

Ascent Pocket Checklist

Mission Operations Directorate Operations Division

Generic, Rev O
April 7, 2009

NOTE

For STS-125 and subsequent flights

AESP: MM101

APCL: MM104

OPCL: MM106

EPCL: MM301

AESP: MM304

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



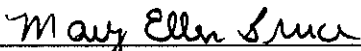
Verify this is the correct version for the pending operation (training, simulation or flight).
Electronic copies of FDF books are available. URL: <http://mod.jsc.nasa.gov/do3/FDF/index.html>

MISSION OPERATIONS DIRECTORATE

ASCENT POCKET CHECKLIST

GENERIC, REVISION 0
April 7, 2009

PREPARED BY:



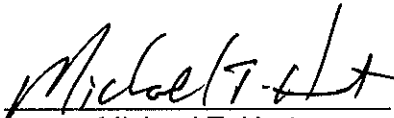
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ECLS	DS441/D. Fasbender	281-483-7857
EPS	DS431/M. Friant	281-483-0682
GNC	DS621/D. Gruber	281-483-0709
OMS/RCS	DS631/T. Campa	281-244-1002
MPS	DS651/E. Turcotte	281-483-5730
PWRDN	DS431/M. Friant	281-483-0682

NOTES

1. The pocket checklists contain contingency procedures to safe a system and continue the flight. As a rule, these procedures do not troubleshoot a malfunction to determine its cause.
2. The 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 and in the step sequence noted. For longer or less time-critical procedures during the orbit phase, the Flight Data File Malfunction Procedures (MAL) book is available.
3. The Ascent Pocket Checklist alone includes the TROUBLESHOOT notation, alerting the crew to the malfunction procedure which may be required later at a less flight-critical time.
4. The absence of a procedure implies no immediate action required.
5. The Ascent Pocket Checklist is unstowed post ET SEP (MM104) and is stowed post OMS-2 (MM106). When a Powered Flight cue card action requires follow-up action, the symbol '⇒' addresses the entry point in the pocket checklist procedure. Additionally, the '◆' icon indicates one should √MCC and if no comm continue with the procedure.
6. Steps are numbered sequentially to facilitate reference for orbiter/ground communications and for procedural cross-reference.
7. Applicable procedures from the A/E SYS book (i.e., Sections A1 thru E9) are placed before the APU/HYD section in the flight copies of this book.
8. Applicable procedures from the PL PWR book (i.e., Section 1) are placed at the end of the flight copies of this book.



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ASCENT POCKET CHECKLIST

LIST OF EFFECTIVE PAGES

GENERIC 04/07/87
REV O 04/07/09

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ii.....	*	ALL/GEN O	4-4.....	ALL/GEN O
iii.....	*	ALL/GEN O	A4-5	ALL/GEN O
iv.....	*	ALL/GEN O	A4-6	3,4/GEN O
v	*	ALL/GEN O	A4-7	3,4/GEN O
vi.....	*	ALL/GEN O	A4-8	ALL/GEN O
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viii.....	*	ALL/GEN O	B4-6	5/GEN O
ix.....	*	ALL/GEN O	B4-7	5/GEN O
x	*	ALL/GEN O	B4-8	ALL/GEN O
xi.....	*	ALL/GEN O	4-9.....	ALL/GEN O
xii.....	*	ALL/GEN O	4-10.....	ALL/GEN O
1-1		ALL/GEN O	4-11.....	ALL/GEN O
1-2.....		ALL/GEN O	4-12.....	ALL/GEN O
1-3.....		ALL/GEN O	4-13.....	ALL/GEN O
1-4.....		ALL/GEN O	4-14.....	ALL/GEN O
1-5.....		ALL/GEN O	4-15.....	ALL/GEN O
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* – Omit from flight book

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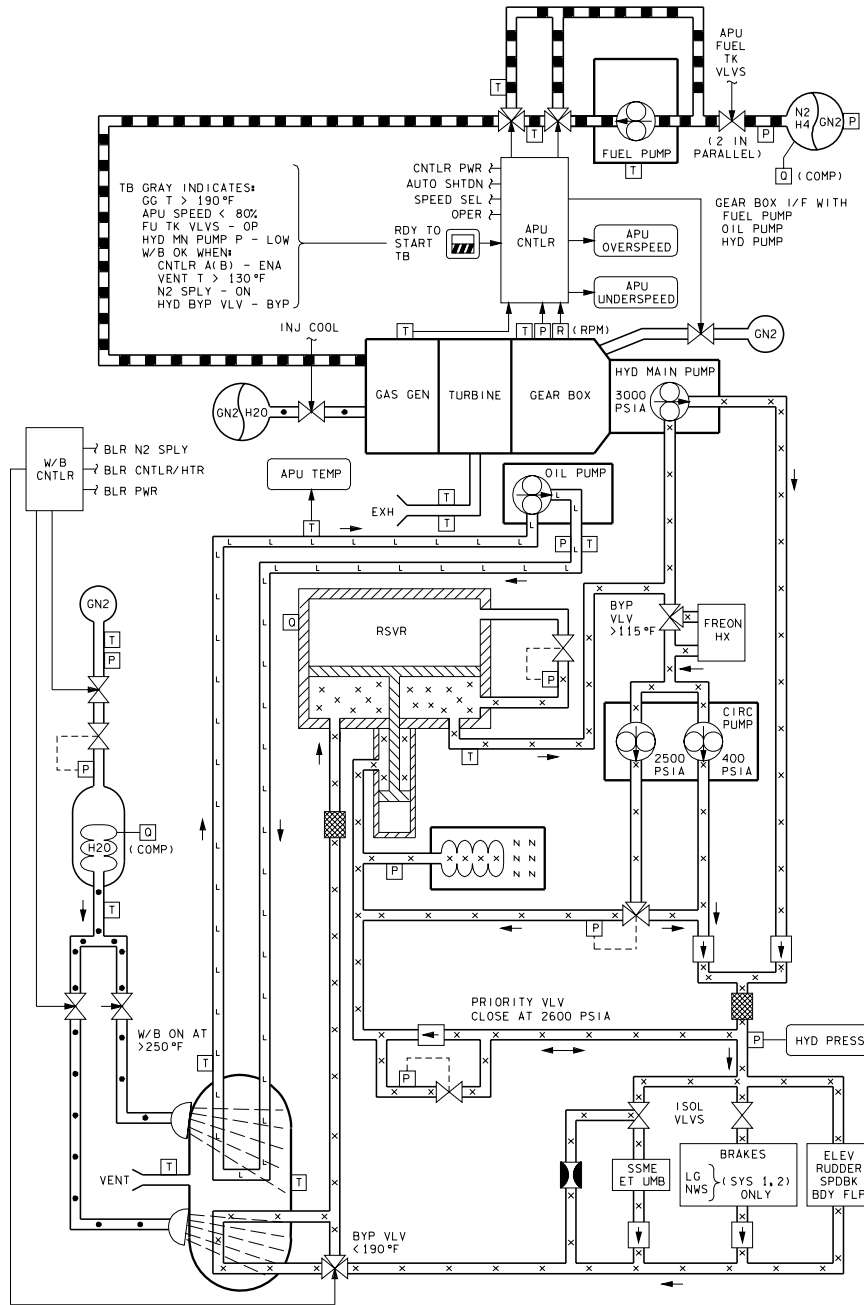
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APU/HYD

APU/
HYD



DATE 07/22/05
 480330101.SCH.2

APU SHUTDN

APU OPER – OFF
FU TK VLV – CL
√Shutdn (HYD PRESS < 200)

Report APU F7 lts
APU CNTLR PWR – OFF

- ⇒ √AUTO SHTDN (three) – ENA
√SPEED SEL (two) – NORM

APU SPD HI

BFS, SM SYS SUMM 2

- ⇒ If SPEED % exceeds 111:
Go to APU SHUTDN

APU OVERSPEED/UNDERSPEED

BFS, SM SYS SUMM 2

If SPEED % exceeds 129 or if APU has shut down:
Go to APU SHUTDN

APU OIL OVERTEMP

BFS, SM SYS SUMM 2

1. BLR CNTLR/HTR – B
√N2 SPLY – ON

- ⇒ If APU OIL OUT TEMP > 305 and OIL IN TEMP incr:

2. Perform APU SHUTDN

If AOA:

At M = 7:

3. Go to APU COOLDOWN (A/E SYS, PLT WND FB,
APU/HYD)

APU PUMP LEAK P

BFS, SM SYS SUMM 2

1. √MCC

If not AOA:

2. Go to APU SHUTDN >>

If AOA and two good APUs:

3. Perform APU SHUTDN, then:

At M = 7:

4. Go to APU COOLDOWN (A/E SYS, PLT WND FB,
APU/HYD)

APU RESTART

- ◆ 1. √APU AUTO SHTDN – ENA
2. HYD MN PUMP PRESS – LO
3. APU CNTLR PWR – ON
4. OPER – INJ COOL (start watch)

If after 1.5 min, APU TEMP INJ not decr:

5. HYD MN PUMP PRESS – NORM
Go to APU SHUTDN >>

At 3.5 min:

6. APU FU TK VLV – OP
OPER – START/RUN
HYD MN PUMP PRESS – NORM

If restart unsuccessful:

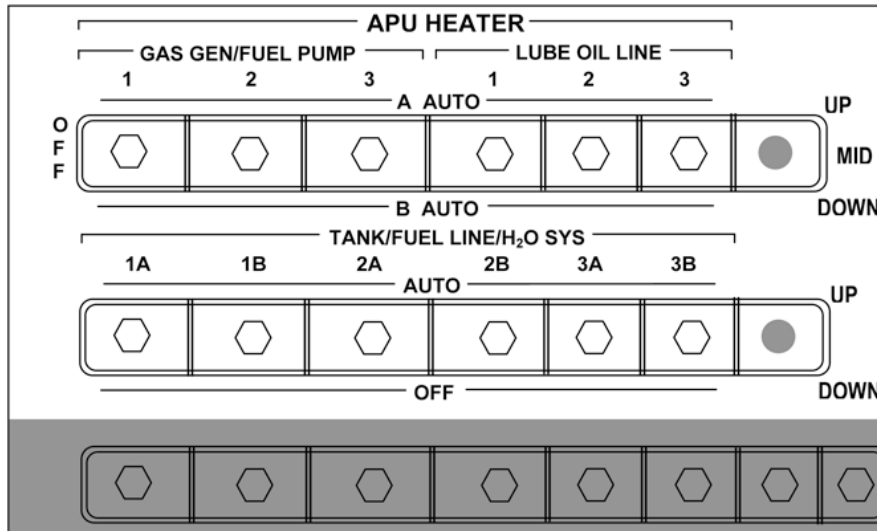
7. Go to APU SHUTDN >>

8. √BLR N2 SPLY – ON
√PWR – ON
√CNTLR/HTR – A(B)

SM0 THRM APU

BFS, SM 0 THERMAL

AFF TEMP	STATUS	ACTION
APU GG/FU PMP HTR 1(2,3)	↑	A12 √(Aff) APU HTR GAS GEN/FU PUMP – OFF >>
	↓	A12 (Aff) APU HTR GAS GEN/FU PUMP – A AUTO >>
	H, L, M	No action >>
APU TK/FU LN HTR 1(2,3)	↑	A12 √(Aff) APU HTR TK/FU LN/H2O SYS (two) – OFF >>
	↓	A12 (Aff) APU HTR TK/FU LN/H2O SYS (two) – AUTO >>
	H, L, M	No action >>
APU PUMP/VLV 1(2,3)	↑	If APU was running and now shut dn, do not attempt restart until aff temp cool
	↓, H, L, M	No action >>



HYD PRESS (LOW)

GNC 51 OVERRIDE
BFS, SM SYS SUMM 2

⇒ 1. √APU SPEED SEL (three) – NORM

If not AOA:

2. √APU AUTO SHTDN (three) – ENA
Go to APU SHUTDN >>

If AOA:

3. Compare 'PRL SYS X' status and aff HYD PRESS
(HYD/APU meter and CRT):

PRL SYS	HYD PRESS	ACTION
↓	both meter and CRT P < 300	Perform APU SHUTDN
blank	either meter or CRT P > 2600	No action reqd >>
'?'	ACUM P > 2800	No action reqd >>

4. If aff APU running: (Aff) HYD MN PUMP PRESS – LO

If two good APU/HYD remain:

5. √APU AUTO SHTDN (three) – ENA

At $\bar{q} = 1$:

6. HYD MN PUMP PRESS (two) – NORM

At TAEM:

7. APU SPEED SEL (two) – HI >>

If only one good APU/HYD remains:

8. √APU AUTO SHTDN (one) – INH

HYD MN PUMP PRESS (one) – LO

At $\bar{q} = 1$:

9. HYD MN PUMP PRESS (one) – NORM

APU SPEED SEL (one) – HI

On MCC call:

10. (Degraded) HYD MN PUMP PRESS – NORM

HYD RSVR QTY (LOW)

BFS, SM SYS SUMM 2

- ⇒ 1. (Aff) HYD MPS/TVC ISOL VLV SYS – CL (hold 5 sec, tb-CL)
√BK ISOL VLV – CL (hold 5 sec, tb-CL)
If HYD sys 1 leaking:
√LG EXT D ISO VLV – CL (hold 5 sec, tb-CL)
If qty still decr:
2. If AOA:
 (Aff) HYD MN PUMP PRESS – LO
 If qty decr within 3 min:
 Go to APU SHUTDN >>
If not AOA:
 Go to APU SHUTDN

HYD RSVR T

BFS, SM SYS SUMM 2

1. BLR CNTLR/HTR – B(A)
If HYD RSVR T > 250:
2. HYD MN PUMP PRESS – LO
If HYD RSVR T > 268 and incr:
3. Perform APU SHUTDN
If AOA:
 At M = 7:
4. Go to APU COOLDOWN (A/E SYS, PLT WND
 FB, APU/HYD)

HYD ACCUM P (LOW)

BFS, SM SYS SUMM 2

HYD CIRC PUMP – ON
If aff APU running:
 HYD MN PUMP PRESS – NORM

W/B QTY (LOW)

BFS, SM SYS SUMM 2

- ⇒ 1. BLR CNTLR/HTR – B
2. √N2 SPLY – ON
If W/B QTY = 0 >>
Monitor W/B QTY for 2 min, then:
If W/B QTY change > 3:
3. Go to APU SHUTDN



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COMM

COMMUNICATIONS



2-1

APCL/ALL/GEN O

COMM

ICOM LOST

1. (Aff) AUD CNTL sel – sel alt
- If still no ICOM AUDIO:
2. AUD CTR – 2

COMM LOST (mult pnls)

NOTE

Perform comm checks with MCC after each step

- ⇒
1. AUD CTR – 2
 - If all ICOM and A/G failed (check three ATUs):
 - R14:A,F 2. √cb AUD CTR (two) – cl
 3. Go to step 11 (both AUD CTRs failed)
 - C3 4. S-BD PM CNTL – PNL,CMD
 5. BFS, GNC 51 OVERRIDE
 Config for TDRS,STDN, or SGLS per COMM COVER (ASC):
 TDRS – ITEM 46 EXEC (*)
 STDN-HI – ITEM 47 EXEC (*)
 SGLS – ITEM 49 EXEC (*)
 If * not next to selected config:
 - A1 6. Config for STDN,SGLS, or TDRS per COMM COVER (ASC)
- | | STDN/SGLS | TDRS |
|---------------------|--------------|-----------|
| S-BD PM MODE sel | STDN LO/SGLS | TDRS DATA |
| NSP DATA RATE (two) | HI | HI |
| NSP CODING (two) | OFF | ON |
- C3 7. S-BD PM CNTL – PNL,CMD to effect reconfig

Cont next page

8. Sel best ant, F9 meter > 300 (if TDRS, reorient veh and try diff ant); if no joy, return to GPC

NOTE

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

A1L

9. Attempt UHF PRI,ALT and G (say freq) per COMM COVER (ASC) (30 sec reqd for site reconfig)
10. Bypass encryption (1 min reqd for MCC reconfig):
NSP ENCRYPTION MODE – SEL
SEL – BYP
11. Confirm U/L CMD capability:
Cue MCC with: ITEM 88 +8 8 8 8 8 8
Check flashing U/L on PASS display
Ack with: ITEM 99 +9 9 9 9 9 9
Check abort light cycling ON/OFF (MCC ack)
Check no flashing U/L
12. If U/L CMD confirmed: Go to MAL, COMM, SSR-1, LOSS OF ALL VOICE COMM >>
13. If still no comm and no U/L CMD, perform MAL, COMM, 2.3a, NO S-BD COMM: TDRS as time permits, then:
 14. Confirm GPS functioning properly:
BFS, GNC 55 GPS STATUS
√STAT = BLANK or BATT
√MODE = INS
√DG FAIL = BLANK
√P $1\sigma \leq 650$ (can be > 650 for no more than 5 min)

- * If GPS not functioning properly for 5 min, *
- * complete all ASC C/L actions, then *
- * perform REV 2 Deorb: LAUNCH DAY *
- * DEORBIT PREP (ORBIT 2) (CONT *
- * DEORB, LAUNCH DAY (ORBIT 2)), and *
- * as time permits once in OPS 3, perform *
- * GPS TROUBLE-SHOOTING (ENT PKT, *
- * GNC) *
- * *

NOTE

- * If GPS recovered with troubleshooting, *
- * return to step 15, following page, to *
- * determine Deorbit opportunity *

Cont next page

15. If GPS functioning properly for 10 min, complete all ASC C/L actions, then perform desired First Day PLS Deorbit considering weather forecasts, lighting conditions, and deorbit capability using PGSC-generated deorbit targets. Navigation accuracy will be maintained with automatic GPS updates once in OPS 2 or OPS 3

If REV 2 Deorb: LAUNCH DAY DEORBIT PREP (ORBIT 2) (CONT DEORB, LAUNCH DAY (ORBIT 2)) >>

If REV 3 Deorb: LAUNCH DAY DEORBIT PREP (ORBIT 3) (CONT DEORB, LAUNCH DAY (ORBIT 3)) >>

If REV 5 or 6 Deorb: ORBIT 5/6 DEORBIT (POST INSERT, ORBIT 5/6 D/O) >>

If REV 7 Deorb: POST INSERTION PROCEDURES (POST INSERT, POST INSERTION), then DEORB, NOMINAL DEORBIT PREP PROCEDURES

Delta entry:

Add 'GPS INCORPORATION (ENT PKT, GNC)' at TIG -2:00 hours



DPS

DATA PROCESSING SYSTEM



3-1

APCL/ALL/GEN O

DUAL DPS DISPLAY COMMANDERS/DK XMTR 1(2,3)

1. BFC CRT SEL – aff IDP
- If reqd to clean up display:
2. (Aff) IDP/CRT PWR – OFF,ON

PASS DISPLAY FAIL

1. MDU PWR – OFF,ON; if recovered >>
 2. GPC/CRT – same GPC/aff IDP; if recovered >>
 3. BFC CRT SEL – aff IDP; if both IDPs OK go to step 9
 4. – orig posn
 5. Report MDU symptoms
- If MCC GO for pwr cycle:
6. IDP/CRT PWR – OFF,ON; if recovered >>
- If MDU blank or autonomous:
7. Set other MDU on same IDP to DPS Mode; if recovered >>
 8. Return other MDU to nominal config
 9. Deassign aff IDP from PASS
 10. GPC/CRT 04 EXEC
 11. In PASS: GPC/CRT 44 EXEC

BFS DISPLAY FAIL

1. If IDP4(CRT4): IDP/CRT4 PWR – OFF >>
 2. MDU PWR – OFF,ON; if recovered >>
 3. BFC CRT SEL – unaff IDP; if both IDPs OK >>
 4. – orig posn
 5. BFC CRT DISPLAY – OFF,ON; if recovered >>
 6. In PASS: GPC/CRT 5/X for aff IDP; if recovered >>
 7. Report MDU symptoms
- If MCC GO for pwr cycle:
8. IDP/CRT PWR – OFF,ON; if recovered >>
- If MDU blank or autonomous:
9. Set other MDU on same IDP to DPS Mode; if recovered >>
 10. Return other MDU to nominal config
 11. BFC CRT SEL – unaff IDP
 12. Deassign aff IDP from PASS
 13. GPC/CRT 04 EXEC
 14. In PASS: GPC/CRT 44 EXEC

FLT INST DISPLAY ANOMALY

1. DATA BUS sel alt FC BUS(s); if recovered >>
2. PORT SELECT aff MDU; if recovered >>
3. MDU PWR – OFF,ON

SUBSYS STATUS DISPLAY ANOMALY

1. PORT SELECT aff MDU; if recovered >>
2. MDU PWR – OFF,ON

BCE STRG X (no 'MDM OUTPUT' msg)

If IMU:

1. **GNC 51 OVERRIDE**
Aff IMU(s) – desel
2. I/O RESET
- ◆ 3. If recovered: IMU – resel >>
4. **GNC 1 DPS UTILITY**
Aff String – port mode
5. If recovered: Go to step 9
6. (Aff) MDM FF – OFF,ON
7. I/O RESET; if recovered: Go to step 9
8. **GNC 1 DPS UTILITY**
Orig ports – resel
9. BFS I/O RESET
- ◆ 10. If IMU recovered:
GNC 51 OVERRIDE
Aff IMU(s) – resel >>

If 'BCE STRG 3 NSP':

11. I/O RESET; if recovered >>
- If msg repeats and LOS/no comm:
12. Go to COMM LOST, step 4 (**COMM**), 2-2 >>

If any other BCE BYP:

13. I/O RESET; if recovered: BFS I/O RESET >>
14. **GNC 1 DPS UTILITY**
Aff String – port mode
- ⇒ 15. BFS I/O RESET; if recovered or if GPS >>
16. (Aff) MDM FA/FF – OFF,ON
17. I/O RESET; if recovered:
BFS, GNC 51 OVERRIDE
If reqd: aff SURF feedback
RGA or AA – resel >>
18. **GNC 1 DPS UTILITY**
Orig ports – resel
19. BFS I/O RESET; if recovered >>
- If msg repeats and is 'BCE STRG B/C/D':
20. If 'BCE STRG 1D(4D)': L(R) OMS – sel SEC GMBL
21. If 'BCE STRG B':
BFS, GNC 51 OVERRIDE
Aff AA – desel
22. If 'BCE STRG D':
BFS, GNC 51 OVERRIDE
Aff SURF feedback, RGA – desel
23. If 'BCE STRG 2C': Go to MPS VACUUM INERT
(**MPS**), 9-3

APCL/ALL/GEN O

DISPLAY FAIL/ANOMALIES 3-3

BCE STRG X

MULT DATA PATH LOSS (non-Recov)

NOTE

If LRU data path loss due to GPC prob and not MDM,
BFS will pick up MDM(s)/LRU(s) when engaged

FAILURE	TYPE	ACTIONS
GPC/FF any combo	I/O or B	No impact
GPC/FA 1,2	I/O	Preburn (TVC): L OMS ENG – OFF
GPC/FA 1,3 or 2,4	I/O	Preburn (IGN): R OMS ENG – OFF
GPC/FA 1,4 or 2,3	I/O	Preburn (IGN): L OMS ENG – OFF
GPC/FA 3,4	I/O	Preburn (TVC): R OMS ENG – OFF

BFS GPC FAIL

1. GPC MODE – STBY,HALT
 - ◆ OUTPUT – TERM
 - ⇒ MODE – STBY
- If BFS cannot drive an IDP:
2. GPC MODE – HALT, then go to step 10
 3. PRO to OPS 106
 4. BFS, OPS 000 PRO
 5. PRO to OPS 302; load TGTs (PEG 7)
- If BFS in desired MM (302):
6. GPC MODE – RUN
 7. OUTPUT – B/U
 8. Advise MCC BFS in BACKUP >>
 9. ✓GPC MODE – STBY (BFS is SM only)
 10. If no comm: sel best S-BD PM ANT

PASS GPC (1st FAIL)

- ⇒ 1. (Aff) GPC PWR – OFF
- ◆ 2. MPS PRPLT DUMP B/U LH2 VLV – OP
- If String 1(4) and performing burn in OPS 1:
- If GPC failed post-ET SEP:
3. MDM FF1(4) – OFF, ON
 4. **GNC 51 OVERRIDE**
Aff IMU – desel
 5. L(R) OMS GMBL – sel SEC
6. √MULT DATA PATH LOSS, then:
7. Reassign IDPs as reqd
- If AOA, at MM301 trans:
8. (All) FCS CH – AUTO
 9. Reassign aff string to highest # GPC

PASS GPC (2nd FAIL)

- ⇒ 1. (Aff) GPC PWR – OFF
- If String 1(4) and performing burn in OPS 1:
- If GPC failed post-ET SEP:
2. MDM FF1(4) – OFF, ON
 3. **GNC 51 OVERRIDE**
Aff IMU – desel
 4. L(R) OMS GMBL – sel SEC
5. √MULT DATA PATH LOSS, then:
6. Reassign IDPs as reqd
 7. On MCC call: Restrung 1 and 3 to one GPC, 2 and 4 to other
 8. If restrung OK, all FCS CH – AUTO
 9. BFS I/O RESET

PASS GPC BITE

- If cyclic GPC BITE on single PASS GPC:
1. Go to PASS GPC (1st FAIL) >>
- For Post Insertion:
2. Consider (aff) GPC failed

APCL/ALL/GEN O

MULT DATA PATH LOSS
BFS GPC FAIL

3-5

PASS GPC (1st)
PASS GPC (2nd)/BITE

SUMWORD ICC

NOTE

If only one GPC annun message, prob is at that GPC annun message

- ⇒ If AOA:
1. Prior to OPS 3 transition, config NBAT, then:
(Aff) GPC PWR – OFF
- If Uphill:
2. Consider (aff) GPC failed in Post Insertion

FA MDM I/O ERROR

- ◆ 1. I/O RESET; if recovered: Go to step 18
- ⇒◆ 2. MPS PRPLT DUMP B/U LH2 VLV – OP
3. If MDM FA1(4): L(R) OMS – sel SEC GMBL
If no BFS 'BCE STRG X PASS' (MDM prob):
 4. **GNC 1 DPS UTILITY**
Aff String – port mode
 5. If recovered: Go to step 18
If OMS not burning and MCC GO for pwr cycle:
 6. MDM FA – OFF,ON
 7. I/O RESET
 8. If recovered: Go to step 18
 9. **GNC 1 DPS UTILITY**
Orig ports – reset
 10. If recovered: Go to step 18
 - If not recovered:
 11. **BFS, GNC 51 OVERRIDE**
Aff SURF feedback, RGA – desel
 12. BFS I/O RESET
 13. √MULT DATA PATH LOSS >>
- If BFS 'BCE STRG X PASS' (GPC prob):
 14. √MULT DATA PATH LOSS
On MCC call:
 15. Restrung to swap aff String with String 4
(if MDM FA4, swap Strings 3 and 4)
 - If GPC fails during restrung:
 16. (Aff) GPC PWR – OFF
 17. Restrung, assigning failed GPC string to highest # GPC
18. BFS I/O RESET
19. (All good) FCS CH – AUTO

FF MDM I/O ERROR

- ◆ 1. I/O RESET; if recovered, BFS I/O RESET >>
 - ⇒ If no BFS 'BCE STRG X PASS' (MDM prob):
 - 2. **GNC 1 DPS UTILITY**
Aff String – port mode
 - 3. BFS I/O RESET; if recovered >>
If MCC GO for pwr cycle:
 - 4. (Aff) MDM FF – OFF,ON
 - 5. I/O RESET; if recovered >>
 - 6. **GNC 1 DPS UTILITY**
Orig ports – resel
 - 7. BFS I/O RESET; if recovered >>
 - 8. **GNC 51 OVERRIDE**
Aff IMU – desel
 - 9. If MDM FF 1(4): L(R) OMS – sel SEC GMBL
 - 10. Go to step 11
 - If BFS 'BCE STRG X PASS' (GPC prob):
 - 11. √MULT DATA PATH LOSS, then:
 - If no BFS 'BCE STRG X PASS' (MDM prob):
 - 12. MDM FF1(2): CDR(PLT) disp sws – green dot
 - 13. **BFS, GNC 51 OVERRIDE**
Aff AA – desel >>
 - If BFS 'BCE STRG X PASS' (GPC prob):
 - On MCC call:
 - 14. Restriring to swap aff String with String 4 (if MDM FF4, swap Strings 3 and 4)
 - If GPC fails during restrig:
 - 15. (Aff) GPC PWR – OFF
 - 16. Restriring, assigning failed GPC string to highest # GPC
 - 17. BFS I/O RESET

APCL/ALL/GEN O

FF(FA) MDM OUTPUT

FAULT

(Take action only if annun by entire set)

If single 'MDM OUTPUT':

| 1. Go to FF(FA) MDM I/O ERROR >>

If both MDM FF and MDM FA annun:

2. I/O RESET

3. If reqd: BFS I/O RESET

If msgs repeat:

4. Go to PASS GPC (1st FAIL) >>

5. If reqd: (Aff) FCS CH – ORIDE,AUTO

PL MDM I/O ERROR

1. BFS I/O RESET; if recovered >>

⇒ 2. **GNC 1 DPS UTILITY**

PL1/2 – port mode

3. BFS I/O RESET; if recovered >>

If I/O Error PL for other PL MDM (GPC prob):

| 4. Repeat steps 2,3 if reqd to recover second PL MDM

If I/O Error PL repeats for same MDM and MCC GO for pwr cycle:

5. (Aff) MDM PL – OFF,ON

6. BFS I/O RESET; if recovered >>

If PL2 lost and no comm at AOS:

7. Sel best S-BD ANT

PCM I/O ERROR

BFS, SM SYS SUMM 1(2)

◆ 1. OI PCMMU PWR – 2(1)

BFS GPC IPL (on MCC Call)

NOTE

√MCC for reapplication of GMEMs as reqd

- MO42F Perform hardware dump:
1. GPC OUTPUT 5 – TERM
MEM DUMP sel – 5
MODE 5 – STBY
- After 8 min:
2. GPC MODE 5 – HALT
OUTPUT 5 – NORM
MEM DUMP sel – OFF
 3. IPL SOURCE – MMU 1
 4. GPC PWR 5 – OFF,ON
IPL 5 pb – push (tb-IPL, then bp within 2 min)
- When tb – bp:
5. BFC CRT DISP – ON
SEL – 3+1 (expect big 'X', POLL FAIL)
IDP3 – LOAD
GPC MODE 5 – STBY (tb remains bp; expect CAM)
Verify GPC IPL MENU displayed (within 2 min)
- On IPL MENU:
6. Press MSG RESET to cycle thru MSGS STILL IN LIST
 7. Load BFS software – ITEM 2 EXEC (*)
- When 'BSL ... LOADED' appears (within 2 min):
8. MSG RESET pb – push
- When 'KSC ... SET MMU SEL SW TO OFF' appears (within 2 min):
9. IPL SOURCE – OFF
 10. MSG RESET pb – push
(repeat until 'MSG STILL IN LIST' = 0)
 11. √GPC MODE 5 tb – RUN (BFS MEMORY appears within 15 sec):
 12. Go to BFS GPC FAIL, step 5

ASC/AOA TRANSITION RESTRING

	1. Config MC1(3) NBAT as reqd
	2. √ <u>G53</u> aff SURF FDBK – desel (*)
	3. ASAP, (aff) GPC(s) – STBY,HALT
ASC	4. OPS Mode Recall: OPS XXX PRO
	5. BFS I/O RESET
AOA	6. OPS 301 PRO
	7. BFS, OPS 301 PRO



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EQUIPMENT COOLING MATRIX

AIR-COOLED		WATER-COOLED	
FORCED	FREE-FLOW		
AV BAY 1		AV BAY 1	
GPC 1,4 ① MLS RF & DECODER 1 AV BAY FAN A,B	BFC 1 (ENGAGE) CICU AA 1,4 TACAN 1 PROXIMITY SW INVERTER DIST & CNTL BRK CNTL 1 SMOKE DET A,B CURRENT SNSR ADTA 1,3	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 MLS RF & DECODER 2,3 AV BAY FAN A,B	BFC 2,3 (ENGAGE) AA 2,3 TACAN 2 PROXIMITY SW INVERTER DIST & CNTL BRK CNTL 2 SMOKE DET A,B CURRENT SNSRS ADTA 2,4	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 PL RF COAX SW OPS RECORDER 1,2 RADAR ALT 2 PSP 1,2
AV BAY 3A		AV BAY 3A	
GPC 3 ① AV BAY FAN A,B C/W LIMIT MODULE SSOR ②	S-BAND EQUIP: FM MLTPLXR QUAD ANT SW ASSEMBLY FM SIG PRCSR SW BEAM ANT CNTL ASSY FM RF SWITCH TACAN 3 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	

10/13/04

- ① GPC INSTALLATION REFERS TO CPU/IOP/MEMORY UNIT.
- ② IF FLOWN.

ECLS

Cont next page

OV103,104

A4-1

APCL/3,4/GEN O

EQUIPMENT COOLING MATRIX (Continued)

AIR-COOLED		WATER-COOLED
FORCED	FREE-FLOW	
CABIN		ECLSS EQUIPMENT BAY
MDUs (eleven) CAB FAN A,B IMU 1,2,3 IMU FANS ③ TV MONITORS RCU VSU MCIU IDP 1,2,3,4 MADS RCDR MS & PS STATION	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 ADC 1A,1B,2A,2B MCM HUD PDU L,R DDU 1,2,3	WATER PUMP 1A,1B SEC
		FLIGHT DECK MDM OF4

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

10/13/04

- ③ IMU FANS ARE LOCATED IN AVIONICS BAY 1 BUT CIRCULATE CABIN AIR RATHER THAN FLOW FROM AVIONICS BAY 1 THROUGH THE IMUs FOR COOLING.

