

FLIGHT DATA FILE

Ascent/Entry Systems Procedures

**Mission Operations Directorate
Systems Division**

**Generic, Rev B
April 20, 1988**



National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

JSC-18768

MISSION OPERATIONS DIRECTORATE

ASCENT/ENTRY SYSTEMS PROCEDURES

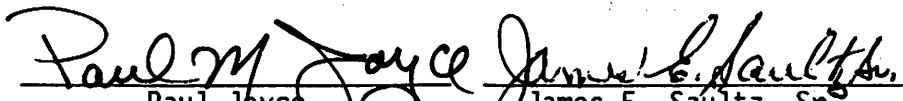
GENERIC, REVISION B
April 20, 1988

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AESP/ALL/GEN B

Incorporates the following:

482#:	AESP-214A	FDf-827B	FDf-902
	AESP-215A	FDf-849D	FDf-913
	AESP-216	FDf-858B	FDf-916A
	AESP-217A	FDf-859A	FDf-922
	AESP-218	FDf-860	FDf-923
	AESP-219A	FDf-865	FDf-926
	AESP-220A	FDf-876B	FDf-934B
	AESP-221	FDf-877B	
	AESP-222A	FDf-884	
	AESP-223A	FDf-886	
	AESP-224	FDf-891B	
	AESP-225A	FDf-892B	
	AESP-227	FDf-893B	
	AESP-230	FDf-900B	
	AESP-231	FDf-901	

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DF7/M. Robinson	483-0803
APU/HYD	DF4/D. Thelen	483-0675
COMM	DF2/H. Black	483-0775
DPS	DF2/T. Keeler	483-0848
ECLS	DF7/J. McLendon	483-0766
EPS	DF7/R. Armstrong	483-0650
GNC	DF6/J. Bantle	483-0715
OMS/RCS	DF6/R. Jackson	483-0685
MPS	DF6/J. Dingler	483-0722
PWRDN	DF7/R. Floyd	483-0752

NOTES

1. Sections 1 through 9 of this book are inserted in the front of the Mission Specialist copies of the Ascent and Entry Pocket Checklists.
2. Sections 10, 11, 12, and 13 are the Multiphase Cue Cards, the Pilot Overhead Flip Book, the Pilot's Window Flip Book and the Commander's Window Flip Book which are printed in this book for documentation and control purposes only. They will be removed from Simulator and Flight copies.
3. For Flight books only, various Ascent-only or Entry-only procedures will be color coded.
4. Separate DPS sections are provided for Ascent and Entry.
5. The content (text) flight phase notation and page coding are controlled by the Ascent/Entry Procedures Book Manager. The size, shape, and velcro location of the cue cards are controlled by the cue card Book Manager.

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ASCENT/ENTRY SYSTEMS PROCEDURES

LIST OF EFFECTIVE PAGES

GENERIC 07/02/87
REV A 02/04/88
REV B 04/20/88

Sign Off...* ALL/GEN B
ii.....* ALL/GEN B
iii.....* ALL/GEN B
iv.....* ALL/GEN B
v.....* ALL/GEN B
vi.....* ALL/GEN B
vii.....* ALL/GEN B
viii.....* ALL/GEN B
ix.....* ALL/GEN B
x.....* ALL/GEN B
xi..... ALL/GEN B
xii..... ALL/GEN B
MS 1-1..... ALL/A,E/GEN B
MS 1-2..... ALL/A,E/GEN B
MS 1-3..... ALL/A,E/GEN B
MS 1-4..... ALL/A,E/GEN B
MS 1-5..... ALL/A,E/GEN B
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MS 3-1A.... ALL/A/GEN B
MS 3-2A.... ALL/A/GEN B
MS 3-3A.... ALL/A/GEN B
MS 3-4A.... ALL/A/GEN B
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MS 3-6A.... ALL/A/GEN B
MS 3-1E.... ALL/E/GEN B
MS 3-2E.... ALL/E/GEN B
MS 3-3E.... ALL/E/GEN B
MS 3-4E.... ALL/E/GEN B
MS 3-5E.... ALL/E/GEN B
MS 3-6E.... ALL/E/GEN B
MS 4-1..... ALL/A,E/GEN B
MS 4-2..... ALL/A,E/GEN B
MS 4-3..... ALL/A,E/GEN B
MS 4-4..... ALL/A,E/GEN B

(*)- Omit from flight book

v

AESP/ALL/GEN B

MS 4-5..... ALL/A,E/GEN B
MS 4-6..... ALL/A,E/GEN B
MS 5-1..... ALL/A,E/GEN B
MS 5-2..... ALL/A,E/GEN B
MS 5-3..... ALL/A,E/GEN B
MS 5-4..... ALL/A,O,E/GEN B
MS 5-5..... ALL/A,O,E/GEN B
MS 5-6..... ALL/A,E/GEN B
MS 5-7..... ALL/A,E/GEN B
MS 5-8..... ALL/A,E/GEN B
MS 5-9..... ALL/A,E/GEN B
MS 5-10.... ALL/A,E/GEN B
MS 5-11.... ALL/A,E/GEN B
MS 5-12.... ALL/A,E/GEN B
MS 5-13.... ALL/A,E/GEN B
MS 5-14.... ALL/A,E/GEN B
MS 6-1..... ALL/A,E/GEN B
MS 6-2..... ALL/A,E/GEN B
MS 6-3..... ALL/A,E/GEN B
MS 6-4..... ALL/A,E/GEN B
MS 7-1..... ALL/A,E/GEN B
MS 7-2..... ALL/A,E/GEN B
MS 7-3..... ALL/A,E/GEN B
MS 7-4..... ALL/A/GEN B
MS A7-5.... ALL/A/GEN B
MS A7-6.... ALL/A/GEN B
MS B7-5.... ALL/A/GEN B
MS B7-6.... ALL/A/GEN B
MS 7-7..... ALL/A/GEN B
MS 7-8..... ALL/A/GEN B
MS 7-9..... ALL/A,E/GEN B
MS 7-10.... ALL/A,E/GEN B
MS 7-11.... ALL/A,E/GEN B
MS 7-12.... ALL/A,E/GEN B
MS 7-13.... ALL/A,E/GEN B
MS 7-14.... ALL/A,E/GEN B
MS 7-15.... ALL/A,E/GEN B
MS 7-16.... ALL/A,E/GEN B
MS 7-17.... ALL/A,E/GEN B
MS 7-18.... ALL/A,E/GEN B
MS 8-1..... ALL/A,E/GEN B
MS 8-2..... ALL/A,E/GEN B
MS 8-3..... ALL/A,E/GEN B

