60. cb AC3 ΦA SIG CONDR HUM SEP – op
    ΦB SIG CONDR IMU FAN – op

61. AC1 ΦA CAB T CNTLR 2 – op
    ΦB AV BAY 2 S/C – op

62. AC2 ΦA CAB T CNTLR 1 – op
    ΦB AV BAY 3 S/C – op
    AC3 ΦA H2O CNTLR 1 – op

63. MN BUS TIE (three) – ON

64. √O2,H2 MANF VLV TK1,TK2 (four) – op
    TK2 HTRS A,B (four) – OFF
    TK1,TK3 HTRS A,B (eight) – AUTO

If O2 TK1(TK3) QTY < 80%:
65. O2 TK1,TK3 HTRS A (two) – OFF

66. BLR CNTLR/HTR 2 – OFF
    PWR 2 – OFF

If not docked with ISS or when undocking complete and Post Final Sep:
67. Perform POST UNDOCKING AND FINAL SEP RECONFIG, 10-55

68. Go to ENTRY CONFIG (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP) by ~ TIG-15 >>
POST UNDOCKING AND FINAL SEP RECONFIG

1. DAP: FREE
O14,O15,

2. RJD LOGIC, DRIVER (seventeen) – OFF
O16
O14:B

3. cb MNA OI SIG CONDR OF 1/4 A – op
O15:B

4. cb MNB OI SIG CONDR OF 1/4 B – op

5. cb MNC OI SIG CONDR OF 2/3 A – op
O14,B

6. √cb L,R,AFT DDU (six) – op
O16:E

OV105
MS PULLOUT PAGE

MS Execute ASAP

R11U 1. FC PURGE HTR – ON
     VLVS (three) – OP
2. Minimize ltg on Aft Flt Deck
   If CO2 RMVL SYS flown:
MO51F 3. CO2 RMVL SYS CNTLR 1(2) MODE – STBY
      (hold 3 sec)

NOTE
For following RAD STOW, KU-BAND ANT
STOW, and PLBD CLOSE procs, use the
following MCA config. Disregard MCA sw
throws in other procs until PLB doors closed

MCA LOGIC CONFIG

MA73C:A, 4. √All MCA LOGIC (fourteen) – ON
B 5. MCA LOGIC MNA FWD 1 – ON
     MNB FWD 2 – OFF
     MID 1 – OFF
     MNC FWD 3 – OFF

MA73C:B 6. MCA LOGIC MNA AFT 1 – OFF
     MNB AFT 2 – OFF
     MID 3 – OFF
     MNC AFT 3 – OFF

6. [GNC 23 RCS]
   ITEM 1 EXEC (FRCS page)
   OVRD FRCS MANF(s) – OP

   CAUTION
   If stow prob occurs with KU-BD ANT,
   perform QUICK RESPONSE JETTISON
   (CONT DEORB)

If KU-BD ANT deployed:
7. Perform KU-BD ANT STOW (ORB OPS,
   COMM/INST), then:
If radiators deployed:
8. Perform RAD STOW (ORB OPS, ECLS), then:

Cont next page
PLBD CLOSURE

WARNING
Verify no obstructions before closing and latching PLBD (Ku ANT, RAD, RMS, etc)

O6 1. √MDM PL1, PL2 (two) – ON
   SM I/O RESET
2. Verify PL SAFING complete
CRT4 3. SM, OPS 202 PRO – close PLBD ASAP
   SM PL BAY DOORS
4. √MDM PL1, PL2 (two) – ON
   SM I/O RESET
R13L 5. PL BAY DR SYS 1, 2 (two) – ENA
   CRT4 3. SM, OPS 202 PRO – close PLBD ASAP
   CRT4 6. AC POWER ON – ITEM 1 EXEC
   AUTO MODE SEL – ITEM 3 EXEC
   PBD SW BYPASS – ITEM 14 EXEC
   CLOSE – ITEM 17 EXEC
If ‘PLB SEQ FAIL’ msg during door closure and aft latches
for that door are not ‘CL’:
   7. Check door scallop on or below tgt line before
      continuing in MAN mode; otherwise:
      8. Perform MAL, MECH SSR-2,
         CONTINGENCY PLBD CLOSURE, then:
9. PBD STOP – ITEM 16 EXEC
10. AC POWER OFF – ITEM 2 EXEC
    GPC/CRT 04 EXEC
R11L 11. IDP/CRT4 PWR – OFF
R13L 12. PL BAY DR SYS (two) – DSBL
A7U 13. All MCA LOGIC sw except MNA FWD 1 (thirteen)
    √FLOOD (all) – OFF
MA73C:A 14. GNC 23 RCS
    ITEM 1 EXEC (FRCS page)
    OVRD FRCS MANF(s) – OP
MA73C:B 15. Report to CDR: RMS, KU-BD ANT, and RADS stowed;
    PLBD closed
16. Go to FLUID LOADING PREP, 10-63

LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE B10-58 OPCL/ALL/GEN M

OV105
RMS STOW

NOTE
For following RMS STOW, use following MCA config. Disregard MCA sw throws in other procs until PLB doors closed

MA73C:A, 1. √MCA LOGIC MNA MID 1 – ON
          B  √3 – ON
          √MNB MID 2 – ON
          √4 – ON
          √MNC MID 2 – ON
          √4 – ON

2. Perform PL SAFING, then:

CAUTION
If stow prob occurs with RMS, perform QUICK RESPONSE JETTISON (CONT DEORB)

If RMS grappled to OBSS:
3. Perform OBSS JETTISON (PDRS OPS FS, OBSS CONTINGENCY), then:

If RMS-only:
4. Perform RMS PWRDN (PDRS OPS), then:

MS OVHD AND AFT PNL CONFIG

O13:A 1. cb ESS 1BC C/W A – op
      :B CRYO QTY O2,H2 TK2 (two) – op
      :C 2CA C/W B – op
           (all SM tones and C/W lights and tones lost; CRT FAULT SUMM and SM ALERT light remains)
      :E cb ESS 2CA MTU B – op
           3AB GPC STAT – op
O14:A 2. √BRAKES MNA – OFF
      3. √RGA 1 – OFF
      :B 4. cb MNA OI SIG CONDR OM 1/2 A – op
           MDM OF 1/2 A – op
           3/4 A – op
           H2O BYP LOOP 1 SNSR – op
           MSN TIMER FWD – op
           EVENT TIMER AFT – op

Cont next page

LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE

OV105

B10-59 OPCL/ALL/GEN M
5. cb MNA UTIL PWR O19/MO52J – op
   FREON RAD CNTLR 1,2 (two) – op
   O2/N2 CNTLR 1 – op (leave cl if PCS 1 active)
   CAB VENT – op
   VENT ISOL – op

6. cb MNA FREON RAD CNTLR 1,2 (two) – op

7. cb MNA O2/N2 CNTLR 1 – op
   (leave cl if PCS 1 active)

8. cb MNA CAB VENT – op

9. cb MNA CAB VENT ISOL – op

10. √ ADTA 1 – op

11. √ ACCEL 1 – op

12. DDU L,AFT (two) – op

13. MMU 1 – OFF

14. ASA 1 – OFF

15. MMU 2 – OFF

16. ASA 2 – OFF

17. ACCEL 4 – OFF

18. BRAKES MNB – OFF

19. RGA 2 – OFF

20. BRAKES MNC – OFF

21. RGA 3 – OFF

22. cb MNC UTIL PWR A11/A15/MO30F – op

Cont next page
O16:C 19. cb MNC ANNUN AFT ACA 4/5 – op
   O2 EMER – op
   :E
   ADTA 3,4 (two) – op
   DDU R,AFT (two) – op
   RCS/OMS PRPLT QTY GAUGE – op
   :F 20. ASA 3,4 (two) – OFF
   21. ACCEL 3 – OFF
   O17:A 22. ATVC (four) – OFF
   :B 23. EIU (three) – OFF
   :C 24. SIG CONDR FREON A,B (two) – OFF
   :D 25. OA 1/2/3 – OFF
   26. MEC 1 – OFF, wait 2 sec, then
   2 – OFF
   MO58F 27. TV PWR – OFF
   O19 28. COAS – OFF
   A11 29. CRYO TK4 HTR O2,H2 A,B (four) – OFF
   A12 30. APU HTR GAS GEN/FU PUMP 2 – OFF
   LUBE OIL LN 1,2,3 (three) – OFF
   APU HTR TK/FU LN/H2O SYS
   1B,2A,2B,3A (four) – OFF
   1A,3B (two) – AUTO
   31. HYD HTR (eight) – OFF
   A13 32. OS AUD SPKR PWR – OFF
   A14 33. RCS/OMS HTR FWD RCS – OFF
   L.R.POD (four) – OFF
   OMS CRSFD LN (two) – OFF
   FWD RCS JET (five) – OFF
   AFT RCS JET (five) – OFF
   A15 34. PTU/MAIN BUS A,B (two) – OFF (tb-OFF)
   A6U 35. FLT CNTLR PWR – OFF, as reqd
   36. ANNUN BUS SEL – OFF

Cont next page
R14:A 37. cb MNA ADC 1A/2A – op
    MNB ADC 1B/2B – op
:B 38. MNA,MNB,MNC PALLET DSC (three) – op
:D 39. TV (fifteen) – op
:E 40. CAMR (six) – op
L9,R10 41. PS,MS AUD PWR (two) – OFF
40. Minimize Middeck ltg
ML31C 42. cb MNB H2O LN HTR B – op
ML86B:A 43. MNA MMU PORT HTR A – op
:D 44. MNB MMU PORT HTR B – op
:CB MNA MMU STBD HTR A – op
:CB MNB MMU STBD HTR B – op
MO39M 45. MIDDECK COMM CCU PWR – OFF
MO42F 46. SPKR AUD PWR – OFF
If MMU is pwrd:
GALLEY 47. Go to step 50
48. FOOD WARMER – OFF
49. H2O DISPENSER PWR pb – OFF
If no GALLEY:
46. Go to step 48
44. MIDDECK COMM CCU PWR – OFF
44. MIDDECK COMM CCU PWR – OFF
MO13Q 45. All MIDDECK lts – lt off