OV103,104

A4-2

APCL/ALL/GEN O

EQUIPMENT COOLING MATRIX

AIR-COOLED		WATER-COOLED	
FORCED	FREE-FLOW		
AV BAY 1		AV BAY 1	
GPC 1,4 ① MLS RF & DECODER 1	BFC 1 (ENGAGE) CICU AA 1,4 PROXIMITY SW GPS 1 INVERTER DIST & CNTL BRK CNTL 1 SMOKE DET A,B CURRENT SNSR ADTA 1,3	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
MIDDECK PL ② AV BAY FAN A,B			
AV BAY 2		AV BAY 2	
GPC 2,5 ① MLS RF & DECODER 2,3	BFC 2,3 (ENGAGE) AA 2,3 PROXIMITY SW INVERTER DIST & CNTL BRK CNTL 2 SMOKE DET A,B CURRENT SNSRS ADTA 2,4	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 PL RF COAX SW OPS RECORDER 1,2 RADAR ALT 2 PSP 1,2
MIDDECK PL ② AV BAY FAN A,B			
AV BAY 3A		AV BAY 3A	
GPC 3 ① AV BAY FAN A,B	S-BAND EQUIP: FM MLTPLXR QUAD ANT SW ASSEMBLY FM SIG PRCSR SW BEAM ANT CNTL ASSY FM RF SWITCH GPS 3 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
C/W LIMIT MODULE SSOR ②			
		AV BAY 3B	
		MTU KU-BAND SIGNAL PROCESSOR HUD ELECT 1,2 GPS 2	

07/10/07

- ① GPC INSTALLATION REFERS TO CPU/IOP/MEMORY UNIT.
- ② IF FLOWN.

ECLS

Cont next page

B4-1

OV105

APCL/5/GEN O

EQUIPMENT COOLING MATRIX (Continued)

AIR-COOLED		WATER-COOLED
FORCED	FREE-FLOW	
CABIN		ECLSS EQUIPMENT BAY
MDUs (eleven) CAB FAN A,B IMU 1,2,3 IMU FANS ③ TV MONITORS RCU VSU MCIU IDP 1,2,3,4 MADS RCDR MS & PS STATION	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 ADC 1A,1B,2A,2B MCM HUD PDU L,R DDU 1,2,3	WATER PUMP 1A,1B SEC
		FLIGHT DECK MDM OF4

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

10/13/04

- ③ IMU FANS ARE LOCATED IN AVIONICS BAY 1 BUT CIRCULATE CABIN AIR RATHER THAN FLOW FROM AVIONICS BAY 1 THROUGH THE IMUs FOR COOLING.

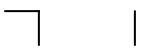
OV105

B4-2

APCL/ALL/GEN O



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CAB PRESS HIGH**BFS, SM SYS SUMM 1**

(14.7 REGS Closed)

1. If incr: LES O2 – OFF, open visor

If still incr:

2. N2 SYS 1,2 REG INLET (two) – CL (tb-CL)

3. O2 SYS 1,2 SPLY (two) – CL (tb-CL)

⇒ TROUBLESHOOT: MAL, ECLS, CABIN PRES ↑↓, 6.2b **1****FREON FLOW LOW****BFS, SM 0 THERMAL****BFS, SM SYS SUMM 2**

1. Switch pumps in aff loop(s)

If flow still low:

2. (Aff) RAD BYP VLV MAN SEL – RAD FLOW (hold 5 sec)

⇒ If flow still low in both loops, and pre OMS 2:

3. Go to LOSS OF 2 FREON LOOPS (AOA) (SYS AOA, 2 FREON LOOPS (AOA)), TIME CRITICAL PROCEDURES >>

If flow still low in both loops and post OMS 2:

4. Go to LOSS OF 2 FREON LOOPS (POST OMS-2) (PWRDN), 10-35, TIME CRITICAL PROCEDURES >>

If flow still low in one loop:

If RAD OUT T in good loop not incr in 3-5 min >>

If RAD OUT T in good loop incr in 3-5 min:

5. (Aff) FREON PUMP LOOP – OFF

If FREON LOOP 1(2) deactivated:

6. O2 SYS 1(2) SPLY – CL (tb-CL)

7. √(In good loop) FLOW PROP VLV LOOP – ICH

If EVAP OUT T not ~39 degF and stable:

8. FLASH EVAP CNTLR PRI A(B) – OFF

SEC – ON (HI LOAD ENA)

OV103,104

Cont next page

APCL/ALL/GEN O

**PCS SCHEMATIC
EQUIP COOL (4-1)**

A4-5

**CAB PRESS HIGH
FREON FLOW LOW**

- When EVAP OUT T stable:
9. FLASH EVAP CNTLR SEC – OFF
PRI A(B) – ON
 10. Go to LOSS OF 1 FREON LOOP (PWRDN), 10-29
TROUBLESHOOT: MAL, ECLS, FREON FLOW LOW, 6.4b [1]

H2O LOOP PRESS LOW(HIGH)

BFS, SM SYS SUMM 1

- ⇒ 1. Switch to Loop 1
If press high in Loop 1:
| 2. Go to step 4
If press < 45 psia in Loop 1:
3. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
Switch pumps
If press still < 45 psia and CABIN HX OUT T incr:
4. H2O PUMP LOOP 1 – OFF
If press was high in Loop 2:
| 5. Go to step 8
If press was low in Loop 2:
6. √cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
H2O PUMP LOOP 2 – GPC
If CABIN HX OUT T not decr:
7. H2O PUMP LOOP 2 – OFF
8. MSTR MADS PWR – OFF
9. Use only one IDP/CRT with two MDUs
10. TACAN MODE sel (three) – OFF
11. √MLS (three) – OFF
12. HUM SEP A(B) – OFF
13. RDR ALTM (two) – OFF

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A4-6

APCL/3,4/GEN O

If both H2O loops lost and pre OMS 2:

14. Go to LOSS OF 2 H2O LOOPS (AOA) (SYS AOA, 2 H2O LOOPS (AOA)), TIME CRITICAL PROCEDURES >>

If both H2O loops lost and post OMS 2:

15. Go to LOSS OF 2 H2O LOOPS (POST OMS-2) (PWRDN), 10-21, TIME CRITICAL PROCEDURES

AV BAY TEMP HIGH

BFS, SM SYS SUMM 2

- ⇒ 1. (Aff) AV BAY FAN A,B (two) – ON

If temp not decr:

2. Switch H2O loops

If temp not decr:

3. H2O LOOP 1(2) BYP MAN – DECR (hold 40 sec)

If temp still incr:

4. Go to LOSS OF AV BAY COOLING/AV BAY FIRE (PWRDN), 10-7/10-10/10-13

TROUBLESHOOT: MAL, ECLS, AV BAY TEMP, 6.1b **1**

AV BAY FAN ΔP

BFS, SM SYS SUMM 2

- ⇒ If AV Bay 1 aff:

1. AV BAY 1 FAN A – ON
2. AV BAY 1 FAN B – OFF

If AV Bay 2 aff:

3. AV BAY 2 FAN B – ON
4. AV BAY 2 FAN A – OFF

If AV Bay 3 aff:

5. AV BAY 3 FAN A – ON
6. AV BAY 3 FAN B – OFF

If FAN ΔP still high(low) and AV BAY TEMP decr, airflow is lost:

7. Go to LOSS OF AV BAY COOLING/AV BAY FIRE (PWRDN), 10-7/10-10/10-13

TROUBLESHOOT: MAL, ECLS, AV BAY FAN ΔP, 6.1c **1**

APCL/3,4/GEN O

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H2O LOOP P

A4-7

**AV BAY TEMP/HIGH
AV BAY FAN ΔP**

CAB FAN FAIL

BFS, SM SYS SUMM 1

- ⇒ 1. Switch fans
If no CAB FAN airflow:
2. Go to LOSS OF 2 CAB FANS (PWRDN), 10-2
TROUBLESHOOT: MAL, ECLS, CABIN FAN ΔP, 6.1a 1

EMER PLBD OPENING

- R13L 1. PL BAY DR SYS (two) – ENA
CRTX X: BFS, SM 63 PL BAY DOORS
2. AC POWER ON – ITEM 1 EXEC (*)
AUTO MODE SEL – ITEM 3 EXEC (*)
PBD SW BYPASS – ITEM 14 EXEC (*)
OPEN – ITEM 15 EXEC (*)
3. √CENTER LATCHES 5-8,9-12 (two) – blank,OP (~20 sec)
√1-4,13-16 (two) – blank,OP (~20 sec)
√STBD FWD,AFT LATCHES (two) – blank,OP (~30 sec)
√DOOR – RDY,blank,OP (~63 sec)
√PORT FWD,AFT LATCHES (two) – blank,OP (~30 sec)
√DOOR – RDY,blank,OP (~63 sec)
4. STOP – ITEM 16 EXEC (*)
PBD SW BYPASS – ITEM 14 EXEC (no *)
AC POWER OFF – ITEM 2 EXEC (*)
- R13L 5. PL BAY DR SYS (two) – DSBL
L1 6. RAD CNTLR LOOP (two) – AUTO A
Wait 10 sec:
RAD BYP VLV MODE (two) – AUTO

NOTE

Do not perform RAD ACT in POST INSERTION

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A4-8

APCL/ALL/GEN O

CAB PRESS HIGH**BFS, SM SYS SUMM 1**

(14.7 REGS Closed)

1. If incr: LES O2 – OFF, open visor

If still incr:

2. N2 SYS 1,2 REG INLET (two) – CL (tb-CL)

3. O2 SYS 1,2 SPLY (two) – CL (tb-CL)

⇒ TROUBLESHOOT: MAL, ECLS, CABIN PRES ↑↓, 6.2b **1****FREON FLOW LOW****BFS, SM 0 THERMAL****BFS, SM SYS SUMM 2**

1. Switch pumps in aff loop(s)

If flow still low:

2. (Aff) RAD BYP VLV MAN SEL – RAD FLOW (hold 5 sec)

⇒ If flow still low in both loops, and pre OMS 2:

3. Go to LOSS OF 2 FREON LOOPS (AOA) (SYS AOA, 2 FREON LOOPS (AOA)), TIME CRITICAL PROCEDURES >>

If flow still low in both loops and post OMS 2:

4. Go to LOSS OF 2 FREON LOOPS (POST OMS-2) (PWRDN), 10-35, TIME CRITICAL PROCEDURES >>

If flow still low in one loop:

If RAD OUT T in good loop not incr in 3-5 min >>

If RAD OUT T in good loop incr in 3-5 min:

5. (Aff) FREON PUMP LOOP – OFF

If FREON LOOP 1(2) deactivated:

6. O2 SYS 1(2) SPLY – CL (tb-CL)

7. √(In good loop) FLOW PROP VLV LOOP – ICH

If EVAP OUT T not ~39 degF and stable:

8. FLASH EVAP CNTLR PRI A(B) – OFF

SEC – ON (HI LOAD ENA)

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APCL/ALL/GEN O

**PCS SCHEMATIC
EQUIP COOL (4-1)**

B4-5

**CAB PRESS HIGH
FREON FLOW LOW**

- When EVAP OUT T stable:
9. FLASH EVAP CNTLR SEC – OFF
PRI A(B) – ON
 10. Go to LOSS OF 1 FREON LOOP (PWRDN), 10-29
TROUBLESHOOT: MAL, ECLS, FREON FLOW LOW, 6.4b [1]

H2O LOOP PRESS LOW(HIGH)

BFS, SM SYS SUMM 1

- ⇒ 1. Switch to Loop 1
If press high in Loop 1:
| 2. Go to step 4
If press < 45 psia in Loop 1:
3. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
Switch pumps
If press still < 45 psia and CABIN HX OUT T incr:
4. H2O PUMP LOOP 1 – OFF
If press was high in Loop 2:
| 5. Go to step 8
If press was low in Loop 2:
6. √cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
H2O PUMP LOOP 2 – GPC
If CABIN HX OUT T not decr:
7. H2O PUMP LOOP 2 – OFF
8. MSTR MADS PWR – OFF
9. Use only one IDP/CRT with two MDUs
10. √MLS (three) – OFF
11. HUM SEP A(B) – OFF
12. RDR ALTM (two) – OFF

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B4-6

OV105
APCL/5/GEN O

If both H2O loops lost and pre OMS 2:

13. Go to LOSS OF 2 H2O LOOPS (AOA) (SYS AOA, 2 H2O LOOPS (AOA)), TIME CRITICAL PROCEDURES >>

If both H2O loops lost and post OMS 2:

14. Go to LOSS OF 2 H2O LOOPS (POST OMS-2) (PWRDN), 10-21, TIME CRITICAL PROCEDURES

AV BAY TEMP HIGH

BFS, SM SYS SUMM 2

- ⇒ 1. (Aff) AV BAY FAN A,B (two) – ON

If temp not decr:

2. Switch H2O loops

If temp not decr:

3. H2O LOOP 1(2) BYP MAN – DECR (hold 40 sec)

If temp still incr:

4. Go to LOSS OF AV BAY COOLING/AV BAY FIRE (PWRDN), 10-7/10-10/10-13

TROUBLESHOOT: MAL, ECLS, AV BAY TEMP, 6.1b **1**

AV BAY FAN ΔP

BFS, SM SYS SUMM 2

- ⇒ If AV Bay 1 aff:

1. AV BAY 1 FAN A – ON
2. AV BAY 1 FAN B – OFF

If AV Bay 2 aff:

3. AV BAY 2 FAN B – ON
4. AV BAY 2 FAN A – OFF

If AV Bay 3 aff:

5. AV BAY 3 FAN A – ON
6. AV BAY 3 FAN B – OFF

If FAN ΔP still high(low) and AV BAY TEMP decr, airflow is lost:

7. Go to LOSS OF AV BAY COOLING/AV BAY FIRE (PWRDN), 10-7/10-10/10-13

TROUBLESHOOT: MAL, ECLS, AV BAY FAN ΔP, 6.1c **1**

APCL/5/GEN O

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H2O LOOP P

B4-7

**AV BAY TEMP/HIGH
AV BAY FAN ΔP**

CAB FAN FAIL

BFS, SM SYS SUMM 1

- ⇒ 1. Switch fans
If no CAB FAN airflow:
2. Go to LOSS OF 2 CAB FANS (PWRDN), 10-2
TROUBLESHOOT: MAL, ECLS, CABIN FAN ΔP, 6.1a 1

EMER PLBD OPENING

- R13L 1. PL BAY DR SYS (two) – ENA
CRTX X: BFS, SM 63 PL BAY DOORS
2. AC POWER ON – ITEM 1 EXEC (*)
AUTO MODE SEL – ITEM 3 EXEC (*)
PBD SW BYPASS – ITEM 14 EXEC (*)
OPEN – ITEM 15 EXEC (*)
3. √CENTER LATCHES 5-8,9-12 (two) – blank,OP (~20 sec)
√1-4,13-16 (two) – blank,OP (~20 sec)
√STBD FWD,AFT LATCHES (two) – blank,OP (~30 sec)
√DOOR – RDY,blank,OP (~63 sec)
√PORT FWD,AFT LATCHES (two) – blank,OP (~30 sec)
√DOOR – RDY,blank,OP (~63 sec)
4. STOP – ITEM 16 EXEC (*)
PBD SW BYPASS – ITEM 14 EXEC (no *)
AC POWER OFF – ITEM 2 EXEC (*)
- R13L 5. PL BAY DR SYS (two) – DSBL
L1 6. RAD CNTLR LOOP (two) – AUTO A
Wait 10 sec:
RAD BYP VLV MODE (two) – AUTO

NOTE

Do not perform RAD ACT in POST INSERTION

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B4-8

APCL/ALL/GEN O

IMU FAN FAIL

BFS, SM SYS SUMM 1

- ⇒ 1. Switch fans
If AOA and no fans:
2. IMU 1 – OFF
 3. **GNC 51 OVERRIDE**
IMU 1 – desel
 4. Perform OMS/RCS POST BURN RECONFIG (ASC, POST D/O BURN), then:
 5. IMU 1 – ON
 6. **GNC 21 IMU ALIGN**, wait for OPER * (~4 min), then:
I/O RESET
 7. Align IMU 1,3, using IMU/IMU option with IMU 2 as REF
When align complete:
 8. **GNC 51 OVERRIDE**
IMU 1 – sel
- If no fans:
After MM201 trans:
9. IMU 1,2 – OFF
 10. **GNC 21 IMU ALIGN**
IMU 1,2 – desel
 11. Perform IMU CONTINGENCY COOLING (IFM, PROCEDURES G THRU L), then:
 12. IMU 1,2 – ON
 13. **GNC 21 IMU ALIGN**, wait for OPER * (~4 min), then:
I/O RESET
 14. Align IMU 1,2 using IMU/IMU option with IMU 3 as REF
When align complete:
 15. IMU 1,2 – sel

APCL/ALL/GEN O

CAB FAN FAIL
EMER PLBD OPENING

4-9

IMU FAN FAIL

EVAP OUT T HIGH

BFS, SM SYS SUMM 2

If temp high in only one loop (snsr failed) >>

1. FLASH EVAP CNTLR PRI A(B) – OFF
B(A) – ON (wait 30 sec)

If EVAP OUT T decr (FES PRI A lost) >>

If EVAP OUT T not decr:

2. FLASH EVAP CNTLR PRI B(A) – OFF
SEC – ON (Hi Load ena)
(wait 30 sec)

If EVAP OUT T decr (Topping Evap lost):

3. TOP EVAP HTR DUCT sel – A/B >>

If EVAP OUT T not decr:

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

If EVAP OUT T decr (Hi Load Evap lost):

6. HI LOAD DUCT HTR sel – A/B
7. Go to LOSS OF HI LOAD EVAP (PWRDN), 10-33 >>

If EVAP OUT T not decr (FES lost):

8. TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF
9. HI LOAD DUCT HTR sel – OFF
10. √RAD BYP VLV MODE (two) – MAN
MAN SEL (two) – RAD FLOW (hold 5 sec)

⇒ If HI LOAD EVAP only lost:

11. Go to LOSS OF HI LOAD EVAP (PWRDN), 10-33 >>

If total FES lost:

12. FLASH EVAP CNTLR SEC – OFF
13. Perform EMER PLBD OPENING, then:
14. Go to LOSS OF FES/1 FC (PWRDN), 10-39

EVAP OUT T LOW

1. If temp low in only one loop (snsr failed) >>
 2. FREON PUMP LOOP 1,2 (two) – OFF
 3. H2O PUMP LOOP 1 (two) – ON,B
 4. FLOW PROP VLV LOOP 1,2 (two) – PL HX (tb-PL)
 5. O2 SYS 1,2 SPLY (two) – CL (tb-CL)
 6. √RAD BYP VLV MODE (two) – MAN
 7. √MAN SEL (two) – BYP (tb-BYP ~3 sec)
 8. FLASH EVAP CNTLR PRI A,B,SEC (three) – OFF
 - ◆ 9. FREON PUMP LOOP 1,2 (two) – B
NH3 CNTLR A,B (two) – SEC/ON
- Wait 3 min, then if any Freon Loop off:
10. FREON PUMP LOOP 1,2 (two) – B
- When EVAP OUT T > 55 for at least 2 min (NH3 depleted):
11. FLASH EVAP CNTLR PRI B – ON
 12. O2 SYS 1,2 SPLY (two) – OP (tb-OP)
 13. NH3 CNTLR A,B (two) – OFF

APCL/ALL/GEN O

EVAP OUT T HIGH

4-11

EVAP OUT T LOW

FREON LEAK

BFS, SM 0 THERMAL

If accum qty < 12% and decr:

1. FREON ISOL MODE – MAN
2. (Aff) FREON ISOL LOOP 1(2) – ISOL (hold for 5 sec)
- ⇒♦ 3. (Aff) FREON PUMP LOOP 1(2) – OFF
4. O2 SYS 1(2) SPLY – CL (tb-CL)
5. √(In good loop) FLOW PROP VLV LOOP – ICH (tb-ICH)

If EVAP OUT T not 39 degF and stable:

6. FLASH EVAP CNTLR PRI A(B) – OFF
SEC – ON (HI LOAD – ENA)

When EVAP OUT T stable:

7. FLASH EVAP CNTLR SEC – OFF
PRI A(B) – ON
8. Go to LOSS OF 1 FREON LOOP (PWRDN), 10-29

CAB PPO2 ABNORMAL

BFS, SM SYS SUMM 1

(14.7 REGS Closed)

If PPO2 ≤ 2.70:

1. Check tabs, close visor, LES O2 – ON

If PPO2 ≥ 3.60:

2. LES O2 – OFF, open visor
3. O2 SYS 1,2 SPLY (two) – CL (tb-CL)

TROUBLESHOOT: MAL, ECLS, PPO2 ↑↓, 6.2c 1

CAB PRESS LEAK
(14.7 REGS Closed)

BFS, SM SYS SUMM 1

- L2 1. CAB RELIEF A – CL (tb-CL),pause,
B – CL (tb-CL)
 - ⇒ 2. √VENT ISOL – ctr (tb-CL)
√VENT – ctr (tb-CL)
 - ML86B:B 3. cb MNA VAC VENT ISOL VLV – cl
 - ML31C 4. √VAC VENT ISOL VLV BUS SEL – MNA
CNTL – CL (tb-CL)
 - Side Hatch WCS 5. NEG PRES RLF vlv cover (two) – push firmly
 - 6. Remove urinal hose from hose block
 - 7. Check center hole (between hose block filters) in
hose block for airflow
 - If airflow detected (EMU drain induced cabin leak):
 - 8. Using Gray Tape, block center hole in hose
block (EMU drain)
 - 9. Go to MAL, ECLS, 6.2b, CABIN PRES ↑↓ **[66]**
>>
 - 10. Reinstall urinal hose
 - Inner Hatch 11. Remove INNER HATCH Equal vlv cap (two)
 - 12. Equal vlv (two) – OFF
 - If dP/dT zero: >>
 - 13. Equal vlv (two) – EMER
 - When CAB P < 13 psia:
 - 14. Record dP/dT EQ _____
 - 15. Check tabs, close visor, LES O2 – ON
 - R1 16. O2 TK 1,2,3 HTRS A,B (six) – AUTO
 - C5 17. If dP/dT EQ > 0.34: DIRECT O2 vlv – OP
 - 18. Perform LOSS OF CAB PRESS (MINOR PWRDN)
(PWRDN), 10-16, then:
 - If dP/dT EQ < 0.6 (stabilize CAB P at 8 psia):
 - L2 19. √O2/N2 CNTLR VLV SYS 2 – OP >>
 - 20. Perform LOSS OF CAB PRESS (MAJOR
PWRDN) (PWRDN), 10-17, then:
 - When CAB P decr < 6.5 psia:
 - L2 21. √O2/N2 CNTLR VLV SYS 2 – OP
- TROUBLESHOOT: MAL, ECLS, CABIN PRES ↑↓,
6.2b **[54]**

APCL/ALL/GEN O

FREON LEAK
CAB PPO2 ABNORM

4-13

CAB PRESS LK

CABIN DEPRESS FOR CRACKED WINDOW PANE (10.2 PSIA Cabin Depress)

BFS, SM SYS SUMM 1

NOTE

If broken glass free in cab, crew should perform CABIN DEPRESS FOR HAZARDOUS ATMOSPHERE and should remain on LES O2 (visors down) to prevent ingestion of glass. Expect possible Klaxon during depress

- ML86B:A 1. cb MNA H2O LINE HTR A – cl
- :B VAC VENT ISOL VLV – cl
- MNB VAC VENT NOZ HTR – cl
- ML31C 2. √VAC VENT ISOL BUS SEL – MNA
- VLV CNTL – OP (tb-OP)
- NOZ HTR – ON
- Middeck 3. CAB PURGE ISOL vlv – 0
- Floor vlv – MAX
- R1 4. O2 TK 1,2,3 HTRS A,B (six) – AUTO
- C5 Using DIRECT O2:
- 5. Maintain PPO2 > 2.2 and O2 conc < 29%
- Inner 6. Remove INNER HATCH cap (two)
- Hatch 7. Equal vlv (two) – EMER
- 8. Open INNER HATCH
- AW82B 9. AIRLK DEPRESS vlv cap – vent, remove and stow
- 10. AIRLK DEPRESS vlv – 5
- When CAB PRESS = 10.2:
- AW82B 11. AIRLK DEPRESS vlv – CL
- ML31C 12. VAC VENT ISOL VLV CNTL – CL (tb-CL)
- NOZ HTR – OFF
- Middeck 13. CAB PURGE ISOL vlv – CL
- Floor vlv – CL
- 14. Go to LAUNCH DAY DEORBIT PREP (ORBIT 2(3))
(CONT DEORB, LAUNCH DAY ORBIT 2(3)) >>

CABIN DEPRESS FOR HAZARDOUS ATMOSPHERE (8.0 PSIA Cabin Depress)

BFS, SM SYS SUMM 1

NOTE

Expect possible Klaxon during depress. Procedure for fire, haz spill, internal O2 leak, or cracked window pane with glass in cabin

- 1. √LES O2 – ON, close visor
- R1 2. O2 TK 1,2,3 HTRS A,B (six) – AUTO
- ML86B:A 3. cb MNA H2O LINE HTR A – cl
- :B VAC VENT ISOL VLV – cl
- MNB VAC VENT NOZ HTR – cl
- ML31C 4. √VAC VENT ISOL BUS SEL – MNA
- VLV CNTL – OP (tb-OP)
- NOZ HTR – ON
- Middeck 5. CAB PURGE ISOL vlv – 0
- Floor vlv – MAX
- Inner 6. Remove INNER HATCH cap (two)
- Hatch 7. Equal vlv (two) – EMER
- 8. Open INNER HATCH
- L1 9. H2O LOOP 2 BYP MAN – DECR (30 sec)
- If broken glass in cab, tox spill, or fire:
- 10. Go to MAL, ECLS FRP-3, FIRE/HAZ SPILL O2 CONTROL >>
- If Unisolable O2 Leak:
- 11. Go to MAL, ECLS FRP-4, O2 LEAK CONTROL >>

SMO THRM EVAP

BFS, SM 0 THERMAL

	AFF TEMP	STATUS	ACTION
H T R	EVAP HI LOAD	↑	L1 HI LOAD DUCT HTR sel – B >>
		↓	L1 HI LOAD DUCT HTR sel – A/B >>
		H, L, M	No action >>
T E M P	EVAP TOP DUCT	↑	L1 TOP EVAP HTR DUCT sel – B >>
		↓	L1 TOP EVAP HTR DUCT sel – A/B >>
		H, L, M	No action >>
	EVAP TOP NOZ L(R)	↑ or ↓	L1 (Aff) TOP EVAP HTR NOZ – B AUTO >>
		H, L, M	No action >>
		EVAP FDLN A(B)	↑ or ↓
H, L, M	No action >>		

APCL/ALL/GEN O

**CABIN DEPRESS
SMO THRM EVAP**

4-15

FULL-UP FES (Over)
POST-FIRE CLEANUP (4-18)
FIRE/SMOKE (4-20)

FULL-UP FES FLUSHING

NOTE

Use proc on MCC call only. Duct temps only available in OPS 2. This proc assumes both HI LOAD and Topper cores in operation (FULL-UP FES)

- L1 1. FLASH EVAP CNTLR PRI A,B,SEC (three) – OFF

HI LOAD CORE FLUSH

2. √HI LOAD DUCT HTR sel – A/B
3. √HI LOAD EVAP – ENA
4. FLASH EVAP CNTLR SEC – ON
Wait 30 sec
FLASH EVAP CNTLR SEC – OFF
Wait 30 sec
5. Repeat step 4 two additional times (three total), then:
FLASH EVAP CNTLR SEC – ON
6. Proceed on MCC call (wait minimum 7 min, then proceed when EVAP OUTs stable at 62 and HI LOAD DUCT temps > 170 degF)

* While waiting, if MCC reports HI LOAD DUCT *
* temps < 40, Hi Load flush not successful. If *
* Topping Core Flush to be performed, proceed *
* to step 7; otherwise, proceed to POST- *
* FLUSH FES CNTLR SELECTION *

TOPPER CORE FLUSH

7. √TOP EVAP HTR DUCT sel – A/B
8. HI LOAD EVAP – OFF
9. FLASH EVAP CNTLR SEC – ON
Wait 30 sec
FLASH EVAP CNTLR SEC – OFF
Wait 30 sec
10. Repeat step 9 two additional times (three total), then:
FLASH EVAP CNTLR SEC – ON
11. Proceed on MCC call (wait minimum 7 min, then proceed when EVAP OUTs stable at 62 and TOP FWD(AFT) DUCT temps > 120 degF)

* While waiting, if MCC reports TOP *
* FWD(AFT) DUCT temps < 40, Topper *
* Flush not successful. Proceed to *
* POST-FLUSH FES CNTLR *
* SELECTION *

Cont next page

POST-FLUSH FES CNTLR SELECTION

If both Topper and HI LOAD core flushes successful:

- 12. FLASH EVAP CNTLR SEC – OFF
HI LOAD EVAP – ENA
FLASH EVAP CNTLR PRI B – ON (GPC)
After 2.5 min, verify EVAP OUT temps ~39

If Topper flush not successful:

- 13. FLASH EVAP CNTLR SEC – OFF
HI LOAD EVAP – ENA
FLASH EVAP CNTLR SEC – ON

If HI LOAD flush not successful:

- 14. √FLASH EVAP CNTLR SEC – ON
HI LOAD EVAP – OFF
Perform LOSS OF HI LOAD EVAP (PWRDN), 10-33

POST-FIRE CABIN CLEANUP (Cab and Av Bay Fires)

Continue from FIRE/SMOKE Cue Card:

NOTE

This proc is to be performed
simo by three crewmembers

- CM1** 1. If Av Bay fire: Post OMS-1, perform LOSS OF AV BAY 1(2,3) COOLING/AV BAY 1(2,3) FIRE (PWRDN), 10-7/10-10/10-13
-

- CM2** L1 2. \sqrt CAB FAN A(B) – ON
3. Unstow CSA-CP
4. MODE pb – press, hold until 'RELEASE' displayed; wait ~1 min for nominal display
5. Sampling Pump sw – ON
6. Monitor cab atmosphere in vicinity of fire and report results to MCC
If HCN > 2.1, HCL > 1.0, or CO > 18 ppm:
LiOH Box 7. If HCL < 5 ppm, install ATCO and one fresh LiOH canister
8. If HCL > 5 ppm, install two fresh LiOH canisters
ML86B:B 9. cb MNA,MNB WCS CNTLR (two) – cl
MA73C:E AC1,2 WCS FAN SEP 1,2 (six) – cl
WCS 10. FAN SEP SEL sw – 1
If Av Bay 1 Fire:
11. HOSE BLOCK to SEP 2
12. FAN SEP SEL sw – 2
13. MODE – COMMODE/MANUAL/EMU
14. COMMODE CNTL – PULL UP
– PUSH FWD
15. Go to MAL, ECLS FRP-2, POST-FIRE CABIN CLEANUP CONTINUATION
-

- CM3** If Av Bay fire, set up for Av Bay purge:
16. Obtain from Cont Hose & Cable Kit (Window Shade Bag):
Free Fluid Nozzle
20-ft Y/Y Hose
Gray Tape
17. Connect Free Fluid Nozzle to Y/Y Hose
18. Insert tip of Free Fluid Nozzle into fire port of Av Bay
19. Secure nozzle and hose with Gray Tape
WCS 20. Mate free end of Y/Y Hose to Vacuum Vent QD

Cont next page

- ML86B:A
:B
- ML31C
21. VAC VLV – OP
 22. cb MNA(MNB) H2O LINE HTR A(B) – cl
MNA,MNB VAC VENT ISOL VLV (two) – cl
MNB VAC VENT NOZ HTR – cl
 23. √VAC VENT ISOL VLV BUS SEL – MNA
NOZ HTR – ON
ISOL VLV CNTL – OP (tb-OP)
 24. Report to MCC: “Av Bay purge is initiated”

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A4-19

APCL/ALL/GEN O

FIRE/SMOKE

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:

1. Go to step 6

If single Av Bay SMOKE DETN A(B) It and assoc CONC > 2:

2. SMOKE DETN CKT TEST – B(A) (25 sec)

If SMOKE DETN B(A) test good (It on):

3. SMOKE DETN CKT TEST – OFF

4. SNSR – RESET >>

If SMOKE DETN B(A) test bad (no It):

5. Go to step 6

If none of above >>

6. Check tabs, visors – CL
LES O2 – ON

If **AV BAY FIRE**:

7. FIRE SUPPR – ARM

pb – DISCH (push until lit)

8. If Ascent: AV BAY FAN (two) – OFF

9. If FIRE in Bay:

1: TACAN 1, MLS 1 – OFF

2: TACAN 2, MLS 2,3 – OFF

3: TACAN 3 – OFF

If **CABIN FIRE**:

10. CAB FAN A,B (two) – OFF (max 20 min)

11. Locate source (see matrix, facing page)

12. Unpwr source of smoke

If smoke persists or source cannot be unpwr:

WARNING

Discharge is propulsive

13. Discharge handheld FIRE EXTGHR

If Ascent:

14. Post MECO, go to POST-FIRE CABIN CLEANUP (ASC PKT,
ECLS) >>

If Entry and prior to TIG:

15. Go to ECLS FRP-3, FIRE/HAZ SPILL O2 CONTROL, step 3
(MAL)

Cont next page

OV103,104

A4-20

APCL/3,4/GEN O

- ML86B:A
:B
- ML31C
21. VAC VLV – OP
 22. cb MNA(MNB) H2O LINE HTR A(B) – cl
MNA,MNB VAC VENT ISOL VLV (two) – cl
MNB VAC VENT NOZ HTR – cl
 23. √VAC VENT ISOL VLV BUS SEL – MNA
NOZ HTR – ON
ISOL VLV CNTL – OP (tb-OP)
 24. Report to MCC: “Av Bay purge is initiated”

OV105

B4-19

APCL/ALL/GEN O

FIRE/SMOKE

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:

1. Go to step 6

If single Av Bay SMOKE DETN A(B) It and assoc CONC > 2:

2. SMOKE DETN CKT TEST – B(A) (25 sec)

If SMOKE DETN B(A) test good (It on):

3. SMOKE DETN CKT TEST – OFF

4. SNSR – RESET >>

If SMOKE DETN B(A) test bad (no It):

5. Go to step 6

If none of above >>

6. Check tabs, visors – CL
LES O2 – ON

If **AV BAY FIRE**:

7. FIRE SUPPR – ARM

pb – DISCH (push until lit)

8. If Ascent: AV BAY FAN (two) – OFF

9. If FIRE in Bay:

1: GPS 1, MLS 1 – OFF

2: MLS 2,3 – OFF

3: GPS 3 – OFF

If **CABIN FIRE**:

10. CAB FAN A,B (two) – OFF (max 20 min)

11. Locate source (see matrix, facing page)

12. Unpwr source of smoke

If smoke persists or source cannot be unpwr:

WARNING

Discharge is propulsive

13. Discharge handheld FIRE EXTGHR

If Ascent:

14. Post MECO, go to POST-FIRE CABIN CLEANUP (ASC PKT,
ECLS) >>

If Entry and prior to TIG:

15. Go to ECLS FRP-3, FIRE/HAZ SPILL O2 CONTROL, step 3
(MAL)

Cont next page

B4-20

OV105

APCL/5/GEN O

ALARM SEQUENCE	SOURCE AREA
<p style="text-align: center;">L(R) FLT DK</p> <p style="text-align: center;">or</p> <p>L(R) FLT DK → CABIN</p>	<p style="text-align: center;">PS(MS), L(R) CONSOLE</p>
<p>L(R) FLT DK ↔ R FLT DK</p>	<p style="text-align: center;">AFT FLT DK, MIDDECK</p>
<p style="text-align: center;">CABIN</p> <p style="text-align: center;">or</p> <p>CABIN → L FLT DK</p> <p style="text-align: center;">↕</p> <p>CABIN → R FLT DK</p>	<p style="text-align: center;">FWD FLT DK, WCS, LEB</p>



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ELECTRICAL POWER SYSTEM

EPS



5-1

APCL/ALL/GEN O

**MN BUS UNDERVOLTS
FC VOLTS**

BFS, 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 pwr'd after untie:

3. Go to aff MN BUS LOSS ACTION (MN bus or tie bus short) >>

If short eliminated and all MN buses pwr'd 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 pwr'd:

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

- L 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 VLV – CL (tb-CL)

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

If FC VOLTS ≥ 32 (bus short):

CAUTION

Do not bus tie to shorted bus

EPS

10. Go to aff MN BUS LOSS ACTION >>

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

(FC disconnect, check APUs):

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:

Cont next page

If FC3 aff:

15. PL PRI FC3 – ON (tb-ON)
MNC – ON (tb-ON)

If first FC prob:

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

APCL/ALL/GEN O

**MN BUS UNDERVOLTS/
FC VOLTS**

5-3

AC VOLTS (LOW or HIGH)

BFS, SM SYS SUMM 1

- ⇒ 1. If AC OVERLOAD F7 light or 'SM1 AC OVLD' msg: Go to AC OVERLOAD >>

If single Φ AC VOLTS > 123 or between 10 and 110 (confirm with F9 meter):

- : 2. (Aff) cb AC CONTR – cl
- : INV/AC BUS – OFF (tb-OFF)
- : INV PWR – OFF (tb-OFF)
- : cb AC CONTR – op
- : If other Φ AC VOLTS < 110 or AC AMPS > 14:
- : 3. Go to step 6
- : If other Φ AC AMPS > 10:
- : : 4. Isolate shorted Φ : Open all aff AC1(2,3)
- : : three- Φ ganged cbs and all aff AC1(2,3)
- : : Φ A(B,C) single- Φ cbs as follows:
- ~ ~

Cont next page

5-4

APCL/ALL/GEN O

total number of cbs to √ open

BUS	L4	MA73C
AC1 3Φ	1	5
ΦA	16	5
ΦB	16	4
ΦC	13	5
AC2 3Φ	0	9
ΦA	15	5
ΦB	16	4
ΦC	14	5
AC3 3Φ	1	7
ΦA	15	3
ΦB	16	3
ΦC	13	3

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

APCL/ALL/GEN O

AC VOLTS (LOW or HIGH) 5-5

AC OVERLOAD

BFS, SM SYS SUMM 1

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

: If single Φ:

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

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

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

total number of cbs to √ open

BUS	L4	MA73C
AC1 3Φ	1	5
ΦA	16	5
ΦB	16	4
ΦC	13	5
AC2 3Φ	0	9
ΦA	15	5
ΦB	16	4
ΦC	14	5
AC3 3Φ	1	7
ΦA	15	3
ΦB	16	3
ΦC	13	3

Cont next page

```

~
:
:
L 4. Go to aff BUS LOSS ACTION >>
: If multi  $\Phi$  (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 AC VOLTS between 110 and 123 and AC AMPS < 14:
7.  $\sqrt{3}$ AC BUS SNSR – MON
   Do not take snsr – AUTO
8. Go to MAL, EPS, AC OVLD 1(2,3) ↓, 7.5b 6

```

APCL/ALL/GEN O

AC OVERLOAD
ESS BUS V LOW (5-9)

3 Φ AC MTRS (5-8)
5-7 CNTL BUS V LOW/RPC (5-10)

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 3Φs) BUS LOSS ACTION

1. Determine aff AC BUS:
FC1 and FREON PUMP 2B: AC1
FC2 and FREON PUMP 1B: AC2
FC3 and CAB FAN A: AC3
2. (Aff) FC – STOP
If AC3 aff:
 3. AV BAY 3 FAN B – OFF
A – ON
CAB FAN A – OFFIsolate aff ΦB(ΦC,ΦA):
 4. (Aff) cb AC CONTR – cl
INV/AC BUS – OFF (tb-OFF)If AC1(2,3) aff and AV BAY FAN 3(2,3) ΔP ≥ 0.5:
 5. Go to step 12 (bad Φ isolated)
 6. (Aff) INV/AC BUS – ON (tb-ON)
cb AC CONTR – op
 7. Repeat from step 4 for aff ΦC(ΦA), then:
Drop aff AC bus (three Φs):
 8. (Aff) cb AC CONTR (three) – cl
 9. INV/AC BUS – OFF (tb-OFF)
 10. INV PWR – OFF (tb-OFF)
 11. Go to aff AC BUS (2 or 3Φs) BUS LOSS ACTION >>Bad Φ isolated:
 12. (Aff) INV PWR – OFF (tb-OFF)
cb AC CONTR – op
FC – START (10 sec or ΔP tb-gray)
 13. If AC3 aff: CAB FAN B – ON
 14. Go to aff Φ BUS LOSS ACTION

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]
4. Go to aff BUS LOSS ACTION (ESS)

CNTL BUS V LOW/CNTL BUS RPC BFS, SM SYS SUMM 1

WARNING
 If VISIBLE FIRE/SMOKE AT ANY TIME, cb CNTL BUS AB1/2/3(BC1/2/3,CA1/2/3) – op (pnl R14:B)

NOTE

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

1. Identify BUS (√BUS LOSS ID)
- If BC2:
 2. Perform COMM LOST, steps 4 and 5 (COMM), 2-2, then:
- ⇒ If critical (per MCC):
 - ◆ 3. Go to CNTL BUS V LOW/CNTL BUS RPC, step 2 (ORB PKT, EPS) >>
 - ◆ If one CNTL BUS RPC tripped (*):

Aff CNTL BUS:

AB1(2,3)

	Tripped RPC (*)	Action (for RESET, hold w/sw reten device)
4.	A	R1 CNTL BUS PWR MNB – RESET R14:B cb CNTL BUS AB1/2/3 – op
5.	B	R1 CNTL BUS PWR MNA – RESET R14:B cb CNTL BUS AB1/2/3 – op

BC1(2,3)

	Tripped RPC (*)	Action (for RESET, hold w/sw reten device)
6.	B	R1 CNTL BUS PWR MNC – RESET R14:B cb CNTL BUS BC1/2/3 – op
7.	C	R1 CNTL BUS PWR MNB – RESET R14:B cb CNTL BUS BC1/2/3 – op

CA1(2,3)

	Tripped RPC (*)	Action (for RESET, hold w/sw reten device)
8.	C	R1 CNTL BUS PWR MNA – RESET R14:B cb CNTL BUS CA1/2/3 – op
9.	A	R1 CNTL BUS PWR MNC – RESET R14:B cb CNTL BUS CA1/2/3 – op

◆ If no CNTL BUS RPC tripped (no *):

	aff CNTL BUS	Panel R1 action (hold w/sw reten device)
10.	AB1(2,3)	CNTL BUS PWR MNA,MNB (two) – RESET
11.	BC1(2,3)	CNTL BUS PWR MNB,MNC (two) – RESET
12.	CA1(2,3)	CNTL BUS PWR MNA,MNC (two) – RESET

For all CNTL V < 25.0:

13. Perform BUS LOSS ACTION (CNTL), then:

If AOA >>

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

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

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

16. Hold crit function sw

For tripped RPC:

R1 17. CNTL BUS PWR MNA(MNB,MNC) – RESET (1 sec),
then dn

FC COOLANT PUMP ΔP LOW

BFS, SM SYS SUMM 1

- If other 3Φ AC motors aff, and AC VOLTS OK:
1. Go to 3Φ AC MOTORS STOPPED >>
- ⇒ O14 2. √(Aff) FC CNTLR – ON
(O15,O16) FC – START (10 sec or ΔP tb-gray)
- If FC EXIT T > 164 and not decr or
RDY tb – bp (30 sec after START) or
L4:C (aff) FC PUMPS cb(s) – op:
3. Go to FC SHUTDN (Cue Card) >>
- If FC EXIT T norm, RDY tb – gray, no MCC in 5 min:
- O14 4. Note AC1(2,3) AMPS, then FC – STOP
(O15,O16)
- If AMPS decr:
- If decr 0.7-0.9 amp/Φ:
- O14 5. FC – START (hold 30 sec if ΔP tb-bp)
(O15,O16)
6. If AMPS incr 0.7-0.9 amp/Φ >>
 7. Go to FC SHUTDN (Cue Card)

FC REACTANT VLV CLOSED

BFS, SM SYS SUMM 1

- R1 1. FC REAC VLV (three) – OP (tb-OP or hold 1 sec max)
2. Perform BUS TIE (Cue Card), then:
If no joy on REAC open:
- C3 3. √cb FC REAC VLV CL ENA (three) – op
- R1 4. FC REAC VLV (three) – OP (tb-OP or hold 10 sec)
- If aff FC COOL P < 50 (ALERT):
5. Go to FC SHUTDN (Cue Card)

FC COOL P

BFS, SM SYS SUMM 1

1. Perform BUS TIE (Cue Card), then:
⇒ If COOL P > 75, incr, and not 100 (H),
or FC COOL PUMP = ΔP (intermittent),
or FC STACK/EXIT TEMP unstable:
 2. Go to FC SAFING >>
- If COOL P < 50:
 3. Go to FC SHUTDN (Cue Card) >>
4. Two min after bus ties: Record Δ AMPS between aff and tied FC, and monitor for 20 min
- If change in Δ AMPS > 12:
 5. Go to FC SHUTDN (Cue Card)

TROUBLESHOOT:

Post Insert: If COOL P ↓, do not press SPLY H2O TKA until MCC GO. Vent TKs B,C,D before TKA fills.
MAL, EPS, FUEL CELL COOL P ↑↓, 7.3e 1

APCL/ALL/GEN O

FC COOL PUMP Δ P LOW
FC REAC VLV CLOSED

5-13

FC COOL P

FC STACK T

BFS, SM SYS SUMM 1

1. MSTR MADS PWR – OFF
- If FC STACK TEMP > 243 degF and incr:
2. If 2nd FC: Go to 2nd FC SHUTDN >>
 3. PL PRI (three) – OFF
- If aff FC amps < 190 or > 360:
4. Go to MN BUS UNDERVOLTS/FC VOLTS, step 7 >>
- ◆ 5. Perform BUS TIE (Cue Card), then:
6. ESS BUS SOURCE FC – OFF
 7. FC/MN BUS – OFF
- If aff FC VOLTS < 32 or FC STACK TEMP not decr:
8. (Aff) FC REAC VLV – CL
 9. After COOL P < 15 and FC STACK TEMP < 243 degF:
FC – STOP
 10. √PWRDN

TROUBLESHOOT:

MAL, EPS, FC STACK T 1(2,3) ↑↓, 7.1b 1

FC EXIT T

BFS, SM SYS SUMM 1

1. MSTR MADS PWR – OFF
 2. Perform BUS TIE (Cue Card), then:
- ⇒ If EXIT T > 164 and incr:
3. Go to FC SHUTDN (Cue Card) >>
- If EXIT T < 131 and decr and no comm:
4. Go to FC SHUTDN (Cue Card)

TROUBLESHOOT: MAL, EPS, FUEL CELL EXIT T ↑↓, 7.3d 1

FC pH 1(2,3)

BFS, SM SYS SUMM 1

- ⇒ 1. Perform BUS TIE (Cue Card), then:
If aff FC SS 1(2,3) $\Delta V > 150$:
| 2. Go to FC SAFING >>
If aff FC SS 1(2,3) $\Delta V < 150$:
3. FLASH EVAP CNTLR PRI A – OFF
B – ON
SEC (two) – B SPLY, OFF
SPLY H2O TKA INLET – CL (tb-CL)
TKB INLET – CL (tb-CL)
TKC OUTLET – CL (tb-CL)
TKD INLET – CL (tb-CL)
4. Two min after bus tie: Record Δ AMPS between aff and tied FC; monitor for 20 min
If no comm:
| If change in Δ AMPS > 12 or FC SS 1(2,3) $\Delta V \geq 150$:
| | 5. Go to FC SAFING >>
| If change in Δ AMPS ≤ 12 and FC SS 1(2,3) $\Delta V < 150$:
| | 6. Remain bus tied to monitor FC performance
If comm avail:
7. \sqrt{MCC}

TROUBLESHOOT: MAL, EPS, FC/H2O LINE pH HIGH, 7.3a 1

FC DELTA V 1(2,3)

BFS, SM SYS SUMM 1

1. Perform BUS TIE (Cue Card), then:
If aff FC pH \downarrow or FC ΔV incr:
| 2. Go to FC SAFING >>
If no aff FC pH \downarrow and FC ΔV not incr:
3. Two min after bus tie: Record Δ AMPS between aff and tied FC; monitor for 20 min
If change in Δ AMPS > 12 or FC ΔV incr:
| 4. Go to FC SAFING >>
If change in Δ AMPS ≤ 12 and FC ΔV not incr:
5. Remain bus tied to monitor FC performance

TROUBLESHOOT:

If FC pH \downarrow : MAL, EPS, FC/H2O LINE pH HIGH, 7.3a 1

APCL/ALL/GEN O

FC STACK T/FC EXIT T

5-15

FC pH/FC DELTA V

FC SHUTDN (1st)

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

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

2nd FC SHUTDN

BFS, 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 pwr one MN bus: Go to step 5
3. MN BUS TIE (three) – OFF (tb-OFF)
4. Perform BUS TIE (Cue Card) to good FC/BUS, then:
(Aff) ESS BUS SOURCE FC – OFF
 FC/MN BUS – OFF (tb-OFF)
 FC – STOP (COOL PUMP Δ P tb-bp or 1 sec)
6. FC REAC VLV – CL (tb-CL)
7. Go to LOSS OF 2nd FC (PWRDN), 10-43

BUS TIE (do not tie bus short, check APUs)

If MN Volts > 20: Bus Tie >>

If MN Volts < 20 (do not BUS TIE Pre MECO for 1st FC):

1. (Aff) AC BUS SNSR – OFF
2. cb AC CONTR (three) – cl
3. (Aff) INV/AC BUS – OFF (tb-OFF)
4. (Aff) INV PWR – OFF (tb-OFF)
5. If MNC(B) dn: CAB FAN A(B) – OFF
6. Bus Tie
7. (Aff) INV PWR – ON (tb-ON)
- ◆ 8. (Aff) INV/AC BUS – ON (tb-ON)
9. cb AC CONTR (three) – op
10. GNC I/O RESET

Post MECO:

11. (Aff) AC BUS SNSR – AUTO TRIP
12. If pwr dn not reqd: √CAB FAN A(B) – ON

FC SAFING

BFS, 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:
- : 8. FC1(2,3) REAC – CL (O2,H2 tb-CL)
- : If either FC REAC tb still OP:

- C3 : 9. cb FC1(2,3) REAC VLV CL ENA – cl
- : 10. FC REAC VLV 1(2,3) – CL

- : If no joy:
- R1 : 11. Install sw reten device FC REAC sw
- : When FC1(2,3) COOL P decr to < 15 or FC1(2,3) AMPS ≤ 0:
- : 12. ESS BUS SOURCE FC1(2,3) – OFF
- : 13. FC/MN BUS A(B,C) – OFF (tb-OFF)
- : When FC1(2,3) COOL P < 15, then:

- L 14. FC1(2,3) – STOP (ΔP tb-bp or 1 sec)

15. Go to LOSS OF FES/1 FC (2nd FC) (PWRDN),
10-39/10-43

APCL/ALL/GEN O

FC SHUTDN (1st)
2nd FC SHUTDN

5-17

BUS TIE/FC SAFING
CRYO O2(H2) (5-18)

**CRYO O2(H2) PRESS/
TEMP HIGH**

BFS, SM SYS SUMM 2

(Aff) O2(H2) TK HTRS (two) – OFF

For O2(H2) PRESS,

go to MAL, EPS, CRYO O2(H2) PRES, TK P ↓↑, 7.6b **1** >>

For H2 TEMP HIGH, go to MAL, EPS, H2 HTR T, 7.6f **1** >>

For O2 TEMP HIGH, go to MAL, EPS, O2 HTR T, 7.6l **1**

CRYO O2(H2) LEAK

BFS, SM SYS SUMM 2

1. Use meter if CRT data OSL

If multiple TK Ps low:

2. O2(H2) MANF VLV TK1,TK2 (two) – CL
TK1,TK2,TK3 HTRS (six) – AUTO

If either MANF VLV fails to close:

3. Hold sw in CLOSE posn (install sw reten device
if reqd), then:

⇒

If TK 1 and 2 P decr slowly (HTR logic fail):

4. O2(H2) MANF VLV TK1,TK2 (two) – OP
5. Go to MAL, EPS, CRYO O2(H2) PRES, TK P ↓↑,
7.6b **1** >>

6. Perform aff BUS TIE (Cue Card), then:

If O2(H2) TK1(2) aff (open unaff manf):

7. O2(H2) MANF VLV TK2(1) – OP

If O2 TK1(2) aff:

8. O2 SYS 1(2) SPLY – CL, then:

If O2 TK 1(2) P now incr (PCS leak):

9. O2 MANF VLV TK1,TK2 (two) – OP >>

10. Perform aff FC SHUTDN (Cue Card), then:

If aff TK P not decr (FC leak):

11. O2(H2) MANF VLV TK1,TK2 (two) – OP (ASAP if
FC3) >>

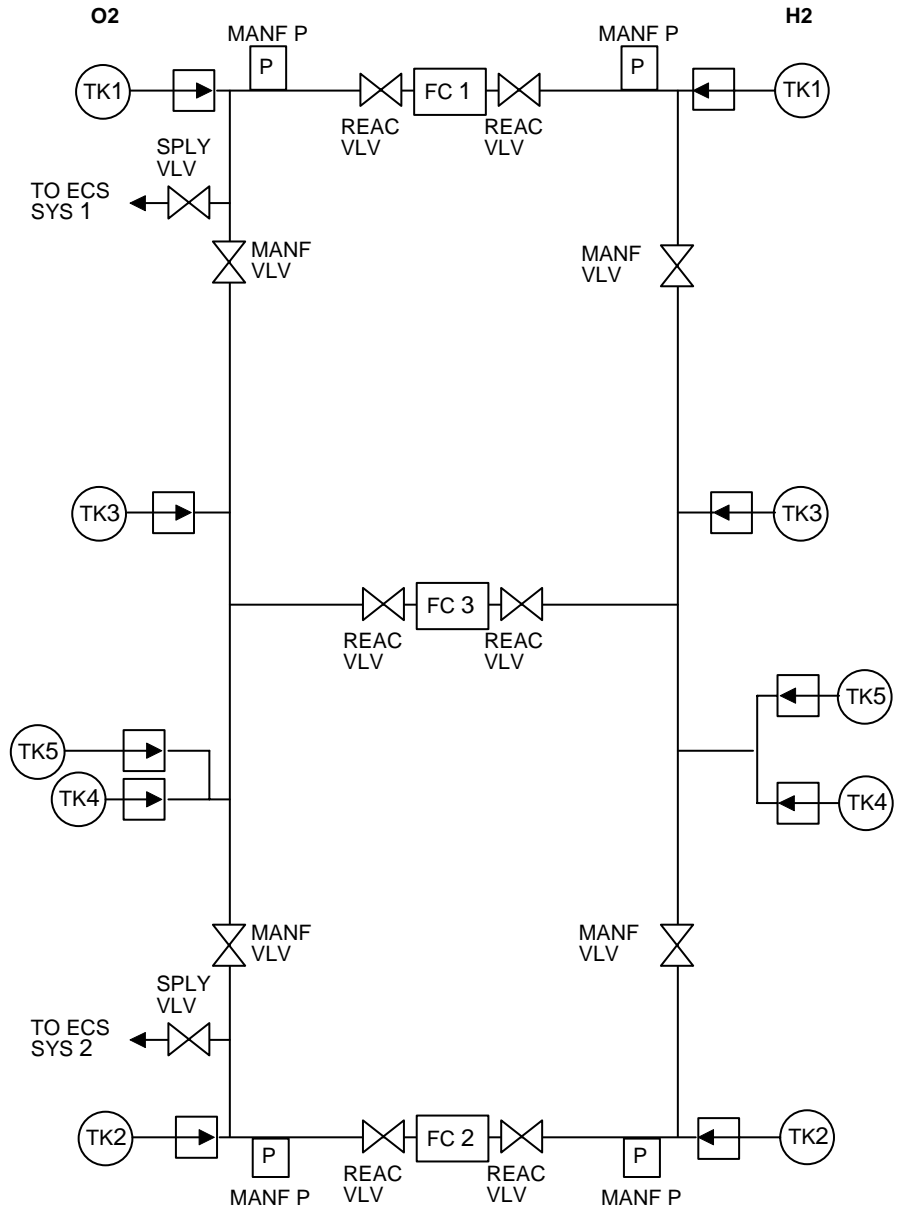
If aff TK P/MANF P decr (MANF leak):

12. (Aff) TK HTRS A(B) (two) – OFF >>

If only one TK P low (TK leak, xdcr, or cntlr fail):

13. (Aff) TK HTRS A(B) (two) – OFF

CRYO



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

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

A/M = AUTO AND MANUAL CAPABILITY LOST

03/27/03

5-20

APCL/ALL/GEN O

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						
C/W	AC VOLTAGE (AC X Lost)	1						2					3												
	APU TEMP (~2 min if APU X ON & BLR/CNTRLR A sel)					3	3				1	1					2	2							
	APU TEMP (~2 min if APU X ON & BLR/CNTRLR B sel)					1	1				2	2					3	3							
	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										
				D						MP															
S-BAND	SYS X ORB voice & PL PSP msg (X: 1,2)							1					2												
P A N E L S	L2 ATM O2 SYS X SPLY tb - CL			1						2															
	F6/F8 LANDING GEAR X tb - bp (X: L,R,NOSE)							LN					RN												
	F7 CRT X Blanks	1						2					3,4												
	O1 H2O PUMP OUT P X = 20 (Pump Loss)		1A						1B																
	O7 AFT X RCS He P Y tb - bp (X: Both,L,R) (Y: A,B)					BA	BA				RB	RB					LB	LB							
	AFT L,R RCS MANF ISOL 5 tb - bp																•	•							
	O8 FWD RCS He P X tb - bp		A						B																
	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										
	R4 HYD BK ISOL VLV X tb - OP					1	1				2	2					3	3							
	LG EXTD ISO VLV tb - OP					•	•																		
	R13L RAD CNTL X tb - bp (X: PORT,STBD)			PS	S	P									PS	P	S								
	A8U 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 07/29/05

5-21

APCL/ALL/GEN O

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
	WMC FLOOD				•						57
COMM	All Voice via AUDIO CTR 2									•	
	ATU			MS			MD			PS	
	PS,MS,MD,AL									AL	
	UHF SPLX PWR AMP			•							
TIMERS	X MISSION TIMER (X: Fwd,Aft)	F				A					
	X EVENT TIMER (X: Fwd,Aft)	A				F					
FWD	MDUs			MFD2			CDR2			CDR1	
AFT	MDU			PLT1			MFD1			PLT2	
L2	CAB RELIEF X tb - bp					A			B		
	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)				O			I			

5-22

APCL/ALL/GEN O

DATE 12/09/03

ESS DC BUS LOSS ID TABLE

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
INDICATION																		
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											•				•		
P A N E L S	X GLARESHIELD FLOOD (X: L,R)	L				L		R			R							
	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						
	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	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										•							

DATE 05/23/00

5-23

APCL/ALL/GEN O

CNTL AB1

C/W – APU TEMP (~2 min if APU 1 ON and BLR/CNTRLR 1B sel)
 MDU CRT 1 Blanks
 C/W – FREON LOOP if FES active (Pri B GPC)

CNTL AB2

C/W – APU TEMP (~2 min if APU 1 ON and BLR/CNTRLR 1B sel)
 L HUD lost
 C/W – FREON LOOP if FES active (Pri B ON)

CNTL AB3

C/W – APU TEMP (~2 min if APU 1(3) ON and BLR/CNTRLR
 1A(3A) sel)
 (O8) – FWD RCS TK ISOL 3/4/5 (tb-bp)
 MANF ISOL 1 (tb-bp)
 (L1) – FLOW PROP VLV LOOP 1 (tb-bp)

CNTL CA1

C/W – APU TEMP (~2 min if APU 3 ON and BLR/CNTRLR 3B sel)
 MDU CRT 3 Blanks
 C/W – FREON LOOP if FES active (Pri A GPC)
 C/W – H2O LOOP (if LOOP 2 GPC)

CNTL CA2

C/W – APU TEMP (~2 min if APU 3 ON and BLR/CNTRLR 3B sel)
 MDU CRT 4 Blanks
 C/W – FREON LOOP if FES active (Pri A ON)

CNTL CA3

C/W – APU TEMP (~2 min if APU 2(3) ON and BLR/CNTRLR 2A(3A) sel)
 (O8) – FWD RCS TK ISOL 1/2 (tb-bp)
 MANF ISOL 3 (tb-bp)
 4 (tb-bp)
 (L1) – RAD BYP VLV MAN SEL 1 (tb-bp)
 FLOW PROP VLV LOOP 2 (tb-bp)

CNTL BC1

C/W – APU TEMP (~2 min if APU 2 ON and BLR/CNTRLR 2B sel)
 (L1) – RAD BYP VLV MAN SEL 2 (tb-bp)
 S-BD SYS 1 Comm
 PL SYS 1

R HUD lost

CNTL BC2

C/W – APU TEMP (~2 min if APU 2 ON and BLR/CNTRLR 2B sel)
 MDU CRT 2 Blanks
 C/W – H2O LOOP (if Pump 1B ON)
 S-BD SYS 2 Comm
 PL SYS 2

CNTL BC3

C/W – APU TEMP (~2 min if APU 1(2) ON and BLR/CNTRLR
 1A(2A) sel)
 (O8) – FWD RCS MANF ISOL 2 (tb-bp)
 C/W – H2O LOOP (if Pump 1B ON)

NOTE

If CNTL Bus Loss suspected, check **SM1** DC V CNTL for confirming cue

BUS LOSS ACTION

	<u>PAGE</u>		<u>PAGE</u>
AC1.....	5-26	CNTL AB1	5-35
MNA DA1 (Entire Bus)		AB2.....	5-35
(Includes AC1).....	5-27	AB3.....	5-35
FPC1	5-27	BC1.....	5-36
FLC1	5-27	BC2.....	5-36
MPC1	5-27	BC3.....	5-36
APC4.....	5-28	CA1.....	5-37
APC1.....	5-28	CA2.....	5-37
ALC1	5-28	CA3.....	5-37
O14	5-28	ESS 1BC DA1	
R14.....	5-28	(Entire Bus)	
AC2.....	5-29	(CIL)	5-38
MNB DA2 (Entire Bus)		MPC1 (CIL).....	5-38
(Includes AC2).....	5-30	FD (CIL).....	5-38
FPC2	5-31	O13&R14.....	5-38
FLC2	5-31	ESS 2CA DA2	
APC5.....	5-31	(Entire Bus)	
ALC2	5-31	(CIL)	5-39
O15	5-31	MPC2 (CIL).....	5-39
AC3.....	5-32	FD (CIL).....	5-39
MNC DA3 (Entire Bus)		O13&R14.....	5-39
(Includes AC3).....	5-33	ESS 3AB DA3	
FPC3	5-34	(Entire Bus)	
FLC3	5-34	(CIL)	5-40
MPC3	5-34	MPC3 (CIL).....	5-40
APC6.....	5-34	FD (CIL).....	5-40
APC3.....	5-34	O13	5-40
ALC3	5-34	ML86B	5-40
O16	5-34		
R14.....	5-34		

**AC1/
MNA**

NOTE

Loss of electrical sub-buses difficult for crew to determine. MCC will pass this sub-bus loss data to crew, as well as reqd actions as noted in ASC PKT C/L. All pwr'd flight major bus loss actions (including RTLS) will be performed only via Ascent Systems Cue Cards

APCL/ALL/GEN O

BUS LOSS ID (5-21)

5-25

BUS LOSS ACTION

AC1/
MNA

AC1 (2 or 3ΦS)

WARNING
FC1 will be lost within 9 min

- ⇒ C3 1. MSTR MADS PWR – OFF
 If no MNA bus short:
 2. Perform BUS TIE (Cue Card), then:
 If no MNA bus tie:
 3. Go to MNA DA1 >>
 If MNA bus tie performed:
R2 4. BLR CNTLR/HTR 3 – B
 5. Perform FC1 SHUTDN (Cue Card),
 then:
L1 6. AV BAY 3 FAN A – ON
 B – OFF
 FREON PUMP LOOP 2 – A

AC1 ΦA

- ⇒ L1 FREON PUMP LOOP 2 – A

AC1 ΦB

- ⇒ L1 1. FREON PUMP LOOP 2 – A
O8 2. LTG PNL NUMERIC sel – OFF
OMS/MP5 3. Use He PRESS for L,R OMS Qty est

AC1 ΦC

- ⇒ R2 1. BLR CNTLR/HTR 3 – B
L1 2. FREON PUMP LOOP 2 – A

AC2 (2 or 3Φs)

WARNING
FC2 will be lost within 9 min

- ⇒ C3 1. MSTR MADS PWR – OFF
 If no MNB bus short:
 2. Perform BUS TIE (Cue Card), then:
 If no MNB bus tie:
 3. Go to MNB DA2 >>
 If MNB bus tie performed:
R2 4. BLR CNTLR/HTR 1 – B
L1 5. Perform FC2 SHUTDN (Cue Card), then:
 6. HUM SEP A – ON
 B – OFF
 IMU FAN A – ON
 B – OFF
 AV BAY 1 FAN A – ON
 B – OFF
 2 FAN A – OFF
 B – ON
 FREON PUMP LOOP 1 – A
O17:C 7. SIG CONDR FREON A – AC3

AC2 ΦA

- ⇒ R2 1. BLR CNTLR/HTR 1 – B
L1 2. FREON PUMP LOOP 1 – A

AC2 ΦB

- ⇒ O17:C 1. SIG CONDR FREON A – AC3
L1 2. FREON PUMP LOOP 1 – A

AC2 ΦC

- ⇒ L1 FREON PUMP LOOP 1 – A

MNB DA2 (Entire Bus) (Includes AC2)

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

- ⇒ R2 ♦ 1. MPS PRPLT DUMP B/U LH2 VLV – OP
C3 2. BLR CNTLR/HTR 1 – B
R1 3. MSTR MADS PWR – OFF
L1 4. AC BUS SNSR 2 – OFF
5. Perform FC2 SHUTDN (Cue Card), then:
6. HUM SEP A – ON
 B – OFF
 IMU FAN A – ON
 B – OFF
 AV BAY 1 FAN A – ON
 B – OFF
 2 FAN A – OFF
 B – ON
 FREON PUMP LOOP 1 – A
 TOP EVAP HTR NOZ R – B AUTO
O6 7. ANNUN BUS SEL ACA 2/3 – MNC
O17:C 8. SIG CONDR FREON A – AC3
R1 9. √O₂,H₂ MANF VLV TK1,TK2 (four) – OP
 TK1 HTRS B (two) – AUTO
10. BFS G51
 AA2, RGA 2 – desel
When BUS LOSS ACTION complete:
11. Go to LOSS OF FES/1 FC (PWRDN),
 10-39

MNB FPC2

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

Go to AC2 (2 or 3Φs)

MNB FLC2

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

GNC 23 RCS
RCS FWD MANF VLVS 2 OVRD – ITEM 41
EXEC (CL)

**AC3/
MNC**

MNB APC5

- ⇒ R2 ♦ 1. MPS PRPLT DUMP B/U LH2 VLV – OP
 2. BLR CNTLR/HTR 1 – B
L1 3. TOP EVAP HTR NOZ R – B AUTO
 4. **BFS G51**
 RGA 2 – desel

MNB ALC2

- ⇒ R2 ♦ 1. MPS PRPLT DUMP B/U LH2 VLV – OP
 2. BLR CNTLR/HTR 1 – B
L1 3. TOP EVAP HTR NOZ R – B AUTO

MNB O15

- O6 1. ANNUN BUS SEL ACA 2/3 – MNC
F6,F8 2. RDR ALTM – 1
 3. HSI SEL SOURCE – not MLS 2
 4. **BFS G51**
 AA2 – desel

AC3 (2 or 3Φs)

WARNING
FC3 will be lost within 9 min

**AC3/
MNC**

- ⇒ C3 1. MSTR MADS PWR – OFF
 If no MNC bus short:
 2. Perform BUS TIE (Cue Card), then:
 If no MNC bus tie:
 3. Go to MNC DA3 >>
 If MNC bus tie performed:
R2 4. BLR CNTLR/HTR 2 – B
L1 5. Perform FC3 SHUTDN (Cue Card), then:
 6. CAB FAN B – ON
 A – OFF
 7. √AV BAY 3 FAN B – ON
 8. H2O PUMP LOOP 1 – ON
 2 – OFF
O17:C 9. SIG CONDR FREON B – AC2

AC3 ΦA

- ⇒ R2 1. BLR CNTLR/HTR 2 – B
L1 2. H2O PUMP LOOP 1 – ON
 2 – OFF

AC3 ΦB

- ⇒ L1 1. H2O PUMP LOOP 1 – ON
 2 – OFF
O17:C 2. SIG CONDR FREON B – AC2

AC3 ΦC

- ⇒ L1 H2O PUMP LOOP 1 – ON
 2 – OFF

MNC DA3 (Entire Bus) (Includes AC3)

