

Entry Pocket Checklist

Mission Operations Directorate Operations Division

Generic, Rev M
October 18, 2006

NOTE

For STS-116 and subsequent flights

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

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



United Space Alliance

ENTRY POCKET CHECKLIST

GENERIC, Rev M (Oct 18, 2006)

PCN-11 (May 15, 2009) Sheet 1 of 1

List of Implemented Change Requests (482s):

OPCL-0520

NOTE

For STS-127 and subsequent flights

Incorporate the following:

1. Replace v thru viii
2. Replace A4-1 thru B4-2 (4 pages)
3. Replace A10-5 thru A10-10
4. Replace B10-9 and B10-10

Prepared by: Maureen Smu
Publication Manager

Approved by: Candyn Parucci
Manager, Flight Procedures

Accepted by: Stef. P.
FDE Manager

Encl: 16 pages

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ENTRY POCKET CHECKLIST**GENERIC, Rev M (Oct 18, 2006)****PCN-10 (Oct 14, 2008) Sheet 1 of 1**

List of Implemented Change Requests (482s):

MULTI-1817
MULTI-1829
MULTI-1830**NOTE**

For STS-126 and subsequent flights

Incorporate the following:

1. Replace v and vi
2. Replace 3-13 thru 3-18 (6 pages)
3. Replace 7-3 and 7-4

Prepared by: _____
Publication Manager**Approved by:** _____
Manager, Shuttle Procedures Management**Accepted by:** _____
FDF Manager

Encl: 10 pages

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ENTRY POCKET CHECKLIST

GENERIC, Rev M (Oct 18, 2006)

PCN-9 (Apr 24, 2008) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1813

EPCL-0285

MULTI-1816

NOTE

For STS-124 and subsequent flights

Incorporate the following:

1. Replace v thru viii
2. Replace 3-9 and 3-10, B3-15 and B3-16
3. Replace A10-17 and A10-18, A10-55 and A10-56
4. Replace B10-17 and B10-18, B10-55 and B10-56

Prepared by: May Ellen Bruce
Publication Manager

Approved by: Layne W. Johnson
Manager, Shuttle Procedures Management

Accepted by: Timberly Johnson
EDF Manager

Encl: 16 pages

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ENTRY POCKET CHECKLIST

GENERIC, Rev M (Oct 18, 2006)

PCN-8 (Jan 11, 2008) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1812A
MULTI-1814**NOTE**

For STS-123 and subsequent flights

Incorporate the following:

1. Replace v and vi, xi and xii
2. Replace 6-7 thru B6-12 (10 pages)

Prepared by: Mary Ellen Lruca
Publication ManagerApproved by: Dorothy M. Mason
Manager, Shuttle Procedures ManagementAccepted by: Michael J. Holt
FDF Manager

Encl: 14 pages

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ENTRY POCKET CHECKLIST

GENERIC, Rev M (Oct 18, 2006)

PCN-7 (Oct 4, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1808

NOTE

For STS-120 and subsequent flights

Incorporate the following:

1. Replace v thru viii
2. Replace B3-15 and B3-16

Prepared by: Mary Ellen Luce
Publication Manager

Approved by: Timberly Johnson
Manager, Shuttle Procedures Management

Accepted by: Michael C. Shaw
FDF Manager

Encl: 6 pages

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ENTRY POCKET CHECKLIST	GENERIC, Rev M (Oct 18, 2006)
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PCN-6 (Oct 1, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1803
MULTI-1805

NOTE For STS-120 and subsequent flights

Incorporate the following:

1. Replace v thru viii
2. Replace B3-15 and B3-16
3. Replace A4-11 and A4-12, B4-11 and B4-12
Delete TEMP B4-11 and TEMP B4-12

Prepared by: Mary Ellen S. Miller
Publication Manager

Approved by: Jayne W. [Signature]
Manager, Shuttle Procedures Management

Accepted by: Michael [Signature]
FDF Manager

Encl: 10 pages

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ENTRY POCKET CHECKLIST

GENERIC, Rev M (Oct 18, 2006)

PCN-5 (July 12, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1786
MULTI-1788
MULTI-1790
MULTI-1797

NOTE

For STS-118 and subsequent flights

Incorporate the following:

1. Replace v thru viii
2. Replace 3-15 and 3-16 with A3-15 thru B3-16 (4 pages)
3. Replace B4-1 thru 4-4 (4 pages), A4-19 thru B4-20 (4 pages)
4. Replace B10-5 thru B10-8

Prepared by: Mary Ellen Bruce
Publication Manager

Approved by: Kimberly Johnson
Manager, Shuttle Procedures Management

Accepted by: Michael T. Lut
FDF Manager

Encl: 20 pages

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ENTRY POCKET CHECKLIST

GENERIC, Rev M (Oct 18, 2006)

PCN-4 (Feb 16, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1780

MULTI-1782

NOTE

For STS-117 and subsequent flights

Incorporate the following:

1. Replace v and vi, ix and x
2. Replace 3-3 thru 3-6
3. Replace TEMP B4-11 and TEMP B4-12

Prepared by: Maureen Luce
Publication Manager

Approved by: Timberly Johnson
Manager, Shuttle Procedures Management

Accepted by: Michael C. Shaw
FDF Manager

Encl: 10 pages

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ENTRY POCKET CHECKLIST

GENERIC, Rev M (Oct 18, 2006)

PCN-3 (Feb 7, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

EPCL-0283	MULTI-1756
EPCL-0284	MULTI-1764A
	MULTI-1774
	MULTI-1778

NOTE
For STS-117 and subsequent flights

Incorporate the following:

1. Replace v thru viii
2. Replace A4-11 and A4-12, B4-11 and B4-12
After B4-12, add TEMP B4-11 and TEMP B4-12
Replace 4-17 thru B4-20 (6 pages)
3. Replace A10-17 and A10-18

Prepared by: May Ellen Bruu
Publication Manager

Approved by: Timberly Johnson
Manager, Shuttle Procedures Management

Accepted by: Michael A. Shan
FDF Manager

Encl: 18 pages

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ENTRY POCKET CHECKLIST

GENERIC, Rev M (Oct 18, 2006)

PCN-2 (Jan 24, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

EPCL-0281
EPCL-0282**NOTE**

For STS-117 and subsequent flights

Incorporate the following:

1. Replace v thru viii
2. Replace A10-41 and A10-42
3. Replace B10-41 and B10-42

Prepared by: Mary Ellen Luce
Publication ManagerApproved by: Kimberly Johnson
Manager, Shuttle Procedures ManagementAccepted by: Michael [Signature]
FDF Manager

Encl: 8 pages

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ENTRY POCKET CHECKLIST

GENERIC, Rev M (Oct 18, 2005)

PCN-1 (Nov 10, 2006) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1759A

NOTE

For STS-116 and subsequent flights

Incorporate the following:

1. Replace v thru xii
2. Replace 1-3 thru 1-6
3. Replace 4-17 and 4-18
4. Replace 7-5 and 7-6

Prepared by: Mary Ellen Lruu
Publication Manager

Approved by: Tanya Vaughan for
Manager, Shuttle Procedures Management

Accepted by: Michael J. Holt
FDF Manager

Encl: 16 pages

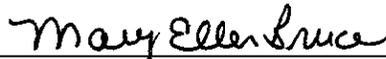
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MISSION OPERATIONS DIRECTORATE

ENTRY POCKET CHECKLIST

GENERIC, REVISION M
October 18, 2006

PREPARED BY:



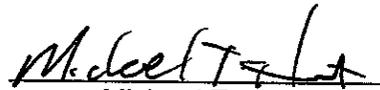
Mary E. Bruce
Publication Manager

APPROVED BY:

ACCEPTED BY:



Kimberly A. Johnson
Manager, Shuttle
Procedures Management



Michael T. Hurt
FDF Manager

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

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

Incorporates the following:			
482#:	MULTI-1755	MULTI-1768	EPCL-0272A
	MULTI-1763		EPCL-0273A
	MULTI-1765		EPCL-0278
	MULTI-1766		EPCL-0279
	MULTI-1767		EPCL-0280

AREAS OF TECHNICAL RESPONSIBILITY

Publication Manager	DO35/M. Bruce	281-483-6083
Alternate	DO35/C. Pierce	281-483-6087
APU/HYD	DF5/J. Jason	281-483-7575
COMM	DF2/J. McKinnie	281-483-0792
DPS	DF3/J. McDonald	281-483-0793
ECLS	DF8/D. Fasbender	281-483-7857
EPS	DF7/M. Friant	281-483-0682
GNC	DF6/D. Gruber	281-483-0709
OMS/RCS	DF6/T. Campa	281-244-1002
MPS	DF5/M. Patel	281-244-0083
PWRDN	DF7/M. Friant	281-483-0682

NOTES

1. The pocket checklists contain contingency procedures to safe a system and continue the flight. Normally, these procedures do not troubleshoot a malfunction to determine its cause.
2. The Entry Pocket Checklist is in effect from transition-to-MM301-for-entry until MM304 transition.
3. The absence of a procedure implies no immediate action required.
4. '(Cue Card)' after a procedure indicates that it can also be found on a cue card.
5. Steps are numbered sequentially to facilitate reference for orbiter/ground communications and for procedural cross-reference. All procedures should be completed promptly and in the step sequence noted.
6. Applicable procedures from the PL PWR book (i.e., Section 4) are placed at the end of the flight copies of this book.
7. Applicable procedures from the A/E SYS book (i.e., Sections E1 thru E9) are placed before the APU/HYD section in the flight copies of this book.
8. The '♦' icon preceding a procedural entry indicates one should √MCC and if no comm continue with the procedure.
9. The '⇒' icon at the end of a procedure line indicates one should continue to the Glided Flight division of the A/E SYS book.



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ENTRY POCKET CHECKLIST

LIST OF EFFECTIVE PAGES

GENERIC	07/22/87	PCN-6	10/01/07
REV M	10/18/06	PCN-7	10/04/07
PCN-1	11/10/06	PCN-8	01/11/08
PCN-2	01/24/07	PCN-9	04/24/08
PCN-3	02/07/07	PCN-10	10/14/08
PCN-4	02/16/07	PCN-11	05/15/09
PCN-5	07/12/07		

Sign Off	*	ALL/GEN M	3-9	ALL/GEN M,9
ii	*	ALL/GEN M	3-10	ALL/GEN M
iii	*	ALL/GEN M	3-11	ALL/GEN M
iv	*	ALL/GEN M	3-12	ALL/GEN M
v	*	ALL/GEN M,11	3-13	ALL/GEN M,10
vi	*	ALL/GEN M,10	3-14	ALL/GEN M
vii	*	ALL/GEN M,11	3-15	ALL/GEN M,10
viii	*	ALL/GEN M,11	3-16	ALL/GEN M,10
ix	*	ALL/GEN M,4	3-17	ALL/GEN M,10
x	*	ALL/GEN M,1	3-18	ALL/GEN M,10
xi	*	ALL/GEN M,8	A4-1	3,4/GEN M,11
xii	*	ALL/GEN M,1	A4-2	ALL/GEN M
1-1		ALL/GEN M	B4-1	5/GEN M,11
1-2		ALL/GEN M	B4-2	ALL/GEN M
1-3		ALL/GEN M	4-3	ALL/GEN M,5
1-4		ALL/GEN M,1	4-4	ALL/GEN M,5
1-5		ALL/GEN M,1	4-5	ALL/GEN M
1-6		ALL/GEN M,1	4-6	ALL/GEN M
2-1		ALL/GEN M	4-7	ALL/GEN M
2-2		ALL/GEN M	4-8	ALL/GEN M
2-3		ALL/GEN M	A4-9	ALL/GEN M
2-4		ALL/GEN M	A4-10	3,4/GEN M
3-1		ALL/GEN M	A4-11	3,4/GEN M
3-2		ALL/GEN M	A4-12	3,4/GEN M,6
3-3		ALL/GEN M	B4-9	ALL/GEN M
3-4		ALL/GEN M,4	B4-10	5/GEN M
3-5		ALL/GEN M,4	B4-11	5/GEN M
3-6		ALL/GEN M	B4-12	5/GEN M,6
3-7		ALL/GEN M	4-13	ALL/GEN M
3-8		ALL/GEN M	4-14	ALL/GEN M

* – Omit from flight book

4-15.....	ALL/GEN M	5-33.....	ALL/GEN M
4-16.....	ALL/GEN M	5-34.....	ALL/GEN M
4-17.....	ALL/GEN M,1	5-35.....	ALL/GEN M
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4-22.....	ALL/GEN M	5-42.....	ALL/GEN M
5-1.....	ALL/GEN M	5-43.....	ALL/GEN M
5-2.....	ALL/GEN M	5-44.....	ALL/GEN M
5-3.....	ALL/GEN M	5-45.....	ALL/GEN M
5-4.....	ALL/GEN M	5-46.....	ALL/GEN M
5-5.....	ALL/GEN M	5-47.....	ALL/GEN M
5-6.....	ALL/GEN M	5-48.....	ALL/GEN M
5-7.....	ALL/GEN M	5-49.....	ALL/GEN M
5-8.....	ALL/GEN M	5-50.....	ALL/GEN M
5-9.....	ALL/GEN M	6-1.....	ALL/GEN M
5-10.....	ALL/GEN M	6-2.....	ALL/GEN M
5-11.....	ALL/GEN M	6-3.....	ALL/GEN M
5-12.....	ALL/GEN M	6-4.....	ALL/GEN M
5-13.....	ALL/GEN M	6-5.....	ALL/GEN M
5-14.....	ALL/GEN M	6-6.....	ALL/GEN M
5-15.....	ALL/GEN M	6-7.....	ALL/GEN M,8
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5-17.....	ALL/GEN M	A6-9.....	3,4/GEN M,8
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5-28.....	ALL/GEN M	7-4.....	ALL/GEN M
5-29.....	ALL/GEN M	7-5.....	ALL/GEN M,1
5-30.....	ALL/GEN M	7-6.....	ALL/GEN M
5-31.....	ALL/GEN M	7-7.....	ALL/GEN M
5-32.....	ALL/GEN M	7-8.....	ALL/GEN M

8-1	ALL/GEN M	A10-31	ALL/GEN M
8-2	ALL/GEN M	A10-32	3,4/GEN M
8-3	ALL/GEN M	A10-33	3,4/GEN M
8-4	ALL/GEN M	A10-34	ALL/GEN M
8-5	ALL/GEN M	A10-35	ALL/GEN M
8-6	ALL/GEN M	A10-36	3,4/GEN M
8-7	ALL/GEN M	A10-37	ALL/GEN M
8-8	ALL/GEN M	A10-38	3,4/GEN M
8-9	ALL/GEN M	A10-39	3,4/GEN M
8-10	ALL/GEN M	A10-40	3,4/GEN M
9-1	ALL/GEN M	A10-41	ALL/GEN M,2
9-2	ALL/GEN M	A10-42	3,4/GEN M
A10-1	ALL/GEN M	A10-43	ALL/GEN M
A10-2	ALL/GEN M	A10-44	ALL/GEN M
A10-3	ALL/GEN M	A10-45	ALL/GEN M
A10-4	ALL/GEN M	A10-46	ALL/GEN M
A10-5	3,4/GEN M,11	A10-47	3,4/GEN M
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A10-7	3,4/GEN M,11	A10-49	3,4/GEN M
A10-8	3,4/GEN M,11	A10-50	3,4/GEN M
A10-9	3,4/GEN M,11	A10-51	3,4/GEN M
A10-10	3,4/GEN M,11	A10-52	ALL/GEN M
A10-11	ALL/GEN M	A10-53	ALL/GEN M
A10-12	3,4/GEN M	A10-54	3,4/GEN M
A10-13	ALL/GEN M	A10-55	ALL/GEN M,9
A10-14	3,4/GEN M	A10-56	ALL/GEN M
A10-15	3,4/GEN M	A10-57	3,4/GEN M
A10-16	3,4/GEN M	A10-58	3,4/GEN M
A10-17	3,4/GEN M,3	A10-59	3,4/GEN M
A10-18	ALL/GEN M,9	A10-60	ALL/GEN M
A10-19	ALL/GEN M	A10-61	ALL/GEN M
A10-20	ALL/GEN M	A10-62	ALL/GEN M
A10-21	3,4/GEN M	A10-63	ALL/GEN M
A10-22	ALL/GEN M	A10-64	ALL/GEN M
A10-23	ALL/GEN M	A10-65	ALL/GEN M
A10-24	ALL/GEN M	A10-66	ALL/GEN M
A10-25	ALL/GEN M	A10-67	3,4/GEN M
A10-26	ALL/GEN M	A10-68	3,4/GEN M
A10-27	ALL/GEN M	A10-69	3,4/GEN M
A10-28	ALL/GEN M	A10-70	ALL/GEN M
A10-29	3,4/GEN M	A10-71	ALL/GEN M
A10-30	ALL/GEN M	A10-72	ALL/GEN M

A10-73	3,4/GEN M	B10-41.....	ALL/GEN M,2
A10-74	ALL/GEN M	B10-42.....	5/GEN M
B10-1.....	ALL/GEN M	B10-43.....	ALL/GEN M
B10-2.....	ALL/GEN M	B10-44.....	ALL/GEN M
B10-3.....	ALL/GEN M	B10-45.....	ALL/GEN M
B10-4.....	ALL/GEN M	B10-46.....	ALL/GEN M
B10-5.....	5/GEN M,5	B10-47.....	5/GEN M
B10-6.....	5/GEN M,5	B10-48.....	5/GEN M
B10-7.....	5/GEN M,5	B10-49.....	5/GEN M
B10-8.....	5/GEN M,5	B10-50.....	5/GEN M
B10-9.....	5/GEN M,11	B10-51.....	5/GEN M
B10-10.....	5/GEN M,11	B10-52.....	ALL/GEN M
B10-11.....	ALL/GEN M	B10-53.....	ALL/GEN M
B10-12.....	5/GEN M	B10-54.....	5/GEN M
B10-13.....	ALL/GEN M	B10-55.....	ALL/GEN M,9
B10-14.....	5/GEN M	B10-56.....	ALL/GEN M
B10-15.....	5/GEN M	B10-57.....	5/GEN M
B10-16.....	5/GEN M	B10-58.....	5/GEN M
B10-17.....	5/GEN M	B10-59.....	5/GEN M
B10-18.....	ALL/GEN M,9	B10-60.....	ALL/GEN M
B10-19.....	ALL/GEN M	B10-61.....	ALL/GEN M
B10-20.....	ALL/GEN M	B10-62.....	ALL/GEN M
B10-21.....	5/GEN M	B10-63.....	ALL/GEN M
B10-22.....	ALL/GEN M	B10-64.....	ALL/GEN M
B10-23.....	ALL/GEN M	B10-65.....	ALL/GEN M
B10-24.....	ALL/GEN M	B10-66.....	ALL/GEN M
B10-25.....	ALL/GEN M	B10-67.....	5/GEN M
B10-26.....	ALL/GEN M	B10-68.....	5/GEN M
B10-27.....	ALL/GEN M	B10-69.....	5/GEN M
B10-28.....	ALL/GEN M	B10-70.....	ALL/GEN M
B10-29.....	5/GEN M	B10-71.....	ALL/GEN M
B10-30.....	ALL/GEN M	B10-72.....	ALL/GEN M
B10-31.....	ALL/GEN M	B10-73.....	5/GEN M
B10-32.....	5/GEN M	B10-74.....	ALL/GEN M
B10-33.....	5/GEN M		
B10-34.....	ALL/GEN M		
B10-35.....	ALL/GEN M		
B10-36.....	5/GEN M		
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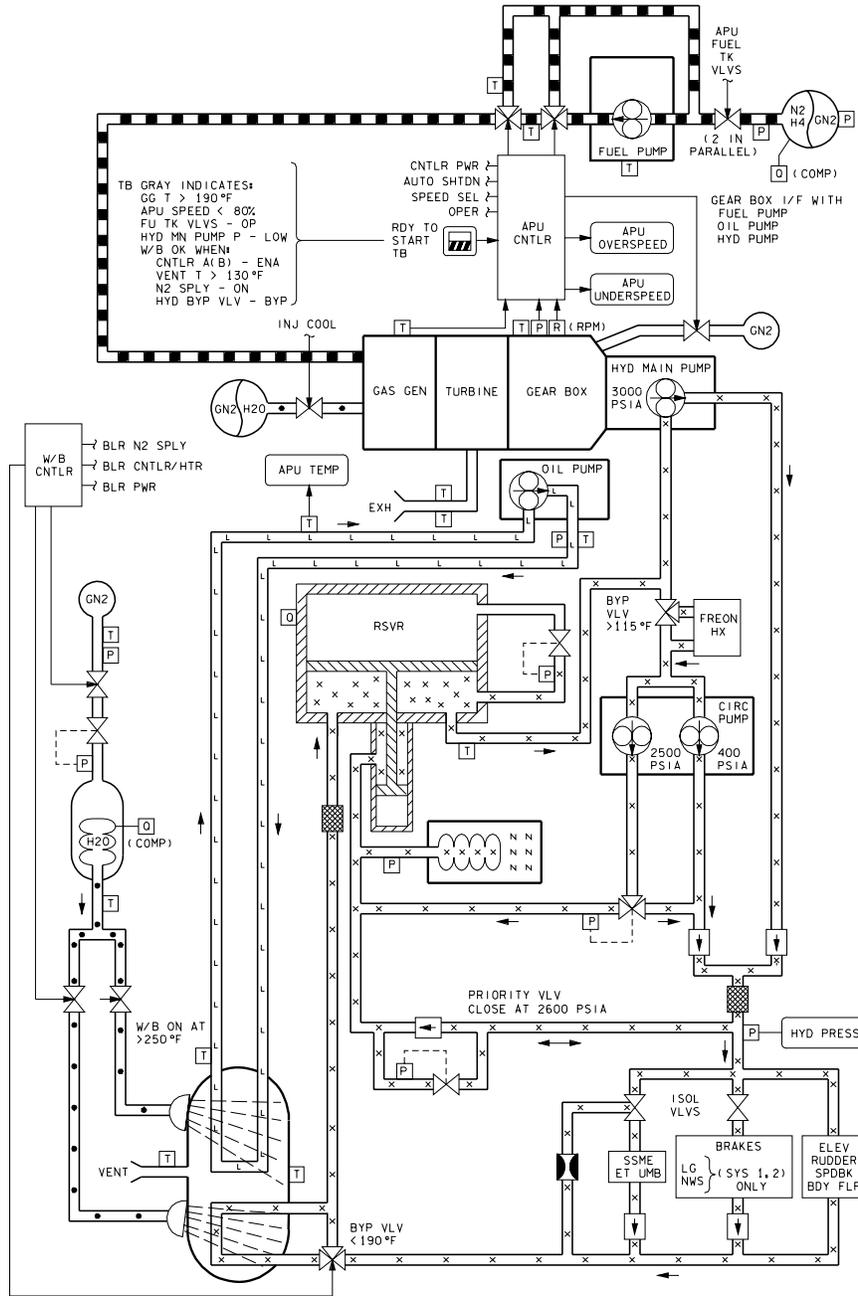
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APU/HYD

APU/
HYD



DATE 07/22/05
480330101, SCH: 2

**APU OVERSPEED/
UNDERSPEED**

BFS, SM SYS SUMM 2

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

APU SPD HI

BFS, SM SYS SUMM 2

If SPEED % exceeds 111:

1. APU SPEED SEL – HI
HYD MN PUMP PRESS – NORM

If two good APU/HYD remain:

2. Perform APU SHUTDN, then:

At M = 7:

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

APU OIL OVERTEMP

BFS, SM SYS SUMM 2

1. BLR CNTLR/HTR – A(B)

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

2. Perform APU SHUTDN, then:

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 two good APUs:

2. Perform APU SHUTDN, then:

At M = 7:

3. 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. Go to APU SHUTDN >>
- At 3.5 min:
6. APU FU TK VLV – OP
OPER – START/RUN
- If restart unsuccessful:
7. Go to APU SHUTDN >>
 8. HYD MN PUMP PRESS – NORM

APU SHUTDN

1. APU OPER – OFF
FU TK VLV – CL
√Shutdn (HYD PRESS < 200)
Report APU F7 Its
APU CNTLR PWR – OFF
- If one APU/HYD failed:
2. At TAEM: (Good) APU SPEED SEL (two) – HI >>
- If two APU/HYDs failed:
3. (Good) APU AUTO SHTDN – INH
HYD MN PUMP PRESS – LO
 4. Delay MM304 trans until EI-2
Immed prior to MM304 trans:
 5. (Good) HYD MN PUMP PRESS – NORM
APU SPEED SEL – HI

EPCL/ALL/GEN M

APU SPEED
APU OIL T/PUMP LK P

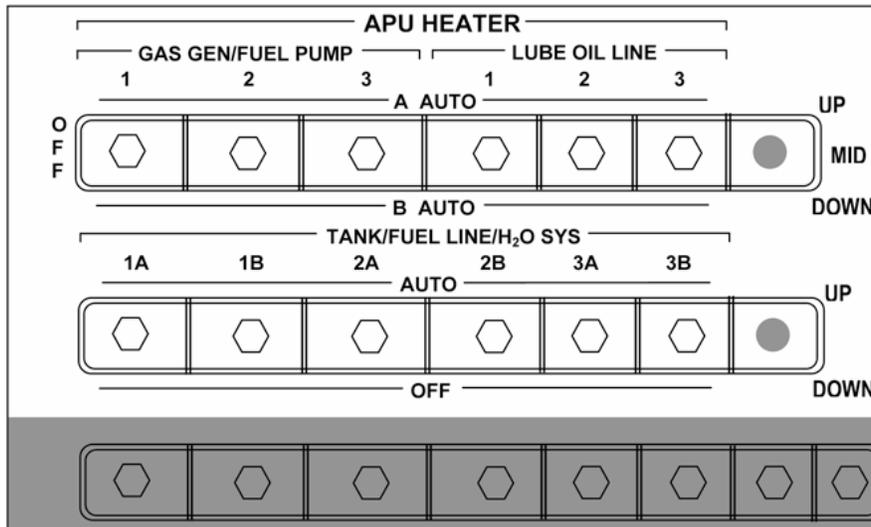
1-3

APU RESTART
APU SHUTDOWN

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/LV 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. 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	Go to APU SHUTDN >>
blank	either meter or CRT P > 2600	No action reqd >>
'?'	ACUM P > 2800	No action reqd >>

2. (Aff) HYD MN PUMP PRESS – LO

If two good APU/HYD remain:

At TAEM:

3. APU SPEED SEL (two) – HI >>

If only one good APU/HYD remains:

4. APU AUTO SHTDN (one) – INH
√HYD MN PUMP PRESS (one) – LO

Delay MM304 trans until EI-2; immed prior to MM304 trans:

5. HYD MN PUMP PRESS (one) – NORM
APU SPEED SEL (one) – HI

On MCC call:

6. (Degraded) HYD MN PUMP PRESS – NORM

EPCL/ALL/GEN M,1

SM0 THRM APU
HYD PRESS (LOW)

HYD RSVR QTY/T (1-6)
1-5 HYD ACCUM P/W/B QTY (1-6)

HYD RSVR QTY LOW**BFS, SM SYS SUMM 2**

1. √(Aff) HYD MPS/TVC ISOL VLV – CL (hold 5 sec, tb-CL)
 √BK ISOL VLV – CL (hold 5 sec, tb-CL)
 If HYD sys 1 leaking:
 √LG EXTD ISO VLV – CL (hold 5 sec, tb-CL)
 If qty still decr:
 If two good Hyd sys:
 2. (Aff) HYD MN PUMP PRESS – LO
 If second sys fails:
 3. At TAEM:
 (Leaking) HYD MN PUMP PRESS – NORM
 4. At TAEM: (Good) APU SPEED SEL (two) – HI
 If one good Hyd sys:
 5. (Good) APU AUTO SHTDN – INH
 6. HYD MN PUMP PRESS (two) – LO
 7. Delay MM304 trans until EI-2
 Immed prior to MM304 trans:
 8. (Good) HYD MN PUMP PRESS – NORM
 9. APU SPEED SEL – HI
 10. At TAEM: (Leaking) HYD MN PUMP PRESS – NORM

HYD RSVR T**BFS, SM SYS SUMM 2**

1. BLR CNTLR/HTR – A(B)
 If HYD RSVR T > 250:
 2. HYD MN PUMP PRESS – LO
 If HYD RSVR T > 268 and incr:
 3. Perform APU SHUTDN, then:
 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

SMO THRM HYD**BFS, SM 0 THERMAL |**

- If HYD BLR/HTR status '↑' or '↓':
 (Aff) BLR CNTLR/HTR – A

W/B QTY (LOW)**BFS, SM SYS SUMM 2**

1. If W/B QTY = 0 >>
2. BLR CNTLR/HTR – A(B)
 Monitor W/B QTY for 2 min, then:
 If W/B QTY change > 3:
 3. Perform APU SHUTDN, then:
 At M = 7:
 4. Go to APU COOLDOWN (A/E SYS, PLT WND FB,
 APU/HYD)



COMM

COMMUNICATIONS



COMM LOST (mult pnls)

SM 76 COMMUNICATIONS

NOTE

Perform comm checks with MCC
after each step

COMM

- 1. AUD CTR – 2
- If all ICOM and A/G failed (check three ATUs):
- 2. √cb AUD CTR (two) – cl
- 3. Go to step 11
- 4. S-BD PM CNTL – PNL,CMD
- 5. **BFS, GNC 51 OVERRIDE**
 Config for TDRS,STDN, or SGLS per Comm Coverage:
 TDRS – ITEM 46 EXEC (*)
 STDN-HI – ITEM 47 EXEC (*)
 SGLS – ITEM 49 EXEC (*)
 If * not next to selected config:
- 6. Config for STDN,SGLS, or TDRS per site coverage:

	STDN/SGLS	TDRS
S-BD PM MODE sel	STDN LO/SGLS	TDRS DATA
NSP DATA RATE (two)	HI	HI
NSP CODING (two)	OFF	ON

- 7. S-BD PM CNTL – PNL,CMD to effect reconfig
- 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

- 9. Attempt UHF PRI,ALT and G (say freq) per site coverage (30 sec reqd for site reconfig)
- 10. Bypass encryption (1 min reqd for MCC reconfig):
 NSP ENCRYPTION MODE – SEL
 SEL – BYP

Cont next page

If MCC GO for deorbit received:

11. Continue with deorbit >>

If MCC GO for deorbit not received:

12. Terminate deorbit proc

13. Confirm U/L CMD capability:

Cue MCC with: ITEM 88 +8 8 8 8 8

Check flashing U/L on PASS display

Ack with: ITEM 99 +9 9 9 9 9

Check abort light cycling ON/OFF (MCC ack)

Check no flashing U/L

If U/L CMD confirmed:

14. Go to MAL, COMM, SSR-1, LOSS OF ALL
VOICE COMM >>

If no comm and no U/L CMD:

15. Go to MAL, COMM, 2.3a, NO S-BD COMM:
TDRS 1

ICOM LOST

1. (Aff) AUD CNTL sel – sel alt

If still no ICOM AUDIO:

2. AUD CTR – 2



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DPS

DATA PROCESSING SYSTEM



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

DPS

FAILURE	TYPE	ACTIONS
GPC/FF 1,2	I/O or B	Use R BODY FLAP and TRIM ENA SWs
GPC/FF 3,4	I/O or B	Use L BODY FLAP and TRIM ENA SWs
GPC/FA 1,2	I/O	Preburn (TVC): L OMS ENG – OFF RCS Deorbit: Translate +Z or -Z
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

FF(FA) MDM OUTPUT

FAULT

- ◆ (Take action only if annun by entire set)
 - If single 'MDM OUTPUT' msg:
 - If 'FF MDM OUTPUT' msg:
 1. **GNC 51 OVERRIDE**
Aff IMU(s) – desel
 2. Go to FF(FA) MDM I/O ERROR >>
 - If both MDM FF and MDM FA annun:
 3. **GNC 51 OVERRIDE**
Aff IMU(s) – desel
 4. I/O RESET; if reqd: BFS I/O RESET
 - If msgs repeat:
 5. Go to PASS GPC (1st FAIL) >>
 - 6. If reqd, (aff) FCS CH – ORIDE,AUTO
 - ◆ 7. **GNC 51 OVERRIDE**
IMU – resel

GPC BITE (Pre-TIG)

If BFS annun GPC BITE:

1. Go to BFS GPC FAIL (Pre-TIG) >>

If single PASS GPC annun single GPC BITE:

2. Time permitting, √MCC for possible restrung >>

If single PASS GPC annun cyclic GPC BITE:

3. Go to PASS GPC (1st FAIL) (Pre-TIG) >>

If multiple PASS GPCs annun single or cyclic GPC BITE:

4. Delay deorbit, √MCC

GPC BITE (Post-TIG)

If OPS 303 and cyclic GPC BITE on single PASS GPC:

- Go to PASS GPC (1st FAIL) (Post Burn)

