

Orbit Pocket Checklist

Volume II: OV102,4

**Mission Operations Directorate
Systems Division**

**Generic, Rev H
August 16, 1999**

NOTE
For STS-108 and subsequent OV102,4 flights
Cover replaced in PCN-15
Also see note #8 on page iii

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

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



United Space Alliance

Verify this is the correct version for the pending operation (training, simulation or flight).
Electronic copies of FDF books are available. URL: <http://fltproc.jsc.nasa.gov/dfd>

ORBIT POCKET CHECKLIST

GENERIC, Rev H (Aug 16, 1999)

PCN-17 (Dec 7, 2001) Sheet 1 of 1

List of Implemented Change Requests (482s):
OPCL-438**NOTE**
For STS-109 and subsequent flights~~Incorporate the following changes to Volume I (OV103,5):~~

- ~~1. Replace v thru viii~~
- ~~2. Replace A4-3 thru G4-8 with 4-3 thru 4-8 (8 pages)~~

Incorporate the following changes to Volume II (OV102,4):

1. Replace v thru viii
2. Replace A4-3 thru E4-8 with 4-3 thru 4-8 (8 pages)

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Encl: Volume I - 12 pages; Vol II - 12 pages

File this PCN immediately behind the front cover as a permanent record

MISSION OPERATIONS DIRECTORATE

ORBIT POCKET CHECKLIST

GENERIC, REVISION H
August 16, 1999

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This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes must be submitted on JSC Form 482 to DO3/FDF Manager.

Additional distribution of this book for official use must be requested in writing to DO3/FDF Manager. 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.

OPCL/ALL/GEN H

Incorporates the following:		
482#:	OPCL-400A	MULTI-1454
	OPCL-401	MULTI-1469
	OPCL-403	MULTI-1471A

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DO35/C. Simon	281-483-0656
Alternate	DO35/J. Gourdine	281-244-1189
APU/HYD	DF05/R. Doremus	281-483-0680
COMM	DF2/S. Murray	281-483-4061
DPS	DF2/T. Murphy	281-483-3290
ECLS	DF8/P. Hasbrook	281-483-0768
EPS	DF7/J. Azbell	281-483-0742
GNC	DF6/K. Dwyer	281-483-2476
OMS/RCS	DF6/C. Koerner	281-483-2617
MPS	DF5/N. Knight	281-483-4899
PWRDN	DF7/J. Azbell	281-483-0742

NOTES

1. The pocket checklists contain contingency procedures to safe 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. This document (Orbit Pocket Checklist) is published in multiple volumes to accommodate vehicle configuration differences. Volume I is dedicated to OV103 and OV105; Volume II is dedicated to OV102 and OV104. Pages which contain procedures that are applicable to all vehicles are duplicated in each volume. The number of volumes and vehicles covered by a particular volume will change as required to keep pace with hardware and/or software

upgrades. Only the applicable volume will be manifested on a given flight.

Although published with separate covers, the volumes will be considered together as one book for configuration control, review, and sign-off purposes. This is to ensure that all vehicle configurations are considered when individual procedure changes are made. Updates to all the various affected volumes will be made at the same time regardless of the flights to which the vehicles are assigned.

ORBIT POCKET CHECKLIST – Vol II

LIST OF EFFECTIVE PAGES

GENERIC	04/07/87	PCN-9	10/13/00
REV H	08/16/99	PCN-10	11/20/00
PCN-1	09/17/99	PCN-11	12/15/00
PCN-2	12/09/99	PCN-12	01/26/01
PCN-3	01/18/00	PCN-13	03/07/01
PCN-4	02/14/00	PCN-14	06/14/01
PCN-5	06/06/00	PCN-15	09/26/01
PCN-6	07/28/00	PCN-16	10/24/01
PCN-7	08/31/00	PCN-17	12/07/01
PCN-8	09/20/00		

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xi *	4/GEN H,5	A4-3	deleted
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xiii *	ALL/GEN H	A4-5	deleted
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3-6	ALL/GEN H,5	B4-8	deleted

* – Omit from flight book

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* - Omit from flight book

⊗ - Highlights reqd

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(Front)	CC 12-4	OPCL-2a/O/H
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(ORBIT) (Back)	CC 12-6	OPCL-7b/A,O,E/F
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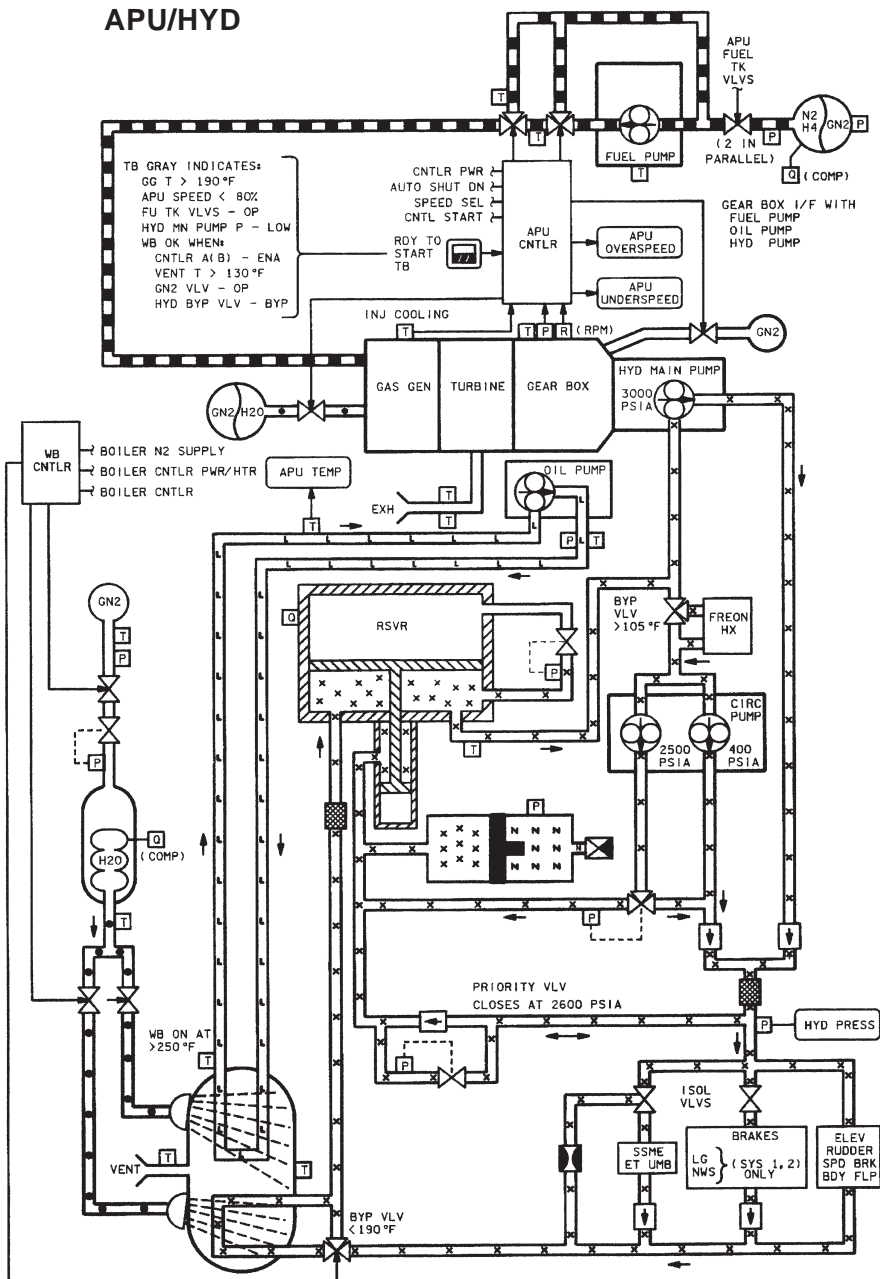
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APU/HYD

APU/
HYD



DATE 08/09/99
480330101.SCH;2

APU/
HYD

HYD ACCUM (RSVR) P LOW

(SM2 HYD ACCUM P, ACCUM P < 1930)
(S86 ACC P, ACCUM P < 1930)
(S86 RSVR P, RSVR P < 28)

SM 87 HYD THERMAL

SM 86 APU/HYD

CAUTION

MN Pump may be damaged if APU started with HYD ACCUM P zero

1. (Aff) HYD CIRC PUMP – ON
2. ✓MCC

If no COMM, go to MAL, APU/HYD, 1.2a 1

HYD CIRC PUMP PRESS LOW

(S87 CIRC PMP P, PRESS < 100)

SM 87 HYD THERMAL

CAUTION

CIRC PUMP – OFF within 60 sec to avoid damage

1. HYD CIRC PUMP – OFF
2. ✓MCC

If no COMM, go to MAL, APU/HYD, 1.3a 1

APU FUEL T

(S88 APU TK T)
(S88 APU FU LN)
(S88 APU FU PMP)
(S88 APU H2O T)

SM 88 APU/ENVIRON THERM

1. APU HTR GAS GEN/FUEL PUMP (three) – OFF (pnl A12)
2. TK/FU LINE/H2O SYS A (three) – OFF
B (three) – OFF
3. ✓MCC

If no COMM, go to MAL, APU/HYD, 1.1b 2

COMMUNICATIONS

PROBLEM	PWRUP	
	LOW LEVEL (Group B)	MSN EXT (Group C)
COMM LOSS	N/A	PL 1

BCE BYP KU
(KU 8=M)

SM 201 ANTENNA

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

ICOM LOST

Try following until ICOM AUDIO regained:

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

S76 COMM PA 2(1) TEMP

SM 76 COMMUNICATIONS

(TEMP > 230)

1. Perform COMM LOST, steps 6,7 for TDRS mode, then:
 2. ✓Comm with MCC
- If no comm:
3. Go to COMM LOST

S76 PA 2(1) OUTPUT LOW

SM 76 COMMUNICATIONS

(PWR OUT < 60)

1. Perform COMM LOST, steps 6,7 for TDRS mode, then:
 2. ✓Comm with MCC
- If no comm:
3. Go to COMM LOST

S76 NSP 2(1) BITE

SM 76 COMMUNICATIONS

(BITE = 'FAIL')

1. Perform COMM LOST, steps 6,7 for TDRS mode, then:
 2. ✓Comm with MCC
- If no comm:
3. Go to COMM LOST

S76 COMSEC 2(1) BITE

SM 76 COMMUNICATIONS

(BITE = 'FAIL')

1. Perform COMM LOST, steps 6,7 for TDRS mode, then:
 2. ✓Comm with MCC
- If no comm:
3. Perform COMM LOST, step 9, then:
 4. ✓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 (✓three ATUs):
 2. ✓cbs ACCU (two) – cl (pnl R14:A,F)
 3. Go to step 10
4. **SM 62 PCMMU/PL COMM**
If PI XMIT PWR not blank:
Deactivate PI (pnl A1L)
✓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 (pnl A1L)
✓UPLK DATA – S–BD
✓PM MODE – TDRS
✓DATA RATE (two) – HI
✓CODING (two) – ON
7. S–BD PM CNTL – PNL (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 encryption (2 min reqd for MCC reconfig):
NSP ENCRYPTION MODE – SEL (pnl A1L)
SEL – BYP

Cont next page

OPCL/ALL/GEN H,14

ICOM LOST
S76

2–3

COMM LOST
UHF COMM LOST (Over)

10. Confirm U/L CMD capability:
 - Cue MCC with: ITEM 88 +8 8 8 8 8
 - ✓Flashing U/L on GNC display
 - Ack with: ITEM 99 +9 9 9 9 9
 - ✓Abort Light cycling ON/OFF (MCC ack)
 - ✓No flashing U/L
11. If U/L CMD confirmed: Go to MAL, COMM SSR-1, LOSS OF ALL VOICE COMM >>
12. If no COMM and no U/L CMD: 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

1. ✓UHF SPLX/EVA PWR AMPL – ON (pnl O6)
 2. AUD CTR – 2(1)
- Reconfigure UHF System (pnl O6):
3. UHF SQUELCH – OFF
 4. UHF 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 PWR AMP – OFF (LO PWR XMIT)
 7. UHF MODE sel – G T/R
Call site stating “on 243.0”, wait 30 sec for site reconfig

DPS

DATA PROCESSING SYSTEM

3-1

OPCL/ALL/GEN H

ALL IDPs ASSIGNED TO FAILED GPC

CAUTION

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

DPS

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,pause 10 sec,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. FLT CNTLR PWR – ON
6. ✓Pri RJDs (sixteen) – ON
7. BFS – ENGAGE

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

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)

OPCL/4/GEN H,13

**ALL IDPs/FAILED GPC
DUAL DPS DISP CDRs
BFS ENGAGE**

3-3

SUMWORD ICC

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, ✓ 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 (Mult Pnls), step 6 >>

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. Resel original ports
16. 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 problem):

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)(ASSY OPS)] >>
5. If reqd, perform PL/DPS RECONFIG, Secure [PL SYS(PL OPS) (ASSY OPS)], then:

If MCC GO for power cycle:

6. (Aff) PL MDM – 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)(ASSY OPS)] >>

If msg repeats:

10. If PL1 msg and no COMM: Go to COMM LOST, steps 5,6,7,8 for TDRS mode
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

OPCL/2,4/GEN H,16

BCE STRG X

3–5

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

FF(FA) MDM OUTPUT

FAULT

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 >>
- If not recovered:
 5. Go to PASS GNC GPC (1st FAIL)

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)

FF(FA) MDM I/O ERROR

1. GNC I/O RESET; if recovered >>
- If simo 'I/O ERR' msgs for mult MDMs (possible GPC problem):
2. ✓MCC/restring as reqd >>
 3. If FF: ✓ADI (aff string)
 4. If ADI 'OFF' flag (GPC problem): Go to step 16
 5. **GNC 1 DPS UTILITY**
(Aff) STRING – port mode; if recovered >>
- If alt msg on aff string (GPC problem):
6. Go to step 16
- If MCC GO for power cycle:
7. If FF: **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 original 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 power cycle:
14. If FF: **GNC 21 IMU ALIGN**
(Aff) IMU – desel >>
 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
- If FF MDM not chosen:
18. **GNC 21 IMU ALIGN**
(Aff) IMU – desel
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 H,16

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) pwrdrn config, MMU 2 – ON

If no active GNC GPC and G2FD GPC available:

1. Go to GNC RECOVERY VIA G2FD >>

If no active GNC GPC and no FD GPC available:

2. Go to BFS ENGAGE >>

If failure is CS split and GPC config is 1 GNC and 1 SM:

3. Go to MAL, DPS, 5.1a, CS SPLIT 1 >>

If Dual G2 and RS split (CS intact) but both GPCs appear functional

(√DPS & ADI displays, MODE tb):

4. Retain GPC with two IMUs

If Triple G2 and RS split but GPCs appear functional

(√DPS & ADI displays, MODE tb):

5. Retain GPC with two strings

6. (Aff) GPC PWR – OFF

If FF 1 PWR cycled:

7. GNC 21 IMU ALIGN

IMU 1 (caged) – desel

8. Reassign failed GPC IDPs: GPC/CRT as reqd

If redundant GNC GPCs reqd and G2FD available:

9. (G2FD) √GPC MODE – HALT

√OUTPUT – NORM

√PWR – ON

MODE – STBY (tb–RUN), RUN

10. IDP/CRTX MAJ FUNC – PL

11. GPC/CRT – (G2FD) GPC/X EXEC

If two GNC GPCs remaining:

12. Assign GNC GPC(s) strings, CRTs, and MMUs in current MC
(√PL 1/2 and LB1 deassigned)

13. GNC, OPS XXX PRO

14. Go to step 22

15. GNC 0 GPC MEMORY

√Downlist to active GNC GPC:

DOWNLIST GPC – ITEM 44 +X EXEC

Cont next page

If GNC OPS 202:

16. GNC, OPS 201 PRO

If RNDZ NAV Ena:

17. DAP: LVLH
18. **GNC UNIV PTG**
CNCL – ITEM 21 EXEC (no *)
19. Assign GNC GPC(s) strings, CRTs, and MMUs in current MC
(√PL 1/2 and LB1 deassigned)
20. GNC, OPS XXX PRO

If RNDZ NAV reqd:

21. Perform RNDZ NAV RECOVERY (RNDZ, CONTINGENCY OPERATIONS), then:
22. **GNC 22 S TRK/COAS CNTL**
S TRK –Y,–Z: STAR TRK – ITEM 3,4 EXEC (*)
23. **GNC 21 IMU ALIGN**; RESUME
24. When time permits: Go to MAL, DPS, GPC FRP–1, SINGLE GPC FAIL

PASS SM GPC FAIL

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:

2. KU PWR – STBY (pnl A1U)
CNTL – PNL,CMD
3. Go to COMM LOST, steps 6,7,8 for TDRS mode
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** >>
6. If reqd, perform PL/DPS RECONFIG, Secure [PL SYS(PL OPS) (ASSY OPS)], then:
7. (SM) GPC PWR – OFF
8. PL1/2 MDM PWR (two) – OFF,ON
9. **GNC 1 DPS UTILITY**
UL CNTL ENA – ITEM 36 EXEC (*)
√CKPT RETRV ENA – ITEM 12 EXEC (*)

Cont next page

OPCL/ALL/GEN H,13

PASS GNC GPC (1st)

3–9

PASS SM GPC FAIL

PASS GPC BITE 1(2,3,4)

If SM GPC annun BITE:

1. Go to PASS SM GPC FAIL >>

If single GNC GPC ($RS \geq 1$) annun BITE:

2. Go to PASS GNC GPC (1st FAIL) >>

If all GNC GPCs ($RS \geq 2$) annun BITE:

If cyclic logging of BITE:

If FD GPC available:

3. Go to GNC RECOVERY VIA G2FD >>

If FD GPC not available:

4. Go to BFS ENGAGE >>

If non-cyclic logging of BITE:

5. When time permits: Go to MAL, DPS
SSR-2, GPC S/W INITIATED MEM DUMP

DPS/COMM RECONFIG

NOTE

Ku-BD sys may need to be taken to STBY to avoid inadvertent radiation of PL or EVA crewmember

If AOS:

1. ✓ MCC for comm config and radiation constraints

If no comm, safe Ku sys and verify TDRS config:

2. KU-BD PWR – STBY (pnl A1U)
CNTL – PNL,CMD
3. ✓ NSP UPLK DATA – S-BD (pnl A1L)
✓ S-BD PM MODE – TDRS
✓ NSP DATA RATE (two) – HI
✓ CODING (two) – ON
4. S-BD PM CNTL – PNL,CMD (pnl C3)
Sel best ant at AOS

OPCL/ALL/GEN H,5

PASS GPC BITE 1(2,3,4)
DPS/COMM RECONFIG
GNC RECOVERY (Over)

GNC RECOVERY VIA G2FD

NOTE

Do not perform any keyboard item entries or switch throws 10 sec before and after moding PASS GPCs to RUN or making OPS transition requests

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 GPCs PWR – OFF
3. Secure SM:
Perform DPS/COMM RECONFIG
SM 62 PCMMU/PL COMM
FORMAT FXD – ITEM 1 EXEC (*)
Perform PL/DPS RECONFIG, Secure [PL SYS(PL OPS)(ASSY OPS)], time permitting
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
✓G2FD grabs 3 FWD IDP/CRTs (reassign IDP4 as reqd)
6. If G2FD activation fails, go to step 20
7. MC2 NBAT Setup for Target GPC (Activated G2FD):
GNC 0 GPC MEMORY

NOTE

If a currently active IMU was in STBY during time G2FD was freeze–dried, don't assign associated string

Assign all FC strings (except as noted above), CRTs, and MMUs to just activated target GPC

✓PL1/2 and L1,2 deassigned

8. Configure 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 – press and hold during OPS
transition

GNC, OPS 201 PRO

✓DAP: FREE

9. If FC string was not assigned in step 7 (IMU STBY issue):

GNC 21 IMU ALIGN

IMU OPER – ITEM 4(5,6) EXEC (no * until restrng)

GNC 0 GPC MEMORY

Assign remaining FC string to GNC GPC

GNC, OPS 201 PRO

10. Re-establish GNC Operational Config:

Pri RJD DRIVER (eight) – as reqd

GNC 20 DAP CONFIG

Load desired DAP A,B (✓FLIGHT PLAN)

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

Cont next page

13. Re-establish SM Operational Config:

NOTE

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

SM 62 PCMMU/PL COMM

Perform LOAD PCMMU FORMAT (ORB OPS FS)

SM 1 DPS UTILITY

CKPT RETRV ENA – ITEM 12 EXEC (*)

UL CNTL ENA – ITEM 36 EXEC

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

SM 94 PDRS CONTROL

(MA, GPC DATA It on)

I/O ON – ITEM 5 EXEC (*) (GPC DATA It off)

14. SAFING – CANCEL (pnl A8U: tb – bp if arm deselected)

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

16. Wait for Orbiter SV Uplink:

NOTE

Auto antenna selection and any auto attitude MNVRs
may be incorrect until a valid Orbiter SV is uplinked

17. S-BD ANT – GPC
KU-BD PWR – ON (pnl A1U)

SM 1 DPS UTILITY

UL CNTL AUTO – ITEM 35 EXEC

18. Re-establish Track Attitude, as reqd:

UNIV PTG

Load desired att (✓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 temporary CRT and SM interface

If second G2FD exists: ✓MCC for GO to step 5

If a G3FD exists: ✓MCC for procedure

If no FD: ✓MCC for GO to perform BFS ENGAGE

EQUIPMENT COOLING MATRIX

AIR-COOLED		WATER-COOLED	
FORCED	FREE-FLOW		
AV BAY 1		AV BAY 1	
GPC 1,4 ① TACAN 1 ② MLS RF & DECODER 1 ADTA 3 AV BAY FAN A,B	BFC 1 (ENGAGE) CICU AA 1,4 PROXIMITY SW INVERTER DIST & CNTL BRK CNTL 1 SMOKE DET A,B CURRENT SNSR ADTA 1	AC INV 1A,1B,1C LCA(FWD) 1 PCA(FWD) 1 MCA(FWD) 1 MDM PL1,OF1, FF1,LF1 DSC OF1 ACCU 1,2 PWR SUPPLY/BATT CHARGER	MMU 1 RJDF 1A,1B P/L RECORDER PCMMU 1 PDI RADAR ALT 1
AV BAY 2		AV BAY 2	
GPC 2,5 ① TACAN 2 ② MLS RF & DECODER 2,3 ADTA 2,4 AV BAY FAN A,B	BFC 2,3 (ENGAGE) AA 2,3 PROXIMITY SW INVERTER DIST & CNTL BRK CNTL 2 SMOKE DET A,B CURRENT SNSRS	AC INV 2A,2B,2C LCA(FWD) 2 PCA(FWD) 2 MCA(FWD) 2 MDM PL2,OF2, FF2,FF4 DSC OF2 PL INTEROG 1,2	MMU 2 RJDF 2A,2B PCMMU 2 S-BD PI RF COAX SW OPS RECORDER 1,2 RADAR ALT 2 PSP 1,2
AV BAY 3A		AV BAY 3A	
GPC 3 ① TACAN 3 ② AV BAY FAN A,B C/W LIMIT MODULE SSOR ③	S-BAND EQUIP: FM MLTPLXR QUAD ANT SW ASSEMBLY FM SIG PRCSR SW BEAM ANT CNTL ASSY FM RF SWITCH CURRENT SNSR INVERTER DIST & CNTL SMOKE DET A,B	AC INV 3A,3B,3C LCA(FWD) 3 PCA(FWD) 3 MCA(FWD) 3 MDM FF3,OF3 DSC OF3 NSP 1,2 S-BAND PA 1,2; PRE-AMP 1,2; XPNDR 1,2; FM XMTR 1,2	EBIA (BYPASS SWITCH) COMSEC 1,2,3 UHF EVA XCVR KU-BND EA 1,2 GCIL
		AV BAY 3B	
		MTU KU-BAND SIGNAL PROCESSOR HUD ELECT 1,2 GPS 2	

ECLS

09/17/99

- ① GPC INSTALLATION REFERS TO CPU/IOP/MEMORY UNIT.
- ② TACAN CONFIG IS ORBITER-UNIQUE.
GOULD (AC) TACANS ARE FORCED-AIR COOLED.
COLLINS (DC) TACANS ARE FREE-FLOW AIR COOLED.
- ③ IF FLOWN.

Cont next page

EQUIPMENT COOLING MATRIX (Continued)

AIR-COOLED		WATER-COOLED
FORCED	FREE-FLOW	
CABIN		ECLSS EQUIPMENT BAY
MDUs (eleven) DDU 1,2,3	MTRS/LTS/IND C/W ANNUN SPKR UNITS ATUs CAMCORDER COLOR PRINTER PGSC VTR CSA CAB TEMP CNTLR A,B WMS HUMIDITY SEP SMOKE DET: L,R FLT DECK CABIN	WATER PUMP 1A,1B SEC
		FLIGHT DECK
CAB FAN A,B IMU 1,2,3 IMU FANS ④ TV MONITORS RCU VSU MCIU IDP 1,2,3,4	ADC 1A,1B,2A,2B MCM HUD PDU L,R	MDM OF4
MADS RCDR ⑤ MS & PS STATION		

ECLS

FREON-COOLED			
AFT COLDPLATES			MIDBODY
BAY 4	BAY 5	BAY 6	
LCA-1 PCA-1,4 MCA-1 MDM FA1 OA1 APU CNTLR 1 ATVC ELECT 1 EIU 1 MPS ULL P SC1 ASA 1 RGA 1 RJDA 1 MEC 1 DSC OA1 DBIA 1	LCA-2 PCA-2,5 MCA-2 MDM FA2 OA2 APU CNTLR 2 ATVC ELECT 2 EIU 2 MPS ULL P SC2 ASA 2 RGA 2 MEC 2 DSC OA2 DBIA 2 PT SNSR	LCA-3 PCA-3,6 MCA-3 MDM FA3,4 OA3 APU CNTLR 3 ATVC ELECT 3,4 EIU 3 MPS ULL P SC3 ASA 3,4 RGA 3,4 RJDA 2 MPS DP SC DSC OA3	PCA(MID) 1,2,3 MCA(MID) 1,2,3,4 MDM PM1 RMA 1,2 FEA 1,2 SGSC H2/O2 CRYO HTR 1A,1B,2A,2B FCL 1 PMP A,B 2 PMP A,B FUEL CELLS 1,2,3 MN DA 1,2,3 MIDBODY PIC CNTLR DSC OM1,OM2,OM3

08/31/00

- ④ IMU FANS ARE LOCATED IN AVIONICS BAY 1 BUT CIRCULATE CABIN AIR RATHER THAN FLOW FROM AVIONICS BAY 1 THROUGH THE IMUs FOR COOLING.
- ⑤ MADS RECORDER DUCT COOLING.