NOTE
PS AUDIO lost

- | | | |
|----------------|-----|--|
| L1 | 1. | FLASH EVAP CNTLR PRI A – OFF
B – ON |
| ⇒ R2 | 2. | BLR CNTLR/HTR 2 – B |
| C3 | 3. | MSTR MADS PWR – OFF
√AUD CTR – 1 |
| R1 | 4. | AC BUS SNSR 3 – OFF |
| | 5. | Perform <u>FC3 SHUTDN</u> (Cue Card), then: |
| L1 | 6. | CAB FAN B – ON
A – OFF |
| | 7. | H2O PUMP LOOP 1 – ON
2 – OFF
√AV BAY 2 FAN A – ON
√3 FAN B – ON |
| O17:C | 8. | SIG CONDR FREON B – AC2 |
| | 9. | <u>XXXXXX MNVR YYYY</u>
R OMS – sel SEC GMBL |
| C3 | 10. | S-BD PM CNTL – PNL,CMD |
| | 11. | <u>BFS, GNC 51 OVERRIDE</u>
TDRS – ITEM 46 EXEC (*) |
| R1 | 12. | √O2,H2 MANF VLV TK1,TK2 (four) – OP
TK3 HTRS A,B (four) – AUTO |
| <u>OMS/MPS</u> | 13. | Use He PRESS for L,R OMS Qty est |
| | 14. | <u>BFS, GNC 51 OVERRIDE</u>
RGA 3 – desel |
- When BUS LOSS ACTION complete:
15. Go to LOSS OF FES/1 FC (PWRDN), 10-39

CNTL

CNTL

MNC FPC3

- C3
1. S-BD PM CNTL – PNL,CMD
 2. BFS, GNC 51 OVERRIDE
TDRS – ITEM 46 EXEC (*)
 3. Go to AC3 (2 or 3Φs)

MNC FLC3

- C3
1. S-BD PM CNTL – PNL,CMD
 2. BFS, GNC 51 OVERRIDE
TDRS – ITEM 46 EXEC (*)
 3. GNC 23 RCS
RCS FWD MANF VLVS 4 OVRD – ITEM
43 EXEC (CL)

MNC MPC3

BFS, GNC 51 OVERRIDE
RGA 3 – desel

MNC APC6

- ⇒ R2
- L1
1. BLR CNTLR/HTR 2 – B
 2. FLASH EVAP CNTLR PRI A – OFF
B – ON
 3. XXXXX MNVR YYYYY
R OMS – sel SEC GMBL

MNC APC3

XXXXX MNVR YYYYY
R OMS – sel SEC GMBL

MNC ALC3

- ⇒ R2
- L1
1. BLR CNTLR/HTR 2 – B
 2. FLASH EVAP CNTLR PRI A – OFF
B – ON

MNC O16

- OMS/MPS
- F6,F8
1. Use He PRESS for L,R OMS Qty est
 2. HSI SEL SOURCE – not MLS 3

MNC R14

NOTE
PS AUDIO lost

- C3
- √AUD CTR – 1

CNTL AB1

- ⇒ L1 1. TOP EVAP HTR DUCT sel – B
HI LOAD DUCT HTR sel – B
- R1 2. √O2,H2 MANF VLV TK1,TK2 (four) – OP

CNTL AB2

- L1 1. TOP EVAP HTR DUCT sel – B
HI LOAD DUCT HTR sel – B
- 2. **GNC 23 RCS**
RCS FWD MANF VLVS 1 OVRD – ITEM
40 EXEC (CL)
- ⇒ R1 3. √O2,H2 MANF VLV TK1,TK2 (four) – OP

CNTL AB3

NOTE

CDR's BFS engage capability lost

If BFS engage reqd:

- O6 1. Use PLT's RHC, then:
- 2. GPC MODE 1,2,4 (three) – STBY,HALT
- 3. BFS I/O RESET
- L1 4. TOP EVAP HTR DUCT sel – B
HI LOAD DUCT HTR sel – B
- ⇒ Do not perform next step if AB1,2,3 unpwr:
- 5. **GNC 51 OVERRIDE**
RCS RM MANF CL OVRD – ITEM 41
EXEC
- R2 6. BLR CNTLR/HTR 1,3 (two) – B

CNTL BC1

⇒

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

- L1 1. TOP EVAP HTR NOZ L – B AUTO
- 2. BFS, GNC 51 OVERRIDE
RGA 2 – desel
- R1 3. √O₂,H₂ MANF VLV TK1,TK2 (four) – OP

CNTL BC2

- C3 1. S-BD PM CNTL – PNL,CMD
- 2. BFS, GNC 51 OVERRIDE
TDRS – ITEM 46 EXEC (*)
- 3. GNC 23 RCS
RCS FWD MANF VLVS 2 OVRD – ITEM
41 EXEC (CL)
- ⇒ R1 4. √O₂,H₂ MANF VLV TK1,TK2 (four) – OP
TK2 HTRS B (two) – AUTO
- If AOA:
- L1 5. NH3 CNTLR B – OFF
A – PRI/GPC

CNTL BC3

- ⇒ R2 1. BLR CNTLR/HTR 1,2 (two) – B
- L1 2. TOP EVAP HTR NOZ R – B AUTO
- Do not perform next step if BC1,2,3 unprwd:
- 3. GNC 51 OVERRIDE
RCS RM MANF CL OVRD – ITEM 41
EXEC

ESS 1BC DA1 (Entire Bus)

NOTE

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

- ⇒ O5 1. L AUD CNTL sel – R (CDR can't talk)
2. Perform FC1 SHUTDN (Cue Card), then:
If add'l ltg reqd:
C3 3. EMER LTG – ON/OFF
R1 4. √O2,H2 MANF VLV TK2 (two) – OP
TK1 HTRS B (two) – AUTO
TK2 HTRS A,B (four) – OFF

ESS 1BC MPC1

Go to FC1 SHUTDN (Cue Card)

ESS 1BC FD

NOTE

GPC 1,4 lost if pwr cycled OFF or ON

Go to FC1 SHUTDN (Cue Card)

ESS 1BC O13&R14

NOTE

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

ESS

- ⇒ O5 1. L AUD CNTL sel – R (CDR can't talk)
If add'l ltg reqd:
C3 2. EMER LTG – ON/OFF
R1 3. √O2,H2 MANF VLV TK1,TK2 (four) – OP
TK1 HTRS B (two) – AUTO
TK2 HTRS A,B (four) – OFF

ESS 2CA DA2 (Entire Bus)

NOTE

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

- C3
O9
⇒
1. AUD CTR – 2
 2. R AUD CNTL sel – L (PLT can't talk)
 3. Perform FC2 SHUTDN (Cue Card), then:
If add'l Itg reqd:
- C3
R1
4. EMER LTG – ON/OFF
 5. √O2,H2 MANF VLV TK1 (two) – OP
TK1 HTRS A,B (four) – OFF
TK2 HTRS B (two) – AUTO

ESS 2CA MPC2

Go to FC2 SHUTDN (Cue Card)

ESS 2CA FD

NOTE

GPC 2,5 lost if pwr cycled OFF or ON

Go to FC2 SHUTDN (Cue Card)

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
O9
⇒
1. AUD CTR – 2
 2. R AUD CNTL sel – L (PLT can't talk)
- C3
R1
3. EMER LTG – ON/OFF
 4. √O2,H2 MANF VLV TK1,TK2 (four) – OP
TK1 HTRS A,B (four) – OFF
TK2 HTRS B (two) – AUTO

ESS 3AB DA3 (Entire Bus)

NOTE

BFS engage capability lost.
Computer Status Matrix lost. GPC 3
lost if pwr cycled OFF or ON

- ⇒ R1 1. √O₂,H₂ MANF VLV TK_{1,2} (four) – OP
 2. Perform FC3 SHUTDN (Cue Card), then:
O6 3. GPC OUTPUT 5 – TERM

ESS 3AB MPC3

Go to FC3 SHUTDN (Cue Card)

ESS 3AB FD

NOTE

GPC 3 lost if pwr cycled OFF or
ON. BFS engage capability lost

Go to FC3 SHUTDN (Cue Card)

ESS 3AB O13

NOTE

Computer Status Matrix lost

ESS 3AB ML86B

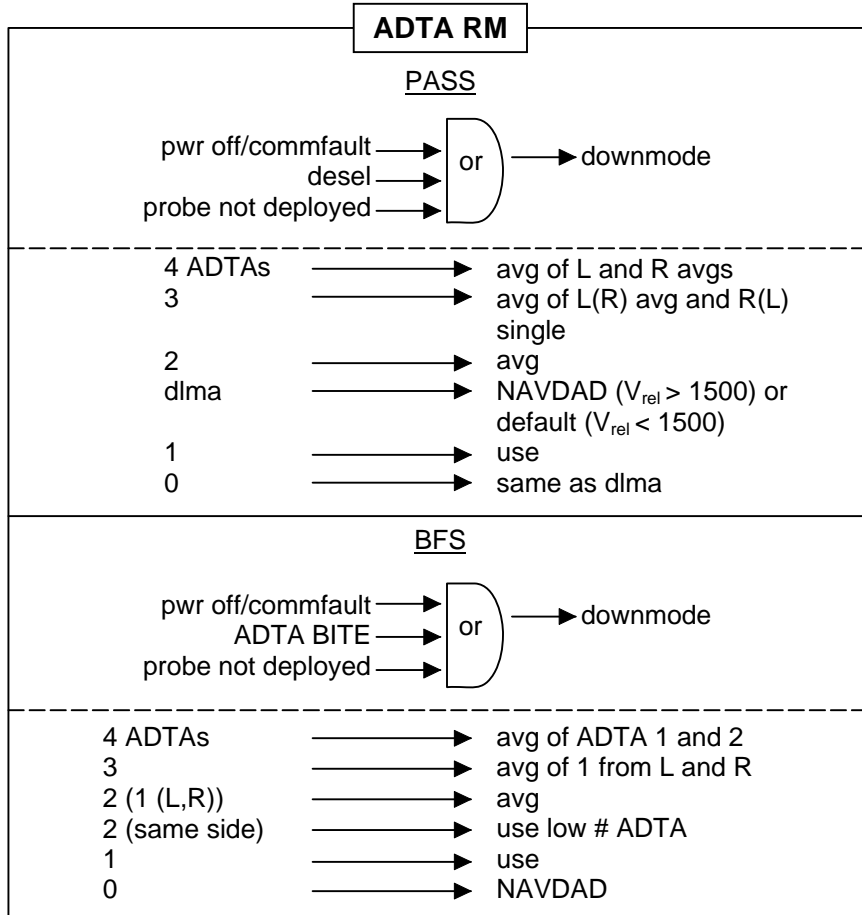
- R1 √O₂,H₂ MANF VLV TK_{1,2} (four) – OP

**GUIDANCE, NAVIGATION, AND
CONTROL**

GNC

DISPLAY SW L(R)

1. L(R) disp sws – green dot



NOTE

When BFS engaged, if failed ADTA candidate for selection, pull ADTA cb, or stow applicable probe

GNC

RM FAIL IMU, RGA, AA

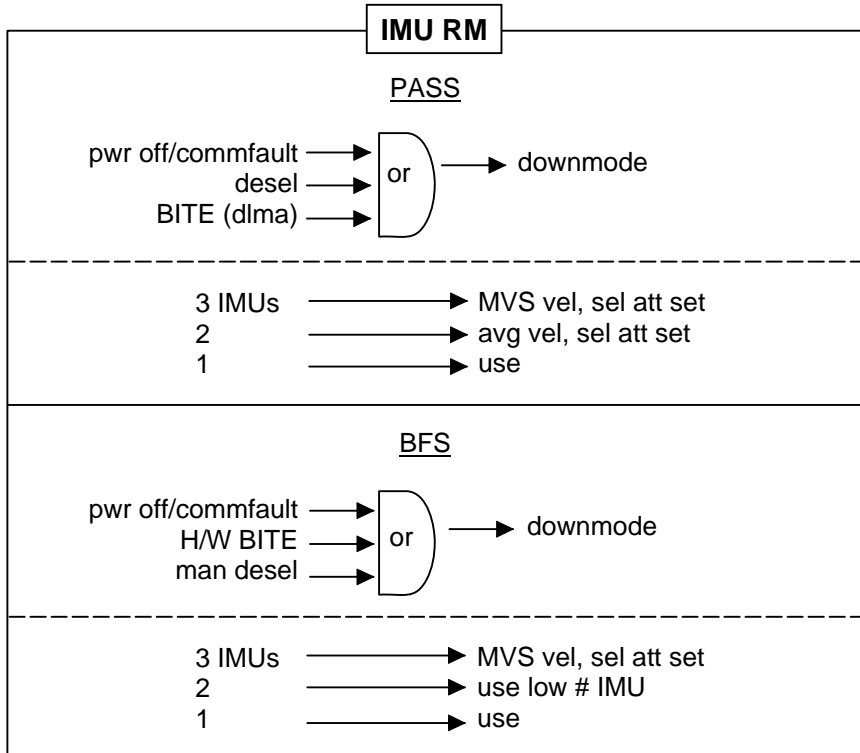
BFS, GNC 51 OVERRIDE

Aff LRU – desel

RM DLMA IMU

GNC 51 OVERRIDE
BFS, GNC 51 OVERRIDE

1. √MCC, bad IMU – desel (PASS and BFS) >>
2. If no MCC: Desel lower # IMU with '?' (PASS)

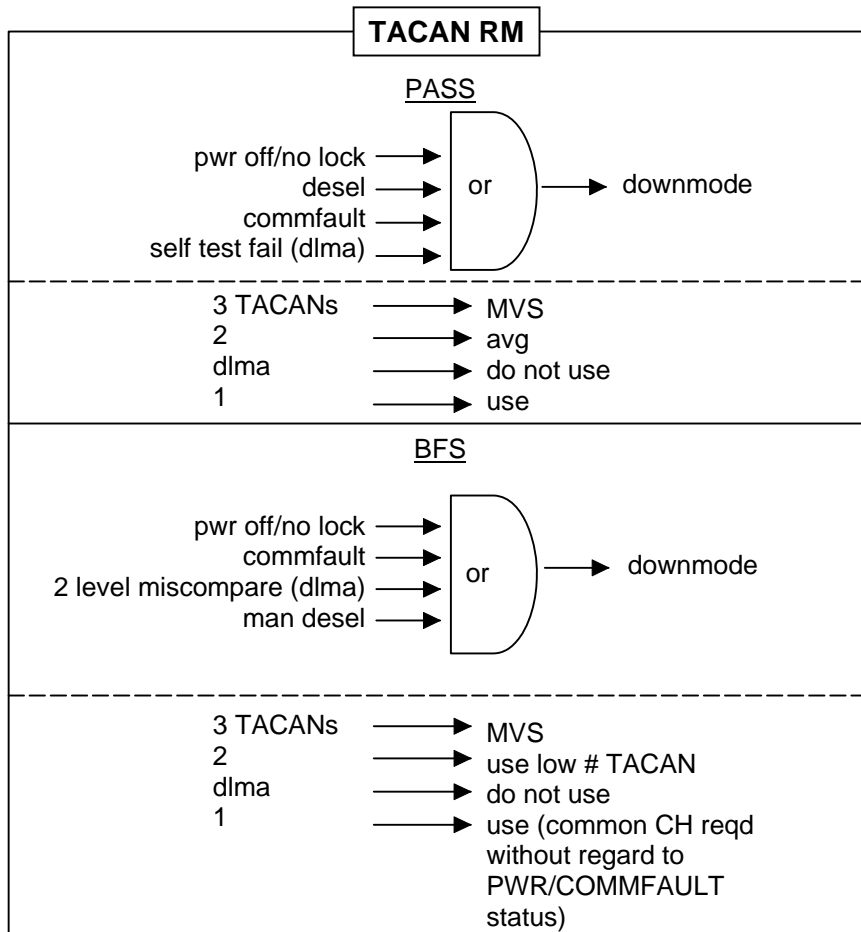


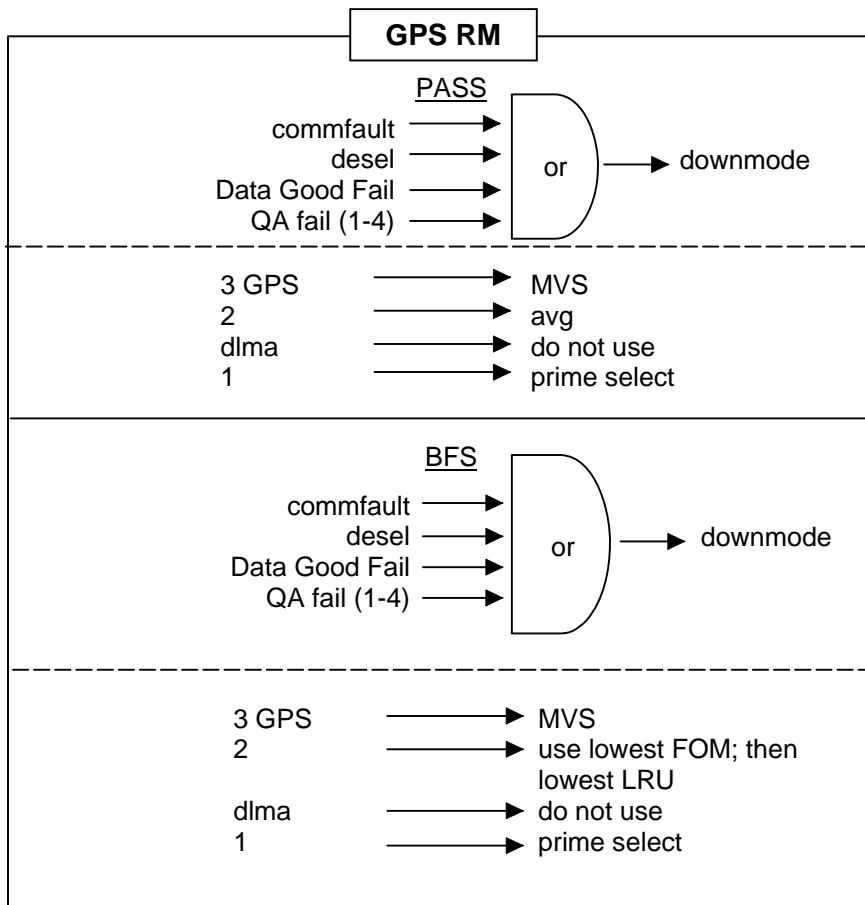
APCL/ALL/GEN O

DISPLAY SW L(R)

6-3

RM FAIL IMU, RGA, AA
RM DLMA IMU





APCL/ALL/GEN O

TACAN RM

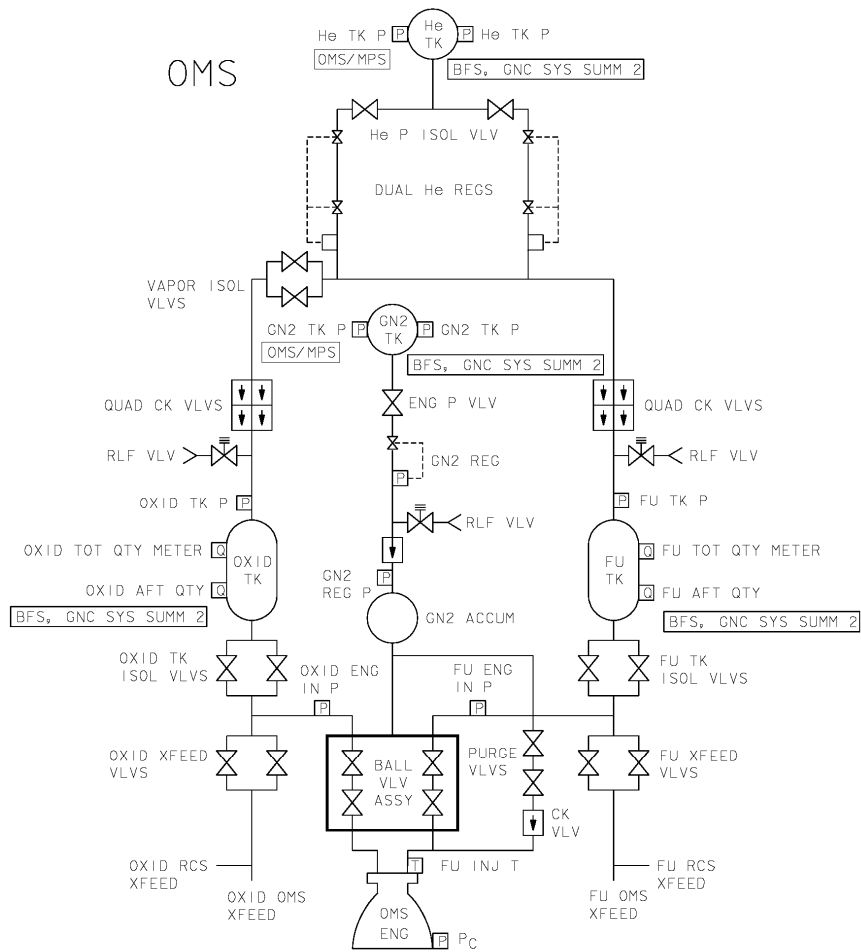
6-5

GPS RM



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DATE 06/17/98

48033A701, SCH 1

OMS

OMS N2 TK P LOW

BFS, GNC SYS SUMM 2

- 1. $\sqrt{N2}$ TK P < 1200 or decr (OMS/MPS) and SPEC)
- If preburn:
 - 2. (Aff) OMS ENG – ARM
 - 3. If OMS N2 REG P decr: (Aff) OMS ENG – OFF
 - 4. \sqrt{MCC} for use of OMS ENG

OMS N2 REG P LOW

BFS, GNC SYS SUMM 2

- 1. $\sqrt{N2}$ TK P decr (OMS/MPS) and SPEC)
- If preburn:
 - 2. (Aff) OMS ENG – OFF
 - 3. \sqrt{MCC} for use of OMS ENG

NOTE

N2 REG P > 299 allows one OMS ENG start

OMS N2 REG P HIGH

BFS, GNC SYS SUMM 2

- 1. $\sqrt{N2}$ TK P decr (OMS/MPS) and SPEC)
- 2. (Aff) OMS ENG – ARM

OMS TK P (FU and OX) HIGH

BFS, GNC SYS SUMM 2

(Aff) OMS He PRESS/VAP ISOL (two) – CL, then cycle to maintain TK P 234-288

OMS TK P (FU or OX) LOW

BFS, GNC SYS SUMM 2

- If sys not secured and corresp ENG IN P disagrees:
 - 1. When time permits: Go to MAL, OMS, L(R) OMS TK P, 11.1a 29 >>

⇒ If OMS 1 reqd:

NOTE

Do not open OMS XFDs for OMS-1

- 2. At TIG-2: (aff) He PRESS (two) – OP
OMS ENG (two) – ARM/PRESS
- If FU IN P < 216 or OX < 151 prior to ign:
 - 3. Go to OMS SECURE >>
- 4. At TIG-15 sec: RCS +X to TIG+1 sec
- 5. Post Burn: Continue with step 6

OMS

Cont next page

If pre-OMS 2:

6. Perform OMS SECURE, then:

If corresp ENG IN P decr (OMS inlet line leak):

7. OMS 2 burn single ENG, good Pod

8. ENG cut off when \geq MIN Hp >>

If OMS TK P decr (prop tk leak), dump ASAP:

9. LOAD Δ VY = $\boxed{-600}$, TIG in ~4 min

10. \sqrt ENG/TRIM CONFIG, LOAD TGTS, MNVR

11. (Good) OMS ENG – OFF

12. (Aff) OMS ENG – ARM/PRESS

At TIG-2:

13. FLT CNTLR PWR (two) – ON

14. (Aff) OMS He PRESS/VAP ISOL (two) – OP
TK ISOL (two) – OP (tb-OP)

If FU IN P < 216 or OX IN P < 151 prior to ign:

15. Go to OMS SECURE >>

At TIG-15 sec:

16. RCS +X to TIG+1 sec

17. Burn to depletion (OMS \downarrow)

Postburn:

18. (Aff) OMS ENG – OFF

19. FLT CNTLR PWR (two) – OFF

20. Perform OMS SECURE, then:

21. Cut off OMS 2 when \geq MIN Hp >>

If post-OMS 2:

22. Perform OMS SECURE, then:

If OMS ENG IN P decr (OMS inlet line leak):

23. \sqrt MCC

If OMS TK P decr (prop tk leak):

24. Go to LEAKING OMS PRPLT/He BURN
(ORB PKT, OMS)

APCL/ALL/GEN O

OMS N2 TK/REG P
OMS TK P HIGH/LOW

7-3

OMS He TK P LOW

BFS, GNC SYS SUMM 2

1. $\sqrt{\text{He TK P}} < 1500$ or decr (OMS/MPS) and SPEC)

⇒ OMS-1 reqd	Blowdown Dump complete or He Tk P < 640	2. OMS ENG (two) – ARM/PRESS 3. XFEED from (good) OMS
	Blowdown Dump not complete	4. XFEED from (leaking) OMS 5. Delta to OMS He TK P LOW (Cue Card, OMS 1 BURN MONITOR): Replace existing text with “When He TK P < 640 or QTY ≤ 5%, XFEED from (good) OMS”
Blowdown Dump not complete and He Tk P > 640		6. XFEED from (leaking) OMS
Good comm		7. $\sqrt{\text{MCC}}$ for TGTS 8. $\sqrt{\text{ENG/TRIM CONFIG, LOAD TGTS, MNVR}}$
Early In-plane Burn		9. OMS ENG (two) – ARM/PRESS When He TK P < 640: 10. OMS ENG (two) – OFF
OMS 2 Burn		11. Delta to OMS He TK P LOW (Cue Card, OMS 2 BURN MONITOR): Delete “or QTY ≤ 41” >>>
No comm or OOP Burn		12. LOAD $\Delta\text{VY} = -500$, TIG in ~4 min 13. $\sqrt{\text{ENG/TRIM CONFIG, LOAD TGTS, MNVR}}$ 14. OMS ENG (two) – ARM/PRESS When He TK P < 640 or QTY < 41%: 15. OMS ENG (two) – OFF
Blowdown Dump complete or He Tk P < 640 (OMS 2 Config)		16. (Leaking) OMS TK ISOL (two) – CL 17. (Good) OMS TK ISOL (two) – OP 18. L,R OMS XFEED (four) – OP If no comm: 19. Cut off OMS 2 when $\geq \text{MIN Hp}$

XFEED: L OMS PRPLT to R OMS ENG

1. √L OMS TK ISOL (two) – OP (tb-OP)
2. R OMS TK ISOL (two) – CL (tb-CL)
3. L,R OMS XFEED (four) – OP (tb-OP)

XFEED: R OMS PRPLT to L OMS ENG

1. √R OMS TK ISOL (two) – OP (tb-OP)
2. L OMS TK ISOL (two) – CL (tb-CL)
3. L,R OMS XFEED (four) – OP (tb-OP)

XFEED RETURN: OMS to OMS (N/A during I'CNCT)

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

OMS SECURE

(Aff) OMS ENG – OFF
XFEED (two) – CL (tb-CL)
TK ISOL (two) – CL (tb-CL)
He PRESS/VAP ISOL (two) – CL

L(R) OMS GIMBAL

GNC XXXXX MNVR EXEC

If first failure:

1. Aff gimbal – sel SEC GMBL (twice) >>

If second failure:

2. Go to OMS GMBL, appropriate BURN MONITOR (Cue Card)

SMO THRM PRPLT

BFS, SM 0 THERMAL

AFF TEMP		STATUS	ACTION
H T R	PRPLT POD L(R)	↑	A14 √(Aff) RCS/OMS HTR POD – OFF >>
		↓, H, L, M	No action >>
T E M P	PRPLT OMS CRSFD	↑	A14 RCS/OMS HTR OMS CRSFD LN – B OFF >>
		↓, H, L, M	No action >>

APCL/ALL/GEN O,X

**OMS He TK P LOW
OMS XFEEDS**

**OMS SECURE/GIMBAL
SMO THRM PRPLT**

DEORBIT MIXED XFD BURN PREP

NOTE

Do not use MSTR RCS XFEED sw

1. L,R OMS TK ISOL (four) – CL (tb-CL)
 XFEED (four) – CL (tb-CL)
 He ISOL (four) – CL
2. AFT L,R RCS XFEED (four) – CL (tb-CL)
 √MSTR RCS XFEED – OFF
3. Set up GPC vlvs **SPEC 0** **GPC MEMORY**
 √HEX 27*
 BIT RST – ITEM 23 EXEC
 Config ADD ID/DESIRED Addresses

ADD ID	DESIRED
28 03 D 8 3	29
30 03 E 0 9	31
32 03 E D 9	33
34 03 E 7 B	35

} From
Tables 1-8

4. WRITE – ITEM 25 EXEC
 BIT SET – ITEM 22 EXEC

ADD ID	DESIRED
28 03 D 8 7	29
30 03 E 0 D	31
32 03 E D D	33
34 03 E 7 F	35

} From
Tables 1-8

5. WRITE – ITEM 25 EXEC
 Perform RECONFIG:
 L,R OMS TK ISOL (four) – GPC
 XFEED (four) – GPC
 (verify tb config from table)
 OMS BURN will be SE or +XRCS
 (ck tables for ENG)
6. During AOS: confirm vlv config w/MCC
7. Perform POST OMS 1 BURN PROCEDURES (ASC, POST OMS 1)
 EXCEPT:
 DO NOT RECONFIG OMS VLVS
 For deorbit burn:
 TGT AOA
 PRPLT = 0 (ITEM 18 +0)
 Use AOA DEORBIT MIXED XFD BURN, 7-7, for
 DEORBIT BURN

AOA DEORBIT MIXED XFD BURN

√MM302 √OMS L(R) or RCS
Enter TGO + 10 sec
√L,R OMS TK ISOL (four) – GPC
 √XFEED (four) – GPC
Verify tb config from table
√DAP – AUTO(PASS)/DISC
ADI – LVLH(REF)/HI/MED
FLT CNTLR PWR (two) – ON
Man Repress to maintain good OMS TK Ps > 234 psi (simo)
If OMS BURN INITIATION:
 √TRIM: P +0.4, LY +5.2, RY -5.2
TIG-2 (Good) OMS ENG – ARM/PRESS
 - :15 EXEC
 - :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
 :00 TIG Start watch (check Pc, ΔVTOT, ENG VLVs)
If RCS BURN INITIATION:
 Man Repress L,R OMS > L,R RCS TK Ps
 L,R RCS XFEED (four) – OP
 TK ISOL (six) – CL
TIG- :00 THC +X
 Maintain PITCH ATT ERR ± 3°

OMS PRPLT LOW

AFT RCS RECONFIG at ΔVTOT =
RCS COMPLETION

APCL/ALL/GEN O

D/O MXD BURN PREP
OMS UPHILL MXD XFD (7-10) 7-7

AOA D/O MXD BURN
TABLES 1-8 (7-12)

* OMS PRPLT FAIL:	*
* OMS ENG – OFF	*
* ITEM 18 +0 EXEC	*
* Secure L,R OMS	*
* √ADI – LVLH, center needles	*
* RCS COMPLETION	*
* OMS ENG FAIL:	*
* OMS ENG – OFF	*
* Man Repress L,R OMS > L,R RCS TK Ps	*
* L,R RCS XFEED (four) – OP	*
* TK ISOL (six) – CL	*
* √ADI – LVLH, center needles	*
* THC +X	*
* (check lowest OMS % vs RCS Burn Time)	*
* AFT RCS RECONFIG	*
* RCS COMPLETION	*
* RCS +X JET FAIL OFF:	*
* ITEM 18 +0 EXEC	*
* G23 resel jet	*

* **RCS COMPLETION:** *

* If DIRECT INSERTION: *

* THC +X to $\Delta VTOT = 0$ or TOT AFT QTY 1 % *

* At AFT QTY 1 if CUR $\Delta VTOT$:
 * THC +X to FLIP ΔV or
 * TOT AFT QTY 2 % then
 * FRCS COMPLETION *

* FLIP -----
 * ΔV FRCS COMPLETION *

* AFT -----
 * ΔV THC +X to TGT ΔV *

* TGT -----
 * ΔV *

* If w/OMS 1: *

* THC +X to TGT HP or TOT AFT QTY 1 % *

* At AFT QTY 1 if CUR HP:
 * THC +X to FLIP HP or
 * TOT AFT QTY 2 % then
 * FRCS COMPLETION *

* FLIP -----
 * HP FRCS COMPLETION *

* AFT -----
 * HP THC +X to TGT HP *

* TGT -----
 * HP *

* **FRCS COMPLETION:** *

* MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 $\Delta VTOT$)
 * THC -X to $\Delta VTOT = 0$ or FRCS depletion (JETS FAIL OFF) *

CUTOFF VGOx = 0, RELEASE THC
 + :02 OMS ENG(s) – OFF (If < 3 IMU, at :)
 * AFT RCS RECONFIG if I'CNCT *
 TRIM X,Z residuals < 2 fps (< 0.5 fps if shallow)

OMS-1/OMS-2 UPHILL MIXED XFD

NOTE

Do not use MSTR RCS XFEED sw

1. If OMS-1: Perform AOA-S (ASC, OMS TGTS), then:
2. L,R OMS TK ISOL (four) – CL (tb-CL)
XFEED (four) – CL (tb-CL)
3. AFT L,R RCS XFEED (four) – CL (tb-CL)
√MSTR RCS XFEED – OFF
4. Set up GPC vlvs SPEC 0
√HEX 27*
BIT RST – ITEM 23 EXEC
Config ADD ID/DESIRED Addresses