OV105
FLUID LOADING PREP

GALLEY
1. OVEN/RHS – ON
2. Unstow, fill 4 water containers (per crewmember) with 8 oz of water each. Temp stow near seat
3. Unstow 8 salt tablets (per crewmember). Temp stow in Flt Suit pocket
4. OVEN/RHS – OFF
5. √ H2O HTR (two) – OFF
6. √ OVEN FAN – OFF
7. Stow Personal Hygiene Hose

NOTE
Ensure sufficient containers and salt tablets are prepared to continue fluid loading thru entry

FLUID LOADING

Immed (or as soon as time permits), begin drinking H2O (one 8-oz container every 15 min with a salt tablet in every other container); continue thru entry

CLOTHING CONFIG

Don QDM for temp > 90 degF and discomfort. If cab temp > 95 degF and no evaporative cooling is sensed, don LES, check tabs, close visor, LES O2 – ON

NOTE
Inflate anti-g suit as needed for on-orbit circulatory support

FDF CONFIG

1. Unstow: ENT, ENT PKT, ENT Cue Cards
2. Use DEORBIT BURN MONITOR and ENTRY MANEUVERS Cue Card (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP)

CAB CONFIG

1. Stow loose equipment
   After Deorbit Targeting complete:
   2. Stow Backup PGSC
   3. Remove and stow Side hatch UV filter, locking device, and pyro box safing pin
   4. Tape foot loops in egress routes
   5. Remove and stow Window Shades (if not needed for cab T control)

LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE

OV105

B10-63
OPCL/ALL/GEN M
WCS DEACT

WCS
1. Foot Restraints – up, locked
ML31C
2. VAC VENT ISOL VLV CNTL – CL (tb-CL)
   If EDO WCS:
WCS
3. URINAL SEL – OFF
4. WCS PWR SEL (two) – OFF1, OFF2
5. \FAN PWR – AUTO

POLE SETUP

Perform ESCAPE POLE STOWAGE/SETUP (Cue Card), then:

SEAT INSTALLATION

1. Confirm minimum ltg on Middeck
2. Unstow LOSS OF 2 FREON LOOPS D/O PREP (CONT DEORB);
   perform MS PAGE procs
NOTE
The COMM PWRDN and POWERUP procs on this and following pages should be used until Touchdown

COMM PWRDN

**MS**  Pwr dn comm ASAP after comm with MCC no longer reqd.
Delay 10 min max if AOS. Use COMM POWERUP, 10-67, if MCC comm reqd. Comm will be pwr'd on entry by AFT PNL CONFIG FOR ENTRY COMM, MS PULLOUT PAGE (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP) and special ENTRY MANEUVERS Cue Card

A1L  1. S-BD PM ANT SW ELEC – OFF
PRE AMP – OFF
PWR AMPL STBY – OFF
OPER – OFF
MODE sel – STDN LO
XPNDR – OFF

2. NSP PWR – OFF
ENCRYPTION PWR – OFF
(Encrypt disabled rest of flt)
ENCRYPTION MODE – SEL
SEL – BYP

C3  3. S-BD PM CNTL – PNL,CMD
OI PCMMU FORMAT – FXD
PWR – OFF
AUD CTR – OFF (pwr up as reqd for cockpit audio)

A1L  4. S-BD PL CNTL – PNL
\(\sqrt{\text{PWR SYS}}\) – OFF
PL DATA INTLVR PWR – OFF

A1R  5. S-BD FM CNTL – PNL
PWR – OFF

A3  6. MON PWR (two) – OFF

A7U  7. TV PWR CONTR UNIT – OFF

O6  8. UHF MODE sel – OFF

R12L  9. MDM PL1,PL2 (two) – OFF

R14:B 11. cb MNA,MNC GCILC (two) – op

Cont next page
NOTE
During each comm window, voice down cab temp, crew body temps and heart rates, per COMM POWERUP, 10-67; indicate severity of cab humidity

If after TIG-10:
12. Go to AFT PNL CONFIG FOR ENTRY COMM, MS PULLOUT PAGE (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP)
COMM POWERUP (If comm reqd prior to landing site coverage)

Pwr up audio sys:

C3  1.  AUD CTR – 1
O5  2.  \L AUD PWR – AUD
O9  3.  \R AUD PWR – AUD

If UHF avail, config for UHF comm (voice only):

O6  2.  UHF MODE sel – SPLX
     \SPLX/EVA PWR AMPL – ON

O9  3.  After comm with MCC complete: Go to COMM
     PWRDN, 10-65 >>

If UHF site unavail or if MCC requests data

(config for GSTDN(SGLS) S-BD):

C3  4.  \S-BD PM CNTL – PNL
A1L  5.  ANT SW ELEC – 2
       MODE sel – STDN LO(SGLS)
       XPNDR – 2

C3/F9  5.  NSP PWR – 2
       DATA RATE XMIT – HI
       RCV – HI
       CODING XMIT – OFF
       RCV – OFF
       \UPLK DATA – S-BD

O14:B  6.  Sel best S-BD PM ANT

If MCC requests data:

O14:B  7.  cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
O17:D  8.  SIG CONDR OA 1/2/3 – ON
       9.  MDM OA 1/2/3 – ON
C3  10.  OI PCMMU PWR – 1
O6  11.  MDM PL2 – ON
       12.  GNC I/O RESET
       At end of data transmission:
O14:B  13.  cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
O17:D  14.  SIG CONDR OA 1/2/3 – OFF
       15.  MDM OA 1/2/3 – OFF
       After comm/data complete:

L  16.  Go to COMM PWRDN, 10-65

Cont next page
If UHF site and GSTDN unavail and comm/data critical:
Config for TDRS S-BD:

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a High Pwr Mode. On-time should be limited to 10 min max due to Pwr Amp Thermal constraints. A 3-min delay occurs after S-BD PM PNL/CMD before Pwr Amp is active. Uplink not affected. Proceed with selection of best antenna</td>
</tr>
</tbody>
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<p>| | |</p>
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<thead>
<tr>
<th></th>
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<tr>
<td>C3</td>
<td>17. S-BD PM CNTL – PNL</td>
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<td>A1L</td>
<td>18. ANT SW ELEC – 2</td>
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<td>PRE AMP – 2</td>
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<td>PWR AMPL OPER – 2</td>
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<td>MODE sel – TDRS DATA</td>
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<td>XPNDR – 2</td>
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<td>NSP PWR – 2</td>
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<td>RCV – HI</td>
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<td>CODING XMIT – ON</td>
</tr>
<tr>
<td></td>
<td>RCV – ON</td>
</tr>
<tr>
<td></td>
<td>UPLK DATA – S-BD</td>
</tr>
<tr>
<td>C3/F9</td>
<td>20. Sel best S-BD PM ANT</td>
</tr>
<tr>
<td></td>
<td>If MCC requests data:</td>
</tr>
<tr>
<td>O14:B</td>
<td>21. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl</td>
</tr>
<tr>
<td>O17:D</td>
<td>22. SIG CONDR OA 1/2/3 – ON</td>
</tr>
<tr>
<td></td>
<td>23. MDM OA 1/2/3 – ON</td>
</tr>
<tr>
<td>C3</td>
<td>24. OI PCMMU PWR – 1</td>
</tr>
<tr>
<td>O6</td>
<td>25. MDM PL2 – ON</td>
</tr>
<tr>
<td></td>
<td>26. GNC I/O RESET</td>
</tr>
<tr>
<td></td>
<td>At end of data transmission:</td>
</tr>
<tr>
<td>O14:B</td>
<td>27. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op</td>
</tr>
<tr>
<td>O17:D</td>
<td>28. SIG CONDR OA 1/2/3 – OFF</td>
</tr>
<tr>
<td>L</td>
<td>29. MDM OA 1/2/3 – OFF</td>
</tr>
<tr>
<td></td>
<td>After comm/data complete:</td>
</tr>
<tr>
<td></td>
<td>30. Go to COMM PWRDN, 10-65</td>
</tr>
</tbody>
</table>

LOSS OF 2 FREON LOOPS
ON-ORBIT
MS COMM PAGE

OV105
LOSS OF FES

MS  Perform MS PWRDN, 10-71, immed

C3  1. √MSTR MADS PWR – OFF
2. Minimize Itg
3. Use one PGSC, and one IDP/CRT with two MDUs only as reqd

If FLT CNTLR PWR not reqd:

O14, O15,  4. cb DDU L,R,AFT (six) – op
O16:E

If not in deorb prep:

O7  5. √GPS 1,3 PWR (two) – OFF
O 6. √PRE AMPL (four) – OFF

O8  6. √RDR ALTM (two) – OFF
7. √MLS (three) – OFF
8. Perform PL PWRDN, then:

L1  9. CAB TEMP CNTLR – OFF
10. H2O LOOP 2 BYP MODE – MAN
MAN – DECR (hold 30 sec)
PUMP LOOP 1 (two) – OFF, B
11. √FLOW PROP VLV LOOP tb (two) – ICH
12. √TOP EVAP HTR NOZ L,R (two) – OFF
√DUCT sel – OFF
13. √HI LOAD DUCT HTR sel – OFF