O2(N2) FLOW HIGH/CAB P LOW/dP/dT

SM SYS SUMM 1

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
2. If dP/dT EQ positive or zero (ISS leak), ✓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 ↑ 4 >>

NOTE

If orbiter dP/dT EQ positive or zero after any leak isolation step, ✓MCC

LEAK ISOLATION

- | | |
|------------|--|
| L2 | 5. CAB RELIEF A – CL (tb-CL), pause
B – CL (tb-CL) |
| | 6. ✓VENT ISOL – ctr (tb-bp)
✓VENT – ctr (tb-bp) |
| ML31C | 7. ✓VAC VENT ISOL VLV BUS SEL – MNA
CNTL – CL (tb-CL) |
| Side Hatch | 8. NEG PRESS RLF vlv cover (two) – push firmly |
| Ext A/L | 9. NEG PRESS RLF vlv cover (two) – push firmly |

If SH HATCH open:

- SH OVHD : 10. EXP VENT VLV – CL
: If leak isolated:
: 11. Go to EXPERIMENT LEAK ISOLATION
: (SH EXP HDBK) >>

~

Cont next page

- SH FWD
BHD
- SH Hatch
TNL ADP
- SSP
- Middeck flr
MO13Q
Inner Hatch
- Middeck flr
- L2
- MO10W
- ML31C
12. NPRV covers (two) – push firmly
 13. ✓CDV – CL
 14. NPRV covers (two) – push firmly
 15. SM 215 SPACEHAB ECS
PPRV 1 CL – ITEM 87 EXEC (*), pause
2 CL – ITEM 89 EXEC (*), pause
 16. Stow PGSC, Camcorder, then:
 17. Close SH HATCH
 18. SH HATCH Equal vlv (two) – OFF, install caps
 19. PL ISOL VLV – CL
- If SH leak:
20. Untape and open diffuser cap at TNL
ADAPT floor fitting
 21. MN PWR – KILL
 22. – NO-OP
 23. SM 214 SPACEHAB ACT/DEAC
FANS ARS OFF – ITEM 61 EXEC (*) >>
- L
24. Disconnect airlock flex duct from cabin floor, stow
 25. ARLK FAN A(B) – OFF
 26. Close INNER HATCH per decal
Remove INNER HATCH Equal vlv caps (two)
Equal vlv (two) – OFF
 27. Install diffuser cap on cabin 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):
28. CAB RELIEF (two) – ENA (tb-ENA)
- If 14.7 psi ops:
29. O2/N2 CNTLR VLV SYS 1(2) – AUTO
 30. 14.7 CAB REG INLET SYS 1(SYS 2)
vlv – OP
✓O2 REG INLET SYS 1(SYS 2) vlv – OP
 31. VAC VENT ISOL VLV CNTL – OP (tb-OP)
 32. ✓MCC for SH deactivation steps >>

CAUTION

ODS avionics require 8 psia or greater for cooling. ✓MCC regarding possible repressurization of ODS prior to ISS undocking

If dP/dT EQ still negative:

UNISOLABLE ORBITER LEAK:
PREPARE FOR DEORBIT

Cont next page

Utilize SH(A/L) Atmosphere

CAUTION

Perform steps 33–35 before determining type of deorbit, to avoid volume–based nomograph errors

- | | | |
|-------------|-----|--|
| Inner Hatch | 33. | INNER HATCH Equal vlv (two) – EMER (Vlvs remain in EMER for duration of flt)
Open INNER HATCH per decal |
| TNL ADP | 34. | SH HATCH Equal vlv (two) – EMER |
| Inner Hatch | 35. | Close INNER HATCH per decal |

Determine Type of Deorbit

Determine latest possible TIG, Tmax, and avail landing sites using PGSC (preferred) or NOMOGRAPHS, 4–6

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

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

- | | | |
|-----|---------|---|
| 36. | CM1,CM2 | Perform JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS, <u>EMERGENCY RESPONSE</u>).
If utilizing ISS atmosphere, delay vestibule depress until CDR GO (ISS Press \cong 9.5 psia)
Perform EMERGENCY DEORBIT PREP/ENTRY (CONT DEORB, <u>EMERGENCY</u>) |
| | CM3 | Continue with Cabin Pressure Maintenance |

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

- | | | |
|-----|---------|---|
| 37. | CM1,CM2 | Perform LOSS OF CAB PRESS (<u>PWRDN</u>) |
| | CM3 | Continue with Cabin Pressure Maintenance
✓ MCC for ISS undocking |

Cont next page

Cabin Pressure Maintenance

If $-dP/dT$ EQ > 0.35 (0.18 if SH):

- C5 38. DIRECT O2 vlv – OP
- C6,MO32M, 39. Don LES, open LEH O2 vlvs, ✓ tabs, visor – cl,
MO69M LES O2 – ON
- L2 40. O2/N2 CNTLR VLV SYS 1,2 (two) – OP (N2)
- MO10W 41. O2 REG INLET SYS 1,SYS 2 vlv (two) – CL
>>

Flow Max O2

- R1 42. O2 MANF VLV TK1,TK2 (two) – OP (tb–OP)
TK1,TK2,TK3 HTRS A (three) – AUTO
- If any O2 QTY > 60%:
 - 43. (Aff) O2 TK HTR B – AUTO
- C5 44. DIRECT O2 vlv – OP
- L2 45. O2/N2 CNTLR VLV SYS 1 – CL (O2)
2 – OP (N2)
O2 XOVR SYS 1 – CL
✓2 – OP
- MO10W 46. 14.7 CAB REG INLET SYS 1 vlv – OP
2 vlv – CL
O2 REG INLET SYS 1 vlv – OP
2 vlv – CL

<p>WARNING</p> <p>Maintain O2 concentration < 29% (CABIN PRESS > 10.3) or PPO2 < 3.0 (CABIN PRESS ≤ 10.3)</p> <hr/> <p>When PPO2 < 2.2, emergency breathing apparatus reqd</p>

Manage O2 Levels

- MO10W,C5 Using O2 REG INLET SYS 1 vlv and DIRECT O2 vlv:
 - When CABIN PRESS > 10.3:
 - 47. Maintain PPO2 > 2.2 and O2 conc < 29%
 - When CABIN PRESS ≤ 10.3:
 - 48. Maintain PPO2 between 2.2 and 3.0
 - When PPO2 < 2.2:
 - 49. Don LES, open LEH O2 vlvs, ✓ tabs,
visor – cl, LES O2 – ON
- C6,MO32M,
MO69M

Cont next page

8 PSI CABIN MAINTENANCE (Flow N2)

When CABIN PRESS reaches 8:

- 50. Continue O2 mgmt per step 48
- 51. Verify time to N2 depletion, perform N2 DEPLETION GRAPH, 4–8, then:

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

- MO10W 52. 14.7 CAB REG INLET SYS 1 vlv – CL
- L2 53. O2/N2 CNTLR VLV SYS 1,2 (two) – OP (N2)
O2 XOVR SYS 1,2 (two) – OP
- MO10W 54. REG INLET SYS 1,SYS 2 vlv (two) – CL

55. Reconfig C/W parameters:

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

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

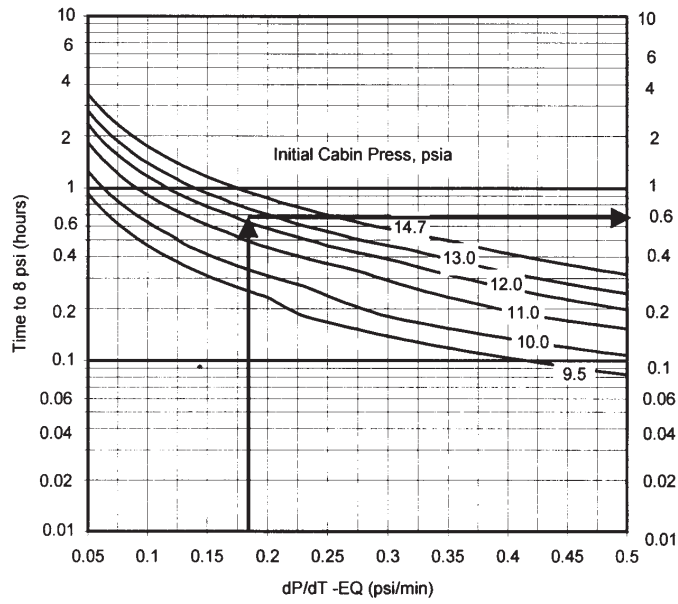
PARAMETER NAME	C/W CH	H/W C/W HI V(HI EU)
CAB PPO2 A	34	3.00(3.00)
B	44	3.00(3.00)

>>

Cont next page

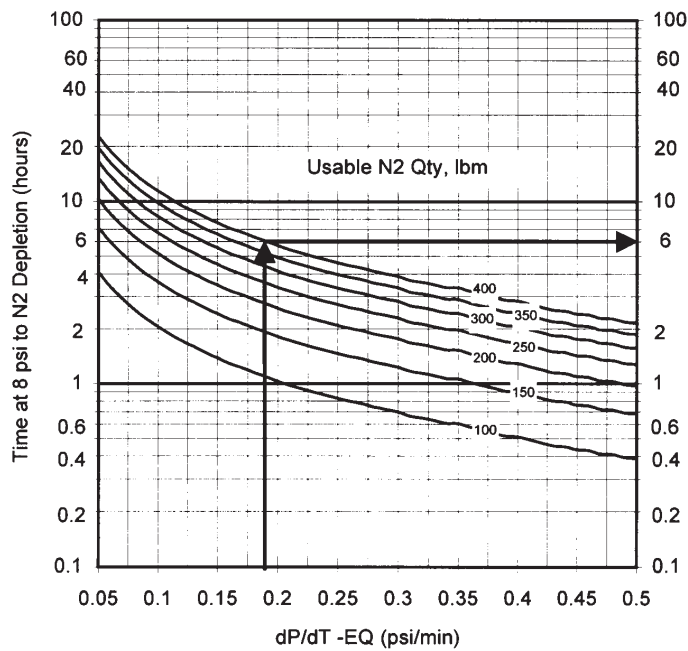
TIME TO 8 PSIA NOMOGRAPH

Orbiter + Ext A/L



TIME AT 8 PSI NOMOGRAPH

Orbiter + Ext A/L



TMAX Computation

SM 66 ENVIRONMENT

Log:

dP/dT EQ _____ N2 QTY 1 _____
 CAB P _____ N2 QTY 2 _____
 MET _____

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

If docked to ISS, determine latest possible TIG and Tmax utilizing ISS atmosphere using PGSC, or if PGSC unavailable, use TMAX DETERMINATION for UTILIZE ISS ATMOSPHERE (SODF: JOINT OPS, EMERGENCY_RESPONSE) in conjunction with nomograph (on facing page) to determine Tmax

	<u>Orbiter Only</u>	<u>Utilizing ISS Atmosphere (if reqd)</u>
Time at 9.5 psi (from SODF: JOINT OPS, UTILIZE ISS ATMOSPHERE, <u>Cue Card</u>)	N/A	_____ hrs
Time to 8 psi (facing page)	_____ hrs (from current cabin pressure)	_____ hrs (from 9.5 psi)
Time to 8 psi (facing page) (N2 Depletion)	+ _____ hrs	+ _____ hrs
Total Avail Time	= _____ hrs	= _____ hrs
Current MET	+ ____/____ : ____	+ ____/____ : ____
Latest TD MET	= ____/____ : ____	= ____/____ : ____
Time, TIG to TD	-1 hr	-1 hr
Latest TIG, TMAX (MET)	= ____/____ : ____	= ____/____ : ____
Landing Site/TIG _____/_____		

NOMOGRAPH Basis:

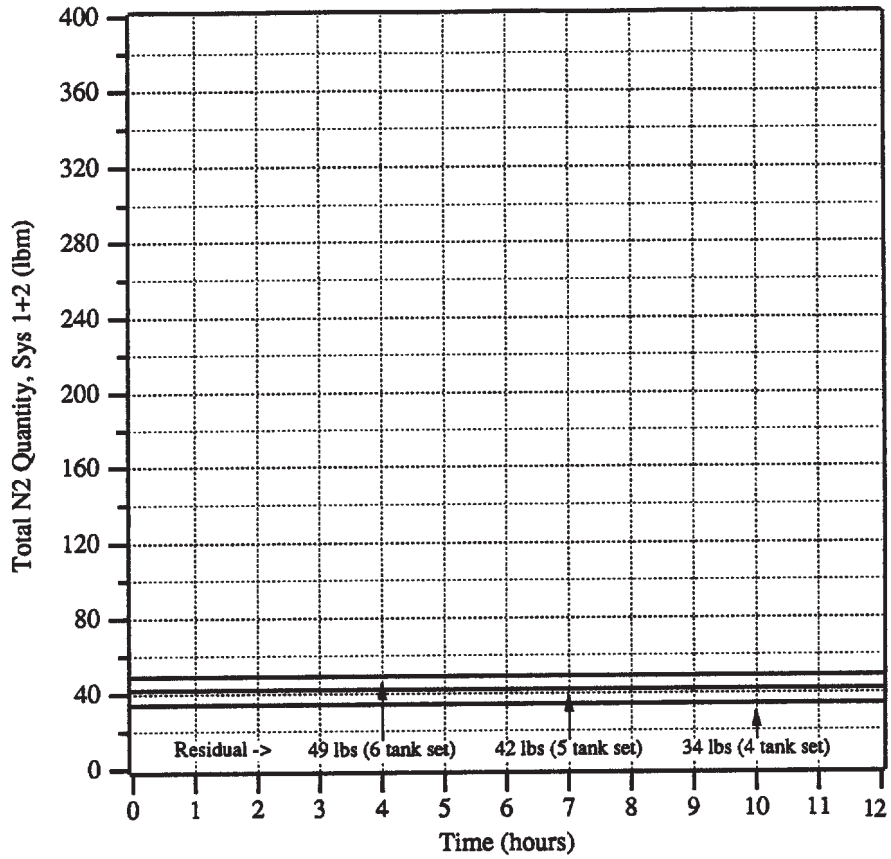
O2 Flow: on/off at 50 lb/hr after 10 min, with PPO2 > 2.2 psi, % O2 < 29
 Orbiter Volume = 2703 ft³

CAUTION

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

11/13/00

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

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

NOTE

Audible vent and 'S66 WASTE H2O PRES' alert for
WASTE H2O PRESS ↓ when performing step 3

3. SPLY H2O GN2 TK VENT vlv – VENT (pnl ML26C)
✓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:

| No action reqd (snsr fail) >>

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:

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) >>

Cont next page

OPCL/ALL/GEN H

N2 DEPLETION

4–9

H2O TK QTY LOW
EVAP OUT T HIGH

If EVAP OUT T not decr:

4. FLASH EVAP CNTLR PRI B(A) – OFF
SEC – ON (Hi Load Evap ena)
5. Minimize Itg (wait 30 sec)

If EVAP OUT T decr:

If in deorb prep:

6. ✓TACAN MODE (three) – OFF
7. ✓RADAR ALTM (two) – OFF
8. ✓MLS (three) – OFF
9. TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF >>

If not in deorb prep >>

If EVAP OUT T not decr (Sec Hi Load failed):

10. HI LOAD EVAP – OFF (Topping Evap ena)
11. MSTR MADS PWR – OFF (wait 30 sec)

If EVAP OUT T decr:

12. Go to LOSS OF HI LOAD EVAP (PWRDN) >>

If EVAP OUT T not decr (all FES lost):

Establish RAD flow:

CDR 13. Go to step 15

If PLB doors closed, open ASAP:

MS 14. Perform steps 17 thru 20

- CDR L1 15. RAD BYP VLV MODE (two) – AUTO
CNTLR LOOP (two) – AUTO A(B) (wait 90 sec)
BYP VLV tb (two) – RAD
✓CNTLR OUT TEMP – NORM
16. HI LOAD DUCT HTR sel – OFF
TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF
FLASH EVAP CNTLR SEC – OFF

Cont next page

- MS R13L 17. PL BAY DR SYS 1,2 (two) – ENA
SM 63 PL BAY DOORS
AC POWER ON – ITEM 1 EXEC
AUTO MODE SEL – ITEM 3 EXEC
PBD SW BYP – ITEM 14 EXEC
PBD OPEN – ITEM 15 EXEC
18. Monitor CRT for proper seq
After doors open:
19. PBD STOP – ITEM 16 EXEC
AC POWER OFF – ITEM 2 EXEC
20. PL BAY DR SYS 1,2 (two) – DSBL
For deorb prep:
21. Go to LOSS OF FES (PWRDN)

EVAP OUT T LOW

SM 88 APU/ENVIRON THERM
SM SYS SUMM 2

1. If temp low in only one loop: N/A (snsr fail) >>
 2. FREON PUMP LOOP 1,2 (two) – OFF
 3. H2O PUMP LOOP 1,2 (two) – ON
- If no PL H2O Loop present:
4. FLOW PROP VLV LOOP 1,2 (two) – PL HX (tb–PL)
- If PL H2O Loop present:
5. FLOW PROP VLV LOOP 1,2 (two) – ICH (tb–ICH)
 6. Activate PL H2O Loop
7. O2 SYS 1,2 SPLY (two) – CL
- If FREON LOOP RAD OUT T LOW:
8. FREON PUMP (unaff loop) – B
 9. O2 SYS SPLY (unaff loop) – OP
 10. Go to FREON LOOP RAD OUT T LOW, step 8 >>
11. RAD CNTLR OUT TEMP – HI
 12. FLASH EVAP CNTLR PRI A,B,SEC (three) – OFF
- If FREON LOOP 1(2) leaking (Accum Qty decr \geq 1.5%/min):
13. FREON PUMP LOOP 1,2 (two) – B
- If after 60 sec EVAP OUT T low again:
14. RAD BYP VLV MODE (leaking loop) – MAN
 15. MAN SEL (leaking loop) – BYP
(tb–BYP 3 sec)
16. Go to MAL, ECLS, 6.4a, EVAP OUT T $\uparrow\downarrow$ 52 >>
- If FREON LOOP 1(2) not leaking:
- If no comm:
17. FREON PUMP LOOP 1,2 (two) – B
 18. NH3 CNTLR A,B (two) – SEC/ON
 19. Go to MAL, ECLS, 6.4a, EVAP OUT T $\uparrow\downarrow$ 51

H2O SPLY PRESS HIGH

SM 69 FUEL CELLS
SM 66 ENVIRONMENT

If multiple FC H2O LN T and FC H2O VLV T converging or within 5 degF of each other:

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

1. cb MNB SPLY H2O TKB INLET – cl (pnl ML86B:A)
2. MNC SPLY H2O XOVR VLV – cl
3. SPLY H2O TKA OUTLET – CL (tb-CL) (pnl R11L)
4. TKB INLET – OP (tb-OP)
5. XOVR VLV – OP (tb-OP)
6. ✓ SPLY H2O TKA,TKB,TKD INLET (three) – OP (tb-OP)
7. ✓ XOVR VLV – OP (tb-OP)

If SUPPLY H2O PRESS decr or < 40: >>

If SUPPLY H2O PRESS not decr or ≥ 40:

8. FLASH EVAP CNTLR PRI A,B,SEC (three) – OFF
9. RAD CNTLR OUT TEMP – HI

When EVAP OUT T ~50 (pnl O1):

10. FLASH EVAP CNTLR PRI B – ON

11. Go to MAL, ECLS, 6.5d, H2O SPLY PRESS ↑ 1 >>

If multiple FC H2O LN T and FC H2O VLV T not converging or within 5 degF of each other:

12. Go to MAL, ECLS, 6.5d, H2O SPLY PRESS ↑ 3

OPCL/ALL/GEN H,14

EVAP OUT T LOW

4-13

H2O SPLY P HIGH

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 1 >>
- If flow still low in both loops:
 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
 5. ✓O2 SYS 1,2 SPLY (two) – OP (tb–OP)
 6. MSTR MADS PWR – OFF
 7. FC PURGE HTR – ON (pnl R11U)
VLVS (three) – OP
 8. Go to LOSS OF 2 FREON LOOPS (PWRDN) >>
 - If in OPS 2:
If AFT cp FLOW in both loops < 200 lb/hr:
Prepare to deorb:
 9. If AFT cp FLOW < 100 lb/hr:
FREON PUMP LOOP 1,2 (two) – OFF
 10. ✓O2 SYS 1,2 SPLY (two) – OP (tb–OP)
 11. MSTR MADS PWR – OFF
 12. FC PURGE HTR – ON (pnl R11U)
VLVS (three) – OP
 13. Go to LOSS OF 2 FREON LOOPS
(PWRDN) >>
 - If AFT cp FLOW in either loop > 200 lb/hr:
 14. Go to MAL, ECLS, 6.4b, FREON FLOW LOW 1

FREON LOOP RAD OUT T LOW

SM 88 APU/ENVIRON THERM
SM SYS SUMM 2

1. If EVAP OUT T not decr after 60 sec: N/A (snsr fail) >>
 2. (Aff) FREON PUMP – OFF
 3. H2O PUMP LOOP 1,2 (two) – ON
- If no PL H2O Loop present:
4. FLOW PROP VLV LOOP 1,2 (two) – PL HX (tb–PL)
- 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 MODE – MAN
 10. CNTLR – AUTO B
- After 10 sec:
11. (Aff) RAD BYP VLV MODE – AUTO
 12. (Aff) FREON PUMP – B
 13. ✓(Aff) RAD BYP VLV tb – RAD
- If RAD OUT T LOW continues:
14. (Aff) FREON PUMP – OFF
 15. ✓MCC (mult failures) >>
- If FES reqd:
16. Perform TOPPING FES STARTUP (ORB OPS, ECLS)
 17. (Aff) O2 SYS SPLY – OP

OPCL/ALL/GEN H

FREON FLOW LOW

4–15

FREON LOOP RAD

LEAKING/EMPTY HALON BOTTLE

If FIRE SUPPR AV BAY 1(2,3) pb It on:

1. Go to POST-FIRE CABIN CLEANUP, steps 26-31 only >>

NOTE

This procedure requires two crewmembers

- CM1 2. ✓ VAC VENT ISOL VLV BUS SEL – MNA(MNB)
(pnl ML31C)
VAC VENT ISOL VLV CNTL – CL (tb-CL)
- If INTERNAL AIRLOCK:
- CM2 3. AIRLK DEPRESS vlv cap – vent, remove, temp stow (pnl AW82B)
AIRLK DEPRESS vlv – 0
- CM2 4. Go to step 7
- CM2 5. CAB PURGE vlv – unscrew, temp stow vlv assy (middeck floor)
6. CAB PURGE ISOL vlv – 0 (middeck floor)
7. Position Halon bottle nozzle up to vlv inlet
Secure body position as reqd

NOTE

Halon discharge will be propulsive

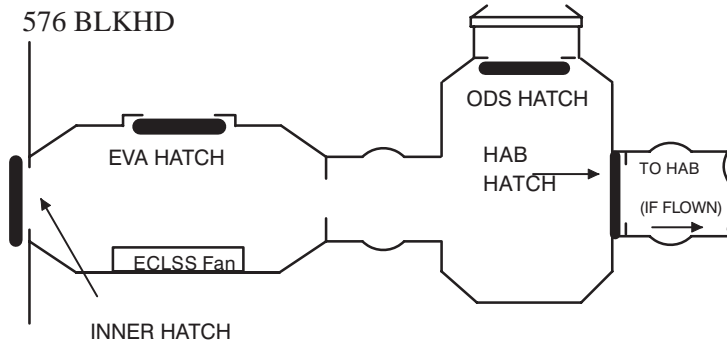
- CM1 On CM2 GO:
8. VAC VENT ISOL VLV CNTL – OP (tb-OP)
(pnl ML31C)
- CM2 9. Discharge Halon directly into vlv inlet until empty
Report duration of discharge to MCC
- CM1 On CM2 GO:
10. VAC VENT ISOL VLV CNTL – CL (tb-CL)
(pnl ML31C)
- If INTERNAL AIRLOCK:
- CM2 11. AIRLK DEPRESS vlv – CL, reinstall cap
(pnl AW82B)
Go to step 15

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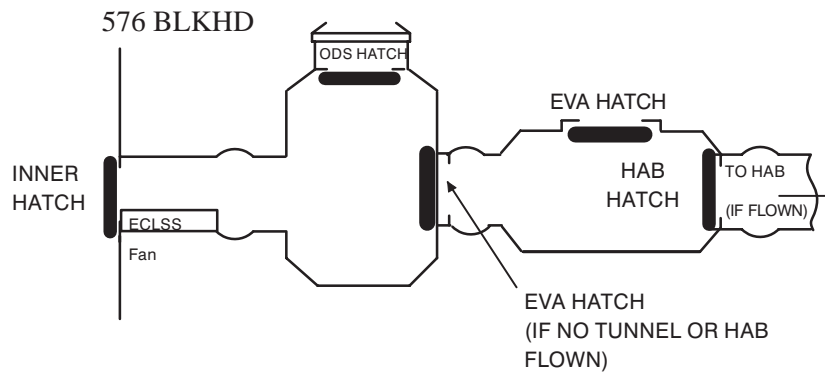
12. CAB PURGE ISOL vlv – CL (middeck floor)
 13. Reinstall CAB PURGE vlv assy
 14. ✓ CAB PURGE vlv – CL
 15. Stow empty bottle (Wet Trash)
- CM1 16. VAC VENT ISOL VLV CNTL – OP (tb-OP) (pnl ML31C)

ODS POST-FIRE ACTIONS

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



CONFIG A



CONFIG B

Cont next page

OPCL/ALL/GEN H

- CM1 1. Don QDM with 14-ft extension O2/Comm line
All other crewmembers: Don QDMs

NOTE

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

- C6,MO32M,
MO69M
C7
MO10W
Inner Hatch
2. ✓ LEH O2 vlv (eight) – OP
3. ✓ LEH O2 SPLY 1,2 vlv (two) – OP
4. 14.7 CAB REG INLET SYS 1(SYS 2) vlv – CL
5. Untether Equal vlv cap (one) from INNER HATCH vlv, for use in step 6
Open HATCH per decal

NOTE

Exit airlock volume IMMEDIATELY after step 6 complete. Expect cabin dP/dT msg

- Hatch
- ON CLOSEST HATCH EXPOSED TO VACUUM,
6. Equal vlv cap (one) – vent,remove
Equal vlv (one) – NORM, then IMMEDIATELY
INNER HATCH Equal vlv cap (one) – install
onto HATCH Equal vlv

- Inner Hatch
CRT
7. Close,latch HATCH per decal
8. SM 177 EXTERNAL AIRLOCK

NOTE

Expect 'S177 EXT A/L PRES' msg

- Inner Hatch
- When EXT AIRLOCK P \cong 0, on MCC GO
Equal vlv (two) – EMER

NOTE

Expect possible 'S66 CABIN PRES',
PPO2 A(B) msgs and KLAXON

Cont next page

- | | | |
|-------------|-----|---|
| CM1 | 9. | When ΔP across INNER HATCH < 0.5 psi,
Open HATCH per decal, then IMMEDIATELY |
| Hatch | 10. | ON CLOSEST HATCH EXPOSED TO VACUUM,
Equal vlv caps (two) – remove
Equal vlvs (two) – OFF
Equal vlvs cap (two) – reinstall original
vlv caps |
| Inner Hatch | 11. | Retether, reinstall original Equal vlv cap (one) |
| CM2 | 12. | Perform cabin air monitoring per MAL, <u>ECLS</u>
FRP-2, POST-FIRE CABIN CLEANUP
CONTINUATION if not already done. Do not
perform cabin cleanup unless CPA readings out
of limits. On MCC call, doff QDMs |
| | 13. | On MCC call, ARLK Fan and ODS avionics may
be re-powered, PCS reconfigured, and PL ISOL
vlv – OP (cap removed) |

POST-FIRE CABIN CLEANUP

(Cabin and Av Bay Fires)

Continue from FIRE/SMOKE Cue Card:

NOTE

This procedure is to be performed simultaneously by two crewmembers

- CM1
- If CO2 RMVL SYS flown:
1. Unstow/install one fresh LiOH canister, one ATCO canister (LiOH Box) and freshest Charcoal canister. Temp stow ATCO canister
- If no CO2 RMVL SYS flown:
2. Unstow/install two fresh LiOH canisters and one ATCO canister (LiOH Box). Temp stow ATCO canister
- When HCL < 5 ppm:
3. Install ATCO canister (in place of LiOH canister)
- If cabin fire:
4. CAB FAN A(B) – ON (pnl L1)
 5. CAB TEMP CNTLR – OFF (pnl L1)
Pin Cab temp cntl act link – FULL COOL (pnl MD44F)
 6. ✓cb MNA,MNB WCS CNTLR (two) – cl (pnl ML86B:B)
AC1,2 WCS FAN SEP 1,2 (six) – cl (pnl MA73C:E)
- If WCS:
- If Av Bay 1 fire:
7. HOSE BLOCK to SEP 2
 8. FAN SEP SEL sw – 2, go to step 10
 9. ✓WCS configured for FAN SEP 1
 10. MODE – COMMODE/MANUAL/EMU
 11. COMMODE CNTL – PULL UP
– PUSH FWD
- ~

Cont next page

~
|
If EDO WCS:

12. Open Commode Lid
13. Remove Fecal Bag (temp stow)
14. ✓ WCS PWR SEL – AUTO1, OFF2 (EDO WCS)

If Av Bay 1 fire:

15. WCS PWR SEL – OFF1, MAN2
16. URN DIV VLV – FAN SEP 2
17. Go to step 20
18. ✓ URN DIV VLV – FAN SEP 1
19. Remove Urine Hose from yoke

If CO2 RMVL SYS flown:

20. CNTLR 1(2) MODE – STBY (hold 3 sec)
(pnl MO51F)

Wait 6 sec, then:

21. ✓ CNTLR 1(2) OPER It – OFF
- CM2 22. Unstow CSA–CP
23. MODE pb – press, hold until ‘RELEASE’ displayed;
Wait ~1 min for nominal display
24. Monitor cabin atmosphere in vicinity of fire, report
results to MCC
25. Unstow ATCO canister (LiOH Box)
- If Av Bay fire: Set up for Av Bay Purge
26. Obtain from Cont Hose & Cable Kit (Window
Shade Bag):
Free Fluid Nozzle
20–ft Y/Y Hose
Gray Tape
27. Connect Free Fluid Nozzle to Y/Y Hose
28. Insert tip of Free Fluid Nozzle into fire port of Av
Bay
29. Secure nozzle and hose with Gray Tape
30. Mate free end of Y/Y Hose to Vacuum Vent QD
(front of WCS)
31. ✓ VAC VLV – OP (WCS/EDO WCS)
32. Go to MAL, ECLS FRP–2, POST–FIRE CABIN
CLEANUP CONTINUATION

ELECTRICAL POWER SYSTEM

EPS

5-1

OPCL/ALL/GEN H

MN BUS UNDERVOLTS/FC VOLTS

SM SYS SUMM 1

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 powered after untie:

3. Go to aff MN BUS LOSS ACTION (MN Bus or Tie Bus Short) >>

If short eliminated and all MN Buses powered 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 powered:

5. Perform BUS TIE (Cue Card), then:

6. Go to PL PWRDN >>

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

If aff FC VOLTS < 32 (FC Short):

8. (Aff) FC REAC – CL (tb-CL)

9. Go to FC SHUTDN (Cue Card) (Do not stop FC until COOL P < 15 and STACK TEMP < 243) >>

If FC VOLTS ≥ 32 (Bus Short):

CAUTION

Do not Bus Tie to Shorted Bus

10. Go to aff MN BUS LOSS ACTIONS for shorted bus >>

EPS

Cont next page

If MN VOLTS < 26.4 and FC VOLTS > 32 and FC AMPS < 20

(FC Disconnect):

11. MSTR MADS PWR – OFF

If PL PRI BUS pwr lost due to FC disconnect:

12. PL PRI (three) – OFF (tb-OFF)

13. (Aff) FC/MN BUS – ON (tb-ON)

If PL PRI disconnected in step 12:

14. Perform PL PWRDN, then:

If FC3 aff:

15. PL PRI FC3 – ON (tb-ON)

MNC – ON (tb-ON)

If first FC problem:

16. Perform BUS TIE (Cue Card), then:

If aff FC VOLTS still > 32:

17. Go to FC SHUTDN (Cue Card) >>

18. (Aff) AC BUS SNSR – OFF,AUTO TRIP

19. GNC I/O RESET >>

If second FC failure and aff MN BUS not recovered:

20. PL PRI (three) – OFF (tb-OFF)

21. Go to 2nd FC SHUTDN >>

If neither:

22. Go to MAL, EPS, 7.3b, FC V ↑↓, FC AMPS ↑↓, MN BUS V
A(B,C) ↑↓ 1

OPCL/ALL/GEN H

**MN BUS UVOLTS/
FC VOLTS**

5-3

**3Φ AC MTRS STOP (Over)
AC VOLTS (5-6)**

3Φ AC MOTORS STOPPED

(No AC VOLTS Alarm: Φ 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 & FREON PUMP 2B: AC1
FC2 & FREON PUMP 1B: AC2
FC3 & CAB FAN A: AC3
2. (Aff) FC – STOP
If AC3 aff:
 3. AV BAY 3 FAN B – OFF
A – ON
CAB FAN A – OFFIsolate aff ΦB:
 4. (Aff) cb AC CONTR – cl
INV/AC BUS – OFF (tb-OFF)

Cont next page

If AC1(2,3) aff and AV BAY FAN 3(2,3) $\Delta P < 0.5$:

5. (Aff) INV/AC BUS – ON (tb–ON)
cb AC CONTR – op
6. Repeat from step 4 for $\Phi C, \Phi A$, then:
7. (Aff) cb AC CONTR (three) – cl
8. INV/AC BUS – OFF
9. Go to aff AC BUS (2 or 3 Φ s) BUS LOSS ACTION >>

If AC1(2,3) aff and AV BAY FAN 3(2,3) $\Delta P \geq 0.5$:

10. (Aff) INV PWR – OFF (tb–OFF) (mtrs restarted)
cb AC CONTR – op
FC – START (10 sec or ΔP tb–gray)
11. If AC3 aff: CAB FAN B – ON
12. Go to aff BUS LOSS ACTION

AC VOLTS

SM 67 ELECTRIC
SM SYS SUMM 1

1. If AC OVERLOAD alarm: Go to AC OVERLOAD >>
If all AC VOLTS between 110 and 123:
 2. Go to MAL, EPS, 7.5a, AC VOLTS 1(2,3) ↓↑ 6 >>
- If single Φ AC VOLTS > 123 or between 10 and 110 (Confirm with F9 meter):
 - : If (aff) INV/AC BUS tb – ON (Inverter lost):
 - : : 3. (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:
 - : L 4. Go to step 8
 - : If (aff) INV/AC BUS tb – OFF (O/V, unannun OVLD, or snsr prob):
 - : If other Φ AMPS > 10:
 - : 5. Go to step 9
 - L 6. Go to aff BUS LOSS ACTIONS >>
- If multi Φ AC VOLTS < 110:
 - If all AC AMPS < 1 (FPC Bus lost):
 - | 7. Go to aff BUS LOSS ACTION >>
 - If any AC AMPS > 14 (Unannun OVLD):
 - 8. (Aff) cb AC CONTR (three) – cl
 - INV/AC BUS – OFF (tb–OFF)
 - INV PWR – OFF (tb–OFF)
 - cb AC CONTR (three) – op

Cont next page

9. Isolate shorted Φ : Open all (aff) AC1(2,3) three- Φ ganged cbs and all (aff) AC1(2,3) Φ A(B,C) single- Φ cbs as noted below:

Number of cbs to open

BUS	L4	MA73C
AC1 3 Φ	1	5
Φ A	15	5
Φ B	15	4
Φ C	12	5
AC2 3 Φ	0	9
Φ A	15	5
Φ B	16	4
Φ C	13	5
AC3 3 Φ	1	7
Φ A	15	3
Φ B	16	3
Φ C	12	3

10. Go to aff BUS LOSS ACTIONS

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 volts < 110 or 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) Φ A(B,C) single- Φ cbs
- : : as follows:

: :
: :
: :
: :
: :
: :
: :
: :
~ ~

Cont next page

Number of cbs to open

BUS	L4	MA73C
AC1 3Φ	1	5
ΦA	15	5
ΦB	15	4
ΦC	12	5
AC2 3Φ	0	9
ΦA	15	5
ΦB	16	4
ΦC	13	5
AC3 3Φ	1	7
ΦA	15	3
ΦB	16	3
ΦC	12	3

L 4. Go to aff BUS LOSS ACTIONS >>

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

L 6. Go to aff BUS LOSS ACTION >>

If all AC VOLTS between 110 and 123 and AMPS < 14:

- 7. Go to MAL, EPS, 7.5b, AC OVLD 1(2,3) ↓ 52

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5-8b

OPCL/ALL/GEN H,6

ESS BUS VOLTS LOW

If verified by F9 voltmeter:

	1BC	2CA	3AB
If (aff) cb op	MNA CONTR (pnl O15:B)	MNB CONTR (pnl O16:B)	MNC CONTR (pnl O14:B)
1. (Aff) cb op	MNA CONTR (pnl O13:A)	MNB CONTR (pnl O13:C)	MNC CONTR (pnl O13:E)
2. (Aff) cb cl	MNA CONTR (pnl O15:B)	MNB CONTR (pnl O16:B)	MNC CONTR (pnl O14:B)

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)

CNTL BUS VOLTS LOW/

SM SYS SUMM 1

CNTL BUS RPC

SM 67 ELECTRIC

1. ✓BUS LOSS ID and CNTL Bus RPC trip status (*)
If pwr reqd (<3 sec) for crit function:
 2. Hold crit function sw
For CNTL BUS AB(BC,CA) VOLTS LOW or tripped RPC A(B,C):
 3. (Aff) CNTL BUS PWR MNA(MNB,MNC) – RESET, then release
4. Go to CNTL BUS SHORT (TIME CRITICAL)

OPCL/ALL/GEN H,4

AC OVERLOAD
ESS BUS V LOW

5-9 CNTL BUS V LOW/BUS RPC
CNTL BUS SHORT (Over)

CNTL BUS SHORT (TIME CRITICAL)

SM SYS SUMM 1
SM 67 ELECTRIC

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 switches must be held continuously
in the RESET position to unpower bus(es)

If CNTL AB1(AB2,AB3):

If MNA(MNB) RPC tripped (*):

1. CNTL BUS PWR MNB(MNA) – RESET
(hold with Switch Retention device) (pnl R1)
2. cb CNTL BUS AB1/2/3 – op (pnl R14:B)

If no RPCs tripped (no *):

3. CNTL BUS PWR MNA,MNB (two) – RESET
(hold with Switch Retention device) (pnl R1)

If no S-BD comm:

4. NSP ENCRYPTION SEL – BYP (pnl A1L)

Cont next page

- ~
- If CNTL BC1(BC2,BC3):
(COMM will be UHF only if BC1,2,3 unpowered)
- If MNB(MNC) RPC tripped (*):
5. CNTL BUS PWR MNC(MNB) – RESET
(hold with Switch Retention device) (pnl R1)
 6. cb CNTL BUS BC1/2/3 – op (pnl R14:B)
- If no RPCs tripped (no *):
7. CNTL BUS PWR MNB,MNC (two) – RESET
(hold with Switch Retention device) (pnl R1)
- If CNTL BC2 unpowered:
8. S–BD PM CNTL – PNL,CMD (pnl C3)
- If CNTL CA1(CA2,CA3):
- If MNC(MNA) RPC tripped (*):
9. CNTL BUS PWR MNA(MNC) – RESET
(hold with Switch Retention device) (pnl R1)
 10. cb CNTL BUS CA1/2/3 – op (pnl R14:B)
- If no RPCs tripped (no *):
11. CNTL BUS PWR MNA,MNC (two) – RESET
(hold with Switch Retention device) (pnl R1)
- For all CNTL V < 25.0:
12. Perform BUS LOSS ACTION (CNTL), then, on MCC call only, perform MAL, EPS SSR–100 thru SSR–108, then:
 13. Perform CONTROL BUS POWERDOWN (IFM, PROCEDURES A THRU F) for shorted bus, then:
 14. If reqd, back out of BUS LOSS ACTIONS for regained buses, then:
 15. Go to MAL, EPS SSR–100 thru SSR–108 for shorted bus

FC COOLANT PUMP ΔP LOW

SM 69 FUEL CELLS
SM SYS SUMM 1

If other 3Φ AC motors aff and AC VOLTS OK:

1. Go to 3Φ AC MOTORS STOPPED >>
2. (Aff) cb FC PUMPS (three) – cl (pnl L4:C)
FC – START (10 sec or ΔP 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):

3. Go to FC SHUTDN (Cue Card) >>

If FC H2 PUMP status norm, FC EXIT T norm, and RDY tb – gray:
N/A (snsr fail)

FC1(2,3) H2 PUMP ↑↓

SM 69 FUEL CELLS
SM SYS SUMM 1

If other 3Φ AC motors aff, and AC VOLTS OK:

1. Go to 3Φ AC MOTORS STOPPED >>

If FC COOL PUMP ΔP tb – bp:

2. Go to FC COOLANT PUMP ΔP 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**

FC REACTANT VLV CLOSED

SM 69 FUEL CELLS
SM SYS SUMM 1

1. FC REAC (three) – OP (tb–OP or hold 1 sec max) (pnl R1)
 2. Perform BUS TIE (Cue Card), then:
If no joy on REAC open:
 3. ✓cb FC REAC VLV CL ENA (three) – op (pnl C3)
 4. FC REAC (three) – OP (tb–OP or hold 10 sec) (pnl R1)
- 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
COOL PUMP ΔP tb – bp/intermittent, or
STACK/EXIT T unstable, or
FC ΔV SS 1(2,3) ≥ 150, or
FC FLOW O2(H2) > 8.4(1.1):
 2. Go to FC SAFING >>
- If FC COOL P < 25 or > 75 and stdy:
| 3. Go to MAL, EPS, 7.3e, FUEL CELL COOL P ↑↓ [8] >>
- If FC COOL P between 25 and 50:
If FC COOL P < (H2O SUPPLY PRESS + 10):
 4. Perform FC SHUTDN (Cue Card), then:
 5. Go to MAL, EPS, 7.3e, FUEL CELL COOL P ↑↓ [33]

OPCL/ALL/GEN H

FC COOL PUMP ΔP
FC1(2,3) H2 PUMP ↑↓

5–13

FC REAC VLV CL
FC COOL P

FC H2O RLF NOZ TEMP ↑↓

SM 69 FUEL CELLS
SM 66 ENVIRONMENT

If H2O RLF NOZ T A and B < 150:

If more than 1 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) >>

If H2O SUPPLY PRESS < 40:

2. Initiate preparations for next PLS entry >>

If 1 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 Switch Failure):

4. FC H2O RELIEF HTR – A AUTO(B AUTO) (R11U) >>

If H2O RLF NOZ T A and B (both) > 425 (HTR fail on):

5. ✓MCC

FC DELTA V 1(2,3)

SM SYS SUMM 1
SM 69 FUEL CELLS

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

OPCL/ALL/GEN H

FC H2O RLF NOZ T ↑↓

5-15

FC DELTA V 1(2,3)

FC pH HIGH or H2O LINE pH HIGH

SM SYS SUMM 1
SM 69 FUEL CELLS

If FC1(2,3) pH ↓:

1. Perform BUS TIE (Cue Card), then:
If aff FC ΔV 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 – CL (tb–CL)
TKB OUTLET – CL (tb–CL)
5. Go to MAL, EPS, 7.3a, FC/H2O LINE pH HIGH [1]

FC SHUTDN (1st)

SM SYS SUMM 1

WARNING

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

1. Pre OMS 2 or Entry: MSTR MADS PWR – OFF
2. If not tied: Perform BUS TIE (Cue Card), then:
If ORB (not D/O Prep), kW > 18:
3. MN BUS TIE (three) – ON (tb–ON)
4. ESS BUS SOURCE FC – OFF
FC/MN BUS – OFF (tb–OFF)
FC – STOP (COOL PUMP ΔP tb–bp or 1 sec)
(expect FDA msgs)
5. FC REAC – CL (tb–CL)
6. Go to LOSS OF 1 FC (PWRDN)

2nd FC SHUTDN

SM SYS SUMM 1

WARNING

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

1. MSTR MADS PWR – OFF
2. If aff FC pwrs 1 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 Δ P tb-bp or 1 sec)
8. FC REAC – CL (tb-CL)
9. Go to LOSS OF 2nd FC (PWRDN)

BUS TIE

If no bus short:

If MN VOLTS > 20:

1. Bus Tie (A to B, B to C, C to A) >>

If MN VOLTS < 20:

2. (Aff) AC BUS SNSR – OFF
3. cb AC CONTR (three) – cl
4. (Aff) INV/AC BUS – OFF (tb-OFF)
5. (Aff) INV PWR – OFF (tb-OFF)
6. If MNC(B) dn: CAB FAN A(B) – OFF
7. Bus Tie (A to B, B to C, C to A)
8. (Aff) INV PWR – ON (tb-ON)
9. (Aff) INV/AC BUS – ON (tb-ON)
10. cb AC CONTR (three) – op
11. (Aff) AC BUS SNSR – AUTO TRIP
12. If pwrdn not reqd: CAB FAN A(B) – ON
13. GNC I/O RESET

OPCL/ALL/GEN H

FC (H2O LINE) pH HIGH
FC SHUTDN (1st)

5-17

2nd FC SHUTDN
BUS TIE

FC SAFING

SM SYS SUMM 1

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:
- If ORB (not D/O Prep) kW > 18 :
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:
10. cb FC1(2,3) REAC VLV CL ENA – CL (pnl C3)
 11. FC REAC VLV 1(2,3) – CL (pnl C3)

If no joy:

12. Install switch reten device FC REAC sw (pnl R1)
- 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:
15. FC1(2,3) – STOP (ΔP tb–bp or 1 sec)

Go to LOSS OF 1 FC(2nd FC)(PWRDN)

CRYO O2(H2) PRESS/TEMP HIGH

SM 68 CRYO SYSTEM
SM SYS SUMM 2
SM 168 CRYO PALLET

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

SM 68 CRYO SYSTEM
SM SYS SUMM 2
SM 168 CRYO PALLET

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 TK 1,TK 2 (two) – CL
If either MANF VLV fails to close:
 4. Hold switch in CLOSE posn (install Switch Retention 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 TK 1(2) aff:
 7. O2 SYS 1(2) SPLY – CL
If O2 TK 1(2) P now incr (PCS leak):
 8. O2 TK 1(2) HTRS A,B (two) – AUTO
MANF VLV TK 1,TK 2 (two) – OP >>
9. Perform aff FC SHUTDN (Cue Card), then:
If aff TK P incr (FC leak):
 10. O2(H2) MANF VLV TK 1,TK 2 (two) – OP (ASAP if FC3)
 11. (Aff) TK HTRS A,B (two) – AUTO >>

Cont next page

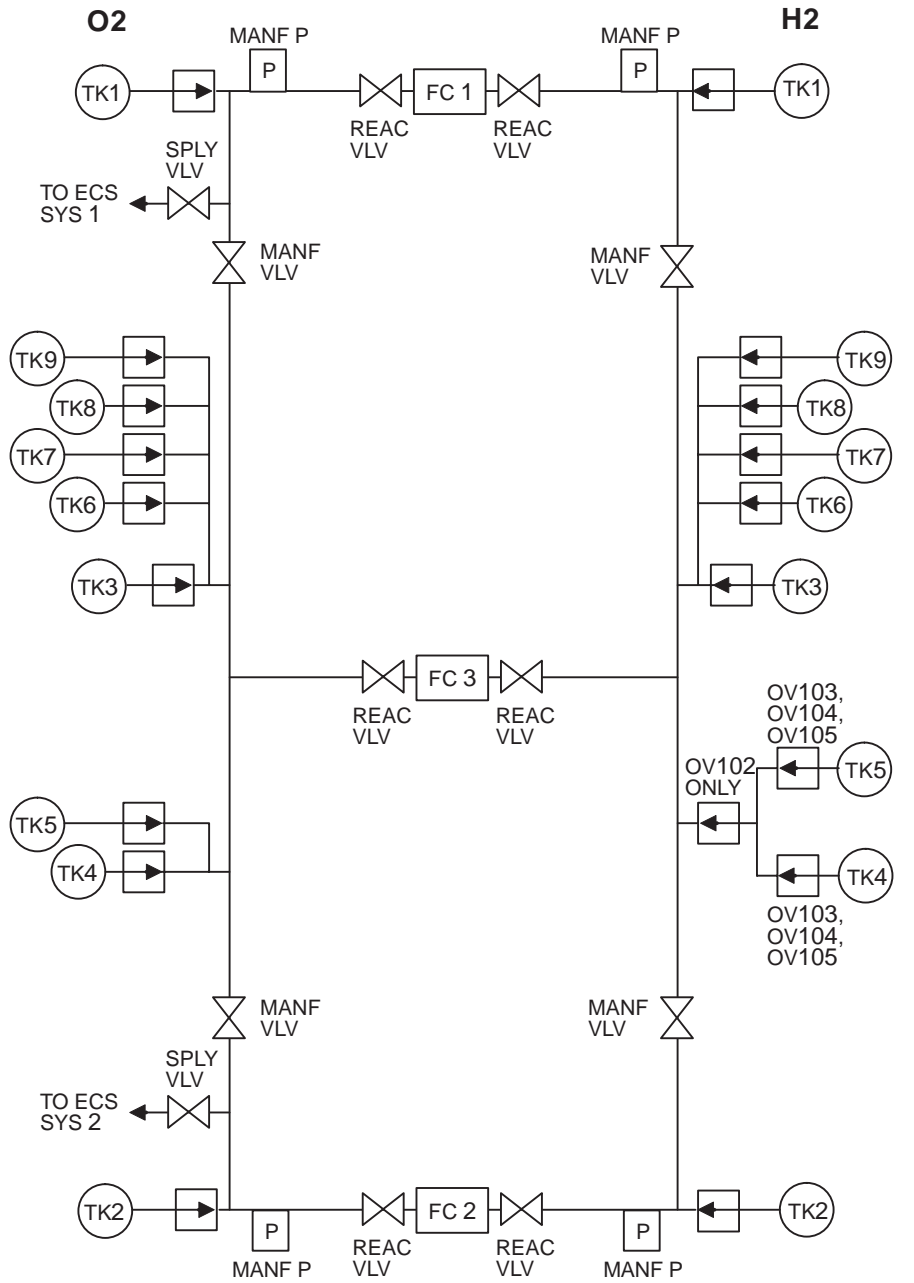
OPCL/4/GEN H

- ~ ~
- If aff TK P not incr within 2 min (MANF or TK leak):
12. (Aff) TK HTRS A,B (two) – OFF
- If TK 1(2) aff and TK P/MANF P diverging (TK leak):
13. O2(H2) MANF VLV TK 1,TK 2 (two) – OP
 14. Go to MAL, EPS SSR-6, FC RESTART >>
- If TK 3(4. . .9) aff or if TK P/MANF P tracking (MANF leak) >>
- If any TK P and connected MANF P diverging or $\Delta > 50$:
15. O2(H2) MANF VLV TK 1,TK 2 (two) – OP
 16. (Aff) TK HTRS A,B (two) – OFF (TK leak or blockage)
 17. (Other) TK HTRS – AUTO >>
- If neither of the above and all TK Ps now steady or incr (small leak or HTR fail):

<p>CAUTION Do not allow P to exceed 920(260)</p>

18. ✓MCC

CRYO



12/30/93

A5-21

OPCL/ALL/GEN H,15

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A5-22

OPCL/2/GEN H,15

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| | —

O2/H2 HTR LOSS (OV102 Only)																				
BUS LOSS	PAIRED				PAIRED									PAIRED		PAIRED				
	TK1		TK2		TK3		TK4 ←→ TK5			TK6		TK7		TK8		TK9				
	A	B	A	B	A	B	O2	H2A	H2B	O2	H2A	H2B	A	B	A	B	A	B	A	B
MNA DA1	A/M		AUTO	A/M	A/M	AUTO	AUTO	A/M	A/M	AUTO	A/M	A/M	A/M		A/M		A/M		A/M	
MNB DA2																				
MNC DA3	AUTO	A/M	A/M		A/M		A/M		A/M		A/M									
CNTL AB1		MAN			MAN								MAN		MAN		MAN		MAN	
AB2		A/M			A/M								A/M		A/M		A/M		A/M	
AB3																				
CNTL BC1			MAN				MAN	MAN		MAN	MAN									
BC2			A/M				A/M	A/M		A/M	A/M									
BC3				MAN					MAN	AUTO	MAN	MAN								
CNTL CA1	MAN					MAN								MAN		MAN		MAN		MAN
CA2	A/M				A/M	A/M								A/M		A/M		A/M		A/M
CA3				A/M					A/M	A/M		A/M								
ESS 1BC	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO
2CA	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO	*AUTO
3AB	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO

*AUTO OPERATION REGAINED IF BOTH A AND B HTR SW OF OTHER PAIRED TANK(S) ARE NOT IN AUTO.
TK1 PAIRED WITH TK2, AND TK3 PAIRED WITH TK4/TK5

A/M = AUTO AND MANUAL LOSS

07/19/94

A5-23

OPCL/2/GEN H,15

A5-24

OPCL/ALL/GEN H,15

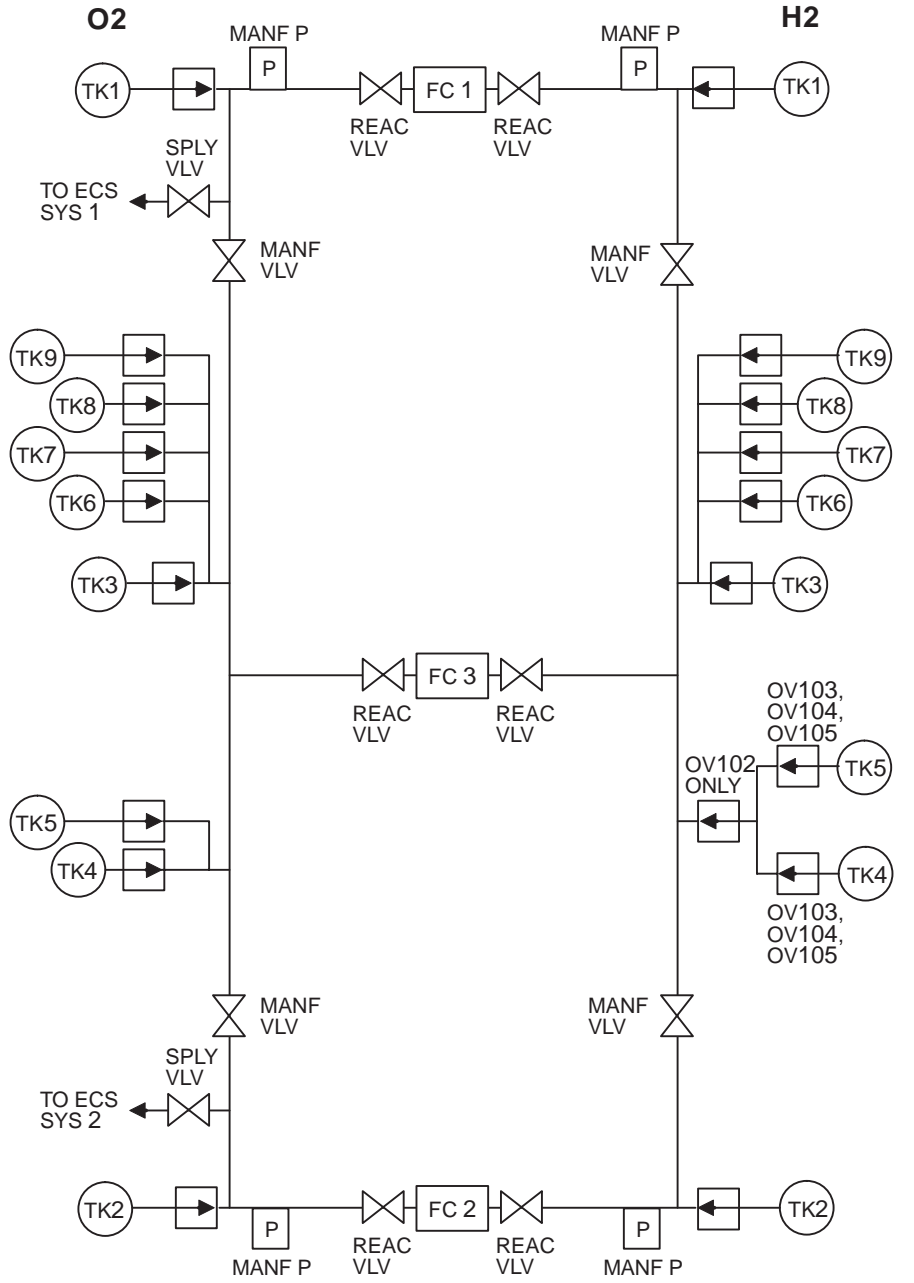
MAIN DC BUS LOSS ID TABLE

BUS		MAIN A									MAIN B						MAIN C											
		*FPC1			MPC1			APC4			*FPC2			MPC2			APC5			*FPC3			MPC3			APC6		
		F L C 1	F M C 1		M M C 1	M M C 3		A P C 1	A L C 1	A M C 1		F L C 2	F M C 2		M M C 2		A P C 2	A L C 2		F L C 3	F M C 3		M M C 2	M M C 4		A P C 3	A L C 3	
CW	AC VOLTAGE (AC X Lost)	1								2									3									
	APU TEMP (-2 min if APU X ON)						3	3								1	1								2	2		
	FREON LOOP (If cooling by FES X only)						B	B																	A	A		
	H2O LOOP (If Pump X Active)		1A								1B																	
	OMS TVC (During OMS PRI GMBL)						L	L																	R	R		
	OMS TVC (During OMS SEC GMBL)						R	R								L	L											
	RCS JET (When Jet Commanded)		•								•										•							
DISP 67	DC AMPS XY = 0 (X: Fwd,Mid,Aft) (Y: A,B,C)	FA		MA		AA				FB		MB		AB					FC		MC				AC			
	DC V PCA XY = 0 (X: Fwd,Aft) (Y: A,B,C)	FA	FA			AA	AA			FB	FB			AB	AB				FC	FC					AC	AC		
	CNTL BUS RPC X = '*' (X: A,B,C)	A								B									C									
PLB LTS	PLB,FLOODS (Fwd,Mid,Aft Port,Stbd,Bkhd, Docking)			FP								FB									MS							
				AS								FS									AP							
S-BAND	SYS X ORB voice & PL PSP msg (X: 1,2)									1										2								
	L2 ATM O2 SYS X SPLY tb - CL				1							2																
F6/F8	LANDING GEAR X tb - bp (X: L,R,NOSE)									LN										RN								
	CRT X Blanks	1																										
O1	H2O PUMP OUT P X = 20 (Pump Loss)			1A							1B																	
	AFT X RCS He P Y tb - bp (X: Both,L,R) (Y: A,B)						BA	BA						RB	RB									LB	LB			
P	AFT L,R RCS MANF ISOL 5 tb - bp																								•	•		
	FWD RCS He P X tb - bp	A									B																	
N	FWD RCS TK ISOL X tb - bp (X: 1/2,3/4/5)		3																	1								
	FWD RCS MANF ISOL X tb - bp		1								2									5	4							
E	HYD BRAKE ISOL VLV X tb - OP						1	1						2	2									3	3			
	LG EXTEND ISOL VLV tb - OP						•	•																				
S	RAD CNTL X tb - bp (X: PORT,STBD)			PS	S	P															PS	P	S					
	RMS EE (except DERIGID) tbs - bp, MA LT - ON			•																								
A8L	X RMS DPY/STO tb - bp (X: PORT,STBD)			P								P									P							
	X RMS RETEN LAT tb - bp (X: PORT,STBD)			P	P							P	P									P	P					
	PORT RMS R-F-L X tb - bp (X: FWD,MID,AFT)			M	M							F	F								A	A						