ADD ID	DESIRED
28 03 D 8 3	29
30 03 E 0 9	31
32 03 E D 9	33
34 03 E 7 B	35

} From
Tables 1-8

5. WRITE – ITEM 25 EXEC
BIT SET – ITEM 22 EXEC

ADD ID	DESIRED
28 03 D 8 7	29
30 03 E 0 D	31
32 03 E D D	33
34 03 E 7 F	35

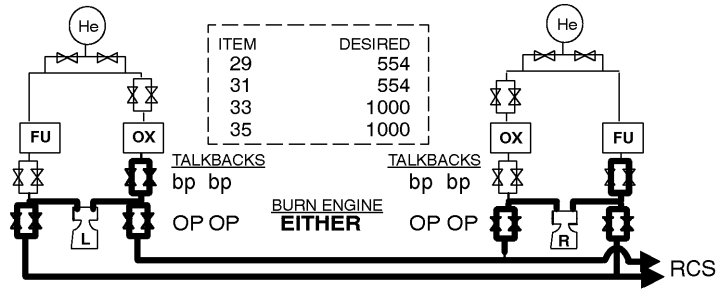
} From
Tables 1-8

6. WRITE – ITEM 25 EXEC
Perform RECONFIG:
L,R OMS TK ISOL (four) – GPC
XFEED (four) – GPC
(verify tb config from table)
BURN will be SE or +XRCS (ck tables for ENG)
7. During AOS: confirm vlv config, TGT w/MCC

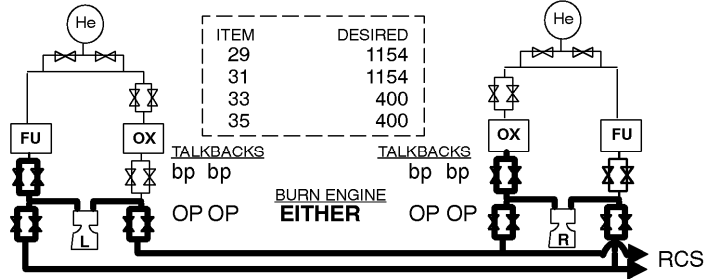
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8. If OMS ENG burn:
 OMS L or R
 TRIM: P +0.0, LY +5.2, RY -5.2
 L(R) OMS ENG – ARM/PRESS (other OMS ENG – OFF)
 TIG -:15 EXEC
 Man Repress from L and R OMS He TKs (240 < TK P < 250)
- If +XRCS burn:
 ✓(Good) OMS TK P > RCS TK P
 OMS ENG – OFF
 L,R RCS XFEED (four) – OP
 TK ISOL (six) – CL
 THC +X (check OMS % vs RCS burn time)
 Man Repress from L and R OMS He TKs (240 < TK P < 250)
9. POST BURN, OMS He VAP ISOL (four) – CL
10. If OMS-1: Perform POST OMS 1 BURN PROCEDURES
 (ASC, POST OMS 1) EXCEPT:
 DO NOT RECONFIG OMS VLVs
 For OMS-2 TGTS, PRPLT = 0 (ITEM 18 +0)
 Use AOA DEORBIT MIXED XFD BURN (for OMS-2 BURN)

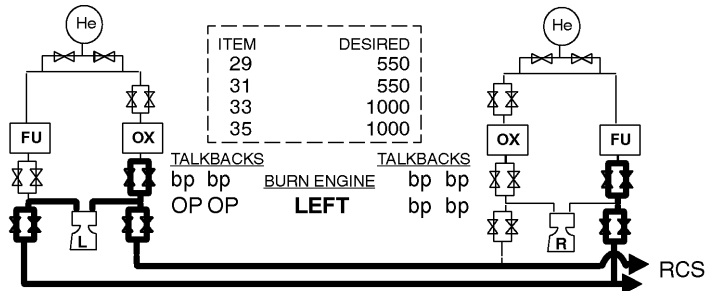
**TABLE 1
L OMS FU TK AND R OMS OX TK FAILED**



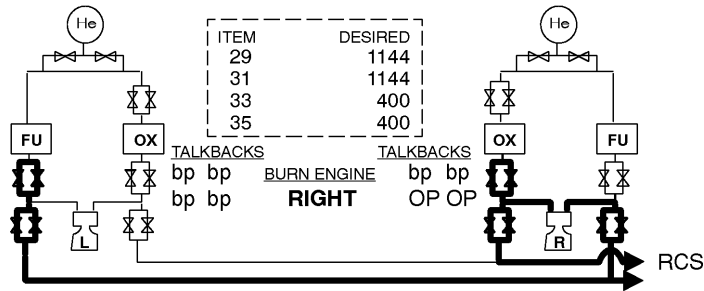
**TABLE 2
L OMS OX TK AND R OMS FU TK FAILED**



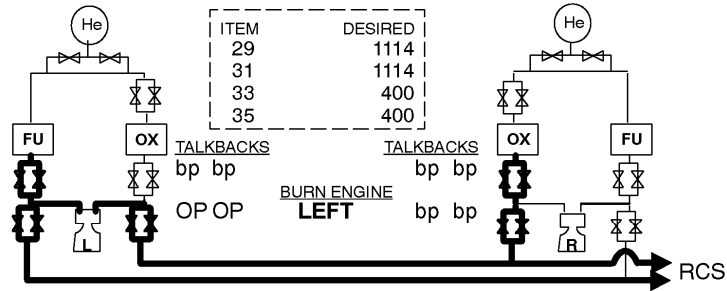
**TABLE 3
L OMS FU TK AND R OMS OX INLET FAILED**



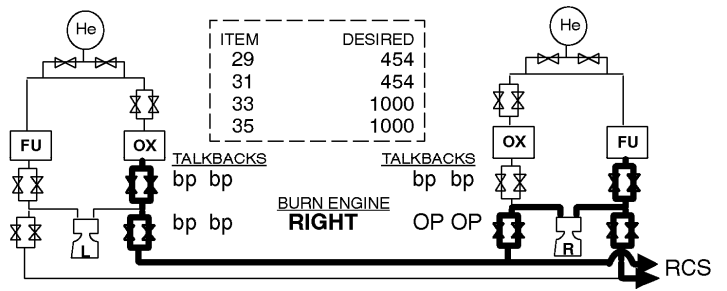
**TABLE 4
L OMS OX INLET AND R OMS FU TK FAILED**



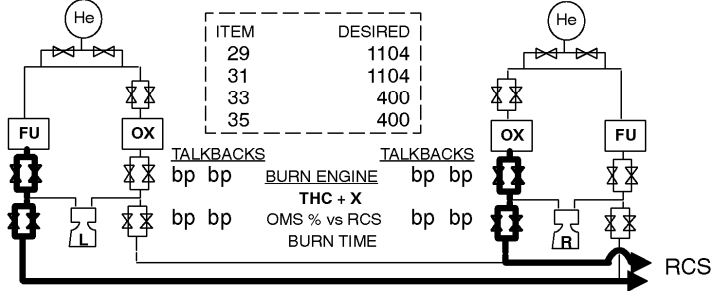
**TABLE 5
L OMS OX TK AND R OMS FU INLET FAILED**



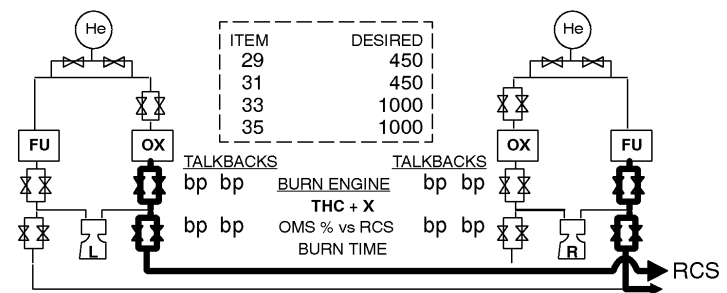
**TABLE 6
L OMS FU INLET AND R OMS OX TK FAILED**



**TABLE 7
L OMS OX INLET AND R OMS FU INLET FAILED**



**TABLE 8
L OMS FU INLET AND R OMS OX INLET FAILED**

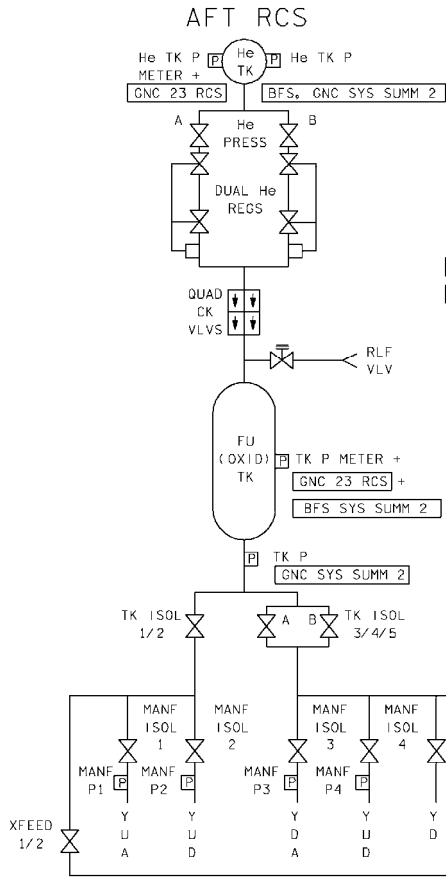




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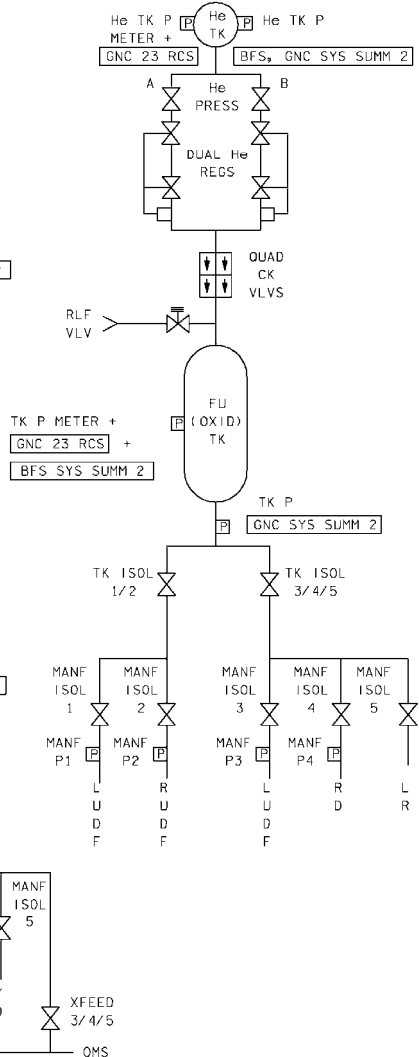


RCS



DATE 02/02/96

FWD RCS



480330801.SCH# 2

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. $\sqrt{\text{RCS}}$ TK ISOL (three) – CL (tb-CL)
He PRESS (two) – CL (tb-CL)

I'CNCT: L OMS to RCS

1. L OMS He PRESS/VAP ISOL (two) – OP
2. $\sqrt{\text{OMS}}$ TK P > RCS TK P and $\Delta P < 50$
3. L OMS XFEED (two) – OP (tb-OP)
4. L,R RCS XFEED (four) – OP (tb-OP)
TK ISOL (six) – CL (tb-CL)

I'CNCT: R OMS to RCS

1. R OMS He PRESS/VAP ISOL (two) – OP
2. $\sqrt{\text{OMS}}$ TK P > RCS TK P and $\Delta P < 50$
3. R OMS XFEED (two) – OP (tb-OP)
4. L,R RCS XFEED (four) – OP (tb-OP)
TK ISOL (six) – CL (tb-CL)

I'CNCT TK SWITCH

1. L(R) OMS XFEED (two) – OP (tb-OP)
He PRESS/VAP ISOL (two) – OP
2. R(L) OMS XFEED (two) – CL (tb-CL)
He PRESS/VAP ISOL (two) – CL

I'CNCT RETURN: OMS to RCS

1. $\sqrt{L(R)}$ OMS He PRESS/VAP ISOL (two) – OP
2. $\sqrt{OMS TK P > RCS TK P \text{ and } \Delta P < 50}$
3. L,R RCS TK ISOL (six) – OP (tb-OP), GPC
XFEED (four) – CL (tb-CL), GPC
4. OMS XFEED (four) – CL (tb-CL)
He PRESS/VAP ISOL (four) – CL

APCL/ALL/GEN O

**RCS SECURE
I'CNCT/TK SW**
—

8-3

I'CNCT RETURN
—

XFEED: R RCS to L RCS

If AUTO XFEED:

1. L,R RCS TK ISOL (six) – GPC
XFEED (four) – GPC
2. OMS XFEED (four) – CL (tb-CL)
3. MSTR RCS XFEED – FEED FROM R >>

If MANUAL XFEED:

4. L,R OMS XFEED (four) – CL (tb-CL)
5. RCS XFEED (four) – OP (tb-OP)
6. L RCS TK ISOL (three) – CL (tb-CL)
He PRESS (two) – CL (tb-CL)
7. MSTR RCS XFEED – FEED FROM R

XFEED: L RCS to R RCS

If AUTO XFEED:

1. L,R RCS TK ISOL (six) – GPC
XFEED (four) – GPC
2. OMS XFEED (four) – CL (tb-CL)
3. MSTR RCS XFEED – FEED FROM L >>

If MANUAL XFEED:

4. L,R OMS XFEED (four) – CL (tb-CL)
5. RCS XFEED (four) – OP (tb-OP)
6. R RCS TK ISOL (three) – CL (tb-CL)
He PRESS (two) – CL (tb-CL)
7. MSTR RCS XFEED – FEED FROM L

XFEED RETURN: RCS to RCS

If AUTO XFEED:

1. L,R RCS TK ISOL (six) – GPC
XFEED (four) – GPC
2. MSTR RCS XFEED – OFF >>

If MANUAL XFEED:

3. L,R RCS He PRESS (four) – OP (tb-OP)
TK ISOL (six) – OP (tb-OP), GPC
XFEED (four) – CL (tb-CL), GPC
4. MSTR RCS XFEED – OFF

RCS TK P HIGH (FU or OX)

BFS, GNC SYS SUMM 2

- 1. Check MANF P
 - 2. (Aff) RCS He PRESS (two) – CL (tb-CL)
 - 3. A – OP (tb-OP)
- If He P decr:
- 4. (Aff) RCS He PRESS A – CL (tb-CL)
 - 5. B – OP (tb-OP)

RCS JET FAIL (LEAK)

GNC 23 RCS

BFS, GNC SYS SUMM 2

- If OX/FU Qty diverging:
- (Aff) RCS MANF ISOL – CL (tb-CL)

RCS JET FAIL (ON)

GNC 23 RCS

BFS, GNC SYS SUMM 2

- 1. (Aff) RCS MANF ISOL – CL (tb-CL)
- If MANF P > 130 and stable (false alarm):
- 2. (Aff) RCS MANF ISOL – OP (tb-OP)
 - 3. Aff jet DES INH (*) (reprioritize)

RCS JET FAIL (OFF)

GNC 23 RCS

BFS, GNC SYS SUMM 2

- If > 1 jet/pod/dir failed:
- 1. Resel jets
 - 2. Aff jet DES INH (*) (reprioritize)

RM DLMA MANF

GNC 23 RCS

- 1. Check CRT to determine aff MANF
- If (aff) MANF tb – OP or sw not thrown:
- 2. Ovrdr (aff) RCS MANF VLVs STAT – OP
 - 3. If (aff) MANF tb – bp: (aff) MANF – GPC

APCL/ALL/GEN O

**XFEED: RCS to RCS
XFEED RETURN**

**RCS TK P HIGH
RCS JET FAIL/RM DLMA**

RCS LEAK ISOL

BFS, GNC SYS SUMM 2

1. If FU or OX TK P high, go to RCS TK P HIGH (FU or OX) >>

If FU or OX TK P normal:

2. Check FU(OX) He P (O3 meter and CRT) decr
3. DAP: INRTL/PULSE

When proc complete:

4. 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 9

√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), aff MANFs, and corresp XFEED vlvs closed >>

√He TK

9. Check He P(s)

If AFT decr:

| 10. I'CNCT from OMS, then open good MANFs >>

If FWD decr:

11. Return to normal config
12. When He P < 456: Go to RCS SECURE >>

Cont next page

√PRPLT TK

13. Check PRPLT TK P(s)

If AFT decr:

| 14. I'CNCT from OMS, then open aff MANFs >>

If FWD decr:

15. Leave FWD RCS secured >>

√He LEG

16. Open He PRESS A and B, check He P(s)

If AFT decr:

| 17. Close He PRESS A and B
| I'CNCT from OMS, then open aff MANFs >>

If FWD decr:

18. Return to normal config except close He PRESS A and B.
Cycle to maintain PRPLT TK P 200-245

When He TK P < 456:

19. Go to RCS SECURE >>

√XFEED LINES

If aff RCS was feeding XFEED when leak occurred:

20. GNC 23 RCS
RCS L – ITEM 2 EXEC

If XFEED P decr or zero:

21. L,R RCS He PRESS (four) – OP (tb-OP)
TK ISOL (six) – OP (tb-OP)
MANF ISOL (ten) – OP (tb-OP)

22. MSTR RCS XFEED – OFF

23. Do not XFEED/I'CNCT >>

√RCS MANF ISOL 5

24. If leak not found above: Assume RCS MANF ISOL 5 leak

25. Return to normal config except leave (aff) RCS MANF ISOL 5 –
GPC (tb-CL)

APCL/ALL/GEN O

RCS LEAK ISOL

8-7

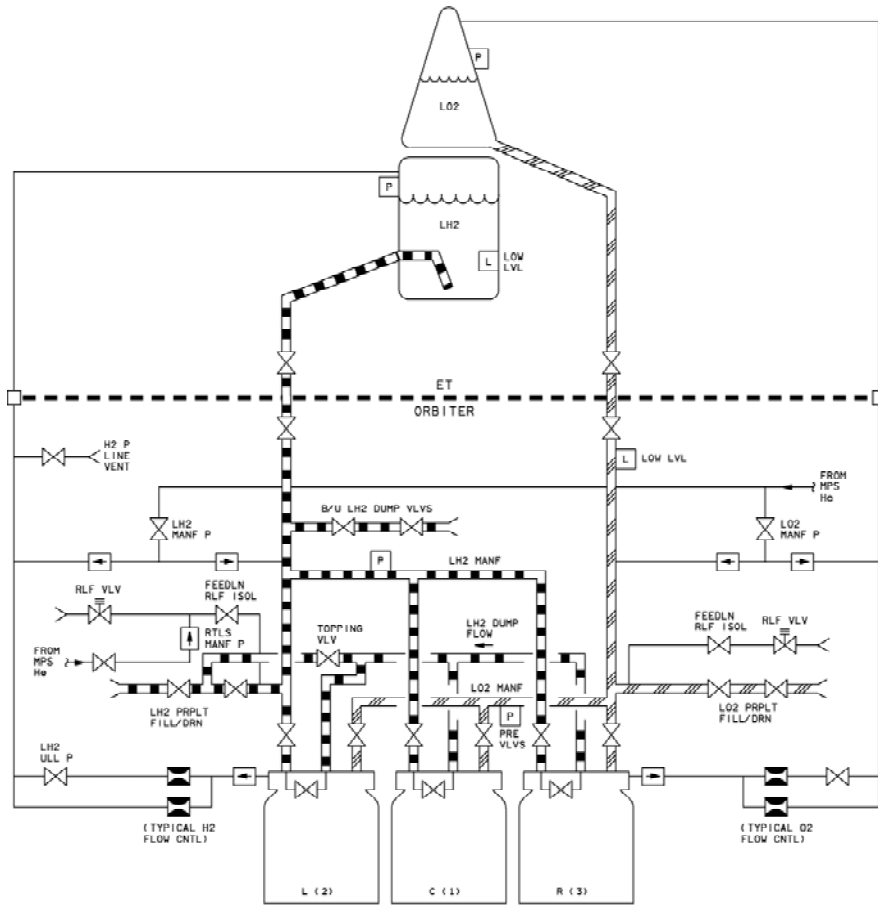


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MPS PRPLT

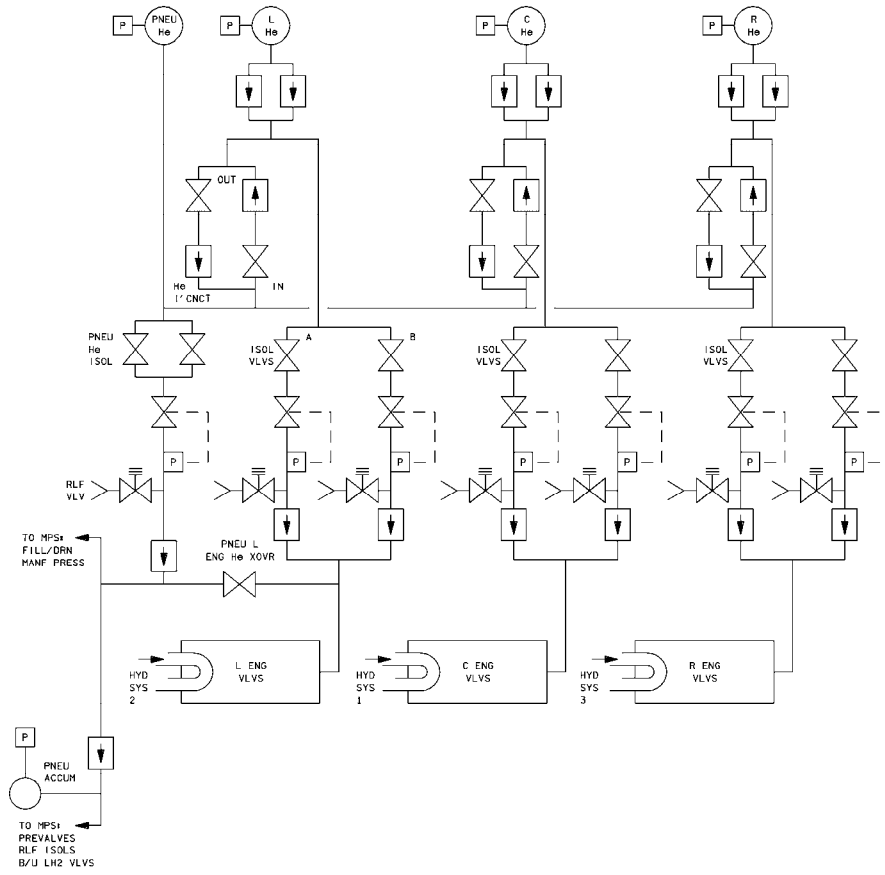
MPS



03/27/03
4800302_116.ART1.2

MPS He

MPS



03/27/03
4800301_116. ART 2

MPS He P (Post ET Sep)

If He TK P < 1150 and decr:

- ◆ 1. (Aff) MPS He ISOL (two) – CL
- If/when second He TK P < 1150:
- ◆ 2. MPS PNEU He ISOL – CL

MPS VACUUM INERT

20 min after MPS dump complete:

If LO2 MANF P > 30 psia, √MCC

Otherwise, proceed with activation

A. ACTIVATION

LO2 Inert

1. MPS FILL/DRAIN LO2 OUTBD – CL
2. INBD – CL
- Wait 15 sec, then:
3. MPS FILL/DRAIN LO2 OUTBD – OP
4. INBD – OP

LH2 Inert

5. MPS FILL/DRAIN LH2 OUTBD – CL
6. INBD – CL
- Wait 15 sec, then:
7. MPS FILL/DRAIN LH2 OUTBD – OP
8. INBD – OP

1 min after last FILL/DRAIN open or on MCC call, continue to termination:

B. TERMINATION

LO2 Inert

1. MPS FILL/DRAIN LO2 OUTBD – CL
- Wait 15 sec, then:
2. MPS FILL/DRAIN LO2 OUTBD – GND
3. INBD – GND

LH2 Inert

4. MPS FILL/DRAIN LH2 OUTBD – CL
- Wait 15 sec, then:
5. MPS FILL/DRAIN LH2 OUTBD – GND
6. INBD – GND

MPS LH2/O2 MANF

If LH2 MANF P > 65 psia:

- ◆ 1. MPS PNEU He ISOL – OP
- 2. PRPLT DUMP B/U LH2 VLV – OP
- 3. FILL/DRAIN LH2 OUTBD – OP
INBD – OP

PWRDN

LOSS OF 2 CAB FANS	10-2
AV BAY 1 COOLING/AV BAY 1 FIRE	10-7
2 COOLING/AV BAY 2 FIRE	10-10
3 COOLING/AV BAY 3 FIRE	10-13
CAB PRESS (MINOR PWRDN)	10-16
(MAJOR PWRDN).....	10-17
2 H2O LOOPS (POST OMS-2)	10-21
1 FREON LOOP	10-29
HI LOAD EVAP	10-33
2 FREON LOOPS (POST OMS-2)	10-35
FES/1 FC	10-39
2nd FC	10-43

PWRDN

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LOSS OF 2 CAB FANS

NOTE

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

PWRDN

- | | | |
|-------------------|-----|--|
| C3 | 1. | MSTR MADS PWR – OFF |
| | 2. | Minimize Itg |
| | 3. | Perform <u>PL PWRDN</u> , then: |
| L1 | 4. | √CAB FAN A,B (two) – OFF |
| | | TEMP CNTLR – OFF |
| | 5. | HUM SEP A,B (two) – OFF |
| | 6. | Use only one FLT CNTLR PWR, PGSC |
| L4:L | 7. | cb ΦA CAB T CNTLR 1,2 (two) – op |
| | 8. | 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 |
| O14:B | 9. | cb MNA EVENT TIMER AFT – op |
| :C | 10. | SMOKE DETN L/R FLT DK – op |
| O15:B | 11. | MNB OI H2O BYP LOOP 2 SNSR – op |
| | 12. | MSN TIMER AFT – op |
| O16:C | 13. | MNC SMOKE DETN CAB – op |
| L4:J | 14. | √cb AC3 ΦA SIG CONDR HUM SEP – op |
| | | Post OMS-2: |
| F6/F8 | 15. | √FLT CNTLR PWR (two) – OFF |
| O14,O15,
O16:E | 16. | cb DDU L,R,AFT (six) – op |
| W1-10 | | Install Window Shades or mnvr to tail Sun att:
If in OPS 1:
 17. Manually mnvr to shade windows
If in OPS 3:
18. Obtain ATT data from MCC
<u>XXXXX MNVR YYYYY</u> |

Cont next page

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A10-2

APCL/ALL/GEN O

NOTE

If uncomfortable, doff LES. Use QDM as needed to provide respiratory cooling. If cab temp > 95 degF and no evaporative cooling is sensed, don LES, check tabs, close visor, LES O2 – ON.

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

19. Continue with ASC, then LAUNCH DAY ORBIT 2(3) (CONT DEORB). Use DEORB PREP/ENTRY DELTAS PULLOUT PAGE, 10-5, for changes

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APCL/ALL/GEN O

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A10-4

APCL/ALL/GEN O

DEORB PREP/ENTRY DELTAS PULLOUT PAGE

- A. Deltas to LAUNCH DAY ORBIT 2(3) (CONT DEORB)
1. Minimize use of IDPs, MDUs, FLT CNTLR PWR, DDU's; use one PGSC only if reqd
 2. Minimize Itg
 3. Minimize sun in cab (delay mnvr to burn att until TIG-15 if necessary)
- If orbit 2 deorb:
4. APU HTRS & DED DISP ENT CONFIG **[3]**
 5. Go to step 7
- If orbit 3 deorb:
6. ENT FWD FLT DECK CONFIG **[10]**
 7. In ENT SW LIST/VER, do not activate pwrdrn items

B. Deltas to DEORBIT BURN (ENT)

At TIG-25:

If time permits, set up for cab purge:

- | | |
|-------------|--|
| MO10W | 1. 14.7 CAB REG INLET SYS 1,2 vlv (two) – OP |
| | 2. O2 REG INLET SYS 1 vlv – OP
√2 vlv – CL |
| L2 | 3. O2/N2 CNTLR VLV SYS 1 – AUTO (O2/N2)
2 – OP (N2) |
| Inner Hatch | 4. √O2 SYS 1,2 SPLY (two) – OP (tb-OP) |
| | 5. Remove INNER HATCH Equal vlv cap (two) |
| | 6. √Equal vlv (two) – NORM |
| | 7. Reinstall Equal vlv cap (two) |
| | 8. Open INNER HATCH |
| ML86B:B | 9. cb MNA VAC VENT ISOL VLV – cl |
| ML31C | 10. VAC VENT ISOL VLV BUS SEL – MNA
CNTL – OP (tb-OP) |
- NOZ HTR – ON

Cont next page

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**LOSS OF 2 CAB FANS
D/O PULLOUT PAGE**

A10-5

APCL/ALL/GEN O

At TIG-20:

11. Initiate cab purge

WARNING

Do not use WCS once constant cab
purge has started (because of high N2
concentration)

MO32M,
MO69M,
C6
L2

12. LEH O2 1(2,...8) vlv – OP (as reqd)

13. O2 XOVR SYS 1 – CL
√2 – OP

AW82B

14. AIRLK DEPRESS vlv cap – vent, remove
vlv – 5

15. Close INNER HATCH

At TIG-15:

16. Mnvr to deorb burn att

At TIG-4:

17. Use two IDP/CRTs with four MDUs for deorb burn

O14,O15,
O16:E
F6,F8

18. cb DDU L,R (four) – cl, then:

19. L,R FLT CNTLR PWR (two) – ON

C. Deltas to POST BURN (ENT)

F6,F8

O14,O15,
O16:E

1. Use one IDP/CRT with two MDUs
2. L,R FLT CNTLR PWR (two) – OFF
3. cb DDU L,R (four) – op

D. Deltas to ENTRY MANEUVERS (Cue Card)

At EI:

O14,O15,
O16:E
F6

1. Use only two IDP/CRTs with four MDUs
2. cb DDU L,R (four) – cl
3. L FLT CNTLR PWR – ON

At Wheel Stop:

4. Open visor, LES O2 – OFF
5. Go to EXPEDITED PWRDN (ENT, POST LDG)

- C3 26. √OI PCMMU FORMAT – GPC
PWR – 2
- MA73C:A 27. MCA LOGIC MNA FWD 1 – OFF
- AW18H 28. √PWR/BATT CHGR EMU 1,2 BUS SEL (two) – OFF
- If visors reqd to remain down due to fire and rev 3 avail:
29. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3)
with AV BAY FIRE CONTINGENCY DELTAS
(CONT DEORB, LAUNCH DAY (ORBIT 3)) >>
- Otherwise:
- For MM201 trans:
30. Go to MAL, DPS, GPC FRP-7, DPS RECONFIG
FOR LOSS OF AV BAY COOLING
(ASCENT/ORBIT) >>
- If orbit 7 deorbit:
31. Perform Deltas to nominal POST INSERT and
DEORB PREP (POST INSERT, ORBIT 7
DEORB), then:
- If AV BAY fire:
32. Go to AV BAY FIRE (ORB PKT, PWRDN) and
complete remaining actions

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A10-9

APCL/ALL/GEN O

LOSS OF AV BAY 2 COOLING/AV BAY 2 FIRE

WARNING

There is no smoke detection or air cooling in AV BAY 2. Failure of any LRU still pwr'd in AV BAY 2 may be indicative of fire in progress

- O7 1. √TACAN 2 MODE sel – OFF
L1 2. √AV BAY 2 FAN A,B (two) – OFF
O6 3. GPC MODE 2 – STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT (tb-bp)

If AV BAY 2 fire:

4. Continue; otherwise go to step 23

NOTE

While performing proc, note any cbs open. Equipment still pwr'd in Av Bay following pwr'dn:

FPCA 2, FLCA 2, BFC 3A (when GPC 3 is pwr'd), MDM OF2, and DSC OF2

- R1 5. cb AC CONTR AC2 (three) – cl
6. INV/AC BUS 2 – OFF (tb-OFF)
INV PWR 2 – OFF (tb-OFF)
cb AC CONTR AC2 (three) – op
R2 7. √BLR CNTLR/HTR 2 – A
1 – B
8. Perform FC2 SHUTDN, except PWRDN (Cue Card), then:
L4:H 9. cb AC3 AV BAY 2 FAN B (three) – op
L1 10. FREON PUMP LOOP 1 – A
11. AV BAY 1 FAN A – ON
B – OFF
12. √CAB FAN A – ON
√B – OFF
O13:C 13. cb ESS 2CA AC2 SNSR – op

Cont next page

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A10-10

APCL/3,4/GEN O

O15:A	14.	BRAKES MNB – OFF
:E	15.	cb MNB RDR ALTM 2 – op MLS 2 – op ADTA 2 – op ACCEL 2 – op
:F	16.	MMU 2 – OFF
O16:A	17.	BRAKES MNC – OFF
:E		cb MNC MLS 3 – op ADTA 4 – op
O8	18.	FWD RCS MANF ISOL 3,4 (two) – CL (tb-CL)
O16:F	19.	RJDF 2A F3 LOGIC – OFF DRIVER – OFF RJDF 2B F4/F5 LOGIC – OFF F4 DRIVER – OFF ACCEL 3 – OFF
A1L	20.	S-BD PM MODE sel – TDRS DATA √NSP DATA RATE XMIT – HI √RCV – HI CODING XMIT – ON √RCV – ON √PWR – 1 S-BD PL PWR SYS – OFF CNTL – PNL,CMD
C3	21.	S-BD PM CNTL – PNL,CMD √OI PCMMU PWR – 1 FORMAT – GPC
MA73C:A	22.	MCA LOGIC MNB FWD 2 – OFF

Cont next page

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A10-11

APCL/3,4/GEN O

23. ASAP post OMS 2:

REASSIGN STRINGS TO GPCs 1,3,4 IN MC 1

24. GNC 0 GPC MEMORY

CONFIG – ITEM 1 +1 EXEC

Modify MC 1 per table ---->

CONFIG	1
GPC	12340
STR	1 1
	2 4
	3 3
	4 4
PL	1/2 1
CRT	1 1
	2 4
	3 3
	4 0
L	1 1
	2 2
MM	1 1
	2 3

NOTE

The following must be an OPS MODE Recall

CRT

- 25. GNC, OPS 10X PRO
- 26. (BFS) GNC I/O RESET
GNC, OPS 106 PRO
000 PRO

C3

- 27. BFC CRT DISP – OFF

O6

- 28. GPC MODE 5 – STBY
(tb-RUN)
– HALT
OUTPUT 5 – NORM

C3

- 29. Sel best S-BD PM ANT until SM GPC is established
If AV BAY 2 fire:

O6

- 30. GPC PWR 2 – OFF
5 – OFF
MDM FF2, FF4 (two) – OFF
PL2 – OFF

If visors reqd to remain down due to fire and rev 3 avail:

- 31. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3)
with AV BAY FIRE CONTINGENCY DELTAS
(CONT DEORB, LAUNCH DAY (ORBIT 3)) >>