L2  14. √NWS – OFF
15. √ANTISKID – OFF

L4:L  16. cb CAB T CNTLR 1,2 (two) – op
R2  17. BLR CNTLR/HTR (three) – OFF

MMU 2 deact:

18. [SM 1 DPS UTILITY]
√MMU ASSIGN 1 SM – ITEM 3 EXEC
MMU 2 – OFF

O15:F

If IMU ALIGN not reqd, mnvr to tail Sun att:

19. [GNC UNIV PTG]
TGT ID – ITEM 8 +4 EXEC
BODY VECT – ITEM 14 +5 EXEC
P – ITEM 15 +184 EXEC
Y – ITEM 16 +0 EXEC
OM – ITEM 17 +90 EXEC (β < 0)
√270 EXEC (β > 0)
START TRK – ITEM 19 EXEC

20. Confirm MS pwrnd activities complete, then:

For deorbit prep:

21. Go to LOSS OF FES (CONT DEORB)

OV105

B10-69

OPCL/5/GEN M
### MS PULLOUT PAGE

**MS2**  
Deploy rads, RAD DEPLOY (ORB OPS, ECLS)  

**MS1**  
Perform pwrdn below

#### MS PWRDN

1. Minimize ltg  
2. √BRAKES (three) – OFF  
3. √cb ADTA (four) – op  
4. MSN TIMER FWD – op  
5. MSN TIMER AFT – op  
6. PL DATA INTLVR PWR – OFF  
7. APU HTR LUBE OIL LN (three) – OFF  
8. HYD HTR (eight) – OFF  
9. RCS/OMS HTR FWD RCS – OFF  
10. cb TV (fifteen) – op  
11. MON 1,2 PWR (two) – OFF  
12. VAC VENT NOZ HTR – OFF  
13. cb MNA,MNB STBD HTR A,B (two) – op  
14. Cab temp cntl act link – pin to FULL COOL

---

**LOSS OF FES**  
**ON-ORBIT**  
**MS COMM PAGE**

---

**OV105**

---

**OPCL/ALL/GEN M,3**
AV BAY FIRE

AV BAY 1

NOTE
While performing proc, note any cbs open.

Equipment still pwrd in Av Bay following pwrdn:

- FPCA 1
- MDM OF 1
- FLCA 1
- DSC OF 1
- IMU FAN
- ACCU

If docked with ISS, proc results in loss of Lo Z Translation.

If no active GNC GPC: Perform GNC RECOVERY VIA G2FD (DPS), 3-12, concurrent with remainder of this proc

R1 1. cb AC CONTR AC1 (three) – cl
2. INV/AC BUS 1 – OFF (tb-OFF)
   INV PWR 1 – OFF (tb-OFF)
3. cb AC CONTR AC1 (three) – op
4. Perform FC1 SHUTDN, except PWRDN (Cue Card),
   then:
   L1 5. √AV BAY 1 FAN A,B (two) – OFF
6. FREON PUMP LOOP 2 – A
7. AV BAY 3 FAN A – ON
   B – OFF
C3 8. OI PCMMU FORMAT – FXD
   PWR – 2
9. BFC CRT DISP – ON
O6 10. √GPC PWR 5 – ON
   OUTPUT 5 – NORM
   MODE 5 – STBY (tb-RUN), RUN
   4 – STBY (tb-bp), HALT
   PWR 4 – OFF

If GNC RECOVERY VIA G2FD (DPS), 3-12, performed:
11. Go to step 15
12. If Single G2 GPC OPS:
13. Perform G2 SET EXPANSION, target Dual G2
    (ORB OPS, DPS), then:
14. If/when in Multiple GPC OPS:
    Reassign strings to GPC 2 in MC 2
    [GNC 0 GPC MEMORY]
CRT

CONFIG – ITEM 1 +2 EXEC
Modify MC 2 per table -- -- --

DOWNLIST GPC – ITEM 44
+2 EXEC

GNC, OPS 201 PRO

O6 15. GPC MODE 1(3) – STBY (tb-bp)
– HALT

PWR 1 – OFF

16. MDM FF1 – OFF
PL1 – OFF

17. Perform PL PWRDN, then:

O7 18. \sqrt{GPS 1 PWR – OFF
\sqrt{PRE AMPL (two) – OFF

O8 19. \sqrt{RDR ALTM 1 – OFF
20. \sqrt{MLS 1 – OFF
21. GNC 23 RCS

CRT
RCS FWD – ITEM 1 EXEC (*

MANF VLVS STAT OVRD – ITEM 41 EXEC –

CL (MANF 2)

O13:A 22. \sqrt{cb ESS 1BC AC1 SNRS – op
3AB GPC STAT – op

O14:A 23. \sqrt{BRAKES MNA – OFF

O14:E 24. \sqrt{cb MNA RDR ALTM 1 – op

MLS 1 – op
\sqrt{ADTA 1 – op
\sqrt{ACCEL 1 – op

O15:F 25. MMU 1 – OFF
26. RJDF 1B F1 LOGIC – OFF
DRIVER – OFF

O15:F 27. RJDF 1A F2 LOGIC – OFF
DRIVER – OFF

A10 28. \sqrt{ACCEL 4 – OFF

O16:A 29. \sqrt{BRAKES MNC – OFF

A12 30. \sqrt{cb MNC ADTA 3 – op

A11R 31. PL DATA INTLVR PWR – OFF

32. S-BD PL CNTL – PNL,CMD

MA73C:A 33. MCA LOGIC MNA FWD 1 – OFF

AW18H 34. \sqrt{PWR/BATT CHGR EMU 1,2 BUS SEL (two) – OFF

A12 35. HYD CIRC PUMP PWR 1 – MNB

2 – MNC

3 – MNA

Cont next page

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OPCL/5/GEN M,2
L4:G 36. cb AC2 \( \Phi_A, \Phi_B, \Phi_C \) AV BAY 1 FAN B (three) – op  
37. Perform MAL, \( \text{EPS} \) SSR-110, BUS LOSS: AC1,  
except:  
\( L_1 \) \( \sqrt{\text{AV BAY 1 FAN A,B (two)}} \) – OFF, then:  
38. Reassign SM into GPC 3, per MAL, \( \text{DPS} \) SSR-4,  
SM REASSIGNMENT  
39. Perform LOAD PCMMU FORMAT, using TFL  
161/103 (ORB OPS FS, COMM/INST), then:  
C3 40. BFC CRT DISP – OFF  
SEL – 3+1  
Check all IDPs deassigned from BFS  
O6 41. GPC MODE 5 – STBY,HALT (tb-bp)  
\( \sqrt{\text{OUTPUT 5}} \) – NORM  
For deorb prep:  
If orbit 3 deorbit:  
42. Go to LAUNCH DAY DEORBIT PREP  
(ORBIT 3) (CONT DEORB) >>  
43. Perform MAL, ECLS SSR-12, AV BAY FIRE  
RECOVERY/RECONFIG, Checkout and Recovery,  
then:  
For deorb prep:  
If orbit 7 deorbit:  
44. Go to AV BAY FIRE (DEORB PREP,  
CONTINGENCY DELTAS)
AV BAY 2

NOTE
While performing proc, note any cbs open.

Equipment still pwrd in Av Bay following pwrdn:
- FPCA 2
- MDM OF2
- FLCA 2
- DSC OF2
- BFC 3A (When GPC 3 is powered).

If docked with ISS, proc will require ISS to control mated attitude or result in loss of mated attitude control. Proc also results in loss of Lo Z Translation

| R1 | 1. cb AC CONTR AC2 (three) – cl |
|    | 2. INV/AC BUS 2 – OFF (tb-OFF) |
|    | INV PWR 2 – OFF (tb-OFF)       |
|    | 3. cb AC CONTR AC2 (three) – op |
|    | 4. Perform FC2 SHUTDN, except PWRD (Cue Card), then: |
| L1 | 5. IMU FAN A(C) – ON |
|    | B – OFF |
|    | 6. AV BAY 1 FAN A – ON |
|    | B – OFF |
|    | 7. FREON PUMP LOOP 1 – A |
|    | 8. √CAB FAN A – ON |
|    | √B – OFF |
|    | 9. √AV BAY 2 FAN A,B (two) – OFF |
| C3 | 10. √O1 PCMMU PWR – 1 |
| A1L| 11. √S-BD PM MODE sel – TDRS DATA |
|    | √NSP DATA RATE XMIT – HI |
|    | √RCV – HI |
|    | √CODING XMIT – ON |
|    | √RCV – ON |
|    | √PWR – 1 |
|    | √UPLK DATA – S-BD |
| C3 | 12. S-BD PM CNTL – PNL,CMD |

Cont next page

OV105
REASSIGN STRINGS TO GPC 1 IN MC 2

13. **[GNC 0 GPC MEMORY]**
   CRT
   CONFIG – ITEM 1 +2 EXEC
   Modify MC 2 per table
14. GNC, OPS 201 PRO
   O6
   15. GPC MODE 2 – STBY(tb-bp)
       PWR 2 – OFF
       MODE 5 – HALT
       OUTPUT 5 – NORM
       PWR 5 – OFF
   16. MDM FF2,FF4 (two) – OFF
       PL2 – OFF
   17. Perform PL PWRDN, then:
       O8
   18. \ exerc
       O13:C
   20. cb ESS 2CA AC2 SNSR – op
   O15:A
   21. cb BRAKES MNB – OFF
       O15:E
   22. cb MNB RDR ALTM 2 – op
       MLS 2 – op
       ADTA 2 – op
       ACCEL 2 – op
   O16:A
   23. MMU 2 – OFF
   O14,O15, O16:F
   24. \ exerc
           "DAP CONFIG" – sel tail only
           "P,Y OPTION – ITEM 15,16 EXEC (TAIL)"
   O16:A
   25. \ exerc
   O16:E
   29. RJDF 2A F3 LOGIC – OFF
       DRIVER – OFF
       2B F4/F5 LOGIC – OFF
       F4 DRIVER – OFF
   30. \ exerc
   31. RJD MANF L5/F5/R5 DRIVER – OFF
   A1L
   32. S-BD PL PWR SYS – OFF
       CNTL – PNL,CMD