*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 02/02/96

CRYO



12/30/93

B5-21

OPCL/ALL/GEN H,15

O2/H2 HTR LOSS (All Except OV102)											
BUS LOSS	PAIRED				PAIRED						
	TK1		TK2		TK3		TK4		TK5		
	A	B	A	B	A	B	A	B	A	B	
MNA DA1	A/M				A/M					A/M	
MNB DA2			AUTO	A/M	AUTO	A/M	AUTO	A/M			
MNC DA3	AUTO	A/M	A/M				A/M			AUTO	A/M
CNTL AB1		MAN			MAN						
AB2		A/M			A/M						
CNTL BC1			MAN				MAN				MAN
BC2			A/M				A/M				A/M
BC3				MAN			MAN				
CNTL CA1	MAN					MAN				MAN	
CA2	A/M					A/M				A/M	
CA3				A/M			A/M				
ESS 1BC	AUTO*	AUTO*	AUTO	AUTO	AUTO*	AUTO*	AUTO	AUTO			
2CA	AUTO	AUTO	AUTO*	AUTO*	AUTO*	AUTO*	AUTO*	AUTO*			
3AB					AUTO	AUTO	AUTO*	AUTO*	AUTO	AUTO	

* AUTO OPERATION REGAINED IF BOTH A AND B HTR SW OF OTHER PAIRED TANK(S) ARE NOI IN AUTO. A/M = AUTO AND MANUAL LOSS

02/02/96

B5-22

OPCL/4/GEN H,15

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B5-23

OPCL/4/GEN H,15

B5-24

OPCL/ALL/GEN H,15

MAIN DC BUS LOSS ID TABLE

BUS		MAIN A									MAIN B						MAIN C											
		*FPC1			MPC1			APC4			*FPC2			MPC2			APC5			*FPC3			MPC3			APC6		
		F L C 1	F M C 1		M M C 1	M M C 3		A P C 1	A L C 1	A M C 1		F L C 2	F M C 2		M M C 2		A P C 2	A L C 2		F L C 3	F M C 3		M M C 2	M M C 4		A P C 3	A L C 3	
CW	AC VOLTAGE (AC X Lost)	1									2								3									
	APU TEMP (-2 min if APU X ON)						3	3								1	1								2	2		
	FREON LOOP (If cooling by FES X only)						B	B																	A	A		
	H2O LOOP (If Pump X Active)		1A									1B																
	OMS TVC (During OMS PRI GMBL)						L	L																	R	R		
	OMS TVC (During OMS SEC GMBL)						R	R								L	L											
	RCS JET (When Jet Commanded)		•									•									•							
DISP 67	DC AMPS XY = 0 (X: Fwd,Mid,Aft) (Y: A,B,C)	FA		MA		AA				FB		MB		AB					FC		MC				AC			
	DC V PCA XY = 0 (X: Fwd,Aft) (Y: A,B,C)	FA	FA			AA	AA			FB	FB			AB	AB				FC	FC					AC	AC		
	CNTL BUS RPC X = '*' (X: A,B,C)	A								B									C									
PLB LTS	PLB,FLOODS (Fwd,Mid,Aft Port,Stbd,Bkhd, Docking)			FP								FB									MS							
				AS								FS									AP							
S-BAND	SYS X ORB voice & PL PSP msg (X: 1,2)										1										2							
	L2 ATM O2 SYS X SPLY tb - CL				1								2															
F6/F8	LANDING GEAR X tb - bp (X: L,R,NOSE)										LN										RN							
	CRT X Blanks	1																										
O1	H2O PUMP OUT P X = 20 (Pump Loss)			1A								1B																
	AFT X RCS He P Y tb - bp (X: Both,L,R) (Y: A,B)						BA	BA							RB	RB								LB	LB			
P	AFT L,R RCS MANF ISOL 5 tb - bp																								•	•		
	FWD RCS He P X tb - bp	A									B																	
N	FWD RCS TK ISOL X tb - bp (X: 1/2,3/4/5)		3																	1								
	FWD RCS MANF ISOL X tb - bp		1									2								5	4							
E	HYD BRAKE ISOL VLV X tb - OP						1	1							2	2								3	3			
	LG EXTEND ISOL VLV tb - OP						•	•																				
S	RAD CNTL X tb - bp (X: PORT,STBD)			PS	S	P															PS	P	S					
	RMS EE (except DERIGID) tbs - bp, MA LT - ON			•																								
A8L	X RMS DPY/STO tb - bp (X: PORT,STBD)			P								P									P							
	X RMS RETEN LAT tb - bp (X: PORT,STBD)			P	P							P	P								P	P						
	PORT RMS R-F-L X tb - bp (X: FWD,MID,AFT)			M	M							F	F								A	A						

*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 02/02/96

MAIN DC BUS LOSS ID TABLE

INDICATION		MAIN A				MAIN B			MAIN C			
		O 1 4	O 1 4 A 8	R 1 4	M L 8 6 B	O 1 5	R 1 4	M L 8 6 B	O 1 6	R 1 4	M L 8 6 B	
C/W	CABIN ATM	•				•						
LIGHTS	FLOODS (L Seat,R Seat, CTR Cnsl, MS,OS,PS)			PS		LC	OS		RC	MS		
	Floods (L,R Ovhd Cnsl)	L				R						
	MIDDECK FLOODS X (X: 1,2,3,4,5,6,7,8)				18			26			34 57	
	WMC FLOOD				•							
COMM	All Voice via AUDIO CTR 2									•		
	ATU PS,MS,MD CCU (CU),MD SMU (SM),AL,OS			MS OS CU			SM			PS AL		
	UHF SPLX PWR AMP			•								
TIMERS	X MISSION TIMER (X: Fwd,Aft)	F				A						
	X EVENT TIMER (X: Fwd,Aft)	A				F						
P A N E L S	FWD MDUs			MFD2 PLT1			CDR2 MFD1			CDR1 PLT2		
	AFT MDU								B	AFD1		
	L2 CAB RELIEF X tb – bp					A						
	ATM N2 SYS X SPLY, REG INLET tb – bp	1				2						
	O1	CAB dP/dT = 0.45					•					
		CAB PRESS = 0 psia	•									
		PPO2 SNSR X = 0 psia	A				BC					
	O3	RCS/OMS PRPLT QTY Disp Blanks							•			
	R11L	SPLY H2O TK X INLET tb – bp				A		B			C	
		SPLY H2O TK X OUTLET tb – bp				B		C			A	
		SPLY H2O DUMP ISOL, B SPLY ISOL VLV tb – bp						•				
		SPLY H2O DUMP, XOVR, GALLEY SPLY VLV tb – bp									•	
	A8U	RMS EE (6), SAFING, S/W STOP tb – bp, BRAKES tb – OFF		•								
	ML31C	WASTE H2O TK X VLV tb – bp				1						
		WASTE H2O DUMP ISOL VLV tb – bp				•						
SPLY H2O TK D X tb – bp (X: INLET,OUTLET)					0		1					

DATE 02/22/02

5-25

OPCL/2/GEN H,Y

ESS DC BUS LOSS ID TABLE

INDICATION		BUS	ESS1BC					ESS2CA					ESS3AB						
			D A 1	FP & LC 1	M P C 1	F D	O 13 R 14	M L 86 B	D A 2	FP & LC 2	M P C 2	F D	O 13 R 14	D A 3	FP & LC 3	M P C 3	F D	O 13	M L 86 B
C/W	MA, but no F7 C/W Lts		•				•												
	O2 PRESS						•					•	•						•
	H2 PRESS						•					•	•						•
	FC REAC				•			•		•			•		•				
	FC PUMP				•	•			•		•		•		•	•			
	PRIMARY C/W (Cannot be Reset)							•					•						
	BACKUP C/W (Cannot be Reset)							•					•						
F9 METER	Aff ESS VOLTS OFF Scale Lo		•			•				•			•			•			
SM1	Aff DC VOLTS ESS = 0		•							•			•						
COMM	All Voice via AUDIO CTR 1											•							
	X ATU,CCU,MIC (X: Cdr,Plt)		C				C		P			P							
LIGHTS LOST	F7 C/W MATRIX		•				•												
	MA BULBS 2 of 4 per MA (except Lamp Test)		•				•		•			•							
	GPC STATUS LTS												•					•	
	X GLARESHIELD FLOOD (X: L,R)		L				L		R			R							
P A N E L S	O2 O2,H2 TK X QTY = 0% (X: 1,2,3,4)		24				2	4	1			1	3					3	
	R1 FC/MN BUS X tb – OFF		A						B				C						
A12	PL PRI MNC tb – OFF												•						
	INV PWR X tb – OFF (Inv OK)			1						2				3					
	INV/AC BUS X tb – OFF (Bus OK)		1				1		2		2		2	3				3	
	O2,H2 MANF VLV TK X tb – CL		1		1				2		2								
	FC X REAC tb – CL		1		1				2		2			3		3			
	FC X RDY tb – bp		1		1	1			2		2	2		3		3	3		
	FC X COOL PUMP ΔP tb – bp		1		1	1			2		2	2		3		3	3		
A12 FC3 STRUCT RTN tb – OFF													•						

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OPCL/ALL/GEN H,5

DATE 05/23/00

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BUS LOSS ACTION

	<u>PAGE</u>		<u>PAGE</u>
AC1	5-30	CNTL AB1	5-42
MNA DA1	5-31	AB2	5-42
FPC1	5-32	AB3	5-42
FLC1	5-32	BC1	5-43
FMC1	5-32	BC2	5-44
MPC1	5-32	BC3	5-44
APC4	5-32	CA1	5-45
ALC1	5-33	CA2	5-45
O14	5-33	CA3	5-45
R14	5-33	ESS 1BC:	
AC2	5-34	DA1 (CIL) ...	5-46
MNB DA2	5-35	MPC1 (CIL) .	5-46
FPC2	5-36	FD (CIL)	5-46
FLC2	5-36	O13&R14 ...	5-46
FMC2	5-36	ESS 2CA:	
MPC2	5-36	DA2 (CIL) ...	5-47
APC5	5-37	MPC2 (CIL) .	5-47
ALC2	5-37	FD (CIL)	5-47
O15	5-37	O13&R14 ...	5-47
AC3	5-38	ESS 3AB:	
MNC DA3	5-39	DA3 (CIL) ...	5-48
FPC3	5-40	MPC3 (CIL) .	5-48
FLC3	5-40	FD (CIL)	5-48
APC6	5-40		
ALC3	5-41		
O16	5-41		
R14	5-41		

**AC1/
MNA**

PROBLEM	PWRUP	
	LOW LEVEL (Group B)	MSN EXT (Group C)
EPS BUS LOSS	N/A	ALL FF&FA MDMs

OPCL/ALL/GEN H

BUS LOSS ID (5-24)

5-29

BUS LOSS ACTION

AC1/
MNA

AC1 (2 or 3Φs)

- L1
1. Perform FC1 SHUTDN (Cue Card), then:
 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 ACTIONS >>
3. Go to MAL, EPS SSR-110, BUS LOSS:
 AC1

I

MNA DA1 (Entire Bus) (Includes AC1)

NOTE

UHF SPLX Hi Pwr Xmit lost

- | | | |
|-----|----|--|
| R1 | 1. | Perform <u>EC1 SHUTDN</u> (Cue Card), then: |
| L1 | 2. | PL CAB – MNB |
| | 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/FUEL PUMP 1 – B AUTO |
| | | 3 – A AUTO |
| | | TK/FU LINE/H2O SYS 1B,3A |
| | | (two) – AUTO |
| | 7. | Perform LOSS OF VERNIERS (ORB OPS, <u>RCS</u>), then: |
| | 8. | Go to MAL, <u>EPS SSR-10</u> , BUS LOSS:
MNA DA1 |

MNA FPC1

1. Perform AC1 (2 or 3 Φ s) (omit MAL, EPS SSR-110), 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-15, 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-17, 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/FUEL PUMP 1 – B AUTO
3 – A AUTO
TK/FU LINE/H2O SYS 1B,3A
(two) – 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:
- A12 2. HI LOAD DUCT HTR sel – B
3. APU HTR
GAS GEN/FUEL PUMP 1 – B AUTO
3 – A AUTO
TK/FU LINE/H2O SYS 1B,3A
(two) – AUTO
4. Perform LOSS OF VERNIERS (ORB OPS, RCS), then:
5. Go to MAL, EPS SSR–16, BUS LOSS:
MNA ALC1

AC2/
MNB

MNA O14

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

MNA R14

NOTE

UHF SPLX Hi Pwr Xmit lost

1. Go to MAL, EPS SSR–21, BUS LOSS:
MNA R14

AC2 (2 or 3Φs)

**AC2/
MNB**

- L1
1. Perform FC2 SHUTDN (Cue Card), then:
 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 ACTIONS >>
 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 subsequent 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/FUEL PUMP 1 – A AUTO
2 – B AUTO
TK/FU LINE/H2O SYS 1A,2B
(two) – 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 subsequent Fault Msg – 'BCE STRG 3 NSP' or loss of comm

If PL comm reqd:

- A1L 1. S-BD PL PWR SYS – 2
CNTL – PNL,CMD

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 Φ s) (omit MAL, EPS SSR-120), 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 subsequent Fault Msg – 'BCE STRG 3 NSP' or loss of comm

1. GNC 23 RCS ovrld F2 MANF STAT – CL

If PL comm reqd:

- A1L 2. S-BD PL PWR SYS – 2
CNTL – PNL,CMD

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 ovrld 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:

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

MNB APC5

- L1 1. TOP EVAP HTR DUCT sel – A
If HI LOAD EVAP ENA:
- A12 2. HI LOAD DUCT HTR sel – A
3. APU HTR
GAS GEN/FUEL PUMP 1 – A AUTO
2 – B AUTO
TK/FU LINE/H2O SYS 1A,2B
(two) – 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:
- A12 2. HI LOAD DUCT HTR sel – A
3. APU HTR
GAS GEN/FUEL PUMP 1 – A AUTO
2 – B AUTO
TK/FU LINE/H2O SYS 1A,2B
(two) – 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/
MNC

AC3 (2 or 3Φs)

AC3/
MNC

- L1
 - 1. Perform FC3 SHUTDN (Cue Card), then:
 - 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 ACTIONS >>
 - 4. Go to MAL, EPS SSR-130, BUS LOSS: AC3

I

MNC DA3 (Entire Bus) (Includes AC3)

- | | | |
|----|----|---|
| L1 | 1. | Perform <u>FC3 SHUTDN</u> (Cue Card), then: |
| | 2. | 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 |
| 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

- | | | |
|-------|----|---|
| O6 | 4. | AUD CTR – 1 |
| O17:C | 5. | ANNUN BUS SEL ACA 2/3 – MNB |
| A12 | 6. | SIG CONDR FREON B – AC2 |
| | 7. | APU HTR
GAS GEN/FUEL PUMP 2 – A AUTO
3 – B AUTO
TK/FU LINE/H2O SYS 2A,3B
(two) – AUTO |
| | 8. | Perform LOSS OF VERNIERS (ORB OPS,
<u>RCS</u>), then: |
| | 9. | Go to MAL, <u>EPS SSR–50</u> , 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 3Φs) (omit MAL, EPS SSR-130), 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/FUEL PUMP 2 – A AUTO
3 – B AUTO
TK/FU LINE/H2O SYS 2A,3B
(two) – 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/FUEL PUMP 2 – A AUTO
3 – B AUTO
TK/FU LINE/H2O SYS 2A,3B
(two) – 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

CAUTION

Do not sw S-BD PM CNTL to PNL if PNL A1 encryption switches in either 'T/R', 'RCV', or 'ALL'. Will result in loss of all S-BD COMM

- L1 1. TOP EVAP HTR DUCT sel – B
If HI LOAD EVAP ENA:
- A12 2. HI LOAD DUCT HTR sel – B
3. APU HTR
GAS GEN/FUEL PUMP 1 – B AUTO
3 – A AUTO
TK/FU LINE/H2O SYS 1B,3A
(two) – AUTO
- If AB1,2,3 unpwr:
4. GNC 23 RCS ovrd F1 MANF STAT – CL
5. Go to MAL, EPS SSR-100, BUS LOSS:
CNTL AB1

CNTL AB2

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

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 unpwr:
If reqd for att control:
3. GNC 23 RCS ovrd F1 MANF STAT
– OP

Cont next page

A12 4. APU HTR
GAS GEN/FUEL PUMP 1 – A AUTO
TK/FU LINE/H2O SYS 1B,3A
(two) – AUTO

A6U If DAP MAN MODE reqd:
5. Use aft station

If BFS ENGAGE reqd:

O6 6. Use PLT's RHC
GPC MODE 1,2,4 (three) – STBY,HALT
BFS I/O RESET

If no S-BD comm:

C3 7. 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

8. Go to MAL, EPS SSR-102, BUS LOSS:
CNTL AB3

CNTL BC1

CAUTION

Do not sw S-BD PM CNTL to PNL if
subsequent Fault Msg – 'BCE
STRG 3 NSP' or loss of comm

L1 1. TOP EVAP HTR NOZ L – B AUTO
DUCT sel – A

If HI LOAD EVAP ENA:

A12 2. HI LOAD DUCT HTR sel – A

3. APU HTR
GAS GEN/FUEL PUMP 1 – A AUTO
2 – B AUTO
TK/FU LINE/H2O SYS 1A,2B
(two) – AUTO

A1L If PL comm reqd:

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 unpwr:

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:
CNTL BC1

CNTL BC2

- L1 1. TOP EVAP HTR DUCT sel – A
If HI LOAD EVAP ENA:
- C3 2. HI LOAD DUCT HTR sel – A
- 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

- A12 4. GNC 23 RCS ovrd F2 MANF STAT – CL
- 5. APU HTR
GAS GEN/FUEL PUMP 2 – B AUTO
TK/FU LINE/H2O SYS 1A,2B
(two) – 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:
CNTL BC2

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/FUEL PUMP 2 – A AUTO
TK/FU LINE/H2O SYS 1A,2B
(two) – AUTO
- A6 5. If DAP MAN MODE reqd: Use aft station
- 6. Go to MAL, EPS SSR–105, BUS LOSS:
CNTL BC3

CNTL CA1

NOTE

GPC 3,5 – no BFS ENGAGE capability. ✓MCC for possible move of BFS FUNCTION

- A12
1. APU HTR
GAS GEN/FUEL PUMP 2 – A AUTO
3 – B AUTO
TK/FU LINE/H2O SYS 2A,3B
(two) – AUTO
- If CA1,2,3 unpwr:
2. **GNC 23 RCS** ovrdr F3 MANF STAT – CL
 3. Go to MAL, **EPS** SSR–106, BUS LOSS:
CNTL CA1

CNTL CA2

- L1
1. FLASH EVAP CNTLR PRI A – OFF
B – ON
- A12
2. **GNC 23 RCS** ovrdr F3 MANF STAT – CL
 3. APU HTR
GAS GEN/FUEL PUMP 3 – B AUTO
TK/FU LINE/H2O SYS 2A,3B
(two) – AUTO
- C3
4. If DAP MAN MODE reqd: Use fwd station
 5. Go to MAL, **EPS** SSR–107, BUS LOSS:
CNTL CA2

ESS

CNTL CA3

- A12
1. APU HTR
GAS GEN/FUEL PUMP 3 – A AUTO
TK/FU LINE/H2O SYS 2A,3B
(two) – AUTO
 2. Go to MAL, **EPS** SSR–108, BUS LOSS:
CNTL CA3

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 the calling procedure is complete:
2. Go to MAL, EPS SSR-70, BUS LOSS:
ESS 1BC DA1

ESS 1BC MPC1

1. Perform FC1 SHUTDN (Cue Card), then:
2. Go to MAL, EPS SSR-72, BUS LOSS: ESS
1BC 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: ESS
1BC FD

ESS

ESS 1BC O13&R14

NOTE

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

1. Go to MAL, EPS SSR-75, BUS LOSS: ESS
1BC O13&R14

ESS 2CA DA2 (Entire Bus)

NOTE

C/W B PWR SPLY lost (Pri C/W remains). FAULT SUMM MSG must be reset to avoid C/W Tone masking. GPC 2,5 lost if pwr cycled OFF or ON

- C3
1. AUD CTR – 2
 2. Perform FC2 SHUTDN (Cue Card), then:
If the calling procedure is complete:
 3. Go to MAL, EPS SSR–80, BUS LOSS:
ESS 2CA DA2

ESS 2CA MPC2

1. Perform FC2 SHUTDN (Cue Card), then:
2. Go to MAL, EPS SSR–82, BUS LOSS: ESS
2CA 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: ESS
2CA FD

ESS 2CA O13&R14

NOTE

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

- C3
1. AUD CTR – 2
 2. Go to MAL, EPS SSR–84, BUS LOSS: ESS
2CA 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 SHUTDOWN (Cue Card), then:
If the calling procedure is complete:
2. Go to MAL, EPS SSR-90, BUS LOSS:
ESS 3AB DA3

ESS 3AB MPC3

1. Perform FC3 SHUTDOWN (Cue Card), then:
2. Go to MAL, EPS SSR-92, BUS LOSS: ESS
3AB MPC3

ESS 3AB FD

NOTE

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

1. Perform FC3 SHUTDOWN (Cue Card), then:
2. Go to MAL, EPS SSR-93, BUS LOSS: ESS
3AB FD

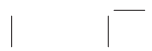
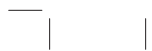
GUIDANCE, NAVIGATION, AND CONTROL

GNC



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GNC



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

GNC SYS SUMM 2

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

XFEED: R OMS to L OMS

GNC 23 RCS

NOTE

This procedure is 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

GNC 23 RCS

NOTE

This procedure is 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 >>

OMS

Cont next page

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

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

OMS N2 TK PRESS LOW

GNC SYS SUMM 2

1. ✓ TK PRESS < 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 PRESS LOW

GNC SYS SUMM 2

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

OMS N2 REG PRESS HIGH

GNC SYS SUMM 2

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

OPCL/4/GEN H

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

7–3

**XFEED RETURN
 OMS N2 TK/REG P**

OMS TK P (FU or OX) LOW

GNC SYS SUMM 2

1. ✓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 OXID 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), then:

8. Go to MAL, OMS, 11.1a, L(R) OMS TK P 22 >>

If OXID or FU (not both) TK P LOW:

Secure RCS and OMS:

9. DAP: FREE

10. 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)

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 corresponding XFEED
vlvs closed

14. If MANF 3/4/5 Leg leak: Go to LOSS OF VERNIERS
(ORB OPS, RCS) >>

Cont next page

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**

OMS He TK P LOW

GNC SYS SUMM 2

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), 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
3. ✓ GPS TO NAV – INH (*)
4. GNC, OPS 202 PRO
5. GNC XXXXX MNVR EXEC leaking OMS – sel, and determine out-of-plane or retrograde burn based on TIG (MCC or msg)
6. GMBL CK sel sys
7. Enter retrograde ($-\Delta VX$) or out-of-plane (ΔVY) burn data on LEAKING OMS PRPLT/He BURN Cue Card from ΔVX vs ORB ALT chart or LEAKING OMS He ΔV TABLE. If out-of-plane PRPLT LK burn, enter $\Delta VY \pm 500$
8. Load burn data
LOAD – ITEM 22 EXEC (✓TGT HP)
TIMER – ITEM 23 EXEC

If OPS 2:

9. ✓ Pri RJD LOGIC, DRIVER (sixteen) – ON
✓ cb L,R DDU (four) – cl
DAP: A(B)/AUTO/PRI
DAP TRANS: NORM/NORM/NORM

If OPS 3: GNC 23 RCS

10. L1A or L3A – desel (N/A He leak)
R1A or R3A – desel (N/A He leak)
11. Mnvr to burn att. When mnvr complete, update TIG if appropriate

At TIG-4, perform OMS burn prep:

12. (Leaking) OMS TK ISOL (two) – OP (tb-OP)
✓ XFEED (four) – CL (tb-CL)
He PRESS/VAP ISOL A – OP

Wait 2 sec

(Leaking) OMS He PRESS/VAP ISOL 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. GNC, OPS 201 PRO

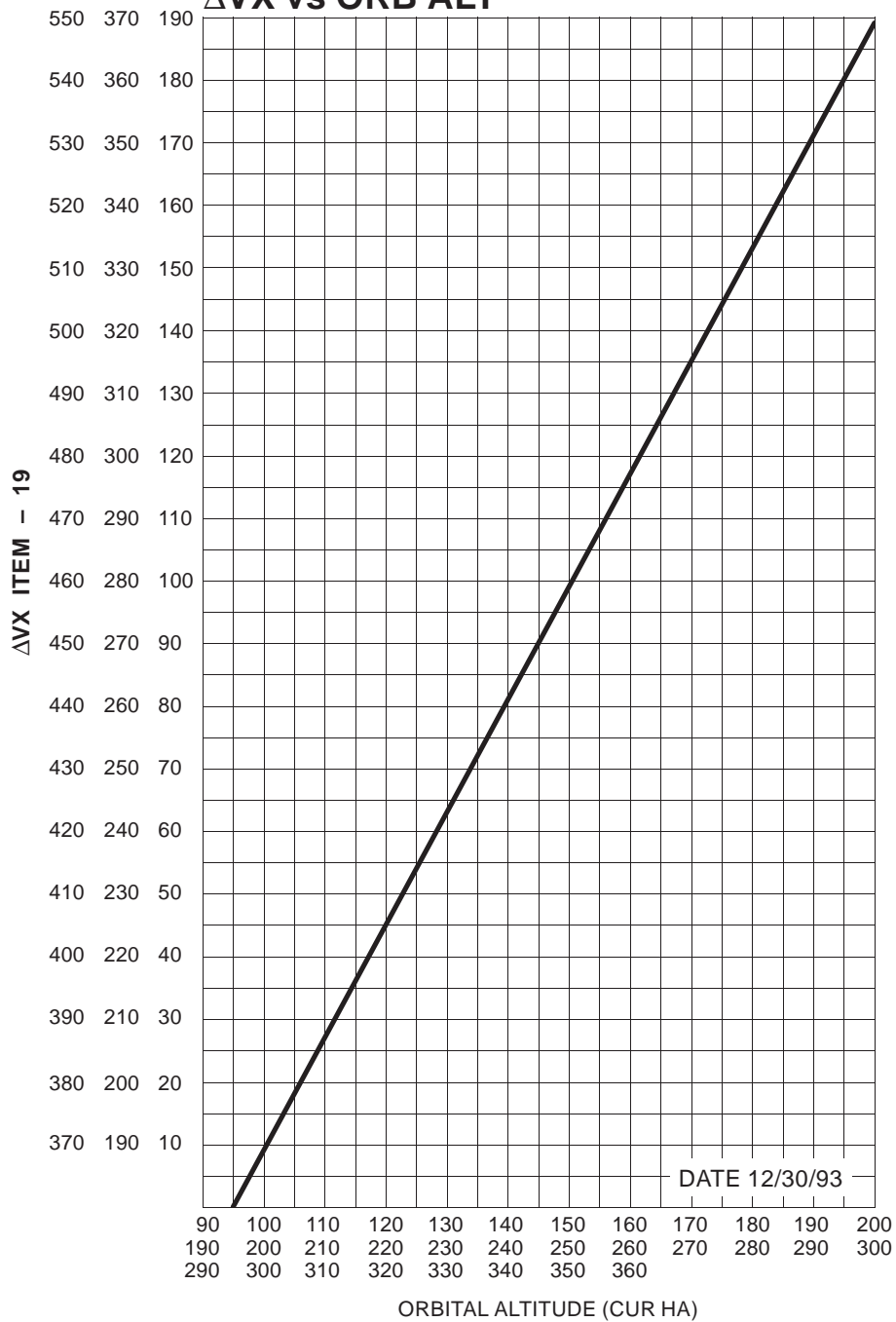
OPCL/ALL/GEN H,3

OMS He TK P LOW

7-7

LK PRPLT/He BURN
 ΔVX vs ORB ALT (Over)