Otherwise:

For MM201 trans:

- 32. Go to MAL, DPS, GPC FRP-7, DPS RECONFIG
FOR LOSS OF AV BAY COOLING
(ASCENT/ORBIT) >>

If orbit 7 deorbit:

- 33. Perform Deltas to nominal POST INSERT and
DEORB PREP (POST INSERT, ORBIT 7
DEORB), then:

If AV BAY fire:

- 34. Go to AV BAY FIRE (ORB PKT, PWRDN) and
complete remaining actions

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LOSS OF AV BAY 3 COOLING/AV BAY 3 FIRE

WARNING

There is no smoke detection or air cooling in AV BAY 3. Failure of any LRU still pwr'd in AV BAY 3 may be indicative of fire in progress

- O7 1. √TACAN 3 MODE sel – OFF
L1 2. √AV BAY 3 FAN A,B (two) – OFF
O6 3. GPC MODE 3 – STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT (tb-bp)

If AV BAY 3 fire:

4. Continue; otherwise go to step 20

NOTE

While performing proc, note any cbs open. Equipment still pwr'd in Av Bay following pwr'dn:

FPCA 3, FLCA 3, MDM OF3, DSC OF3, and active comm equipment

- R1 5. cb AC CONTR AC3 (three) – cl
6. INV/AC BUS 3 – OFF (tb-OFF)
INV PWR 3 – OFF (tb-OFF)
cb AC CONTR AC3 (three) – op
R2 7. √BLR CNTLR/HTR 3 – A
2 – B
8. Perform FC3 SHUTDN, except PWRDN (Cue Card), then:
L1 9. H2O PUMP LOOP 1 – ON
2 – OFF
CAB FAN B – ON
A – OFF
L4:H 10. cb AC1 AV BAY 3 FAN B (three) – op

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A10-13

APCL/3,4/GEN O

WARNING

The following steps will unpwr C/W sys. All Class 1, Class 2, and SM aural tones and C/W annun lights will be lost. CRTs must be monitored for fault summ msgs

- O13:A 11. cb ESS 1BC C/W A – op
 :C 2CA C/W B – op
 :E 3AB AC3 SNSR – op

NOTE

If comm presently working, performing a PNL,CMD may result in loss of comm (if fire has aff alt comm sys)

If no comm:

- A1L 12. S-BD PM MODE sel – TDRS DATA
 √NSP DATA RATE XMIT – HI
 √RCV – HI
 CODING XMIT – ON
 √RCV – ON
 √PWR – 1

- C3 13. S-BD PM CNTL – PNL,CMD
 If S-BD comm avail:

- O6 14. UHF MODE sel – OFF

If comm not recovered:

- C3 15. S-BD PM CNTL – PNL
A1L ANT SW ELEC – OFF
 PRE AMP – OFF
 PWR AMPL STBY – OFF
 OPER – OFF
 XPNDR – OFF
 NSP PWR – OFF
 ENCRYPTION SEL – BYP
 PWR – OFF

- O6 16. √UHF MODE sel – SPLX

- A1L 17. S-BD PL CNTL – PNL
 PL DATA INTLVR PWR – OFF

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APCL/ALL/GEN O

- A1R 18. S-BD FM PWR – OFF
 CNTL – PNL
 MA73C:A 19. MCA LOGIC MNC FWD 3 – OFF

20. ASAP post OMS 2:

REASSIGN STRINGS TO GPCs 1,2,4 IN MC 1

21. GNC 0 GPC MEMORY

CONFIG – ITEM 1 +1 EXEC
 Modify MC 1 per table---->

CONFIG GPC	1 12340
STR 1	1
2	2
3	4
4	2
PL 1/2	1
CRT 1	1
2	2
3	4
4	0
L 1	1
2	2
MM 1	1
2	2

NOTE

The following must be
 an OPS MODE Recall

22. GNC, OPS 10X PRO
 23. (BFS) GNC I/O RESET
 If AV BAY 3 fire:
 24. GPC PWR 3 – OFF
 MDM FF3 – OFF

If visors reqd to remain dn due to fire and rev 3 avail:

25. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3)
 with AV BAY FIRE CONTINGENCY DELTAS
 (CONT DEORB, LAUNCH DAY (ORBIT 3)) >>

Otherwise:

For MM201 trans:

26. Go to MAL, DPS, GPC FRP-7, DPS RECONFIG
 FOR LOSS OF AV BAY COOLING
 (ASCENT/ORBIT) >>

If orbit 7 deorbit:

27. Perform Deltas to nominal POST INSERT and
 DEORB PREP (POST INSERT, ORBIT 7
DEORB), then:

If AV Bay fire:

28. Go to AV BAY FIRE (ORB PKT, PWRDN) and
 complete remaining actions

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LOSS OF CAB PRESS (MINOR PWRDN)

NOTE

If EQ dP/dT < 0.6, CAB P will stabilize at 8 psia

1. Minimize Itg
- O7 2. √TACAN MODE sel (three) – OFF
- O8 3. √MLS (three) – OFF
4. Perform PL PWRDN, then:
- L1 5. √H2O LOOP 2(1) BYP MODE – MAN
MAN – DECR (hold 30 sec)
6. √FLOW PROP VLV LOOP tb (two) – ICH
- C3 7. Use two IDP/CRTs with four MDUs
- If AOA:
 8. Deltas to ENTRY MANEUVERS (Cue Card)
At V = 10K:
TACAN 2,3 MODE sel (two) – GPC
At M = 2.9:
Use two HUDs, MLS, and RAs as reqd
GNC I/O RESET
 9. Continue AOA PROCEDURES (ASC, AOA).
Do not perform ENT PKT pwrn >>
- If not AOA:
 10. Go to LOSS OF CAB PRESS (MAJOR PWRDN) (PWRDN), 10-17

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A10-16

APCL/3,4/GEN O

LOSS OF CAB PRESS (MAJOR PWRDN)

NOTE

If EQ dP/dT > 0.6, CAB P will stabilize
below 8 psia

1. Minimize Itg
- O7 2. \sqrt TACAN MODE sel (three) – OFF
- O8 3. \sqrt MLS (three) – OFF
- C3 4. MSTR MADS PWR – OFF
5. Perform PL PWRDN, then:
- L1 6. \sqrt H2O LOOP 2(1) BYP MODE – MAN
MAN – DECR (hold 30 sec)
7. \sqrt FLOW PROP VLV LOOP tb (two) – ICH
- C3 8. Use one IDP/CRT with two MDUs
- F6,F8 9. FLT CNTLR PWR (two) – OFF
- If FLT CNTLR PWR not reqd:
- O14,O15, 10. cb DDU L,R (four) – op
O16:E \sqrt AFT (two) – op
11. ADTA (four) – op
- L2 12. ANTISKID – OFF
NWS – OFF
- L1 13. HUM SEP B – OFF
- O16:E 14. cb MNC RCS/OMS PRPLT QTY GAUGE – op(cl) as
reqd
- If AOA:
15. Continue AOA PROCEDURES (ASC, AOA)
Do not perform ENT PKT pwrdn
Use DEORB PREP/ENTRY DELTAS PULLOUT
PAGE, 10-19, for changes >>
- If orbit 2 or 3 deorb:
16. Continue ASC
Use DEORB PREP/ENTRY DELTAS PULLOUT
PAGE, 10-19, for changes

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DEORB PREP/ENTRY DELTAS PULLOUT 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

If no comm or if CAB P stabilizes < 6 psia (MCC call), after OPS 301 transition:

PWRDN GPC 1 AND REASSIGN STRINGS TO REMAINING PASS GPCs IN MC 3

	1.	<u>GNC 0 GPC MEMORY</u> CONFIG – ITEM 1 +3 EXEC Modify MC 3 per table ----->	CONFIG GPC	3 02340
CRT	2.	GNC, OPS 301 PRO	STR 1	4
	3.	<u>GNC 50 HORIZ SIT</u> Check runway sel Resel runway	2 3 4	2 3 2
O6	4.	(BFS) GNC, OPS 301 PRO	PL 1/2	4
	5.	GPC MODE 1 – STBY (tb-bp) – HALT	CRT 1 2 3 4	4 2 3 0
			L 1 2	0 0
			MM 1 2	4 2

NOTE

Single fault tolerance used for most cab air-cooled equipment. Add'l LRUs may be activated as reqd if cab press stable ≥ 8 psia

Initiate changes:

If Orbit 2(3):

- 6. Start with step A

If AOA:

- 7. Start with step B, 10-20

A. Deltas to LAUNCH DAY ORBIT 2(3) (CONT DEORB)

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

If orbit 2:

- 2. APU HTRS & DED DISP ENT CONFIG [3]
Do not pwr MLS, TACANs

If orbit 3:

- 3. ENT FWD FLT DECK CONFIG [10]
Do not pwr MLS, TACANs
- 4. In ENT FORWARD, AFT, MIDDECK, do not activate pwrdn items

Cont next page

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**LOSS OF CAB PRESS
D/O PULLOUT PAGE**

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APCL/3,4/GEN O

- B. Deltas to DEORBIT BURN (ENT)
At TIG-4:
- 1. Use two IDP/CRTs with four MDUs for deorb burn
 - 2. cb DDU L,R (four) – cl
 - 3. L,R FLT CNTLR PWR (two) – ON
- O14,O15,
O16:E
F6,F8
- C. Deltas to POST BURN (ENT)
- 1. Use one IDP/CRT with two MDUs
 - 2. L,R FLT CNTLR PWR (two) – OFF
 - 3. cb DDU L,R (four) – op
 - 4. Delete ANTISKID, NWS callouts (ENTRY SW CHECK)
- F6,F8
O14,O15,
O16:E
- D. Deltas to ENTRY MANEUVERS (Cue Card)
At EI:
- 1. Use only one IDP/CRT with two MDUs
 - 2. cb DDU L,R (four) – cl
 - 3. L FLT CNTLR PWR – ON
 - 4. cb ADTA (three) – cl
 - 5. (BFS) GNC I/O RESET
- O14,O15,
O16:E
F6
O14,O15,
O16:E
- At V = 15K:
If CAB PRESS < 8 psia:
- 6. Delete NAVAIDS callout
- If CAB PRESS ≥ 8 psia:
- 7. Activate all TACANs, RAs, MLS
 - 8. GNC I/O RESET
 - 9. Disregard subs NAVAID callout DELTAS
- At V = 10K:
- 10. TACAN 2,3 MODE sel (two) – GPC
- O7
- At M = 2.7:
- 11. Use two HUDs, MLS, and RAs as reqd
 - 12. GNC I/O RESET
- At M < 1.0:
- 13. ANTISKID – ON
 - 14. NWS – 1
- L2

**LOSS OF CAB PRESS
D/O PULLOUT PAGE**

A10-20

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APCL/3,4/GEN O

LOSS OF 2 H2O LOOPS (POST OMS-2)

NOTES

- Loss of water loop cooling aff both water and air cooled equipment
- This proc assumes loss of both water loops occurs after AOA opportunity has passed, but before OPS 2 transition
- If orbit 2 deorb, this pwrdn leads into LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP). For all other launch day deorb, this pwrdn leads to LOSS OF 2 H2O LOOPS ON-ORBIT WAIT (CONT DEORB, LOSS OF 2 H2O LOOPS)
- The LOSS OF 2 H2O LOOPS (ORB PKT, PWRDN) is used for MS pwrdn and comm config. This proc powers down all comm. If comm reqd, preferred comm config in order of heat production:
 1. UHF only
 2. STDN LO PWR if reqd
 3. TDRS only if mandatory

CAUTION

TDRS OR STDN – HI AOS may be limited to 10 min (pwr amp will overheat)

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APCL/ALL/GEN O

TIME CRITICAL PROCEDURES (execute simo)

- L4:B 1. Unstow ORB PKT, CONT DEORB, ORB OPS, and one PGSC. To pwr the PGSC:
cb UTIL PWR A15/MO13Q AC3 – cl, or
F1/MO52J AC1 – cl
- MS1 2. Perform MS OVHD PNL PWRDN (N2 qty not reqd by CDR in step 11 and omit step 14) (ORB PKT, PWRDN)

As part of MS OVHD PNL PWRDN perform the following:

- O14:B 3. cb MNA OI SIG CONDR OF 1/4 A – op
:E DDU AFT – 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
:E DDU AFT – op

NOTE

- MS Do not pwrdrn MMU 1.
- If orbit 2 deorb, do not pwrdrn MTU.

If orbit 2 deorb and TIG > 1 hr, perform 20 MINUTE DE/REPRESS MS PULLOUT PAGE (CONT DEORB, LOSS OF 2 H2O LOOPS)

- MS2 6. Perform LOSS OF 2 H2O LOOPS, COMM PWRDN (ORB PKT, PWRDN), within 10 min

CDR and PLT perform following PWRDN ASAP:

CDR AND PLT PWRDN

- C3 7. √MSTR MADS PWR – OFF
Minimize Itg
8. Use only one IDP/CRT with one MDU
- F6,F8 9. FLT CNTLR PWR (two) – OFF, use one as reqd
10. Perform PL PWRDN, then:
- O7 11. √TACAN MODE sel (three) – OFF
- O8 12. √RDR ALTM (two) – OFF
13. √MLS (three) – OFF
- L1 14. H2O PUMP LOOP 1,2 (two) – OFF (one ON if PUMP OUT P > 45 psia, or MCC call)
15. HUM SEP A,B (two) – OFF (one ON if either H2O loop ON)

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APCL/3,4/GEN O

NOTE

If performing 20 MINUTE DE/REPRESS MS PULLOUT PAGE (CONT DEORB, LOSS OF 2 H2O LOOPS), do not turn cab fan OFF. Record MET for fan OFF when DE/REPRESS complete

- 16. CAB FAN A,B (two) – OFF
(one ON if either H2O LOOP ON)
Rcd MET ___/___:___
- 17. FREON PUMP LOOP 1 – OFF
2 – B
√FLOW PROP VLV LOOP 1,2 (two) – ICH (tb-ICH)
- L2 18. √FLASH EVAP CNTLR PRI A – ON
- 19. O2 SYS 1 SPLY – CL (tb-CL)
- 20. ANTISKID – OFF
NWS – OFF
- R2 21. FLASH EVAP FDLN HTR SPLY (two) – 2
- 22. HYD CIRC PUMP (three) – ON (to prevent MN BUS O/V)

RECONFIG DPS

- O14:F 23. √MMU 1 – ON
- 24. GNC 0 GPC MEMORY

Reassign Strings to GPC 1 in MC 1

- 25. CONFIG – ITEM 1 +1 EXEC
Modify MC 1 per table ---->

NOTE

The following must be an OPS MODE Recall

- CRT 26. GNC, OPS 10X PRO

CONFIG	1	
GPC	12340	
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

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- O6 27. GPC MODE 2,3,4 (three) – STBY (tb-bp)
 - HALT
 - STBY (tb-RUN)
 - HALT (tb-bp)
- CRT 28. (BFS) GNC, OPS 106 PRO
000 PRO
- O6 29. GPC MODE 5 – STBY (tb-RUN), HALT (tb-bp)
OUTPUT 5 – NORM
- C3 30. BFC CRT DISP – OFF
- L1 31. AV BAY 2,3 FANS (four) – OFF
 - √1 FAN A – ON
 - B – OFF
- 32. IMU FAN A – ON
 - B,C (two) – OFF
- 33. If not orbit 2 deorb: Go to step 40
Transition GPC 1 to GNC OPS 3:
- O14,O15, 34. √RGA (four) – ON
O16:A
- O14,O15:E √cb ACCEL (two) – cl
- O15,O16:F √ACCEL 3,4 (two) – ON
- O14,O15, √ASA (four) – ON
O16:F
- C3 35. √FCS CH (four) – AUTO
- 36. GNC 0 GPC MEMORY

Reassign Strings to GPC 1 in MC 3

- CRT 37. CONFIG – ITEM 1 +3 EXEC
Modify MC 3 per table-----→
- 38. GNC, OPS 301 PRO
GNC DEORB MNVR COAST
- 39. Go to step 43

CONFIG	3
GPC	10000
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

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A10-24

APCL/ALL/GEN O

RECONFIG DPS, TRANSITION TO OPS 2

40. GNC 0 GPC MEMORY

Reassign Strings to GPC 1 in MC 2

	41. CONFIG – ITEM 1 +2 EXEC Modify MC 2 per table----->	CONFIG GPC	2 10000
	42. GNC, OPS 201 PRO	STR	1 1
	43. For any CRT that is OFF: GPC/CRT1/X EXEC		2 1 3 1
O14:F	44. MMU 1 – OFF		4 1
	45. Calculate DEORBIT TARGETS using PGSC	PL	1/2 1
C3	46. C/W MODE – ACK	CRT	1 1 2 1 4 0
		L	1 0 2 0
		MM	1 1 2 1

NOTE

For F7 lts, hold F2 or
F4 MA in

Repress SPLY H2O TKA:

ML26C 47. SPLY H2O GN2 TK VENT vlv – PRESS

TKA SPLY vlv – OP

R11L XOVV VLV – OP (tb-OP)

If time to CONUS TIG < 50 min:

48. Read notes below then go to step 69

If time to CONUS TIG > 50 min, continue:

49. GNC 21 IMU ALIGN

IMU 1,3 (two) – desel

O14:A, 50. IMU 1,3 (two) – OFF

O15:A

O6 51. MDM FF1,3,4 (three) – OFF

If orbit 2 deorb:

52. Mnvr to shade windows from sun or install Window
Shades until TIG-10 min, then go to step 61

If not orbit 2 deorb:

53. Config DAPs A1,B1 with these exceptions:

(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)

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Mnvr to tail Sun att:

54. GNC UNIV PTD
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 if reqd)
DAP: A/AUTO/PRI
START TRK – ITEM 19 EXEC

Establish stabilized att:

55. DAP: B/AUTO/PRI
ADI ATT – INRTL
Wait 30 sec (check rates)

Establish free drift:

56. DAP: FREE
O6 57. GPC MODE 1 – STBY (tb-bp), HALT
– STBY (tb-RUN)
– HALT (tb-bp)
PWR (five) – OFF

58. Record MET ___/___/___
C2,R12L 59. Confirm all IDPs and MDUs – OFF
L1 60. AV BAY 1 FAN (two) – OFF
O8 61. FWD RCS MANF ISOL 1,2,3,4 (four) – CL (tb-CL)
O14:F 62. RJDF 1B F1 LOGIC – OFF
DRIVER – OFF
O15:F 63. 1A F2 DRIVER – OFF
LOGIC – OFF
O16:F 64. 2A F3, 2B F4 DRIVER (two) – OFF
F4/F5 LOGIC (two) – OFF
RJD MANF L5/F5/R5 DRIVER – OFF
L4:J 65. \sqrt{cb} AC3 Φ A SIG CONDR HUM SEP – op
:P 66. Φ A LG SNSR (two) – op
If H2O PUMP LOOP 1 A(B) ON:
MA73C 67. Leave MCA LOGIC MNA FWD 1 – ON
(MNB FWD 2 – ON)
MCA LOGIC MNA,B,C (thirteen) – OFF
If H2O PUMP LOOP 1 A,B OFF:
68. MCA LOGIC MNA,B,C (fourteen) – OFF

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APCL/ALL/GEN O

NOTE

30 min after deact, cycle one CAB FAN – ON (30 min ON, 30 min OFF) to control PPCO2 and for cooling.

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.

If GPC 1 remains in RUN, limit its operation to max of 1 hr. If reqd, reactivate GPC 2 and restrng in MC 3, take GPC 1 to HALT, turn AV BAY 2 FAN B – ON, AV BAY 1 FAN – OFF, then wherever GPC 1 is referenced, replace with GPC 2 in the LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY or LOSS OF 2 H2O LOOPS ON-ORBIT WAIT (CONT DEORB).

Expect 100% cab humidity in ~2 hr.

Possible cab air OVBD RLF due to cab air heating which may cause a loud noise

69. Verify MS PWRDN complete, then:
If not orbit 2 deorb:

NOTE

Use QDM as needed for temp > 90 degF. If temp > 95 degF and no evaporative cooling is sensed, don LES, check tabs, close visor, LES O2 – ON.

Immed begin drinking H2O (one 8-oz container every 15 min with salt tablet in every other container) and continue thru entry

70. Go to LOSS OF 2 H2O LOOPS ON-ORBIT WAIT (CONT DEORB, LOSS OF 2 H2O LOOPS) >>
71. Go to LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP). Perform all steps although some activities may already have been performed

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A10-28

APCL/ALL/GEN O

LOSS OF 1 FREON LOOP

- | | |
|-----------------------|--|
| C3 | 1. MSTR MADS PWR – OFF |
| | 2. Minimize Itg |
| | 3. Use one IDP/CRT with two MDUs, FLT CNTLR PWR |
| O7 | 4. TACAN MODE sel (three) – OFF |
| O8 | 5. RDR ALTM (two) – OFF |
| | 6. If reqd: Perform <u>PL PWRDN</u> , then: |
| L1 | 7. \sqrt FLOW PROP VLV LOOP tb (two) – ICH |
| | 8. H2O LOOP 2(1) BYP MODE – MAN
MAN – DECR (30 sec) |
| O14,
O15,
O16:A | 9. BRAKES (three) – OFF |
| O14,
O15,
O16:E | 10. cb ADTA (four) – op |

If FLT CNTLR PWR not reqd:

11. cb DDU L,R,AFT (six) – op
12. \sqrt (Aff) FREON PUMP – OFF

If FREON LEAK performed and leak isolated (accum qty > 3 and not decr)(\sqrt MCC):

13. Perform EMER PLBD OPENING (ECLS), 4-8
14. Mnvr per MCC >>

If AOA:

- | | |
|--------------------------------|---|
| O14,
O15,
O16:E | 15. Deltas to <u>AOA</u> (ASC)
At TIG-10 min:
\sqrt cb DDU L,R (four) – cl |
| | Use two IDP/CRTs with four MDUs, two FLT CNTLR PWR for burn |
| F7,F8
O14,
O15,
O16:E | 16. Deltas to <u>AOA POST D/O BURN</u> (ASC)
FLT CNTLR PWR (two) – OFF
cb DDU L,R (four) – op |
| | Use one IDP/CRT with two MDUs |
| | 17. Deltas to <u>ENTRY SW CHECK</u> (ENT, <u>POST BURN</u>)
Pwr NAV AIDS per <u>ENTRY MANEUVERS</u> (Cue Card) |
| | 18. Deltas to <u>ENTRY MANEUVERS</u> (Cue Card)
Use DEORB PREP/ENTRY DELTAS PULLOUT PAGE, 10-31, starting with step D,1
Continue with <u>AOA</u> (ASC) >> |

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APCL/3,4/GEN O

DEORB PREP/ENTRY DELTAS PULLOUT PAGE

DO NOT DISCARD; USE TO LANDING

- A. Deltas to LAUNCH DAY ORBIT 2(3) (CONT DEORB)
1. Use one FLT CNTLR PWR, DDU, PGSC, and one IDP/CRT with two MDUs
 2. Minimize Itg
 3. Minimize sun in cab if possible
- If orbit 2:
4. APU HTRS & DED DISP ENT CONFIG **[3]**
Do not pwr TACANs
 5. Go to step 7
- If orbit 3:
6. ENT FWD FLT DECK CONFIG **[10]**
Do not pwr MLS, TACANs
 7. In ENT SW LIST/VER, do not activate TACANs, MLS, RA, ADTAs until indicated by ENTRY MANEUVERS (Cue Card) deltas

O14,
O15,
O16:E

- B. Deltas to DEORBIT BURN (ENT)
- At TIG-15 min:
1. Remove Window Shades/mnvr to deorb burn att
- At TIG-10 min:
2. √cb DDU L,R (four) – cl
 3. Use two IDP/CRTs with four MDUs, two FLT CNTLR PWR for burn

F6,F8
O14,
O15,
O16:E

- C. Deltas to POST BURN (ENT)
1. L,R FLT CNTLR PWR (two) – OFF
 2. cb DDU L,R (four) – op
 3. Use one IDP/CRT with two MDUs, as reqd

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**LOSS OF 1 FREON LOOP
D/O PULLOUT PAGE**

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APCL/3,4/GEN O

- D. Deltas to ENTRY MANEUVERS (Cue Card)
- At EI:
- 1. cb DDU L,R (four) – cl
 - 2. L FLT CNTLR PWR – ON
 - 3. Use two IDP/CRTs with four MDUs, as reqd
 - 4. BRAKES (three) – ON
- cb ADTA 1,2,3 (three) – cl
- 5. GNC I/O RESET
- At V = 15K:
- 6. Delete NAVAIDS callout
 - 7. TACAN 1,2 MODE sel (two) – GPC
- At V = 12K:
- If loop 1(2) lost:
- 8. NH3 CNTLR A(B) – OFF
B(A) – PRI/GPC
- At M = 2.7:
- 9. Use two HUDs, MLS, and RAs
GNC I/O RESET

LOSS OF HI LOAD EVAP

- | | |
|--------------------------------|--|
| C3 | 1. \sqrt MSTR MADS PWR – OFF |
| | 2. Minimize Itg |
| | 3. Use one PGSC and one IDP/CRT with two MDUs, as reqd |
| O7 | 4. TACAN MODE sel (three) – OFF |
| O8 | 5. RDR ALTM (two) – OFF |
| | 6. Perform <u>PL PWRDN</u> , then: |
| L1 | 7. H2O LOOP 2(1) BYP MODE – MAN
MAN – DECR (hold 30 sec) |
| | 8. \sqrt FLOW PROP VLV LOOP tb (two) – ICH |
| O14,
O15,
O16:A | 9. BRAKES (three) – OFF |
| O14,
O15,
O16:E | 10. cb ADTA (four) – op |
| | If FLT CNTLR PWR not reqd: |
| | 11. cb DDU L,R (four) – op |
| | If AOA: |
| | 12. Deltas to <u>AOA</u> (ASC)
At TIG-10:
\sqrt cb DDU L,R (four) – cl |
| O14,
O15,
O16:E | Use FLT CNTLR, and two IDP/CRTs with four MDUs, as reqd for burn |
| F6,F8
O14,
O15,
O16:E | 13. Deltas to <u>AOA POST D/O BURN</u> (ASC)
L,R FLT CNTLR PWR (two) – OFF
cb DDU L,R (four) – op |
| O14,
O15,
O16:A | 14. Use two IDP/CRTs with four MDUs
Deltas to ENTRY SW CHECK (ENT, <u>POST BURN</u>)
BRAKES (three) – ON |
| | Do not pwr NAV AIDS, NWS
Perform LOSS OF HI LOAD EVAP DEORB OR
ENTRY PULLOUT PAGE (ENT PKT, <u>PWRDN</u>),
then: |

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A10-33

APCL/3,4/GEN O

LOSS OF 2 FREON LOOPS (POST OMS-2)

WARNING

FC purge must be started and loads pwr'd dn ASAP

Orbiter lifetime is expected to be 120 min from LOSS OF 2nd FREON LOOP with all three FCs running. This assumes three FCs are pwr'd dn to a total level of 8 kW immed and are continuously purged

Earliest possible landing is req'd

NOTES

- Failure assumed to occur too late for an AOA and before OPS 2 transition
- FC purging and pwr'dn should be performed ASAP after failure
- COMM proc (ORB PKT) should be used throughout this proc and CONT DEORB.
Preferred comm config is:
 - A. UHF only
 - B. GSTDN S-BD if req'd
 - C. Use TDRS only if mandatory

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APCL/ALL/GEN O

TIME CRITICAL PROCEDURES

1. MS initiate FC purge (step 4) and unstow ORB PKTs and PGSC, ASAP
2. MS perform LOSS OF 2 FREON LOOPS, COMM PWRDN (ORB PKT, PWRDN); delay 10 min max if AOS

CDR and PLT perform following steps ASAP:

- | | | |
|---------|----|---|
| C3 | 3. | MSTR MADS PWR – OFF |
| MS R11U | 4. | √FC PURGE HTR – ON
√VLVS (three) – OP |
| | 5. | Perform <u>PL PWRDN</u> , then: |
| | 6. | Minimize Itg |
| CRTX | 7. | Use only one FWD IDP/CRT with one MDU (save IDP3 for entry) |
| | 8. | Use only one PGSC |
| F6/F8 | 9. | √FLT CNTLR PWR (two) – OFF |

RESTRICTING TO GPC 1/TRANSITION TO OPS 3

- | | | | |
|----|-----|--|--|
| | 10. | <u>GNC 0 GPC MEMORY</u>
CONFIG – ITEM 1 +3 EXEC
Modify MC 3 per table-----> | |
| | 11. | GNC, OPS 301 PRO
For any FWD IDP that is OFF: | |
| | 12. | GPC/CRT1/X EXEC | |
| C3 | 13. | BFC CRT DISP – OFF | |
| O6 | 14. | GPC MODE 2,3,4 (three)
– STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT (tb-bp)
PWR 2,3,4 (three) – OFF | |
| | 15. | BFS GNC, OPS 106 PRO
000 PRO | |
| | 16. | GPC MODE 5 – STBY (tb-RUN)
– HALT (tb-bp)
OUTPUT 5 – NORM
PWR 5 – OFF | |
| | 17. | <u>GNC 53 ENTRY CONTROLS</u>
RGA 1,3,4 (three) – desel | |
| | 18. | Have MS perform MS OVHD AND AFT PNL PWRDN (ORB PKT, <u>PWRDN</u>), but leave RGA 2 pwr until step 52 | |

CONFIG GPC	3	10000
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	

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PLT

- O7 . √TACAN MODE sel (three) – OFF
- O8 20. √RDR ALTM (two) – OFF
- 21. √MLS (three) – OFF
- C3 22. FCS CH (four) – AUTO
- R4 23. MPS MANF PRESS LO2,LH2 (two) – CL
- R2 24. √HYD CIRC PUMP (three) – OFF
- 25. MPS He ISOL (six) – CL
PNEU He ISOL – CL
L ENG He XOVR – CL
- 26. Go to step 47

CDR

- L1 27. HUM SEP A,B (two) – OFF
- 28. √IMU FAN B – ON
A,C (two) – OFF
- 29. CAB FAN A,B (two) – OFF
- 30. AV BAY 1,2,3 FAN A,B (five) – OFF
- 31. √1 FAN B – ON
- 32. FREON PUMP LOOP 1,2 (two) – OFF (one-ON,
if any flow)
- 33. √RAD CNTLR LOOP 1,2 (two) – OFF
- 34. NH3 CNTLR A,B (two) – OFF
- If no FREON PUMP ON:
 - L2 35. O2 SYS 1,2 SPLY (two) – OP (tb-OP)
 - L1 36. FLASH EVAP CNTLR PRI A,B (two) – OFF
 - 37. TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF
 - 38. HI LOAD DUCT HTR sel – OFF
 - L2 39. FLASH EVAP FDLN HTR SPLY (two) – OFF
- If one FREON PUMP ON:
 - L1 40. FLASH EVAP CNTLR PRI A – ON
 - 41. TOP EVAP HTR NOZ (two) – OFF
√DUCT sel – ON
 - 42. √HI LOAD DUCT HTR sel – ON
 - L2 43. FLASH EVAP FDLN HTR B SPLY – OFF
- 44. NWS – OFF
- O6 45. √S TRK PWR -Y,-Z (two) – OFF
- 46. ANNUN BUS SEL ACA 2/3 – OFF

Cont next page

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A10-37

APCL/3,4/GEN O

- | | | |
|-----------------------|-----|--|
| | 47. | <u>GNC 51 OVERRIDE</u> |
| | | IMU 1,2 (two) – desel |
| O14,
O15:A | 48. | IMU 1,2 (two) – OFF |
| O14,
O15,
O16:A | 49. | BRAKES (three) – OFF |
| | 50. | All IDPs, MDUs – OFF (use IDP1 as reqd until
CONT DEORB proc, 3 min
OFF for each min ON) |
| | 51. | DAP: INRTL/PULSE |
| O15:A | 52. | RGA 2 – OFF |
| O6 | 53. | MDM FF1,4 (two) – OFF
FA1,4 (two) – OFF |
| F6 | 54. | CDR disp sws – green dot |
| O8 | 55. | FWD RCS MANF ISOL 1,2,3,4 (four) – CL (tb-CL) |
| MA73C:
A,B | 56. | √MCA LOGIC MNA FWD 1 – ON
MID 1,AFT 1,MID 3 (three) – OFF
MNB,MNC (ten) – OFF |
| O14:F | 57. | RJDA 1A,2A LOGIC,DRIVER (four) – OFF
RJDF 1B F1 LOGIC,DRIVER (two) – OFF |
| O15:F | 58. | RJDA 1B LOGIC,DRIVER (two) – OFF
RJDF 1A F2 LOGIC,DRIVER (two) – OFF |
| O16:F | 59. | RJDA 2B LOGIC,DRIVER (two) – OFF
RJDF 2A F3 LOGIC,DRIVER (two) – OFF
2B LOGIC,DRIVER (two) – OFF
RJD MANF L5/F5/R5 DRIVER – OFF |
| | 60. | Go to LOSS OF 2 FREON LOOPS (ORB PKT,
<u>PWRDN</u>), beginning at step 58 (Sel ELS TIG) |

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A10-38

APCL/ALL/GEN O

LOSS OF FES/1 FC

- ⇒ C3
1. √MSTR MADS PWR – OFF
 2. Minimize Itg
 3. Use only one IDP/CRT with two MDUs
- If FLT CNTLR PWR not reqd:
4. cb DDU L,R,AFT (six) – op
- O14,
O15,
O16:E
5. TACAN MODE sel (three) – OFF
- O7
6. RDR ALTM (two) – OFF
- O8
7. √FLASH EVAP FDLN HTR SPLY (two) – OFF
- L2
8. NWS – OFF
 9. ANTISKID – OFF
- L1
10. √CAB FAN A(B) – ON
 11. Perform PL PWRDN, then:
 12. √FLOW PROP VLV LOOP 1,2 tb (two) – ICH
- If AOA and FES lost:
- MS perform pwrnd activities (steps 13-18)
13. Minimize Itg
 14. BRAKES (three) – OFF
- O14,
O15,
O16:A
15. cb ADTA (four) – op
- O14,
O15,
O16:E
16. cb MSN TIMER FWD,AFT (two) – op
- O14,
O15:B
17. EVENT TIMER AFT,FWD (two) – op
 18. MMU 1,2 (two) – OFF (MMU 2 ON for OPS TRANSITION, then OFF)
- O14,
O15:F
19. H2O LOOP 2(1) BYP MODE – MAN
MAN – DECR
(hold 30 sec)
- L1
20. Continue with AOA (ASC):
Do not perform LOSS OF FES (ENT PKT,
PWRDN)
Use ENTRY DELTAS PULLOUT PAGE,
10-41