EPCL/ALL/GEN M

MULT DATA PATH LOSS 3-3

FF(FA) MDM OUTPUT
GPC BITE

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 >>
7. If MDU blank or autonomous:
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 >>
9. If MDU blank or autonomous:
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

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 MDM (GPC prob):
4. Repeat steps 2,3 if reqd to recover PL2, then:
Go to step 9
- If I/O Error PL repeats for same MDM:
If before TIG-5 and MCC GO for pwr cycle:
5. (Aff) MDM PL – OFF,ON
 6. BFS I/O RESET; if recovered >>
 7. Orig ports – reset
 8. BFS I/O RESET; if recovered >>
- If PL1 ↓:
9. FLASH EVAP CNTLR PRI B – ON
- If PL2 ↓ and no comm at AOS:
10. Sel best S-BD PM ANT
- If PL2 ↓ and AOA/TAL ⇒

PCM I/O ERROR

BFS, SM SYS SUMM 1(2)

- ◆ OI PCMMU PWR – 2(1)

G3 to G2/G8 TRANS

1. If MM302: GNC, OPS 301 PRO
- If no SM GPC and SM GPC desired:
2. Perform G3 to S2(4) TRANS (G3/BFS), then:
- If SM GPC avail:
3. √SM GPC OUTPUT – TERM
 4. **SM 1 DPS UTILITY**
UL CNTL AUTO – ITEM 35 EXEC
- C3
5. √UPLK – ENA
 6. Perform LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST), then:
- If no G2FD and one desired:
7. **GNC 0 GPC MEMORY**
Desel tgt FD GPC from MC 3
Assign all strings, CRTs, MMUs to remaining GNC GPCs
Verify PL1/2 deassigned from tgt FD GPC
GNC, OPS 301 PRO

Cont next page

**DUAL CMDRS/DK XMTR
DISPLAY FAIL/
ANOMALIES**

3-5

EPCL/ALL/GEN M,4

**PL MDM/PCM I/O
MC TRANS**

8. IDP/CRTX MAJ FUNC – PL
Assign FD GPC to IDP X
X: PL 0 GPC MEMORY
CONFIG – ITEM 45 +2 EXEC
GPC – ITEM 46 +(FD GPC) EXEC
STORE – ITEM 47 EXEC
Store complete when MC = 02 (~18 sec)
 9. (FD) GPC MODE – STBY (tb-bp), HALT
– STBY (tb-RUN)
– HALT (tb-bp)
- If (BFS) GPC MODE – STBY(RUN):
10. √BFS GPC MODE – STBY (tb-RUN)
 11. FLASH EVAP CNTLR PRI B – ON
 12. (BFS) GNC, OPS 000 PRO
GPC OUTPUT – NORM
 13. BFC CRT DISP – OFF
 14. (BFS) GPC MODE – HALT (tb-bp)
15. GNC 0 GPC MEMORY
Verify desired MC 2
√S TRK PWR (two) – ON
GNC, OPS 201 PRO
 16. If reqd: GNC, OPS 801 PRO
 17. As reqd: Pri RJD LOGIC, DRIVER (sixteen) – OFF
- If remaining in G2 config:
18. RGA (four) – OFF
cb ADTA (four) – op
MLS (three) – OFF
ASA (four) – OFF
 19. GNC 22 S TRK/COAS CNTL
S TRK -Y,-Z: STAR TRK – ITEM 3,4 EXEC (*)
 20. GNC 21 IMU ALIGN; RESUME

SM to G3 TRANS (G3/BFS)

1. (BFS) GPC MODE – RUN
2. SM, OPS 000 PRO
3. SM GPC OUTPUT – NORM (tb-gray)
4. Assign current SM GPC to MC 3 with its string
5. Reassign PL1/2
6. GNC, OPS 301 PRO
7. (BFS) GNC, OPS 000 PRO, OPS 301 PRO
8. GNC 50 HORIZ SIT
√PASS R/W sel

G2/G8 to G3 TRANS

1. √RGA (four) – ON
√Pri RJD LOGIC, DRIVER (sixteen) – ON
√cb ADTA (four) – cl
√MLS (three) – ON
√ASA (four) – ON
√FCS CH (four) – AUTO
2. Assign current GNC GPCs, strings, CRTs, and MMUs to MC 3
3. If SM GPC active: check PL1/2 deassigned
4. GNC, OPS 301 PRO
5. Perform LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST), then:

If nominal Ent MC 3 desired:

6. Assign GPCs, strings, PL1/2, CRTs, and MMUs (deassign L1,2)
7. √(FD) GPC PWR – ON
MODE – STBY, RUN (tb-RUN)

If SM GPC active:

8. (SM) GPC OUTPUT – NORM
9. SM 1 DPS UTILITY
UL CNTL ENA – ITEM 36 EXEC
10. SM, OPS 000 PRO
11. GNC, OPS 301 PRO
12. √(BFS) GPC PWR – ON
MODE – STBY (tb-RUN), RUN
OUTPUT – B/U
13. BFC CRT DISP – ON
SEL – 3+1
14. (BFS) GNC, OPS 301 PRO

G3 to S2(4) TRANS (G3/BFS)

1. FLASH EVAP CNTLR PRI B – ON
2. If MM302: GNC, OPS 301 PRO
3. Desel tgt SM GPC from MC 3
Reassign tgt SM GPCs string
Deassign PL1/2
4. GNC, OPS 301 PRO
5. BFS I/O RESET
6. Assign tgt SM GPC, PL1/2, CRTs, L1, and MMUs to MC 4(5)
7. IDP/CRTX: MAJ FUNC – SM
Assign tgt SM GPC to IDP X
SM, OPS 201(401) PRO
8. (BFS) GPC MODE – STBY

BCE STRG X (no 'MDM OUTPUT' msg)

If ADTA (MLS, GPS, TACAN, MTU):

1. I/O RESET; if recovered >>
2. **GNC 1 DPS UTILITY**
Aff String – port mode
3. Go to step 22

If NSP:

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

If A(B,C,D):

6. I/O RESET; if recovered >>
7. **GNC 1 DPS UTILITY**
Aff String – port mode
8. If recovered: Go to step 22
9. (Aff) MDM FF A(B) or MDM FA C(D) – OFF,ON
10. I/O RESET
11. If MDM FA pwr cycled: (aff) FCS CH – ORIDE,
AUTO
12. If recovered: Go to step 22
13. **GNC 1 DPS UTILITY**
Orig ports – resel
14. Go to step 22

If IMU:

15. **GNC 21 IMU ALIGN**
√IMU OPER (wait up to 90 sec); if STBY,
go to step 17
16. I/O RESET; if recovered: Go to step 23
17. **GNC 1 DPS UTILITY**
Aff String – port mode
18. If recovered: Go to step 22
19. (Aff) MDM FF – OFF,ON
20. I/O RESET; if recovered: Go to step 22
21. **GNC 1 DPS UTILITY**
Orig ports – resel
22. BFS I/O RESET

If recovered and IMU:

23. **GNC 21 IMU ALIGN**
√att ANG; if Delta > 1°, √MCC for IMU/IMU align >>
24. **GNC 21 IMU ALIGN**
Aff IMU – resel
25. If pre-TIG: Go to step 26

Cont next page

If recovered and other:

If pre-TIG and String 1(2,3) port moded or MDM FF1(2,3) pwr cycled:

26. If MM302: BFS GNC, OPS 301 PRO
27. BFS GNC, OPS 000 PRO
OPS 301(302) PRO
28. Reload BFS Ent Mnvr tgts
29. BFS, GNC 50 HORIZ SIT
√BFS R/W sel
30. If reqd:
GNC 21 IMU ALIGN
Aff IMU – resel

If not recovered:

31. If IMU >>
If pre-TIG and not IMU and String 1(2,3) port moded or MDM FF1(2,3) pwr cycled:
32. Perform steps 26-30, then:
If msg 'BCE STRG X A(B,C,D)':
If < 3Y or 2P jets/pod/dir:
33. GNC 23 RCS
Aff jet DES INH (*) (reprioritize)
Aff MANF VLVS STAT OP – OVRD
- If 'BCE STRG 1D(4D)' and pre-MM303:
34. L(R) OMS – sel SEC GMBL
- If 'BCE STRG 1A(2A)':
35. CDR(PLT) disp sws – green dot
- If 'BCE STRG B':
36. BFS, GNC 51 OVERRIDE
Aff AA – desel
- If 'BCE STRG D':
37. BFS, GNC 51 OVERRIDE
Aff SURF feedback, RGA – desel
38. √FWD(AFT) RCS RM LOSS (RCS), 8-5
39. √MULT DATA PATH LOSS

EPCL/ALL/GEN M,9

PASS GPC (1st FAIL) (Pre-TIG)NOTE

If reqd to complete proc, delay 1 orbit.
As reqd, √MCC for reapplication of GMEMs

1. (Aff) GPC PWR – OFF
 2. MODE – STBY,HALT
 3. If MM302: GNC, OPS 301 PRO
 4. Restrng to highest # GPC
Verify PL1/2 assigned
 5. (BFS) GNC, OPS 000 PRO
OPS 301 PRO
 6. BFS, GNC 50 HORIZ SIT √BFS R/W sel
 7. Reload BFS Ent Mnvr tgts
- If String 1(2,3) recovered:
8. GNC 21 IMU ALIGN aff IMU – resel
 9. On MCC GO, perform PASS/BFS HISAM AND SOFTWARE DUMP, then:
 10. Any PASS IDP, GNC 0 GPC MEMORY:
ERR LOG RESET – ITEM 48 EXEC
 11. BFC CRT DISP – OFF
 12. (Aff) GPC PWR – OFF,ON
 13. IPL SOURCE – MMU 1(2)
 14. (Aff) GPC IPL pb – push (tb-IPL, bp in 2 min)
- When tb – bp or 2 min:
15. (Aff) GPC MODE – STBY (tb-RUN in 2 min)
- When tb – RUN or 2 min:
16. (Aff) GPC MODE – RUN (tb remains RUN)
 17. Desired IDP/CRT, MAJ FUNC – PL
Assign IPL'd GPC to desired IDP
GNC 0 GPC MEMORY
- If GPC CANNOT drive an IDP:
- If first IPL attempt:
18. (Aff) GPC MODE – HALT
PWR – OFF,ON
 19. IPL SOURCE – MMU 2(1)
 20. Go to step 14
- If second IPL attempt:
21. Go to step 29
 22. IPL SOURCE – OFF
 23. Restrng String 4 to aff GPC
 24. BFC CRT DISP – ON
 25. (BFS) GNC, OPS 000 PRO, OPS 301 PRO
 26. BFS, GNC 50 HORIZ SIT √BFS R/W sel
 27. Reload BFS Ent Mnvr tgts
 28. GNC 50 HORIZ SIT √PASS R/W sel >>

Cont next page

If GPC unrecoverable:

29. (Aff) GPC PWR – OFF
30. IPL SOURCE – OFF
31. BFC CRT DISP – ON

PASS GPC (2nd FAIL) (Pre-TIG)

NOTE

If reqd to complete proc, delay deorbit.

As reqd, √MCC for reapplication of GMEMs

1. (Aff) GPC PWR – OFF
2. MODE – STBY,HALT
3. If MM302: GNC, OPS 301 PRO
4. Restrng 1,3 to one GPC; 2,4 to other; PL1/2 and MM(s) to nonfailed GPC(s)
5. BFS I/O RESET

If String 1(2,3) recovered:

- ◆ 6. GNC 21 IMU ALIGN
Aff IMU(s) – reset
7. FCS CH (four) – ORIDE
8. On MCC GO, perform PASS/BFS HISAM AND SOFTWARE DUMP, then:
9. IPL each failed GPC, perform PASS GPC (1st FAIL) (pre-TIG), steps 10 thru 22, then:

If both GPCs recovered (four GPC set):

10. Restrng String 3 to one recovered GPC, String 4 to other

If one GPC recovered (three GPC set):

11. Restrng String 3 to recovered GPC
12. (BFS) GNC, OPS 000 PRO, OPS 301 PRO
13. BFS, GNC 50 HORIZ SIT
√BFS R/W sel

Cont next page

EPCL/ALL/GEN M

PASS GPC (1st) (Pre)

3-11

PASS GPC (2nd) (Pre)

14. Reload BFS Ent Mnvr tgts

15. GNC 50 HORIZ SIT

√PASS R/W sel

If four GPC set exists:

16. FCS CH (four) – AUTO

If three GPC set exists and any GPC commanding more than one FCS CH:

17. FCS CH (one) – OFF

BFS GPC FAIL (Pre-TIG)

NOTE

Delay deorbit if reqd to complete proc

1. (BFS) GPC PWR – OFF
2. MODE – STBY,HALT
OUTPUT – TERM
- ◆ 3. MDM PL (two) – OFF,ON
4. FLASH EVAP CNTLR PRI B(A) – ON
5. If no comm: sel best S-BD PM ANT
6. On MCC GO, perform PASS/BFS HISAM AND SOFTWARE DUMP, BFS HISAM dump only, then:
7. Go to MAL, DPS, GPC FRP-3, BFS GPC FAIL RECOVERY (ENTRY)

PASS/BFS HISAM AND SOFTWARE DUMP

NOTE

√MCC for TFL compatibility

HISAM dump:

1. √GPC MODE – HALT
 2. OUTPUT – TERM
 3. PWR – ON
 - MO42F 4. MEM DUMP sel – 1(2,3,4,5)
- If PASS, sel GPC to be dumped as downlister:
5. GNC 0 GPC MEMORY
ITEM 44 +X EXEC
 6. On MCC GO, GPC MODE – STBY
(starts dump)

Cont next page

- After 4 min for PASS dump; 8 min for BFS dump:
7. GPC MODE – HALT (stops dump)
 - If PASS, sel lowest ID GNC GPC as downlister:
 8. GNC 0 GPC MEMORY
ITEM 44 +X EXEC
 9. GPC OUTPUT – NORM
 - MO42F 10. MEM DUMP sel – OFF
- Software dump (PASS only):
- Sel GPC to be dumped as downlister:
11. GNC 0 GPC MEMORY
DOWNLIST GPC – ITEM 44 +X EXEC
 12. On MCC GO, DUMP START – ITEM 43 EXEC
- When dump complete (items 40,41 blank):
13. Sel lowest ID GNC GPC – ITEM 44 +X EXEC

FA MDM I/O ERROR (Pre-TIG)

- ◆1. I/O RESET; if recovered: BFS I/O RESET >>
 2. If MDM FA1: L OMS – sel SEC GMBL
FA4: R OMS – sel SEC GMBL
- If BFS 'BCE STRG X PASS' (GPC prob):
- If MDM FA1(2,3):
 3. Restrung to swap aff string with String 4
 - If GPC fails during restrung:
 4. (Aff) GPC PWR – OFF
 5. Restrung assigning failed GPCs string to highest # GPC
 6. Go to step 23
 - If MDM FA4:
 7. GNC 1 DPS UTILITY
String 4 – port mode
 8. BFS I/O RESET >>

Cont next page

EPCL/ALL/GEN M,10

**BFS GPC (Pre)
HISAM/SW DUMP**

3-13

FA MDM I/O ERROR

↑
If no BFS 'BCE STRG X PASS' (MDM prob):

9. GNC 1 DPS UTILITY
Aff String – port mode
 10. If recovered: Go to step 23
- If MCC GO for pwr cycle:
11. (Aff) MDM FA – OFF,ON
 12. I/O RESET; if recovered: Go to step 22
 13. Orig ports – resel
 14. If recovered: Go to step 22
 15. BFS I/O RESET
 16. (Aff) MDM FA – OFF
 17. (Aff) FCS CH – OFF
- If second FCS CH failure:
18. (Remaining) FCS CH (two) – ORIDE
 19. BFS, GNC 51 OVERRIDE
Aff SURF feedback, RGA – desel
 20. √MULT DATA PATH LOSS
 21. Go to step 24

If recovered:

22. (Aff) FCS CH – ORIDE,AUTO if reqd
23. BFS I/O RESET
24. If MDM FA4 >>
25. If MM302: BFS GNC, OPS 301 PRO
26. BFS GNC, OPS 000 PRO
OPS 301(302) PRO
27. BFS, GNC 50 HORIZ SIT
√BFS R/W sel
28. Reload BFS Ent Mnvr tgts

FF MDM I/O ERROR (Pre-TIG)

- ◆ 1. I/O RESET; if recovered: Go to step 19
- If BFS 'BCE STRG X PASS' (GPC prob):
 - 2. If MDM FF4, √MULT DATA PATH LOSS >>
 - If MDM FF1(2,3):
 - 3. Restrung to swap aff String with String 4
 - If GPC fails during restrung:
 - 4. (Aff) GPC PWR – OFF
 - 5. Restrung, assigning failed GPCs string to highest # GPC
 - 6. Go to step 19
- If no BFS 'BCE STRG X PASS' (MDM prob):
 - : 7. **GNC 1 DPS UTILITY**
 - : Aff String – port mode
 - : 8. If recovered: Go to step 19
 - : If MCC GO for pwr cycle:
 - : 9. (Aff) MDM FF – OFF, ON (may cage IMU)
 - : 10. I/O RESET; if recovered: Go to step 19
 - : 11. Orig ports – resel
 - : 12. If recovered: Go to step 19
 - : 13. BFS I/O RESET
 - : 14. (Aff) MDM FF – OFF
 - : 15. If MDM FF1: L OMS – sel SEC GMBL
 - : FF4: R OMS – sel SEC GMBL
 - : If FF1(2):
 - : 16. CDR(PLT) disp sws – green dot
 - : NWS – 2
 - : 17. **BFS, GNC 51 OVERRIDE**
 - : Aff AA – desel
 - : 18. √MULT DATA PATH LOSS >>
 - : If MDM FF1(2,3) recovered:
 - ◆ : 19. **GNC 21 IMU ALIGN**
 - : Aff IMU – resel
 - : 20. If MM302: BFS GNC, OPS 301 PRO
 - : 21. BFS GNC, OPS 000 PRO
 - : OPS 301(302) PRO
 - : 22. **BFS, GNC 50 HORIZ SIT**
 - : √BFS R/W sel
 - : 23. Reload BFS Ent Mnvr tgts >>
 - : If MDM FF4 recovered:
 - L 24. BFS I/O RESET

**Post
Burn**

EPCL/ALL/GEN M,10

**FF MDM I/O ERROR
(Pre)**

3-15

**PASS GPC (1st)/(2nd)
(Post) (Over)**

PASS GPC (1st FAIL) (Post Burn)

1. (Aff) GPC PWR – OFF
2. (Aff) FCS CH – OFF
3. **GNC 53 CONTROLS**
Aff SURF FDBK – desel

If String 1(2):

4. CDR(PLT) disp sws – green dot
5. NWS – 2

PASS GPC (2nd FAIL) (Post Burn)

If Hp > safe Hp:

1. Go to PASS GPC (2nd FAIL) (pre-TIG) >>
2. (Aff) GPC PWR – OFF
3. On MCC call: Restrng 1,3 to one GPC; 2,4 to other;
PL1/2 and MM(s) to nonfailed GPC(s)
4. BFS I/O RESET

If MDM FF1 pwr cycled:

5. **GNC 21 IMU ALIGN**
√IMU 1 IN OPER – ITEM 4 (*)
I/O RESET
REF IMU – ITEM 14 +2(3) EXEC
√TYPE, ITEM 15 – TORQUE
ALIGN IMU 1(2,3) – ITEM 10(11,12) EXEC (*)
EXEC – ITEM 16 EXEC (*)

If String 1(2,3) recovered:

- ◆ 6. **GNC 21 IMU ALIGN** aff IMU(s) – resel
7. FCS CH (four) – ORIDE

BFS GPC FAIL (Post Burn)

1. GPC MODE – STBY,HALT,pause,STBY

If BFS cannot drive an IDP:

2. GPC MODE – HALT, then go to step 8
3. BFS, OPS 301 PRO
4. BFS, OPS 000 PRO
5. PRO to OPS 303

If BFS in desired MM (303):

6. **BFS: GNC 50 HORIZ SIT**
√BFS R/W sel
GPC MODE – RUN >>
7. √GPC MODE – STBY (BFS is SM only)
- ◆ 8. OUTPUT – TERM
9. If no comm: sel best S-BD PM ANT
10. MPS He ISOL B (three) – CL
PNEU He ISOL – CL

If AOA/TAL < 120K:

11. NH3 CNTLR B – SEC/ON

FA MDM I/O ERROR (Post Burn)

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

If pre-MM303:

2. If MDM FA1: L OMS – sel SEC GMBL
FA4: R OMS – sel SEC GMBL

If BFS 'BCE STRG X PASS' (GPC prob):

If MDM FA4:

3. GNC 1 DPS UTILITY

String 4 – port mode

4. BFS I/O RESET >>

If MDM FA1(2,3): Go to step 14

If no BFS 'BCE STRG X PASS' (MDM prob):

5. GNC 1 DPS UTILITY

Aff String – port mode

6. If recovered: BFS I/O RESET >>

If MCC GO for pwr cycle:

7. (Aff) MDM FA – OFF,ON
8. I/O RESET; if recovered: Go to step 19
9. Orig ports – resel
10. If recovered: Go to step 19
11. BFS I/O RESET

12. (Aff) MDM FA – OFF

13. BFS, GNC 51 OVERRIDE

Aff SURF feedback, RGA – desel

14. (Aff) FCS CH – OFF

15. GNC 53 ENTRY CONTROLS

Aff SURF feedback – desel

If second FCS CH failure:

16. (Remaining) FCS CH (two) – ORIDE
17. Aff SURF feedback – desel
18. √MULT DATA PATH LOSS >>

If recovered:

19. (Aff) FCS CH – ORIDE,AUTO if reqd
20. BFS I/O RESET

EPCL/ALL/GEN M,10

BFS GPC FAIL

3-17

FA MDM I/O ERROR (Post)
FF MDM I/O ERROR (Over)

FF MDM I/O ERROR (Post Burn)

- ◆ 1. I/O RESET; if recovered: Go to step 19
 - If BFS 'BCE STRG X PASS' (GPC prob):
 - If MDM FF1(2,3):
 - 2. **GNC 1 DPS UTILITY**
Aff String – port mode (MDM FA1(2,3) given up), then: Go to step 16
 - 3. If MDM FF4, √MULT DATA PATH LOSS >>
 - If no BFS 'BCE STRG X PASS' (MDM prob):
 - 4. **GNC 1 DPS UTILITY**
Aff String – port mode
 - 5. If recovered: Go to step 19
 - If MCC GO for pwr cycle:
 - 6. (Aff) MDM FF – OFF,ON (may cage IMU)
 - 7. I/O RESET; if recovered: Go to step 19
 - 8. Orig ports – resel
 - 9. If recovered: Go to step 19
 - 10. BFS I/O RESET
 - 11. (Aff) MDM FF – OFF
 - If pre-MM303:
 - 12. If MDM FF1: L OMS – sel SEC GMBL
FF4: R OMS – sel SEC GMBL
 - 13. **BFS, GNC 51 OVERRIDE**
Aff AA – desel
 - If MDM FF1(2):
 - 14. CDR(PLT) disp sws – green dot
NWS – 2
 - 15. √MULT DATA PATH LOSS >>
 - 16. (Aff) FCS CH – OFF
 - If second FCS CH failure:
 - 17. (Remaining) FCS CH (two) – ORIDE
 - 18. Aff SURF feedback – desel
 - If MDM FF1(2,3) recovered:
 - 19. **GNC 21 IMU ALIGN**
Aff IMU – resel
 - 20. BFS I/O RESET
 - If MDM FA given up:
 - 21. √MULT DATA PATH LOSS >>
 - If MDM FF4 recovered:
 - 22. BFS I/O RESET

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

ECLS

05/15/09

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

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A4-1

EPCL/3,4/GEN M,11

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

EPCL/ALL/GEN M

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 MIDDECK PL ②			
		AV BAY 3B	
		MTU KU-BAND SIGNAL PROCESSOR HUD ELECT 1,2 GPS 2	

05/15/09

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

ECLS

Cont next page

B4-1

OV105

EPCL/5/GEN M,11

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

EPCL/ALL/GEN M

O2(N2) FLOW HIGH/CAB P LOW/dP/dT BFS, SM SYS SUMM 1

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

MO10W 1. 14.7 CAB REG INLET SYS 1,2 vlv (two) – CL

LEAK ISOLATION

- L2 2. CAB RELIEF A – CL (tb-CL),pause,
 B – CL (tb-CL)
3. √VENT ISOL – ctr (tb-bp)
 √VENT – ctr (tb-bp)
- ML31C 4. √VAC VENT ISOL VLV BUS SEL – MNA
 √CNTL – CL (tb-CL)
- Side Hatch 5. NEG PRES RLF vlv cover (two) – push firmly
 WCS 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)
 Equal vlv (two) – OFF
 12. If dP/dT EQ zero >>

UNISOLATABLE LEAK: PREPARE FOR DEORBIT

13. INNER HATCH Equal vlv (two) – EMER

If TIG not complete, quantify leak and determine Tmax:

14. Log dP/dT _____; CAB P _____; MET ____:__:____;
 N2 QTY 1 _____; N2 QTY 2 _____
15. Determine latest possible TIG, Tmax, and avail
 landing sites using PGSC (preferred)/NOMOGRAPH
- If Tmax < planned TIG:
 16. Select new TIG (PGSC or wx tpr msg) < Tmax
- If Tmax > planned TIG:
 17. Use planned TIG

If -dP/dT EQ > 0.35:

- C5 : 18. DIRECT O2 vlv – OP
 C6, : 19. Don LES, open LEH O2 vlvs, check tabs, visor – cl,
 MO32M, : LES O2 – ON
 MO69M :
 ~

Cont next page

- L2 ? 20. O2/N2 CNTLR VLV SYS 1,2 (two) – OP (N2)
- R1 : 21. O2 MANF VLV TK1,TK2 (two) – OP (tb-OP)
- : TK1,TK2,TK3 HTRS A (three) – AUTO
- : If any O2 PRESS ↓:
- : 22. (Aff) O2 TK HTR B – AUTO
- MO10W L 23. O2 REG INLET SYS 1,SYS 2 vlv (two) – CL >>

Flow Max O2

- R1 24. O2 MANF VLV TK1,TK2 (two) – OP (tb-OP)
- : TK1,TK2,TK3 HTRS A (three) – AUTO
- : If any O2 PRESS ↓:
- : 25. (Aff) O2 TK HTR B – AUTO
- C5 26. DIRECT O2 vlv – OP
- L2 27. O2/N2 CNTLR VLV SYS 1 – CL (O2)
- 2 – OP (N2)
- O2 XOVR SYS 1 – CL
- √2 – OP
- MO10W 28. 14.7 CAB REG INLET SYS 1 vlv – OP
- 2 vlv – CL
- O2 REG INLET SYS 1 vlv – OP
- 2 vlv – CL
- 29. MS perform LOSS OF CAB PRESS (PWRDN)(10-29)

WARNING

Maintain O2 concentration < 29% (CABIN PRESS > 10.3) or PPO2 < 3.0 (CABIN PRESS ≤ 10.3); refer to O2 CONCENTRATION PLOT for O2 concentration determination

If -dP/dT EQ > 0.48 or PPO2 < 2.2, don LES (step 32)

Manage O2 Levels

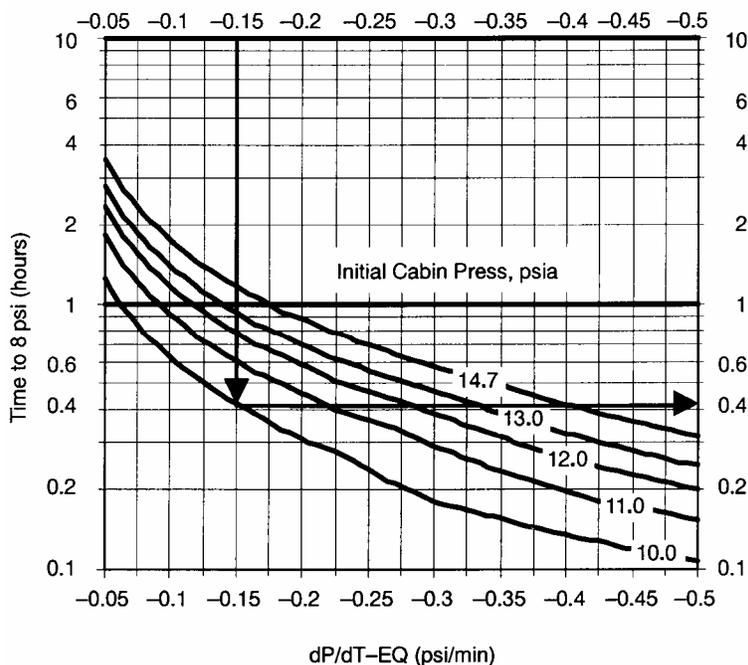
- MO10W, C5 Using O2 REG INLET SYS 1 vlv and DIRECT O2 vlv:
- When CABIN PRESS > 10.3:
- 30. Maintain PPO2 > 2.2 and O2 conc < 29%
- When CABIN PRESS ≤ 10.3:
- 31. Maintain PPO2 between 2.2 and 3.0
- If -dP/dT EQ > 0.48 or when PPO2 < 2.2:
- C6, MO32M, MO69M 32. Don LES, open LEH O2 vlvs, check tabs, visor – cl, LES O2 – ON

8 PSI CABIN MAINTENANCE (Flow N2)

- When CABIN PRESS reaches 8:
- 33. Maintain O2 mgmt per step 31
- If CABIN PRESS does not remain ≥ 7.8 psi (max N2 flow reqd):
- MO10W 34. 14.7 CAB REG INLET SYS 1 vlv – CL
- L2 35. O2/N2 CNTLR VLV SYS 1,2 (two) – OP (N2)
- O2 XOVR SYS 1,2 (two) – OP
- MO10W 36. O2 REG INLET SYS 1,SYS 2 vlv (two) – CL

CABIN PRESS LEAK NOMOGRAPH

Orb + A/L



Procedure:

1. Fill in values to right, compute Usable N2
2. Determine Time to 8 psi from above graph, record
3. On opposite, determine Time to N2 Depletion on graph, record
4. Add results from steps 2,3 to obtain Total Avail Time
5. Add step 4 to Current MET to obtain Time of TD, MET
6. Subtract default 1 hr for time from TIG to TD to obtain latest TIG, Tmax

dP/dT-EQ = _____ psi/min

Cabin P = _____ psi

N2 Qty 1 = _____ lbm

+ 2 = _____ lbm

Total N2 = _____ lbm

If 4(5,6) tank set, subtract:

- 0(7.5, 14.8) lbm

Usable N2 = _____ lbm

Time to 8 psi, hr _____

11/29/04

Basis:

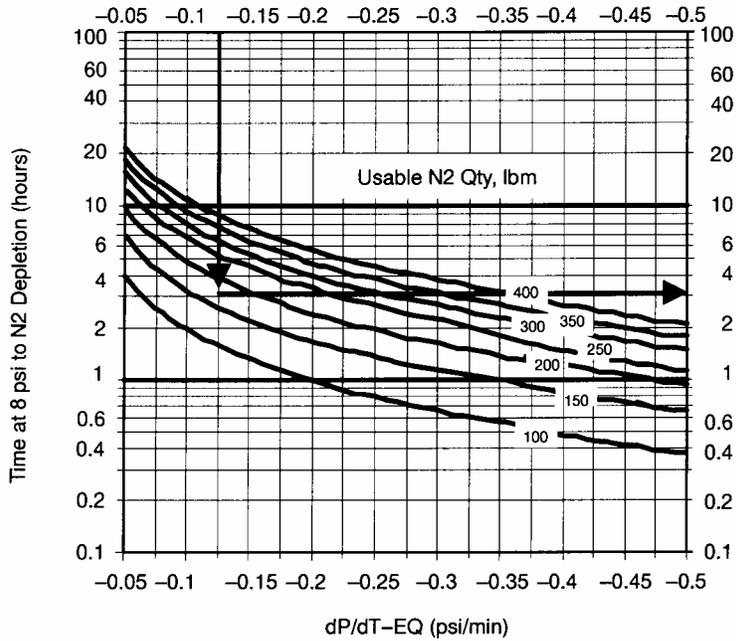
O2 Flow: on/off at 50 lb/hr after 10 min, with PPO2 > 2.2 psi, % O2 < 29

Total Volume = 2703

Volumes = Orb (2475 ft³) + Ext A/L (228 ft³)

CABIN PRESS LEAK NOMOGRAPH

Orb + A/L



Time at 8 psi to
N2 Depletion, hr ____

= Total Avail Time, hr ____

+

Current MET ____/____:____

= Time to TD ____/____:____
(MET)