ΔVX vs ORB ALT



LEAKING OMS He ΔV TABLE

1. Pick ΔV from table to achieve MAX BLOWDOWN

Affected OMS % (QTY)	ΔV
95	352
90	320
85	289
80	257
75	226
70	195
65	164
60	133
55	102
50	71
45	40
40	10

If retrograde burn:

2. $\checkmark \Delta VX$ vs ORB ALT
- If ΔV from table $<$ ΔVX from chart:
3. Use ΔV from table (Hp will be above 95 nm) $>>$
- If ΔV from table $>$ ΔVX from chart:
4. Use ΔVX from chart to take Hp to 95 nm, then repeat procedure to burn out-of-plane to achieve max blowdown (39%)

— | |

| | —

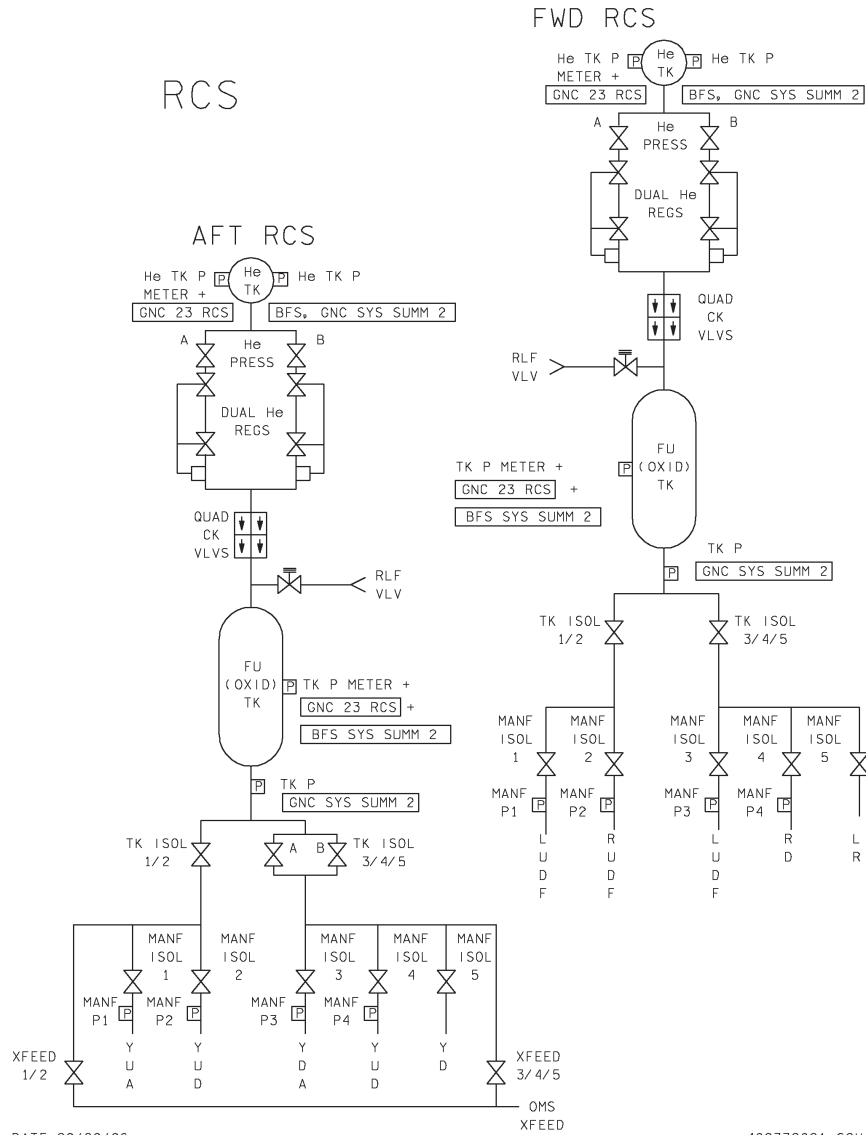
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7–10

OPCL/ALL/GEN H

— | |

| | —



RCS

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

GNC 23 RCS

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, ✓MCC >>
4. ✓L OMS He PRESS/VAP ISOL (two) – CL
TK ISOL (two) – OP (tb-OP)
✓R OMS XFEED (two) – CL (tb-CL)
L OMS XFEED A – CL (tb-CL)
B – OP (tb-OP)
5. OMS PRESS ENA L OMS – ITEM 5 EXEC
6. DAP: as reqd

NOTE

Gauging not avail in OPS 3

I'CNCT: R OMS to RCS

GNC 23 RCS

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, ✓MCC >>
4. ✓R OMS He PRESS/VAP ISOL (two) – CL
TK ISOL (two) – OP (tb-OP)
✓L OMS XFEED (two) – CL (tb-CL)
R OMS XFEED A – CL (tb-CL)
B – OP (tb-OP)
5. OMS PRESS ENA R OMS – ITEM 6 EXEC
6. DAP: as reqd

NOTE

Gauging not avail in OPS 3

OPCL/ALL/GEN H

RCS SECURE

8-3

I'CNCT: OMS to RCS

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

GNC 23 RCS

1. DAP: FREE
2. L OMS XFEED B – CL (tb-CL)
R OMS XFEED B – OP (tb-OP)
3. OMS PRESS ENA OFF – ITEM 7 EXEC
R OMS – ITEM 6 EXEC
4. DAP: as reqd

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

GNC 23 RCS

1. DAP: FREE
2. R OMS XFEED B – CL (tb-CL)
L OMS XFEED B – OP (tb-OP)
3. OMS PRESS ENA OFF – ITEM 7 EXEC
L OMS – ITEM 5 EXEC
4. DAP: as reqd

I'CNCT RETURN (OPS 2,3)

GNC 23 RCS

1. DAP: FREE
2. OMS PRESS ENA 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 H

I'CNCT TK SW
I'CNCT RETURN

8–5

XFEED: RCS to RCS
XFEED RETURN

RCS RM LOSS

GNC 23 RCS

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. Desel aff jet >>

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 (*) (Reprioritize)
6. If auto deselected: Reselect
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 (Reprioritize, 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 (Reprioritize, 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. Go to MAL, RCS, 10.1b, RM DLMA MANF 1

RCS TK P LOW (FU or OX)**GNC SYS SUMM 2**

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)**GNC 23 RCS**

1. (Aff) RCS He PRESS (two) – CL (tb-CL)
2. Go to MAL, RCS, 10.1a **55**

RCS JET FAIL (ON)**GNC 23 RCS**

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

RCS JET FAIL (LEAK)**GNC 23 RCS**

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)**GNC 23 RCS**

If FAIL OFF(s) caused by pwrn 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**

OPCL/ALL/GEN H

**RCS RM LOSS
RM DLMA MANF**

8-7

**RCS TK P LO/HI
RCS JET FAIL**

RCS LEAK ISOL

GNC SYS SUMM 2

If FU or OX TK P high:

1. 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

After procedure 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 corresponding XFEED vlvs closed

If MANF 3/4/5 leg leak:

9. Go to LOSS OF VERNIERS (ORB OPS, RCS) >>

Cont next page

✓He TK

If He P decr:

10. ✓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) >>

✓PRPLT TK

If PRPLT TK P decr:

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

✓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)

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

Cont next page

When He TK P < 456:

28. Perform I'CNCT: L(R) OMS to RCS, then:

At EI:

29. Go to XFEED: L(R) RCS to R(L) RCS >>

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)

39. Do not XFEED/I'CNCT >>

✓MANF 5

If leak not found above:

40. Reconfig system 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

MPS

MAIN PROPULSION SYSTEM

9-1

OPCL/ALL/GEN H

MPS

MPS C/W

1. MPS PNEU He ISOL – OP
2. FILL/DRAIN LH2 OUTBD – OP
3. INBD – OP
4. LO2 OUTBD – OP
5. INBD – OP
6. ✓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

PWRDN

LOSS OF 2 CAB FANS

- MS1,2 1. Perform MS PWRDN on 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

PWRDN

- C3 2. MSTR MADS PWR – OFF
 3. Minimize Itg
- 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 +1 84 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 cabin temp > 95 degF and no evaporative cooling is sensed, don LES, ✓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 procedure if time-to-TIG < 3.5 hr

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MS PULLOUT PAGE

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

MS PWRDN

1. Minimize Itg
- 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 Φ A SIG CONDR HUM SEP – op
- A6U 6. ANNUN BUS SEL – OFF
- A13 7. OS AUD SPKR PWR – OFF
8. Food Warmer – OFF or
If GALLEY installed:
GALLEY 9. DC PWR BUS A,B (two) – OFF
MA73C:G 10. cb AC3 GALLEY FAN (three) – op
ML86B:B 11. MNA GALLEY OVEN – op
MNB GALLEY H2O HTR – op
- If CO2 RMVL SYS flown:
MO51F 12. CNTLR 1(2) MODE – STBY (hold 3 sec)
- If RMS powered down:
A3 13. MON 1,2 PWR (two) – OFF
- A7U 14. TV PWR CNTL – PNL
CONTR UNIT – OFF
- A7U 15. VID OUT pb (two) – MON1, MON2
- O19 16. TV PWR – OFF
- R12L 17. VTR PWR – OFF
- MO58F 18. TV PWR – OFF
- If not reqd:
R11L 19. IDP/CRT4 PWR – OFF
CRT4,AFD1 MDU PWR – OFF
- A6U 20. FLT CNTLR PWR – OFF

**LOSS OF 2 CAB FANS
ON-ORBIT
MS PAGE**

10-5

OPCL/4/GEN H

PLB EQUIP PWRDN

1. Perform PL SAFING, then:

<p style="text-align: center;"><u>CAUTION</u> If stow problem occurs with either RMS and/or KU-BD ANT, perform aff system <u>QUICK</u> <u>RESPONSE JETTISON (CONT DEORB)</u></p>

If RMS:

2. Perform RMS PWRDN (PDRS OPS), then:

If KU-BD ANT deployed:

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

If radiators deployed:

4. Go to RAD STOW/DEPLOY (ORB OPS, ECLS)

**LOSS OF 2 CAB FANS
ON-ORBIT
MS PAGE**

10-6

OPCL/ALL/GEN H

LOSS OF 2 H2O LOOPS

NOTES

- This procedure requires > 45 min
 - Loss of H2O cooling aff both water and air cooled equipment
 - This procedure powers down all comm. If comm reqd, preferred COMM config in order of heat production:
 1. UHF
 2. STDN LO PWR – If reqd
 3. TDRS – Only if mandatory (10 min max)
 - Call ground at every available UHF site
 - Tear out COMM pages from this procedure and use until touchdown
 - Cabin depress/repress cycles to 10.2 psia are used for cabin temperature and humidity control
 - If docked to ISS, this procedure is to be worked simo with JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS C/L)
1. Perform PART 1 of this pwrdn and, based on TIG, complete PART 2 or PART 3

Cont next page

LOSS OF 2 H2O LOOPS, PART 1 – INITIAL PWRDN

TIME CRITICAL PROCEDURES (execute simo)

1. If docked to ISS, have CDR perform JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS C/L)
2. Have MS perform MS OVHD PNL PWRDN, 10–19, ASAP and FLUID LOADING PREP, etc, 10–20, when time avail
3. Have second MS perform MCA CONFIG, 10–17, and PLB EQUIP PWRDN, 10–17, ASAP
4. Establish comm plan with MCC, determine best TIG opportunities, then have MS3 perform COMM PWRDN, 10–23 (delay 10 min max)
5. Have PLT proceed with CDR AND PLT PWRDN, ASAP

DETERMINE MAXIMUM TIME TO TIG, NUMBER OF DEP/REP, FROM N2 QTY FROM SPEC 66. Select best landing site and deorbit TIG from PGSC. Set Wristwatch Timer (A17) counting down to TIG. Enter TARGETS in LOSS OF 2 H2O LOOPS D/O PREP (CONT DEORB)

<u>IF TOTAL N2</u>	<u>NUMBER OF DEP/REP</u>	<u>SEL BEST TIG WITHIN</u>
>160 lb	3	45M – 4H:00M
>120 lb	2	45M – 2H:50M

CDR AND PLT PWRDN

- O14,O15, 6. ✓Pri RJD LOGIC,DRIVER (sixteen) – ON
O16:F
DAP: ALT (This procedure results in loss of VERNs)
RJD MANF L5/F5/R5 DRIVER – OFF
- O16:F
C3 7. ✓MSTR MADS PWR – OFF
8. Minimize ltg
9. Use only one IDP/CRT with two MDUs, one PGSC
- F6,F8,A6 10. FLT CNTLR PWR (three) – OFF, use one as reqd
O7 11. ✓TACAN MODE sel (three) – OFF
O8 12. ✓RADAR ALTM (two) – OFF
13. ✓MLS (three) – OFF
- L1 If no flow in either loop:
14. ✓H2O PUMP LOOP 1,2 (two) – OFF
HUM SEP (two) – OFF

~
Cont next page

- ~
- If any flow in loop 1(2):
- L1 : 15. H2O PUMP LOOP 1(2) – ON
 - : HUM SEP A(B) – ON
 - : Minimize bypass:
 - : 16. H2O LOOP 1(2) BYP MODE – MAN
 - : MAN – DECR (30 sec)
 - : If LOOP 1 PUMP ON, A(B), 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 – B(A)
 - : ✓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 ΦA SIG CONDR HUM SEP – op
 - : 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)
 - : ✓GPC MODE 3,5 (two) – HALT
 - : ✓OUTPUT 5 – NORM
 - L1 : 27. AV BAY 1 FAN A – ON
 - : B – OFF
 - : 2,3 FAN A,B (four) – OFF
 - : 28. IMU FAN A – ON
 - : B – OFF
 - : ✓C – OFF
 - : For any fwd CRT that is OFF:
 - R2 : 29. GPC/CRT1/X EXEC
 - : 30. HYD CIRC PUMP (three) – ON

	CONFIG	2
	GPC	10000
STR	1	1
	2	1
	3	1
	4	1
PL	1/2	0
CRT	1	1
	2	1
	3	0
	4	1
L	1	0
	2	0
MM	1	1
	2	1

Cont next page

- O14,O15, 31. ✓RJDA LOGIC,DRIVER (eight) – ON
- O16:F
- 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 >>

- 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 unpower all IMU/FF MDM's pairs

If IMU 2 in OPER:

- O14,O16:A 36. GNC 21 IMU ALIGN
IMU 1,3 (two) – desel
- O6 37. IMU 1,3 (two) – OFF
- 38. MDM FF3,FF4 (two) – OFF

If IMU 2 in STBY:

- O15,O16:A 39. GNC 21 IMU ALIGN
IMU 2,3 (two) – desel
- O6 40. IMU 2,3 (two) – OFF
- 41. MDM FF3,FF4 (two) – OFF
- 42. ✓MS OVHD PWRDN complete

NOTE

Both MMUs are OFF. If a ROLL-IN DISPLAY is reqd: turn MMU 1 ON, wait 34 sec, try transaction, turn MMU 1 OFF again

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

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

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

- 44. Go to LOSS OF 2 H2O LOOPS, PART 3 – EXTENDED ON-ORBIT WAIT

LOSS OF 2 H2O LOOPS, PART 2 – SHORT ON-ORBIT WAIT

If not docked with ISS or after Undocking and Post Final Sep:

1. Perform POST UNDOCKING AND FINAL SEP RECONFIG

Perform BYPASS RADS/FES ACT:

2. Give MS GO to perform PLBD CLOSURE (10-18)
- L1 3. FLASH EVAP CNTLR (three) – OFF
- R11L 4. SPLY H2O XOVR VLV – OP (tb-OP)
- L1 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 > 50:

6. FLASH EVAP CNTLR PRI A(B) – ON
7. Wait 1 min, ✓EVAP OUT T = 39 degF

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

8. Go to LOSS OF 2 H2O LOOPS D/O PREP (CONT DEORB) >>

NOTE

Limit operation of each GPC (1 hr max ON time). If reqd, restring to GPC 2, take GPC 1 to HALT, turn AV BAY 2 FAN A ON, turn AV BAY 1 FAN OFF, and wherever GPC 1 is referenced, replace with GPC 2 in the LOSS OF 2 H2O LOOPS D/O PREP (CONT DEORB)

CAUTION

Do not perform SM GPC DEACT until PLBDs are closed

9. SM 1 DPS UTILITY
UL CNTL ENA – ITEM 36 EXEC
- C3 10. UPLK – GPC BLK
- C2 11. IDP/CRT1,2,3 MAJ FUNC (three) – GNC
- O6 12. GPC MODE 4 – STBY (tb-bp), HALT
PWR 4 – OFF

Cont next page

CRT
O6

13. GNC 0 GPC MEMORY
CONFIG – ITEM 1 +2 EXEC
14. Assign PL 1/2 to GPC 1
15. GNC, OPS 201 PRO
16. MDM PL1,PL2 (two) – OFF

17. 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

18. Perform first cabin depress/repress cycle starting at approx 1 hr 15 min after the failure. The final cycle at TIG–20 min. Procedures 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. Delay donning LES as late as possible but prior to EI (CDR last). To determine health of crewmember, place temp strip (MED KIT) on forehead. If any crewmember temp greater than 99 degF and crew feels ill, immediately begin cabin depress/repress cycle

At TIG–30 min:

19. Go to LOSS OF 2 H2O LOOPS D/O PREP
(CONT DEORB)

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

If not docked with ISS or after Undocking and Post Final Sep:

1. Perform POST UNDOCKING AND FINAL SEP RECONFIG

Power down GPCs:

2. GPC MODE 4 – STBY (tb-bp)
– RUN (tb-RUN)
OUTPUT 4 – NORM (tb-gray)

3. GNC 0 GPC MEMORY
CONFIG – ITEM 1 +2 EXEC

Modify MC 2 per table ---->
GNC, OPS 201 PRO

	CONFIG GPC	2 10040
STR	1	1
	2	1
	3	1
	4	1
PL	1/2	1
CRT	1	1
	2	1
	3	1
	4	0
L	1	0
	2	0
MM	1	1
	2	1

O6

4. GPC MODE 4 – STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT (tb-bp)
√2 – HALT
PWR 2,4 (two) – OFF
5. √MODE 3,5 (two) – HALT
PWR 3,5 (two) – OFF

6. Record MET from watch ___/___:___
- C2,R11L 7. IDP/CRT PWR (four) – OFF
- FWD,AFT All MDU PWR (eleven) – OFF
- L1 8. AV BAY FAN (six) – OFF
- O13:C 9. cb ESS 2CA MTU B – op
3AB GPC STAT – op
- :E
- O14:B 10. MNA MSN TIMER FWD – op
- :C SMOKE DETN L/R FLT DK – op

Cont next page

- W1-10
11. Install Window Shades
 12. ✓All powerdowns complete
 13. 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
 14. Perform first cabin depress/repress cycle starting at approx 1 hr 15 min after the failure, the second at TIG-1:15 and the final cycle at TIG-20 min. Procedures 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 QDM as needed to provide additional respirator cooling during periods of high cab temp and humidity. If cabin temp > 95 degF and no evaporative cooling is sensed, don LES, ✓tabs, close visor, LES O2 – ON. To determine health of crewmember, place temp strip (MED KIT) on forehead of CDR and PLT

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

POST UNDOCKING AND FINAL SEP RECONFIG

If undocking with ISS complete and Post Sep 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)

<p><u>CAUTION</u> DO NOT mnvr on PRCS until MS has completed RMS JETT or STOW</p>

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 - *)
✓ERR TOT - ITEM 23 (*)

- | | |
|---------|--|
| O6 | If IMU 2 in OPER: |
| | 3. MDM FF1 - OFF |
| | If IMU 2 in STBY: |
| O6 | 4. MDM FF2 - OFF |
| O14,O15 | 5. RJDF LOGIC,DRIVER (eight) - OFF |
| 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
2/3 A - op |
| O16:B | 8. cb MNC OI SIG CONDR OF 2/3 B - op |
| O16:E | 9. DDU AFT - op |

Cont next page

If performing PART 3 – EXTENDED ON-ORBIT WAIT:

NOTE

Delay steps 10 thru 18 until GPCs 2 thru 5 have been unpowered

Establish free drift:

- F8 10. ✓Att mnvr complete
- C3 DAP: B/AUTO/PRI
- F8 ADI ATT – INRTL (wait 30 sec)
- C3 DAP: FREE
- O15:E cb MNB DDU R – op
- O6 11. MDM PL1,PL2 (two) – OFF

Power down remaining GPC:

- 12. GPC PWR 4 – ON
- 13. GPC MODE 4 – STBY (tb-RUN),RUN
- 14. GNC 0 GPC MEMORY
CONFIG – ITEM 1 +2 EXEC

Modify MC 2 per table →
GNC, OPS 201 PRO

CONFIG	2
GPC	10040
STR 1	1
2	1
3	1
4	1
PL 1/2	1
CRT 1	1
2	1
3	1
4	0
L 1	0
2	0
MM 1	1
2	1

- O6 15. GPC MODE 4 – STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT
PWR 4 – OFF
- O6 16. GNC, OPS 000 PRO
- O6 17. GPC MODE 1 – STBY (tb-bp),HALT
– STBY (tb-RUN),HALT(tb-bp)
- 18. GPC PWR 1 – OFF

MCA CONFIG (Execute ASAP)

- L1 If H2O PUMP LOOP 1 (two) – ON, A(B):
MA73C:A 1. Leave MCA LOGIC MNA FWD 1 – ON
(MNB FWD 2 – ON)
in next step
- 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 switch config until step 7 of the PLB EQUIP PWRDN. Disregard MCA switch throws in the PL SAFING, RAD STOW/DEPLOY, KU-BD ANT STOW, and RMS PWRDN procedure

PLB EQUIP PWRDN (Execute ASAP)

1. Perform PL SAFING, then:

CAUTION

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

If RMS:

2. Perform RMS PWRDN (PDRS OPS), then:

If KU-BD ANT deployed:

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

If radiators deployed:

4. Perform RAD STOW/DEPLOY (ORB OPS, ECLS)

5. Inform CDR: RMS stowed(jettisoned)

If current time to TIG \leq 2 hr 30 min:

6. Perform PLBD CLOSURE on GO from CDR

- MA73C:A, 7. MCA LOGIC MNA MID 1,3 (two) – OFF
B MNB MID 2,3,4 (three) – OFF
MNC MID 2,4 (two) – OFF

LOSS OF 2 H2O LOOPS

ON-ORBIT

MS PAGE

10-17

OPCL/ALL/GEN H,4

CO2 RMVL SYS DEACT (if flown)

MO51F 1. CNTLR 1(2) MODE – STBY (hold 3 sec)

PLBD CLOSURE

- O6 1. Inform CDR: Beginning PLBD CLOSURE
 - O6 2. ✓MDM PL1,PL2 (two) – ON
 - CRT4 3. SM I/O RESET
 - CRT4 4. SM, OPS 202 PRO – close PLBD ASAP
 - R13L 5. SM PL BAY DOORS
 - CRT4 6. PL BAY DR SYS (two) – ENA
 - CRT4 7. 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':
- : 8. ✓Door scallop on or below tgt line before
 - : continuing in MAN mode; otherwise:
 - : 9. Perform MAL, MECH SSR-2,
 - : CONTINGENCY PLBD CLOSURE,
 - : then:
 - L
- After PLBD closed:
- CRT 10. PBD STOP – ITEM 16 EXEC
AC POWER OFF – ITEM 2 EXEC
 - R13L 11. PL BAY DR SYS (two) – DSBL
GPC/CRT 0/4 EXEC
 - R11L 12. IDP/CRT4 PWR – OFF
 - A7U 13. ✓PL BAY FLOOD (all) – OFF
 - MA73C 14. MCA LOGIC MNA,B,C (fourteen) – OFF
 - 15. Report to CDR: PLBDs closed
- If EDO Pallet flown:
- 16. Go to EDO PALLET DEACT (ORB OPS, EPS)

**LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE**

10-18

OPCL/4/GEN H,4

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 Itg 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 – 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 1/2A, 3/4A (two) – op
 - O15:B MNB OI MDM OF 1/2B – op
 - O16:B MNC OI MDM OF 3/4B – op
 - O14:F MMU 1 – OFF
12. Inform CDR: MS OVHD PNL PWRDN complete
 13. Assist other MS with completion of PLB EQUIP PWRDN (10–17)

**LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE**

10–19

OPCL/4/GEN H,4

When all powerdowns 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. Stow temporarily near seat
 3. Unstow 8 salt tablets (per crewmember). Stow temporarily 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. Immediately 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. If cabin temp > 95 degF and no evaporative cooling is sensed, don LES, ✓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, Deorb 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)

Cont next page

LOSS OF 2 H2O LOOPS

ON-ORBIT

MS PAGE

10-20

OPCL/4/GEN H

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 STOWAGE/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
✓ Pole straps secure
2. Prep LES for donning in LOSS OF 2 H2O LOOPS D/O PREP
(CONT DEORB)
3. ✓ Minimum Itg on Middeck

**LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE**

10-21

OPCL/ALL/GEN H

This Page Intentionally Blank

**LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE**

10-22

OPCL/ALL/GEN H

NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN

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

CAUTION
TDRS or STDN – HI AOS may be limited to
10 min (power amp will overheat)

NOTE
This procedure powers 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 – STDN LO
XPNDR – OFF |
| | 2. | NSP PWR – OFF
ENCRYPTION PWR – OFF
(Encryp OFF rest of flt)
MODE – SEL
SEL – BYP |
| 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) |

Cont next page

**LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE**

10-23

OPCL/ALL/GEN H

NOTE

KEEP THIS PAGE UNTIL TOUCHDOWN

- O5 6. L AUD PWR – OFF (turn ON as reqd for ICOM audio)
 - O6 7. UHF MODE sel – OFF
 - O9 8. R AUD PWR – OFF (turn ON as reqd for ICOM audio)
 - A1L 9. ✓S-BD PL CNTL – PNL
 - ✓PWR SYS – OFF
 - A1R 10. PL DATA INTLVR PWR – OFF
 - 11. OPS RCDRS PWR 1,2 (two) – OFF
 - 12. S-BD FM CNTL – PNL
 - PWR – OFF
 - A3 13. PL RCDR PWR – OFF
 - A7U 14. MON 1,2 PWR (two) – OFF
 - R12L 15. TV PWR CONTR UNIT – OFF
 - R14:B 16. VTR PWR – OFF
 - :D 17. cb MNA,MNC GCILC (two) – op
 - TV (fourteen) – op
 - MNB CCTV ADU – op
 - :E RMS TV (six) – op
 - L9,R10 18. PS,MS AUD PWR (two) – OFF
 - MO42F 19. MIDDECK SPKR AUD SPKR PWR – OFF
 - 20. Call ground at every available 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:
- 21. Perform CABIN ENVIRONMENT MONITOR (CONT DEORB, LOSS OF 2 H2O LOOPS), then:
- If after TIG–10 min:
- 22. Perform AFT PNL CONFIG FOR ENTRY COMM (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP)

**LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE**

10–24

OPCL/ALL/GEN H

NOTE
KEEP THIS PAGE UNTIL TOUCHDOWN

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

- Power up audio system:
- 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 PWR AMP – ON
 - 3. After Comm with MCC complete: Go to COMM PWRDN, steps 5 thru 8 >>
- 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 – 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 >>

Cont next page

**LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE**

10–25

OPCL/ALL/GEN H,4

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 ANT SW ELEC – 2
- PRE AMP – 2
- PWR AMPL OPER – 2
- PMMODE – TDRS DATA
- PMXPNDR – 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 L 26. MDM PL2 – OFF
- After comm/data complete:
- 27. Go to COMM PWRDN