Cont next page

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A10-39

APCL/3,4/GEN O

~
If not AOA:

After APU/HYD SHUTDN and MPS PWRDN/ISOL:

O17:A
:B
:D

21. ATVC (four) – OFF
- EIU (three) – OFF
- MEC 1 – OFF (wait 2 sec)
- 2 – OFF

L2

If FES failed, after MM201 transition:

22. FLASH EVAP FDLN HTR A,B SPLY (two) – 1
23. On MCC call, go to FULL-UP FES FLUSHING (ECLS), 4-16 >>

If FC lost, after MM201 transition:

24. FLASH EVAP FDLN HTR A,B SPLY (two) – 1
25. Go to LOSS OF 1 FC (ORB PKT, PWRDN) >>

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APCL/3,4/GEN O

ENTRY DELTAS PULLOUT PAGE

DO NOT DISCARD; USE TO LANDING

NOTE

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

- A. Deltas to AOA (ASC)
TIG-5 min:
- 1. Use two IDP/CRTs with four MDUs
 - 2. cb DDU L,R (four) – cl
 - 3. L,R FLT CNTLR PWR (two) – ON
- O14,O15,
O16:E
F6,F8
- B. Deltas to POST D/O BURN (ASC)
- 1. Use one IDP/CRT with two MDUs
 - 2. L,R FLT CNTLR PWR (two) – OFF
 - 3. cb DDU L,R (four) – op
 - 4. Delete ANTISKID, NWS callouts (ENTRY SW CHECK)
- F6,F8
O14,
O15,
O16:E
- At EI-7:
- 5. Use two IDP/CRTs with four MDUs
 - 6. Perform EMER PLBD CLOSING (ENT PKT, ECLS)
- C. Deltas to ENTRY MANEUVERS (Cue Card)
At EI:
- 1. NH3 CNTLR B(A) – SEC/ON
 - 2. cb DDU L,R (four) – cl
 - 3. L,R FLT CNTLR PWR (two) – ON
 - 4. BRAKES (three) – ON
 - 5. cb ADTA (four) – cl
 - 6. GNC I/O RESET
- L1
O14,
O15,
O16:E
F6,F8
O14,
O15,
O16:A
O14,
O15,
O16:E

Cont next page

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**LOSS OF FES/1 FC
ENTRY PULLOUT PAGE**

A10-41

APCL/ALL/GEN O

- O7 At V = 15K:
 7. Delete NAVAIDS callout
 8. TACAN MODE sel (three) – GPC
- At V = 12K:
 9. Delete ref to RAD FLOW
- L1 At V = 6K:
 10. NH3 CNTLR B(A) – OFF
 A(B) – PRI/GPC
- At M = 2.7:
 11. Use two HUDs, three MLSs, and two RAs as
 reqd
- L2 12. GNC I/O RESET
 13. ANTISKID – ON
 14. NWS – 1
- At post Wheel Stop:
 15. Go to EXPEDITED PWRDN (ENT, POST LDG)

LOSS OF 2nd FC

- ⇒ C3 1. √MSTR MADS PWR – OFF
 O7 2. Use one IDP/CRT with three MDUs
 O8 3. √TACAN MODE sel (three) – OFF
 4. √RDR ALTM (two) – OFF

NOTE

Do not tie three main buses during ascent

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

MS Perform MS OVHD AND AFT PNL PWRDN, 10-47,
 immed

- L1 5. Minimize Itg
 6. Perform PL PWRDN, then:
 7. CAB FAN (two) – OFF
 8. If in OPS 2: Go to step 15

CONTRACT RS AND REASSIGN STRINGS TO GPC 1 IN MC 1

GNC 0 GPC MEMORY

9. CONFIG – ITEM 1 +1 EXEC
 Modify MC 1 per table

NOTE

The following must be
 an OPS MODE recall

- CRT 10. GNC, OPS 10X PRO

For any CRT that is OFF:

11. GPC/CRT1/X EXEC

CONFIG	1
GPC	12340
STR	1
	2
	3
	4
PL	1/2
CRT	1
	2
	3
	4
L	1
	2
MM	1
	2

Cont next page

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APCL/3,4/GEN O

- O6 12. GPC MODE 2,3,4 (three) – STBY (tb-bp)
 – HALT
 – STBY (tb-RUN)
 – HALT (tb-bp)

PWR 2,3 (two) – OFF

13. (BFS) GNC I/O RESET

14. Go to step 21

15. **GNC 0 GPC MEMORY**

CONFIG – ITEM 1 +2 EXEC

Modify MC 2 per table----->

DOWNLIST GPC – ITEM 44 +1
 EXEC

	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

- CRT 16. GNC, OPS 201 PRO

- O6 17. GPC MODE 2 – STBY (tb-bp)
 – HALT

PWR 2 – OFF

18. √GPC MODE 3,5 (two) – HALT
 (tb-bp)

PWR 3 – OFF

19. **GNC 20 DAP CONFIG**

P OPTION – ITEM 15 EXEC
 (TAIL)

Y OPTION – ITEM 16 EXEC
 (TAIL)

- C3 20. DAP: A/AUTO/PRI

- R2 21. When MPS Dump Complete:
 MPS ENG PWR (six) – OFF

22. **GNC 51 OVERRIDE**

Any comm faulted IMU – desel

- L1 23. √IMU FAN (one) – ON

24. √H2O PUMP LOOP (one) – ON

25. AV BAY 1 FAN B(A) – ON

26. AV BAY 2 FAN A(B) – ON

If MNA unpwr:

27. FREON PUMP LOOP 1 – B
 2 – A

28. FLASH EVAP CNTLR PRI A – ON
 B – OFF

29. TOP EVAP HTR DUCT sel – B
 HI LOAD DUCT HTR sel – B

30. L OMS – sel SEC

Cont next page

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A10-44

APCL/ALL/GEN O

- If MNB(C) unpwr:
- L1 31. FREON PUMP LOOP 1,2 (two) – A(B)
 32. TOP EVAP HTR DUCT sel – A
 HI LOAD DUCT HTR sel – A
- If MNC unpwr:
33. FLASH EVAP CNTLR PRI B – ON
 A – OFF
34. R OMS – sel SEC
- If no MANF leak:
- R1 35. $\sqrt{O_2, H_2}$ MANF VLV TK1, TK2 (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:
36. $\sqrt{O_2, H_2}$ HTR LOSS TABLE (EPS), 5-20
 37. Sel one htr in one O₂, H₂ TK
- R4 38. Activate PGSC if reqd
- L2 39. $\sqrt{FLASH EVAP FDLN HTR A, B SPLY}$ (two) – OFF
- L4:L 40. cb ΦA CAB T CNTLR (two) – op
- C3 41. C/W MODE – ACK
- F6/F8 42. FLT CNTLR PWR (two) – OFF, use one as reqd
- Post APU/HYD SHUTDN:
- R2 43. BLR CNTLR/HTR (three) – OFF
 44. $\sqrt{HYD CIRC PUMP}$ (three) – OFF
 45. GNC 23 RCS
 ITEM 1 EXEC (FRCS page)
 Ovrdrd FRCS MANF 1,2,3,4 STAT (four) – CL
- O8 46. RJDF DRIVER, LOGIC (eight) – OFF
 O14, O15, O16:F $\sqrt{RJDF MANF L5/F5/R5 DRIVER}$ – OFF
- If not MN BUS SHORT:
47. Tie three MN buses, BUS TIE (Cue Card)
- Post BUS TIE config check:
- L1 48. CAB FAN A(B) – ON
 49. $\sqrt{AV BAY 1 FAN}$ (one) – ON
 50. $\sqrt{AV BAY 2 FAN}$ (one) – ON
 51. $\sqrt{MS OVHD AND AFT PNL PWRDN}$ complete, then
 continue:
- If in OPS 2:
52. Go to LOSS OF 2 FC LAUNCH DAY DEORBIT
 PREP (ORBIT 2 OR ORBIT 3) (CONT DEORB,
LOSS OF 2 FC ORB 2 OR 3) (read notes) >>
53. Set watch to count down to DEORBIT TIG (use PGSC
 or MCC for TIG time)

Cont next page

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A10-45

APCL/ALL/GEN O

OPS 3 TRANSITION CONFIG – POST OMS 2

- O14,O15,
O16:F 54. ASA (four) – ON
- O14,
O15,
O16:A 55. √RGA 1,2,3 (three) – ON
- O14,
O15:E 56. √cb ACCEL (two) – cl
- O16:F 57. √ACCEL 3 – ON
- C3 58. √FCS CH (four) – AUTO

TRANSITION GPC 1 TO GNC OPS 3

- CRT1 59. GNC 0 GPC MEMORY
CONFIG – ITEM 1 +3 EXEC
Modify MC 3 per table----->
- CRT 60. GNC, OPS 301 PRO
- 61. GNC DEORB MNVR COAST

	CONFIG GPC	3 10000
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

- C3 TRANSITION BFS GPC TO
GNC OPS 3
62. BFC CRT DISP – ON
√SEL – 3+1
- CRT 63. (BFS) GNC OPS 301 PRO
- O14,
O15:F 64. MMU (two) – OFF

- 65. Go to LOSS OF 2 FC LAUNCH DAY DEORBIT PREP (ORBIT 2 OR ORBIT 3) (CONT DEORB, LOSS OF 2 FC ORB 2 OR 3); DO NOT perform PRE DPS TRANSITION SWITCH CONFIG [5] and DPS ENTRY CONFIG [6]

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MS OVHD AND AFT PNL PWRDN

- O14,O15, 1. BRAKES (three) – OFF
O16:A
- O14,O15, 2. cb ADTA (four) – op
O16:E
- O16:E 3. cb MNC RCS/OMS PRPLT QTY GAUGE – OP
- O15, 4. cb DDU R (two) – op
O16:E
- O14:A 5. Desel IMU – OFF (one of three IMUs OFF)
- :B 6. cb MNA MSN TIMER FWD – op
EVENT TIMER AFT – op
- O15:B 7. MNB MSN TIMER AFT – op
EVENT TIMER FWD – op
- Post MPS pwrdn and APU/HYD SHUTDN:
- O14,O15, 8. ASA (four) – OFF
O16:F
- O17:A 9. ATVC (four) – OFF
- :B 10. EIU (three) – OFF
- :D 11. MEC 1 – OFF (wait 2 sec), then
2 – OFF
- A12 12. √APU HTR LUBE OIL LN (three) – OFF
- 13. HYD HTR (eight) – OFF
- A13 14. GPS PWR – OFF
PRE AMPL (two) – OFF
- A14 15. RCS/OMS HTR FWD RCS – OFF
JET 1,2,3,4,5
(five) – OFF
AFT RCS JET 5 (one) – OFF
- ML26C 16. SPLY H2O GN2 TK VENT vlv – PRESS
TKA SPLY vlv – OP

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**LOSS OF 2nd FC
ASCENT
MS PAGE**

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APCL/ALL/GEN O

PWRDN

LOSS OF 2 CAB FANS	10-2
AV BAY 1 COOLING/AV BAY 1 FIRE	10-7
2 COOLING/AV BAY 2 FIRE	10-10
3 COOLING/AV BAY 3 FIRE	10-13
CAB PRESS (MINOR PWRDN)	10-16
(MAJOR PWRDN).....	10-17
2 H2O LOOPS (POST OMS-2)	10-21
1 FREON LOOP	10-29
HI LOAD EVAP	10-33
2 FREON LOOPS (POST OMS-2)	10-35
FES/1 FC	10-39
2nd FC	10-43

PWRDN

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B10-1

APCL/ALL/GEN O

LOSS OF 2 CAB FANS

NOTE

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

PWRDN

- | | | |
|-------------------|-----|--|
| C3 | 1. | MSTR MADS PWR – OFF |
| | 2. | Minimize Itg |
| | 3. | Perform <u>PL PWRDN</u> , then: |
| L1 | 4. | √CAB FAN A,B (two) – OFF |
| | | TEMP CNTLR – OFF |
| | 5. | HUM SEP A,B (two) – OFF |
| L4:L | 6. | Use only one FLT CNTLR PWR, PGSC |
| | 7. | cb ΦA CAB T CNTLR 1,2 (two) – op |
| | 8. | 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 |
| O14:B | 9. | cb MNA EVENT TIMER AFT – op |
| :C | 10. | SMOKE DETN L/R FLT DK – op |
| O15:B | 11. | MNB OI H2O BYP LOOP 2 SNSR – op |
| | 12. | MSN TIMER AFT – op |
| O16:C | 13. | MNC SMOKE DETN CAB – op |
| L4:J | 14. | √cb AC3 ΦA SIG CONDR HUM SEP – op |
| | | Post OMS-2: |
| F6/F8 | 15. | √FLT CNTLR PWR (two) – OFF |
| O14,O15,
O16:E | 16. | cb DDU L,R,AFT (six) – op |
| W1-10 | | Install Window Shades or mnvr to tail Sun att:
If in OPS 1:
 17. Manually mnvr to shade windows
If in OPS 3:
18. Obtain ATT data from MCC
<u>XXXXX MNVR YYYY</u> |

Cont next page

B10-2

OV105

APCL/ALL/GEN O

NOTE

If uncomfortable, doff LES. Use QDM as needed to provide respiratory cooling. If cab temp > 95 degF and no evaporative cooling is sensed, don LES, check tabs, close visor, LES O2 – ON.

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

19. Continue with ASC, then LAUNCH DAY ORBIT 2(3) (CONT DEORB). Use DEORB PREP/ENTRY DELTAS PULLOUT PAGE, 10-5, for changes

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B10-3

APCL/ALL/GEN O

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B10-4

OV105

APCL/ALL/GEN O

DEORB PREP/ENTRY DELTAS PULLOUT PAGE

- A. Deltas to LAUNCH DAY ORBIT 2(3) (CONT DEORB)
1. Minimize use of IDPs, MDUs, FLT CNTLR PWR, DDU's; use one PGSC only if reqd
 2. Minimize Itg
 3. Minimize sun in cab (delay mnvr to burn att until TIG-15 if necessary)
- If orbit 2 deorb:
4. APU HTRS & DED DISP ENT CONFIG 3
 5. Go to step 7
- If orbit 3 deorb:
6. ENT FWD FLT DECK CONFIG 10
 7. In ENT SW LIST/VER, do not activate pwrdrn items

B. Deltas to DEORBIT BURN (ENT)

At TIG-25:

If time permits, set up for cab purge:

- | | |
|-------------|--|
| MO10W | 1. 14.7 CAB REG INLET SYS 1,2 vlv (two) – OP |
| | 2. O2 REG INLET SYS 1 vlv – OP
√2 vlv – CL |
| L2 | 3. O2/N2 CNTLR VLV SYS 1 – AUTO (O2/N2)
2 – OP (N2) |
| Inner Hatch | 4. √O2 SYS 1,2 SPLY (two) – OP (tb-OP) |
| | 5. Remove INNER HATCH Equal vlv cap (two) |
| | 6. √Equal vlv (two) – NORM |
| | 7. Reinstall Equal vlv cap (two) |
| | 8. Open INNER HATCH |
| ML86B:B | 9. cb MNA VAC VENT ISOL VLV – cl |
| ML31C | 10. VAC VENT ISOL VLV BUS SEL – MNA
CNTL – OP (tb-OP) |
- NOZ HTR – ON

Cont next page

**LOSS OF 2 CAB FANS
D/O PULLOUT PAGE**

B10-5

OV105

APCL/ALL/GEN O

At TIG-20:

11. Initiate cab purge

<p>WARNING Do not use WCS once constant cab purge has started (because of high N2 concentration)</p>

MO32M,
MO69M,
C6
L2

12. LEH O2 1(2,...8) vlv – OP (as reqd)

AW82B

13. O2 XOVR SYS 1 – CL
√2 – OP
14. AIRLK DEPRESS vlv cap – vent, remove
vlv – 5
15. Close INNER HATCH

At TIG-15:

16. Mnvr to deorb burn att

At TIG-4:

O14,O15,
O16:E
F6,F8

17. Use two IDP/CRTs with four MDUs for deorb burn
18. cb DDU L,R (four) – cl, then:
19. L,R FLT CNTLR PWR (two) – ON

C. Deltas to POST BURN (ENT)

F6,F8
O14,O15,
O16:E

1. Use one IDP/CRT with two MDUs
2. L,R FLT CNTLR PWR (two) – OFF
3. cb DDU L,R (four) – op

D. Deltas to ENTRY MANEUVERS (Cue Card)

O14,O15,
O16:E
F6

At EI:

1. Use only two IDP/CRTs with four MDUs
2. cb DDU L,R (four) – cl
3. L FLT CNTLR PWR – ON

At Wheel Stop:

4. Open visor, LES O2 – OFF
5. Go to EXPEDITED PWRDN (ENT, POST LDG)

LOSS OF AV BAY 1 COOLING/AV BAY 1 FIRE

WARNING
 There is no smoke detection or air cooling in AV BAY 1. Failure of any LRU still pwr'd in AV BAY 1 may be indicative of fire in progress

- O7 1. GPS 1 PWR – OFF
 PRE AMPL (two) – OFF
- L1 2. √AV BAY 1 FAN A,B (two) – OFF
- O6 3. GPC MODE 1,4 (two) – STBY (tb-bp)
 – HALT
 – STBY (tb-RUN)
 – HALT (tb-bp)

REASSIGN STRINGS TO GPCs 2,3 IN MC 1

- 4. GNC 0 GPC MEMORY
 CONFIG – ITEM 1 +1 EXEC
 Modify MC 1 per table----->

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

NOTE
 The following must be an OPS MODE Recall

- CRT 5. GNC, OPS 10X PRO
- 6. (BFS) GNC I/O RESET
- 7. Perform PL PWRDN, then:
 If AV BAY 1 fire:
- 8. Continue; otherwise go to step 31

NOTE
 While performing proc, note any cbs open. Equipment still pwr'd in Av Bay following pwr'dn:
 FPCA 1, FLCA 1, IMU FAN, MDM OF1, DSC OF1, and ACCU

- C3 27. √OI PCMMU FORMAT – GPC
PWR – 2
- MA73C:A 28. MCA LOGIC MNA FWD 1 – OFF
- AW18H 29. √PWR/BATT CHGR EMU 1,2 BUS SEL (two) – OFF
- If visors reqd to remain down due to fire and rev 3 avail:
30. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3)
with AV BAY FIRE CONTINGENCY DELTAS
(CONT DEORB, LAUNCH DAY (ORBIT 3)) >>
- Otherwise:
- For MM201 trans:
31. Go to MAL, DPS, GPC FRP-7, DPS RECONFIG
FOR LOSS OF AV BAY COOLING
(ASCENT/ORBIT) >>
- If orbit 7 deorbit:
32. Perform Deltas to nominal POST INSERT and
DEORB PREP (POST INSERT, ORBIT 7
DEORB), then:
- If AV BAY fire:
33. Go to AV BAY FIRE (ORB PKT, PWRDN) and
complete remaining actions

LOSS OF AV BAY 2 COOLING/AV BAY 2 FIRE

WARNING

There is no smoke detection or air cooling in AV BAY 2. Failure of any LRU still pwr'd in AV BAY 2 may be indicative of fire in progress

- L1
O6
1. √AV BAY 2 FAN A,B (two) – OFF
 2. GPC MODE 2 – STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT (tb-bp)
 3. Perform PL PWRDN, then:
If AV BAY 2 fire:
 4. Continue; otherwise go to step 23

NOTE

While performing proc, note any cbs open. Equipment still pwr'd in Av Bay following pwr'dn:

FPCA 2, FLCA 2, BFC 3A (when GPC 3 is pwr'd), MDM OF2, and DSC OF2

- R1
5. cb AC CONTR AC2 (three) – cl
 6. INV/AC BUS 2 – OFF (tb-OFF)
INV PWR 2 – OFF (tb-OFF)
cb AC CONTR AC2 (three) – op
- R2
7. √BLR CNTLR/HTR 2 – A
1 – B
 8. Perform FC2 SHUTDN, except PWRDN (Cue Card), then:
- L4:H
L1
9. cb AC3 AV BAY 2 FAN B (three) – op
 10. FREON PUMP LOOP 1 – A
 11. AV BAY 1 FAN A – ON
B – OFF
 12. √CAB FAN A – ON
√B – OFF
- O13:C
13. cb ESS 2CA AC2 SNSR – op

Cont next page

B10-10

OV105

APCL/5/GEN O

O15:A	14.	BRAKES MNB – OFF
:E	15.	cb MNB RDR ALTM 2 – op MLS 2 – op ADTA 2 – op ACCEL 2 – op
:F	16.	MMU 2 – OFF
O16:A	17.	BRAKES MNC – OFF
:E		cb MNC MLS 3 – op ADTA 4 – op
O8	18.	FWD RCS MANF ISOL 3,4 (two) – CL (tb-CL)
O16:F	19.	RJDF 2A F3 LOGIC – OFF DRIVER – OFF RJDF 2B F4/F5 LOGIC – OFF F4 DRIVER – OFF ACCEL 3 – OFF
A1L	20.	S-BD PM MODE sel – TDRS DATA √NSP DATA RATE XMIT – HI √RCV – HI CODING XMIT – ON √RCV – ON √PWR – 1 S-BD PL PWR SYS – OFF CNTL – PNL,CMD
C3	21.	S-BD PM CNTL – PNL,CMD √OI PCMMU PWR – 1 FORMAT – GPC
MA73C:A	22.	MCA LOGIC MNB FWD 2 – OFF

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23. ASAP post OMS 2:

REASSIGN STRINGS TO GPCs 1,3,4 IN MC 1

24. GNC 0 GPC MEMORY

CONFIG – ITEM 1 +1 EXEC
 Modify MC 1 per table ---->

CONFIG	1
GPC	12340
STR	1 1
	2 4
	3 3
	4 4
PL	1/2 1
CRT	1 1
	2 4
	3 3
	4 0
L	1 1
	2 2
MM	1 1
	2 3

NOTE

The following must be
 an OPS MODE Recall

CRT

25. GNC, OPS 10X PRO
 26. (BFS) GNC I/O RESET
 GNC,OPS 106 PRO
 000 PRO

C3

27. BFC CRT DISP – OFF

O6

28. GPC MODE 5 – STBY
 (tb-RUN)
 – HALT
 OUTPUT 5 – NORM

C3

29. Sel best S-BD PM ANT until SM GPC is established
 If AV BAY 2 fire:

O6

30. GPC PWR 2 – OFF
 5 – OFF
 MDM FF2,FF4 (two) – OFF
 PL2 – OFF

If visors reqd to remain down due to fire and rev 3 avail:

31. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3)
 with AV BAY FIRE CONTINGENCY DELTAS
 (CONT DEORB, LAUNCH DAY (ORBIT 3)) >>

Otherwise:

For MM201 trans:

32. Go to MAL, DPS, GPC FRP-7, DPS RECONFIG
 FOR LOSS OF AV BAY COOLING
 (ASCENT/ORBIT) >>

If orbit 7 deorbit:

33. Perform Deltas to nominal POST INSERT and
 DEORB PREP (POST INSERT, ORBIT 7
DEORB), then:

If AV BAY fire:

34. Go to AV BAY FIRE (ORB PKT, PWRDN) and
 complete remaining actions

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LOSS OF AV BAY 3 COOLING/AV BAY 3 FIRE

WARNING

There is no smoke detection or air cooling in AV BAY 3. Failure of any LRU still pwr'd in AV BAY 3 may be indicative of fire in progress

- O7 1. GPS 3 PWR – OFF
PRE AMPL (two) – OFF
- L1 2. √AV BAY 3 FAN A,B (two) – OFF
- O6 3. GPC MODE 3 – STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT (tb-bp)
- If AV BAY 3 fire:
4. Continue; otherwise go to step 20

NOTE

While performing proc, note any cbs open. Equipment still pwr'd in Av Bay following pwr'dn:

FPCA 3, FLCA 3, MDM OF3, DSC OF3, and active comm equipment

- R1 5. cb AC CONTR AC3 (three) – cl
6. INV/AC BUS 3 – OFF (tb-OFF)
INV PWR 3 – OFF (tb-OFF)
cb AC CONTR AC3 (three) – op
- R2 7. √BLR CNTLR/HTR 3 – A
2 – B
8. Perform FC3 SHUTDN, except PWRDN (Cue Card), then:
- L1 9. H2O PUMP LOOP 1 – ON
2 – OFF
CAB FAN B – ON
A – OFF
- L4:H 10. cb AC1 AV BAY 3 FAN B (three) – op

Cont next page

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APCL/5/GEN O

WARNING

The following steps will unpwr C/W sys. All Class 1, Class 2, and SM aural tones and C/W annun lights will be lost. CRTs must be monitored for fault summ msgs

- O13:A 11. cb ESS 1BC C/W A – op
 :C 2CA C/W B – op
 :E 3AB AC3 SNSR – op

NOTE

If comm presently working, performing a PNL,CMD may result in loss of comm (if fire has aff alt comm sys)

- If no comm:
- A1L 12. S-BD PM MODE sel – TDRS DATA
 √NSP DATA RATE XMIT – HI
 √RCV – HI
 CODING XMIT – ON
 √RCV – ON
 √PWR – 1
- C3 13. S-BD PM CNTL – PNL,CMD
 If S-BD comm avail:
- O6 14. UHF MODE sel – OFF
- If comm not recovered:
- C3 15. S-BD PM CNTL – PNL
A1L ANT SW ELEC – OFF
 PRE AMP – OFF
 PWR AMPL STBY – OFF
 OPER – OFF
 XPNDR – OFF
 NSP PWR – OFF
 ENCRYPTION SEL – BYP
 PWR – OFF
- O6 16. √UHF MODE sel – SPLX
A1L 17. S-BD PL CNTL – PNL
 PL DATA INTLVR PWR – OFF

Cont next page

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APCL/ALL/GEN O

- A1R 18. S-BD FM PWR – OFF
 CNTL – PNL
 MA73C:A 19. MCA LOGIC MNC FWD 3 – OFF

20. ASAP post OMS 2:

REASSIGN STRINGS TO GPCs 1,2,4 IN MC 1

21. GNC 0 GPC MEMORY

CONFIG – ITEM 1 +1 EXEC
 Modify MC 1 per table---->

CONFIG GPC	1	12340
STR 1	1	
2	2	
3	4	
4	2	
PL 1/2	1	
CRT 1	1	
2	2	
3	4	
4	0	
L 1	1	
2	2	
MM 1	1	
2	2	

NOTE

The following must be
 an OPS MODE Recall

22. GNC, OPS 10X PRO
 23. (BFS) GNC I/O RESET
 If AV BAY 3 fire:
 24. GPC PWR 3 – OFF
 MDM FF3 – OFF

If visors reqd to remain dn due to fire and rev 3 avail:

25. Go to LAUNCH DAY DEORBIT PREP (ORBIT 3)
 with AV BAY FIRE CONTINGENCY DELTAS
 (CONT DEORB, LAUNCH DAY (ORBIT 3)) >>

Otherwise:

For MM201 trans:

26. Go to MAL, DPS, GPC FRP-7, DPS RECONFIG
 FOR LOSS OF AV BAY COOLING
 (ASCENT/ORBIT) >>

If orbit 7 deorbit:

27. Perform Deltas to nominal POST INSERT and
 DEORB PREP (POST INSERT, ORBIT 7
DEORB), then:

If AV Bay fire:

28. Go to AV BAY FIRE (ORB PKT, PWRDN) and
 complete remaining actions

OV105

LOSS OF CAB PRESS (MINOR PWRDN)

NOTE

If EQ dP/dT < 0.6, CAB P will stabilize at 8 psia

- O8 1. Minimize Itg
- 2. √MLS (three) – OFF
- L1 3. Perform PL PWRDN, then:
- 4. √H2O LOOP 2(1) BYP MODE – MAN
MAN – DECR (hold 30 sec)
- C3 5. √FLOW PROP VLV LOOP tb (two) – ICH
- 6. Use two IDP/CRTs with four MDUs
- If AOA:
 - 7. Deltas to ENTRY MANEUVERS (Cue Card)
At M = 2.9:
Use two HUDs, MLS, and RAs as reqd
GNC I/O RESET
 - 8. Continue AOA PROCEDURES (ASC, AOA).
Do not perform ENT PKT pwrdn >>
- If not AOA:
 - 9. Go to LOSS OF CAB PRESS (MAJOR PWRDN) (PWRDN), 10-17

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APCL/5/GEN O

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LOSS OF CAB PRESS (MAJOR PWRDN)

NOTE

If EQ dP/dT > 0.6, CAB P will stabilize
below 8 psia

1. Minimize Itg
- O8 2. √MLS (three) – OFF
- C3 3. MSTR MADS PWR – OFF
4. Perform PL PWRDN, then:
- L1 5. √H2O LOOP 2(1) BYP MODE – MAN
MAN – DECR (hold 30 sec)
6. √FLOW PROP VLV LOOP tb (two) – ICH
- C3 7. Use one IDP/CRT with two MDUs
- F6,F8 8. FLT CNTLR PWR (two) – OFF
- If FLT CNTLR PWR not reqd:
- O14,O15, 9. cb DDU L,R (four) – op
- O16:E √AFT (two) – op
10. ADTA (four) – op
- L2 11. ANTISKID – OFF
NWS – OFF
- L1 12. HUM SEP B – OFF
- O16:E 13. cb MNC RCS/OMS PRPLT QTY GAUGE – op(cl) as
reqd
- If AOA:
 14. Continue AOA PROCEDURES (ASC, AOA)
Do not perform ENT PKT pwrdn
Use DEORB PREP/ENTRY DELTAS PULLOUT
PAGE, 10-19, for changes >>
- If orbit 2 or 3 deorb:
 15. Continue ASC
Use DEORB PREP/ENTRY DELTAS PULLOUT
PAGE, 10-19, for changes

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APCL/ALL/GEN O

DEORB PREP/ENTRY DELTAS PULLOUT 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

If no comm or if CAB P stabilizes < 6 psia (MCC call), after OPS 301 transition:

PWRDN GPC 1 AND REASSIGN STRINGS TO REMAINING PASS GPCs IN MC 3

	1.	<u>GNC 0 GPC MEMORY</u> CONFIG – ITEM 1 +3 EXEC Modify MC 3 per table ----->	CONFIG GPC	3 02340
CRT	2.	GNC, OPS 301 PRO	STR 1	4
	3.	<u>GNC 50 HORIZ SIT</u> Check runway sel Resel runway	2 3 4	2 3 2
O6	4.	(BFS) GNC, OPS 301 PRO	PL 1/2	4
	5.	GPC MODE 1 – STBY (tb-bp) – HALT	CRT 1 2 3 4	4 2 3 0
			L 1 2	0 0
			MM 1 2	4 2

NOTE

Single fault tolerance used for most cab air-cooled equipment. Add'l LRUs may be activated as reqd if cab press stable ≥ 8 psia

Initiate changes:

If Orbit 2(3):

- 6. Start with step A

If AOA:

- 7. Start with step B, 10-20

A. Deltas to LAUNCH DAY ORBIT 2(3) (CONT DEORB)

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

If orbit 2:

- 2. APU HTRS & DED DISP ENT CONFIG [3]
Do not pwr MLS

If orbit 3:

- 3. ENT FWD FLT DECK CONFIG [10]
Do not pwr MLS
- 4. In ENT FORWARD, AFT, MIDDECK, do not activate pwrdn items

Cont next page

- B. Deltas to DEORBIT BURN (ENT)
 At TIG-4:
 O14,O15, 1. Use two IDP/CRTs with four MDUs for deorb burn
 O16:E 2. cb DDU L,R (four) – cl
 F6,F8 3. L,R FLT CNTLR PWR (two) – ON
- C. Deltas to POST BURN (ENT)
 F6,F8 1. Use one IDP/CRT with two MDUs
 O14,O15, 2. L,R FLT CNTLR PWR (two) – OFF
 O16:E 3. cb DDU L,R (four) – op
 4. Delete ANTISKID, NWS callouts (ENTRY SW CHECK)
- D. Deltas to ENTRY MANEUVERS (Cue Card)
 At EI:
 O14,O15, 1. Use only one IDP/CRT with two MDUs
 O16:E 2. cb DDU L,R (four) – cl
 F6 3. L FLT CNTLR PWR – ON
 O14,O15, 4. cb ADTA (three) – cl
 O16:E 5. (BFS) GNC I/O RESET
 At V = 15K:
 If CAB PRESS < 8 psia:
 6. Delete NAVAIDS callout
 If CAB PRESS ≥ 8 psia:
 7. Activate all RAs, MLS
 8. GNC I/O RESET
 9. Disregard subs NAVAID callout DELTAS
 At M = 2.7:
 10. Use two HUDs, MLS, and RAs as reqd
 11. GNC I/O RESET
 At M < 1.0:
 L2 12. ANTISKID – ON
 13. NWS – 1

LOSS OF 2 H2O LOOPS (POST OMS-2)

NOTES

- Loss of water loop cooling aff both water and air cooled equipment
- This proc assumes loss of both water loops occurs after AOA opportunity has passed, but before OPS 2 transition
- If orbit 2 deorb, this pwrdn leads into LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP). For all other launch day deorb, this pwrdn leads to LOSS OF 2 H2O LOOPS ON-ORBIT WAIT (CONT DEORB, LOSS OF 2 H2O LOOPS)
- The LOSS OF 2 H2O LOOPS (ORB PKT, PWRDN) is used for MS pwrdn and comm config. This proc powers down all comm. If comm reqd, preferred comm config in order of heat production:
 1. UHF only
 2. STDN LO PWR if reqd
 3. TDRS only if mandatory

CAUTION

TDRS OR STDN – HI AOS may be limited to 10 min (pwr amp will overheat)

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TIME CRITICAL PROCEDURES (execute simo)

- L4:B 1. Unstow ORB PKT, CONT DEORB, ORB OPS, and one PGSC. To pwr the PGSC:
cb UTIL PWR A15/MO13Q AC3 – cl, or
F1/MO52J AC1 – cl
- MS1 2. Perform MS OVHD PNL PWRDN (N2 qty not reqd by CDR in step 11 and omit step 13) (ORB PKT, PWRDN)

As part of MS OVHD PNL PWRDN perform the following:

- O14:B 3. cb MNA OI SIG CONDR OF 1/4 A – op
:E DDU AFT – 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
:E DDU AFT – op

NOTE

- MS Do not pwrdrn MMU 1.
- If orbit 2 deorb, do not pwrdrn MTU.