Cont next page

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B10-78
OPCL/5/GEN M,2
33. √HYD CIRC PUMP PWR 1 – MNA
    2 – MNB
    3 – MNC

34. MCA LOGIC MNB FWD 2 – OFF

35. cb AC3 AV BAY 2 FAN B (three) – op

36. Perform MAL, EPS SSR-120, BUS LOSS: AC2, except:
    L1 √AV BAY 2 FAN A,B (two) – OFF, then:

37. Reassign BFS into GPC 3, per MAL, DPS SSR-7, GPC IPL MENU OPTION (PASS/BFS)

For deorb prep:
   If orbit 3 deorbit:
      38. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3) (CONT DEORB) >>
   39. Perform MAL, ECLS SSR-12, AV BAY FIRE RECOVERY/RECONFIG, Checkout and Recovery, then:

For deorb prep:
   If orbit 7 deorbit:
      40. Perform Deltas to nominal POST INSERTION, DEORB PREP (POST INSERT, ORBIT 7 D/O), then:
      41. Go to AV BAY FIRE (DEORB PREP, CONTINGENCY DELTAS)
AV BAY 3A

NOTE
While performing proc, note any cbs open.

Equipment still pwrd in Av Bay following pwrdn:
- FPCA 3 MDM OF3 GCIL
- FLCA 3 DSC OF3
- Active comm sys equipment
- S-BD PWR-AMP stby (alt sys)

R1
1. cb AC CONTR AC3 (three) – cl
2. INV/AC BUS 3 – OFF (tb-OFF)
3. cb AC CONTR AC3 (three) – op
4. Perform FC3 SHUTDN, except PWRDN (Cue Card),
   then:

L1
5. AV BAY 3 FAN A,B (two) – OFF
6. CAB FAN B – ON
   A – OFF
7. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl

L4:F
8. H2O PUMP LOOP 1 – ON
   H2O PUMP LOOP 2 – GPC

L1
If Triple G2:
8. CONFIG – ITEM 1 +2 EXEC
    Modify MC 2 per table

O6
9. GNC, OPS 201 PRO
10. √GPC MODE 3 – HALT
    √OUTPUT 3 – NORM
    √PWR 3 – OFF
11. MDM FF3 – OFF

O7
12. √GPS 3 PWR – OFF
    √PRE AMPL – OFF

O13:A
13. cb ESS 1BC C/W A – op
    2CA C/W B – op

O13:C
14. cb ESS 3AB AC3 SNSR – op
15. Perform LOSS OF VERNIERS
    (ORB OPS, RCS) while continuing with pwrdn, then:

<table>
<thead>
<tr>
<th>CRT</th>
<th>CONFIG</th>
<th>GPC</th>
<th>2</th>
</tr>
</thead>
<tbody>
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<td>O13:A:</td>
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<td>1</td>
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</tbody>
</table>

Cont next page
OV105
B10-81

OPCL/5/GEN M
If comm not working:

A1L 16. √ S-BD PM MODE sel – TDRS DATA
√ NSP DATA RATE XMIT – HI
√ RCV – HI
√ CODING XMIT – ON
√ RCV – ON
√ PWR – 1
√ UPLK DATA – S-BD

C3 17. S-BD PM CNTL – PNL,CMD

If comm still not working:

√ PWR SYS – OFF

C3 19. PL DATA INTLVR PWR – OFF

A1L 20. S-BD PM CNTL – PNL

ANT SW ELEC – OFF
PRE AMP – OFF
PWR AMPL STBY – OFF
OPER – OFF
XPNDR – OFF

21. √ NSP PWR – OFF
√ ENCRYPTION PWR – OFF

MA73C:A 22. √ MCA LOGIC MNC FWD 3 – OFF

NOTE

If comm presently working, performing a PNL,CMD may result in loss of comm (if fire has aff alt comm sys)

L4:H 23. √ cb AC1 AV BAY 3 FAN B (three) – op

24. Perform MAL, EPS SSR-130, BUS LOSS: AC3, except:
   L1 √ AV BAY 3 FAN A,B (two) – OFF, then:

For deorb prep:

If orbit 3 deorbit:

25. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3) (CONT DEORB, LAUNCH DAY ORBIT 3) >>

26. Perform MAL, ECLS SSR-12, AV BAY FIRE RECOVERY/RECONFIG, Checkout and Recovery, then:

For deorb prep:

If orbit 7 deorbit:

27. Perform Deltas to nominal POST INSERTION, DEORB PREP (POST INSERT, ORBIT 7 D/O), then:

28. Go to AV BAY FIRE (DEORB PREP, CONTINGENCY DELTAS)
# PRIORITY PWRDN PROCEDURES

(And Mission Specific Pwrdns)

1. **Letter coded** priority pwrdns are for mission specific operations. 
   - **Group A** (normal) is standard sw list config for on-orbit operations. 
   - **Group B** (LOW LEVEL) and **Group C** (MSN EXT) are specialized pwrdns. 
   - **Group B** (with A) comprises a nonstandard avionics config to be used nominally on power-critical missions not normally involving payload deploys, rendezvous, proximity, or RMS operations. 
   - **Group C** (with A) will be implemented, if reqd, during mission extension days.

Activities not consistent with Group B and C Pwrds are:

<table>
<thead>
<tr>
<th>LOW LEVEL CONFIG (Group B)</th>
<th>MISSION EXT (Group C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. OMS BURNS</td>
<td>f. OMS BURNS</td>
</tr>
<tr>
<td>b. FCS CHECKOUT</td>
<td>g. FCS CHECKOUT</td>
</tr>
<tr>
<td>c. NOMINAL OPS TRANSITIONS (i.e., not reqd for troubleshooting)</td>
<td>h. OPS TRANSITIONS</td>
</tr>
<tr>
<td>d. DEORB PREP</td>
<td>i. CIRC PUMP OPS</td>
</tr>
<tr>
<td>e. DTOs</td>
<td>j. APU OPS</td>
</tr>
<tr>
<td></td>
<td>k. PLBD OPS</td>
</tr>
<tr>
<td></td>
<td>l. KU BAND OPS</td>
</tr>
<tr>
<td></td>
<td>m. PAYLOAD OPS</td>
</tr>
<tr>
<td></td>
<td>n. DEORB PREP</td>
</tr>
<tr>
<td></td>
<td>o. DTOs</td>
</tr>
</tbody>
</table>

Pwrup for any of the activities listed above will be accomplished using the B or C Pwrds in reverse order.

2. **Numbered** priority pwrdn procs are for contingency use, and are listed according to operational criticality, higher numbers resulting in greater power reduction. Usage of any numbered pwrdn assumes sequential inclusion of all lower numbered procs.
3. The loads for the major power users are presented below.

4. Use PWRUP column in reverse order to back out of numbered priority pwrnds.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>dc Watts</th>
<th>Pnl</th>
</tr>
</thead>
<tbody>
<tr>
<td>MADS – ASCENT/ENTRY</td>
<td>305</td>
<td>C3</td>
</tr>
<tr>
<td>– ORBIT</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>LTG PNL (L OVHD, L CTR)</td>
<td>654</td>
<td>O6</td>
</tr>
<tr>
<td>LTG PNL (R OVHD, R)</td>
<td>396</td>
<td>O8</td>
</tr>
<tr>
<td>LTG INST (L/CTR, OVHD)</td>
<td>108</td>
<td>O6</td>
</tr>
<tr>
<td>LTG INST (R)</td>
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</tr>
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<tr>
<td>GPC (HALT)</td>
<td>56</td>
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</tr>
<tr>
<td>IDP</td>
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<td>MDU</td>
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<td>FLT CNTLR PWR</td>
<td>10</td>
<td>F7,F8</td>
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<td>ADI/DDU</td>
<td>129</td>
<td>O14,O15, O16:E</td>
</tr>
<tr>
<td>TACAN – SEARCH</td>
<td>75</td>
<td>O7</td>
</tr>
<tr>
<td>– TRACK</td>
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<tr>
<td>MLS</td>
<td>55</td>
<td>O14,O15, O16:E</td>
</tr>
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<td>GPS</td>
<td>25.2</td>
<td>A13</td>
</tr>
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<td>RA</td>
<td>23</td>
<td>O8</td>
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<tr>
<td>HUD</td>
<td>245</td>
<td>F3</td>
</tr>
<tr>
<td>IMU – OPER</td>
<td>119</td>
<td>O14,O15, O16:A</td>
</tr>
<tr>
<td>– STBY</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>FREON LOOP PUMP</td>
<td>467</td>
<td>L1</td>
</tr>
<tr>
<td>H2O PUMP LOOP</td>
<td>258</td>
<td>L1</td>
</tr>
<tr>
<td>FES HTRS – (FES OFF)</td>
<td>222</td>
<td>L1</td>
</tr>
<tr>
<td>– (FES ON)</td>
<td>600</td>
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<tr>
<td>ACIP htr</td>
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## PRIORITY PWRDN GROUP A