- Time, TIG to TD 01:00

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

11/29/04

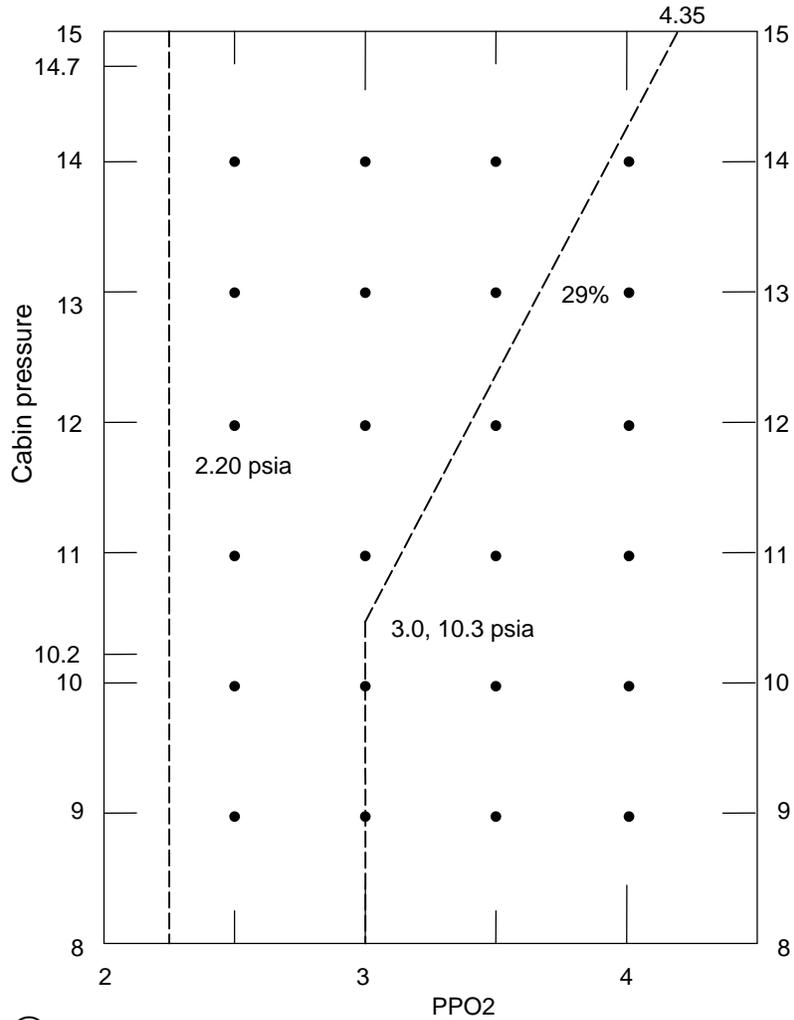
Basis:

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

Total Volume = 2703

Volumes = Orb (2475 ft³) + Ext A/L (228 ft³)

O2 CONCENTRATION PLOT



- ① Plot the intersection of cabin pressure and PPO2
- ② 2.20 psia PPO2 protects minimum physiological PPO2 level at 8 psi; 29% protects 30% O2 concentration during depress
- ③ Plot used during cabin depress to 8 psia in OPS 3. Once at 10.3 psia, plot is no longer used and PPO2 is maintained between 2.20 and 2.90

12/30/93

j_48021_001

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 rising:
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. \sqrt 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
- If TIG > 45 min:
9. Go to LOSS OF 2 H2O LOOPS (ORB PKT, PWRDN) >>
- If TIG \leq 45 min:
10. Go to LOSS OF 2 H2O LOOPS (ENTRY) (PWRDN), 10-11

AV BAY FAN Δ P

BFS, SM SYS SUMM 2

1. Switch fans
- If FAN Δ P still high(low) and AV BAY TEMP decr, airflow is lost:
2. Go to LOSS OF AV BAY COOLING (PWRDN), 10-5/10-7/10-9

AV BAY TEMP HIGH

BFS, SM SYS SUMM 2

1. (Aff) AV BAY FAN (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 rising:
4. Go to LOSS OF AV BAY COOLING (PWRDN), 10-5/10-7/10-9

FREON FLOW LOW

BFS, SM 0 THERMAL
BFS, SM SYS SUMM 2

1. Switch pumps in aff loop(s)

If flow still low in only one loop:

2. (Aff) RAD BYP VLV MODE – AUTO
CNTLR LOOP – AUTO A(B) (wait 90 sec)

If flow still low in both loops:

3. Go to LOSS OF 2 FREON LOOPS (ENTRY) (PWRDN),
10-45 >>

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:

4. (Aff) FREON PUMP LOOP – OFF
If FREON LOOP 1(2) deactivated:
5. O2 SYS 1(2) SPLY – CL (tb-CL)
6. √(In good loop) FLOW PROP VLV LOOP – ICH
7. FLASH EVAP CNTLR PRI A(B) – OFF
SEC – ON (HI LOAD ENA)

If EVAP OUT T stable or decr:

8. FLASH EVAP CNTLR SEC – OFF
PRI A(B) – ON

9. Go to LOSS OF 1 FREON LOOP OR HI LOAD EVAP
(ENTRY) (PWRDN), 10-33

OV103,104

EPCL/ALL/GEN M

H2O LOOP P LOW(HIGH)
AV BAY FAN ΔP
AV BAY TEMP HIGH

A4-9

FREON FLOW LOW

EVAP OUT T HIGH

BFS, SM SYS SUMM 2

If EVAP OUT T (two) > 65:

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

If EVAP OUT T decr (PRI B(A) CNTL lost) >>

If EVAP OUT T not decr (PRI A,B CNTL lost):

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

If EVAP OUT T decr:

4. TACAN MODE sel (three) – OFF
5. RDR ALTM (two) – OFF
MLS (three) – OFF
TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF >>

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

6. HI LOAD EVAP – OFF (Topping ena)
7. MSTR MADS PWR – OFF (wait 30 sec)

If EVAP OUT T decr:

8. HI LOAD DUCT HTR sel – OFF
9. Go to LOSS OF 1 FREON LOOP OR HI LOAD EVAP (ENTRY)
(PWRDN), 10-33 >>

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

If AOA:

10. RAD BYP VLV MODE 1,2 (two) – MAN
MAN SEL (two) – RAD FLOW, 5 sec
√1,2 tb (two) – RAD
√CNTLR OUT TEMP – NORM
11. FLASH EVAP CNTLR SEC – OFF

Cont next page

OV103,104

A4-10

EPCL/3,4/GEN M

If in one rev late deorbit:

26. Perform only steps 1 thru 19 of LOSS OF FES (PWRDN), 10-39, plus MS PWRDN, 10-43, then:

27. Go to LOSS OF FES DEORBIT PREP (CONT DEORBIT, LOSS OF FES) and remove LOSS OF FES DEORBIT PREP ENTRY DELTAS PULLOUT PAGE, and

MS Perform payload bay door activities per timeline, LOSS OF FES (CONT DEORBIT)

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
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 – GPC
12. O2 SYS 1,2 SPLY (two) – OP (tb-OP)
13. NH3 CNTLR A,B (two) – OFF

OV103,104

A4-12

EPCL/3,4/GEN M,6

FREON FLOW LOW

BFS, SM 0 THERMAL
BFS, SM SYS SUMM 2

1. Switch pumps in aff loop(s)
If flow still low in only one loop:
 2. (Aff) RAD BYP VLV MODE – AUTO
CNTLR LOOP – AUTO A(B) (wait 90 sec)
- If flow still low in both loops:
 3. Go to LOSS OF 2 FREON LOOPS (ENTRY) (PWRDN),
10-45 >>
- 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:
 4. (Aff) FREON PUMP LOOP – OFF
If FREON LOOP 1(2) deactivated:
 5. O2 SYS 1(2) SPLY – CL (tb-CL)
 6. $\sqrt{\text{In good loop}}$ FLOW PROP VLV LOOP – ICH
 7. FLASH EVAP CNTLR PRI A(B) – OFF
SEC – ON (HI LOAD ENA)
 - If EVAP OUT T stable or decr:
 8. FLASH EVAP CNTLR SEC – OFF
PRI A(B) – ON
 9. Go to LOSS OF 1 FREON LOOP OR HI LOAD EVAP
(ENTRY) (PWRDN), 10-33

OV105

EPCL/ALL/GEN M

H2O LOOP P LOW(HIGH)
AV BAY FAN Δ P
AV BAY TEMP HIGH

B4-9

FREON FLOW LOW

EVAP OUT T HIGH

BFS, SM SYS SUMM 2

If EVAP OUT T (two) > 65:

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

If EVAP OUT T decr (PRI B(A) CNTL lost) >>

If EVAP OUT T not decr (PRI A,B CNTL lost):

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

If EVAP OUT T decr:

4. RDR ALTM (two) – OFF
MLS (three) – OFF
TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF >>

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

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

If EVAP OUT T decr:

7. HI LOAD DUCT HTR sel – OFF
8. Go to LOSS OF 1 FREON LOOP OR HI LOAD EVAP (ENTRY)
(PWRDN), 10-33 >>

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

If AOA:

9. RAD BYP VLV MODE 1,2 (two) – MAN
MAN SEL (two) – RAD FLOW, 5 sec
√1,2 tb (two) – RAD
√CNTLR OUT TEMP – NORM
10. FLASH EVAP CNTLR SEC – OFF

Cont next page

B4-10

OV105

EPCL/5/GEN M

If during or after TIG:

11. Go to LOSS OF FES/1 FC (ASC PKT, PWRDN) >>

If prior to TIG:

12. Perform EMER PLBD OPENING, omit step 1, then:

13. Go to LOSS OF FES/1 FC (ASC PKT, PWRDN) >>

If not AOA:

14. RAD BYP VLV MODE 1,2 (two) – AUTO
CNTLR LOOP 1,2 (two) – AUTO A(B)

15. FLASH EVAP CNTLR SEC – OFF
Wait 90 sec

√RAD BYP VLV 1,2 tb (two) – RAD
√CNTLR OUT TEMP – NORM

If PLB doors cannot be opened:

16. Go to LOSS OF FES (PWRDN), 10-39 >>

If PLB doors can be opened:

If TIG ≤ 15 min or Post TIG:

17. Go to LOSS OF FES (PWRDN), 10-39 >>

If TIG between 15 and 45 min:

If one rev late deorbit avail:

18. Select new TIG; perform EMER PLBD OPENING, omit
step 1, then continue with step 23 >>

If one rev late deorbit not avail:

If D/O Prep Coldsoak (2) completed, or 1-day waveoff not
avail:

19. Go to LOSS OF FES (PWRDN), 10-39 >>

If D/O Prep Coldsoak not completed, and 1-day waveoff avail:

20. Perform EMER PLBD OPENING, omit step 1, then:

21. Go to DEORBIT PREP BACKOUT (DEORB
PREP) >>

If TIG ≥ 45 min:

22. Perform EMER PLBD OPENING, omit step 1, then continue
with step 23 >>

23. Mnvr to tail Sun att (data from MCC or FLIGHT PLAN)

24. Go to LOSS OF FES (PWRDN), 10-39, or

OV105
EPCL/5/GEN M

Cont next page

EVAP OUT T HIGH

B4-11

If in one rev late deorbit:

25. Perform only steps 1 thru 19 of LOSS OF FES (PWRDN), 10-39, plus MS PWRDN, 10-43, then:

26. Go to LOSS OF FES DEORBIT PREP (CONT DEORBIT, LOSS OF FES) and remove LOSS OF FES DEORBIT PREP ENTRY DELTAS PULLOUT PAGE, and

MS Perform payload bay door activities per timeline, LOSS OF FES (CONT DEORBIT)

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
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 – GPC
12. O2 SYS 1,2 SPLY (two) – OP (tb-OP)
13. NH3 CNTLR A,B (two) – OFF

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)

If (aff) FREON LOOP 1(2) ACCUM QTY decr:

- ◆ 3. (Aff) FREON ISOL LOOP 1(2) – RAD
Hold for 5 sec

When 'SM2 FREON FLOW 1(2)' msg (loop fail):

4. (Aff) FREON PUMP LOOP 1(2) – OFF
5. O2 SYS 1(2) SPLY (one) – CL (tb-CL) >>

If (aff) FREON LOOP 1(2) ACCUM QTY not decr:

When V < 12K:

6. √RAD BYP VLV MODE 2(1) – AUTO
7. √RAD CNTLR LOOP 2(1) – AUTO B
8. NH3 CNTLR B(A) – PRI/GPC

EMER PLBD OPENING

- L1 1. RAD BYP VLV MODE (two) – AUTO
CNTLR LOOP (two) – AUTO A(AUTO B)
(wait 90 sec)
√BYP VLV MAN SEL tb (two) – RAD
- R13L 2. PL BAY DR SYS (two) – ENA
CRTX **X: BFS, SM 63 PL BAY DOORS**
3. AC POWER ON – ITEM 1 EXEC (*)
AUTO MODE SEL – ITEM 3 EXEC (*)
PBD SW BYPASS – ITEM 14 EXEC (*)
OPEN – ITEM 15 EXEC (*)
4. √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)
5. STOP – ITEM 16 EXEC (*)
PBD SW BYPASS – ITEM 14 EXEC (no *)
AC POWER OFF – ITEM 2 EXEC (*)
- R13L 6. PL BAY DR SYS (two) – DSBL

EPCL/ALL/GEN M

EVAP OUT T LOW

CAB/IMU FAN FAIL (4-15)

4-13

**FREON LEAK
EMER PLBD OPENING
EMER PLBD CLOSING (4-14)**

EMER PLBD CLOSING

CAUTION

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

- R13L
CRTX
1. PL BAY DR SYS (two) – ENA
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 (*)
CLOSE – ITEM 17 EXEC (*)

* If 'S63 PBD SEQ FAIL' msg, √AUTO SEQ column: *
* If '↓' for CENTER, PORT(STBD) FWD or *
* PORT(STBD) AFT LATCHES, continue in *
* MANUAL mode (skip affected latch gang) *
* If '↓' for PORT(STBD) DOOR: *
* If PORT DOOR, and DOOR SCALLOP on or *
* below target line, continue in MANUAL mode *
* If either AFT LATCHES close MICRO-SW STAT *
* for aff DOOR is '1', continue in MANUAL mode *
* Perform MAL, MECH, SSR-2, CONTINGENCY *
* PLBD CLOSURE *
 3. √PORT DOOR – blank,RDY,CL (~63 sec)
√FWD,AFT LATCHES – blank, CL (~30 sec)
√STBD DOOR – blank,RDY,CL (~63 sec)
√FWD,AFT LATCHES (two) – blank,CL (~30 sec)
√CENTER LATCHES 1-4,13-16 (two) – blank,CL (~20 sec)
√5-8,9-12 (two) – blank,CL (~20 sec)
 4. STOP – ITEM 16 EXEC (*)
PBD SW BYPASS – ITEM 14 EXEC (no *)
AC POWER OFF – ITEM 2 EXEC (*)
- R13L
A7U
5. PL BAY DR SYS (two) – DSBL
 6. √PL BAY FLOOD (eight) – OFF

CAB FAN FAIL**BFS, SM SYS SUMM 1**

1. Switch fans

If no flow:

2. Go to LOSS OF 2 CAB FANS (PWRDN), 10-2

IMU FAN FAIL**BFS, SM SYS SUMM 1**

Switch fans

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

If incr:

1. 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)

CAB PPO2 ABNORMAL**BFS, SM SYS SUMM 1**If PPO2 \leq 2.7:

1. DIRECT O2 vlv – OP until PPO2 \geq 2.90

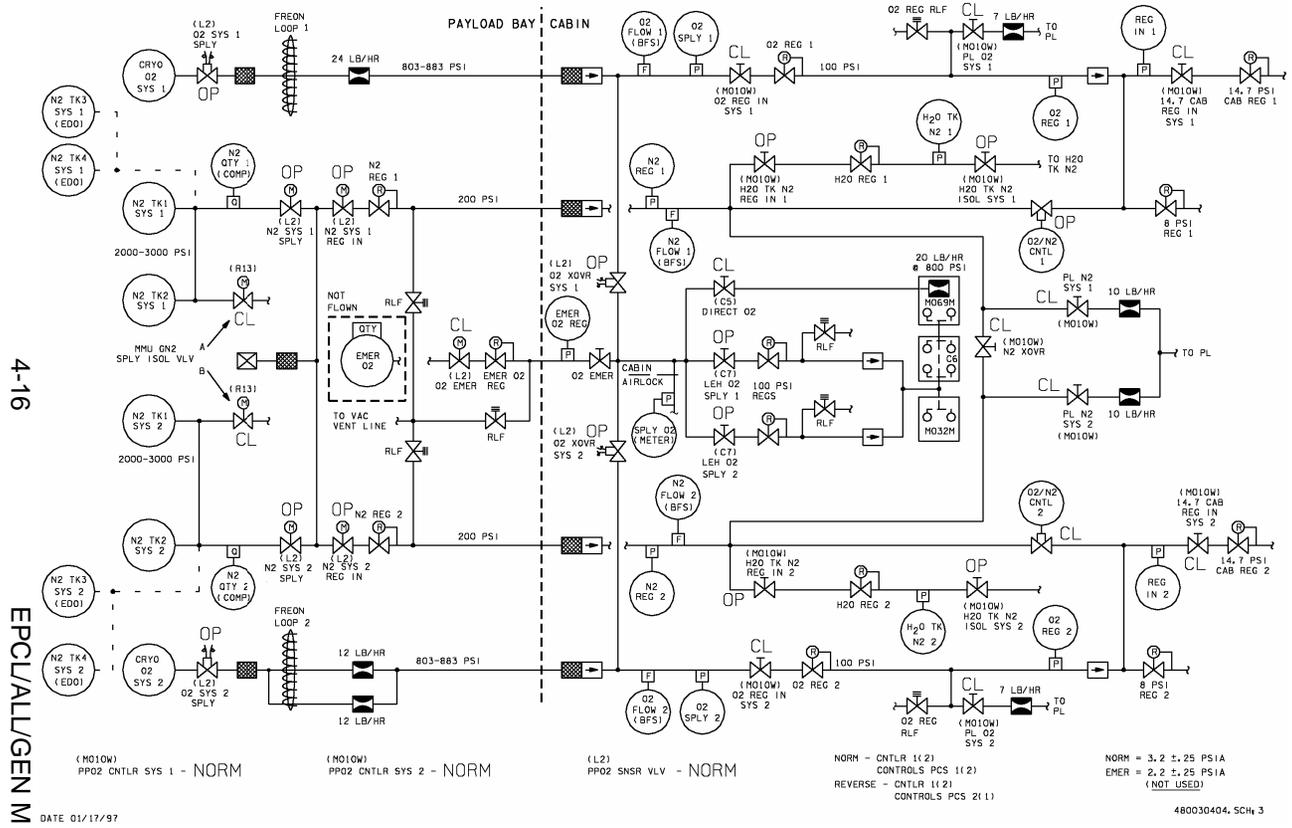
If PPO2 still decr:

2. \sqrt O2 REG INLET SYS 1,2 vlv (two) – CL
3. \sqrt LEH O2 SPLY 1,2 vlv (two) – OP
4. Don LES suit and helmet
Check tabs, visor – cl, LES O2 – ON >>

If PPO2 \geq 3.6:

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

PRESSURE CONTROL SYSTEM
ASCENT/ENTRY



SM0 THRM EVAP

BFS, SM 0 THERMAL

AFF TEMP		STATUS	ACTION
H T R T E M P	EVAP HI LOAD	↑	L1 HI LOAD DUCT HTR sel – A >>
		↓	L1 HI LOAD DUCT HTR sel – A/B >>
		H, L, M	No action >>
	EVAP TOP DUCT	↑	L1 TOP EVAP HTR DUCT sel – A >>
		↓	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 – A AUTO >>
		H, L, M	No action >>
	EVAP FDLN A(B)	↑ or ↓	L2 (Aff) FLASH EVAP FDLN HTR SPLY – 1 >>
H, L, M		No action >>	

EPCL/ALL/GEN M,1

CAB PRESS HIGH (4-15)
CAB PPO2 ABNORMAL (4-15) 4-17

PCS SCHEMATIC (4-16)
SM0 THRM EVAP

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 A – 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
- √TACAN MODE sel (three) – OFF
- √RDR ALTM (two) – OFF
- √MLS (three) – OFF

O7
O8

If HI LOAD flush not successful:

- 14. √FLASH EVAP CNTLR SEC – ON
- HI LOAD EVAP – OFF
- Perform LOSS OF 1 FREON LOOP OR HI LOAD EVAP (ENTRY) (PWRDN), 10-33

L1

OV103,104

EPCL/ALL/GEN M,3

FULL-UP FES FLUSH

A4-19

FIRE/SMOKE (Over)

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)

OV103,104

A4-20

EPCL/3,4/GEN M,5

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 A – 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
√TACAN MODE sel (three) – OFF
√RDR ALTM (two) – OFF
√MLS (three) – OFF

O7
O8

If HI LOAD flush not successful:

- 14. √FLASH EVAP CNTLR SEC – ON
HI LOAD EVAP – OFF
Perform LOSS OF 1 FREON LOOP OR HI LOAD
EVAP (ENTRY) (PWRDN), 10-33

L1

OV105

EPCL/ALL/GEN M,3

FULL-UP FES FLUSH

B4-19

FIRE/SMOKE (Over)

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)

OV105

EPCL/5/GEN M,5

B4-20

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

EPCL/ALL/GEN M

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

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:

If FC3 aff:

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

EPS

Cont next page

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

EPCL/ALL/GEN M

**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

EPCL/ALL/GEN M

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

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):
 : 8. Go to aff BUS LOSS ACTION >>

Cont next page

EPCL/ALL/GEN M

AC VOLTS (LOW or HIGH) 5-5

AC OVERLOAD (Over)

- ~ ♦ If recovery critical and MCC GO:
- : 9. (Aff) AC BUS SNSR – OFF, wait 1 sec, MON
- : 10. (Aff) cb AC CONTR – cl
- : INV PWR – ON (tb-ON)
- : INV/AC BUS – ON (tb-ON)
- : If any AC AMPS > 14:
- : 11. (Aff) INV/AC BUS – OFF (tb-OFF)
- : INV PWR – OFF (tb-OFF)
- L 12. cb AC CONTR – op

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

Cont next page

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

4. Go to aff BUS LOSS ACTION >>
- If multi Φ (bus short):
5. (Aff) cb AC CONTR (three) – cl
 INV/AC BUS – OFF (tb-OFF)
 INV PWR – OFF (tb-OFF)
 cb AC CONTR (three) – op
 6. Go to aff BUS LOSS ACTION >>
- If AC VOLTS between 110 and 123 and AC AMPS < 14:
7. (Aff) AC BUS SNSR – MON
 8. √MCC for HW C&W param inhibit

3Φ AC MOTORS STOPPED

(No AC VOLTS Alarm: Φ Shift)

WARNING

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

1. Determine aff AC BUS:
FC1 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) $\Delta P \geq 0.5$:
 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 3 Φs) BUS LOSS ACTION >>

Cont next page

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

EPCL/ALL/GEN M

3 Φ AC MTRS

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

CNTL BUS V LOW/CNTL BUS RPC

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 (A/E SYS, PLT WND FB, ESS CNTL) >>
- ◆ 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

Cont next page

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 Pre-TIG and time permits:

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

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

16. Hold crit function sw

For tripped RPC:

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:
4. Note AC1(2,3) AMPS, then FC – STOP
- : If AMPS decr:
: If decr 0.7-0.9 amp/Φ:
: 5. FC – START (hold 30 sec if ΔP tb-bp)
: 6. If AMPS incr 0.7-0.9 amp/Φ >>
: If Δ not 0.7-0.9 amp/Φ:
: 7. Go to FC SHUTDN (Cue Card) >>
: If AMPS not decr:
L 8. Go to FC SHUTDN (Cue Card)

FC REACTANT VLV CLOSED

BFS, SM SYS SUMM 1

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:
3. √cb FC REAC VLV CL ENA (three) – op
- C3 4. FC REAC VLV (three) – OP (tb-OP or hold 10 sec)
- R1 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 STACK/EXIT T unstable:
 2. Go to FC SAFING >>
- If aff FC COOL P between 25 and 50, pre TIG-1 hr, and no comm:
 3. Perform step 3 of FC SHUTDN (Cue Card), then:
 4. √RAD BYP FES C/O complete
 5. SPLY H2O TKA OUTLET – OP (tb-OP)
TKB,C,D OUTLET (three) – CL (tb-CL)
 6. Wait 45 min (to FES H2O out of TKA), then:
 7. SPLY H2O TKB,C,D OUTLET (three) – OP (tb-OP)
TKA OUTLET – CL (tb-CL)
 8. GN2 TKA SPLY vlv – CL
TK VENT vlv – VENT
 9. Wait 5 min, then:
 10. (Aff) FC – START (ΔP tb-gray)
When aff FC RDY tb – gray:
 11. (Aff) FC/MN BUS – ON (tb-ON)
ESS BUS SOURCE FC – ON >>
 12. Two min after bus tie, record ΔAMPS between aff and tied FC and monitor for 20 min
- If change in ΔAMPS > 12:
 13. Go to FC SHUTDN (Cue Card)

ML26C

EPCL/ALL/GEN M

FC COOL PUMP ΔP LOW
FC REACT VLV CLOSED

5-13

FC COOL P

FC STACK T

BFS, SM SYS SUMM 1

1. MSTR MADS PWR – OFF

If STACK T > 243 and incr:

2. If 2nd FC: Go to 2nd FC SHUTDN >>

3. PL PRI (three) – OFF

If aff FC amps < 170 or > 360:

4. Go to MN BUS UNDERVOLTS/FC VOLTS, step 7 >>

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

6. (Aff) ESS BUS SOURCE FC – OFF

7. (Aff) FC/MN BUS – OFF

If aff FC VOLTS < 32 or STACK T not decr:

8. (Aff) FC REAC VLV – CL

9. After COOL P < 15 and STACK T < 243:

FC – STOP

10. √PWRDN

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)

FC pH 1(2,3)

BFS, SM SYS SUMM 1

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

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 ΔAMPS between aff and tied FC;
monitor for 20 min
If change in FC $\Delta\text{AMPS} > 12$ or FC ΔV incr:
| 4. Go to FC SAFING >>
If change in FC $\Delta\text{AMPS} \leq 12$ and FC ΔV not incr:
5. Remain bus tied to monitor FC performance

EPCL/ALL/GEN M

FC STACK T/FC EXIT T

5-15

FC pH/FC DELTA V

FC SHUTDN (1st)

BFS, SM SYS SUMM 1

WARNING

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

1. MSTR MADS PWR – OFF
2. If not tied: Perform BUS TIE (Cue Card), then:
If ORB (not deorb prep), kW > 18:
MN BUS TIE (three) – ON
3. ESS BUS SOURCE FC – OFF
FC/MN BUS – OFF (tb-OFF)
FC – STOP (COOL PUMP ΔP tb-bp or 1 sec)
4. FC REAC VLV – CL (tb-CL)
Go to LOSS OF 1 FC (PWRDN), 10-67

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 6
3. MN BUS TIE (three) – OFF (tb-OFF)
If only MNA(B,C) pwr and APU 2(3,1) started:
4. Perform APU SHUTDN (APU/HYD)(1-3) for APU 2(3,1), then:
5. Perform BUS TIE (Cue Card) to good FC/BUS, then:
6. (Aff) ESS BUS SOURCE FC – OFF
FC/MN BUS – OFF (tb-OFF)
FC – STOP (FC COOL PUMP ΔP tb-bp or 1 sec)
7. FC REAC VLV – CL (tb-CL)
8. Go to LOSS OF 2nd FC (ENTRY) (PWRDN), 10-69

BUS TIE (do not tie bus short, check APUs) BFS, SM SYS SUMM 1

If MN Volts > 20: Bus Tie >>

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

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

Post MECO:

11. (Aff) AC BUS SNSR – AUTO TRIP
12. If pwrdn not reqd: $\sqrt{\text{CAB FAN A(B)}}$ – ON

FC SAFING BFS, SM SYS SUMM 1

If FC already SHUTDN:

1. $\sqrt{\text{FC1(2,3) REAC}}$ – 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 \leq 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 \leq 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)
- Go to LOSS OF 1 FC (2nd FC) (PWRDN), 10-67/10-69

EPCL/ALL/GEN M

FC SHUTDN (1st)
2nd FC SHUTDN

5-17

BUS TIE/FC SAFING
CRYO O2/H2 (Over)

CRYO O2(H2) PRESS/TEMP HIGH

BFS, SM SYS SUMM 2

(Aff) O2(H2) TK HTRS (two) – OFF

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

3. O2(H2) TK3 HTRS A – AUTO

If either MANF VLV fails to close:

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

If TK1 and 2 P decr slowly (HTR logic fail):

5. If QTY > 55%: O2(H2) TK3 HTRS B (one) – AUTO

6. O2(H2) MANF VLV TK1,TK2 (two) – OP >>

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

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

8. O2(H2) MANF VLV TK 2(1) – OP

If O2 leak:

If TK1(2) aff:

9. O2 SYS 1(2) SPLY – CL, then:

10. If P incr: O2 MANF VLV TK1,TK2 (two) – OP >>

11. (Aff) TK HTRS A,B (two) – ON (not AUTO)

12. If HTR T alarm: TK HTRS A,B (two) – OFF

13. Wait for aff FC COOL P alarm, then:

14. √(Aff) TK HTRS A – ON (not AUTO)

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

If aff TK P not decr (FC leak):

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

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

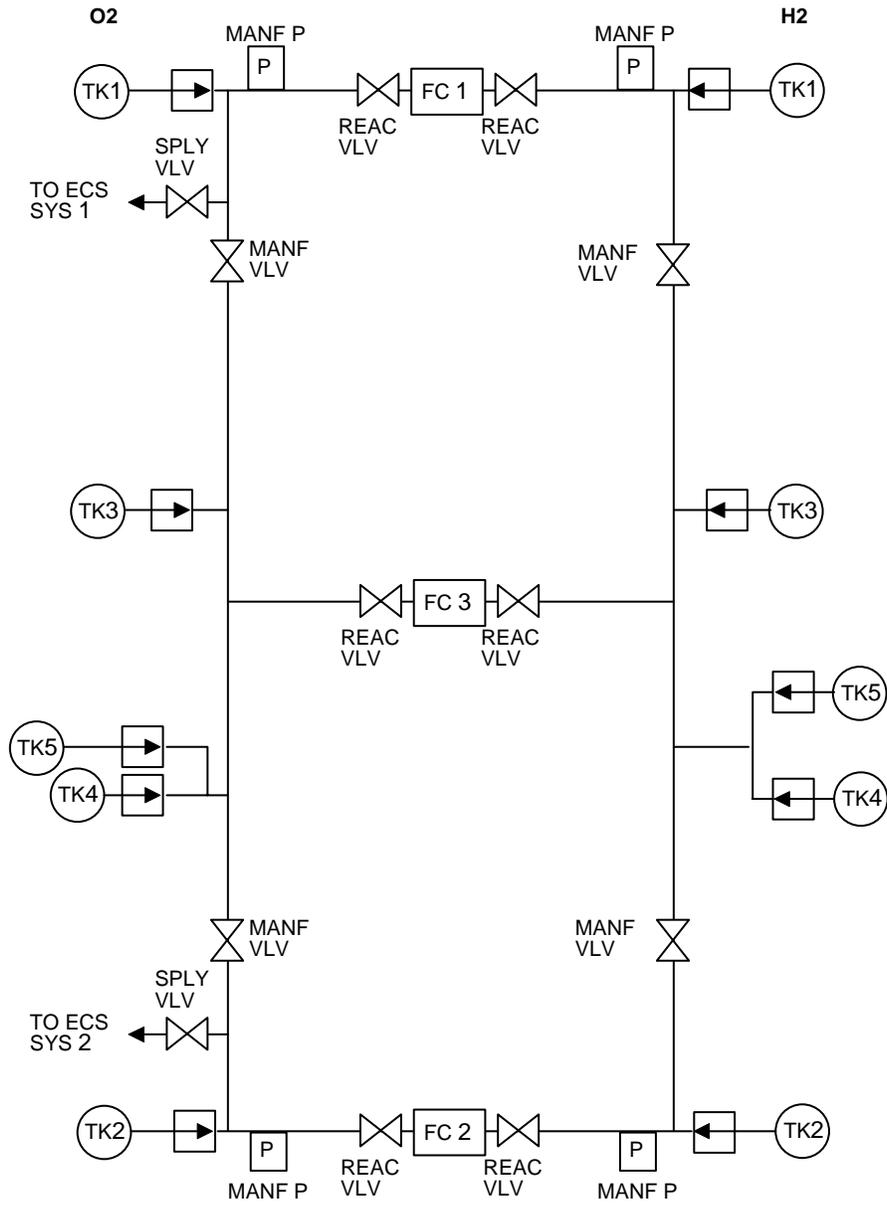
17. MCC may request FC restart if H2 leak

18. (Aff) TK HTRS A,B (two) – OFF

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

19. (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					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	*	*							
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

5-24

EPCL/ALL/GEN M

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

12/09/03

AC1/
MNA

AC1 (2 or 3 Φ s)