LOSS OF 2 H2O LOOPS
ON-ORBIT
MS PAGE

LOSS OF CAB PRESS

CDR Perform JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINTS OPS C/L)
MS1,MS2 Perform procedures on 10-30
PLT Perform following pwrn

NOTE

Cab press will stabilize at 8 psia for the 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
5. cb DDU L,R,AFT (six) – op
- O7
6. ✓TACAN MODE sel (three) – OFF
- O8
7. ✓MLS (three) – OFF
 - ✓RADAR 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 immediately:
 - : | 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

10-27

OPCL/4/GEN H,4

If orbit 2,3 deorbit due to cabin leak:

18. Use DEORB PREP/ENTRY DELTAS PULLOUT (10-31), then go to LAUNCH DAY DEORBIT PREP (ORBIT 2(3)) (CONT DEORB) >>

If orbit 3 deorbit due to fire:

19. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3) (CONT DEORB) >>

- 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:

Cont next page

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

CRT O6	23.	GPC 0 GPC MEMORY		
		CONFIG – ITEM 1 +2 EXEC		
		Modify MC 2 per table →	CONFIG	2
		DOWNLIST GPC –	GPC	02000
		ITEM 44 +2 EXEC	STR	1 2
	24.	GNC, OPS 201 PRO		2 2
	25.	GPC MODE 1(3) – STBY		3 2
		– HALT		4 2
		– STBY	PL	1/2 0
		(tb–RUN)	CRT	1 2
	– HALT		2 2	
	(tb–bp)		3 0	
	PWR 1(3) – OFF		4 2	
	√MODE 3,5 (two) –	L	1 0	
	HALT (tb–bp)		2 0	
		MM	1 2	
			2 2	

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

Cont next page

DEORB PREP/ENTRY DELTAS PULLOUT PAGE

NOTE

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

Single fault tolerance used for most cabin air cooled equipment. Additional LRUs may be activated if required and if CAB PRESS stable \geq 8 psia

Deltas to the CONT DEORB, LAUNCH DAY ORBIT 2(3):

1. Minimize use of IDPs, MDUs, FLT CNTLR PWR, DDUs. Use one PGSC

If rev 2:

2. APU HTRS & DED DISP ENT CONFIG 3
Do not power TACANs

If rev 3:

3. ENT FWD FLT DECK CONFIG 10
Do not power MLS, TACANs

4. In ENT SW LIST/VER, do not activate pwrndn items

Deltas to ENT, DEORBIT BURN:

At TIG-4:

5. Use two IDP/CRTs with four MDUs for deorbit burn

O14,O15,
O16:E
F6,F8

6. cb DDU L,R (four) – cl

7. L,R FLT CNTLR PWR (two) – ON

Deltas to ENT, POST BURN:

8. Use one IDP/CRT with two MDUs

F6,F8

9. L,R FLT CNTLR PWR (two) – OFF

O14,O15,
O16:E

10. cb DDU L,R,AFT (six) – op

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

Cont next page

Deltas to ENTRY MANEUVERS (Cue Card):

At EI:

- 12. Use two IDP/CRTs with four MDUs
 - 13. cb DDU L,R (four) – cl
 - 14. L,R FLT CNTLR PWR (two) – ON
 - 15. cb ADTA 1,2,3 (three) – cl
 - 16. BFS, GNC I/O RESET
- O14,O15,
O16:E
F6,F8
O14,O15,
O16:E

At V = 15K:

If CAB P < 8 psia:

- 17. Delete NAVAIDS callout

If CAB P ≥ 8 psia:

- 18. Activate all TACANs, RAs, MLSs
GNC I/O RESET

At M = 0.9, go to step 22

At V = 10K:

- 19. TACAN 2,3 MODE sel (two) – GPC
- O7

At M = 2.7:

- 20. Use two HUD, MLS, and RA as reqd
- 21. GNC I/O RESET

At M = 0.9:

- 22. ANTISKID – ON
 - 23. NWS – 1
- L2

LOSS OF HI LOAD EVAP

NOTE

MAL, ECLS SSR-2, FES CORE FLUSH PROCEDURE should be performed if core icing is suspected. If unsuccessful, then perform pwrn prior to RAD BYPASS at TIG-2:50 during deorb prep. If already in DEORB PREP, perform pwrn 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. ✓ RADAR 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:
- O14,O15,
O16:E 11. cb DDU L,R,AFT (six) – op
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 P&I to DEORB PREP, NOMINAL DEORBIT PREP if not already performed:
At TIG-03:00, prior to RAD BYP:
- L1 13. 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:
14. Do not power NAV/LDG AIDS, ADTAs
Power DDUs, MDUs only as reqd

Cont next page

At TIG-01:50, ENT SWITCH LIST/VERIF:

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

P&I ENT, DEORBIT BURN

At TIG-10:

- O14,O15,
O16:E
17. cb DDU L,R (four) – cl
 18. Use two IDP/CRTs with four MDUs, and two
FLT CNTLR PWR for burn

At TIG-5:

- L1
19. TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF

P&I ENT, POST BURN:

- F6,F8
O14,O15,
O16:E
20. L,R FLT CNTLR PWR (two) – OFF
 21. cb DDU L,R (four) – op (save for entry)
 22. Use one IDP/CRT with two MDUs
 23. Delete ANTISKID, NWS callouts (ENTRY SW
CHECK)

P&I to ENTRY MANEUVERS (Cue Card)

At EI:

- O14,O15,
O16:E
F6
O14,O15,
O16:A
O16:E
L2
24. cb DDU L,R (four) – cl
 25. L FLT CNTLR PWR – ON
 26. Use two IDP/CRTs with four MDUs
 27. BRAKES (three) – ON
 28. cb ADTA 1,2,3 (three) – cl
 29. GNC I/O RESET
 30. NWS – 1
 31. ANTISKID – ON

At V = 15K:

- O7
32. Delete NAVAIDS callout
 33. TACAN 2,3 MODE sel (two) – GPC

At M = 2.7:

34. Use two HUD, MLS, and RA
35. GNC I/O RESET

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
- O14,O15,
O16:E If FLT CNTLR PWR not reqd:
4. cb DDU L,R,AFT (six) – op
- L1 5. If reqd, perform PL PWRDN, then:
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. Mnv to shade windows from Sun or install
Window Shades
SM SYS SUMM 1
12. ✓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 >>
- F6,F8 If in DEORB PREP:
14. ✓FLT CNTLR PWR (two) – OFF
15. Use one IDP/CRT with two MDUs, as reqd
- O7 16. TACAN MODE sel (three) – OFF
O8 17. RADAR ALTM (two) – OFF
18. MLS (three) – OFF
- L2 19. ANTISKID – OFF
NWS – OFF
20. Continue with DEORB PREP; use DEORB/ ENTRY
DELTAS PULLOUT PAGE (10-37) for changes

MS PWRDN

1. Minimize lgt on Aft Flt Deck and middeck
- R14:D 2. cb TV (fifteen) – op
- :E 3. MNA,MNB RMS TV (six) – op
- A3 4. MON 1,2 PWR (two) – OFF
- If CO2 RMVL SYS flown:
- MO51F 5. 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
- O16:E 8. cb ADTA (four) – op

UNDOCKING/DEORB/ENTRY DELTAS PULLOUT PAGE

NOTE

KEEP THIS PAGE UNTIL TOUCHDOWN.

Incorporate the following changes or remove these pages for use with the indicated checklist/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

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 CONT DEORB, LAUNCH DAY ORBIT 3:

4. ENT FWD FLT DECK CONFIG [10]
Do not power MLS, TACANs

If nominal deorb prep:

Deltas to DEORB PREP, NOMINAL DEORBIT PREP:

5. Verify steps 14 thru 20 (10-35), MS, steps 7,8 (10-36)
6. DED DISP ENT CONFIG [6]
Do not power ADTAs, TACANs
Add: Power NAV/LDG AIDS per ENTRY MANEUVERS Cue Card
Minimize MDU use
7. ENT SWITCH LIST/VERIF
Do not power LRUs previously powered down

Deltas to ENT, DEORBIT BURN:

8. Maintain window shading att until TIG-15

At TIG-15:

9. Remove Window Shades if installed

At TIG-10:

- O14,O15,O16:E
10. cb DDU L,R (four) – cl
 11. Use two IDP/CRTs with four MDUs, two FLT CNTLR PWR for burn

Cont next page

LOSS OF 1 FREON LOOP 10-37

OPCL/4/GEN H,4

- Deltas to ENT, POST BURN:
- F6,F8 12. L,R FLT CNTLR PWR (two) – OFF
 - O14,O15, 13. cb DDU L,R (four) – op
 - O16:E
 - 14. Use one IDP/CRT with two MDUs
 - 15. Delete ANTISKID, NWS callouts
(ENTRY SW CHECK)
- Deltas to ENTRY MANEUVERS (Cue Card):
- At EI:
- O14,O15, 16. cb DDU L,R (four) – cl
 - O16:E
 - F6 17. L FLT CNTLR PWR – ON
 - 18. Use two IDP/CRTs with four MDUs
 - O14,O15, 19. BRAKES (three) – ON
 - O16:A
 - O16:E cb ADTA 1,2,3 (three) – cl
 - GNC I/O RESET
 - L2 ANTISKID – ON
 - NWS – 1
- At V = 15K:
- O7 20. Delete NAVAIDS callout
 - TACAN MODE sel (two) – GPC
- At V = 12K:
- 21. Perform RAD FLOW in unfailed loop
- At M = 2.7:
- 22. Use two HUD, MLS, and RA
 - GNC I/O RESET
- P&I to ENT, POST LDG:
- If EVAP OUT T high and incr:
- 23. Go to EMER PWRDN (Cue Card)
- P&I to EVAP OUT TEMP HIGH (Cue Card):
- If EVAP OUT T HIGH and V > 12K:
- Establish RAD FLOW in unaffected loop:
- L1 24. RAD BYP VLV MODE 1(2) – AUTO
 - CNTLR LOOP 1(2) – AUTO A(B)
 - 25. 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 26. NH3 CNTLR B(A) – PRI/GPC

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 ORB, 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 ΔAMPS > 100:
- 7. Perform MAL, EPS SSR-8, BUS LOADING – LRU SELECT, then:
 - 8. Go to step 18
- If in deorb prep:
- 9. Minimize Itg
 - 10. Use only one DDU, and FLT CNTLR PWR as reqd. One IDP/CRT off as reqd
 - O7 11. TACAN MODE sel (three) – OFF
 - O8 12. RADAR ALTM (two) – OFF
 - 13. MLS (three) – OFF
 - L1 14. ✓ CAB FAN A(B) – ON
 - R14:D 15. cb TV (fifteen) – op
:E RMS TV (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 P&I 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

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 ACTIONS 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 (~15 min). Purge FC at *
- * 430 amps or less *

- MS 3. Perform AFT PNL PWRDN, 10-43, immediately
- C3 4. ✓MSTR MADS PWR – OFF
- 5. Minimize Itg
- 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. ✓RADAR 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
- CRT 12. ✓DOWNLIST GPC (ITEM 44) – 1
- O6 GNC, OPS 201 PRO
- 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
- R4 16. ✓MPS ENG CNTLR HTR
- (three) – OFF

CONFIG	2
GPC	10000
STR 1	1
2	1
3	1
4	1
PL 1/2	0
CRT 1	1
2	1
3	0
4	1
L 1	0
2	0
MM 1	1
2	1

Cont next page

17. GNC 20 DAP CONFIG
 Sel TAIL PRI P,Y OPTION
 Sel PRI JETS
- O7 18. AFT L,R RCS MANF ISOL 4 (two) – CL
 O14,O15, 19. RJDF DRIVER (four) – OFF
 O16:F LOGIC (four) – OFF
 O6 20. MDM FF4 – OFF
 O14:F 21. RJDA 2A L4/R4 DRIVER – OFF
 LOGIC – OFF
- L1 22. ✓FLOW PROP VLV LOOP tb (two) – ICH
 23. SM 88 APU/ENVIRON THERM
- L1 24. H2O LOOP 2 BYP MODE – MAN
 MAN – INCR(DECN)
 (adjust until ICH FLOW ~950)
- If no MANF leak:
- R1 25. ✓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:
26. ✓O2/H2 HTR LOSS TABLE (EPS), 5–22(5–23)
 Sel one htr in one O2,H2 TK
- R2 27. HYD CIRC PUMP (three) – OFF
 L4:L 28. cb AC1,2 ΦA CAB T CNTLR 1,2 (two) – op
 If not MN bus short, tie three MN Buses:
 29. Perform BUS TIE (Cue Card), then:
 Post BUS TIE config check:
- L1 30. ✓CAB FAN A(B) – ON
 31. Perform RCS SECURE, FWD RCS only (RCS), then:
 32. Perform MAL, EPS SSR–3, FC SHUTDN C&W
 LIMIT CHANGE, then:
 33. 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

- A1R 1. PL RCDR PWR – OFF
OPS RCDRS PWR (two) – OFF
- A11 2. CRYO TANK HTRS (four) – OFF
- A12 3. APU HTR LUBE OIL LINE (three) – OFF
- 4. HYD HTR (eight) – OFF
- A14 5. RCS/OMS HTR FWD RCS – OFF
RCS JET (five) – OFF
- 6. Perform PL SAFING, then:

CAUTION
If stow problem occurs with either RMS and/or
KU–BD ANT, perform aff system QUICK
RESPONSE JETTISON (CONT DEORB)

If RMS:

- 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/DEPLOY (ORB OPS, ECLS),
then:

- A3 10. MON 1,2 PWR (two) – OFF

- R15:D 11. cb TV (fifteen) – op
- :E RMS TV (six) – op

If MMU is powered:

- ML86B:D 12. cb MNA MMU PORT HTR A – op
STBD HTR A – op
MNB MMU PORT HTR B – op
STBD HTR B – op

- MD44F 13. Cab temp cntl act link – pin to FULL COOL

If CO2 RMVL SYS flown:

- MO51F 14. CNTLR 1(2) MODE – STBY (hold 3 sec)
- 15. Remove current cans and install two fresh LiOH
cans

**LOSS OF 2nd FC
ON–ORBIT (TIG < 4 hr)
MS PAGE**

A10–43

OPCL/2/GEN H,15

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**LOSS OF 2nd FC
ON-ORBIT (TIG < 4 hr)
MS PAGE**

A10-44

OPCL/ALL/GEN H,15

AFT PNL PWRDN

- A1R 1. PL RCDR PWR – OFF
OPS RCDRS PWR (two) – OFF
- A11 2. CRYO TANK HTRS (four) – OFF
- A12 3. APU HTR LUBE OIL LINE (three) – OFF
- 4. HYD HTR (eight) – OFF
- A14 5. RCS/OMS HTR FWD RCS – OFF
RCS JET (five) – OFF
- 6. Perform PL SAFING, then:

CAUTION
If stow problem occurs with either RMS and/or
KU–BD ANT, perform aff system QUICK
RESPONSE JETTISON (CONT DEORB)

If RMS:

- 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/DEPLOY (ORB OPS, ECLS),
then:

- A3 10. MON 1,2 PWR (two) – OFF
- R15:D 11. cb TV (fifteen) – op
:E RMS TV (six) – op
- ML86B:C 12. ✓cb MNB EXT AIRLK HTR VEST Z1/2/3 – op
If MMU is powered:
: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. 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**

B10–43

OPCL/4/GEN H,15

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**LOSS OF 2nd FC
ON-ORBIT (TIG < 4 hr)
MS PAGE**

B10-44

OPCL/ALL/GEN H,15

LOSS OF 2nd FC ON-ORBIT (TIG > 4 hr)

NOTE

Do NOT perform BUS LOSS ACTIONS 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 (~15 min). Purge FC at *
- * 430 amps or less *

- MS 1. Perform MS OVHD AND AFT PNL PWRDN, 10-47, immediately
- 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 ---→
- | CONFIG GPC | 2 | 10000 |
|------------|---|-------|
| STR 1 | 1 | 1 |
| 2 | 1 | |
| 3 | 1 | |
| 4 | 1 | |
| PL 1/2 | 0 | |
| CRT 1 | 1 | |
| 2 | 1 | |
| 3 | 0 | |
| 4 | 1 | |
| L 1 | 0 | |
| 2 | 0 | |
| MM 1 | 1 | |
| 2 | 1 | |
- ✓ DOWNLIST GPC
 (ITEM 44) – 1
- CRT GNC, OPS 201 PRO
 For any IDP that is OFF:
- O6 5. GPC/CRT1/X EXEC
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 3 MN Buses:
8. Perform BUS TIE (EPS),
 5-17, then:
9. Minimize Itg
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. ✓ RADAR 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 PRIMARY, establish drift in VERN) (ORB OPS, RCS), then:
 If docked with ISS, have ISS establish mated attitude control
- O14,O15, O16:F 19. Set event timer for 30 min (for FES duct htr deact)
 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
- L1 25. H2O LOOP 2 BYP MODE – MAN
 MAN – INCR(DEC)
 (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), 5–22(5–23)
 Sel one htr in one O2,H2 TK
- R2 28. BLR CNTLR/HTR (three) – OFF
 29. HYD CIRC PUMP (three) – OFF
- R4 30. ✓ MPS ENG CNTLR HTR (three) – OFF
 MA73C:A, :B 31. MCA LOGIC (fourteen) – OFF
- If H2O LOOP 2 failed:
 :A 32. MCA LOGIC MNB FWD 2 – ON
 30 min after FES deact:
- L1 33. TOP EVAP HTR DUCT sel – OFF
 34. Perform MAL, EPS SSR–3, FC SHUTDN C&W LIMIT CHANGE, then:
 If docked with ISS, perform UNDOCKING DELTAS prior to undocking
35. 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. 2 – OFF (confirm IMU desel)
- O16:E 3. cb MNC RCS/OMS PRPLT QTY GAUGE – op
- R14:D 4. TV (fifteen) – op
- A1R 5. OPS RCDRS PWR (two) – OFF
- 6. PL RCDR PWR – OFF
- A11 7. CRYO TK HTR (four) – OFF
- A12 8. APU HTR LUBE OIL LINE (three) – OFF
- 9. HYD HTR (eight) – OFF
- A14 10. RCS/OMS HTR FWD RCS JET 1,2,3,4 (four) – OFF
- ML31C 11. VAC VENT NOZ HTR – OFF
- ML86B:A 12. cb MNA H2O LINE HTR A – op
- 13. MNB H2O LINE HTR B – op
- If MMU is powered:
 - :D 14. cb MNA MMU PORT HTR A – op
 - STBD HTR A – op
 - MNB MMU PORT HTR B – op
 - STBD HTR B – op
- MD44F 15. Cab temp cntl act link – pin to FULL COOL
- 16. Perform PL SAFING, then:

CAUTION

If stow problem occurs with either RMS and/or KU–BD ANT, perform aff system QUICK RESPONSE JETTISON (CONT DEORB)

If RMS:

- 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/DEPLOY (ORB OPS, ECLS)

- O14:F 20. MMU 1 – OFF
- R14:E 21. cb RMS TV (six) – op
- A3 22. MON PWR (two) – OFF
- If CO2 RMVL SYS flown:
 - MO51F 23. CNTLR 1(2) MODE – STBY (hold 3 sec)
 - 24. Remove current cans and install two fresh LiOH cans

**LOSS OF 2nd FC
ON–ORBIT (TIG > 4 hr)
MS PAGE**

A10–47

OPCL/2/GEN H,15

UNDOCKING DELTAS

NOTE

The following steps are required to recover RCS functionality prior to undocking

1. One hour prior to undock:
A14 RCS/OMS HTR FWD RCS JET 1,2,3,4
(four) – ON
2. RJD LOGIC,DRIVER (seventeen) – ON
O14,O15,
O16:F
3. MDM FF1,FF2,FA1,FA2 (four) – ON
O6

After undocking complete and post Final Sep:

4. Perform GG FREE DRIFT, ATT ID B (mnvr in PRIMARY. Establish drift in VERN) (ORB OPS, RCS), then:
5. RJD LOGIC,DRIVER (seventeen) – OFF
O14,O15,
O16:F
6. MDM FF1,FF2,FA1,FA2 (four) – OFF
O6
7. RCS/OMS HTR FWD RCS JET 1,2,3,4
(four) – OFF
A14

**LOSS OF 2nd FC
ON-ORBIT (TIG > 4 hr)
MS PAGE**

A10-48

OPCL/ALL/GEN H,15

MS OVHD AND AFT PNL PWRDN

- O14:A 1. IMU 1 – OFF (confirm IMU desel)
- O15:A 2. 2 – OFF (confirm IMU desel)
- O16:E 3. cb MNC RCS/OMS PRPLT QTY GAUGE – op
- R14:D 4. TV (fifteen) – op
- A1R 5. OPS RCDRS PWR (two) – OFF
- 6. PL RCDR PWR – OFF
- A11 7. CRYO TK HTR (four) – OFF
- A12 8. APU HTR LUBE OIL LINE (three) – OFF
- 9. HYD HTR (eight) – OFF
- A14 10. RCS/OMS HTR FWD RCS JET 1,2,3,4 (four) – OFF
- ML31C 11. VAC VENT NOZ HTR – OFF
- ML86B:A 12. cb MNA H2O LINE HTR A – op
- 13. MNB H2O LINE HTR B – op
- :C 14. ✓cb MNB EXT AIRLK HTR VEST Z1/2/3 – op
- If MMU is powered:
- :D 15. cb MNA MMU PORT HTR A – op
- STBD HTR A – op
- MNB MMU PORT HTR B – op
- STBD HTR B – op
- MD44F 16. Cab temp cntl act link – pin to FULL COOL
- 17. Perform PL SAFING, then:

CAUTION

If stow problem occurs with either RMS and/or KU–BD ANT, perform aff system QUICK RESPONSE JETTISON (CONT DEORB)

If RMS:

- 18. Perform RMS PWRDN (PDRS OPS), then:

If KU–BD ANT deployed:

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

If radiators deployed:

- 20. Perform RAD STOW/DEPLOY (ORB OPS, ECLS)

- O14:F 21. MMU 1 – OFF
- R14:E 22. cb RMS TV (six) – op
- A3 23. MON PWR (two) – OFF
- If CO2 RMVL SYS flown:
- MO51F 24. 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**

B10–47

OPCL/4/GEN H,15

UNDOCKING DELTAS

NOTE

The following steps are required to recover RCS functionality prior to undocking

1. One hour prior to undock:
A14 RCS/OMS HTR FWD RCS JET 1,2,3,4
(four) – ON
2. RJD LOGIC, DRIVER (seventeen) – ON
O14, O15, O16:F
3. MDM FF1, FF2, FA1, FA2 (four) – ON
O6

After undocking complete and post Final Sep:

4. Perform GG FREE DRIFT, ATT ID B (mnvr in PRIMARY. Establish drift in VERN) (ORB OPS, RCS), then:
5. RJD LOGIC, DRIVER (seventeen) – OFF
O14, O15, O16:F
6. MDM FF1, FF2, FA1, FA2 (four) – OFF
O6
7. RCS/OMS HTR FWD RCS JET 1,2,3,4
(four) – OFF
A14

**LOSS OF 2nd FC
ON-ORBIT (TIG > 4 hr)
MS PAGE**

B10-48

OPCL/ALL/GEN H,15

LOSS OF 2 FREON LOOPS

WARNING

FC purge must be started and loads powered down ASAP

If all three FCs remain running, orbiter lifetime is expected to be 120 min from LOSS OF 2nd FREON LOOP. This assumes the three FCs are powered down to a total level of 8 kW immediately and are continuously purged

If two FCs are shut down for ON-ORBIT WAIT, max orbiter lifetime from time of failure is expected to be > 120 min

Earliest possible landing is reqd

NOTES

- Failure assumed to occur after GO for On-orbit and before Deorbit TIG-2:05
- Comm procedures (10-65 thru 10-68) should be used throughout this procedure and CONT DEORB
- Preferred COMM Config is:
 - A. UHF only
 - B. GSTDN S-BD (If reqd)
 - C. Use TDRS only if mandatory
- If docked to ISS, this procedure is to be worked simo with JOINT EXPEDITED UNDOCKING AND SEPARATION (SODF: JOINT OPS C/L)

Cont next page

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 C/L)
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 procedure results in loss of VERNS) |
| O16:F | | RJD MANF L5/F5/R5 DRIVER – OFF |
| | 7. | Write down 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

O6

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-----

CONFIG	2
GPC	10000
STR 1	1
2	1
3	1
4	1
PL 1/2	0
CRT 1	1
2	1
3	0
4	1
L 1	0
2	0
MM 1	1
2	1

NOTE

The following must be an
OPS mode recall:
GNC, OPS 201 PRO

For any IDP that is OFF:

C3
O6

- 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

O7
O8

- 22. ✓TACAN MODE sel (three) – OFF
- 23. ✓RADAR ALTM (two) – OFF
- 24. ✓MLS (three) – OFF

C3
R4

- 25. FCS CH (four) – AUTO
- 26. ✓MPS ENG CNTLR HTR (three) – OFF
 - 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 A,B (two) – OFF
- 30. IMU FAN A – ON
 - B,C (two) – OFF

L4:F
L1

- 31. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
 - H2O PUMP LOOP 1 – A
 - ON
 - LOOP 1 BYP MODE – MAN
 - MAN – DECR (30 sec)
 - PUMP LOOP 2 – OFF
 - LOOP 2 BYP MODE – MAN

Cont next page

- MD44F 32. Cab temp cntl act link – pin to FULL COOL
- L1 33. CAB FAN A,B (two) – OFF
34. AV BAY 1B FAN – OFF
2,3 FAN A,B (four) – OFF
1 FAN A – ON
35. FREON PUMP LOOP 1,2 (two) – OFF (one-ON,
if any flow)
36. RAD CNTLR LOOP 1,2 (two) – OFF
37. ✓NH3 CNTLR A,B (two) – OFF
If no FREON PUMPS ON, then:
- L2 38. O2 SYS 1,2 SPLY (two) – OP (tb-OP)
- L1 39. FLASH EVAP CNTLR PRI A,B (two) – OFF
TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF
- L2 40. HI LOAD DUCT HTR sel – OFF
41. FLASH EVAP FDLN HTR SPLY (two) – OFF
- If one FREON PUMP ON:
- L1 42. FLASH EVAP CNTLR PRI A – ON
43. TOP EVAP HTR NOZ (two) – OFF
✓DUCT sel – ON
- L2 44. ✓HI LOAD DUCT HTR sel – ON
45. FLASH EVAP FDLN HTR B SPLY – OFF
46. ANTISKID – OFF
47. NWS – OFF
- O6 48. S TRK PWR –Y,-Z (two) – OFF
49. ANNUN BUS SEL ACA 2/3 – OFF
- GNC 21 IMU ALIGN
50. IMU 1,2 (two) – desel
– OFF
- O14,
O15:A

CAUTION

Do not perform steps 51 thru 57
until PLBDs are closed

- C2 51. IDP/CRT MAJ FUNC (three) – GNC
- O6 52. GPC MODE 4 – STBY (tb-bp)
– HALT
PWR 4 – OFF
- GNC 0 GPC MEMORY
53. CONFIG – ITEM 1 +2 EXEC
54. Assign PL1/2 to GPC 1 (Provides Uplk Path)
55. GNC, OPS 201 PRO

Cont next page

- 56. All IDPs,MDUs – OFF (Use one IDP/CRT with one MDU as reqd until CONT DEORB Proc, 3 min OFF for each min ON)
- 57. MDM FF1,4 (two) – OFF
FA1,4 (two) – OFF
- F6 58. CDR disp – green dot
- 59. Sel ELS TIG (Use PGSC or WX TPR MSG):
Selected TIG ___:___:___ MET
(–) Present TIME ___:___:___ MET
(=) Time to TIG ___:___:___

- R1 If time to TIG ≤ 40 min, no On–Orbit Wait reqd:
60. MN BUS TIE (three) – ON
61. Go to step 76
- If time to TIG > 40 min, On–Orbit Wait reqd:
62. Disconnect and shut down two FCs for On–Orbit Wait:

NOTE
UHF only available w/FC2,3 shut down

DO NOT BUS TIE

- R11U 63. FC PURGE VLVS 2,3 (two) – CL
- R1 64. ESS BUS SOURCE FC2,FC3 (two) – OFF
- 65. FC/MN BUS B,C (two) – OFF
- 66. FC2,FC3 – STOP
- 67. AC BUS SNSR 2,3 (two) – OFF
- 68. cb AC CONTR AC2,AC3 (six) – cl
- 69. INV/AC BUS 2,3 (two) – OFF
- 70. INV PWR 2,3 (two) – OFF
- 71. cb AC CONTR AC2,AC3 (six) – op
- R14:B 72. cb MNA GCILC – op

WARNING
Limit operation of GPC 1 to 1 hr. If reqd, restrng to GPC 2 and power down GPC 1

Cont next page

- If FC1 on:
 O14:B | 73. cb MNA OI SIG CONDR OF 1/4 A – cl
 If FC2 on:
 O15:B | 74. cb MNB OI SIG CONDR OF 2/3 A – cl
 If FC3 on:
 O16:B | 75. cb MNC OI SIG CONDR OF 2/3 B – cl

<p>WARNING Monitor FC performance. If FC STK T \geq 250° or FC V \leq 27, go immediately to ON-ORBIT WAIT BACKOUT (CONT DEORB, <u>LOSS OF 2 FREON LOOPS D/O PREP</u>). Restart FCs immediately and perform the remaining ON-ORBIT WAIT BACKOUT at specified times</p>

- If PL MDMs not currently being used for comm:
 76. \checkmark PLBDs are closed, then:
 O6 \checkmark MDM PL1, PL2 (two) – OFF
 L4:J 77. cb AC3 Φ A SIG CONDR HUM SEP – op
 Φ B SIG CONDR IMU FAN – op
 :K 78. AC1 Φ A H2O CNTLR 2 – op
 :L CAB T CNTLR 2 – op
 Φ B AV BAY 2 S/C – op
 79. AC2 Φ A CAB T CNTLR 1 – op
 Φ B AV BAY 3 S/C – op
 R1 80. \checkmark O2, H2 MANF VLV TK1, TK2 (four) – op
 TK2 HTRS A, B (four) – OFF
 TK1, TK3 HTRS A, B (eight) – AUTO
 If O2 TK1(3) QTY < 80%:
 81. O2 TK1, TK3 HTRS A (two) – OFF
 R2 82. BLR CNTLR/HTR 2 – OFF
 PWR 2 – OFF

If not docked with ISS or when undocking complete and Post Final Sep:
 83. Perform POST UNDOCKING AND FINAL SEP RECONFIG

If no On-Orbit Wait (2 FC not shut down):
 84. Go to ENTRY CONFIG (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP) >>

- If proceeding with On-Orbit Wait (2 FC SHUTDN):
 O6 85. MDM FA1, FA2 (two) – OFF
 FF1, FF2 (two) – OFF
 L4:P 86. cb AC2,3 Φ A LG SNSR 2,1 (two) – op
 W1-10 87. Install Window Shades (remove as reqd to monitor att or control cab temp)

Cont next page

NOTE

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.