If orbit 2 deorb and TIG > 1 hr, perform 20 MINUTE DE/REPRESS MS PULLOUT PAGE (CONT DEORB, LOSS OF 2 H2O LOOPS)

- MS2 6. Perform LOSS OF 2 H2O LOOPS, COMM PWRDN (ORB PKT, PWRDN), within 10 min

CDR and PLT perform following PWRDN ASAP:

CDR AND PLT PWRDN

- C3 7. √MSTR MADS PWR – OFF
Minimize Itg
8. Use only one IDP/CRT with one MDU
- F6,F8 9. FLT CNTLR PWR (two) – OFF, use one as reqd
10. Perform PL PWRDN, then:
- O7 11. GPS PWR (three) – OFF
- O8 12. √RDR ALTM (two) – OFF
13. √MLS (three) – OFF
- L1 14. H2O PUMP LOOP 1,2 (two) – OFF (one ON if PUMP OUT P > 45 psia, or MCC call)
15. HUM SEP A,B (two) – OFF (one ON if either H2O loop ON)

Cont next page

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APCL/5/GEN O

NOTE

If performing 20 MINUTE DE/REPRESS MS PULLOUT PAGE (CONT DEORB, LOSS OF 2 H2O LOOPS), do not turn cab fan OFF. Record MET for fan OFF when DE/REPRESS complete

- 16. CAB FAN A,B (two) – OFF
(one ON if either H2O LOOP ON)
Rcd MET ___/___:___
- 17. FREON PUMP LOOP 1 – OFF
2 – B
√FLOW PROP VLV LOOP 1,2 (two) – ICH (tb-ICH)
- L2 18. √FLASH EVAP CNTLR PRI A – ON
- 19. O2 SYS 1 SPLY – CL (tb-CL)
- 20. ANTISKID – OFF
NWS – OFF
- R2 21. FLASH EVAP FDLN HTR SPLY (two) – 2
- 22. HYD CIRC PUMP (three) – ON (to prevent MN BUS O/V)

RECONFIG DPS

- O14:F 23. √MMU 1 – ON
- 24. GNC 0 GPC MEMORY

Reassign Strings to GPC 1 in MC 1

- 25. CONFIG – ITEM 1 +1 EXEC
Modify MC 1 per table ---->

CONFIG	1	
GPC	12340	
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

NOTE
The following must be an OPS MODE Recall

- CRT 26. GNC, OPS 10X PRO

Cont next page

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- O6 27. GPC MODE 2,3,4 (three) – STBY (tb-bp)
 - HALT
 - STBY (tb-RUN)
 - HALT (tb-bp)
- CRT 28. (BFS) GNC, OPS 106 PRO
000 PRO
- O6 29. GPC MODE 5 – STBY (tb-RUN), HALT (tb-bp)
OUTPUT 5 – NORM
- C3 30. BFC CRT DISP – OFF
- L1 31. AV BAY 2,3 FANS (four) – OFF
 - √1 FAN A – ON
 - B – OFF
- 32. IMU FAN A – ON
 - B,C (two) – OFF
- 33. If not orbit 2 deorb: Go to step 40
Transition GPC 1 to GNC OPS 3:
- O14,O15, 34. √RGA (four) – ON
O16:A
- O14,O15:E √cb ACCEL (two) – cl
- O15,O16:F √ACCEL 3,4 (two) – ON
- O14,O15, √ASA (four) – ON
O16:F
- C3 35. √FCS CH (four) – AUTO
- 36. GNC 0 GPC MEMORY

Reassign Strings to GPC 1 in MC 3

- CRT 37. CONFIG – ITEM 1 +3 EXEC
Modify MC 3 per table----->
- 38. GNC, OPS 301 PRO
GNC DEORB MNVR COAST
- 39. Go to step 43

CONFIG	3
GPC	10000
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

Cont next page

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RECONFIG DPS, TRANSITION TO OPS 2

40. GNC 0 GPC MEMORY

Reassign Strings to GPC 1 in MC 2

	41. CONFIG – ITEM 1 +2 EXEC Modify MC 2 per table----->	CONFIG GPC	2 10000
	42. GNC, OPS 201 PRO	STR	1 1
	43. For any CRT that is OFF: GPC/CRT1/X EXEC		2 1
			3 1
O14:F	44. MMU 1 – OFF		4 1
	45. Calculate DEORBIT TARGETS using PGSC	PL	1/2 1
C3	46. C/W MODE – ACK	CRT	1 1
			2 1
			3 1
			4 0
		L	1 0
			2 0
		MM	1 1
			2 1

NOTE

For F7 lts, hold F2 or
F4 MA in

Repress SPLY H2O TKA:

ML26C 47. SPLY H2O GN2 TK VENT vlv – PRESS

TKA SPLY vlv – OP

R11L XOVV VLV – OP (tb-OP)

If time to CONUS TIG < 50 min:

48. Read notes below then go to step 69

If time to CONUS TIG > 50 min, continue:

49. GNC 21 IMU ALIGN

IMU 1,3 (two) – desel

O14:A, 50. IMU 1,3 (two) – OFF

O15:A

O6 51. MDM FF1,3,4 (three) – OFF

If orbit 2 deorb:

52. Mnvr to shade windows from sun or install Window
Shades until TIG-10 min, then go to step 61

If not orbit 2 deorb:

53. Config DAPs A1,B1 with these exceptions:

(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)

Cont next page

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Mnvr to tail Sun att:

54. GNC UNIV P TG
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 if reqd)
DAP: A/AUTO/PRI
START TRK – ITEM 19 EXEC

Establish stabilized att:

55. DAP: B/AUTO/PRI
ADI ATT – INRTL
Wait 30 sec (check rates)

Establish free drift:

56. DAP: FREE
- O6 57. GPC MODE 1 – STBY (tb-bp), HALT
– STBY (tb-RUN)
– HALT (tb-bp)
PWR (five) – OFF
58. Record MET ___/___/___
- C2,R12L 59. Confirm all IDPs and MDUs – OFF
- L1 60. AV BAY 1 FAN (two) – OFF
- O8 61. FWD RCS MANF ISOL 1,2,3,4 (four) – CL (tb-CL)
- O14:F 62. RJDF 1B F1 LOGIC – OFF
DRIVER – OFF
- O15:F 63. 1A F2 DRIVER – OFF
LOGIC – OFF
- O16:F 64. 2A F3, 2B F4 DRIVER (two) – OFF
F4/F5 LOGIC (two) – OFF
RJD MANF L5/F5/R5 DRIVER – OFF
- L4:J 65. \sqrt{cb} AC3 Φ A SIG CONDR HUM SEP – op
- :P 66. Φ A LG SNSR (two) – op
- MA73C If H2O PUMP LOOP 1 A(B) ON:
67. Leave MCA LOGIC MNA FWD 1 – ON
(MNB FWD 2 – ON)
MCA LOGIC MNA,B,C (thirteen) – OFF
- If H2O PUMP LOOP 1 A,B OFF:
68. MCA LOGIC MNA,B,C (fourteen) – OFF

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NOTE

30 min after deact, cycle one CAB FAN – ON (30 min ON, 30 min OFF) to control PPCO2 and for cooling.

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.

If GPC 1 remains in RUN, limit its operation to max of 1 hr. If reqd, reactivate GPC 2 and restrng in MC 3, take GPC 1 to HALT, turn AV BAY 2 FAN B – ON, AV BAY 1 FAN – OFF, then wherever GPC 1 is referenced, replace with GPC 2 in the LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY or LOSS OF 2 H2O LOOPS ON-ORBIT WAIT (CONT DEORB).

Expect 100% cab humidity in ~2 hr.

Possible cab air OVBD RLF due to cab air heating which may cause a loud noise

69. Verify MS PWRDN complete, then:
If not orbit 2 deorb:

NOTE

Use QDM as needed for temp > 90 degF. If temp > 95 degF and no evaporative cooling is sensed, don LES, check tabs, close visor, LES O2 – ON.

Immed begin drinking H2O (one 8-oz container every 15 min with salt tablet in every other container) and continue thru entry

70. Go to LOSS OF 2 H2O LOOPS ON-ORBIT WAIT (CONT DEORB, LOSS OF 2 H2O LOOPS) >>
71. Go to LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (CONT DEORB, LOSS OF 2 H2O LOOPS D/O PREP). Perform all steps although some activities may already have been performed

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LOSS OF 1 FREON LOOP

- C3 1. MSTR MADS PWR – OFF
 2. Minimize Itg
 3. Use one IDP/CRT with two MDUs, FLT CNTLR PWR
- If not AOA:
- O7 4. GPS 1,3 PWR (two) – OFF
 O8 5. RDR ALTM (two) – OFF
 6. If reqd: Perform PL PWRDN, then:
- L1 7. \sqrt FLOW PROP VLV LOOP tb (two) – ICH
 8. H2O LOOP 2(1) BYP MODE – MAN
 MAN – DECR (30 sec)
- O14, 9. BRAKES (three) – OFF
 O15,
 O16:A
- O14, 10. cb ADTA (four) – op
 O15,
 O16:E
- If FLT CNTLR PWR not reqd:
 11. cb DDU L,R,AFT (six) – op
 12. \sqrt (Aff) FREON PUMP – OFF
- If FREON LEAK performed and leak isolated (accum qty > 3 and not decr)(\sqrt MCC):
 13. Perform EMER PLBD OPENING (ECLS), 4-8
 14. Mnvr per MCC >>
- If AOA:
- O14, 15. Deltas to AOA (ASC)
 O15, At TIG-10 min:
 O16:E \sqrt cb DDU L,R (four) – cl
- Use two IDP/CRTs with four MDUs, two FLT CNTLR PWR for burn
- F7,F8 16. Deltas to AOA POST D/O BURN (ASC)
 O14, FLT CNTLR PWR (two) – OFF
 O15, cb DDU L,R (four) – op
 O16:E
- Use one IDP/CRT with two MDUs
17. Deltas to ENTRY SW CHECK (ENT, POST BURN)
 Pwr NAV AIDS per ENTRY MANEUVERS (Cue Card)
18. Deltas to ENTRY MANEUVERS (Cue Card)
 Use DEORB PREP/ENTRY DELTAS PULLOUT PAGE, 10-31, starting with step D,1
 Continue with AOA (ASC) >>

Cont next page

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DEORB PREP/ENTRY DELTAS PULLOUT PAGE

DO NOT DISCARD; USE TO LANDING

- A. Deltas to LAUNCH DAY ORBIT 2(3) (CONT DEORB)
1. Use one FLT CNTLR PWR, DDU, PGSC, and one IDP/CRT with two MDUs
 2. Minimize Itg
 3. Minimize sun in cab if possible
- If orbit 2:
4. APU HTRS & DED DISP ENT CONFIG 3
Do not pwr GPS
 5. Go to step 7
- If orbit 3:
6. ENT FWD FLT DECK CONFIG 10
Do not pwr MLS
 7. In ENT SW LIST/VER, do not activate GPS, MLS, RA, ADTAs until indicated by POST BURN (ENT) and ENTRY MANEUVERS (Cue Card) deltas

O14,
O15,
O16:E

- B. Deltas to DEORBIT BURN (ENT)
- At TIG-15 min:
1. Remove Window Shades/mnvr to deorb burn att
- At TIG-10 min:
2. √cb DDU L,R (four) – cl
 3. Use two IDP/CRTs with four MDUs, two FLT CNTLR PWR for burn

F6,F8
O14,
O15,
O16:E

- C. Deltas to POST BURN (ENT)
1. L,R FLT CNTLR PWR (two) – OFF
 2. cb DDU L,R (four) – op
 3. Use one IDP/CRT with two MDUs, as reqd
- At EI-15 min:

O7

4. GPS 3 PWR – ON
PRE AMPL (two) – ON
Wait 30 sec
GNC I/O RESET
GNC 55 GPS STATUS
INIT – ITEM 16 EXEC
NAV – ITEM 19 EXEC

Cont next page

**LOSS OF 1 FREON LOOP
D/O PULLOUT PAGE**

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OV105

APCL/5/GEN O

- D. Deltas to ENTRY MANEUVERS (Cue Card)
- At EI:
- O14,
O15,
O16:E
F6
1. cb DDU L,R (four) – cl
 2. L FLT CNTLR PWR – ON
 3. Use two IDP/CRTs with four MDUs, as reqd
 4. BRAKES (three) – ON
- O14,
O15,
O16:A
- O14,
O15,
O16:E
CRT
5. GNC I/O RESET
- At V = 12K:
- If loop 1(2) lost:
- L1
6. NH3 CNTLR A(B) – OFF
B(A) – PRI/GPC
- At M = 2.7:
7. Use two HUDs, MLS, and RAs
GNC I/O RESET

LOSS OF HI LOAD EVAP

- | | |
|--------------------------------|---|
| C3 | 1. √MSTR MADS PWR – OFF |
| | 2. Minimize Itg |
| | 3. Use one PGSC and one IDP/CRT with two MDUs, as reqd |
| O8 | 4. RDR ALTM (two) – OFF |
| | 5. Perform PL PWRDN, then: |
| L1 | 6. H2O LOOP 2(1) BYP MODE – MAN
MAN – DECR (hold 30 sec) |
| | 7. √FLOW PROP VLV LOOP tb (two) – ICH |
| O14,
O15,
O16:A | 8. BRAKES (three) – OFF |
| O14,
O15,
O16:E | 9. cb ADTA (four) – op |
| | If FLT CNTLR PWR not reqd: |
| | 10. cb DDU L,R (four) – op |
| | If AOA: |
| | 11. Deltas to <u>AOA</u> (ASC)
At TIG-10:
√cb DDU L,R (four) – cl |
| O14,
O15,
O16:E | Use FLT CNTLR, and two IDP/CRTs with four MDUs, as reqd for burn |
| F6,F8
O14,
O15,
O16:E | 12. Deltas to <u>AOA POST D/O BURN</u> (ASC)
L,R FLT CNTLR PWR (two) – OFF
cb DDU L,R (four) – op |
| | Use two IDP/CRTs with four MDUs |
| O14,
O15,
O16:A | 13. Deltas to ENTRY SW CHECK (ENT, <u>POST BURN</u>)
BRAKES (three) – ON |
| | Do not pwr NAVAIDS, NWS
Perform LOSS OF HI LOAD EVAP DEORB OR
ENTRY PULLOUT PAGE (ENT PKT, <u>PWRDN</u>),
then: |

Cont next page

B10-33

OV105

APCL/5/GEN O

LOSS OF 2 FREON LOOPS (POST OMS-2)

WARNING

FC purge must be started and loads pwr'd dn ASAP

Orbiter lifetime is expected to be 120 min from LOSS OF 2nd FREON LOOP with all three FCs running. This assumes three FCs are pwr'd dn to a total level of 8 kW immed and are continuously purged

Earliest possible landing is req'd

NOTES

- Failure assumed to occur too late for an AOA and before OPS 2 transition
- FC purging and pwr'dn should be performed ASAP after failure
- COMM proc (ORB PKT) should be used throughout this proc and CONT DEORB.
Preferred comm config is:
 - A. UHF only
 - B. GSTDN S-BD if req'd
 - C. Use TDRS only if mandatory

Cont next page

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OV105

APCL/ALL/GEN O

TIME CRITICAL PROCEDURES

1. MS initiate FC purge (step 4) and unstow ORB PKTs and PGSC, ASAP
2. MS perform LOSS OF 2 FREON LOOPS, COMM PWRDN (ORB PKT, PWRDN); delay 10 min max if AOS

CDR and PLT perform following steps ASAP:

- | | | |
|---------|----|---|
| C3 | 3. | MSTR MADS PWR – OFF |
| MS R11U | 4. | √FC PURGE HTR – ON
√VLVS (three) – OP |
| | 5. | Perform <u>PL PWRDN</u> , then: |
| | 6. | Minimize Itg |
| CRTX | 7. | Use only one FWD IDP/CRT with one MDU (save IDP3 for entry) |
| | 8. | Use only one PGSC |
| F6/F8 | 9. | √FLT CNTLR PWR (two) – OFF |

RESTRICTING TO GPC 1/TRANSITION TO OPS 3

- | | | | |
|----|-----|--|--|
| | 10. | <u>GNC 0 GPC MEMORY</u>
CONFIG – ITEM 1 +3 EXEC
Modify MC 3 per table-----> | |
| | 11. | GNC, OPS 301 PRO
For any FWD IDP that is OFF: | |
| | 12. | GPC/CRT1/X EXEC | |
| C3 | 13. | BFC CRT DISP – OFF | |
| O6 | 14. | GPC MODE 2,3,4 (three)
– STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT (tb-bp)
PWR 2,3,4 (three) – OFF | |
| | 15. | BFS GNC, OPS 106 PRO
000 PRO | |
| | 16. | GPC MODE 5 – STBY (tb-RUN)
– HALT (tb-bp)
OUTPUT 5 – NORM
PWR 5 – OFF | |
| | 17. | <u>GNC 53 ENTRY CONTROLS</u>
RGA 1,3,4 (three) – desel | |
| | 18. | Have MS perform MS OVHD AND AFT PNL PWRDN (ORB PKT, <u>PWRDN</u>), but leave RGA 2 pwr until step 52 | |

CONFIG GPC	3	10000
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	

Cont next page

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APCL/ALL/GEN O

PLT

- O7 19. GPS PWR (three) – OFF
PRE AMPL (six) – OFF
- O8 20. √RDR ALTM (two) – OFF
- 21. √MLS (three) – OFF
- C3 22. FCS CH (four) – AUTO
- R4 23. MPS MANF PRESS LO2,LH2 (two) – CL
- R2 24. √HYD CIRC PUMP (three) – OFF
- 25. MPS He ISOL (six) – CL
PNEU He ISOL – CL
L ENG He XOVR – CL
- 26. Go to step 47

CDR

- L1 27. HUM SEP A,B (two) – OFF
- 28. √IMU FAN B – ON
A,C (two) – OFF
- 29. CAB FAN A,B (two) – OFF
- 30. AV BAY 1,2,3 FAN A,B (five) – OFF
- 31. √1 FAN B – ON
- 32. FREON PUMP LOOP 1,2 (two) – OFF (one-ON,
if any flow)
- 33. √RAD CNTLR LOOP 1,2 (two) – OFF
- 34. NH3 CNTLR A,B (two) – OFF
- If no FREON PUMP ON:
 - L2 35. O2 SYS 1,2 SPLY (two) – OP (tb-OP)
 - L1 36. FLASH EVAP CNTLR PRI A,B (two) – OFF
 - 37. TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF
 - 38. HI LOAD DUCT HTR sel – OFF
 - L2 39. FLASH EVAP FDLN HTR SPLY (two) – OFF
- If one FREON PUMP ON:
 - L1 40. FLASH EVAP CNTLR PRI A – ON
 - 41. TOP EVAP HTR NOZ (two) – OFF
√DUCT sel – ON
 - 42. √HI LOAD DUCT HTR sel – ON
 - L2 43. FLASH EVAP FDLN HTR B SPLY – OFF
- 44. NWS – OFF
- O6 45. √S TRK PWR -Y,-Z (two) – OFF
- 46. ANNUN BUS SEL ACA 2/3 – OFF

Cont next page

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OV105

APCL/5/GEN O

- | | | |
|-----------------------|-----|--|
| | 47. | <u>GNC 51 OVERRIDE</u> |
| | | IMU 1,2 (two) – desel |
| O14,
O15:A | 48. | IMU 1,2 (two) – OFF |
| O14,
O15,
O16:A | 49. | BRAKES (three) – OFF |
| | 50. | All IDPs, MDUs – OFF (use IDP1 as reqd until
CONT DEORB proc, 3 min
OFF for each min ON) |
| | 51. | DAP: INRTL/PULSE |
| O15:A | 52. | RGA 2 – OFF |
| O6 | 53. | MDM FF1,4 (two) – OFF
FA1,4 (two) – OFF |
| F6 | 54. | CDR disp sws – green dot |
| O8 | 55. | FWD RCS MANF ISOL 1,2,3,4 (four) – CL (tb-CL) |
| MA73C:
A,B | 56. | √MCA LOGIC MNA FWD 1 – ON
MID 1,AFT 1,MID 3 (three) – OFF
MNB,MNC (ten) – OFF |
| O14:F | 57. | RJDA 1A,2A LOGIC,DRIVER (four) – OFF
RJDF 1B F1 LOGIC,DRIVER (two) – OFF |
| O15:F | 58. | RJDA 1B LOGIC,DRIVER (two) – OFF
RJDF 1A F2 LOGIC,DRIVER (two) – OFF |
| O16:F | 59. | RJDA 2B LOGIC,DRIVER (two) – OFF
RJDF 2A F3 LOGIC,DRIVER (two) – OFF
2B LOGIC,DRIVER (two) – OFF
RJD MANF L5/F5/R5 DRIVER – OFF |
| | 60. | Go to LOSS OF 2 FREON LOOPS (ORB PKT,
<u>PWRDN</u>), beginning at step 58 (Sel ELS TIG) |

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B10-38

APCL/ALL/GEN O

LOSS OF FES/1 FC

- ⇒ C3
1. √MSTR MADS PWR – OFF
 2. Minimize Itg
 3. Use only one IDP/CRT with two MDUs
- If FLT CNTLR PWR not reqd:
4. cb DDU L,R,AFT (six) – op
- O14,
O15,
O16:E
5. RDR ALTM (two) – OFF
- O8
6. √FLASH EVAP FDLN HTR SPLY (two) – OFF
- L2
7. NWS – OFF
 8. ANTISKID – OFF
- L1
9. √CAB FAN A(B) – ON
 10. Perform PL PWRDN, then:
 11. √FLOW PROP VLV LOOP 1,2 tb (two) – ICH
- If AOA and FES lost:
- MS perform pwrdsn activities (steps 12-17)
12. Minimize Itg
 13. BRAKES (three) – OFF
- O14,
O15,
O16:A
14. cb ADTA (four) – op
- O14,
O15,
O16:E
15. cb MSN TIMER FWD,AFT (two) – op
- O14,
O15:B
16. EVENT TIMER AFT,FWD (two) – op
 17. MMU 1,2 (two) – OFF (MMU 2 ON for OPS TRANSITION, then OFF)
- O14,
O15:F
18. H2O LOOP 2(1) BYP MODE – MAN
MAN – DECR
(hold 30 sec)
- L1
19. Continue with AOA (ASC):
Do not perform LOSS OF FES (ENT PKT, PWRDN)
Use ENTRY DELTAS PULLOUT PAGE,
10-41
- ~

Cont next page

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OV105

APCL/5/GEN O

~
If not AOA:

After APU/HYD SHUTDOWN and MPS PWRDN/ISOL:

- O17:A 20. ATVC (four) – OFF
 :B EIU (three) – OFF
 :D MEC 1 – OFF (wait 2 sec)
 2 – OFF
- L2 If FES failed, after MM201 transition:
 21. FLASH EVAP FDLN HTR A,B SPLY
 (two) – 1
 22. On MCC call, go to FULL-UP FES
 FLUSHING (ECLS), 4-16 >>
- If FC lost, after MM201 transition:
 23. FLASH EVAP FDLN HTR A,B SPLY
 (two) – 1
 24. Go to LOSS OF 1 FC (ORB PKT,
 PWRDN) >>

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APCL/5/GEN O

B10-40

ENTRY DELTAS PULLOUT PAGE

DO NOT DISCARD; USE TO LANDING

NOTE

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

- A. Deltas to AOA (ASC)
TIG-5 min:
- 1. Use two IDP/CRTs with four MDUs
 - 2. cb DDU L,R (four) – cl
 - 3. L,R FLT CNTLR PWR (two) – ON
- O14,O15,
O16:E
F6,F8
- B. Deltas to POST D/O BURN (ASC)
- 1. Use one IDP/CRT with two MDUs
 - 2. L,R FLT CNTLR PWR (two) – OFF
 - 3. cb DDU L,R (four) – op
 - 4. Delete ANTISKID, NWS callouts (ENTRY SW CHECK)
- F6,F8
O14,
O15,
O16:E
- At EI-7:
- 5. Use two IDP/CRTs with four MDUs
 - 6. Perform EMER PLBD CLOSING (ENT PKT, ECLS)
- C. Deltas to ENTRY MANEUVERS (Cue Card)
At EI:
- 1. NH3 CNTLR B(A) – SEC/ON
 - 2. cb DDU L,R (four) – cl
 - 3. L,R FLT CNTLR PWR (two) – ON
 - 4. BRAKES (three) – ON
 - 5. cb ADTA (four) – cl
 - 6. GNC I/O RESET
- L1
O14,
O15,
O16:E
F6,F8
O14,
O15,
O16:A
O14,
O15,
O16:E

Cont next page

**LOSS OF FES/1 FC
ENTRY PULLOUT PAGE**

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OV105

APCL/ALL/GEN O

At V = 15K:

7. Delete NAVAIDS callout

At V = 12K:

8. Delete ref to RAD FLOW

At V = 6K:

L1

9. NH3 CNTLR B(A) – OFF
A(B) – PRI/GPC

At M = 2.7:

L2

10. Use two HUDs, three MLSs, and two RAs as reqd
11. GNC I/O RESET
12. ANTISKID – ON
13. NWS – 1

At post Wheel Stop:

14. Go to EXPEDITED PWRDN (ENT, POST LDG)

LOSS OF 2nd FC

- ⇒ C3 1. √MSTR MADS PWR – OFF
- 2. Use one IDP/CRT with three MDUs
- O7 3. GPS PWR (three) – OFF
- PRE AMPL (six) – OFF
- O8 4. √RDR ALTM (two) – OFF

NOTE

Do not tie three main buses during ascent

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

MS Perform MS OVHD AND AFT PNL PWRDN, 10-47, immed

- L1 5. Minimize Itg
- 6. Perform PL PWRDN, then:
- 7. CAB FAN (two) – OFF
- 8. If in OPS 2: Go to step 15

CONTRACT RS AND REASSIGN STRINGS TO GPC 1 IN MC 1

GNC 0 GPC MEMORY

- 9. CONFIG – ITEM 1 +1 EXEC
Modify MC 1 per table----->

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

NOTE
The following must be an OPS MODE recall

- CRT 10. GNC, OPS 10X PRO

- For any CRT that is OFF:
- 11. GPC/CRT1/X EXEC

Cont next page

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OV105

APCL/5/GEN O

- O6 12. GPC MODE 2,3,4 (three) – STBY (tb-bp)
 – HALT
 – STBY (tb-RUN)
 – HALT (tb-bp)

PWR 2,3 (two) – OFF

13. (BFS) GNC I/O RESET

14. Go to step 21

15. GNC 0 GPC MEMORY

CONFIG – ITEM 1 +2 EXEC

Modify MC 2 per table----->

DOWNLIST GPC – ITEM 44 +1
 EXEC

	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

- CRT 16. GNC, OPS 201 PRO

- O6 17. GPC MODE 2 – STBY (tb-bp)
 – HALT

PWR 2 – OFF

18. √GPC MODE 3,5 (two) – HALT
 (tb-bp)

PWR 3 – OFF

19. GNC 20 DAP CONFIG

P OPTION – ITEM 15 EXEC
 (TAIL)

Y OPTION – ITEM 16 EXEC
 (TAIL)

- C3 20. DAP: A/AUTO/PRI

- R2 21. When MPS Dump Complete:
 MPS ENG PWR (six) – OFF

22. GNC 51 OVERRIDE

Any comm faulted IMU – desel

- L1 23. √IMU FAN (one) – ON

24. √H2O PUMP LOOP (one) – ON

25. AV BAY 1 FAN B(A) – ON

26. AV BAY 2 FAN A(B) – ON

If MNA unpwr:

27. FREON PUMP LOOP 1 – B
 2 – A

28. FLASH EVAP CNTLR PRI A – ON
 B – OFF

29. TOP EVAP HTR DUCT sel – B
 HI LOAD DUCT HTR sel – B

30. L OMS – sel SEC

Cont next page

B10-44

OV105

APCL/ALL/GEN O

- If MNB(C) unpwr:
- L1 31. FREON PUMP LOOP 1,2 (two) – A(B)
 32. TOP EVAP HTR DUCT sel – A
 HI LOAD DUCT HTR sel – A
- If MNC unpwr:
33. FLASH EVAP CNTLR PRI B – ON
 A – OFF
34. R OMS – sel SEC
- If no MANF leak:
- R1 35. $\sqrt{O_2, H_2}$ MANF VLV TK1, TK2 (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:
36. $\sqrt{O_2, H_2}$ HTR LOSS TABLE (EPS), 5-20
 37. Sel one htr in one O₂, H₂ TK
- R4 38. Activate PGSC if reqd
- L2 39. $\sqrt{FLASH EVAP FDLN HTR A, B SPLY}$ (two) – OFF
- L4:L 40. cb ΦA CAB T CNTLR (two) – op
- C3 41. C/W MODE – ACK
- F6/F8 42. FLT CNTLR PWR (two) – OFF, use one as reqd
- Post APU/HYD SHUTDN:
- R2 43. BLR CNTLR/HTR (three) – OFF
 44. $\sqrt{HYD CIRC PUMP}$ (three) – OFF
 45. GNC 23 RCS
 ITEM 1 EXEC (FRCS page)
 Ovrdrd FRCS MANF 1,2,3,4 STAT (four) – CL
- O8 46. RJDF DRIVER, LOGIC (eight) – OFF
 O14, O15, O16:F $\sqrt{RJD MANF L5/F5/R5 DRIVER}$ – OFF
- If not MN BUS SHORT:
47. Tie three MN buses, BUS TIE (Cue Card)
- Post BUS TIE config check:
- L1 48. CAB FAN A(B) – ON
 49. $\sqrt{AV BAY 1 FAN}$ (one) – ON
 50. $\sqrt{AV BAY 2 FAN}$ (one) – ON
 51. $\sqrt{MS OVHD AND AFT PNL PWRDN}$ complete, then
 continue:
- If in OPS 2:
52. Go to LOSS OF 2 FC LAUNCH DAY DEORBIT
 PREP (ORBIT 2 OR ORBIT 3) (CONT DEORB,
LOSS OF 2 FC ORB 2 OR 3) (read notes) >>
53. Set watch to count down to DEORBIT TIG (use PGSC
 or MCC for TIG time)

Cont next page

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OV105

APCL/ALL/GEN O

OPS 3 TRANSITION CONFIG – POST OMS 2

- O14,O15, O16:F 54. ASA (four) – ON
- O14, O15, O16:A 55. √RGA 1,2,3 (three) – ON
- O14, O15:E 56. √cb ACCEL (two) – cl
- O16:F 57. √ACCEL 3 – ON
- C3 58. √FCS CH (four) – AUTO

TRANSITION GPC 1 TO GNC OPS 3

- CRT1 59. GNC 0 GPC MEMORY
CONFIG – ITEM 1 +3 EXEC
Modify MC 3 per table----->
- CRT 60. GNC, OPS 301 PRO
- 61. GNC DEORB MNVR COAST

	CONFIG GPC	3 10000
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

- C3 TRANSITION BFS GPC TO GNC OPS 3
62. BFC CRT DISP – ON
√SEL – 3+1
- CRT 63. (BFS) GNC OPS 301 PRO
- O14, O15:F 64. MMU (two) – OFF

- 65. Go to LOSS OF 2 FC LAUNCH DAY DEORBIT PREP (ORBIT 2 OR ORBIT 3) (CONT DEORB, LOSS OF 2 FC ORB 2 OR 3); DO NOT perform PRE DPS TRANSITION SWITCH CONFIG [5] and DPS ENTRY CONFIG [6]

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MS OVHD AND AFT PNL PWRDN

- O14,O15, 1. BRAKES (three) – OFF
O16:A
- O14,O15, 2. cb ADTA (four) – op
O16:E
- O16:E 3. cb MNC RCS/OMS PRPLT QTY GAUGE – OP
- O15, 4. cb DDU R (two) – op
O16:E
- O14:A 5. Desel IMU – OFF (one of three IMUs OFF)
- :B 6. cb MNA MSN TIMER FWD – op
EVENT TIMER AFT – op
- O15:B 7. MNB MSN TIMER AFT – op
EVENT TIMER FWD – op
- Post MPS pwrdn and APU/HYD SHUTDN:
- O14,O15, 8. ASA (four) – OFF
O16:F
- O17:A 9. ATVC (four) – OFF
- :B 10. EIU (three) – OFF
- :D 11. MEC 1 – OFF (wait 2 sec), then
2 – OFF
- A12 12. √APU HTR LUBE OIL LN (three) – OFF
- 13. HYD HTR (eight) – OFF
- A14 14. RCS/OMS HTR FWD RCS – OFF
JET 1,2,3,4,5
(five) – OFF
- ML26C 15. SPLY H2O GN2 TK VENT vlv – PRESS
TKA SPLY vlv – OP

LOSS OF 2nd FC
ASCENT
MS PAGE

B10-47

OV105

APCL/5/GEN O

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**LOSS OF 2nd FC
ASCENT
MS PAGE**

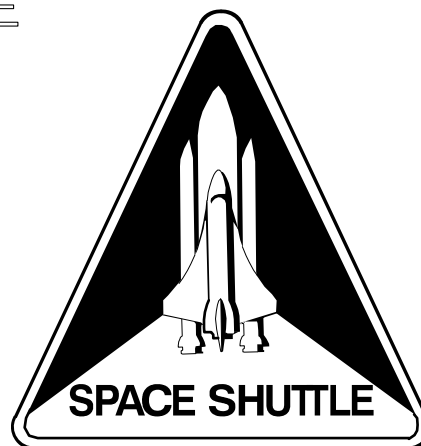
B10-48

OV105

APCL/ALL/GEN O

Space Shuttle Program
FLIGHT DATA FILE

JSC-48003
GENERIC, REV O



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

ASCENT PKT CHECKLIST

OV
ALL

Flight Cover (trim bottom to expose tabs)