<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP A</th>
<th>PWRDN (normal)</th>
<th>PWRUP</th>
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<tr>
<td></td>
<td></td>
<td>Nominal on-orbit config:</td>
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</tr>
<tr>
<td></td>
<td>1.</td>
<td>Lights – OFF except when needed</td>
<td></td>
</tr>
<tr>
<td>O14,</td>
<td>2.</td>
<td>BRAKES (three) – OFF</td>
<td>1</td>
</tr>
<tr>
<td>O15,</td>
<td>3.</td>
<td>cb ADTA (four) – op</td>
<td></td>
</tr>
<tr>
<td>O16:A</td>
<td></td>
<td>If ASA – ON:</td>
<td></td>
</tr>
<tr>
<td>:E</td>
<td>4.</td>
<td>Sequence FCS CH (four) – OFF rapidly, then:</td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td>5.</td>
<td>ASA (four) – OFF</td>
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</tr>
<tr>
<td>O14,</td>
<td>6.</td>
<td>ATVC (four) – OFF</td>
<td></td>
</tr>
<tr>
<td>O15,</td>
<td>7.</td>
<td>EIU (three) – OFF</td>
<td></td>
</tr>
<tr>
<td>O16:F</td>
<td>8.</td>
<td>MEC (two) – OFF</td>
<td></td>
</tr>
<tr>
<td>:D</td>
<td>9.</td>
<td>TACAN MODE sel (three) – OFF</td>
<td></td>
</tr>
<tr>
<td>O7</td>
<td>10.</td>
<td>RDR ALTM (two) – OFF</td>
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<tr>
<td>O8</td>
<td>11.</td>
<td>MLS (three) – OFF</td>
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</tr>
<tr>
<td>L1</td>
<td>12.</td>
<td>HI LOAD DUCT HTR sel – OFF</td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>13.</td>
<td>ANTISKID – OFF</td>
<td></td>
</tr>
<tr>
<td>F6,F8</td>
<td>14.</td>
<td>FLT CNTLR PWR (two) – OFF</td>
<td></td>
</tr>
<tr>
<td>A12</td>
<td>15.</td>
<td>APU HTR TK/FU LN/H2O SYS:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>One set – AUTO, one set – OFF</td>
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</tr>
<tr>
<td>O6</td>
<td>16.</td>
<td>GPC MODE 3 – STBY (tb-bp)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>– HALT (tb-bp)</td>
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<tr>
<td></td>
<td></td>
<td>– STBY (tb-RUN)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>– HALT (tb-bp)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 – STBY (tb-RUN)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>– HALT (tb-bp)</td>
<td></td>
</tr>
</tbody>
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1 As reqd per other FDF documents
<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP A</th>
<th>PWRDN (Cont) (normal)</th>
<th>PWRUP</th>
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</thead>
<tbody>
<tr>
<td>O6</td>
<td>O14,</td>
<td>17. GPC MODE 2 – as reqd</td>
<td></td>
</tr>
<tr>
<td></td>
<td>O15,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>O16:A</td>
<td>18. RGA (four) – OFF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>O14,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>O15:E</td>
<td>19. cb ACCEL 1,2 (two) – op</td>
<td></td>
</tr>
<tr>
<td></td>
<td>O15,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>O16:F</td>
<td>20. ACCEL 4,3 (two) – OFF</td>
<td></td>
</tr>
<tr>
<td>F3</td>
<td>O14,</td>
<td>21. HUD PWR (two) – OFF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>O15,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>O16:E</td>
<td>22. cb DDU L,R,AFT (six) – op</td>
<td></td>
</tr>
<tr>
<td>O6</td>
<td></td>
<td>23. IDPs – three ON for crew awake</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

2. If GPC 2 not reqd, perform G2 SET CONTRACTION (ORB OPS, DPS)

3. As reqd per FLIGHT PLAN, perform G2 SET EXPANSION (ORB OPS, DPS)

4. Other(s) ON as reqd

5. ON as reqd for FLT CNTLR PWR

OV103,104
PRIORITY PWRDN PROCEDURES
(And Mission Specific Pwrdns)

1. Letter coded priority pwrdns are for mission specific operations. Group A (normal) is standard sw list config for on-orbit operations. Group B (LOW LEVEL) and Group C (MSN EXT) are specialized pwrdns.

Group B (with A) comprises a nonstandard avionics config to be used nominally on power-critical missions not normally involving payload deploys, rendezvous, proximity, or RMS operations. Group C (with A) will be implemented, if reqd, during mission extension days.

Activities not consistent with Group B and C Pwrdns are:

LOW LEVEL CONFIG (Group B) MISSION EXT (Group C)

- OMS BURNS
- FCS CHECKOUT
- NOMINAL OPS TRANSITIONS (i.e., not reqd for troubleshooting)
- DEORB PREP
- DTOs
- OMS BURNS
- FCS CHECKOUT
- OPS TRANSITIONS
- CIRC PUMP OPS
- APU OPS
- PLBD OPS
- KU BAND OPS
- PAYLOAD OPS
- DEORB PREP
- DTOs

Pwrup for any of the activities listed above will be accomplished using the B or C Pwrdns in reverse order.

2. Numbered priority pwrdn procs are for contingency use, and are listed according to operational criticality, higher numbers resulting in greater power reduction. Usage of any numbered pwrdn assumes sequential inclusion of all lower numbered procs.
3. The loads for the major power users are presented below.

4. Use PWRUP column in reverse order to back out of numbered priority pwrdns.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>dc Watts (Avg)</th>
<th>Pnl</th>
</tr>
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<tbody>
<tr>
<td>MADS – ASCENT/ENTRY</td>
<td>305</td>
<td>C3</td>
</tr>
<tr>
<td>– ORBIT</td>
<td>128</td>
<td></td>
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<tr>
<td>LTG PNL (L OVHD, L CTR)</td>
<td>654</td>
<td>O6</td>
</tr>
<tr>
<td>LTG PNL (R OVHD, R)</td>
<td>396</td>
<td>O8</td>
</tr>
<tr>
<td>LTG INST (L/CTR, OVHD)</td>
<td>108</td>
<td>O6</td>
</tr>
<tr>
<td>LTG INST (R)</td>
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<tr>
<td>GPC (RUN)</td>
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<td>O6</td>
</tr>
<tr>
<td>GPC (HALT)</td>
<td>56</td>
<td>O6</td>
</tr>
<tr>
<td>IDP</td>
<td>55</td>
<td>C2</td>
</tr>
<tr>
<td>MDU</td>
<td>66</td>
<td>R14:A</td>
</tr>
<tr>
<td>ADC</td>
<td>3.7</td>
<td>R14:A</td>
</tr>
<tr>
<td>FLT CNTLR PWR</td>
<td>10</td>
<td>F7,F8</td>
</tr>
<tr>
<td>ADI/DDU</td>
<td>129</td>
<td>O14,O15, O16:E</td>
</tr>
<tr>
<td>MLS</td>
<td>55</td>
<td>O14,O15, O16:E</td>
</tr>
<tr>
<td>GPS</td>
<td>25.2</td>
<td>O7</td>
</tr>
<tr>
<td>RA</td>
<td>23</td>
<td>O8</td>
</tr>
<tr>
<td>HUD</td>
<td>245</td>
<td>F3</td>
</tr>
<tr>
<td>IMU – OPER</td>
<td>119</td>
<td>O14,O15, O16:A</td>
</tr>
<tr>
<td>– STBY</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>FREON LOOP PUMP</td>
<td>467</td>
<td>L1</td>
</tr>
<tr>
<td>H2O PUMP LOOP</td>
<td>258</td>
<td>L1</td>
</tr>
<tr>
<td>FES HTRS – (FES OFF)</td>
<td>222</td>
<td>L1</td>
</tr>
<tr>
<td>– (FES ON)</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>ACIP htr</td>
<td>50</td>
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OV105
## PRIORITY PWRDN GROUP A

<table>
<thead>
<tr>
<th>PNL</th>
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<tr>
<td></td>
<td>Nominal on-orbit config:</td>
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</tr>
<tr>
<td>O14, O15, O16:A</td>
<td>1. Lights – OFF except when needed</td>
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</tr>
<tr>
<td></td>
<td>2. BRAKES (three) – OFF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. cb ADTA (four) – op</td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td>4. Sequence FCS CH (four) – OFF</td>
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</tr>
<tr>
<td>O14, O15, O16:F</td>
<td>If ASA – ON:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. ASA (four) – OFF</td>
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</tr>
<tr>
<td>O17:A</td>
<td>6. ATVC (four) – OFF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. EIU (three) – OFF</td>
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</tr>
<tr>
<td></td>
<td>8. MEC (two) – OFF</td>
<td></td>
</tr>
<tr>
<td>O7</td>
<td>9. GPS 1,3 PWR (two) – OFF</td>
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</tr>
<tr>
<td>O8</td>
<td>10. RDR ALTM (two) – OFF</td>
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</tr>
<tr>
<td>L1</td>
<td>11. MLS (three) – OFF</td>
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</tr>
<tr>
<td>L2</td>
<td>12. HI LOAD DUCT HTR sel – OFF</td>
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</tr>
<tr>
<td>F6,F8</td>
<td>13. ANTISKID – OFF</td>
<td></td>
</tr>
<tr>
<td>A12</td>
<td>14. FLT CNTLR PWR (two) – OFF</td>
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<tr>
<td>O6</td>
<td>15. APU HTR TK/FU LN/H2O SYS:</td>
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</tr>
<tr>
<td></td>
<td>Two set – AUTO, one set – OFF</td>
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<tr>
<td></td>
<td>16. GPC MODE 3 – STBY (tb-bp)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– HALT (tb-bp)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– STBY (tb-RUN)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– HALT (tb-bp)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 – STBY (tb-RUN)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– HALT (tb-bp)</td>
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Cont next page