Immediately begin drinking H₂O (one 8-oz container every 15 min with a salt tablet in every other container); continue thru entry.

Don QDM for temp > 90 degF and discomfort. If cabin temp > 95 degF and no evaporative cooling is sensed, don LES, ✓ tabs, close visor, LES O₂ – ON.

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

88. Monitor crew health by applying temp strip (MED Kit) to forehead and trunk of CDR and PLT. Record temp every 15 min
89. Continue monitoring FC and go to ON-ORBIT WAIT BACKOUT (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP)

POST UNDOCKING AND FINAL SEP RECONFIG

1. DAP: FREE
- O14,O15, O16 2. RJD LOGIC,DRIVER (seventeen) – OFF
- 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
2/3 A – op
- O16:B 5. cb MNC OI SIG CONDR OF 2/3 B – op
6. ✓cb L,R,AFT DDU (three) – op
- If On-Orbit Wait:
- O6 7. ✓MDM FF1,FF2,FF3,FA3,FA4 (five) – OFF

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. CNTLR 1(2) MODE – STBY (hold 3 sec)

NOTE

For the following RAD STOW, KU-BAND ANT STOW, and PLBD CLOSE procedures, use the following MCA config. Disregard MCA switch throws in other procedures until PLB doors closed

4. MCA LOGIC CONFIG
- MA73C:A, ✓ All MCA LOGIC (fourteen) – ON
B
- :A 5. MCA LOGIC MNA FWD 1 – ON
MNB FWD 2 – OFF
MID 1 – OFF
MNC FWD 3 – OFF
- :B 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 problem 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/DEPLOY (ORB OPS, ECLS), then:

Cont next page

**LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE**

10-57

OPCL/ALL/GEN H,4

PLBD CLOSURE

- O6 1. ✓MDM PL1,PL2 (two) – ON
SM I/O RESET
 - 2. ✓PL SAFING complete
 - 3. ✓No obstructions (Ku ANT, RMS, RAD, etc)
 - CRT4 4. SM, OPS 202 PRO – close PLBD ASAP
 - 5. SM PL BAY DOORS
 - R13L 6. PL BAY DR SYS 1,2 (two) – ENA
 - CRT4 7. 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':
- : 8. ✓Door scallop on or below tgt line before continuing
 - : in MAN mode; otherwise:
 - : 9. Perform MAL, MECH SSR-2,
 - : CONTINGENCY PLBD CLOSURE,
 - L then:
 - 10. PBD STOP – ITEM 16 EXEC
 - 11. AC POWER OFF – ITEM 2 EXEC
GPC/CRT 04 EXEC
 - R11L 12. IDP/CRT4 PWR – OFF
 - R13L 13. PL BAY DR SYS (two) – DSBL
 - A7U ✓FLOOD (all) – OFF
 - MA73C:A, 14. All MCA LOGIC sw except MNA FWD 1 (thirteen)
 - B – OFF
 - :A ✓MCA LOGIC MNA FWD 1 – ON
 - 15. GNC 23 RCS
ITEM 1 EXEC (FRCS page)
OVRD FRCS MANF(s) – OP
 - 16. Report to CDR: RMS, KU-BD ANT, and RADS
stowed; PLBD closed
 - 17. Go to FLUID LOADING PREP (10-63)

**LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE**

10-58

OPCL/4/GEN H,4

RMS STOW

NOTE

For the following RMS STOW, use the following MCA config. Disregard MCA switch throws in other procedures 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:

<p><u>CAUTION</u> If stow problem occurs with RMS, perform <u>QUICK RESPONSE JETTISON</u> (CONT DEORB)</p>
--

If RMS:

3. 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)
cb ESS 2CA MTU B – op
:E 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**

10-59

OPCL/ALL/GEN H,4

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)	
		GPS 2 PRE AMPL UPPER – op	
:D		FREON RAD CNTLR 1,2 (two) – op	
		O2/N2 CNTLR 2 – op (leave cl if PCS 2 active)	
		GPS 2 PRE AMPL LOWER – op	
: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**

10-60

OPCL/4/GEN H,4

- | | | | |
|-------|-----|-------------------------------------|--|
| 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 | | OA 1/2/3 – OFF | |
| | 25. | MDM OA 1/2/3 – OFF | |
| | 26. | MEC 1 – OFF, wait 2 sec, then | |
| | | 2 – OFF | |
| O19 | 27. | TV PWR – OFF | |
| | 28. | COAS PWR – OFF | |
| A11 | 29. | CRYO TK4 HTR O2,H2 A,B (four) – OFF | |
| A12 | 30. | APU HTR GAS GEN/FUEL PUMP 2 – OFF | |
| | | LUBE OIL LINE 1,2,3 (three) – OFF | |
| | | APU HTR TK/FU LINE/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 LINES (two) – OFF | |
| | | FWD RCS JET (five) – OFF | |
| | | AFT RCS JET (five) – OFF | |
| A6U | 34. | FLT CNTLR PWR – OFF, as reqd | |
| | 35. | ANNUN BUS SEL – OFF | |

Cont next page

**LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE**

10-61

OPCL/4/GEN H,4

- If EDO Pallet flown:
- A15:C 36. PALLET HTRS A,B (two) – OFF
 - :D–G 37. O2,H2 TK6,7,8,9 HTRS A,B
(sixteen) – OFF
 - :C 38. PWR PPCA–1(PPCA–1/3 if OV105)
MNA – OFF (tb–OFF)
 - :C PPCA–2(PPCA–2/4 if OV105)
MNB – OFF (tb–OFF)
 - :B 39. cb PPCA CONT PWR 1(1/3 if OV105)
ESS 1BC – op
2(2/4 if OV105)
ESS 2CA – op
 - :H–K 40. All cbs (twenty–four) – op
(Cntlrs, Qty, O2 Htr Snrsrs)
 - R14:A 41. cb MNA ADC 1A/2A – op
MNB ADC 1B/2B – op
 - :B MNA,MNB,MNC PALLET DSC (three) – op
 - :D 42. TV (fifteen) – op
 - :E RMS TV (six) – op
 - L9,R10 43. PS,MS AUD PWR (two) – OFF
 - 44. Minimize Middeck Itg
 - ML31C 45. VAC VENT NOZ HTR – OFF
 - ML86B:A 46. cb MNB H2O LINE HTR B – op
 - If MMU is powered:
 - :D 47. cb MMU PORT HTR A – op
STBD HTR A – op
PORT HTR B – op
STBD HTR B – op
 - MO39M 48. MIDDECK COMM CCU PWR – OFF
 - MO42F SPKR AUD PWR – OFF
 - If no GALLEY:
 - 49. Go to step 52
 - GALLEY 50. OVEN/RHS – OFF
H2O HTRS – OFF
✓OVEN FAN – OFF
 - 51. Go to step 54
 - 52. FOOD WARMER – OFF
 - 53. H2O DISPENSER PWR pb – OFF
 - MD44F 54. Cab temp cntl act link – pin to FULL COOL
 - MO13Q 55. All MIDDECK Its – OFF

**LOSS OF 2 FREON LOOPS
ON–ORBIT
MS PAGE**

10–62

OPCL/4/GEN H

FLUID LOADING PREP

- GALLEY
1. OVEN/RHS – ON
 2. Unstow, fill 4 water containers (per crewmember) with 8 oz of water each. Stow temporarily near seat
 3. Unstow 8 salt tablets (per crewmember). Stow temporarily 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. Immediately (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

1. Don QDM for temp > 90 degF and discomfort. If cabin temp > 95 degF and no evaporative cooling is sensed, don LES, ✓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)

Cont next page

**LOSS OF 2 FREON LOOPS
ON–ORBIT
MS PAGE**

10–63

OPCL/4/GEN H

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

1. ESCAPE POLE STOWAGE/SETUP (Cue Card)

SEAT INSTALLATION

1. ✓ Minimum Itg on Middeck
2. Unstow CONT DEORB, LOSS OF 2 FREON LOOPS D/O
PREP; perform MS PAGE procedures

**LOSS OF 2 FREON LOOPS
ON-ORBIT
MS PAGE**

10-64

OPCL/ALL/GEN H

NOTE

The COMM PWRDN and POWERUP procedures on this and following pages should be used until Touchdown

COMM PWRDN

MS Power down 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 powered 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 – STDN LO
XPNDR – OFF
- 2. NSP PWR – OFF
ENCRYPTION PWR – OFF (Encrypt disabled
rest of flt)
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
✓PWR SYS – OFF
PL DATA INTLVR PWR – OFF
- A1R 5. OPS RCDRS PWR 1,2 (two) – OFF
S-BD FM CNTL – PNL
PWR – OFF
PL RCDR PWR – OFF
- A3 6. MON 1,2 PWR (two) – OFF
- A7U 7. TV PWR CONTR UNIT – OFF
- O6 8. UHF MODE sel – OFF
- 9. MDM PL1,PL2 (two) – OFF
- R12L 10. VTR PWR – OFF
- R14:B 11. cb MNA,MNC GCILC (two) – op

Cont next page

LOSS OF 2 FREON LOOPS

ON-ORBIT

MS COMM PAGE

10-65

OPCL/ALL/GEN H

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)

**LOSS OF 2 FREON LOOPS
ON-ORBIT
MS COMM PAGE**

10-66

OPCL/ALL/GEN H

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

- Power up audio system:
- 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 PWR AMP – ON
 - 3. After comm with MCC complete: Go to COMM PWRDN >>
- 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 – 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:
- 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

Cont next page

**LOSS OF 2 FREON LOOPS
ON-ORBIT
MS COMM PAGE**

10-67

OPCL/ALL/GEN H,4

~
|
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

- C3 17. ✓S-BD PM CNTL - PNL
- A1L 18. ✓ANT SW ELEC - 2
 - ✓PRE AMP - 2
 - ✓PWR AMPL OPER - 2
 - MODE - TDRS DATA
 - ✓XPNDR - 2
- 19. ✓NSP PWR - 2
 - ✓DATA RATE XMIT - HI
 - RCV - HI
 - CODING XMIT - ON
 - RCV - ON
 - ✓UPLK DATA - S-BD
- C3/F9 20. Sel best S-BD PM ANT
- If MCC requests data:
 - O14:B : 21. cb MNA OI MDM OF 1/2 A,3/4 A (two) - cl
 - O17:D : 22. SIG CONDR OA 1/2/3 - ON
 - : 23. MDM OA 1/2/3 - ON
 - C3 : 24. OI PCMMU PWR - 1
 - O6 : 25. MDM PL2 - ON
 - : 26. GNC I/O RESET
 - : At end of data transmission:
 - O14:B : 27. cb MNA OI MDM OF 1/2 A,3/4 A (two)
 - : - op
 - O17:D : 28. SIG CONDR OA 1/2/3 - OFF
 - L 29. MDM OA 1/2/3 - OFF
- After comm/data complete:
 - 30. Go to COMM PWRDN

**LOSS OF 2 FREON LOOPS
ON-ORBIT
MS COMM PAGE**

10-68

OPCL/ALL/GEN H,4

LOSS OF FES

- MS Perform MS PWRDN, 10–71, immediately
- 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,
O16:E 4. cb DDU L,R,AFT (six) – op
- O7 5. ✓TACAN MODE sel (three) – OFF
- O8 6. ✓RADAR ALTM (two) – OFF
7. ✓MLS (three) – OFF
- L1 8. Perform PL PWRDN, then:
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
- R4 18. ✓MPS ENG CNTLR HTR (three) – OFF
MMU 2 deact:
19. 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:
20. 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 ($\beta < 0$)
+270 EXEC ($\beta > 0$)
START TRK – ITEM 19 EXEC
21. ✓MS pwrn activities complete, then:
For deorbit prep:
22. Go to LOSS OF FES
(CONT DEORB)

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OPCL/ALL/GEN H

MS PULLOUT PAGE

MS2 Deploy rads, RAD STOW/DEPLOY (ORB OPS, ECLS)
MS1 Perform pwrn below

MS PWRDN

1. Minimize ltg
 2. ✓ BRAKES (three) – OFF
 3. ✓ cb ADTA (four) – op
 4. MSN TIMER FWD – op
EVENT TIMER AFT – op
 5. MSN TIMER AFT – op
EVENT TIMER FWD – op
 6. PL RCDR PWR – OFF
 7. DATA INTLVR PWR – OFF
 8. APU HTR LUBE OIL LINE (three) – OFF
 9. HYD HTR (eight) – OFF
 10. RCS/OMS HTR FWD RCS – OFF
L,R POD (four) – OFF
OMS CRSFD LINES (two) – OFF
 11. cb TV (fifteen) – op
RMS TV (six) – op
 12. MON 1,2 PWR (two) – OFF
 13. VAC VENT NOZ HTR – OFF
- If Manned Mnv Unit is powered:
14. cb MNA,MNB STBD HTR A,B (two) – op
PORT HTR A,B (two) – op
 15. Cab temp cntl act link – pin to FULL COOL

**LOSS OF FES
ON-ORBIT
MS COMM PAGE**

10-71

OPCL/ALL/GEN H

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**LOSS OF FES
ON-ORBIT
MS COMM PAGE**

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OPCL/ALL/GEN H

AV BAY FIRE

AV BAY 1

NOTE

While performing procedure, note any cbs open.

Equipment still powered in Av Bay following pwrn:

FPCA 1	MDM OF1
FLCA 1	DSC OF1
IMU FAN	ACCU

If docked with ISS, this procedure results in loss of Lo Z Translation.

If no active GNC GPC: Perform GNC RECOVERY VIA G2FD (DPS) concurrent with remainder of this procedure

- 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
- L2
 - 8. ✓ANTISKID – OFF
- C3
 - 9. OI PCMMU FORMAT – FXD
PWR – 2
- O6
 - 10. BFC CRT DISP – ON
 - 11. ✓GPC PWR 5 – ON
✓OUTPUT 5 – NORM
MODE 5 – STBY (tb–RUN), RUN
 - 12. 4 – STBY (tb–bp), HALT
PWR 4 – OFF

If GNC RECOVERY VIA G2FD (DPS) performed:

- 13. Go to step 16

If Single G2 GPC OPS:

- 14. Perform G2 SET EXPANSION, target Dual G2 (ORB OPS, DPS), then:

If/when in Multiple GPC OPS:

- 15. 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	CONFIG	2
	+2 EXEC	GPC	02000
O6	GNC, OPS 201 PRO	STR	1 2
	16. GPC MODE 1(3) – STBY		2 2
	(tb-bp)		3 2
	– HALT	PL	4 2
	PWR 1 – OFF	1/2	0
	17. MDM FF1 – OFF	CRT	1 2
	PL1 – OFF		2 2
O7	18. ✓TACAN 1 MODE sel – OFF		3 0
O8	19. ✓RADAR ALTM 1 – OFF		4 2
	20. ✓MLS 1 – OFF	L	1 0
	21. GNC 23 RCS		2 0
CRT	RCS FWD – ITEM 1	MM	1 2
	EXEC (*)		2 2
	MANF VLVS STAT OVRD – ITEM 41 EXEC –		
	CL (MANF 2)		
O13:A	22. cb ESS 1BC AC1 SNSR – op		
:E	3AB GPC STAT – op		
O14:A	23. ✓BRAKES MNA – OFF		
:E	24. cb MNA 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 RCDR PWR – OFF		
A1L	DATA INTLVR PWR – OFF		
	32. 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

- L4:G
:P(O14:C)
36. cb AC2 Φ A, Φ B, Φ C AV BAY 1 FAN B (three) – op
AC1 Φ C(MNA) TACAN 1 – op
37. Perform MAL, EPS SSR–110, BUS LOSS: AC1,
except:
L1 \checkmark AV BAY 1 FAN A,B (two) – OFF, then:
38. Reassign SM into GPC 3, per MAL, DPS SSR–4
39. Perform LOAD PCMMU FORMAT, using TFL
161/103 (ORB OPS FS, COMM/INST), then:
- C3 40. BFC CRT DISP – OFF
SEL – 3+1
 \checkmark All IDPs deassigned from BFS
- O6 40. GPC MODE 5 – STBY,HALT (tb–bp)
 \checkmark OUTPUT 5 – NORM
41. Perform MAL, ECLS SSR–12, AV BAY FIRE
RECOVERY/RECONFIG, Checkout and
Recovery, then:
For deorb prep:
If orbit 3 deorbit:
42. Go to LAUNCH DAY DEORBIT PREP
(ORBIT 3) (CONT DEORB) >>
- If orbit 7 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)

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AV BAY 2

NOTE

While performing procedure, note any cbs open.

Equipment still powered in Av Bay following pwrn:

FPCA 2 MDM OF2
FLCA 2 DSC OF2
BFC 3A (When GPC 3 is powered).

If docked with ISS, this procedure will require ISS to control mated attitude or result in loss of mated attitude control. This procedure also results in loss of Lo Z Translation

- | | | | |
|-----|-----|--|--|
| L2 | 1. | FREON ISOL MODE – MAN | |
| R1 | 2. | cb AC CONTR AC2 (three) – cl | |
| | 3. | INV/AC BUS 2 – OFF (tb-OFF) | |
| | | INV PWR 2 – OFF (tb-OFF) | |
| | 4. | cb AC CONTR AC2 (three) – op | |
| | 5. | Perform <u>FC2 SHUTDN</u> , except PWRDN (Cue Card), then: | |
| L1 | 6. | IMU FAN A(C) – ON | |
| | | B – OFF | |
| | 7. | AV BAY 1 FAN A – ON | |
| | | B – OFF | |
| | 8. | FREON PUMP LOOP 1 – A | |
| | 9. | ✓CAB FAN A – ON | |
| | | ✓B – OFF | |
| | 10. | ✓AV BAY 2 FAN A,B (two) – OFF | |
| L2 | 11. | ✓ANTISKID – OFF | |
| C3 | 12. | ✓OI PCMMU PWR – 1 | |
| A1L | 13. | ✓S-BD PM MODE – TDRS DATA | |
| | | ✓NSP DATA RATE XMIT – HI | |
| | | ✓RCV – HI | |
| | | ✓CODING XMIT – ON | |
| | | ✓RCV – ON | |
| | | ✓PWR – 1 | |
| | | ✓UPLK DATA – S-BD | |
| C3 | 14. | S-BD PM CNTL – PNL,CMD | |

Cont next page

REASSIGN STRINGS TO GPC 1 IN MC 2

CRT	15.	<u>GNC 0 GPC MEMORY</u>		
		CONFIG – ITEM 1 +2 EXEC		
		Modify MC 2 per table →	CONFIG	2
	16.	GNC, OPS 201 PRO	GPC	10000
O6	17.	GPC MODE 2 – STBY(tb-bp)	STR	1
		– HALT	2	1
		PWR 2 – OFF	3	1
		✓MODE 5 – HALT	4	1
		✓OUTPUT 5 – NORM	PL	1/2
		✓PWR 5 – OFF		0
	18.	MDM FF2,FF4 (two) – OFF	CRT	1
		PL2 – OFF	2	1
O7	19.	✓TACAN 2 MODE sel – OFF	3	0
O8	20.	✓RADAR ALTM 2 – OFF	4	1
	21.	✓MLS 2,3 (two) – OFF	L	1
O13:C	22.	cb ESS 2CA AC2 SNSR – op	2	0
O15:A	23.	✓BRAKES MNB – OFF	MM	1
:E	24.	cb MNB RDR ALTM 2 – op	1	1
		MLS 2 – op	2	1
		✓ADTA 2 – op		
		✓ACCEL 2 – op		
:F	25.	MMU 2 – OFF		
O14,O15,	26.	✓RJDA LOGIC,DRIVER (eight) – ON		
O16:F				
	27.	<u>GNC 20 DAP CONFIG</u> – sel tail only		
		P,Y OPTION – ITEM 15,16 EXEC (TAIL)		
		– ITEM 35,36 EXEC (TAIL)		
	28.	DAP: PRI		
O16:A	29.	✓BRAKES MNC – OFF		
:E	30.	cb MNC MLS 3 – op		
		✓ADTA 4 – op		
:F	31.	RJDF 2A F3 LOGIC – OFF		
		DRIVER – OFF		
		2B F4/F5 LOGIC – OFF		
		F4 DRIVER – OFF		
	32.	✓ACCEL 3 – OFF		
	33.	RJD MANF L5/F5/R5 DRIVER – OFF		
A1R	34.	OPS RCDRS PWR 1 – OFF		
		2 – OFF		
A1L	35.	S–BD PL PWR SYS – OFF		
		CNTL – PNL,CMD		

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OPCL/ALL/GEN H

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AV BAY 3A

NOTE

While performing procedure, note any cbs open.

Equipment still powered in Av Bay following pwrn:

FPCA 3 MDM OF3 GCIL
 FLCA 3 DSC OF3
 Active COMM System Equipment
 S-BD PWR-AMP stby (alt sys)

- L2 1. FREON ISOL MODE – MAN
- R1 2. cb AC CONTR AC3 (three) – cl
- 3. INV/AC BUS 3 – OFF (tb-OFF)
- 4. INV PWR 3 – OFF (tb-OFF)
- 5. cb AC CONTR AC3 (three) – op
- 6. Perform FC3 SHUTDN, except PWRDN (Cue Card), then:
- L1 7. AV BAY 3 FAN A,B (two) – OFF
- 8. CAB FAN B – ON
- A – OFF
- L4:F 9. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
- L1 10. H2O PUMP LOOP 1 – ON
- 2 – GPC

If Triple G2:

- CRT 9. CONFIG – ITEM 1 +2 EXEC
 Modify MC 2 per table →
- O6 10. GNC, OPS 201 PRO
- 11. ✓GPC MODE 3 – HALT
- ✓OUTPUT 3 – NORM
- ✓PWR 3 – OFF
- 12. MDM FF3 – OFF
- O7 13. ✓TACAN 3 MODE sel – OFF
- O13:A 14. cb ESS 1BC C/W A – 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)
- O13:E 15. cb ESS 3AB AC3 SNSR – op
- 16. Perform LOSS OF VERNIERS (ORB OPS, RCS) while continuing with pwrn, then:

CONFIG	2
GPC	12000
STR	1
2	2
3	1
4	2
PL	1/2
CRT	1
2	2
3	0
4	1
L	1
2	0
MM	1
2	2

Cont next page

- If Comm not working:
- A1L 17. ✓S-BD PM MODE – TDRS DATA
 ✓NSP DATA RATE XMIT – HI
 ✓RCV – HI
 ✓CODING XMIT – ON
 ✓RCV – ON
 ✓PWR – 1
 ✓UPLK DATA – S-BD
- C3 18. S-BD PM CNTL – PNL,CMD
- If Comm still not working:
19. S-BD PL CNTL – PNL
 PWR SYS – OFF
20. PL DATA INTLVR PWR – OFF
- C3 21. S-BD PM CNTL – PNL
 A1L ANT SW ELEC – OFF
 PRE AMP – OFF
 PWR AMPL STBY – OFF
 OPER – OFF
 XPNDR – OFF
22. NSP PWR – OFF
 ENCRYPTION PWR – OFF
- MA73C:A 23. 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 system)

- L4:H 24. cb AC1 AV BAY 3 FAN B (three) – op
 L4:P 25. AC3 ΦC(MNC) TACAN 3 – op
 (O16:C)
26. Perform MAL, EPS SSR-130, BUS LOSS: AC3, except:
 L1 ✓ AV BAY 3 FAN A,B (two) – OFF, then:
- L2 27. FREON ISOL MODE – AUTO
28. Perform MAL, ECLS SSR-12, AV BAY FIRE RECOVERY/RECONFIG, Checkout and Recovery, then:
- For deorb prep:
 If orbit 3 deorbit:
 29. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3) (CONT DEORB) >>
- If orbit 7 deorbit:
 30. Perform P&I nominal POST INSERTION, DEORB PREP (POST INSERT, ORBIT 7 D/O), then:
31. 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 switch 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)

- a. OMS BURNS
- b. FCS CHECKOUT
- c. NOMINAL OPS TRANSITIONS (i.e., not reqd for troubleshooting)
- d. DEORB PREP
- e. DTOs

MISSION EXT (Group C)

- f. OMS BURNS
- g. FCS CHECKOUT
- h. OPS TRANSITIONS
- i. CIRC PUMP OPS
- j. APU OPS
- k. PLBD OPS
- l. KU BAND OPS
- m. PAYLOAD OPS
- n. DEORB PREP
- o. DTOs

PRIOR
PWRDN

Powerup for any of the activities listed above will be accomplished using the B or C Pwrdns in reverse order.

2. Numbered priority pwrdn procedures 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 procedures.

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.