- R2 1. BLR CNTLR/HTR 1 – A
3 – B
- L1 2. Perform FC1 SHUTDOWN (Cue Card), then:
3. HUM SEP B – ON
IMU FAN B(C) – ON
- If H2O LOOP 1 active:
4. H2O PUMP LOOP 1 – B
5. AV BAY 1 FAN B – ON
2 FAN A,B (two) – ON
3 FAN A – ON
6. FREON PUMP LOOP 1 – B
2 – A
7. Deltas to ENTRY MANEUVERS (Cue Card)
When V = 12K:
- L1 RAD CNTLR LOOP (two) – AUTO A
- If AC BUS not shorted and Pre-TIG:
8. Go to MAL, EPS, SSR-200, AC PWR
TRANSFER CABLE >>
9. Go to LOSS OF 1 FC (PWRDN), 10-67

AC1 Φ A

- R2 1. BLR CNTLR/HTR 1 – A
- L1 If H2O LOOP 1 active:
2. H2O PUMP LOOP 1 – B
3. FREON PUMP LOOP 1 – B
2 – A
- O6 4. LTG PNL L/CTR sel – OFF
- O8 5. R INST sel – OFF
6. Deltas to ENTRY MANEUVERS (Cue Card)
When V = 12K:
- L1 RAD CNTLR LOOP (two) – AUTO A

AC1 Φ B

- L1 If H2O LOOP 1 active:
1. H2O PUMP LOOP 1 – B
2. AV BAY 2 FAN A,B (two) – ON
3. FREON PUMP LOOP 1 – B
2 – A
- O6 4. LTG PNL L/CTR, OVHD sel – OFF
- O8 5. NUMERIC sel – OFF
6. Deltas to ENTRY MANEUVERS (Cue Card)
When V = 12K:
- L1 RAD CNTLR LOOP (two) – AUTO A

AC1 ΦC

- R2 1. BLR CNTLR/HTR 3 – B
L1 If H2O LOOP 1 active:
2. H2O PUMP LOOP 1 – B
3. FREON PUMP LOOP 1 – B
2 – A

MNA DA1 (Entire Bus) (Includes AC1)

NOTE

Loss of UHF SPLX Hi Pwr Xmit

- R2 1. BLR CNTLR/HTR 1 – A
3 – B
2. Perform FC1 SHUTDN (Cue Card), steps 1 thru 3, then:
R1 3. PL CAB – MNB
R11L 4. MS AUD CNTL sel – PS (MS can't talk)
R1 5. O2 TK1 HTR B – AUTO
L1 6. HUM SEP B – ON
IMU FAN B(C) – ON
If H2O LOOP 1 active:
7. H2O PUMP LOOP 1 – B
8. AV BAY 1 FAN B – ON
2 FAN A,B (two) – ON
3 FAN A – ON
9. FREON PUMP LOOP 1 – B
2 – A
FLASH EVAP CNTLR PRI B – OFF
A – GPC
L2 10. O2/N2 CNTLR VLV SYS 2 – OP
NWS – 2
O6 11. ANNUN BUS SEL ACA 1 – MNB
F6,F8 12. RDR ALTM – 2
13. HSI SEL SOURCE – not MLS 1 or
TACAN/GPS 1
14. XXXXXX MNVR YYYYY
L OMS – sel SEC GMBL
15. BFS G51
AA1 – desel

Cont next page

- For SSME HYD REPRESS (ENT, POST BURN):
- R4 16. Perform using HYD SYS 2 and 3
- If > 25 min before APU start:
- A12 17. APU HTR GAS GEN/FU PUMP 1 – B AUTO
3 – A AUTO
TK/FU LN/H2O SYS 1B – AUTO
3A – AUTO
- If prior to TIG-5:
- L1 18. TOP EVAP HTR NOZ L – B AUTO
DUCT sel – B
HI LOAD DUCT HTR sel – B
- Post D/O burn and prior to seat ingress:
19. Discharge handheld fire extinguisher into Av Bay 3
- When V = 12K:
- L1 20. RAD CNTLR LOOP (two) – AUTO A
- When BUS LOSS ACTION complete:
21. Go to LOSS OF 1 FC (PWRDN), 10-67

MNA FPC1

1. Go to AC1 (2 or 3Φs)
- Post D/O burn and prior to seat ingress:
2. Discharge handheld fire extinguisher into Av Bay 3

MNA FLC1

- O8 1. FWD RCS MANF ISOL 1 – CL
- Post D/O burn and prior to seat ingress:
2. Discharge handheld fire extinguisher into Av Bay 3

MNA FMC1

1. GNC 23 RCS
Ovrd MANF F1 jets – OP
- If H2O LOOP 1 active:
- L1 2. H2O PUMP LOOP 1 – B

MNA MPC1

- R1 1. PL CAB – MNB
- L1 2. TOP EVAP HTR DUCT sel – B
HI LOAD DUCT HTR sel – B

MNA APC4

- R2 1. BLR CNTLR/HTR 1 – A
3 – B
- L1 2. FLASH EVAP CNTLR PRI B – OFF
A – GPC
TOP EVAP HTR NOZ L – B AUTO
DUCT sel – B
HI LOAD DUCT HTR sel – B
3. XXXXXX MNVR YYYYYY
L OMS – sel SEC GMBL
- For SSME HYD REPRESS (ENT, POST BURN):
- R4 4. Perform using HYD SYS 2 and 3
If > 25 min before APU start:
- A12 5. APU HTR GAS GEN/FU PUMP 1 – B AUTO
3 – A AUTO
TK/FU LN/H2O SYS 1B – AUTO
3A – AUTO

MNA APC1

1. XXXXXX MNVR YYYYYY
L OMS – sel SEC GMBL
- If > 25 min before APU start:
- A12 2. APU HTR TK/FU LN/H2O SYS 1B – AUTO
3A – AUTO

MNA ALC1

- R2 1. BLR CNTLR/HTR 1 – A
3 – B
- L1 2. FLASH EVAP CNTLR PRI B – OFF
A – GPC
TOP EVAP HTR NOZ L – B AUTO
DUCT sel – B
HI LOAD DUCT HTR sel – B
- For SSME HYD REPRESS (ENT, POST BURN):
- R4 3. Perform using HYD SYS 2 and 3
If > 25 min before APU start:
- A12 4. APU HTR GAS GEN/FU PUMP 1 – B AUTO
3 – A AUTO
TK/FU LN/H2O SYS 1B – AUTO
3A – AUTO

MNA O14

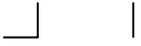
- L2 1. O2/N2 CNTLR VLV SYS 2 – OP
 - 2. NWS – 2
 - O6 3. ANNUN BUS SEL ACA 1 – MNB
 - F6,F8 4. RDR ALTM – 2
 - 5. HSI SEL SOURCE – not MLS 1
 - 6. BFS G51
AA1 – desel
- Post D/O burn and prior to seat ingress:
- 7. Discharge handheld fire extinguisher into Av Bay 3
- When V = 12K:
- L1 8. RAD CNTLR LOOP (two) – AUTO A

MNA R14

NOTE

Loss of UHF SPLX Hi Pwr Xmit

- R11L MS AUD CNTL sel – PS (MS can't talk)



**AC2/
MNB**

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AC2/
MNB

AC2 (2 or 3 Φ s)

- R2 1. BLR CNTLR/HTR 2 – A
1 – B
- L1 2. Perform FC2 SHUTDN (Cue Card), then:
3. HUM SEP A – ON
CAB FAN A – ON
IMU FAN A(C) – ON
- If H2O LOOP 1 active:
- L4:F 4. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
L1 H2O PUMP LOOP 1 – A
5. AV BAY 1 FAN A – ON
2 FAN B – ON
3 FAN A,B (two) – ON
6. FREON PUMP LOOP 1 – A
- L4:P 7. \sqrt cb AC3 Φ A LG SNSR 1 – cl
O17:C 8. SIG CONDR FREON A – AC3
- If AC BUS not shorted and pre-TIG:
9. Go to MAL, EPS, SSR-200, AC PWR
TRANSFER CABLE >>
10. Go to LOSS OF 1 FC (PWRDN), 10-67

AC2 Φ A

- R2 1. BLR CNTLR/HTR 1 – B
- L1 If H2O LOOP 1 active:
- L4:F 2. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
L1 H2O PUMP LOOP 1 – A
3. FREON PUMP LOOP 1 – A
- L4:P 4. \sqrt cb AC3 Φ A LG SNSR 1 – cl
O8 5. LTG PNL R OVHD sel – OFF

AC2 Φ B

- L1 If H2O LOOP 1 active:
- L4:F 1. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
L1 H2O PUMP LOOP 1 – A
2. AV BAY 3 FAN A,B (two) – ON
FREON PUMP LOOP 1 – A
- O6 3. LTG INST OVHD sel – OFF
O8 PNL R sel – OFF
- O17:C 4. SIG CONDR FREON A – AC3

AC2 Φ C

- L1 If H2O LOOP 1 active:
- L4:F 1. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
L1 H2O PUMP LOOP 1 – A
2. FREON PUMP LOOP 1 – A
- R2 3. BLR CNTLR/HTR 2 – A

MNB DA2 (Entire Bus) (Includes AC2)

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

- R2 1. BLR CNTLR/HTR 2 – A
1 – B
- 2. Perform FC2 SHUTDN (Cue Card), steps 1 thru 3, then:
- R1 3. O2,H2 TK1 HTRS A,B (four) – AUTO
If CRYO O2 TK1 QTY < 55%:
- L1 4. O2 TK1 HTRS B – OFF
- 5. HUM SEP A – ON
CAB FAN A – ON
IMU FAN A(C) – ON
If H2O LOOP 1 active:
- L4:F 6. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
L1 H2O PUMP LOOP 1 – A
- 7. AV BAY 1 FAN A – ON
2 FAN B – ON
3 FAN A,B (two) – ON
- 8. FREON PUMP LOOP 1 – A
- O1 If EVAP OUT T 1,2 not stable at ~39 degF:
- L1 9. FLASH EVAP CNTLR PRI B – OFF, GPC
- L4:P 10. √cb AC3 ΦA LG SNSR 1 – cl
- O17:C 11. SIG CONDR FREON A – AC3
- F6,F8 12. RDR ALTM – 1
- 13. HSI SEL SOURCE – not MLS 2 or TACAN/GPS 2
- O6 14. ANNUN BUS SEL ACA 1 – MNA
ACA 2/3 – MNC
- For SSME HYD REPRESS (ENT, POST BURN):
- R4 15. Perform using HYD SYS 1 and 3
- 16. BFS G51
AA2, RGA 2 – desel

Cont next page

- If > 25 min before APU start:
- A12 17. APU HTR GAS GEN/FU PUMP 1 – A AUTO
 2 – B AUTO
 TK/FU LN/H2O SYS 1A – AUTO
 2B – AUTO
- If prior to TIG-5:
- L1 18. TOP EVAP HTR NOZ L – A AUTO
 R – B AUTO
 DUCT sel – A
 HI LOAD DUCT HTR sel – A
- Post D/O burn and prior to seat ingress:
19. Discharge handheld fire extinguisher into Av Bay 1
- When BUS LOSS ACTION complete:
20. Perform LOSS OF 1 FC (PWRDN), 10-67, then:
- When V = 12K:
- L1 21. RAD CNTLR LOOP (two) – AUTO B

MNB FPC2

<p style="text-align: center;">CAUTION</p> <p>Do not sw S-BD PM CNTL to PNL if subs Fault Msg – 'BCE STRG 3 NSP' or loss of comm</p>

1. Go to AC2 (2 or 3Φs)
- Post D/O burn and prior to seat ingress:
2. Discharge handheld fire extinguisher into Av Bay 1

MNB FLC2

<p style="text-align: center;">CAUTION</p> <p>Do not sw S-BD PM CNTL to PNL if subs Fault Msg – 'BCE STRG 3 NSP' or loss of comm</p>

- O8 1. FWD RCS MANF ISOL 2 – CL
- Post D/O burn and prior to seat ingress:
2. Discharge handheld fire extinguisher into Av Bay 1

MNB FMC2

- L1 If H2O LOOP 1 active:
L4:F 1. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
L1 H2O PUMP LOOP 1 – A
2. **GNC 23 RCS**
Ovrd MANF F2 jets – OP

MNB MPC2

- L1 1. TOP EVAP HTR DUCT sel – A
2. HI LOAD DUCT HTR sel – A

MNB APC5

- R2 1. BLR CNTLR/HTR 2 – A
1 – B
L1 2. TOP EVAP HTR NOZ L – A AUTO
R – B AUTO
DUCT sel – A
HI LOAD DUCT HTR sel – A
3. **BFS G51**
RGA 2 – desel

For SSME HYD REPRESS (ENT, POST BURN):

- R4 4. Perform using HYD SYS 1 and 3
If > 25 min before APU start:
A12 5. APU HTR GAS GEN/FU PUMP 1 – A AUTO
2 – B AUTO
TK/FU LN/H2O SYS 1A – AUTO
2B – AUTO

MNB APC2

- If > 25 min before APU start:
A12 APU HTR TK/FU LN/H2O SYS 1A – AUTO
2B – AUTO

MNB ALC2

- R2 1. BLR CNTLR/HTR 2 – A
1 – B
- L1 2. TOP EVAP HTR NOZ L – A AUTO
R – B AUTO
DUCT sel – A
HI LOAD DUCT HTR sel – A

For SSME HYD REPRESS (ENT, POST BURN):

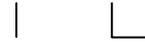
- R4 3. Perform using HYD SYS 1 and 3
- If > 25 min before APU start:
- A12 4. APU HTR GAS GEN/FU PUMP 1 – A AUTO
2 – B AUTO
TK/FU LN/H2O SYS 1A – AUTO
2B – AUTO

MNB O15

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

Post D/O burn and prior to seat ingress:

5. Discharge handheld fire extinguisher into
Av Bay 1
- F2 6. Use CDR's DRAG CHUTE ARM
- When V = 12K:
- L1 7. RAD CNTLR LOOP (two) – AUTO B



**AC3/
MNC**

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MNC DA3 (Entire Bus) (Includes AC3)

NOTE

PS AUDIO lost

- R2 1. BLR CNTLR/HTR 3 – A
2 – B
- C3 2. S-BD PM CNTL – PNL,CMD
3. BFS, GNC 51 OVERRIDE
TDRS – ITEM 46 EXEC (*)
AUD CTR – 1
4. Perform FC3 SHUTDN (Cue Card), steps 1 thru 3, then:
- R1 5. O2 TK2 HTRS B – AUTO
6. O2,H2 TK3 HTRS A,B (four) – AUTO
If CRYO O2 TK3 QTY < 55%:
7. O2 TK3 HTRS B – OFF
- L1 8. CAB FAN B – ON
IMU FAN B(A) – ON
- L4:F cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
L1 H2O PUMP LOOP 2 – GPC
AV BAY 1 FAN A,B (two) – ON
2 FAN A – ON
3 FAN B – ON
FREON PUMP LOOP 2 – B
- O1 If EVAP OUT T 1,2 not stable at ~39 degF:
L1 9. FLASH EVAP CNTLR PRI B – OFF,GPC
- L4:P 10. √cb AC2 ΦA LG SNSR 2 – cl
- O6 11. ANNUN BUS SEL ACA 2/3 – MNB
- F6,F8 12. HSI SEL SOURCE – not MLS 3 or TACAN/GPS 3
13. Use He PRESS for L,R OMS Qty est
- O17:C 14. SIG CONDR FREON B – AC2
15. XXXXXX MNVR YYYYYY
R OMS – sel SEC GMBL
16. BFS, GNC 51 OVERRIDE
RGA 3 – desel
- When BUS LOSS ACTION complete:
17. Perform LOSS OF 1 FC (PWRDN), 10-67, then:
- If > 25 min before APU start:
- A12 18. APU HTR GAS GEN/FU PUMP 2 – A AUTO
3 – B AUTO
TK/FU LN/H2O SYS 2A – AUTO
3B – AUTO
- If prior to TIG-5:
- L1 19. TOP EVAP HTR NOZ R – A AUTO
- Post D/O burn and prior to seat ingress:
20. Discharge handheld fire extinguisher into Av Bay 2

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)
- Post D/O burn and prior to seat ingress:
4. Discharge handheld fire extinguisher into Av Bay 2

MNC FLC3

- C3
1. S-BD PM CNTL – PNL,CMD
 2. BFS, GNC 51 OVERRIDE
TDRS – ITEM 46 EXEC (*)
- O8
3. FWD RCS MANF ISOL 4 – CL
- Post D/O burn and prior to seat ingress:
4. Discharge handheld fire extinguisher into Av Bay 2

MNC MPC3

BFS, GNC 51 OVERRIDE
RGA 3 – desel

MNC APC6

- R2
1. BLR CNTLR/HTR 3 – A
2 – B
- L1
2. TOP EVAP HTR NOZ R – A AUTO
 3. XXXXX MNVR YYYYY
R OMS – sel SEC GMBL
- If > 25 min before APU start:
- A12
4. APU HTR GAS GEN/FU PUMP 2 – A AUTO
3 – B AUTO
TK/FU LN/H2O SYS 2A – AUTO
3B – AUTO

MNC APC3

- 1. XXXXX MNVR YYYY
R OMS – sel SEC GMBL
- If > 25 min before APU start:
- A12 2. APU HTR TK/FU LN/H2O SYS 3B – AUTO

MNC ALC3

- R2 1. BLR CNTLR/HTR 3 – A
2 – B
- L1 2. TOP EVAP HTR NOZ R – A AUTO
- If > 25 min before APU start:
- A12 3. APU HTR GAS GEN/FU PUMP 2 – A AUTO
3 – B AUTO
TK/FU LN/H2O SYS 2A – AUTO
3B – AUTO

MNC O16

- O6 1. ANNUN BUS SEL ACA 2/3 – MNB
- F6,F8 2. HSI SEL SOURCE – not MLS 3
- 3. Use He PRESS for L,R OMS Qty est
- F3 4. Use PLT's DRAG CHUTE ARM
- Post D/O burn and prior to seat ingress:
- 5. Discharge handheld fire extinguisher into
Av Bay 2

CNTL

MNC R14

NOTE
PS AUDIO lost

- C3 AUD CTR – 1

CNTL AB1

- If FLASH EVAP CNTLR PRI B in 'GPC':
- L1 1. FLASH EVAP CNTLR PRI B – ON
 - 2. TOP EVAP HTR DUCT sel – B
 - 3. HI LOAD DUCT HTR sel – B
 - A12 4. APU HTR GAS GEN/FU PUMP 1 – B AUTO
3 – A AUTO
TK/FU LN/H2O SYS 1B – AUTO
3A – AUTO
 - 5. Use R Trim and Body Flap sws
 - R2 6. BLR CNTLR/HTR 1 – A
- For SSME HYD REPRESS (ENT, POST BURN):
- R4 7. Perform using HYD SYS 2 and 3

CNTL AB2

- F6 1. CDR disp sws – green dot
- If H2O LOOP 1 active:
- L1 2. H2O PUMP LOOP 1 – B
- If FLASH EVAP CNTLR PRI B is ON:
- 3. FLASH EVAP CNTLR PRI B – GPC
 - 4. TOP EVAP HTR NOZ L – A AUTO
DUCT sel – B
HI LOAD DUCT HTR sel – B
 - O8 5. FWD RCS MANF ISOL 1 – CL
 - A12 6. APU HTR GAS GEN/FU PUMP 1 – B AUTO
TK/FU LN/H2O SYS 1B – AUTO
3A – AUTO
 - R2 7. BLR CNTLR/HTR 1 – A
- For SSME HYD REPRESS (ENT, POST BURN):
- R4 8. Perform using HYD SYS 2 and 3

CNTL AB3

NOTE

CDR's BFS engage capability lost

If BFS engage reqd:

1. Use PLT's RHC
2. GPCs 1,2,4 (three) – STBY,HALT
3. BFS I/O RESET

R2 4. BLR CNTLR/HTR 1,3 (two) – B

If H2O LOOP 1 active:

- L1 5. H2O PUMP LOOP 1 – B
6. TOP EVAP HTR DUCT sel – B
 7. HI LOAD DUCT HTR sel – B

Do not perform next step if AB1,2,3 unpwr:

8. GNC 23 RCS
Ovrd MANF F1 jets – OP
- A12 9. APU HTR GAS GEN/FU PUMP 1 – A AUTO
TK/FU LN/H2O SYS 1B – AUTO
3A – AUTO

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
DUCT sel – A
HI LOAD DUCT HTR sel – A
- 2. Use R Trim and Body Flap sws
- For SSME HYD REPRESS (ENT, POST BURN):
- R4 3. Perform using HYD SYS 1 and 3
- A12 4. APU HTR GAS GEN/FU PUMP 1 – A AUTO
2 – B AUTO
TK/FU LN/H2O SYS 1A – AUTO
2B – AUTO
- R2 5. BLR CNTLR/HTR 2 – A
- F3,F4 6. Use PLT’s DRAG CHUTE DPY/JETT
- 7. BFS, GNC 51 OVERRIDE
RGA 2 – desel

CNTL BC2

- C3 1. S-BD PM CNTL – PNL,CMD
- 2. BFS, GNC 51 OVERRIDE
TDRS – ITEM 46 EXEC (*)
- R1 3. O2 TK2 HTRS B – AUTO
- If H2O LOOP 1 active:
- L4:F 4. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
- L1 H2O PUMP LOOP 1 – A
- If FLASH EVAP CNTLR SEC in GPC:
- 5. FLASH EVAP CNTLR SEC – ON
- 6. TOP EVAP HTR DUCT sel – A
- 7. HI LOAD DUCT HTR sel – A
- F8 8. PLT disp sws – green dot
- O8 9. FWD RCS MANF ISOL 2 – CL
- For SSME HYD REPRESS (ENT, POST BURN):
- R4 10. Perform using HYD SYS 1 and 3
- A12 11. APU HTR GAS GEN/FU PUMP 2 – B AUTO
TK/FU LN/H2O SYS 1A – AUTO
2B – AUTO
- 12. Use L Trim and Body Flap sws
- R2 13. BLR CNTLR/HTR 2 – A
- F3,F4 14. Use PLT’s DRAG CHUTE DPY/JETT

CNTL BC3

Do not perform next step if BC1,2,3 unpwr:

1. GNC 23 RCS
Ovrd MANF F2 jets – OP
- R2 2. BLR CNTLR/HTR 1,2 (two) – B
- If H2O LOOP 1 active:
- L4:F 3. cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
- L1 H2O PUMP LOOP 1 – A
- If FLASH EVAP CNTLR SEC is ON:
4. FLASH EVAP CNTLR SEC – GPC
5. TOP EVAP HTR NOZ R – B AUTO
DUCT sel – A
6. HI LOAD DUCT HTR sel – A
- A12 7. APU HTR GAS GEN/FU PUMP 2 – A AUTO
TK/FU LN/H2O SYS 1A – AUTO
2B – AUTO

CNTL CA1

NOTE

GPC 3,5 – no BFS engage capability

If BFS in GPC 3(5):

If pre-TIG (NOM ENTRY):

1. Delay at least 1 rev
2. Perform MAL, DPS, GPC FRP-3,
BFS GPC FAIL RECOVERY (ENTRY)
to regain BFS capability for ENTRY,
then:
Go to step 4

If post-TIG:

- | | | |
|-------|---|--|
| O6 | ◆ | 3. GPC OUTPUT 3(5) – TERM |
| L1 | | 4. If FLASH EVAP CNTLR PRI A in GPC:
FLASH EVAP CNTLR PRI A – ON |
| A12 | | 5. TOP EVAP HTR NOZ R – A AUTO |
| | | 6. APU HTR GAS GEN/FU PUMP 2 – A AUTO
3 – B AUTO
TK/FU LN/H2O SYS 2A – AUTO
3B – AUTO |
| R2 | | 7. BLR CNTLR/HTR 3 – A |
| F2,F3 | | 8. Use CDR's DRAG CHUTE DPY/JETT |
| | | 9. <u>BFS G51</u>
RGA 3 – desel |

CNTL CA2

- R1 1. O2 TK1 HTRS B – AUTO
- If FLASH EVAP CNTLR PRI A is ON:
- L1 2. FLASH EVAP CNTLR PRI A – GPC
- O8 3. FWD RCS MANF ISOL 3 – CL
- A12 4. APU HTR GAS GEN/FU PUMP 3 – B AUTO
TK/FU LN/H2O SYS 2A – AUTO
3B – AUTO
- L1 5. Use L Trim and Body Flap sws
- R2 6. BLR CNTLR/HTR 3 – A
- F2,F3 7. Use CDR's DRAG CHUTE DPY/JETT

CNTL CA3

- R2 1. BLR CNTLR/HTR 2,3 (two) – B
- A12 2. APU HTR GAS GEN/FU PUMP 3 – A AUTO
TK/FU LN/H2O SYS 2A – AUTO
3B – AUTO

ESS

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 TK2 HTRS A,B (four) – OFF
TK3 HTRS A,B (four) – AUTO
If CRYO O2 TK3 QTY < 55%:
- 5. O2 TK3 HTRS B – 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

ESS

NOTE

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

- 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 TK2 HTRS A,B (four) – OFF
TK3 HTRS A (two) – AUTO

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 | 1. | AUD CTR – 2 |
| O9 | 2. | R AUD CNTL sel – L (PLT can't talk) |
| | 3. | Perform <u>FC2 SHUTDN</u> (Cue Card), then: |
| | | If add'l lgt reqd: |
| C3 | 4. | EMER LTG – ON/OFF |
| R1 | 5. | O2,H2 TK1 HTRS A,B (four) – OFF |
| | | TK3 HTRS A (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 MSGs must be reset to avoid
C/W Tone masking

- | | | |
|----|----|-------------------------------------|
| C3 | 1. | AUD CTR – 2 |
| O9 | 2. | R AUD CNTL sel – L (PLT can't talk) |
| | | If add'l lgt reqd: |
| C3 | 3. | EMER LTG – ON/OFF |
| R1 | 4. | O2,H2 TK1 HTRS A,B (four) – OFF |
| | | TK3 HTRS A (two) – AUTO |

ESS 3AB DA3 (Entire Bus)

NOTE

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

- O6
1. (BFS) GPC OUTPUT – TERM
 2. Go to FC3 SHUTDN (Cue Card)

ESS 3AB MPC3

Go to FC3 SHUTDN (Cue Card)

ESS 3AB FD

NOTE

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

- O6
1. (BFS) GPC OUTPUT – TERM
 2. Go to FC3 SHUTDN (Cue Card)

ESS 3AB O13

NOTE

Computer Status Matrix lost



GUIDANCE, NAVIGATION, AND CONTROL

GNC



DISPLAY SW L(R)

L(R) disp sws – green dot

G51 ROLL MODE SW

GNC 51 OVERRIDE

If ROLL MODE \neq sw pos:
 AUTO SEL – ITEM 42 EXEC (*)

FCS CH 1(2,3,4) (2nd FAIL)

GNC 53 CONTROLS

1. \sqrt MCC or **G53**
- If two FCS CH \downarrow on any actuator or no comm:
 2. (Remaining) FCS CH (two) – ORIDE

SBTC/THC L

If first fail:

1. No action >>

If second fail (dilemma):

2. L FLT CNTLR PWR – OFF (ON only when reqd)

NOTE

If no response to THC in +X axis, and
 RCS completion reqd, pitch vehicle to
 burn in -X axis

Post MM304 trans:

3. L FLT CNTLR PWR – ON

RHC L(R)

If first fail:

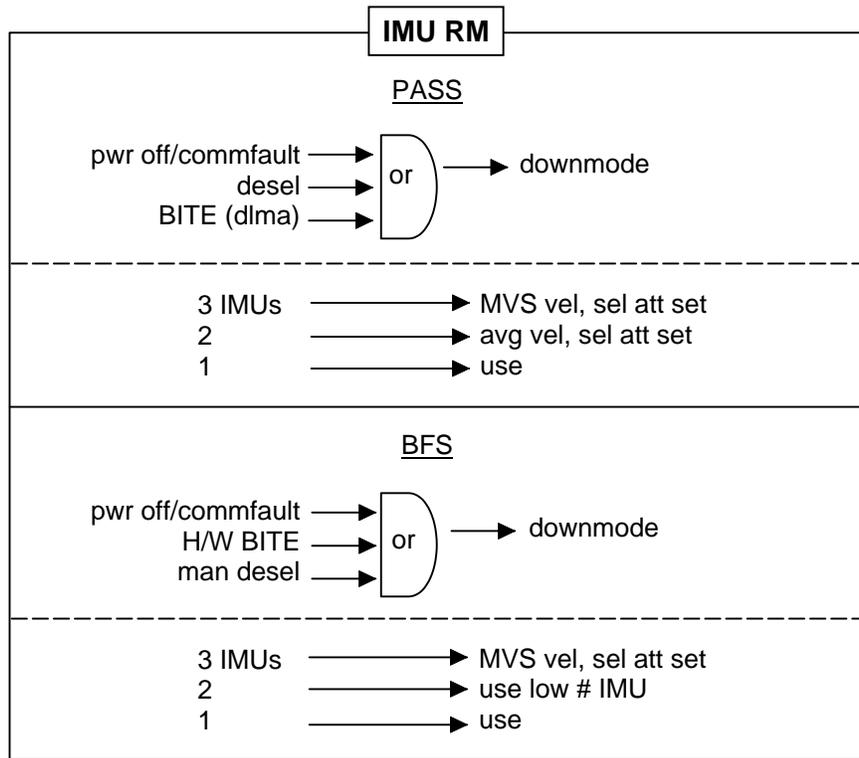
1. No action >>

If second fail (dilemma):

2. (Aff) FLT CNTLR PWR – OFF

If pre-deorbit burn:

3. Perform G3 to G2/G8 TRANS (DPS), 3-5, then:
4. **GNC 25: RM ORBIT**
 Desel all CHs on aff RHC – DES (*)
5. (Aff) FLT CNTLR PWR – ON
6. Deflect aff RHC in each axis (check R,P,Y Xdcrs)
7. (Aff) FLT CNTLR PWR – OFF
8. Good RHC CH – DES (no *)
9. Go to G2/G8 to G3 TRANS (DPS), 3-7



RM FAIL IMU, RGA, AA

BFS, GNC 51 OVERRIDE

Aff LRU – desel

RM DLMA IMU

GNC 21 IMU ALIGN

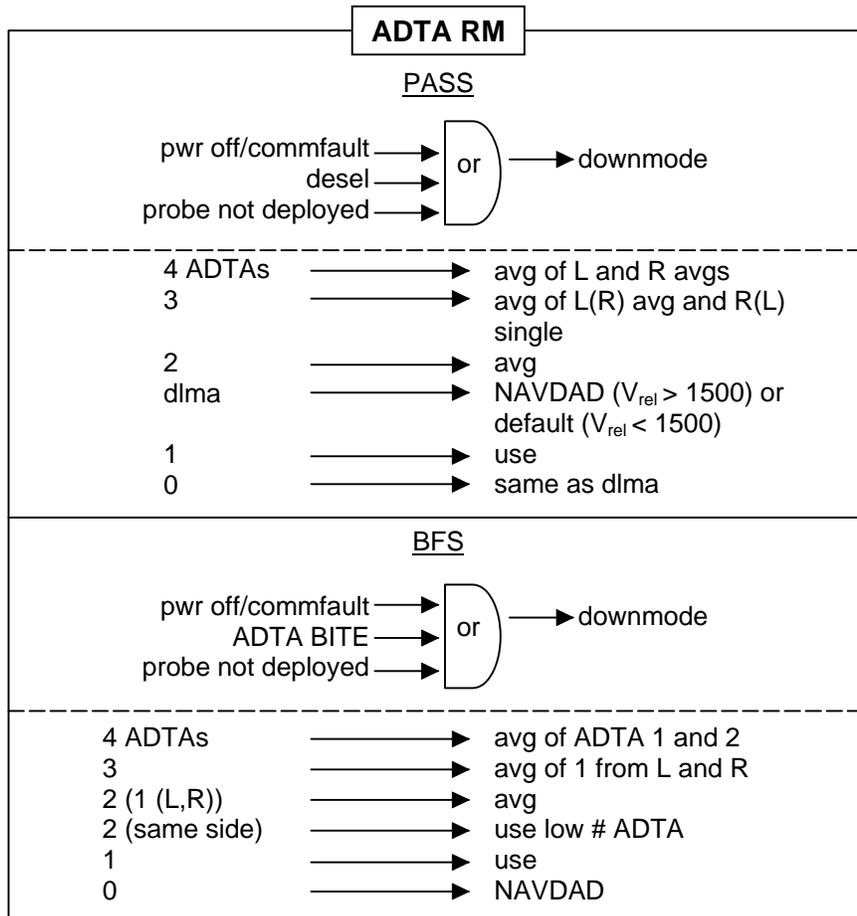
$\sqrt{\text{MCC or ACC}} > 0.03$, bad IMU – desel (PASS and BFS)