1 As reqd per other FDF documents
<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP A</th>
<th>PWRDN (Cont) (normal)</th>
<th>PWRUP</th>
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<td>O6</td>
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<td></td>
</tr>
<tr>
<td>O14, O15, O16:A</td>
<td>17. GPC MODE 2 – as reqd</td>
<td>2</td>
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<tr>
<td>O14, O15:E</td>
<td>18. RGA (four) – OFF</td>
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<td></td>
</tr>
<tr>
<td>O15, O16:F</td>
<td>19. cb ACCEL 1,2 (two) – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F3</td>
<td>20. ACCEL 4,3 (two) – OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O14, O15, O16:E</td>
<td>21. HUD PWR (two) – OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22. cb DDU L,R,AFT (six) – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O6</td>
<td>23. IDPs – three ON for crew awake</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All MDUs – ON as desired</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All MDUs and IDPs OFF for crew single-shift sleep</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24. UHF MODE sel – OFF</td>
<td>SPLX</td>
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</table>

2. If GPC 2 not reqd, perform G2 SET CONTRACTION (ORB OPS, DPS)
3. As reqd per FLIGHT PLAN, perform G2 SET EXPANSION (ORB OPS, DPS)
4. Other(s) ON as reqd
5. ON as reqd for FLT CNTLR PWR
### PRIORITY PWRDN GROUP B

<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP B</th>
<th>PWRDN (LOW LEVEL)</th>
<th>PWRUP</th>
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<tbody>
<tr>
<td></td>
<td>NOTE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>KU-BD and S-BD FM sw: As reqd to conserve energy and accomplish mission objectives, MCC will cmd</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Turn off all lights except Middeck lts 6, 7, 8 (no lts for single-shift sleep, one for split-shift sleep)</td>
<td>As reqd</td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td>2. MSTR MADS PWR – OFF (as reqd, cycle ON per FLIGHT PLAN)</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>A14</td>
<td>3. RCS/OMS HTR L POD (two) – A AUTO, B OFF R POD (two) – A AUTO, B OFF</td>
<td>MCC call</td>
<td></td>
</tr>
<tr>
<td>GALLEY</td>
<td>4. H2O HTR (two), OVEN FAN – OFF</td>
<td>ON, 1</td>
<td></td>
</tr>
<tr>
<td>O14, O15, O16:E</td>
<td>5. cb DDU L R AFT (six) – op</td>
<td>cl</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If GPC MODE 2 – RUN: 6. Perform G2 SET CONTRACTION (ORB OPS, DPS), then:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O15:F</td>
<td>7. MMU 2 – OFF (1 of 2 off)</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Minimize PGSC use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O14, O15, O16:F</td>
<td>9. Pri RJDF DRIVER, LOGIC (eight) – OFF</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Pri RJDA DRIVER, LOGIC (eight) – OFF</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RJDA 1A L2/R2 DRIVER – ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Use only one IDP with three MDUs max. All IDPs and MDUs OFF for single-shift sleep; otherwise – ON</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12. [GNC 21 IMU ALIGN IMU 2 STBY – ITEM 22 EXEC</td>
<td>3</td>
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</tr>
<tr>
<td></td>
<td>COLOR PRINTER – OFF</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

1. Insert drink package to keep water tank pump from cycling (water temp may decrease slightly); if repowering Galley, remove drink package

2. If reqd, go to G2 SET EXPANSION (ORB OPS, DPS)

3. Recover IMU 2 (MAL, GNC FRP-3)

4. MCC will instruct crew when to turn COLOR PRINTER ON
### PRIORITY PWRDN GROUP C

<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP C</th>
<th>PWRDN (MSN EXT)</th>
<th>PWRUP</th>
</tr>
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<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>1.</td>
<td>Perform PRIORITY PWRDN GROUP 1,2</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>If prior to first deorbit prep:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Perform PRIORITY PWRDN GROUP 3A, then:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Turn off all lights except two Middeck lts</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(use no lts for single-shift sleep or split-shift sleep)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GALLEY</td>
<td>4.</td>
<td>H2O HTR (two), OVEN FAN – OFF</td>
<td>ON</td>
</tr>
<tr>
<td>O14, O15, O16:F</td>
<td>5.</td>
<td>MDUs: Cycle ON when req’d</td>
<td></td>
</tr>
<tr>
<td>O6</td>
<td>6.</td>
<td>Pri RJDF DRIVER,LOGIC (eight) – OFF</td>
<td></td>
</tr>
<tr>
<td>A14</td>
<td>7.</td>
<td>Pri RJDA DRIVER,LOGIC (eight) – OFF</td>
<td></td>
</tr>
<tr>
<td>A1L</td>
<td>8.</td>
<td>MDM PL2 – OFF</td>
<td></td>
</tr>
<tr>
<td>A1R</td>
<td>9.</td>
<td>RCS/OMS HTR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L POD (two) – A AUTO, B OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>R POD (two) – A AUTO, B OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O6</td>
<td>10.</td>
<td>PL DATA INTLVR PWR – OFF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S-BD PL PWR SYS – OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CNTL – PNL,CMD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O14, O15, O16:E</td>
<td>11.</td>
<td>FM PWR – OFF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CNTL – PNL,CMD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O6</td>
<td>12.</td>
<td>UHF MODE sel – OFF</td>
<td></td>
</tr>
<tr>
<td>O14, O15, O16:E</td>
<td>13.</td>
<td>KU-BAND SYS – max 2 hr ON/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cb DDU L,R,AFT (six) – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>COLOR PRINTER – OFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Notes:

1. Insert drink package to keep water tank pump from cycling (water temp may decrease slightly); if repowering Galley, remove drink package
2. Before powering off PF2 MDM, UHF for Antenna Electronics 1 activation
3. SM I/O RESET
4. If PDI and/or PSP pwrd off, expect ‘S62 BCE BYP PL’, ‘S62 BCE BYP PDI’ and/or ‘S62 BCE BYP PSP’ msgs
5. As req’d, MCC will command
### PRIORITY PWRDN GROUP 1

<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP 1</th>
<th>PWRDN</th>
<th>PWRUP</th>
</tr>
</thead>
</table>
| O15:F | 1. Minimize ltg  
2. Use only one IDP with three MDUs max  
If GPC 2 – RUN:  
3. Perform G2 SET CONTRACTION (ORB OPS, DPS), then:  
4. MMU 2 OFF – (1 of 2 off)  
5. [GNC 21 IMU ALIGN] IMU 2 STBY – ITEM 22 EXEC | 1 | ON |

1. If reqd, go to G2 SET EXPANSION (ORB OPS, DPS)
2. Recover IMU 2 (MAL, GNC FRP-3)

### PRIORITY PWRDN GROUP 2

<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP 2</th>
<th>PWRDN</th>
<th>PWRUP</th>
</tr>
</thead>
</table>
| O6  | 1. STRK PWR -Y,-Z (two) – OFF  
2. Perform GPS PWRDN (ORB OPS, GNC) for GPS 2  
3. MDM FF2,4 (two) – OFF  
FA4 – OFF | 1 | As reqd |
| C3  | 4. MSTR MADS PWR – OFF | ON 2 |
| L1  | 5. FLASH EVAP CNTLR PRI (two) – OFF  
SEC – OFF  
TOP EVAP HTR NOZ (two) – OFF  
DUCT sel – OFF | ON 3 Two ON 3 |

**NOTE**
RMS temps no longer avail on A8U; however, MCC has insight

| MA73C:F | A8L | 6. cb AC1 RMS PRI ΦA – op  
7. PORT RMS HTR A(B) – OFF  
* If PDRS PORT TEMP msg (MA tone only): *  
* Within 30 min, PORT RMS HTR A(B) – *  
* AUTO  
* On MCC call:  
* PORT RMS HTR A(B) – OFF;  
* repeat as reqd | 4 |

**OCAC**
8. Use only one orbiter PGSC  
If OCAC flown:  
9. OCAC PWR – OFF | ON 5 |

1. Perform GPS PWRUP (ORB OPS, GNC) for GPS 2  
2. GNC I/O RESET  
3. Perform TOPPING FES STARTUP, using Pri A/B (ORB OPS, ECLS)  
4. SEC CNTLR ON only if both primary controllers failed
PRIORITY PWRDN GROUP 3

Perform PL PWRDN

PRIORITY PWRDN 3A (PP3A) contains recoverable PL ops pwrdn steps. PRIORITY PWRDN 3B (PP3B) is a total PL pwrdn that may cause PL ops to be nonrecoverable

PRIORITY PWRDN GROUP 4

<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP 4</th>
<th>PWRDN</th>
<th>PWRUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>GALLEY</td>
<td>1. H2O HTR (two), OVEN FAN – OFF</td>
<td>If RMS pwrd; 2. Perform RMS PWRDN (PDRS OPS), then:</td>
<td>ON MCC call</td>
</tr>
<tr>
<td>L4:L</td>
<td>3. cb AC1 ΦB AV BAY 2 S/C – op</td>
<td>cl</td>
<td></td>
</tr>
<tr>
<td>GALLEY</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PRIORITY PWRDN GROUP 5