**PRIOR
PWRDN**

<u>Equipment</u>	<u>dc Watts</u> (Avg)	<u>Pnl</u>
MADS – ASCENT/ENTRY	305	C3
– ORBIT	128	
Ltg pnl (L OVHD, L CTR)	654	O6
Ltg pnl (R OVHD, R)	396	O8
Inst Itg (L/CTR, OVHD)	108	O6
Inst Itg (R)	63	O8
GPC (RUN)	560	O6
GPC (HALT)	56	O6
CRT/DEU	285	C3
INST PWR	149	F6,F8
FLT CNTLR PWR	10	F7,F8
ADI/DDU	129	O14,O15, O16:E
TACAN (old) – SEARCH	213	O7
– TRACK	192	
(new) – SEARCH	75	O7
– TRACK	50	
MLS	55	O14,O15, O16:E
RA	23	O8
HUD	245	F3
IMU – OPER	119	O14,O15, O16:E
– STBY	55	
Freon Loop Pump	467	L1
H2O Loop Pump	258	L1
FES HTRS – (FES OFF)	222	L1
– (FES ON)	600	
ACIP htr	50	A7U

PRIORITY PWRDN GROUP A

PNL	GRP A PWRDN (normal)	PWRUP
O14, O15, O16:A :E C3 O14, O15, O16:F O17:A :B :D O7 O8 O14, O15, O16:E L1 L2 F6,F8 A12 O6	<p>Nominal on-orbit config:</p> <ol style="list-style-type: none"> 1. Lights – OFF except when needed 2. BRAKES (three) – OFF 3. cb ADTA (four) – op <p>If ASA – ON:</p> <ol style="list-style-type: none"> 4. Sequence FCS CH (four) – OFF rapidly, then: 5. ASA (four) – OFF 6. ATVC (four) – OFF 7. EIU (three) – OFF 8. MEC (two) – OFF 9. TACAN MODE sel (three) – OFF 10. RADAR ALTM (two) – OFF 11. MLS (three) – OFF 12. HI LOAD DUCT HTR sel – OFF 13. ANTISKID – OFF 14. FLT CNTLR PWR (two) – OFF 15. APU HTR TK/FU LINE/H2O SYS: One set – AUTO, one set – OFF 16. GPC MODE 3 – STBY (tb-bp) – HALT (tb-bp) – STBY (tb-RUN) – HALT (tb-bp) 5 – STBY (tb-RUN) – HALT (tb-bp) <p>Cont next page</p>	④

④ As reqd per other FDF documents

PNL	GRP A	PWRDN (Cont) (normal)	PWRUP
O14, O15, O16:A	17.	GPC MODE 2 – as reqd	⑥
	18.	RGA (four) – OFF	
O14, O15:E	19.	cb ACCEL 1,2 (two) – op	
	20.	ACCEL 4,3 (two) – OFF	
O15, O16:F	21.	HUD PWR (two) – OFF	
	22.	✓ MPS ENG CNTLR HTR (three) – OFF	
F3 R4	23.	cb DDU's (six) – op	⑧
	24.	IDPs – three ON for crew awake MDUs – ON as desired All MDUs and IDPs OFF for crew single-shift sleep	⑦
O6	25.	UHF MODE sel – OFF	SPLX

⑤ If GPC 2 not reqd, perform G2 SET CONTRACTION (ORB OPS, DPS)

⑥ As reqd per FLIGHT PLAN, perform G2 SET EXPANSION (ORB OPS, DPS)

⑦ Other(s) ON as reqd

⑧ ON as reqd for FLT CNTLR PWR

PRIORITY PWRDN GROUP B

PNL	GRP B	PWRDN (LOW LEVEL)	PWRUP
		<u>NOTE</u>	
		KU-BD, S-BD FM, and SL Video Analog sw: As reqd to conserve energy and accomplish mission objectives, MCC will cmd	
C3		1. Turn off all lights except Middeck lts 6,7,8 (no lts for single-shift sleep, one for split-shift sleep)	As reqd
A14		2. MSTR MADS PWR – OFF (as reqd, cycle ON per FLIGHT PLAN)	ON
		3. RCS/OMS HTRS L POD (two) – A AUTO, B OFF R POD (two) – A AUTO, B OFF	MCC call
GALLEY		4. H2O HTRS (two), OVEN FAN – OFF (1)	ON (1)
O14, O15, O16:E		5. All DDU cbs (six) – op	cl
		If GPC MODE 2 – RUN:	
		6. Perform G2 SET CONTRACTION (ORB OPS, <u>DPS</u>), then:	(2)
O15:F		7. MMU 2 – OFF (1 of 2 off)	ON
		8. Minimize PGSC use	
O14, O15, O16:F		9. Pri RJDF DRIVER, LOGIC (eight) – OFF	ON
		10. Pri RJDA DRIVER, LOGIC (eight) – OFF RJDA 1A L2/R2 DRIVER – ON	ON
Cont next page			

(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)

PNL	GRP B	PWRDN (Cont) (LOW LEVEL)	PWRUP
	11.	Use only one IDP with 3 MDUs max. All IDPs and MDUs OFF for single-shift sleep; Otherwise – ON	ON
	12.	<u>GNC 21 IMU ALIGN</u> IMU 2 STBY – ITEM 22 EXEC	③
	13.	COLOR PRINTER – OFF	④

③ Recover IMU 2 (MAL, GNC FRP-3)

④ MCC will instruct crew when to turn COLOR PRINTER ON

PRIORITY PWRDN GROUP C

PNL	GRP C	PWRDN (MSN EXT)	PWRUP
		1. Perform PRIORITY PWRDN GROUP 1,2 If prior to first deorbit prep:	
		2. Perform PRIORITY PWRDN GROUP 3A, then:	
		3. Turn off all lights except two Middeck lts (use no lts for single-shift sleep or split-shift sleep)	
GALLEY		4. H2O HTRS (two), OVEN FAN – OFF (1)	ON (1)
		5. MDUs: Cycle ON when reqd	
O14,		6. Pri RJDF DRIVER, LOGIC (eight) – OFF	ON
O15,		7. Pri RJDA DRIVER, LOGIC (eight) – OFF	ON
O16:F		RJDA 1A L2/R2 DRIVER – ON	
O6		8. MDM PL2 – OFF (2)	ON (3)
A14		9. RCS/OMS HTRS L POD (two) – A AUTO, B OFF R POD (two) – A AUTO, B OFF	MCC call
A1L		10. PL DATA INTLVR PWR – OFF S-BD PL PWR SYS – OFF CNTL – PNL, CMD (4)	MCC call MCC call
A1R		11. FM PWR – OFF CNTL – PNL, CMD	1 (5)
O6		12. ✓ UHF MODE sel – OFF	
		13. KU-BAND SYS – max 2 hr ON/day (5)	
O14,		14. All DDU cbs (six) – op	cl
O15,			
O16:E			
A1R		15. OPS RCDRS PWR 2 – OFF PL RCDR PWR – OFF	ON MCC call
		16. COLOR PRINTER – OFF	MCC call

(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, ✓MCC for Antenna Electronics 1 activation

(3) SM I/O RESET

(4) If PDI and/or PSP powered off, expect S62 BCE BYP PL, S62 BCE BYP PDI and/or S62 BCE BYP PSP msgs

(5) As reqd, MCC will command

PRIORITY PWRDN GROUP 1

PNL	GRP 1 PWRDN	PWRUP
O15:F	1. Minimize Itg 2. Use only one IDP with 3 MDUs max If GPC 2 – RUN: 3. Perform G2 SET CONTRACTION (ORB OPS, <u>DPS</u>), then: 4. MMU 2 OFF – (1 of 2 off) 5. <u>GNC 21 IMU ALIGN</u> IMU 2 STBY – ITEM 22 EXEC	① ON ②

① If reqd, go to G2 SET EXPANSION (ORB OPS, DPS)

② Recover IMU 2 (MAL, GNC FRP–3)

PRIORITY PWRDN GROUP 2

PNL	GRP 2 PWRDN	PWRUP
O6	1. S TRK PWR –Y,–Z (two) – OFF 2. MDM FF2,4 (two) – OFF FA4 – OFF	As reqd ON ①
C3 L1	3. MSTR MADS PWR – OFF 4. FLASH EVAP CNTLR PRI (two) – OFF SEC – OFF TOP EVAP HTR NOZ (two) – OFF DUCT sel – OFF	ON ② ③ Two ON ② ON
MA73C:F A8L	5. cb AC1 RMS PRI Φ A – op 6. PORT RMS HTR A(B) – OFF * If PDRS PORT TEMP msg (MA tone only): * * Within 30 min, HTR A(B) – AUTO. * * On MCC call: * * HTR A(B) – OFF; repeat as reqd *	
OCAC	7. Use only one orbiter PGSC If OCAC flown: 8. OCAC PWR – OFF	ON

① GNC I/O RESET

② Perform TOPPING FES STARTUP, using Pri A/B (ORB OPS, ECLS)

③ 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

PNL	GRP 4 PWRDN	PWRUP
GALLEY	1. H2O HTRS (two), OVEN FAN – OFF If RMS is powered: 2. Perform <u>RMS PWRDN</u> (PDRS OPS), then:	ON MCC call
L4:L	3. cb AC1 ΦB AV BAY 2 S/C – op	cl

PRIORITY PWRDN GROUP 5

PNL	GRP 5 PWRDN	PWRUP
O15:A	1. IMU 2 – OFF (1 of 3)	①
	2. <u>GNC 20 DAP CONFIG</u> TAIL P,Y OPTION DAP: X/AUTO/PRI	②
O8 A1R	3. FWD RCS MANF ISOL 1,2,3,4 (four) – CL If OPS RCDRS 2 MODE tb – RCD:	③
A1R	4. PWR 1 – OFF If OPS RCDRS 2 MODE tb – bp and 1 MODE tb – RCD:	ON
O6 A14	5. PWR 2 – OFF 6. MDM PL2 – OFF 7. RCS/OMS HTR FWD RCS JET 1,2,3,4 (four) – OFF	ON ON ④
O14, O15, O16:F	8. RJDF DRIVER,LOGIC (eight) – OFF	AUTO ON
O14:C O15:C	9. cb UTIL PWR O19/MO52J – op F1/MO13Q – op	cl cl
	10. Perform KU–BD ANT STOW (ORB OPS, <u>COMM/INST</u>), then:	⑤
R14:C	11. cb MNB KU ANT HTR – op	cl

- 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

PNL	GRP 6 PWRDN	PWRUP
O14:A O15:D O16:E L4:L	1. IMU 1 – OFF (2 of 3 off) 2. cb O2/N2 CNTLR 2 – op 3. RCS/OMS PRPLT QTY GAUGE – op 4. AC1 ΦA CAB T CNTLR 2 – op AC2 ΦA CAB T CNTLR 1 – op (if desired, pin CAB T CNTLRS)	① cl cl cl cl
R2 A12	5. BLR CNTLR/HTR (three) – OFF 6. APU HTR LUBE OIL LINE (three) – OFF HYD HTR A (four) – OFF B (four) – OFF	A B AUTO ✓ OFF AUTO ON As reqd
A14 ML31C ML86B:C	7. RCS/OMS HTR OMS CRSFD LINES (two) – A OFF, B OFF 8. VAC VENT NOZ HTR – OFF If no Internal Airlock:	cl cl cl
:A	9. cb EXT ARLK HTR STRUC (two) – op 10. cb MNA H2O LINE HTR A – op MNB H2O LINE HTR B – op If EDO WCS:	② ②
WCS	11. URINAL SEL – OFF WCS PWR SEL (two) – OFF1,OFF2 ✓ FAN PWR – AUTO	③
ML86B:D	If MMU is powered: 12. cb MNA MMU PORT HTR A – op STBD HTR A – op MNB MMU PORT HTR B – op STBD HTR B – op	
MA73C	13. MCA LOGIC MNA,B,C: MID 1,2,3,4 (eight) – OFF	ON
A6U R14:D	14. ANNUN BUS SEL – OFF 15. cb MNA TV C AFT BAY CAMR HTR – op PAN-TILT HTR – op MNB TV A FWD BAY CAMR HTR – op PAN-TILT HTR – op MNC B TV B KEEL/EVA CAMR HTR – op PAN-TILT HTR – op	MNC cl cl cl cl cl cl cl
:E	16. cb MNB RMS PORT RMS TV CAMR HTR – op PAN-TILT HTR – op MNA D STBD RMS TV CAMR HTR – op PAN-TILT HTR – op	cl cl cl cl
	17. Purge both supply,waste H2O lines. Go to SUPPLY(WASTE) H2O PURGE FROM DUMP LINE(S) (IFM)	④

- 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
(OFF1,AUTO2)
✓ FAN PWR – AUTO
URINE DIVERTER VLV – SEP 1(2)
- ④ For PWRUP, reopen SPLY(WASTE) H2O DUMP ISOL VLV

PRIORITY PWRDN GROUP 7

PNL	GRP 7 PWRDN	PWRUP
O13:D	1. All CRYO cbs (four) – op	cl
O14:C	2. cb CRYO O2 HTR TK1 SNSR 1 – op	cl
:F	3. MMU 1 – OFF (2 of 2 off)	ON
O16:C	4. cb CRYO O2 HTR TK1 SNSR 2 – op	cl
L4:K	5. AC1 ΦA H2O CNTLR 2 – op	cl
L1	6. FREON PUMP LOOP 2 – OFF	ON
	RAD CNTLR LOOP 2 – OFF	A
L2	O2 SYS 2 SPLY – CL (tb-CL)	OP
		(tb-OP)
R1	7. O2 TK1,TK2,TK3 HTRS A (three) – OFF	AUTO
	TK1,TK3 HTRS B (two) – OFF	AUTO
	H2 TK1,TK2,TK3 HTRS A (three) – OFF	AUTO
	TK1,TK3 HTRS B (two) – OFF	AUTO
	If Primary Jets Only Option:	
	8. Go to step 17	
	If Vernier Jets Only Option:	
	9. Go to step 27	
	If Gravity Gradient Option:	①
	10. Perform GG FREE DRIFT, ATT ID B, steps 1,2 (Do not sel LO Z) (ORB OPS, <u>RCS</u>), then:	
O14, O15, O16:F	11. All RJD DRIVER,LOGIC (seventeen) – OFF	②
	12. Perform RCS SECURE (FWD,AFT) (<u>RCS</u>), then:	
O6	13. MDM FF1 – OFF	ON
	FA1,FA2,FA3 (three) – OFF	ON
MA73C	14. MCA LOGIC MNA,B,C:	
	FWD 1,2,3 (three) – OFF	ON
	AFT 1,2,3 (three) – OFF	ON
A14	15. RCS/OMS HTR FWD RCS – OFF	AUTO
	RCS JET (five) – OFF	AUTO
	AFT RCS JET (five) – OFF	AUTO
	16. Go to step 31	
	Cont next page	

- ① Perform GG FREE DRIFT, step 3 (ORB OPS, RCS)
- ② Perform MAL, RCS SSR–4, STAGED, MANF REPRESS (FRCS only). √L,R MANF P > 130 prior to MANF ISOL – OP

PNL	GRP 7 PWRDN (Cont)	PWRUP
	17. Perform XFEED: L RCS to R RCS (RCS), then:	
O6	18. GNC 23 RCS Ovrdr L,R,1,3,4,5 STAT – CL	OP
	19. MDM FA2 – OFF FF1 – OFF	ON (3)
O14:F	20. GNC 20 DAP CONFIG – √TAIL P,Y OPTION	
O14, O15, O16:F	21. RJDA 1A L2/R2 LOGIC – ON DRIVER – ON	
O7	22. Remaining RJD DRIVER,LOGIC	
O15, O16:F	(fifteen) – OFF	ON
O7	23. AFT L,R RCS MANF ISOL 5 (two) – CL	OP
O8	24. FWD RCS MANF ISOL 5 – CL	CL
A14	25. RCS/OMS HTR FWD RCS – OFF	AUTO
	RCS JET (five) – OFF	AUTO
	AFT RCS JET 1,3,4,5 (four) – OFF	AUTO
O6	26. Go to step 31	
	27. MDM FA3 – OFF FF1 – OFF	
O16:F	28. √Vern RJD – ON	
O14, O15, O16:F	29. Pri RJD DRIVER,LOGIC (sixteen) – OFF	ON
A14	30. RCS/OMS HTR FWD RCS – OFF	AUTO
	RCS JET 1,2,3,4 (four) – OFF	AUTO
	AFT RCS JET 1,2,3,4 (four) – OFF	AUTO
A11	31. CRYO TK HTR (four) – OFF	AUTO MCC call

Cont next page

(3) GNC I/O RESET

PNL	GRP 7	PWRDN (Cont)	PWRUP
		If EDO Pallet flown:	
A15:C		32. PALLET HTRS A,B (two) – OFF	④
:D-G		33. PALLET O2,H2 TK6,7,8,9 HTRS A,B (sixteen) – OFF	MCC call
:C		34. PALLET PWR PPCA-1 (PPCA-1/3 if OV105) MNA – OFF (tb-OFF)	④
		PALLET PWR PPCA-2 (PPCA-2/4 if OV105) MNB – OFF (tb-OFF)	④
:B		35. cb PPCA CONT PWR 1 (1/3 if OV105) ESS 1BC – op	④
		cb PPCA CONT PWR 2 (2/4 if OV105) ESS 2CA – op	④
:H-K		36. All cbs (twenty-four) – op (Cntlrs, Qty, O2 Htr Snsrs)	cl
R15:B		37. cb MNA,MNB,MNC PALLET DSC (three) – op	cl
		If no Internal Airlock:	
ML86B:C		38. cb EXT ARLK HTR LINE ZN 1 (three) – op	cl
		2 (three) – op	cl
:F		39. cb CRYO O2 HTR SNSR (four) – op	cl
:G		40. All cbs – op	MCC call
R1		If 3 good FCs, shut down FC2 and AC2 per the following:	⑤
		41. MN BUS TIE A,B (two) – ON (tb-ON)	
		42. Perform AC2 BUS LOSS ACTIONS (<u>EPS</u>) <u>ONLY</u> , leaving FC2 REACS open, then:	
		43. cb AC CONTR (three) – cl	op
		INV/AC BUS 2 – OFF (tb-OFF)	ON
		INV PWR 2 – OFF (tb-OFF)	ON
		AC BUS SNSR 2 – OFF	ON
		44. Use only IDP4, aft MDUs, and aft FLT CNTLR PWR	As reqd

④ Perform steps 36 and 37, then:
Perform EDO PALLET ACTIVATION (ORB OPS, EPS)

⑤ Perform MAL, EPS SSR-6, FC RESTART, then:
MN BUS TIE A,B (two) – OFF (tb-OFF)

CUE CARD CONFIGURATION

**CUE
CARDS**

12-1

OPCL/ALL/GEN H

TOP

TARGET DATA		LEAKING OMS PRPLT/ He BURN		BURN DATA	
OMS L	2			BURN ATT	
R	3			24 R	
5 TV ROLL				25 P	
TRIM LOAD				26 Y	
6 P		(+) 0 . 4		Δ VTOT	
7 LY		(+) 5 . 2		TGO	:
8 RY		(-) 5 . 2		VGO X	()
9 WT				Y	()
10 TIG	*	/	:	Z	()

*Current MET + 10 min

TGT PEG 7		OUT OF PLANE		RETROGRADE	
19 Δ VX	()		0 . 0	(-) ()	
20 Δ VY	()	5 0 0 . 0		()	0 . 0
21 Δ VZ	()		0 . 0	()	0 . 0

TGT

HA		
HP	()	

 ✓TGT HP ≤ 95
 ✓MM202** ✓CNTLR PWR (two) - ON ✓ATT
 (302)** ✓ADI - REF/HI ✓DAP - AUTO**
 ✓ENG SEL (LVLH/Hi) (AUTO/DISC)**

If retrograde burn: Enter TGO + 10 sec
TIG-2 Selected OMS ENG - ARM/PRESS

WARNING

Do not burn if: OMS He TK P < 640
FU ENG IN P < 216
OX ENG IN P < 151
Payload/RMS not berthed or stowed

CUE CARDS

-:15 EXEC, and if PRPLT LEAK, THC + X
 :00 TIG** (✓Pc, Δ VTOT, ENG VLV)
 +:01 Release THC
 If PRPLT LEAK, when CUR HP = 95 or PC < 80:
 OMS ENG - OFF; secure affected OMS
 If He LEAK, when CUR HP = 95 or OMS He TK P < 640 or OMS QTY < 39 OMS ENG - OFF
 If reqd, repeat procedure to burn OUT OF PLANE

* On MCC call *
 * If PER ADJ TIG < 4 orbits from Deorb TIG, FRCS *
 * QTY > 6%, and Δ VTOT > 10 fps at OMS fail, MNVR to *
 * -X ATT (pitch up at 3°/sec to VGOz = 1/4 Δ VTOT): *
 * THC -X to CUR HP = 95 or FRCS PRPLT deplete *
 CUTOFF**
 +:02 OMS ENG - OFF** (If < 3 IMU, at

--	--	--

)

OPCL-1a/O/D

(reduced copy)

FAB USE ONLY

CC 12-2

OPCL/ALL/GEN H,4

TOP
BACK OF 'LEAKING OMS PRPLT/He BURN'

HOOK
VELCRO

HOOK
VELCRO

FAB USE ONLY

(reduced copy)

CC 12-3

OPCL-1b/O/A

OPCL/ALL/GEN H

TOP

HOOK
VELCRO

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 Quick Don Masks

If Booster Fan flown:

MO13Q 3. ARLK FAN A(B) – OFF

If hatches to ISS open:

4. Simo, perform JOINT EMERGENCY EGRESS (Cue Card), continue with this proc

L1 5. CAB TEMP sel – COOL

WCS 6. MODE – COMMODE/MANUAL/EMU

7. COMMODE CNTL – PULL UP (wait 20 sec)
– PUSH FWD

If CO2 RMLV SYS flown:

MO51F 8. CO2 RMLV SYS CNTLR 1(2) MODE – STBY (hold 3 sec)

If OCAC flown:

OCAC 9. ✓OCAC PWR – ON

10. ✓MCC

R
E
D

LEVEL 3 (ORANGE) HAZARDOUS SPILL (CONTAINABLE)

1. Inform other crew, MCC – “Level 3 spill in cabin”
2. All crew don/activate Quick Don Masks, silver shield gloves

If Booster Fan active:

MO13Q 3. ARLK FAN A(B) – OFF
Simo, go to JOINT EMERGENCY EGRESS (Cue Card), continue with this proc

L1 4. CAB FAN A(B) – OFF (max 20 min)

5. IMU FAN B(A,C) – OFF (max 45 min)

If OCAC flown:

OCAC 6. OCAC PWR – OFF

CCK 7. Clean up spill w/dry wipes. Bag, label, stow in wet trash

If cleanup fails, perform steps 10 and 11, then go to LEVEL 4 step 5

8. Deact/doff Quick Don Masks, gloves. Stow gloves in wet trash
9. Inform other crew, MCC – “Spill in cabin cleaned up”

L1 10. CAB FAN A(B) – ON

11. IMU FAN B(A,C) – ON

If OCAC flown:

OCAC 12. OCAC PWR – ON

If Booster Fan active:

MO13Q 13. ARLK FAN A(B) – ON

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HOOK
VELCRO

OPCL-2a/O/H

NOTE: Titles – Highlight each color as shown in parentheses.
Borders – Highlight using color indicated on right side

(reduced copy)

FAB USE ONLY

CC 12-4

OPCL/ALL/GEN H,15

TOP
BACK OF 'HAZARDOUS SPILL RESPONSE – ORBITER'

HOOK
VELCRO

HAZARDOUS SPILL RESPONSE – ORBITER (Cont)

	LEVEL 2 (YELLOW) HAZARDOUS SPILL
	LEVEL 1 (BLUE) LEAST HAZARDOUS SPILL
	LEVEL 0 (GREEN) NONHAZARDOUS SPILL
	1. Inform other crew, MCC – “Level 2(1,0) spill in cabin”
	If LEVEL 2 spill:
CCK	2. All crew in vicinity don goggles, masks, silver shield gloves
	If LEVEL 1 spill:
	3. All crew in vicinity don goggles, masks, gloves
	If LEVEL 0 “Controlled” spill >>
	If Booster Fan active:
MO13Q	4. ARLK FAN A(B) – OFF
L1	5. CAB FAN A(B) – OFF (max 20 min)
	6. IMU FAN B(A,C) – OFF (max 45 min)
	If OCAC flown:
OCAC	7. OCAC PWR – OFF
CCK	8. Clean up spill w/dry wipes. Bag, label, stow in wet trash
	If LEVEL 2 cleanup fails, perform steps 11 and 12, then go to LEVEL 4 step 3
	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
	12. IMU FAN B(A,C) – ON
	If OCAC flown:
OCAC	13. OCAC PWR – ON
	If Booster Fan active:
MO13Q	14. ARLK FAN A(B) – ON

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HOOK
VELCRO

OPCL-2b/O/F

NOTE: Titles – Highlight each color as shown in parentheses.
Borders – Highlight using color indicated on right side

(reduced copy)

FAB USE ONLY

CC 12-5

OPCL/ALL/GEN H

TOP
BACK OF 'FIRE/SMOKE'

V E L C R O
H O O K

FIRE/SMOKE
(ASCENT/ENTRY)
(AESP-7a), front of
FIRE/SMOKE (ORBIT)
appears in the
ASCENT/ENTRY SYSTEMS
PROCEDURES

FIRE/SMOKE (ORBIT)

SM SYS SUMM 1

- If **VISUAL SMOKE/FIRE**, or
two SMOKE DETN It on, or
two CONC > 2, or
one SMOKE DETN It on and
other CONC > 2:
- Go to step 6
- If single Av Bay SMOKE DETN A(B) It and
assoc CONC > 2:
- SMOKE DETN CKT TEST - B(A) (25 sec)
- If SMOKE DETN B(A) test good (It on):
- SMOKE DETN CKT TEST - OFF
 - SMOKE DETN SNSR - RESET >>
- If SMOKE DETN B(A) test bad (no It):
- Go to step 6
- If none of above >>
- ARLK FAN A(B) - OFF
 - ISS(SH) crew:
Don QDMs(SEBs), perform
**JOINT EMERGENCY EGRESS
(SH RAPID SAFING DEACT)**
(Cue Card), then:
 - Don Quick Don Masks
LEH O2 vlv - OP
✓ SUPPLY vlv - OP

IF AV BAY FIRE:

- FIRE SUPPR - ARM
pb - DISCH
(push until lit)
- AV BAY FAN (two) - OFF
- Simultaneously, go to
POST-FIRE CABIN CLEANUP
(ORB PKT, ECLS) and AV BAY
FIRE (ORB PKT, PWRDN)

IF CABIN FIRE:

- CAB FAN (two) - OFF (max 20 min)
 - Locate source
 - Unpower source of smoke
- If smoke persists or source cannot be unpowered:

WARNING
Discharge is propulsive

- Discharge handheld FIRE
EXTGHR
- Go to POST-FIRE CABIN
CLEANUP (ORB PKT, ECLS)

ALARM SEQUENCE	SOURCE AREA
[L(R) FLT DK] or [L(R) FLT DK] → CABIN	PS(MS), L(R) CONSOLE
[L FLT DK] ↔ [R FLT DK]	AFT FLT DK, MIDDECK
[CABIN] or [CABIN] ← [L FLT DK] ↑ [R FLT DK]	FWD FLT DK, WCS, LEB

OPCL-7b(AESP-7b)/A, O, E/F

V E L C R O
H O O K

BOTTOM
MATE TOP-TO-BOTTOM:
FLIP VERTICALLY TO TURN



replace side tab
with clear tape
and Hook Velcro

(reduced copy)

FAB USE ONLY

CC 12-6

OPCL/ALL/GEN H,15

TOP

- ODS VOLUME FIRE/SMOKE**
- MO13Q 1. ARLK FAN A(B) – OFF
- If hatches open to ISS, perform JOINT EMERGENCY EGRESS (Cue Card), then:
- A7L 2. APDS PWR (three) – OFF
3. ✓A,B,C lts (three) – OFF
4. HTRS/DCU PWR (three) – OFF
5. CNTL PNL PWR (three) – OFF
- A6L 6. PSU PWR (two) – OFF
7. SYS PWR MNA,MNB (two) – OFF
(hold 5 sec)
✓SYS PWR SYS1,SYS2 tb (two) – OFF
- If SH HATCH flown:
- SH Hatch 8. Close 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 hatch per decal
✓Equal vlvs (two) – OFF, caps installed
11. On MCC call, go to ODS
POST-FIRE ACTIONS (ECLS)

ODS

OPCL-3a/ODS/O/H

TOP

BACK OF 'ODS VOLUME FIRE/SMOKE'



ODS

OPCL-3b/ODS/O/D

(reduced copy)

FAB USE ONLY

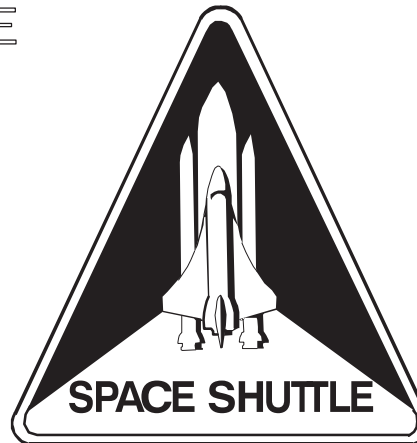
CC 12-7

OPCL/ODS/GEN H,15

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Space Shuttle Program
FLIGHT DATA FILE

JSC-48033-II
GENERIC, REV H



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

ORBIT POCKET CHECKLIST

OV
102,
104

Flight Cover (trim bottom to expose tabs)