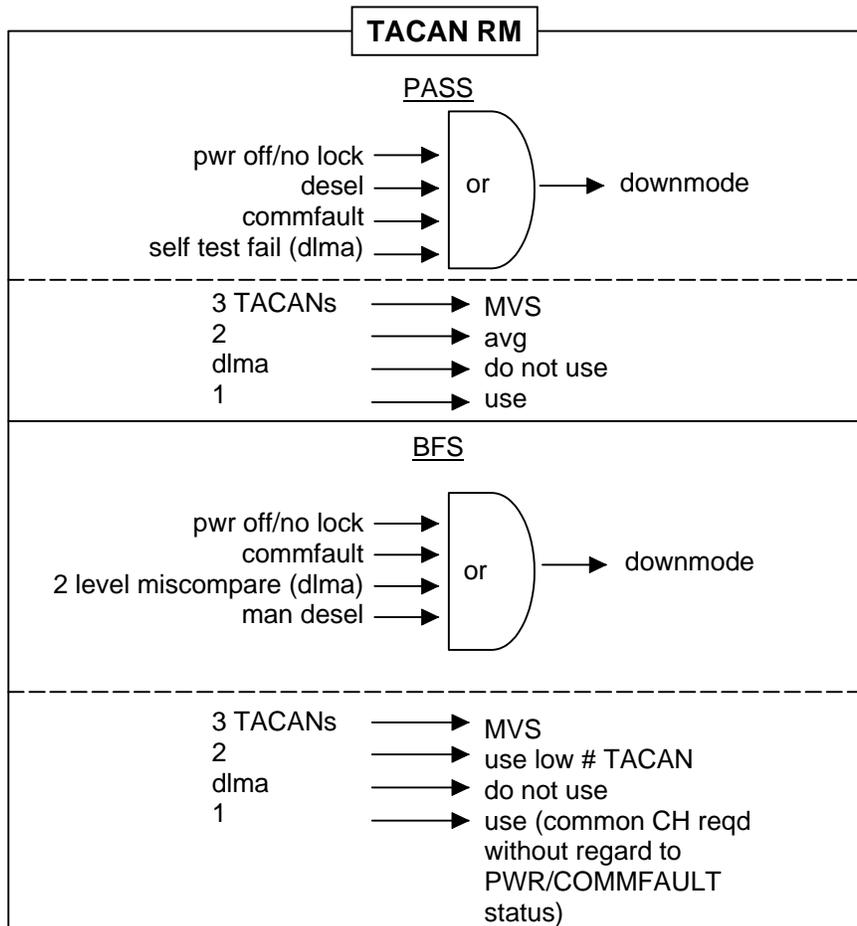
EPCL/ALL/GEN M

**DISPLAY SW L(R)
 G51 ROLL MODE SW
 FCS
 SBTC/THC L
 RHC L(R)**

6-3

**IMU RM
 RM FAIL IMU, RGA, AA
 RM DLMA IMU**



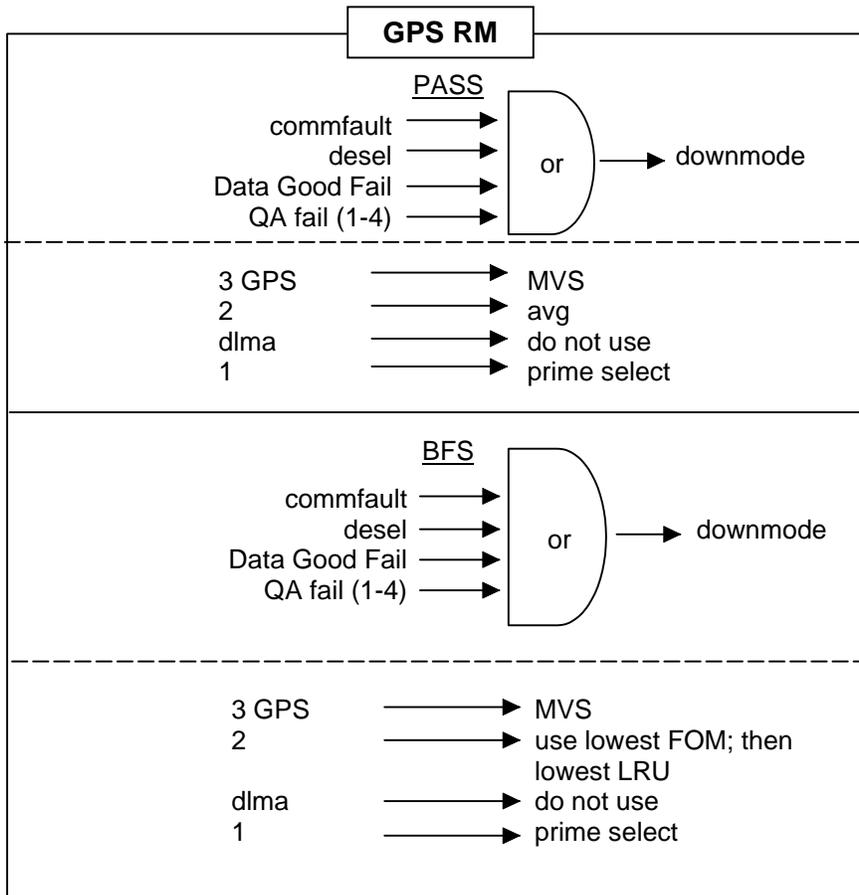


EPCL/ALL/GEN M

ADTA RM

6-5

TACAN RM



GPS INCORPORATION

- CRT
1. VERIFY GPS FUNCTIONING PROPERLY
GNC 55 GPS STATUS
√STAT = BLANK or BATT
√MODE = INS
√DG FAIL = BLANK
√QA1 P $1\sigma \leq 650$ (can be > 650 for no more than 5 min)
√LAST SEL FIL UPDATE < 5 min
* If GPS not functioning properly for 5 min, *
* perform GPS TROUBLESHOOTING as *
* time permits *
|
 2. GNC 50 HORIZ SIT
If GPS ratio > 1.0, GPS TO NAV FOR – ITEM 44 EXEC (*)
Expect a toggle to FOR then back to previous state (AUT or INH) |
 3. GPS TO NAV AUT – ITEM 35 EXEC (*)
√GPS MINUS NAV POS ($\Delta H, \Delta DR, \Delta CR$) < 100
 4. If staying in OPS 3, repeat step 1 every 90 min to confirm GPS still functioning properly
 5. If transitioning to OPS 2, perform step 1 of GPS INCORPORATION (ORB OPS, GNC) every 90 min

EPCL/ALL/GEN M,8



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NOTE

GPS may take up to 1 min for steady state performance

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

- CRT
- C. GPS INIT
INIT – ITEM 15 EXEC (*)
√MODE – INIT
NAV – ITEM 18 EXEC (*)
√MODE – INS

NOTE

GPS may take up to 5 min for steady state performance

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

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

NOTE

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

Check SATELLITES – tracking at least 4 satellites

Repeat step 1. If GPS not functioning properly within 12 min, perform step E (next page)

OV103,104

A13
CRT

E. GPS S/TEST
GPS PRE AMPL (two) – OFF
√NAV – ITEM 18 (*)
S/TEST – ITEM 12 EXEC (*)
√'BIT' in STAT field after ~6 sec
Wait for 'BIT' to clear after ~2 min
√S/TEST '↑'; if '↓' go to GPS SAFING (step 3)

A13
CRT

GPS PRE AMPL (two) – MNC (OV103)
– ON (OV104)
NAV – ITEM 18 EXEC (*)
√MODE – INS

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

3. GPS SAFING

CRT

GNC 55 GPS STATUS
√GPS TO G&C INH – ITEM 33 EXEC (*)
√GPS TO NAV INH – ITEM 36 EXEC (*)

OV103,104

A6-11

EPCL/3,4/GEN M,8

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OV103,104

A6-12

EPCL/ALL/GEN M

GPS TROUBLESHOOTING

1. VERIFY GPS FUNCTIONING PROPERLY

CRT GNC 55 GPS STATUS
 √STAT = BLANK or BATT
 √MODE = INS
 √DG FAIL = BLANK
 √QA1 P $1\sigma \leq 650$ (can be > 650 for no more than 5 min)
 √LAST SEL FIL UPDATE < 5 min

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

2. GPS TROUBLESHOOTING

CRT Desel affected GPS
 DES RCVR 1(2,3) – ITEM 26(27,28) EXEC (*)

A. GPS sw Config

O7 √GPS 1(2,3) PWR – ON
 √PRE AMPL (two) – ON

O7 * If receiver not pwr'd: *

* GPS 1(2,3) PRE AMPL (two) – ON *

* PWR – ON *

* √GPS ENCRYPT – NORM *

* Wait at least 30 sec *

CRT * GNC I/O RESET *

* *

* GNC 55 GPS STATUS *

* √NAV – ITEM 17(18,19) (*) *

* INIT – ITEM 14(15,16) EXEC (*) *

* √MODE – INIT *

* NAV – ITEM 17(18,19) EXEC (*) *

* √MODE – INS *

B. GPS Filter Restart

CRT √MODE – INS
 If not in INS MODE, go to GPS INIT, step C below
 RESTART – ITEM 20(21,22) EXEC (*)
 Wait 5 sec
 √RESTART – ITEM 20(21,22) (no *)

Cont next page

B6-9

OV105

EPCL/5/GEN M,8

NOTE

GPS may take up to 1 min for steady state performance

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

- CRT C. GPS INIT
INIT – ITEM 14(15,16) EXEC (*)
√MODE – INIT
NAV – ITEM 17(18,19) EXEC (*)
√MODE – INS

NOTE

GPS may take up to 5 min for steady state performance

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

- O7 D. GPS Long Pwr Cycle
GPS 1(2,3) PWR – OFF (at least 30 sec), ON
(expect 'BCE STRG X GPS' msg)
Wait at least 30 sec
- CRT GNC I/O RESET
√NAV – ITEM 17(18,19) (*)
INIT – ITEM 14(15,16) EXEC (*)
√MODE – INIT
NAV – ITEM 17(18,19) EXEC (*)
√MODE – INS

NOTE

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

Check SATELLITES – tracking at least 4 satellites

Repeat step 1. If GPS not functioning properly within 12 min, perform step E (next page)

Cont next page

B6-10

OV105

EPCL/5/GEN M,8

O7
CRT

E. GPS S/TEST
GPS 1(2,3) PRE AMPL (two) – OFF
√NAV – ITEM 17(18,19) (*)
S/TEST – ITEM 11(12,13) EXEC (*)
√'BIT' in STAT field after ~6 sec
Wait for 'BIT' to clear after ~2 min
√S/TEST '↑'; if '↓' go to GPS CLEANUP (step 3)

O7
CRT

GPS 1(2,3) PRE AMPL (two) – ON
NAV – ITEM 17(18,19) EXEC (*)
√MODE – INS

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

3. GPS CLEANUP
If GPS functioning properly, on MCC GO, reset affected
GPS

CRT

GNC 55 GPS STATUS
DES RCVR 1(2,3) – ITEM 26(27,28) EXEC (no *)

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

OV105

B6-11

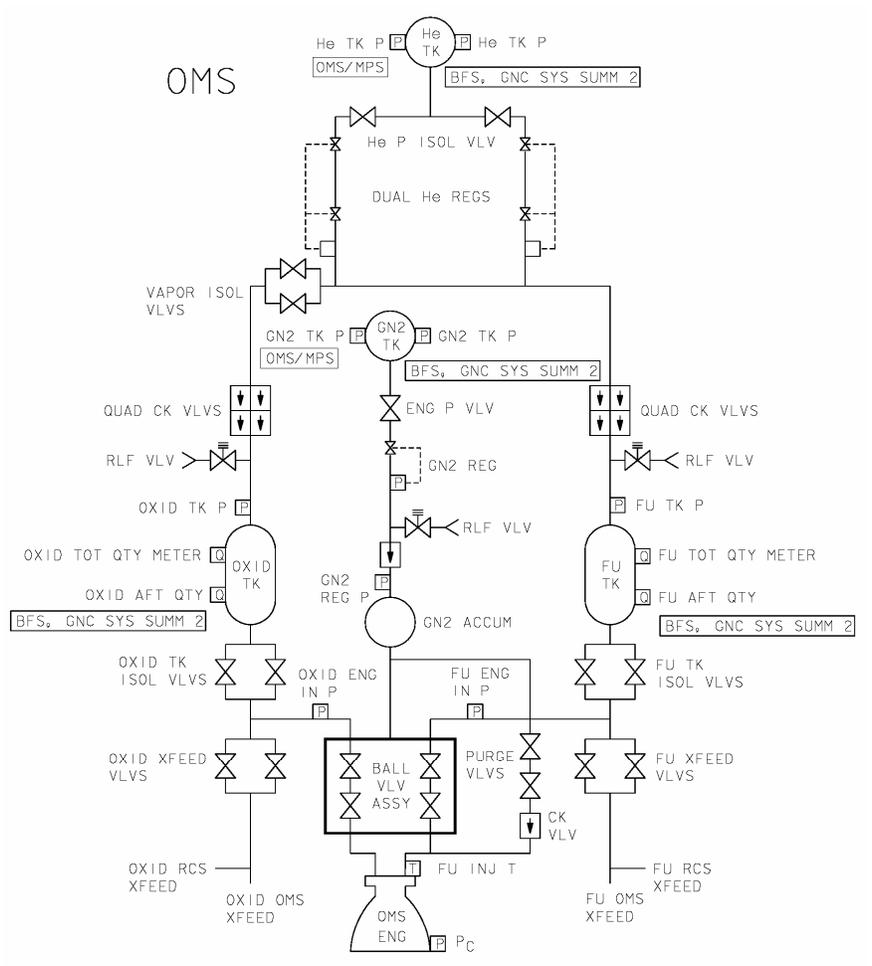
EPCL/5/GEN M,8

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B6-12

OV105

EPCL/ALL/GEN M



DATE 06/17/98

48033A701, SCH 1

OMS

OMS TK P (FU or OX) LOW

BFS, GNC SYS SUMM 2

1. If corresp ENG IN P disagrees >>
2. Perform OMS SECURE, then:
If prior to burn:
If corresp ENG IN P decr (OMS inlet line leak):
| 3. √MCC >>
- If OMS FU(OX) TK P decr (prop tk leak):
 4. Go to LEAKING OMS PRPLT/He BURN

NOTE

Post MM304: If OX TK leak, open vent doors.

At Mach 24: Close vent doors

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 He TK P LOW

BFS, GNC SYS SUMM 2

1. √He TK P < 1500 or decr (OMS/MPS) and SPEC)
- If He TK P > 640:
 2. (Aff) OMS He PRESS/VAP ISOL – OP
3. Continue with planned burn

NOTE

Post MM304: If leak, open vent doors.

At Mach 24: Close vent doors

OMS N2 TK P LOW

BFS, GNC SYS SUMM 2

1. √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. √MCC for use of OMS ENG

OMS

OMS N2 REG P LOW

BFS, GNC SYS SUMM 2

1. √N2 TK P decr (OMS/MPS and SPEC)

If preburn:

2. (Aff) OMS ENG – OFF
3. √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. √N2 TK P decr (OMS/MPS and SPEC)

2. (Aff) OMS ENG – ARM

L(R) OMS GIMBAL

GNC XXXXX MNVR EXEC

If first failure:

1. Aff gimbal – sel SEC GMBL >>

If second failure:

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

OMS SECURE

(Aff) OMS ENG – OFF

XFEED (two) – CL (tb-CL)

TK ISOL (two) – CL (tb-CL)

He PRESS/VAP ISOL (two) – CL

EPCL/ALL/GEN M,10

OMS TK P (FU or OX)
OMS He(N2) TK P LOW

7-3

OMS N2 REG P
OMS GIMBAL/SECURE

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)

SM0 THRM PRPLT

BFS, SM 0 THERMAL

AFF TEMP		STATUS	ACTION
H T R T E M P	PRPLT POD L(R)	↑	A14 If (aff) RCS/OMS HTR POD – A AUTO(B AUTO): swap htrs >> A14 If (aff) RCS/OMS HTR POD (two) – OFF: No action >>
		↓, H, L, M	No action >>
	PRPLT OMS CRSFD	↑	A14 If RCS/OMS HTR OMS CRSFD LN – A AUTO(B AUTO): swap htrs >> A14 If RCS/OMS HTR OMS CRSFD LN (two) – A AUTO,B AUTO, then: RCS/OMS HTR OMS CRSFD LN – A OFF >>
		↓, H, L, M	No action >>

EPCL/ALL/GEN M,1

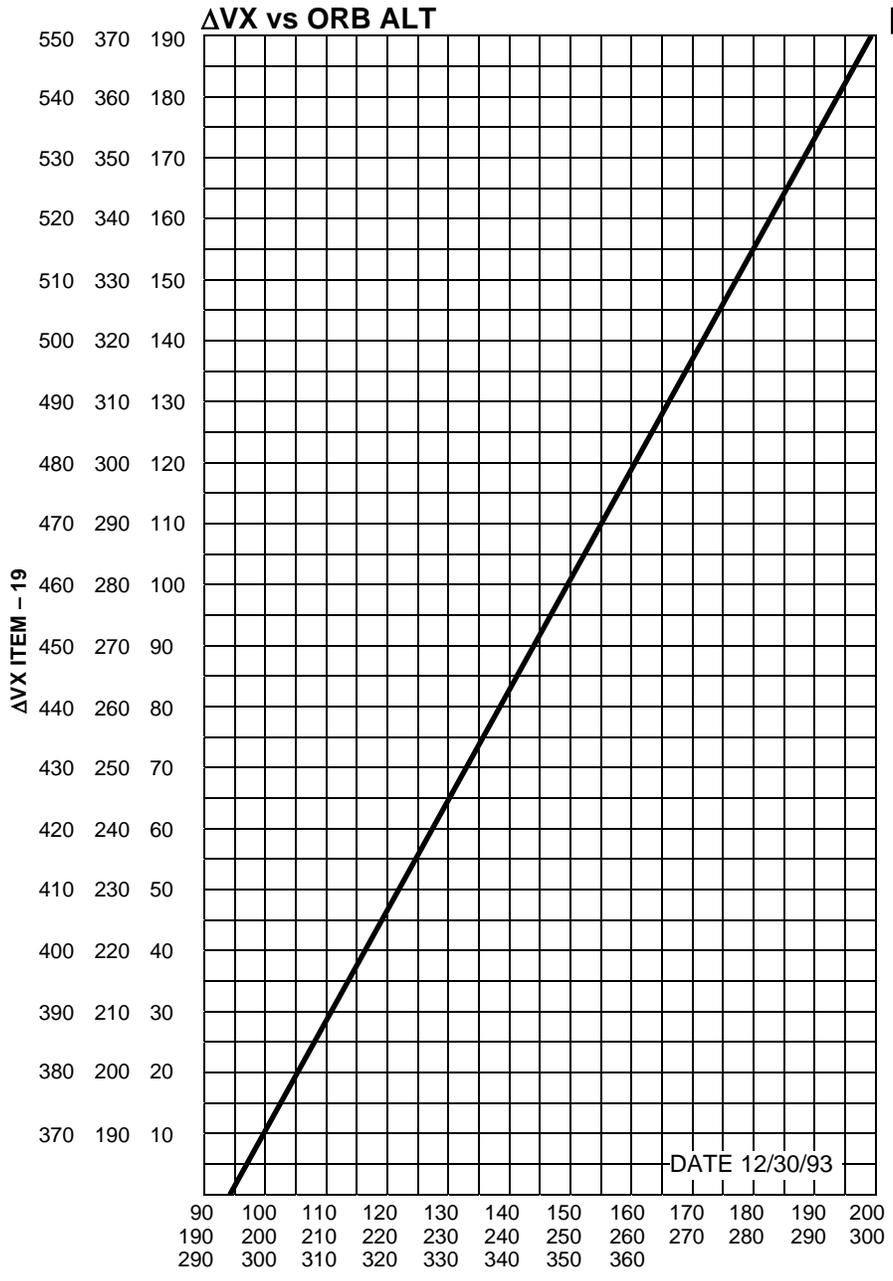
XFEEDS

7-5

SM0 THRM PRPLT

LEAKING OMS PRPLT/He BURN

1. Verify vent doors open for OX or He leak
 2. Install LEAKING OMS PRPLT/He BURN (Cue Card) and ON-ORBIT OMS BURN MONITOR (Cue Card) (C2 wedge)
 3. GNC, OPS 302 PRO
 4. GNC DEORB MNVR EXEC leaking OMS – sel, and determine out-of-plane or retrograde burn based on TIG (MCC or msg)
 5. GNC DEORB MNVR EXEC
Enter PEG 7 TARGET data:
 - If out-of-plane:
 - Enter ΔVX and $\Delta VZ = 0.0$
 - Enter $\Delta VY \pm 500$
 - If retrograde:
 - Enter ΔVY and $\Delta VZ = 0.0$
 - Enter $-\Delta VX$ from ΔVX vs ORB ALT chart
 6. GNC DEORB MNVR EXEC
Load TARGET DATA:
 - LOAD – ITEM 22 EXEC (if retrograde burn, \sqrt{TGT} HP = 95 ± 1 ; adjust ΔVX as reqd)
 - TIMER – ITEM 23 EXEC
 7. GNC 23 RCS
 - L1A or L3A – desel
 - R1A or R3A – desel
 8. Mnvr to burn att. When mnvr complete, update TIG if appropriate
 9. GMBL CK sel sys
- At TIG-4, perform OMS burn prep:
10. (Leaking) OMS TK ISOL (two) – OP (tb-OP)
 - \sqrt{XFEED} (four) – CL (tb-CL)
 - He PRESS/VAP ISOL A – OP (wait 2 sec),
B – OP
 11. Burn to depletion using LEAKING OMS PRPLT/He BURN (Cue Card), then postburn:
 12. GNC 23 RCS
 - AFT jets – resel
 13. FLT CNTLR PWR (two) – OFF
 14. (Aff) OMS He PRESS/VAP ISOL (two) – CL
 - TK ISOL (two) – CL (tb-CL)
 15. GNC, OPS 301 PRO



ORBITAL ALTITUDE (CUR HA)

EPCL/ALL/GEN M

LK PRPLT BURN

7-7

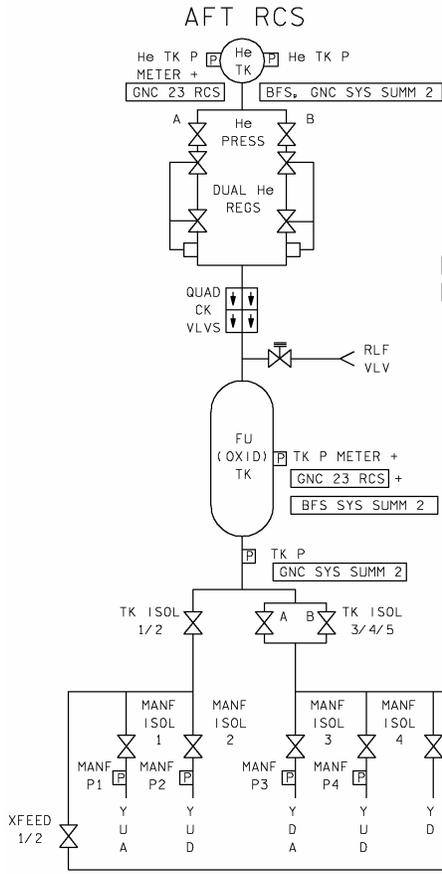
ΔVX vs ORB ALT



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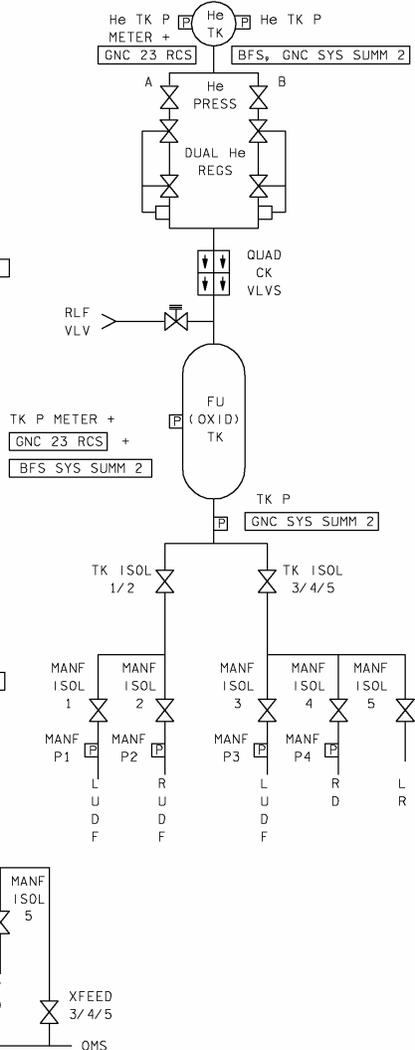


RCS



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 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 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 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

If OPS 301:

1. DAP: INRTL/PULSE
2. L(R) OMS He PRESS/VAP ISOL (two) – OP
XFEED (two) – CL (tb-CL)
3. L,R RCS XFEED (four) – CL (tb-CL)
TK ISOL (six) – OP (tb-OP)
4. L(R) OMS He PRESS/VAP ISOL (two) – CL
5. DAP: as reqd >>

If OPS 302,303:

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

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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

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

FWD RCS RM LOSS

GNC 23 RCS

If loss of FAIL OFF or LK detection:

1. Aff jet – DES INH (*) (reprioritize)
2. If auto deselected: reset

If loss of total RM (BCE BYP or MDM fail):

3. If att control still avail: Leave MANF STAT closed >>
4. If reqd for -X completion of deorb burn or fwd dump:
√RJD – ON and DES INH twice (reprioritize, reset RM),
override MANF STAT open >>

If loss of FAIL ON detection:

5. √RJD – ON, MANF STAT – op
6. Aff jet – DES INH twice (reprioritize, reset RM)

AFT RCS RM LOSS

GNC 23 RCS

CAUTION

Do not take action which will result in less than fail-safe jet redundancy (3Y, 2P jets/pod/dir)

If loss of FAIL OFF or LK detection:

1. Aff jet – DES INH (*) (reprioritize)
2. If yaw jet: desel >>
3. If auto deselected: reset

If loss of total RM (BCE BYP or MDM fail):

4. √RJD – ON
 5. Aff jet – DES INH twice (reprioritize, reset RM)
- If fail-safe redundancy (3Y,2P jets/pod/dir) lost, or if RCS deorbit to regain 4 +X jets:
6. Override MANF STAT open; otherwise, leave closed >>

If loss of FAIL ON detection:

7. √RJD – ON, MANF STAT(s) – op
8. Aff jet – DES INH twice (reprioritize, reset RM)
9. If yaw jet: desel

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**XFEED: RCS to RCS
XFEED RETURN**

8-5

FWD/AFT RCS RM LOSS

RM DLMA MANF

GNC 51 OVERRIDE

If (aff) MANF tb – OP or sw not thrown:

1. If FRCS: √MCC
2. If ARCS: RCS RM MANF CL OVRD – ITEM 41 EXEC
3. If (aff) MANF tb – bp: (aff) MANF – GPC

RCS JET FAIL (LEAK)

GNC 23 RCS

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 psi and stable (false alarm):
2. (Aff) RCS MANF ISOL – OP (tb-OP)
3. √AFT RCS RM LOSS

RCS JET FAIL (OFF)

GNC 23 RCS

If one jet failed:

1. DES INH (*) (reprioritize)
2. Continue with jet deselected >>

If more than one jet/pod/dir failed:

If preburn:

3. If avail: Delay one orbit
4. Go to MAL, RCS, 10.1a >>

If postburn:

5. DES INH (*) (reprioritize)
6. Resel jets >>

If more than one jet failed, but no two in same pod and same direction:

7. DES INH (*) (reprioritize)
8. Continue with jets deselected
9. If time permits: Go to MAL, RCS, 10.1a

RCS TK P HIGH (FU or OX)

BFS, GNC SYS SUMM 2

Confirm via associated MANF P:

1. (Aff) RCS He PRESS (two) – CL (tb-CL)

When good RCS TK P < 220:

2. (Aff) RCS He PRESS A – OP (tb-OP)

If subsequently RCS TK P > 312:

3. (Aff) RCS He PRESS A – CL (tb-CL)
 B – OP (tb-OP)

PERIGEE ADJUST -X RCS BURN, OPS 3

1. GNC, OPS 302 PRO
 2. Enter or verify Tgt Data per MNVR PAD
 3. **GNC DEORBIT MNVR EXEC** Load tgt
Load – ITEM 22 EXEC
Timer – ITEM 23 EXEC
Verify burn data per MNVR PAD – Ignore computed burn attitude
DO NOT MNVR
 4. Load Inertial Burn Attitude per MNVR PAD
Roll – ITEM 24 +__ __ __
Pitch – ITEM 25 +__ __ __
Yaw – ITEM 26 +__ __ __
 5. Mnv to Burn Attitude
√DAP: AUTO
ITEM 27 EXEC
- At TIG -00:30:
6. √Burn Att (INRTL), then ATT REF pb – push (ATT REF It on)
√FLT CNTLR PWR (two) – ON
DAP: INRTL/DISC
√VGOX = negative
√VGOZ ≈ +1/4 ΔVTOT

Cont next page

EPCL/ALL/GEN M

RCS TK P HI
PERIGEE ADJUST

NOTE

Error needles invalid during burn.
Burn time $\approx 2 \times$ TGO

7. TIG: THC -X: Trim VGOX < 0.2 fps critical burn
< 2.0 fps noncritical burn
or multiple FRCS jets FAIL OFF
8. FLT CNTLR PWR (two) – OFF
9. GNC, OPS 301 PRO
10. If cutoff due to FRCS depletion (multiple FRCS jets FAIL OFF):
GNC 23 RCS
FWD page – ITEM 1 EXEC
Override Manifold Status to CL:
ITEM 40 EXEC
ITEM 41 EXEC
ITEM 42 EXEC
ITEM 43 EXEC



MPS

MAIN PROPULSION SYSTEM



MPS He P/MPS C&W LIGHT
MPS PNEU REG

R2 (Aff) MPS He ISOL – CL

MPS

PWRDN

LOSS OF 2 CAB FANS	10-2
AV BAY 1 COOLING	10-5
2 COOLING	10-7
3 COOLING	10-9
2 H2O LOOPS (ENTRY).....	10-11
ENTRY MANEUVERS	10-17
BAILOUT MODE 8.....	10-19
LOSS OF CAB PRESS	10-29
1 FREON LOOP OR HI LOAD EVAP (ENTRY) ...	10-33
FES	10-39
2 FREON LOOPS (ENTRY)	10-45
ENTRY MANEUVERS.....	10-54
BAILOUT MODE 8.....	10-56
LOSS OF 1 FC	10-67
2nd FC (ENTRY).....	10-69

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 IDP/CRT with two MDUs, PGSC; minimize use |
| | | If FLT CNTLR PWR not reqd: |
| O14, O15, O16:E | 7. | cb DDU L,R,AFT (six) – 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 :C | 9. | cb MNA EVENT TIMER AFT – op |
| | 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 |

NOTE

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

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

15. Continue with deorbit using DEORBIT PREP/ENTRY DELTAS PULLOUT PAGE, 10-3

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DEORBIT PREP/ENTRY DELTAS PULLOUT PAGE

NOTE

Incorporate the following changes or remove page and use with appropriate checklist or cue card

- A. Deltas to NOMINAL DEORBIT PREP PROCEDURES (DEORBIT PREP, NOMINAL DEORBIT PREP)
1. Minimize use of IDPs, MDUs, FLT CNTLR PWR, DDUs; use one PGSC only if reqd
 2. Minimize Itg
 3. Minimize sun in cab (delay mnvr to burn att until TIG-15 if necessary)
 4. In ENT SWITCH LIST/VERIE, do not activate pwr dn items

- B. Deltas to DEORBIT BURN (ENT)
- | | |
|-------------|---|
| MO10W | <ol style="list-style-type: none"> 1. If time permits: set up for cabin purge 2. 14.7 CAB REG INLET SYS 1,2 vlv (two) – OP 3. O2 REG INLET SYS 1 vlv – OP
√2 vlv – CL |
| L2 | <ol style="list-style-type: none"> 4. O2/N2 CNTLR VLV SYS 1 – AUTO (O2/N2)
2 – OP(N2) |
| Inner Hatch | <ol style="list-style-type: none"> 5. √O2 SYS 1,2 SPLY (two) – OP (tb-OP) 6. INNER HATCH Equal vlv cap (two) – remove 7. √Equal vlv (two) – NORM 8. Reinstall Equal vlv cap (two) 9. Open INNER HATCH <p>At TIG-20 (if set up): Initiate cabin purge</p> |

WARNING
Do not use WCS once constant Cabin Purge has started because of high N2 concentration

- | | |
|------------------------|---|
| MO32M,
MO69M,
C6 | <ol style="list-style-type: none"> 10. LEH O2 1(2,...8) vlv – OP (as reqd) |
| L2 | <ol style="list-style-type: none"> 11. O2 XOVR SYS 1 – CL
√2 – OP |

Cont next page

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- AW82B
12. AIRLK DEPRESS vlv cap – vent, remove
 13. vlv – 5
 14. Close INNER HATCH
 15. At TIG-15: Mnvrt to deorbit burn att
- At TIG-4:
16. Use two IDP/CRTs with four MDUs for deorbit burn
- O14,O15,
O16:E
F6,F8
17. cb DDU L,R (four) – cl
 18. L,R FLT CNTLR PWR (two) – ON