<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP 5</th>
<th>PWRDN</th>
<th>PWRUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>O15:A</td>
<td>1. IMU 2 – OFF (1 of 3)</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2. GNC 20 DAP CONFIG TAIL P,Y OPTION DAP: X/AUTO/PRI</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>O8</td>
<td>3. FWD RCS MANF ISOL 1,2,3,4 (four) – CL</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>O6</td>
<td>4. MDM PL2 – OFF</td>
<td></td>
<td>ON 4</td>
</tr>
<tr>
<td>A14</td>
<td>5. RCS/OMS HTR FWD RCS JET 1,2,3,4 (four) – OFF</td>
<td>AUTO</td>
<td>ON</td>
</tr>
<tr>
<td>O14, O15, O16:F</td>
<td>6. RJDF DRIVER,LOGIC (eight) – OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O14:C</td>
<td>7. cb UTIL PWR O19/MO52J – op F1/MO13Q – op</td>
<td></td>
<td>cl</td>
</tr>
<tr>
<td>O15:C</td>
<td>8. Perform KU-BD ANT STOW (ORB OPS, COMM/INST), then:</td>
<td></td>
<td>cl</td>
</tr>
<tr>
<td>R14:C</td>
<td>9. cb MNB KU ANT HTR – op</td>
<td></td>
<td>cl</td>
</tr>
</tbody>
</table>

1. Recover IMU 2 (MAL, GNC FRP-3)
2. At MCC call, sel JET OPT 1 (cont PWRUP until AOS)
3. For PWRUP, perform MAL, RCS SSR-4, STAGED, MANF REPRESS
4. SM I/O RESET
5. Perform KU-BD ANT DEPLOY (ORB OPS, COMM/INST)
### PRIORITY PWRDN GROUP 6

<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP 6</th>
<th>PWRDN</th>
<th>PWRUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>O14:A</td>
<td>1. IMU 1 – OFF (2 of 3 off)</td>
<td></td>
<td>①</td>
</tr>
<tr>
<td>O15:D</td>
<td>2. cb O2/N2 CNTLR 2 – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O16:E</td>
<td>3. RCS/OMS PRPLT QTY GAUGE – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L4:L</td>
<td>4. AC1 A CAB T CNTLR 2 – op</td>
<td></td>
<td>cl</td>
</tr>
<tr>
<td></td>
<td>(if desired, pin CAB T CNTLR(3s))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>5. BLR CNTLR/HTR (three) – OFF</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>A12</td>
<td>6. APU HTR LUBE OIL LN (three) – OFF</td>
<td></td>
<td>B AUTO OFF</td>
</tr>
<tr>
<td></td>
<td>HYD HTR A (four) – OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B (four) – OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A14</td>
<td>7. RCS/OMS HTR OMS CRSFD LN (two) – A OFF, B OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ML31C</td>
<td>8. VAC VENT NOZ HTR – OFF</td>
<td></td>
<td>ON</td>
</tr>
<tr>
<td>ML86B:C</td>
<td>9. cb MNA EXT AIRLK HTR STRUCT Z1/2/3 – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:A</td>
<td>10. cb MNA H2O LN HTR A – op</td>
<td></td>
<td>②</td>
</tr>
<tr>
<td></td>
<td>MNB H2O LN HTR B – op</td>
<td></td>
<td>cl</td>
</tr>
<tr>
<td>If EDO WCS:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WCS</td>
<td>11. URINAL SEL – OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WCS PWR SEL (two) – OFF1,OFF2</td>
<td></td>
<td>③</td>
</tr>
<tr>
<td></td>
<td>√ FAN PWR – AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If MMU pwrd:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ML86B:D</td>
<td>12. cb MNA MMU PORT HTR A – op</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>STBD HTR A – op</td>
<td></td>
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<tr>
<td></td>
<td>MNB MMU PORT HTR B – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>STBD HTR B – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA73C</td>
<td>13. MCA LOGIC MNA,B,C:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MID 1,2,3,4 (eight) – OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A6U</td>
<td>14. ANNUN BUS SEL – OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R14:D</td>
<td>15. cb MNA TV C AFT BAY CAMR HTR – op</td>
<td></td>
<td>MNC</td>
</tr>
<tr>
<td></td>
<td>PAN-TILT HTR – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MNB TV A FWD BAY CAMR HTR – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAN-TILT HTR – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MNC B TV B KEEL/EVA CAMR HTR – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAN-TILT HTR – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAN-TILT HTR – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:E</td>
<td>16. cb MNB RMS PORT RMS TV CAMR HTR – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAN-TILT HTR – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MNA D STBD RMS TV CAMR HTR – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAN-TILT HTR – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAN-TILT HTR – op</td>
<td></td>
<td>④</td>
</tr>
</tbody>
</table>

1. Recover IMU 1 (MAL, GNC FRP-3)
2. One of two reqd
3. WCS URINAL SEL – SEP 1(2)
   WCS PWR SEL – AUTO1,OFF2
   (√FAN PWR – AUTO)
   URINE DIVERTER VLV – SEP 1(2)
4. For PWRUP, reopen SPLY(WASTE) H2O DUMP ISOL VLV

11-9 OPCL/ALL/GEN M
PRIORITY PWRDN GROUP 7

<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP 7</th>
<th>PWRDN</th>
<th>PWRUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>O13:D</td>
<td>1.</td>
<td>cb CRYO (four) – op</td>
<td>cl</td>
</tr>
<tr>
<td>O14:C</td>
<td>2.</td>
<td>cb MNA CRYO O2 HTR TK1 SNSR 1 – op</td>
<td>cl</td>
</tr>
<tr>
<td>:F</td>
<td>3.</td>
<td>MMU 1 – OFF (2 of 2 off)</td>
<td>ON</td>
</tr>
<tr>
<td>O16:C</td>
<td>4.</td>
<td>cb MNC CRYO O2 HTR TK1 SNSR 2 – op</td>
<td>cl</td>
</tr>
<tr>
<td>L4:K</td>
<td>5.</td>
<td>cb AC1 φA H2O CNTLR 2 – op</td>
<td>cl</td>
</tr>
<tr>
<td>L1</td>
<td>6.</td>
<td>FREON PUMP LOOP 2 – OFF</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RAD CNTLR LOOP 2 – OFF</td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>7.</td>
<td>O2 SYS 2 SPLY – CL (tb-CL)</td>
<td>OP</td>
</tr>
<tr>
<td>R1</td>
<td>8.</td>
<td>O2 TK1,TK2,TK3 HTRS A (three) – OFF</td>
<td>AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TK1,TK3 HTRS B (two) – OFF</td>
<td>AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H2 TK1,TK2,TK3 HTRS A (three) – OFF</td>
<td>AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TK1,TK3 HTRS B (two) – OFF</td>
<td>AUTO</td>
</tr>
<tr>
<td></td>
<td>If Primary Jets Only Option:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.</td>
<td>Go to step 17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If Vernier Jets Only Option:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.</td>
<td>Go to step 27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If Gravity Gradient Option:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.</td>
<td>Perform GG FREE DRIFT, ATT ID B, steps 1,2 (do not sel LO Z) (ORB OPS, RCS), then:</td>
<td></td>
</tr>
<tr>
<td>O14,</td>
<td>11.</td>
<td>All RJD DRIVER,LOGIC (seventeen) – OFF</td>
<td></td>
</tr>
<tr>
<td>O15,</td>
<td>O16:F</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.</td>
<td>Perform RCS SECURE (FWD,AFT) (RCS), 8-2, then:</td>
<td></td>
</tr>
<tr>
<td>O6</td>
<td>13.</td>
<td>MDM FF1 – OFF</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FA1,FA2,FA3 (three) – OFF</td>
<td>ON</td>
</tr>
<tr>
<td>MA73C</td>
<td>14.</td>
<td>MCA LOGIC MNA,B,C:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FWD 1,2,3 (three) – OFF</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AFT 1,2,3 (three) – OFF</td>
<td>ON</td>
</tr>
<tr>
<td>A14</td>
<td>15.</td>
<td>RCS/OMS HTR FWD RCS – OFF</td>
<td>AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RCS JET (five) – OFF</td>
<td>AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AFT RCS JET (five) – OFF</td>
<td>AUTO</td>
</tr>
<tr>
<td></td>
<td>16.</td>
<td>Go to step 31</td>
<td></td>
</tr>
</tbody>
</table>

Cont next page

1 Perform GG FREE DRIFT, step 3 (ORB OPS, RCS)
2 Perform MAL, RCS SSR-4, STAGED, MANF REPRESS (FRCS only). ΛL,R MANF P > 130 prior to MANF ISOL – OP
17. Perform XFEED: L RCS to R RCS (RCS), 8-5, then:

18. **GNC 23 RCS**
   - Ovrd L,R,1,3,4,5 STAT – CL

19. MDM FA2 – OFF
    FF1 – OFF

20. **GNC 20 DAP CONFIG**
    - TAIL P,Y OPTION

O14:F
21. RJDA 1A L2/R2 LOGIC – ON
    DRIVER – ON

O14, O15, O16:F
22. (Remaining) RJD DRIVER,LOGIC
    (fifteen) – OFF

O7
23. AFT L,R RCS MANF ISOL 5 (two) – CL

O8
24. FWD RCS MANF ISOL 5 – CL

A14
25. RCS/OMS HTR FWD RCS – OFF
    RCS JET (five) – OFF
    AFT RCS JET 1,3,4,5 (four) – OFF

26. Go to step 31

O6
27. MDM FA3 – OFF
    FF1 – OFF

O16:F
28. Vern RJD – ON

O14, O15, O16:F
29. Pri RJD DRIVER,LOGIC (sixteen) – OFF

A14
30. RCS/OMS HTR FWD RCS – OFF
    RCS JET 1,2,3,4 (four) – OFF
    AFT RCS JET 1,2,3,4 (four) – OFF

A11
31. CRYO TK HTR (four) – OFF

Cont next page

---

3 GNC I/O RESET
<table>
<thead>
<tr>
<th>PNL</th>
<th>GRP 7</th>
<th>PWRDN (Cont)</th>
<th>PWRUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML86B:C</td>
<td>32. cb EXT AIRLK HTR LN ZONE 1 (three) – op 2 (three) – op</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:F</td>
<td>cl</td>
<td>cl</td>
<td>cl</td>
</tr>
<tr>
<td>:G</td>
<td>op</td>
<td>cl</td>
<td>MCC call</td>
</tr>
<tr>
<td>R1</td>
<td>If three good FCs, shut dn FC2 and AC2 per the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. cb CRYO O2 HTR SNSR (four) – op</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34. All cbs – op</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. MN BUS TIE A,B (two) – ON (tb-ON)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36. Perform AC2 BUS LOSS ACTION (EPS), 5-30, only, leaving FC2 REACS open, then:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. cb AC CONTR (three) – cl</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INV/AC BUS 2 – OFF (tb-OFF)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INV PWR 2 – OFF (tb-OFF)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC BUS SNSR 2 – OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. Use only IDP4, aft MDUs, and aft FLT CNTLR PWR</td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>Perform MAL, EPS SSR-6, FC RESTART, then:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN BUS TIE A,B (two) – OFF (tb-OFF)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11-12</td>
<td>OPCL/ALL/GEN M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CUE CARD CONFIGURATION
LEAKING OMS PRPLT/He BURN