- 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
- F6,F8
O14,
O15,
O16:E

- D. Deltas to ENTRY MANEUVERS (Cue Card)
- 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 M = 2.7:
4. HUD PWR (two) – ON
- At Wheel Stop:
5. Visors open, LES O2 – OFF
 6. Go to EXPEDITED PWRDN (ENT, POST LDG)
- O14,O15,
O16:E
F6
F3

LOSS OF AV BAY 1 COOLING

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. Immed discharge fire suppression bottle

O7
L1

1. \sqrt TACAN 1 MODE sel – OFF
2. AV BAY 1 FAN (two) – OFF
3. Perform PL PWRDN, then:

If after TIG-5, no GPC reconfig:

4. Go to step 10

If between MM301 trans and TIG-5:

RECONFIG DPS

GPC OPS	1	2	3	4	5
	-	G3	G3	-	BFS
PWR	ON	ON	ON	ON	ON
OUTPUT	NORM	NORM	NORM	NORM	B/U
MODE	HALT	RUN	RUN	HALT	RUN

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EPCL/3,4/GEN M,11

NOTE

After completing reassignment, the following uplinks to the BFS may be required: Guidance targets, ADI quaternions, IMU gyro bias, IMU accelerometer bias, TMBU

- C3 10. FCS CH (four) – ORIDE
- If prior to TIG, perform following pwrdn:
- O15:A 11. BRAKES MNB – OFF
 :E 12. cb MNB ADTA 2 – op
 13. ACCEL 2 – op
- O16:A 14. BRAKES MNC – OFF
 :E 15. cb MNC ADTA 4 – op
 :F 16. ACCEL 3 – OFF
- O8 17. MLS 2,3 (two) – OFF
L4:P 18. cb AC2 Φ A LG SNSR 2 – op
19. Deltas to ENTRY MANEUVERS (Cue Card)
 At EI, repwr above components, then:
 PASS, BFS I/O RESET
 At V = 10K, if TACAN 1 or 3 failed:
O7 TACAN 2 MODE sel – GPC

NOTE

Post rollout: Immed pwr dn air cooled equipment in AV BAY 2, EQUIPMENT COOLING MATRIX (ECLS), 4-1

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EPCL/3,4/GEN M,11

LOSS OF AV BAY 3 COOLING

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. Immed discharge fire suppression bottle

- O7 L1
1. √TACAN 3 MODE sel – OFF
 2. AV BAY 3 FAN (two) – OFF
 3. Perform PL PWRDN, then:
 If after TIG-5, no GPC reconfig:
 | 4. Go to step 9
 If between MM301 trans and TIG-5:

RECONFIG DPS

GPC OPS	1 G3	2 G3	3 -	4 G3	5 BFS
PWR	ON	ON	ON	ON	ON
OUTPUT	NORM	NORM	NORM	NORM	B/U
MODE	RUN	RUN	HALT	RUN	RUN

REASSIGN STRINGS TO GPCs 1,2,4 IN MC 3

- O6
5. **GNC 0 GPC MEMORY**
 CONFIG – ITEM 1 +3 EXEC
 Modify MC 3 per table →
- | CONFIG GPC | 3 | |
|------------|-------|--|
| | 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 | 0 | |
| 2 | 0 | |
| MM 1 | 1 | |
| 2 | 2 | |
6. GNC, OPS 30X PRO
 7. GPC MODE 3 – STBY
 – HALT
 8. (BFS) GNC I/O RESET

- O13:A
- If prior to TIG, perform following pwr'dn:
 9. cb ESS 1BC C/W A – op

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EPCL/3,4/GEN M,11

10. Deltas to ENTRY MANEUVERS (Cue Card)

At EI:

O13:A

cb ESS 1BC C/W A – cl

At V = 10K, if TACAN 1 or 2 failed:

O7

TACAN 3 MODE – GPC

NOTE

Post rollout: Immed pwr dn air cooled
equipment in AV BAY 3, EQUIPMENT
COOLING MATRIX (ECLS), 4-1

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EPCL/3,4/GEN M,11

LOSS OF 2 H2O LOOPS (ENTRY)

NOTES

- Use ENT proc(s) except when this pwrn overrides it
- Second failure assumed to occur between EOM TIG-45 min and EI-5 min
- This proc pwr dn 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 (10 min MAX)
- Call ground at every avail UHF site

If EOM TIG > 45 min:

1. Go to LOSS OF 2 H2O LOOPS, TIME CRITICAL PROCEDURES (ORB PKT, PWRDN) >>

TIME CRITICAL PROCEDURES (execute simo)

2. Have MS perform MS OVHD PANEL PWRDN, 10-21, ASAP
3. Have another MS perform COMM PWRDN, 10-23, ASAP
4. Perform CDR AND PLT PWRDN, 10-12, ASAP

Cont next page

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EPCL/ALL/GEN M

CDR AND PLT PWRDN

- C3 5. √MSTR MADS PWR – OFF
- 6. Minimize Itg
- 7. Perform PL PWRDN, then:
- 8. Use only one IDP/CRT with two MDUs as reqd (cycle IDPs, MDUs)
- F6,F8 9. FLT CNTLR PWR (two) – OFF, use one as reqd (pwr assoc DDU when reqd)
- O7 10. TACAN MODE sel (three) – OFF
- O8 11. RDR ALTM (two) – OFF
- 12. MLS (three) – OFF
- L1 13. √H2O PUMP LOOP 1,2 (two) – OFF
- 14. If any flow: Leave H2O pump on, minimize bypass
If H2O LOOP 1 PUMP A(B) ON:
- MA73C:A 15. √MCA LOGIC MNA FWD 1 – ON
MNB FWD 2 – ON
- L1 16. HUM SEP A,B (two) – OFF
(one ON if either H2O Loop ON)
- 17. CAB FAN (two) – OFF
- 18. TEMP CNTLR – OFF
- 19. FREON PUMP LOOP 1 – OFF
√2 – B
- 20. √FLOW PROP VLV LOOP (two) – ICH (tb-ICH)
- 21. FLASH EVAP CNTLR PRI B – OFF
A – GPC
- L2 22. O2 SYS 1 SPLY – CL (tb-CL)
- O6 23. MDM PL1 – OFF
FF4 – OFF

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EPCL/3,4/GEN M

ENTRY MANEUVERS

At OPS 304:

72. Go to LOSS OF 2 H2O LOOPS ENTRY
MANEUVERS (next page) instead of ENTRY
MANEUVERS (Cue Card)

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EPCL/3,4/GEN M

LOSS OF 2 H2O LOOPS ENTRY MANEUVERS

FLIGHT CONDITIONS	MANEUVER
EI-5	cb MNA,MNB DDU L (two) – cl √LVLH ATT GNC, OPS 304 PRO * If PREBANK, R/Y – CSS * * Roll at 1°/sec to <input type="text"/> <input type="text"/> <input type="text"/> * * Maintain PREBANK ±5° * L FLT CNTLR PWR – ON Use two IDP/CRTs with four MDUs as reqd √IMU FAN B – ON AV BAY 1 FAN A – ON BRAKES (three) – ON cb ADTA 1,2,3 (three) – cl MDM FF4 – ON GNC I/O RESET
‘Guidance Box’ @ q ~ 8 or D ~ 3	CLOSED LOOP GUIDANCE _____:_____: * If PREBANK: P,R/Y – AUTO * Begin AIL trim monitoring
D = 11	√DRAG H
ΔAZ = 10.5°	FIRST ROLL REVERSAL <input type="text"/> <input type="text"/> <input type="text"/> (DEL PAD)
V = 19K	√HYD MPS/TVC ISOL VLV SYS (three) – CL <input type="text"/> G50 GPS, INCORPORATE
V = 15K	TACAN 1 – GPC
V = 12K	RAD BYP VLV MODE (two) – AUTO CNTLR LOOP (two) – AUTO B(A) <u>ACTIVATE ENTRY COMM</u> √L,R AUD PWR – AUD √AUD CTR – 1 UHF MODE sel – SPLX S-BD PM CNTL – PNL,CMD GNC I/O RESET OI PCMMU PWR – 1 √FORMAT – FXD Sel best S-BD PM ANT – suggest LRF
V = 10K	√SPDBK to 81%
V = 7K	√TACAN & GPS status
V = 5K	ADTA PROBES – DEPLOY (√HEAT) Begin AIL and RUD trim monitoring

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EPCL/3,4/GEN M,3

LOSS OF 2 H2O LOOPS ENTRY MANEUVERS

FLIGHT CONDITIONS	MANEUVER
M = 2.9	Pwr one HUD, one MLS, one RA for landing GNC I/O RESET
M = 2.7	cb MNB,MNC DDU R (two) – cl R FLT CNTLR PWR – ON √APUs TRIM PNL (two) – OFF RHC/PNL (two) – ENA
* If M < 2.5, P CSS for ADTA to G&C incorp *	
M = 2.0	Ensure ADTA to G&C, else check Theta Limits
M < 1.0	* For Bailout procs, go to BAILOUT MODE 8 (next page) * P,R/Y – CSS as reqd √ANTISKID – ON √SPDBK CMD vs POS √NWS – 1
M = 0.7	√LG EXTD ISO VLV – OP
h = 15K	√MLS (if activated)
h = 10K	√A/L (KSC – Tabs, Visors, Suit O2)
h = 2K	LDG GEAR ARM pb – push (ARM It on)
h = 300	LDG GEAR DN pb – push (DN It on)
MAIN GEAR TD	SPDBK – 100%
V = 195 KEAS	DRAG CHUTE ARM,DPY pb (two) – push (simo) (all Its on)
V = 185 KEAS	DEROTATE
NOSE GEAR TD	SRB SEP – MAN/AUTO, SRB SEP pb – push (SEP It on) √AUTO LOAD RELIEF √HYD BK ISOL VLV (three) – OP
V < 120 KGS or 5K' remaining	BRAKE as reqd (8-10 FPS ² , -0.25 to -0.3 G)
* If 5K' remaining and V > 140 KGS – MAX BRAKING *	
V = 60 KGS	DRAG CHUTE JETT pb – push (JETT1,JETT2 It on)
V = 40 KGS	BRAKE < 6 FPS ² (-0.2 G) (Antiskid cutout)
WHEEL STOP	DIRECT O2 vlv – CL Go to <u>EMER PWRDN</u> (Cue Card)

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EPCL/ALL/GEN M,9

**BAILOUT
MODE 8**

REPORT POSITION

√MACH < 1.0

P,R/Y – CSS

OPS 305/603 PRO (if reqd)

SB – AUTO; BF – AUTO

FLY 185-195 KEAS, $\Phi = 0^\circ$

ABORT MODE – ATO

ABORT PBI – PUSH

P,R/Y – AUTO

FLT CNTLR PWR (two) – OFF

~50K FT

TABS – RELEASE

VISOR – CLOSE/LOCK

SUIT O2 – ON

GREEN APPLE – PULL

~40K FT

MS3 – VENT CABIN

CDR,PLT SEATS – LOWER

KNEEBOARDS – REMOVE

COOLING – DISCONNECT

SEAT RESTRAINT – RELEASE

D-RING – UNCOVER

~30K FT

MS3 – JETTISON HATCH

COMM – DISCONNECT

(G-SUIT CLIP – PULL)

SUIT O2 – DISCONNECT

EGRESS SEAT

POLE – DEPLOY

D-RING – HOOK UP

BAILOUT

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EPCL/ALL/GEN M

MS OVHD PANEL PWRDN

- O13:A 1. Minimize Itg on Aft Flt Deck and Middeck
- :C 2. cb ESS 1BC MTU A – op
- O14:A 3. 2CA C/W B – op
- :B 4. BRAKES MNA – OFF
- 5. cb MNA OI SIG CONDR OF 1/4 A – op
- 6. MDM OF 1/2 A,3/4 A (two) – op
- 7. H2O BYP LOOP 1 SNSR – op
- 8. EVENT TIMER AFT – op
- :E 9. ADTA 1 – op
- 10. DDU L,AFT (two) – op
- :F 11. MMU 1 – OFF
- O15:A 12. BRAKES MNB – OFF
- :B 13. cb MNB OI SIG CONDR OF 1/4 B,2/3 A (two) – op
- 14. MDM OF 1/2 B – op
- 15. H2O BYP LOOP 2 SNSR – op
- 16. MSN TIMER AFT – op
- :E 17. ADTA 2 – op
- 18. DDU L,R (two) – op
- :F 19. MMU 2 – OFF
- 20. ACCEL 4 – OFF
- O16:A 21. BRAKES MNC – OFF
- :B 22. cb MNC OI SIG CONDR OF 2/3 B – op
- 23. MDM OF 3/4 B – op
- :E 24. ADTA 3,4 (two) – op
- 25. DDU R,AFT (two) – op
- If prior to D/O TIG:
- A13 26. GPS PWR – OFF

**LOSS 2 H2O LOOPS
ENTRY
MS PAGE**

A10-21

OV103,104

EPCL/3,4/GEN M

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**LOSS 2 H2O LOOPS
ENTRY
MS PAGE**

A10-22

OV103,104

EPCL/ALL/GEN M

COMM PWRDN

NOTE

- MS Perform COMM PWRDN ASAP. If comm reqd prior to landing site coverage, use COMM POWERUP proc, 10-25
- A1L 1. S-BD PM ANT SW ELEC – OFF
PRE AMP – OFF
PWR AMPL STBY – OFF
OPER – OFF
MODE sel – STDN LO
XPNDR – OFF
2. NSP PWR – OFF
ENCRYPTION PWR – OFF
(Encrypt disabled for rest of flight)
ENCRYPTION MODE – SEL
SEL – BYP
- C3 3. S-BD PM CNTL – PNL
OI PCMMU PWR – OFF
FORMAT – FXD
AUD CTR – OFF (pwr up as reqd for cockpit audio)
- O6 4. UHF MODE sel – OFF
A1L 5. √S-BD PL CNTL – PNL
√PWR SYS – OFF
PL DATA INTLVR PWR – OFF
- A1R 6. S-BD FM CNTL – PNL
PWR – OFF
- R14:B 7. cb MNA,MNC GCILC (two) – op
If after TIG-15:
8. Go to AFT PANEL CONFIG FOR ENTRY COMM,
10-27

**LOSS 2 H2O LOOPS
ENTRY
MS PAGE**

A10-23

OV103,104

EPCL/ALL/GEN M

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**LOSS 2 H2O LOOPS
ENTRY
MS PAGE**

A10-24

OV103,104

EPCL/ALL/GEN M

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

- Pwr up audio sys:
- C3 1. AUD CTR – 1
 - O5 √L AUD PWR – AUD
 - O9 √R AUD PWR – AUD
- If UHF avail, config for UHF COMM (voice only):
- O6 2. UHF MODE sel – SPLX
 √SPLX/EVA PWR AMPL – ON
- After comm with MCC complete:
- 3. Go to COMM PWRDN >>
- If UHF site unavail or if MCC requests data
(config for GSTDN(SGLS) S-BD):
- C3 4. √S-BD PM CNTL – PNL
 - A1L 5. ANT SW ELEC – 2
 MODE sel – STDN LO(SGLS)
 XPNDR – 2
 NSP PWR – 2
 √DATA RATE XMIT – HI
 RCV – HI
 CODING XMIT – OFF
 RCV – OFF
 √UPLK DATA – S-BD
 - C3/F9 6. Sel best S-BD PM ANT
- If MCC requests data:
- O14:B 7. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
 - C3 8. OI PCMMU PWR – 1
 - O6 9. MDM PL2 – ON
 - 10. (BFS) GNC I/O RESET
- At end of data transmission:
- O14:B 11. cb MNA OI MDM OF 1/2 A,3/4 A
 (two) – op
- After comm/data complete:
- 12. Go to COMM PWRDN >>

Cont next page

**LOSS 2 H2O LOOPS
ENTRY
MS PAGE**

A10-25

OV103,104

EPCL/ALL/GEN M

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

<p>CAUTION</p> <p>This is a High Pwr Mode. On-time should be limited to 10 min max due to Pwr Amp Thermal constraints. A 3-min delay occurs after S-BD PM PNL/CMD before Pwr Amp is active. Uplink not affected. Proceed with sel of best antenna</p>
--

- | | |
|-------------------|---|
| C3
A1L | 13. √S-BD PM CNTL – PNL
ANT SW ELEC – 2
PRE AMP – 2
PWR AMPL OPER – 2
MODE sel – TDRS DATA
XPNDR – 2
NSP PWR – 2
√DATA RATE XMIT – HI
RCV – HI
CODING XMIT – ON
RCV – ON
√UPLK DATA – S-BD |
| C3/F9 | Sel best S-BD PM ANT |
| O14:B
C3
O6 | If MCC requests data:
14. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
15. OI PCMMU PWR – 1
16. MDM PL2 – ON
17. (BFS) GNC I/O RESET |
| O14:B | At end of data transmission:
18. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
After comm/data complete:
19. Go to COMM PWRDN |

AFT PANEL CONFIG FOR ENTRY COMM:

On GO from CDR at deorbit TIG-15 min:
R14:B 1. cb MNA,MNC GCILC (two) – cl
C3 2. S-BD PM CNTL – CMD
A1L 3. ANT SW ELEC – 2
MODE sel – STDN LO
XPNDR – 2
4. NSP PWR – 2
DATA RATE XMIT – HI
RCV – HI
√UPLK DATA – S-BD
CODING XMIT – OFF
RCV – OFF

LOSS 2 H2O LOOPS
ENTRY
MS PAGE

A10-27

OV103,104

EPCL/ALL/GEN M

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**LOSS 2 H2O LOOPS
ENTRY
MS PAGE**

A10-28

OV103,104

EPCL/ALL/GEN M

LOSS OF CAB PRESS

NOTE

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

- | | | |
|-------------------|-----|---|
| C3 | 1. | MSTR MADS PWR – OFF |
| | 2. | Minimize Itg |
| | 3. | Use one IDP/CRT with two MDUs |
| | 4. | Use one PGSC only as reqd |
| | | If FLT CNTLR PWR not reqd: |
| O14,O15,
O16:E | 5. | cb DDU L,R,AFT (six) – op |
| | 6. | cb ADTA (four) – op |
| O16:E | 7. | MNC RCS/OMS PRPLT QTY GAUGE – op |
| | 8. | Perform <u>PL PWRDN</u> , then: |
| O7 | 9. | TACAN MODE sel (three) – OFF |
| O8 | 10. | MLS (three) – OFF |
| | | RDR ALTM (two) – OFF |
| L1 | 11. | HUM SEP (two) – OFF |
| | 12. | CAB TEMP CNTLR – OFF |
| | 13. | √H2O LOOP 2(1) BYP MODE – MAN |
| | | MAN – DECR (hold 30 sec) |
| | 14. | √FLOW PROP VLV LOOP tb (two) – ICH |
| L2 | 15. | ANTISKID – OFF |
| | | NWS – OFF |
| L4:L | 16. | cb AC1,AC2 ΦA CAB T CNTLR 1,2 (two) – op |
| | 17. | Go to LOSS OF CABIN PRESS ENTRY DELTAS
PULLOUT PAGE, 10-31 |

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A10-29

EPCL/3,4/GEN M

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A10-30

EPCL/ALL/GEN M

LOSS OF CABIN PRESS 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.

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

A. Deltas to NOMINAL DEORBIT PREP PROCEDURES (DEORBIT PREP, NOMINAL DEORBIT PREP)

1. Minimize use of IDPs, MDUs, FLT CNTLR PWR, DDUs. Use one PGSC
2. In ENT SWITCH LIST/VERIF, do not activate pwrn items

B. Deltas to DEORBIT BURN (ENT)

At TIG-4:

- O14,O15,
O16:E
F6,F8
1. Use two IDP/CRTs with four MDUs as reqd for deorbit burn
 2. cb DDU L,R (four) – cl
 3. 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 as reqd
 2. L,R FLT CNTLR PWR (two) – OFF
 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,
O16:E
F6
O14,O15,
O16:E
1. Use only two IDP/CRTs with four MDUs as reqd
 2. cb DDU L,R (four) – cl
 3. L FLT CNTLR PWR – ON
 4. cb ADTA 1,2,3 (three) – cl

GNC I/O RESET

Cont next page

**LOSS CAB PRESS
ENTRY
PULLOUT PAGE**

A10-31

OV103,104

EPCL/ALL/GEN M

At V = 15K:

If CAB P < 8 psia:

5. Delete NAVAIDS callout

If CAB P ≥ 8 psia:

6. Activate all TACANs, RAs, MLS

GNC I/O RESET

Disregard subs NAVAID callout DELTAs

At V = 10K:

O7

TACAN 2,3 MODE sel (two) – GPC

At M = 2.7:

Use two HUDs, MLS, and RAs as reqd

GNC I/O RESET

At M < 1.0:

L2

ANTISKID – ON

NWS – 1

LOSS CAB PRESS
ENTRY
PULLOUT PAGE

A10-32

OV103,104

EPCL/3,4/GEN M

LOSS OF 1 FREON LOOP OR HI LOAD EVAP (ENTRY)

- C3 1. √MSTR MADS PWR – OFF
- 2. Minimize Itg
- 3. Use only one IDP/CRT with two MDUs as reqd
- O7 4. TACAN 1,2,3 MODE sel (three) – OFF
- O8 5. RDR ALTM 1,2 (two) – OFF
- 6. MLS 1,2,3 (three) – OFF
- L1 7. √FLOW PROP VLV LOOP 1,2 tb (two) – ICH
- 8. √H2O LOOP 2(1) BYP MODE – MAN
MAN – DECR (hold 30 sec)
- 9. Perform PL PWRDN, then:
- L2 10. NWS – OFF
- O14,O15, 11. BRAKES (three) – OFF
O16:A
- If FLT CNTLR PWR not reqd:
- O14,O15, 12. cb DDU L,R (four) – op
O16:E
- 13. cb ADTA (four) – op
- 14. Reset EVAP OUT T C/W upper limit (ch 107,117) to 2.15v (70 deg). √MCC to update B/U C/W, if reqd
- 15. Go to DEORB OR ENTRY PULLOUT PAGE for appropriate failure:
LOSS OF HI LOAD EVAP
LOSS OF 1 FREON LOOP

OV103,104

A10-33

EPCL/3,4/GEN M

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A10-34

EPCL/ALL/GEN M

LOSS OF HI LOAD EVAP DEORB OR ENTRY PULLOUT PAGE

DO NOT DISCARD; USE TO LANDING

NOTE

Incorporate following changes or remove this page for use with indicated checklist or cue card. If entering proc after TIG-10, review entire list of deltas to determine correct config

- A. Deltas to DEORBIT BURN (ENT)
TIG-10:
O14,O15,
O16:E
1. cb DDU L,R (four) – cl
2. Use MDUs, IDPs, FLT CNTLR PWR as reqd for burn
- B. Deltas to POST BURN (ENT)
F6,F8
O14,O15,
O16:E
1. L,R FLT CNTLR PWR (two) – OFF
2. cb DDU L,R (four) – op
3. Use two IDP/CRTs with four MDUs
- C. Deltas to ENTRY SW CHECK
Add:
O14,O15,
O16:A
1. BRAKES (three) – ON
2. Do not pwr NAVAIDS, NWS
- D. Deltas to ENTRY MANEUVERS (Cue Card)
At EI:
O14,O15,
O16:E
F6,F8
O14,O15,
O16:E
L2
1. cb DDU L,R (four) – cl
2. FLT CNTLR PWR (two) – ON
3. Use MDUs, IDPs as reqd
4. cb ADTA (four) – cl
5. GNC I/O RESET
6. NWS – 1

Cont next page

**LOSS OF HI LOAD EVAP
D/O PULLOUT PAGE**

A10-35

OV103,104

EPCL/ALL/GEN M

- At V = 15K:
 - Delete NAVAIDS callout
 - TACAN MODE 1,2,3 sel (three) – GPC
- O7 If AOA:
 - At V = 12K, delete RAD and add:
 - NH3 CNTLR B – PRI/GPC
- L1 At M = 2.7:
 - Use all HUDs, MLS, and RAs
 - GNC I/O RESET
- E. Post Wheel Stop
 - Go to EXPEDITED PWRDN (ENT, POST LDG)

LOSS OF 1 FREON LOOP DEORB OR ENTRY 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 DEORBIT BURN (ENT)
TIG-10:
O14,O15,
O16:E
1. cb DDU L,R (four) – cl
 2. Use two IDP/CRTs with four MDUs, two FLT CNTLR PWR for burn
- TIG-5:
L1
3. TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF
- L2
4. FLASH EVAP FDLN HTR A,B SPLY
(two) – OFF
- B. Deltas to POST BURN (ENT)
F6,F8
O14,O15,
O16:E
1. L,R FLT CNTLR PWR (two) – OFF
 2. cb DDU L,R (four) – op
 3. Use one IDP/CRT with two MDUs
- C. Deltas to ENTRY SW CHECK
Add:
O14,O15,
O16:A
1. BRAKES (three) – ON
 2. Do not pwr NAV AIDS, NWS
- D. Deltas to ENTRY MANEUVERS (Cue Card)
At EI:
O14,O15,
O16:E
F6
1. cb DDU L,R (four) – cl
 2. L FLT CNTLR PWR – ON
 3. Use two IDP/CRTs with four MDUs
- O14,O15,
O16:E
4. cb ADTA 1,2,3 (three) – cl
 5. GNC I/O RESET
- L2
6. NWS – 1

Cont next page

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

A10-37

EPCL/ALL/GEN M

- At V = 15K:
 - Delete NAVAIDS callout
 - TACAN MODE 2,3 sel (two) – GPC
- O7
- At V = 12K:
 - Perform RAD FLOW in unfailed loop
- L1
- At M = 2.7:
 - Use two HUDs, MLSs, and RAs
 - GNC I/O RESET

- E. Deltas to EVAP OUT TEMP HIGH (Cue Card)
 - If EVAP OUT T HIGH and V > 12K:
 - Establish RAD FLOW in unaffected loop:
 - RAD BYP VLV MODE 1(2) – AUTO
 - CNTR LOOP 1(2) – AUTO A(B)
 - Work steps 2-4, EVAP OUT TEMP HIGH (RADS COLD SOAKED) as written
 - If EVAP OUT T HIGH and V < 12K:
 - If FREON LOOP 1(2) failed:
 - NH3 CNTR B(A) – PRI/GPC

- L1

- F. Post Wheel Stop
 - Go to EXPEDITED PWRDN (ENT, POST LDG)

LOSS OF FES

- | | | |
|-------------------|-----|---|
| MS | 1. | If prior to TIG (prior to EI-5 if no RAD COLDSOAK):
Go to MS PWRDN, 10-43, immed |
| C3 | 2. | √MSTR MADS PWR – OFF |
| | 3. | Minimize Itg |
| | 4. | Use one PGSC and one IDP/CRT with two MDUs |
| | | If FLT CNTLR PWR not reqd: |
| O14,O15,
O16:E | 5. | cb DDU L,R,AFT (six) – op |
| O7 | 6. | √TACAN MODE sel (three) – OFF |
| O8 | 7. | √RDR ALTM (two) – OFF |
| | 8. | √MLS (three) – OFF |
| | 9. | Perform <u>PL PWRDN</u> , then: |
| L1 | 10. | CAB TEMP CNTLR – OFF |
| | 11. | H2O LOOP 2 BYP MODE – MAN
MAN – DECR (hold 30 sec)
PUMP LOOP 1 (two) – OFF, B |
| | 12. | √FLOW PROP VLV LOOP tb (two) – ICH
√TOP EVAP HTR NOZ (two) – OFF
√DUCT sel – OFF
√HI LOAD DUCT HTR sel – OFF |
| | 13. | √FLASH EVAP CNTLR (three) – OFF |
| L2 | 14. | NWS – OFF
ANTISKID – OFF |
| L4:L | 15. | cb AC1,AC2 ΦA CAB T CNTLR 1,2 (two) – op |
| | | If FRCS DUMP not reqd or time to TIG > 30 min: |
| O8 | 16. | FWD RCS MANF ISOL 1,2,3,4 (four) – CL |
| O14,O15,
O16:F | 17. | RJDF DRIVER,LOGIC (eight) – OFF |
| A14 | 18. | RCS/OMS HTR FWD RCS JET (five) – OFF |

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A10-39

EPCL/3,4/GEN M

DEORBIT/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

1. If AOA: Go to step B,1

A. Deltas to DEORBIT BURN (ENT)

1. CDR/PLT transition to ENT at nominal time

TIG-15:

2. MS Perform CONFIG FOR PLBD CLOSING (DEORB PREP, NOMINAL DEORBIT PREP)

3. CDR/PLT Minvr to deorbit burn att
Use two IDP/CRTs with four MDUs as reqd, two FLT CNTLR PWR/DDUs as reqd for burn

4. Do not perform RCS/OMS HTR config (steps 3-9)

TIG-10:

MS Perform EMER PLBD CLOSING (ECLS), 4-14, then: |

TIG-5:

MS Perform POST CLOSING CONFIG (DEORB PREP, NOMINAL DEORBIT PREP), then:

B. Deltas to POST BURN (ENT)

1. Minimize use of MDUs, IDPs, use one FLT CNTLR PWR,DDU only as reqd

At EI-18, if FRCS DUMP reqd:

O14,O15,
O16:F
O8

2. RJDF LOGIC,DRIVERS (eight) – ON

3. FWD RCS MANF ISOL 1,2,3,4 (four) – OP (tb-OP)

4. GNC 23 RCS
JET RESET – ITEM 45 EXEC
Resel deselected FRCS jets
JET RESET – ITEM 45 EXEC

5. Post FRCS DUMP (if performed),
RJDF LOGIC,DRIVERS (eight) – OFF

O14,O15,
O16:F

Cont next page

OV103,104

**LOSS OF FES
D/O PULLOUT PAGE**

A10-41

EPCL/ALL/GEN M,2

MS PULLOUT PAGE

MS PWRDN

- | | | |
|-------------------|-----|--|
| O14,O15,
O16:A | 1. | BRAKES (three) – OFF |
| O14,O15,
O16:E | 2. | cb ADTA (four) – op |
| O14,O15:B | 3. | MSN TIMER FWD,AFT (two) – op |
| | 4. | EVENT TIMER AFT,FWD (two) – op |
| :F | 5. | MMU (two) – OFF |
| A6U | 6. | ANNUN BUS SEL – OFF |
| A12 | 7. | APU HTR LUBE OIL LN (three) – OFF |
| | 8. | HYD HTR (eight) – OFF |
| A14 | 9. | RCS/OMS HTR FWD RCS – OFF
L,R POD (four) – OFF
FWD RCS JET (five) – OFF
AFT RCS JET 5 – OFF |
| R14:D | 10. | cb TV (fifteen) – op |
| :E | 11. | RMS TV (six) – op |
| A3 | 12. | MON PWR (two) – OFF |
| ML86B:A | 13. | cb MNA,MNB H2O LN HTR (two) – op |

LOSS OF FES
ENTRY
MS PAGE

A10-43

OV103,104

EPCL/ALL/GEN M

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**LOSS OF FES
ENTRY
MS PAGE**

A10-44

OV103,104

EPCL/ALL/GEN M

LOSS OF 2 FREON LOOPS (ENTRY)

WARNING

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

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

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

Earliest possible landing is req'd

NOTES

- Failure requires an immed deorbit to first avail landing site, while pwr'd dn to very low level
- Failure assumed to occur after Deorbit TIG-2:05 and before EI
- COMM POWERUP and COMM PWRDN procs should be used for comm until landing
- Preferred comm config is:
 1. UHF only
 2. GSTDN S-BD or SGLS if req'd
 3. TDRS only if mandatory

TIME CRITICAL PROCEDURES

1. Have MS execute MS OVHD AND AFT PANEL CONFIG thru FDF CONFIG, 10-57 thru 10-62, ASAP
Have second MS execute COMM PWRDN, 10-63, ASAP.
Delay 10 min max if AOS
Record MET of 2nd Freon Loop failure:

___/___:___:___

Cont next page

OV103,104

A10-45

EPCL/ALL/GEN M

PERFORM FOLLOWING PWRDN STEPS

PWRDN

- C3 2. MSTR MADS PWR – OFF
- MS R11U 3. √FC PURGE HTR – ON
√VLVS (three) – OP
- 4. Perform PL PWRDN, then:
- 5. Minimize Itg
- CRTX 6. Use only one FWD IDP/CRT (save IDP3 for entry)
- F6,F8 7. FLT CNTLR PWR (two) – OFF
- If pre TIG-45:
- 8. Delete APU prestart
- If post TIG-45 and pre EI-13:
- 9. Shut dn running APU. Back out of
Prestart for others (leave BLR
CTLR/HTR – ON, BLR PWR – ON)
- R2 10. Shut dn APU 2. Use APUs 1,3 for landing

CONFIG GPC 1 TO MC 3

If in MM302 or MM303:

11. GNC, OPS 301 PRO

12. GNC 0 GPC MEMORY

CONFIG – ITEM 1 +3 EXEC

Modify MC 3 per table ----->

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

13. GNC, OPS 301 PRO

(302,303 as reqd)

14. GNC 50 HORIZ SIT

Resel RWY

For any IDP that is OFF:

15. GPC/CRT 1/X EXEC

Cont next page

OV103,104

A10-46

EPCL/ALL/GEN M

- | | | |
|--------|-----|--|
| C3 | 16. | √BFC CRT DISP – OFF |
| O6 | 17. | GPC MODE 2,3,4 (three) – STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT (tb-bp)
PWR 2,3,4 (three) – OFF |
| | 18. | (BFS) GNC, OPS 301 PRO
000 PRO |
| | 19. | GPC MODE 5 – STBY (tb-RUN)
– HALT (tb-bp)
OUTPUT 5 – NORM
PWR 5 – OFF |
| CDR | 20. | Go to step 27 |
| PLT O7 | 21. | √TACAN MODE sel (three) – OFF |
| O8 | 22. | √RDR ALTM (two) – OFF
√MLS (three) – OFF |
| C3 | 23. | FCS CH (four) – AUTO |
| R4 | | HYD BK HTR (three) – OFF |
| | 24. | MPS MANF PRESS (two) – CL |
| R2 | 25. | √MPS ENG PWR (six) – OFF
He ISOL (six) – CL
PNEU He ISOL – CL
L ENG He XOVR – CL
HYD CIRC PUMP (three) – OFF |
| PLT | 26. | Continue at step 50 |
| L1 | 27. | HUM SEP (two) – OFF |
| | 28. | √IMU FAN B – ON
A,C (two) – OFF |
| L4:F | 29. | cb AC1 H2O LOOP PUMP 1A/2 (three) – cl |
| L1 | | H2O PUMP LOOP 1 – A,ON |
| | 30. | LOOP 1 BYP MODE – MAN
MAN – DECR (hold 30 sec) |
| | 31. | PUMP LOOP 2 – OFF |
| | 32. | CAB TEMP sel – COOL |
| | 33. | FAN (two) – OFF |
| | 34. | AV BAY 1,2,3 FAN (six) – OFF |
| | 35. | √FREON PUMP LOOP 1,2 (two) – OFF
(one ON if any flow) |
| | 36. | RAD CNTLR LOOP 1,2 (two) – OFF |
| | 37. | √NH3 CNTLR A,B (two) – OFF |

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A10-47

EPCL/3,4/GEN M

- If all FREON PUMPS – OFF:
- L2 38. O2 SYS 1,2 SPLY (two) – OP (tb-OP)
 - L1 39. FLASH EVAP CNTLR PRI (two) – OFF
√SEC – OFF
 - 40. TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF
HI LOAD DUCT HTR sel – OFF
 - L2 41. FLASH EVAP FDLN HTR SPLY (two) – OFF
- If one FREON PUMP ON:
- L1 42. FLASH EVAP CNTLR PRI A – ON
 - 43. TOP EVAP HTR NOZ (two) – OFF
√DUCT sel – ON
√HI LOAD DUCT HTR sel – ON
 - L2 44. FLASH EVAP FDLN HTR SPLY – OFF
- 45. ANTISKID – OFF
NWS – OFF
 - O6 46. S TRK PWR -Y,-Z (two) – OFF
 - 47. ANNUN BUS SEL ACA 2/3 – OFF
 - 48. GNC 51 OVERRIDE
IMU 1,2 – desel
 - O14,
O15:A 49. IMU 1,2 (two) – OFF
 - 50. All MDUs, IDPs – OFF (use IDP1 as reqd; 3 min OFF
for each min ON)
 - O6 51. MDM FF1,4 (two) – OFF
FA1,4 (two) – OFF
 - 52. CDR disp sws – green dot
 - O8 53. FWD RCS MANF ISOL 1,2,3,4 (four) – CL
 - O7 54. AFT L,R RCS MANF ISOL 1,4 (four) – CL
 - O14:F 55. RJDA 2A L4/R4 LOGIC, DRIVER (two) – OFF
 - 56. RJDF 1B F1 LOGIC, DRIVER (two) – OFF
 - O15:F 57. RJDA 1B LOGIC, DRIVER (two) – OFF
 - 58. RJDF 1A F2 LOGIC, DRIVER (two) – OFF
 - O16:F 59. RJDF 2A,2B LOGIC, DRIVER (four) – OFF
 - 60. RJD MANF L5/F5/R5 DRIVER – OFF
 - 61. Select ELS TIG (Use PGSC or WX TPR MSG):
Selected TIG _____:_____:_____ MET
(-) Present TIME _____:_____:_____ MET
(=) Time to TIG _____:_____:_____ MET
- If TIG > 25 min, pwr dn AFT RJD LOGIC and DRIVERS:
- O14,
O16:F 62. DAP: INRTL/PULSE
 - 63. RJDA 1A LOGIC, DRIVER (two) – OFF
2B LOGIC, DRIVER (two) – OFF

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A10-48

EPCL/3,4/GEN M

- If time to TIG \leq 40 min, then no On-Orbit Wait reqd:
 | 64. Bus Tie all MN buses and continue at step 78
 If time to TIG $>$ 40 min, then On-Orbit Wait reqd:
 65. Disconnect and shut dn two FCs for On-Orbit Wait:

NOTE
 Only UHF avail w/FC2,3 shut dn

DO NOT BUS TIE

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

WARNING
 Limit operation of GPC 1 to 1 hr. If reqd,
 restrng to GPC 2 and pwr dn GPC 1

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

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A10-49

EPCL/3,4/GEN M

WARNING

Monitor FC performance. If FC STACK TEMP ≥ 250 degF or FC V ≤ 27 , go immed to ON-ORBIT WAIT BACKOUT (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP). Restart FCs immed and perform remaining ON-ORBIT WAIT BACKOUT at specified times

- If not being currently used for comm:
- O6 78. MDM PL1, PL2 (two) – OFF
 - L4:J 79. cb AC3 Φ A SIG CONDR HUM SEP – op
 Φ B SIG CONDR IMU FAN – op
 - :K 80. cb AC1 Φ A H2O CNTLR 2 – op
:L CAB T CNTLR 2 – op
 Φ B AV BAY 2 S/C – op
 - 81. AC2 Φ A CAB T CNTLR 1 – op
 Φ B AV BAY 3 S/C – op
 - R1 82. $\sqrt{\text{O}_2, \text{H}_2}$ MANF VLV TK1, TK2 (four) – OP
 - 83. O2, H2 TK2 HTRS A, B (four) – OFF
TK1, TK3 HTRS A, B (eight) – AUTO
- If O2 TK1(TK3) QTY < 80%:
- R2 84. O2 TK1, TK3 HTRS A (two) – OFF
 - 85. BLR CNTLR/HTR 2 – OFF
PWR 2 – OFF
- If no On-Orbit Wait (two FCs not shut dn):
- If TIG > 15 min:
 - 86. Unstow CONT DEORB and go to ENTRY CONFIG (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP). (Omit step 1 of DPS ENTRY CONFIG) >>
 - If TIG < 15 min:
 - 87. Go to ENT with Deltas to DEORBIT BURN (ENT), 10-51 >>
- If proceeding with On-Orbit Wait (two FCs shut dn):
- O6 88. MDM FA1, 2, 3, 4 (four) – OFF
FF1, 2, 4 (three) – OFF
 - L4:P 89. cb AC2, AC3 Φ A LG SNSR 1, 2 (two) – op

Cont next page

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A10-50

EPCL/3,4/GEN M

W1-10 90. Install Window Shades (remove as reqd to monitor att or control cab temp)

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

91. Continue monitoring FC and go to ON-ORBIT WAIT BACKOUT (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP) (omit step 1 of DPS ENTRY CONFIG) >>

A. Deltas to DEORBIT BURN (ENT)

At TIG-15:

Omit RCS/OMS HTR RECONFIG

At TIG-5:

Omit Single APU Start

At TIG-4:

- O6 1. MDM FA4 – ON
GNC I/O RESET
- O13:A 2. cb ESS 1BC MTU A – op
- O14,O15, 3. √RJDA LOGIC,DRIVERS (eight) – ON
- O16:F 4. Sel L,R Secondary Gimbals

B. Deltas to POST BURN (ENT)

Postburn:

- O6 1. MDM FA 4 – OFF
- F6 2. √FLT CNTLR PWR – OFF
Minimize MDU, IDP use
- O14,O15, 3. √cb L,R AFT DDU (six) – op
- O16:E

Cont next page

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A10-51

EPCL/3,4/GEN M

<p>CAUTION Monitor FC performance through landing (steps 4-5)</p>
--

4. If any single FC STACK TEMP \geq 250 degF:
(Aff) ESS BUS SOURCE FC 1(2,3) – OFF
(Aff) FC MN BUS A(B,C) – OFF
When FC STACK TEMP within 5 degF of either
remaining FC, reconnect to buses
5. If all three FC STACK TEMPs \geq 250 degF – no action

Postburn prior to OPS 304:

If active GPC pwrd without cooling since TIG-10 min:

Restricting to GPC 3 (due to 1 hr limit without cooling):

- O6 6. GPC PWR 3 – ON
MODE 3 – STBY (tb-RUN)
3 – RUN
7. GNC, OPS 301 PRO

REASSIGN STRINGS TO GPC 3 IN MC 3

8. GNC 0 GPC MEMORY
CONFIG – ITEM 1 +3 EXEC
Modify MC 3 per table----->

CONFIG	3
GPC	10300
STR 1	3
2	3
3	3
4	3
PL 1/2	3
CRT 1	3
2	3
3	3
4	0
L 1	0
2	0
MM 1	3
2	3

9. GNC, OPS 301,302,303 PRO

10. GNC 50 HORIZ SIT
Resel RWY

For any IDPs that are OFF:

11. GPC/CRT 3/X EXEC

12. GNC 0 GPC MEMORY
DOWNLIST GPC – ITEM 44 +3
EXEC

- O6 13. GPC MODE 1 – STBY (tb-bp)
– HALT
PWR – OFF

14. \sqrt OMS/RCS POSTBURN RECONFIGURATION

15. At EI-18: Omit FRCS DUMP (unless reqd for cg)

If reqd, FRCS ACTIVATION:

- O14:B 16. \sqrt cb OI SIG CONDR OF 1/4 A – cl
- O15:B 2/3 A – cl
- O14,O15, 17. RJDF LOGIC,DRIVERS (eight) – ON
- O16:F

Cont next page

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- O6 18. √MDM FF2,3 – ON
FF1,4 – ON
- O8 19. GNC I/O RESET
- 20. Reopen FRCS
- 21. GNC 23 RCS
RCS FWD – ITEM 1 EXEC
JET RESET – ITEM 45 EXEC
Resel deselected FRCS Jets
JET RESET – ITEM 45 EXEC
- 22. Perform FRCS DUMP per ENT
When Dump complete:
- O8 23. FWD RCS MANF ISOL 1,2,3,4 (four) – CL(tb-CL)
- O6 24. MDM FF1,4 (two) – OFF
- O14,O15,
O16:F 25. RJDF LOGIC,DRIVERS (eight) – OFF

At ENT SW CHECK:

- 26. Leave NWS – OFF
ANTISKID – OFF
NAV AIDS – OFF
(CDR disp sws – green dot)

At EI-13:

- 27. Omit Remaining APUs Start

At EI-12:

- 28. Omit SSME HYD REPRESS

At EI-11:

- 29. Omit HYD FLUID THERMAL CONDITIONING

At EI-10:

- 30. Perform APU Pre-start on 1,3
(F8 INST PWR – ON)

At EI-8:

- L1 31. AV BAY 3 FAN B – ON
CAB FAN A – ON
- C3 32. FCS CH 1,4 (two) – OFF
2,3 (two) – ORIDE
- L4:P 33. √cb AC2 ΦA LG SNSR 2 – cl
AC3 ΦA LG SNSR 1 – cl
- O14 34. ASA 1 – ON
:E cb MNA DDU L – ON
- O15:E 35. cb MNB ADTA 2 – cl
ACCEL 2 – cl
DDU L – cl
ASA 2 – ON
- O16:E 36. cb MNC ADTA 3 – cl
ACCEL 3 – cl
ASA 3 – ON
4 – ON
- 37. Go to LOSS OF 2 FREON LOOPS ENTRY
MANEUVERS (next page)

OV103,104

LOSS OF 2 FREON LOOPS ENTRY MANEUVERS

FLIGHT CONDITIONS	MANEUVER
EI-8	Use one IDP/CRT with two MDUs MA73C:B MCA LOGIC MNB AFT 2 – ON O6 MDM FF1,FF4,FA1,FA4 (four) – ON GNC I/O RESET Perform APU 1,3 start, <u>APU RESTART</u> (Cue Card) √LVLH ATT GNC, OPS 304 PRO Wait 60 sec, then: O6 MDM FF1,FF4,FA1,FA4 (four) – OFF MA73C:A MCA LOGIC MNA MID 1 – ON * If PREBANK, R/Y – CSS * * Roll at 1°/sec to <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> * * Maintain PREBANK ±5° *
EI	A13 GPS PWR – ON If OV103: GPS PRE AMPL (two) – MNC If OV104: GPS PRE AMPL (two) – ON Wait 30 sec GNC I/O RESET <input type="text"/> GNC 55 GPS STATUS INIT – ITEM 15 EXEC (*) NAV – ITEM 18 EXEC (*)
'Guidance Box' @ q ~ 8 or D ~ 3	CLOSED LOOP GUIDANCE _____:_____:_____ * If PREBANK: P,R/Y – AUTO * Begin ALL trim monitoring
D = 11	√DRAG H
ΔAZ = 10.5°	FIRST ROLL REVERSAL <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> (DEL PAD)
V = 19K	√HYD MPS/TVC ISOL VLV SYS (three) – CL <input type="text"/> G50 √GPS, INCORPORATE
V = 12K	O15,O16:A BRAKES MNB,MNC (two) – ON O6 UHF MODE sel – SPLX (G T/R if ELS) C3 AUD CTR – 1 √OI PCMMU FORMAT – FXD O5 √L AUD PWR – AUD O9 √R AUD PWR – AUD L9,R10 PS,MS AUD PWR – AUD (if reqd) If FREON LOOP 1(2) – FLOW: L1 NH3 CNTLR A(B) – PRI/GPC
	If command or data reqd: C3 OI PCMMU PWR – 2 O6 MDM PL2 – ON C3 S-BD PM CNTL – PNL,CMD CRTX GNC I/O RESET ANT SW – sel best ANT On MCC call: O6 MDM PL2 – OFF C3 OI PCMMU PWR – OFF
V = 10K	√SPDBK to 81%
V = 7K	√GPS status

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A10-54

EPCL/3,4/GEN M

LOSS OF 2 FREON LOOPS ENTRY MANEUVERS

FLIGHT CONDITIONS	MANEUVER
V = 5K	ADTA PROBES – DEPLOY (check HEAT, only one side if reqd) Begin AIL and RUD trim monitoring
M = 4	MDM FF1 – ON GNC I/O RESET
M = 2.9	O8 RDR ALTM 2 – ON L1 CAB FAN (two) – OFF Use no landing aids (HUD,MLS) unless reqd to safely land the vehicle If MLS reqd: L HUD DATA BUS – 2, if reqd GNC I/O RESET
M = 2.7	√APUs R2 APU SPEED SEL (two) – HI F3 TRIM PNL (two) – OFF RHC/PNL (two) – ENA
* If M < 2.5, P CSS for ADTA to G&C incorp *	
M = 2.0	Ensure ADTA to G&C, else check Theta Limits If NWS not reqd: MDM FF1 – OFF
M < 1.0	* For Bailout procs, go to BAILOUT MODE 8 (next page) * O15:E cb MNB DDU R – cl (if NWS reqd) O16:E cb MNC DDU R – cl (if NWS reqd) F7 L FLT CNTLR PWR – ON P,R/Y – CSS as reqd √SPDBK CMD vs POS F8 R FLT CNTLR – ON (if NWS reqd) L2 ANTISKID – ON If NWS reqd: L2 NWS – 1
M = 0.7	LG EXTD ISO VLV – OP HYD BK ISOL VLV 1 – OP
h = 15K	√MLS (if on)
h = 10K	√A/L (KSC – Tabs, Visor, Suit O2)
h = 2K	LDG GEAR ARM pb – push (ARM It on)
h = 300	LDG GEAR DN pb – push (DN It on)
MAIN GEAR TD	SPDBK – 100%
V = 195 KEAS	DRAG CHUTE ARM,DPY pb (two) – push (simo) (all Its on)
V = 185 KEAS	DEROTATE
NOSE GEAR TD	SRB SEP – MAN/AUTO, SRB SEP pb – push (SEP It on) √AUTO LOAD RELIEF √HYD BK ISOL VLV 1,3 (two) – OP
V < 120 KGS or 5K' remaining	BRAKE as reqd (8-10 FPS ² , -0.25 to -0.3 G)
* If 5K' remaining and V > 140 KGS – MAX BRAKING *	
V = 60 KGS	DRAG CHUTE JETT pb – push (JETT1,JETT2 It on)
V = 40 KGS	BRAKE < 6 FPS ² (-0.2 G) (Antiskid cutout)
WHEEL STOP	Go to <u>EMER PWRDN</u> (Cue Card)

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A10-55

EPCL/ALL/GEN M,9

**BAILOUT
MODE 8**

REPORT POSITION

√MACH < 1.0

P,R/Y – CSS

OPS 305/603 PRO (if reqd)

SB – AUTO; BF – AUTO

FLY 185-195 KEAS, $\Phi = 0^\circ$

ABORT MODE – ATO

ABORT PBI – PUSH

P,R/Y – AUTO

FLT CNTLR PWR (two) – OFF

~50K FT

TABS – RELEASE

VISOR – CLOSE/LOCK

SUIT O2 – ON

GREEN APPLE – PULL

~40K FT

MS3 – VENT CABIN

CDR,PLT SEATS – LOWER

KNEEBOARDS – REMOVE

COOLING – DISCONNECT

SEAT RESTRAINT – RELEASE

D-RING – UNCOVER

~30K FT

MS3 – JETTISON HATCH

COMM – DISCONNECT

(G-SUIT CLIP – PULL)

SUIT O2 – DISCONNECT

EGRESS SEAT

POLE – DEPLOY

D-RING – HOOK UP

BAILOUT

OV103,104

A10-56

EPCL/ALL/GEN M

MS OVHD AND AFT PANEL CONFIG

NOTE

Execute continuous purge ASAP

- R11U 1. FC PURGE HTR – ON
VLVS (three) – OP
- 2. Minimize ltg on Aft Flt Deck
- O13:A 3. cb ESS 1BC C/W A – op
- :B 4. CRYO QTY O2,H2 TK2 (two) – op
- :C 5. cb ESS 2CA C/W B – op (all SM tones and C/W
lights and tones lost; CRT FAULT SUMM and SM
ALERT It remains)
cb ESS 2CA MTU B – op
- :E 6. 3AB GPC STAT – op
- O14:A 7. BRAKES MNA – OFF
- 8. RGA 1 – OFF
- :B 9. cb MNA OI MDM OF 1/2 A – op
3/4 A – op
H2O BYP LOOP 1 SNSR – op
MSN TIMER FWD – op
EVENT TIMER AFT – op
- :C 10. UTIL PWR O19/MO52J – op
- :D 11. FREON RAD CNTLR 1,2 (two) – op
O2/N2 CNTLR 1 – op
CAB VENT – op
VENT ISOL – op
- :E 12. ADTA 1 – op
ACCEL 1 – op
DDU L – op
AFT – op
- :F 13. MMU 1 – OFF

Cont next page

**LOSS 2 FREON LOOPS
ENTRY
MS PAGE**

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EPCL/3,4/GEN M

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**LOSS 2 FREON LOOPS
ENTRY
MS PAGE**

A10-60

OV103,104

EPCL/ALL/GEN M

POLE SETUP

Perform ESCAPE POLE STOWAGE/SETUP (Cue Card), then:

SEAT INSTALLATION

Confirm minimum lgt on Middeck

FDF CONFIG

If TIG > 15 min:

1. Unstow CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP; pull out COMM pages for comm cycling >>

If Post TIG-10 min:

Config AFT PANEL FOR ENTRY COMM:

NOTE

Proc configs aft panel for landing site
comm coverage at V = 12K

- | | | |
|-------|----|---|
| R14:B | 2. | cb GCILC (two) – cl |
| C3 | 3. | √S-BD PM CNTL – CMD |
| A1L | 4. | S-BD PM ANT SW ELEC – 2
MODE sel – STDN LO
XPNDR – 2 |
| | 5. | NSP PWR – 2
DATA RATE XMIT – HI
RCV – HI
√UPLK DATA – S-BD
√CODING XMIT – OFF
√RCV – OFF |

**LOSS 2 FREON LOOPS
ENTRY
MS PAGE**

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EPCL/ALL/GEN M

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**LOSS 2 FREON LOOPS
ENTRY
MS PAGE**

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OV103,104

EPCL/ALL/GEN M

FC REACTANT VLV CLOSED, 5-12:

5. Replace step 2 with
 2. If aff FC/MN BUS tied and COOL
P > 40:
MN BUS TIE (three) – ON (ASAP)
(Aff) MN BUS TIE (one) – OFF
(ASAP)
 6. Delete following steps:
FC DELTA V 1(2,3), steps 1,4,5;
FC pH 1(2,3), steps 1,5,6
 7. Replace following steps with:
If aff FC/MN BUS tied:
MN BUS TIE (three) – ON
(Aff) MN BUS TIE (one) – OFF
FC DELTA V 1(2,3), step 3;
pH 1(2,3), step 4;
SAFING, step 7
 8. BUS TIE: In steps 1 and 7, delete (A to ...A)
- C. Deltas to ENTRY MANEUVERS (Cue Card)
At V = 15K, repwr all TACANs, MLS, and RAs

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EPCL/3,4/GEN M

LOSS OF 2nd FC (ENTRY)

1. Perform PWRDN ASAP while continuing nominal deorbit prep and/or entry activities
 - * 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 *
 - C3 2. √MSTR MADS PWR – OFF
If prior to TIG and two MN buses lost:
 3. Delay deorbit, contact MCC, and continueIf one MN bus down:
 4. Perform EPS, BUS LOSS ACTION, 5-25, only, then:
 - R2 5. √HYD CIRC PUMP (three) – OFF
 6. Minimize Itg
 7. Perform PL PWRDN, then:
 8. Use only one FLT CNTLR PWR, one PGSC, and two IDP/CRTs
- Recover any aff IMUs:
9. GNC 21 IMU ALIGN
Wait for OPER * (~4 min), then I/O RESET
Align IMU, using IMU/IMU option
When align complete:
 10. GNC 51 OVERRIDE
Aff IMU – reset
- O7 11. √TACAN MODE sel (three) – OFF
 - O8 12. √RDR ALTM (two) – OFF
 13. √MLS (three) – OFF
 - L2 14. √FLASH EVAP FDLN HTR SPLY (two) – OFF
 - L1 15. √CAB FAN A(B) – ON
√One FAN in each AV BAY – ON

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EPCL/3,4/GEN M

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EPCL/ALL/GEN M

- At EI-15, if GPS 1 or 2 failed:
- O7 10. GPS 3 PWR – ON
 Wait 30 sec
 GNC I/O RESET
 GNC 55 GPS STATUS
 INIT – ITEM 16 EXEC
 NAV – ITEM 19 EXEC
11. Deltas to ENTRY MANEUVERS (Cue Card)
At EI:
O13:A cb ESS 1BC C/W A – cl

NOTE

Post rollout: Immed pwr dn air cooled
equipment in AV BAY 3, EQUIPMENT
COOLING MATRIX (ECLS), 4-1

LOSS OF 2 H2O LOOPS (ENTRY)

NOTES

- Use ENT proc(s) except when this pwrtn overrides it
- Second failure assumed to occur between EOM TIG-45 min and EI-5 min
- This proc pwrts dn 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 (10 min MAX)
- Call ground at every avail UHF site

If EOM TIG > 45 min:

1. Go to LOSS OF 2 H2O LOOPS, TIME CRITICAL PROCEDURES (ORB PKT, PWRDN) >>

TIME CRITICAL PROCEDURES (execute simo)

2. Have MS perform MS OVHD PANEL PWRDN, 10-21, ASAP
3. Have another MS perform COMM PWRDN, 10-23, ASAP
4. Perform CDR AND PLT PWRDN, 10-12, ASAP

Cont next page

B10-11

OV105

EPCL/ALL/GEN M

CDR AND PLT PWRDN

- C3 5. √MSTR MADS PWR – OFF
- 6. Minimize Itg
- 7. Perform PL PWRDN, then:
- 8. Use only one IDP/CRT with two MDUs as reqd (cycle IDPs, MDUs)
- F6,F8 9. FLT CNTLR PWR (two) – OFF, use one as reqd (pwr assoc DDU when reqd)
- If pre TIG:
- O7 10. GPS PWR (three) – OFF
- O8 11. RDR ALTM (two) – OFF
- 12. MLS (three) – OFF
- L1 13. √H2O PUMP LOOP 1,2 (two) – OFF
- 14. If any flow: Leave H2O pump on, minimize bypass
- If H2O LOOP 1 PUMP A(B) ON:
- MA73C:A 15. √MCA LOGIC MNA FWD 1 – ON
MNB FWD 2 – ON
- L1 16. HUM SEP A,B (two) – OFF
(one ON if either H2O Loop ON)
- 17. CAB FAN (two) – OFF
- 18. TEMP CNTLR – OFF
- 19. FREON PUMP LOOP 1 – OFF
√2 – B
- 20. √FLOW PROP VLV LOOP (two) – ICH (tb-ICH)
- 21. FLASH EVAP CNTLR PRI B – OFF
A – GPC
- L2 22. O2 SYS 1 SPLY – CL (tb-CL)
- O6 23. MDM PL1 – OFF
FF4 – OFF

Cont next page

B10-12

OV105

EPCL/5/GEN M

- L1 73. AV BAY 3 FAN B – ON
 √2 FAN A – ON
 1 FAN A,B (two) – OFF
 2 FAN B – OFF
 3 FAN A – OFF

ENTRY MANEUVERS

At OPS 304:

74. Go to LOSS OF 2 H2O LOOPS ENTRY
 MANEUVERS (next page) instead of ENTRY
 MANEUVERS (Cue Card)

LOSS OF 2 H2O LOOPS ENTRY MANEUVERS

FLIGHT CONDITIONS	MANEUVER
EI-5	cb MNA,MNB DDU L (two) – cl √LVLH ATT GNC, OPS 304 PRO * If PREBANK, R/Y – CSS * * Roll at 1°/sec to <input type="text"/> <input type="text"/> <input type="text"/> * * Maintain PREBANK ±5° * L FLT CNTLR PWR – ON Use two IDP/CRTs with four MDUs as reqd √IMU FAN B – ON AV BAY 1 FAN A – ON BRAKES (three) – ON cb ADTA 1,2,3 (three) – cl MDM FF4 – ON GNC I/O RESET
'Guidance Box' @ q̄ ~ 8 or D ~ 3	CLOSED LOOP GUIDANCE _____:_____: * If PREBANK: P,R/Y – AUTO * Begin AIL trim monitoring
D = 11	√DRAG H
ΔAZ = 10.5°	FIRST ROLL REVERSAL <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> (DEL PAD)
V = 19K	√HYD MPS/TVC ISOL VLV SYS (three) – CL <input type="text"/> GPS, INCORPORATE
V = 12K	RAD BYP VLV MODE (two) – AUTO CNTLR LOOP (two) – AUTO B(A) <u>ACTIVATE ENTRY COMM</u> √L,R AUD PWR – AUD √AUD CTR – 1 UHF MODE sel – SPLX S-BD PM CNTL – PNL,CMD GNC I/O RESET OI PCMMU PWR – 1 √FORMAT – FXD Sel best S-BD PM ANT – suggest LRF
V = 10K	√SPDBK to 81%
V = 7K	√GPS status * If ELS: UHF MODE sel – G T/R *
V = 5K	ADTA PROBES – DEPLOY (√HEAT) Begin AIL and RUD trim monitoring

OV105

EPCL/5/GEN M

B10-17

LOSS OF 2 H2O LOOPS ENTRY MANEUVERS

FLIGHT CONDITIONS	MANEUVER
M = 2.9	Pwr one HUD, one MLS, one RA for landing GNC I/O RESET
M = 2.7	cb MNB,MNC DDU R (two) – cl R FLT CNTLR PWR – ON √APUs TRIM PNL (two) – OFF RHC/PNL (two) – ENA
* If M < 2.5, P CSS for ADTA to G&C incorp *	
M = 2.0	Ensure ADTA to G&C, else check Theta Limits
M < 1.0	* For Bailout procs, go to BAILOUT MODE 8 (next page) * P,R/Y – CSS as reqd √ANTISKID – ON √SPDBK CMD vs POS √NWS – 1
M = 0.7	√LG EXTD ISO VLV – OP
h = 15K	√MLS (if activated)
h = 10K	√A/L (KSC – Tabs, Visors, Suit O2)
h = 2K	LDG GEAR ARM pb – push (ARM It on)
h = 300	LDG GEAR DN pb – push (DN It on)
MAIN GEAR TD	SPDBK – 100%
V = 195 KEAS	DRAG CHUTE ARM,DPY pb (two) – push (simo) (all Its on)
V = 185 KEAS	DEROTATE
NOSE GEAR TD	SRB SEP – MAN/AUTO, SRB SEP pb – push (SEP It on) √AUTO LOAD RELIEF √HYD BK ISOL VLV (three) – OP
V < 120 KGS or 5K' remaining	BRAKE as reqd (8-10 FPS ² , -0.25 to -0.3 G)
* If 5K' remaining and V > 140 KGS – MAX BRAKING *	
V = 60 KGS	DRAG CHUTE JETT pb – push (JETT1,JETT2 It on)
V = 40 KGS	BRAKE < 6 FPS ² (-0.2 G) (Antiskid cutout)
WHEEL STOP	DIRECT O2 vlv – CL Go to <u>EMER PWRDN</u> (Cue Card)

OV105

B10-18

EPCL/ALL/GEN M,9

**BAILOUT
MODE 8**

REPORT POSITION

√MACH < 1.0

P,R/Y – CSS

OPS 305/603 PRO (if reqd)

SB – AUTO; BF – AUTO

FLY 185-195 KEAS, $\Phi = 0^\circ$

ABORT MODE – ATO

ABORT PBI – PUSH

P,R/Y – AUTO

FLT CNTLR PWR (two) – OFF

~50K FT

TABS – RELEASE

VISOR – CLOSE/LOCK

SUIT O2 – ON

GREEN APPLE – PULL

~40K FT

MS3 – VENT CABIN

CDR,PLT SEATS – LOWER

KNEEBOARDS – REMOVE

COOLING – DISCONNECT

SEAT RESTRAINT – RELEASE

D-RING – UNCOVER

~30K FT

MS3 – JETTISON HATCH

COMM – DISCONNECT

(G-SUIT CLIP – PULL)

SUIT O2 – DISCONNECT

EGRESS SEAT

POLE – DEPLOY

D-RING – HOOK UP

BAILOUT

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EPCL/ALL/GEN M

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B10-20

OV105

EPCL/ALL/GEN M

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

CAUTION
This is a High Pwr Mode. On-time should be limited to 10 min max due to Pwr Amp Thermal constraints. A 3-min delay occurs after S-BD PM PNL/CMD before Pwr Amp is active. Uplink not affected. Proceed with sel of best antenna

- C3
A1L
13. √S-BD PM CNTL – PNL
ANT SW ELEC – 2
PRE AMP – 2
PWR AMPL OPER – 2
MODE sel – TDRS DATA
XPNDR – 2
NSP PWR – 2
√DATA RATE XMIT – HI
RCV – HI
CODING XMIT – ON
RCV – ON
√UPLK DATA – S-BD
- C3/F9
Sel best S-BD PM ANT
- If MCC requests data:
- O14:B
C3
O6
14. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
15. OI PCMMU PWR – 1
16. MDM PL2 – ON
17. (BFS) GNC I/O RESET
- At end of data transmission:
- O14:B
18. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
- After comm/data complete:
19. Go to COMM PWRDN

**LOSS 2 H2O LOOPS
ENTRY
MS PAGE**

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OV105

EPCL/ALL/GEN M

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B10-30

OV105

EPCL/ALL/GEN M

LOSS OF 1 FREON LOOP OR HI LOAD EVAP (ENTRY)