BURN ATT

TGT PEG 7

OUT-OF-PLANE

RETOGRADE

\( \Delta VX \)

\( \Delta VY \)

\( \Delta VZ \)

-15 EXEC, and if PRPLT LEAK, THC + X

-00 TIG* (Pc, \( \Delta VTOT \), ENG VLV)

+01 Release THC

If PRPLT LEAK, when CUR HP = 95±1 or Pc < 80:

OMS ENG – OFF; secure aff OMS

If He LEAK, when CUR HP = 95±1 or OMS He TK

P < 640 or OMS QTY < 39 OMS ENG – OFF

If reqd, repeat proc to burn OUT-OF-PLANE; start

in step 6 (if ENT PKT, start in step 5)

* On MCC call:

* If PER ADJ TIG < four orbits from Deorb TIG, FRCS

* QTY > 6%, and \( \Delta VTOT \) > 10 fps at OMS fail, mnvr to

* -X ATT (pitch up at 3°/sec to VGOz = 1/4 \( \Delta VTOT \));

* THC -X to CUR HP = 95 or FRCS PRPLT deplete

CUTOFF**

+02 OMS ENG – OFF** (if < three IMU, at

(reduced copy)
HAZARDOUS SPILL RESPONSE – ORBITER

**LEVEL 4 (RED) MOST HAZARDOUS SPILL (NONCONTAINABLE)**

1. Inform other crew, MCC – “Level 4 spill in cabin”
2. All crew don/activate QDMs
3. QDM Regulator mode – EMERGENCY (red knob cw)
   If Booster Fan active:
   MO13Q 4. AIRLK FAN A(B) – OFF, then:
   If hatches to ISS open:
   5. Simo, perform JOINT EMERGENCY EGRESS (Cue Card), continue with this proc

L1 6. CAB TEMP sel – COOL
WCS 7. MODE – COMM/COMMODE/MANUAL/EMU
OCAC 8. COMM MODE CTM – PULL UP (wait 15 sec), PUSH FWD

L1 9. \OCAC\ PWR – ON
10. \MCC\ Level 3 (ORANGE) HAZARDOUS SPILL (CONTAINABLE)

1. Inform other crew, MCC – “Level 3 spill in cabin”
2. All crew don/activate QDMs
3. QDM Regulator mode – EMERGENCY (red knob cw)
   If Booster Fan active:
   MO13Q 4. AIRLK FAN A(B) – OFF, then:
   If hatches to ISS open:
   5. Simo, perform JOINT EMERGENCY EGRESS (Cue Card), continue with this proc

L1 6. CAB FAN A(B) – OFF (max 30 min)
WCS 7. IMU FAN B(A,C) – OFF (max 90 min)
OCAC 8. OCAC PWR – OFF

CCK 9. Cleanup crew don Silver Shield Gloves, clean up spill w/Dry Wipes. Bag, label, stow in Wet Trash
   If cleanup fails, perform steps 13 and 14, then go to Level 4 step 6 >>

10. QDM Regulator mode – NORM (red knob ccw)
11. Doff Quick Don Masks, gloves. Stow gloves in Wet Trash
12. Inform other crew, MCC – “Spill in cabin cleaned up”

L1 13. CAB FAN A(B) – ON
14. IMU FAN B(A,C) – ON
OCAC 15. OCAC PWR – ON

If Booster Fan in bypass config >>

MO13Q 16. AIRLK FAN A(B) – ON

**HOOK VELCRO**

(reduced copy)

FAB USE ONLY

CC 12-4

OPCL/ALL/GEN M
HAZARDOUS SPILL RESPONSE – ORBITER

**LEVEL 2 (YELLOW) HAZARDOUS SPILL**
1. Inform other crew, MCC – “Level 2(1,0) spill in cabin”
   - If Level 2 spill:
     - CCK 2. Cleanup crew in vicinity don goggles, masks, and gloves (√MCC for Silver Shield or latex)
   - If Level 1 spill:
     - CCK 3. Cleanup crew in vicinity don goggles, masks, latex gloves
   
   If Level 0 controlled spill, >>

**LEVEL 1 (BLUE) LEAST HAZARDOUS SPILL**

**LEVEL 0 (GREEN) NONHAZARDOUS SPILL**

If Booster Fan active:

**MO13Q**
4. AIRLK FAN A(B) – OFF, then:
5. CAB FAN A(B) – OFF (max 30 min)
6. IMU FAN B(A,C) – OFF (max 90 min)

**OCAC**
7. OCAC PWR – OFF
8. Clean up spill w/Dry Wipes. Bag, label, stow in Wet Trash
   - If Level 2(1,0) cleanup fails, perform steps 11 and 12, then go to Level 4 step 5 >>
   - 9. As reqd, doff goggles, masks, gloves. Stow gloves in Wet Trash
   - 10. Inform other crew, MCC – “Spill in cabin cleaned up”
   - L1 11. CAB FAN A(B) – ON
   - OCAC 13. OCAC PWR – ON
   - MO13Q 14. AIRLK FAN A(B) – ON

If Booster Fan in bypass config >>
### FIRE/SMOKE (ORBIT)

If VISUAL SMOKE/FIRE, or two SMOKE DETN lights on, or two CONC > 2, or one SMOKE DETN light on and other CONC > 2:

1. Go to step B

If single Av Bay SMOKE DETN A/B and assoc CONC > 2:

2. SMOKE DETN CKT TEST – B(A) (25 sec)

If SMOKE DETN B(A) test good (lt on):

3. SMOKE DETN CKT TEST – OFF

4. SMOKE DETN SNSR – RESET =>

If SMOKE DETN B(A) test bad (no lt):

5. Go to step B

If none of above =>

6. AIRLK FAN A(B) – OFF

7. If DOCKED: Perform JOINT EMERGENCY EGRESS (Cue Card)

8. Don Quick Don Masks

9. LEH O2 vlvs – OP

10. SUPPLY vlv – OP

If AV BAY FIRE:

9. FIRE SUPPR – ARM

PB – DISCH

10. AV BAY FAN (two) – OFF

11. Simn, go to POST-FIRE CABIN CLEANUP (ORB PKT, ECLS) and AV BAY FIRE (ORB PKT, PORT)

If CABIN FIRE:

12. CAB FAN A(B) (two) – OFF

(max 20 min)

13. Locate source

14. Unpwr source of smoke

If smoke persists or source cannot be unpwr:

**WARNING**

Discharge is propulsive

15. Discharge handheld FIRE EXTINGUISH

16. Go to POST-FIRE CABIN CLEANUP (ORB PKT, ECLS)

<table>
<thead>
<tr>
<th>ALARM SEQUENCE</th>
<th>SOURCE AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALARM PANEL</td>
<td>PS/MSL (IR) CONSOLE</td>
</tr>
<tr>
<td>ART FILTER</td>
<td>AFT FLR DK, MIDDLEDECK</td>
</tr>
<tr>
<td>FWD FLR DK</td>
<td>CABIN</td>
</tr>
<tr>
<td>FWD FLR DK</td>
<td>WCS, LEB</td>
</tr>
</tbody>
</table>

**OPCL-7b (AESP-7a), front of FIRE/SMOKE (ORBIT) appears in the ASCENT/ENTRY SYSTEMS PROCEDURES**

replace side tab with clear tape and Hook Velcro

(reduced copy)
If hatches open to ISS, perform JOINT EMERGENCY EGRESS (Cue Card), then:

A7L
1. AIRLK FAN A(B) – OFF
2. APDS PWR (three) – OFF
3. √A,B,C lts (three) – OFF
4. HTRS/DCU PWR (three) – OFF
5. CNTL PNL PWR (three) – OFF
6. PSU PWR (two) – OFF
7. SYS PWR MNA,MNB (two) – OFF
    (hold 5 sec)
    √SYS PWR SYS1,SYS2 tb (two) – OFF

A6L
8. Close SH HATCH per decal
    √Equal vlvs (two) – OFF, caps installed
9. PL ISOL vlv – CL, install cap in flex duct

If SH HATCH flown:

SH Hatch
8. Close SH HATCH per decal
    √Equal vlvs (two) – OFF, caps installed

Tnl Adp
9. PL ISOL vlv – CL, install cap in flex duct

Inner Hatch
10. Close INNER HATCH per decal
    √Equal vlvs (two) – OFF, caps installed
11. On MCC call, go to ODS POST-FIRE ACTIONS (ECLS)
AESP: MM101
APCL: MM104
OPCL: MM106
EPCL: MM301
AESP: MM304

Orbit Pocket Checklist

Flight Cover (trim bottom to expose tabs)