- C3 1. √MSTR MADS PWR – OFF
2. Minimize Itg
3. Use only one IDP/CRT with two MDUs as reqd
- O8 4. RDR ALTM 1,2 (two) – OFF
5. MLS 1,2,3 (three) – OFF
- L1 6. √FLOW PROP VLV LOOP 1,2 tb (two) – ICH
7. √H2O LOOP 2(1) BYP MODE – MAN
 MAN – DECR (hold 30 sec)
8. Perform PL PWRDN, then:
- L2 9. NWS – OFF
- O14,O15, 10. BRAKES (three) – OFF
O16:A
- If FLT CNTLR PWR not reqd:
- O14,O15, 11. cb DDU L,R (four) – op
O16:E
12. cb ADTA (four) – op
13. Reset EVAP OUT T C/W upper limit (ch 107,117) to
 2.15v (70 deg). √MCC to update B/U C/W, if reqd
14. Go to DEORB OR ENTRY PULLOUT PAGE for
 appropriate failure:
 LOSS OF HI LOAD EVAP
 LOSS OF 1 FREON LOOP

OV105

EPCL/5/GEN M

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OV105

EPCL/ALL/GEN M

LOSS OF HI LOAD EVAP DEORB OR ENTRY PULLOUT PAGE

DO NOT DISCARD; USE TO LANDING

NOTE

Incorporate following changes or remove this page for use with indicated checklist or cue card. If entering proc after TIG-10, review entire list of deltas to determine correct config

- A. Deltas to DEORBIT BURN (ENT)
TIG-10:
O14,O15, O16:E
 - 1. cb DDU L,R (four) – cl
 - 2. Use MDUs, IDPs, FLT CNTLR PWR as reqd for burn

- B. Deltas to POST BURN (ENT)
F6,F8 O14,O15, O16:E
 - 1. L,R FLT CNTLR PWR (two) – OFF
 - 2. cb DDU L,R (four) – op
 - 3. Use two IDP/CRTs with four MDUs

- C. Deltas to ENTRY SW CHECK
Add:
O14,O15, O16:A
 - 1. BRAKES (three) – ON
 - 2. Do not pwr NAV AIDS, NWS

- D. Deltas to ENTRY MANEUVERS (Cue Card)
At EI:
O14,O15, O16:E
F6,F8
O14,O15, O16:E
L2
 - 1. cb DDU L,R (four) – cl
 - 2. FLT CNTLR PWR (two) – ON
 - 3. Use MDUs, IDPs as reqd
 - 4. cb ADTA (four) – cl
 - 5. GNC I/O RESET
 - 6. NWS – 1

Cont next page

L1

If AOA:

At V = 12K, delete RAD and add:
NH3 CNTLR B – PRI/GPC

At M = 2.7:

Use all HUDs, MLS, and RAs
GNC I/O RESET

- E. Post Wheel Stop
Go to EXPEDITED PWRDN (ENT, POST LDG)

LOSS OF 1 FREON LOOP DEORB OR ENTRY 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 DEORBIT BURN (ENT)
 - TIG-10:
 - 1. cb DDU L,R (four) – cl
 - 2. Use two IDP/CRTs with four MDUs, two FLT CNTLR PWR for burn
 - TIG-5:
 - 3. TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF
 - L1
 - L2
 - 4. FLASH EVAP FDLN HTR A,B SPLY
(two) – OFF
- B. Deltas to POST BURN (ENT)
 - F6,F8
 - O14,O15,
O16:E
 - 1. L,R FLT CNTLR PWR (two) – OFF
 - 2. cb DDU L,R (four) – op
 - 3. Use one IDP/CRT with two MDUs
- C. Deltas to ENTRY SW CHECK
 - Add:
 - 1. BRAKES (three) – ON
 - 2. Do not pwr NAVAIDS, NWS
- 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
 - O14,O15,
O16:E
 - 4. cb ADTA 1,2,3 (three) – cl
 - L2
 - 5. GNC I/O RESET
 - 6. NWS – 1

Cont next page

L1 At V = 12K:
Perform RAD FLOW in unfailed loop
At M = 2.7:
Use two HUDs, MLSs, and RAs
GNC I/O RESET

L1 E. Deltas to EVAP OUT TEMP HIGH (Cue Card)
If EVAP OUT T HIGH and V > 12K:
Establish RAD FLOW in unaffected loop:
RAD BYP VLV MODE 1(2) – AUTO
CNTLR LOOP 1(2) – AUTO A(B)
Work steps 2-4, EVAP OUT TEMP HIGH
(RADS COLD SOAKED) as written
If EVAP OUT T HIGH and V < 12K:
If FREON LOOP 1(2) failed:
NH3 CNTLR B(A) – PRI/GPC

F. Post Wheel Stop
Go to EXPEDITED PWRDN (ENT, POST LDG)

LOSS OF FES

- MS 1. If prior to TIG (prior to EI-5 if no RAD COLDSOAK):
Go to MS PWRDN, 10-43, immed
- C3 2. MSTR MADS PWR – OFF
3. Minimize Itg
4. Use one PGSC and one IDP/CRT with two MDUs
If FLT CNTLR PWR not reqd:
- O14,O15,
O16:E 5. cb DDU L,R,AFT (six) – op
- O8 6. RDR ALTM (two) – OFF
7. MLS (three) – OFF
8. Perform PL PWRDN, then:
- L1 9. CAB TEMP CNTLR – OFF
10. H2O LOOP 2 BYP MODE – MAN
MAN – DECR (hold 30 sec)
PUMP LOOP 1 (two) – OFF, B
11. FLOW PROP VLV LOOP tb (two) – ICH
 TOP EVAP HTR NOZ (two) – OFF
 DUCT sel – OFF
 HI LOAD DUCT HTR sel – OFF
- L2 12. FLASH EVAP CNTLR (three) – OFF
13. NWS – OFF
ANTISKID – OFF
- L4:L 14. cb AC1,AC2 Φ A CAB T CNTLR 1,2 (two) – op
If FRCS DUMP not reqd or time to TIG > 30 min:
- O8 15. FWD RCS MANF ISOL 1,2,3,4 (four) – CL
O14,O15,
O16:F 16. RJDF DRIVER,LOGIC (eight) – OFF
- A14 17. RCS/OMS HTR FWD RCS JET (five) – OFF

Cont next page

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OV105

EPCL/5/GEN M

If TIG between 15 and 60 min, HALT GPC2 and 4 and reconfig DPS:

CRT

18. If OPS 302: GNC, OPS 301 PRO

REASSIGN STRINGS GPCs 1,3 IN MC 3

CRT

19. GNC 0 GPC MEMORY
 CONFIG – ITEM 1 +3 EXEC
 Modify MC 3 per table -----▶

CONFIG	3	
GPC	10300	
STR	1	1
	2	3
	3	1
	4	3
PL	1/2	1
CRT	1	1
	2	3
	3	3
	4	0
L	1	0
	2	0
MM	1	1
	2	3

CRT

20. GNC, OPS 301 PRO
 21. BFS I/O RESET
 22. Check runway sel

O6

- If OPS 302 reqd:
 23. GNC, OPS 302 PRO
 24. GPC MODE 2,4
 (two) – STBY,HALT
 – STBY (tb-RUN)
 – HALT (tb-bp)

25. Go to DEORBIT/ENTRY DELTAS PULLOUT PAGE, 10-41

OV105

MS PULLOUT PAGE

MS PWRDN

- | | | |
|-------------------|-----|--|
| O14,O15,
O16:A | 1. | BRAKES (three) – OFF |
| O14,O15,
O16:E | 2. | cb ADTA (four) – op |
| O14,O15:B | 3. | MSN TIMER FWD,AFT (two) – op |
| | 4. | EVENT TIMER AFT,FWD (two) – op |
| :F | 5. | MMU (two) – OFF |
| A6U | 6. | ANNUN BUS SEL – OFF |
| A12 | 7. | APU HTR LUBE OIL LN (three) – OFF |
| | 8. | HYD HTR (eight) – OFF |
| A14 | 9. | RCS/OMS HTR FWD RCS – OFF
L,R POD (four) – OFF
FWD RCS JET (five) – OFF
AFT RCS JET 5 – OFF |
| R14:D | 10. | cb TV (fifteen) – op |
| :E | 11. | RMS TV (six) – op |
| A3 | 12. | MON PWR (two) – OFF |
| ML86B:A | 13. | cb MNA,MNB H2O LN HTR (two) – op |

LOSS OF FES
ENTRY
MS PAGE

B10-43

OV105
EPCL/ALL/GEN M

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**LOSS OF FES
ENTRY
MS PAGE**

B10-44

OV105
EPCL/ALL/GEN M

LOSS OF 2 FREON LOOPS (ENTRY)

WARNING

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

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

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

Earliest possible landing is req'd

NOTES

- Failure requires an immed deorbit to first avail landing site, while pwr'd dn to very low level
- Failure assumed to occur after Deorbit TIG-2:05 and before EI
- COMM POWERUP and COMM PWRDN procs should be used for comm until landing
- Preferred comm config is:
 1. UHF only
 2. GSTDN S-BD or SGLS if req'd
 3. TDRS only if mandatory

TIME CRITICAL PROCEDURES

1. Have MS execute MS OVHD AND AFT PANEL CONFIG thru FDF CONFIG, 10-57 thru 10-62, ASAP
Have second MS execute COMM PWRDN, 10-63, ASAP.
Delay 10 min max if AOS
Record MET of 2nd Freon Loop failure:

___/___:___:___

Cont next page

B10-45

OV105

EPCL/ALL/GEN M

PERFORM FOLLOWING PWRDN STEPS

PWRDN

- C3 2. MSTR MADS PWR – OFF
- MS R11U 3. √FC PURGE HTR – ON
√VLVS (three) – OP
- 4. Perform PL PWRDN, then:
- 5. Minimize Itg
- CRTX 6. Use only one FWD IDP/CRT (save IDP3 for entry)
- F6,F8 7. FLT CNTLR PWR (two) – OFF
- If pre TIG-45:
- 8. Delete APU prestart
- If post TIG-45 and pre EI-13:
- 9. Shut dn running APU. Back out of
Prestart for others (leave BLR
CTLR/HTR – ON, BLR PWR – ON)
- R2
- If post EI-13:
- 10. Shut dn APU 2. Use APUs 1,3 for landing

CONFIG GPC 1 TO MC 3

If in MM302 or MM303:

11. GNC, OPS 301 PRO

12. GNC 0 GPC MEMORY

CONFIG – ITEM 1 +3 EXEC

Modify MC 3 per table ----->

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

13. GNC, OPS 301 PRO
(302,303 as reqd)

14. GNC 50 HORIZ SIT

Resel RWY

For any IDP that is OFF:

15. GPC/CRT 1/X EXEC

Cont next page

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EPCL/ALL/GEN M

- | | | |
|------|-----|--|
| C3 | 16. | √BFC CRT DISP – OFF |
| O6 | 17. | GPC MODE 2,3,4 (three) – STBY (tb-bp)
– HALT
– STBY (tb-RUN)
– HALT (tb-bp)
PWR 2,3,4 (three) – OFF |
| | 18. | (BFS) GNC, OPS 301 PRO
000 PRO |
| | 19. | GPC MODE 5 – STBY (tb-RUN)
– HALT (tb-bp)
OUTPUT 5 – NORM
PWR 5 – OFF |
| CDR | 20. | Go to step 28 |
| PLT | | If Pre TIG: |
| O7 | 21. | GPS PWR (three) – OFF
PRE AMPL (six) – OFF |
| | | If post TIG: |
| | 22. | GPS 1,3 PWR (two) – OFF
PRE AMPL (four) – OFF |
| O8 | 23. | √RDR ALTM (two) – OFF
√MLS (three) – OFF |
| C3 | 24. | FCS CH (four) – AUTO |
| R4 | | HYD BK HTR (three) – OFF |
| | 25. | MPS MANF PRESS (two) – CL |
| R2 | 26. | √MPS ENG PWR (six) – OFF
He ISOL (six) – CL
PNEU He ISOL – CL
L ENG He XOVR – CL
HYD CIRC PUMP (three) – OFF |
| PLT | 27. | Continue at step 51 |
| L1 | 28. | HUM SEP (two) – OFF |
| | 29. | √IMU FAN B – ON
A,C (two) – OFF |
| L4:F | 30. | cb AC1 H2O LOOP PUMP 1A/2 (three) – cl
H2O PUMP LOOP 1 – A,ON |
| L1 | 31. | LOOP 1 BYP MODE – MAN
MAN – DECR (hold 30 sec) |
| | 32. | PUMP LOOP 2 – OFF |
| | 33. | CAB TEMP sel – COOL |
| | 34. | FAN (two) – OFF |
| | 35. | AV BAY 1,2,3 FAN (six) – OFF |
| | 36. | √FREON PUMP LOOP 1,2 (two) – OFF
(one ON if any flow) |
| | 37. | RAD CNTLR LOOP 1,2 (two) – OFF |
| | 38. | √NH3 CNTLR A,B (two) – OFF |

Cont next page

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OV105

EPCL/5/GEN M

- If all FREON PUMPS – OFF:
- L2 39. O2 SYS 1,2 SPLY (two) – OP (tb-OP)
 - L1 40. FLASH EVAP CNTLR PRI (two) – OFF
√SEC – OFF
 - 41. TOP EVAP HTR NOZ (two) – OFF
DUCT sel – OFF
HI LOAD DUCT HTR sel – OFF
 - L2 42. FLASH EVAP FDLN HTR SPLY (two) – OFF
- If one FREON PUMP ON:
- L1 43. FLASH EVAP CNTLR PRI A – ON
 - 44. TOP EVAP HTR NOZ (two) – OFF
√DUCT sel – ON
√HI LOAD DUCT HTR sel – ON
 - L2 45. FLASH EVAP FDLN HTR SPLY – OFF
 - 46. ANTISKID – OFF
NWS – OFF
 - O6 47. S TRK PWR -Y,-Z (two) – OFF
 - 48. ANNUN BUS SEL ACA 2/3 – OFF
 - 49. GNC 51 OVERRIDE
IMU 1,2 – desel
 - O14,
O15:A 50. IMU 1,2 (two) – OFF
 - 51. All MDUs, IDPs – OFF (use IDP1 as reqd; 3 min OFF
for each min ON)
 - O6 52. MDM FF1,4 (two) – OFF
FA1,4 (two) – OFF
 - 53. CDR disp sws – green dot
 - O8 54. FWD RCS MANF ISOL 1,2,3,4 (four) – CL
 - O7 55. AFT L,R RCS MANF ISOL 1,4 (four) – CL
 - O14:F 56. RJDA 2A L4/R4 LOGIC, DRIVER (two) – OFF
 - 57. RJDF 1B F1 LOGIC, DRIVER (two) – OFF
 - O15:F 58. RJDA 1B LOGIC, DRIVER (two) – OFF
 - 59. RJDF 1A F2 LOGIC, DRIVER (two) – OFF
 - O16:F 60. RJDF 2A,2B LOGIC, DRIVER (four) – OFF
 - 61. RJD MANF L5/F5/R5 DRIVER – OFF
 - 62. Select ELS TIG (Use PGSC or WX TPR MSG):
Selected TIG _____:_____:_____ MET
(-) Present TIME _____:_____:_____ MET
(=) Time to TIG _____:_____:_____ MET
- If TIG > 25 min, pwr dn AFT RJD LOGIC and DRIVERS:
- O14,
O16:F 63. DAP: INRTL/PULSE
 - 64. RJDA 1A LOGIC, DRIVER (two) – OFF
2B LOGIC, DRIVER (two) – OFF

Cont next page

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OV105

EPCL/5/GEN M

- If time to TIG \leq 40 min, then no On-Orbit Wait reqd:
 | 65. Bus Tie all MN buses and continue at step 79 |
 If time to TIG $>$ 40 min, then On-Orbit Wait reqd:
 66. Disconnect and shut dn two FCs for On-Orbit Wait:

NOTE
 Only UHF avail w/FC2,3 shut dn

DO NOT BUS TIE

- | | |
|------------|--|
| R11U
R1 | 67. FC PURGE VLVS 2,3 (two) – CL |
| | 68. ESS BUS SOURCE FC2,FC3 (two) – OFF |
| | 69. FC/MN BUS B,C (two) – OFF |
| | 70. FC2,FC3 – STOP |
| | 71. AC BUS SNSR 2,3 (two) – OFF |
| | 72. cb AC CONTR AC2,AC3 (six) – cl |
| | 73. INV/AC BUS 2,3 (two) – OFF |
| | 74. INV PWR 2,3 (two) – OFF |
| | 75. cb AC CONTR AC2,AC3 (six) – op |

WARNING
 Limit operation of GPC 1 to 1 hr. If reqd,
 restrng to GPC 2 and pwr dn GPC 1

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

WARNING

Monitor FC performance. If FC STACK TEMP ≥ 250 degF or FC V ≤ 27 , go immed to ON-ORBIT WAIT BACKOUT (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP). Restart FCs immed and perform remaining ON-ORBIT WAIT BACKOUT at specified times

- If not being currently used for comm:
- O6 79. MDM PL1, PL2 (two) – OFF
 - L4:J 80. cb AC3 Φ A SIG CONDR HUM SEP – op
 Φ B SIG CONDR IMU FAN – op
 - :K 81. cb AC1 Φ A H2O CNTLR 2 – op
:L CAB T CNTLR 2 – op
 Φ B AV BAY 2 S/C – op
 - 82. AC2 Φ A CAB T CNTLR 1 – op
 Φ B AV BAY 3 S/C – op
 - R1 83. $\sqrt{O_2, H_2}$ MANF VLV TK1, TK2 (four) – OP
 - 84. O2, H2 TK2 HTRS A, B (four) – OFF
TK1, TK3 HTRS A, B (eight) – AUTO
- If O2 TK1(TK3) QTY < 80%:
- R2 85. O2 TK1, TK3 HTRS A (two) – OFF
 - 86. BLR CNTLR/HTR 2 – OFF
PWR 2 – OFF
- If no On-Orbit Wait (two FCs not shut dn):
- If TIG > 15 min:
 - 87. Unstow CONT DEORB and go to ENTRY CONFIG (CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP). (Omit step 1 of DPS ENTRY CONFIG) >>
 - If TIG < 15 min:
 - 88. Go to ENT with Deltas to DEORBIT BURN (ENT), 10-51 >>
- If proceeding with On-Orbit Wait (two FCs shut dn):
- O6 89. MDM FA1, 2, 3, 4 (four) – OFF
FF1, 2, 4 (three) – OFF
 - L4:P 90. cb AC2, AC3 Φ A LG SNSR 1, 2 (two) – op

Cont next page

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OV105

EPCL/5/GEN M

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**LOSS 2 FREON LOOPS
ENTRY
MS PAGE**

B10-60

OV105
EPCL/ALL/GEN M

POLE SETUP

Perform ESCAPE POLE STOWAGE/SETUP (Cue Card), then:

SEAT INSTALLATION

Confirm minimum lbg on Middeck

FDF CONFIG

If TIG > 15 min:

1. Unstow CONT DEORB, LOSS OF 2 FREON LOOPS D/O PREP; pull out COMM pages for comm cycling >>

If Post TIG-10 min:

Config AFT PANEL FOR ENTRY COMM:

NOTE

Proc configs aft panel for landing site
comm coverage at V = 12K

- | | | |
|-------|----|---|
| R14:B | 2. | cb GCILC (two) – cl |
| C3 | 3. | √S-BD PM CNTL – CMD |
| A1L | 4. | S-BD PM ANT SW ELEC – 2
MODE sel – STDN LO
XPNDR – 2 |
| | 5. | NSP PWR – 2
DATA RATE XMIT – HI
RCV – HI
√UPLK DATA – S-BD
√CODING XMIT – OFF
√RCV – OFF |

**LOSS 2 FREON LOOPS
ENTRY
MS PAGE**

B10-62

OV105

EPCL/ALL/GEN M

COMM PWRDN

- | | | |
|-------------------|-----|---|
| MS/
CDR | 1. | Pwr dn comm ASAP after comm with MCC no longer reqd. Use COMM POWERUP, 10-65, if MCC comm reqd. Comm will be pwrd on entry by AFT PANEL CONFIG FOR ENTRY COMM (see MS PAGE 10-62) and special <u>ENTRY MANEUVERS</u> (Cue Card) |
| A1L | 2. | S-BD PM ANT SW ELEC – OFF
PRE AMP – OFF
PWR AMPL STBY – OFF
OPER – OFF
MODE sel – STDN LO
XPNDR – OFF |
| | 3. | NSP PWR – OFF
ENCRYPTION PWR – OFF
(Encrypt disabled for rest of ft)
ENCRYPTION MODE – SEL
SEL – BYP |
| C3 | 4. | S-BD PM CNTL – PNL,CMD
OI PCMMU FORMAT – FXD
PWR – OFF
AUD CTR – OFF (pwr up as reqd for cockpit audio) |
| A1L | 5. | √S-BD PL CNTL – PNL
√PWR SYS – OFF
PL DATA INTLVR PWR – OFF |
| A1R | 6. | S-BD FM CNTL – PNL
PWR – OFF |
| A3 | 7. | MON PWR (two) – OFF |
| A7U | 8. | TV PWR CONTR UNIT – OFF |
| O5 | 9. | L AUD PWR – AUD |
| O9 | 10. | R AUD PWR – AUD |
| O6 | 11. | UHF MODE sel – OFF
√MDM PL1,PL2 (two) – OFF |
| R12L | 12. | VTR PWR – OFF |
| R14:A | 13. | cb MNA ADC 1A/2A – op
MNB ADC 1B/2B – op
MNA,MNC GCILC (two) – op
TV (fifteen) – op
RMS TV (six) – op |
| R14:B
:D
:E | | |
| L9,R10 | 14. | PS,MS AUD PWR (two) – OFF |
| MO42F | 15. | MIDDECK SPKR AUD PWR – OFF |
| | 16. | If post TIG-10, perform AFT PANEL CONFIG FOR ENTRY COMM, 10-62 |

**LOSS 2 FREON LOOPS
ENTRY
MS PAGE**

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**LOSS 2 FREON LOOPS
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COMM POWERUP (If comm reqd prior to landing site coverage)

- Pwr up audio sys:
- C3 1. AUD CTR – 1
- O5 2. √L AUD PWR – AUD
- O9 3. √R AUD PWR – AUD
- Config for UHF comm (voice only):
- O6 4. UHF MODE sel – SPLX
√SPLX/EVA PWR AMPL – ON
- 5. After comm with MCC complete: Go to COMM
PWRDN, 10-63 >>
- If UHF site unavail or if MCC requests data
(config for GSTDN (SGLS) S-BD):
- C3 6. √S-BD PM CNTL – PNL
- A1L 7. ANT SW ELEC – 2
MODE sel – STDN LO (SGLS)
XPNDR – 2
- 8. NSP PWR – 2
DATA RATE XMIT – HI
RCV – HI
√CODING XMIT – OFF
RCV – OFF
UPLK DATA – S-BD
- C3/F9 9. Sel best S-BD PM ANT
- If MCC requests data:
- O14:B : 10. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
- O17:D : 11. SIG CONDR OA 1/2/3 – ON
MDM OA 1/2/3 – ON
- C3 : 12. OI PCMMU PWR – 1
- O6 : 13. MDM PL2 – ON
GNC I/O RESET
- : At end of data transmission:
- O14:B : 14. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
- O17:D : 15. SIG CONDR OA 1/2/3 – OFF
MDM OA 1/2/3 – OFF
- : After comm/data complete:
- L 16. Go to COMM PWRDN, 10-63 >>

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**LOSS 2 FREON LOOPS
ENTRY
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If UHF site and GSTDN unavail and comm/data critical:
Config for TDRS S-BD:

CAUTION

This is a High Pwr Mode. On-time should be limited to 10 min max due to Pwr Amp Thermal constraints. A 3-min delay occurs after S-BD PM PNL/CMD before Pwr Amp is active. Uplink not affected. Proceed with sel of best antenna

- C3 17. √S-BD PM CNTL – PNL
- A1L 18. √ANT SW ELEC – 2
 - √PRE AMP – 2
 - √PWR AMPL OPER – 2
 - √MODE sel – TDRS DATA
 - √XPNDR – 2
- 19. √NSP PWR – 2
 - √DATA RATE XMIT – HI
 - √RCV – HI
 - CODING XMIT – ON
 - RCV – ON
 - √UPLK DATA – S-BD
- C3/F9 20. Sel best S-BD PM ANT
- If MCC requests data:
 - O14:B : 21. cb MNA OI MDM OF 1/2 A,3/4 A (two) – cl
 - O17:D : 22. SIG CONDR OA 1/2/3 – ON
 - : MDM OA 1/2/3 – ON
 - C3 : 23. OI PCMMU PWR – 1
 - O6 : 24. MDM PL2 – ON
 - : 25. GNC I/O RESET
 - : At end of data transmission:
 - O14:B : 26. cb MNA OI MDM OF 1/2 A,3/4 A (two) – op
 - O17:D : 27. SIG CONDR OA 1/2/3 – OFF
 - L MDM OA 1/2/3 – OFF
- After comm/data complete:
 - 28. Go to COMM PWRDN, 10-63

LOSS OF 1 FC

1. Confirm Itg minimized
 2. Use only one FLT CNTLR PWR and two IDP/CRTs
 - O7 3. GPS 1,3 PWR (two) – OFF
PRE AMPL (four) – OFF
 - O8 4. RDR ALTM (two) – OFF
 5. MLS (three) – OFF
 - F1 6. DC UTIL PWR MNB – OFF
 - L2 7. FLASH EVAP FDLN HTR A,B SPLY (two) – OFF
 - L1 8. √CAB FAN A(B) – ON
- If Total Pwr > 17 kW:
- C3 9. MSTR MADS PWR – OFF
(MCC will call for MADS cycle ON/OFF)

NOTE

If second FC degrades during entry,
immed switch MSTR MADS PWR – OFF

10. Perform PL PWRDN, then:
 - A. Deltas to DEORBIT BURN (ENT)
Add at TIG-5:
 - L1 TOP EVAP HTR NOZ L,R (two) – OFF
DUCT sel – OFF
HI LOAD DUCT HTR sel – OFF
HUM SEP (two) – OFF
 - Add at EI-15:
 - O7 1. GPS 1,3 PWR (two) – ON
PRE AMPL (four) – ON
 - Wait 30 sec
GNC I/O RESET
GNC 55 GPS STATUS
INIT – ITEM 14,16 EXEC
NAV – ITEM 17,19 EXEC
 - B. Deltas to EPS procs this book
FC COOL P, 5-13:
 1. Change step 1 to read:
If aff FC/MN BUS tied and no comm:
 1. MN BUS TIE (three) – OFF
Perform BUS TIE (Cue Card) good
FC/BUS to unpwr bus

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EPCL/5/GEN M

MO10W
ML26C

2. Change step 3 to read:
 3. ESS BUS SOURCE FC – OFF
FC/MN BUS – OFF
FC – STOP
3. Replace steps 4-8 with:
 4. H2O TK N2 ISOL vlv (two) – CL
 5. SPLY H2O GN2 TK VENT vlv – VENT
4. Delete steps 12,13

FC REACTANT VLV CLOSED, 5-12:

5. Replace step 2 with
 2. If aff FC/MN BUS tied and COOL
P > 40:
MN BUS TIE (three) – ON (ASAP)
(Aff) MN BUS TIE (one) – OFF
(ASAP)
 6. Delete following steps:
FC DELTA V 1(2,3), steps 1,4,5;
FC pH 1(2,3), steps 1,5,6
 7. Replace following steps with:
If aff FC/MN BUS tied:
MN BUS TIE (three) – ON
(Aff) MN BUS TIE (one) – OFF
FC DELTA V 1(2,3), step 3;
pH 1(2,3), step 4;
SAFING, step 7
 8. BUS TIE: In steps 1 and 7, delete (A to ...A)
- C. Deltas to ENTRY MANEUVERS (Cue Card)
At V = 15K, repwr all MLS and RAs

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EPCL/5/GEN M

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LOSS OF 2nd FC (ENTRY)

1. Perform PWRDN ASAP while continuing nominal deorbit prep and/or entry activities
 - * 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 *
- C3 2. √MSTR MADS PWR – OFF
If prior to TIG and two MN buses lost:
 3. Delay deorbit, contact MCC, and continueIf one MN bus down:
 4. Perform EPS, BUS LOSS ACTION, 5-25, only, then:
- R2 5. √HYD CIRC PUMP (three) – OFF
6. Minimize Itg
7. Perform PL PWRDN, then:
8. Use only one FLT CNTLR PWR, one PGSC, and two IDP/CRTs
Recover any aff IMUs:
 9. GNC 21 IMU ALIGN
Wait for OPER * (~4 min), then I/O RESET
Align IMU, using IMU/IMU option
When align complete:
 10. GNC 51 OVERRIDE
Aff IMU – resel
- O7 11. GPS PWR (three) – OFF
PRE AMPL (six) – OFF
- O8 12. √RDR ALTM (two) – OFF
13. √MLS (three) – OFF
- L2 14. √FLASH EVAP FDLN HTR SPLY (two) – OFF
- L1 15. √CAB FAN A(B) – ON
√One FAN in each AV BAY – ON

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- If no MANF leaks:
- R1 16. $\sqrt{O_2, H_2}$ MANF VLV (four) – OP
TK1 HTRS B – AUTO (MNA or MNB ↓) or
TK2 HTRS B – AUTO (MNC or no
MN BUS ↓); then:
All others OFF
- If MANF leak:
- A1R 17. $\sqrt{O_2, H_2}$ HTR LOSS TABLE (EPS), 5-20
Sel one htr in one O2,H2 TK
18. S-BD FM CNTL – PNL
PWR – OFF
- If MNC is pwrd:
- O6 19. Proceed with normal comm operations
MDM PL1 – OFF
- If MNB is pwrd and MNC is not:
- A1L 20. \sqrt{NSP} CODING XMIT – ON
C3 \sqrt{RCV} – ON
S-BD PM MODE sel – TDRS DATA
CNTL – PNL, CMD

Reconfig DPS:
REASSIGN STRINGS TO GPCs 1,4 IN MC 3

	21. <u>GNC 0 GPC MEMORY</u>	CONFIG GPC	3			
			1	2	3	4
C3	22. FCS CH (four) – ORIDE	STR	1	1		
	23. GNC, OPS 30X PRO		2	4		
O6	24. GPC MODE 2,3 (two) – STBY (tb-bp) – HALT PWR 2,3 (two) – OFF		3	1		
		PL	1/2	4	4	
		CRT	1	1		
	25. (BFS) GNC I/O RESET		2	1		
			3	4		
			4	0		
		L	1	0		
			2	0		
		MM	1	1		
			2	4		

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- MA73C:A 26. MCA LOGIC MID (four) – OFF
 √FWD (three) – ON
 :B MID (four) – OFF
 AFT (three) – OFF
- If MNB and AC2 pwrld:
 MA73C:C 27. cb MCA PWR AC1 3Φ FWD 1 – op
 AC3 3Φ FWD 3 – op
- If only one MN BUS pwrld:
 28. Perform BUS TIE (Cue Card)
- If two MN BUSES lost:
 29. Modify entry procs per MCC direction >>

NOTE

VENT DOOR CLOSE must be performed
 prior to MM302 transition

If MM301:

- If only MNA is unpwrld:
 MA73C:A,B 30. MCA LOGIC MNC MID 2 – ON
 MNB MID 4 – ON
2: GNC 51 OVERRIDE
 CRT2 VENT DOOR CNTL CLOSE – ITEM 44 EXEC
 MA73C:A,B MCA LOGIC MNC MID 2 – OFF
 MNB MID 4 – OFF
 MNB MID 1 – ON
 MNC MID 4 – ON
 MNC AFT 3 – ON
- VENT DOOR CNTL CLOSE – ITEM 44 EXEC
 CRT2 MCA LOGIC MNB MID 1 – OFF
 MA73C:A,B MNC MID 4 – OFF
 MNC AFT 3 – OFF
- If only MNB is unpwrld:
 MA73C:A,B 31. MCA LOGIC MNC MID 2 – ON
 MNC AFT 3 – ON
2: GNC 51 OVERRIDE
 CRT2 VENT DOOR CNTL CLOSE – ITEM 44 EXEC
 MA73C:A,B MCA LOGIC MNC MID 2 – OFF
 MNC AFT 3 – OFF
 MNA MID 1 – ON
 MNA MID 3 – ON
- VENT DOOR CNTL CLOSE – ITEM 44 EXEC
 CRT2 MCA LOGIC MNA MID 1 – OFF
 MA73C:A,B MNA MID 3 – OFF

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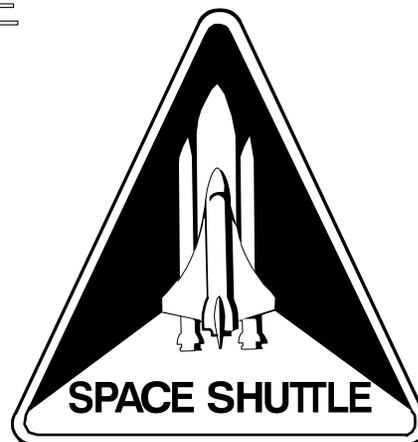
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OV105
EPCL/ALL/GEN M

Space Shuttle Program
FLIGHT DATA FILE

JSC-48021
GENERIC, REV M



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

ENTRY POCKET CHECKLIST

OV
ALL

Flight Cover (trim bottom to expose tabs)