MS 8-4..... ALL/A,E/GEN B
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 CC 10-1....* ALL/A,O,E/GEN B
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 CC 10-7....* ALL/A/GEN B
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 CC 10-9....* ALL/A/GEN B
 CC 10-10...* ALL/A/GEN B
 CC A10-11..* ALL/A/GEN B
 CC A10-12..* ALL/A/GEN B
 FB 11-1....* ALL/A,E/GEN B
 FB 11-2....* ALL/A,E/GEN B
 FB 11-3....* ALL/A,E/GEN B
 FB 11-4....* ALL/A,E/GEN B
 FB 11-5....* ALL/A,E/GEN B
 FB 11-6....* ALL/A,E/GEN B
 FB 11-7....* ALL/A,E/GEN B
 FB 11-8....* ALL/A,E/GEN B
 FB 11-9....* ALL/A,E/GEN B
 FB 11-10...* ALL/A,E/GEN B
 FB A11-11..* ALL/A,E/GEN B
 FB A11-12..* ALL/A,E/GEN B
 FB B11-11..* ALL/A,E/GEN B
 FB B11-12..* ALL/A,E/GEN B
 FB 11-13...* ALL/A,E/GEN B
 FB 11-14...* ALL/A,E/GEN B
 FB 11-15...* ALL/A,E/GEN B
 FB 11-16...* ALL/A,E/GEN B
 FB 11-17...* ALL/A,E/GEN B
 FB 11-18...* ALL/A,E/GEN B
 FB A11-19..* ALL/A/GEN B
 FB A11-20..* ALL/A/GEN B
 FB 11-21...* ALL/A/GEN B
 FB 11-22...* ALL/A,E/GEN B

(*)- Omit from flight book

FB 11-23...* ALL/A,E/GEN B
 FB 11-24...* ALL/A,E/GEN B
 FB 11-25...* ALL/A,E/GEN B
 FB 11-26...* ALL/A,E/GEN B
 FB 12-1....* ALL/A,E/GEN B
 FB 12-2....* ALL/A,E/GEN B
 FB 12-3....* ALL/A,E/GEN B
 FB 12-4....* ALL/A,E/GEN B
 FB 12-5....* ALL/A,E/GEN B
 FB 12-6....* ALL/A,E/GEN B
 FB 12-7....* ALL/A,E/GEN B
 FB 12-8....* ALL/A,E/GEN B
 FB 12-9....* ALL/A,E/GEN B
 FB 12-10...* ALL/A,E/GEN B
 FB 12-11...* ALL/A,E/GEN B
 FB 12-12...* ALL/A,E/GEN B
 FB 12-13...* ALL/A,E/GEN B
 FB 12-14...* ALL/A,E/GEN B
 FB 12-15...* ALL/A,E/GEN B
 FB 12-16...* ALL/A,E/GEN B
 FB 12-17...* ALL/A,E/GEN B
 FB 12-18...* ALL/A,E/GEN B
 FB 12-19...* ALL/A,E/GEN B
 FB 12-20...* ALL/A,E/GEN B
 FB 12-21...* ALL/A,E/GEN B
 FB 12-22...* ALL/A,E/GEN B
 FB 12-23...* ALL/A,E/GEN B
 FB 12-24...* ALL/A,E/GEN B
 FB 13-1....* ALL/A,E/GEN B
 FB 13-2....* ALL/A,E/GEN B
 FB 13-3....* ALL/A,E/GEN B
 FB 13-4....*⊗ALL/A/GEN B
 FB 13-5....*⊗ALL/A/GEN B
 FB 13-6....*⊗ALL/E/GEN B
 FB 13-7....*⊗ALL/E/GEN B
 FB 13-8....*⊗ALL/E/GEN B
 FB 13-9....* ALL/A,E/GEN B
 FB 13-10...* ALL/A,E/GEN B
 FB 13-11...*⊗ALL/A,E/GEN B
 FB 13-12...* ALL/A,E/GEN B

(*) - Omit from flight book
 (⊗) - Highlights required

FB 13-13...*⊗ALL/A,E/GEN B
FB 13-14...* ALL/A,E/GEN B
FB 13-15...*⊗ALL/A,E/GEN B
FB 13-16...*⊗ALL/A,E/GEN B
FB 13-17...* ALL/A,E/GEN B
FB 13-18...* ALL/A,E/GEN B
FB 13-19...*⊗ALL/A,E/GEN B
FB 13-20...* ALL/A,E/GEN B
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MS 14-3.... SLM/A,E/GEN B
MS 14-4.... SLM/A,E/GEN B
MS 14-5.... SLP/A,E/GEN B
MS 14-6.... SLP/A,E/GEN B

(*) - Omit from flight book
(⊗) - Highlights required

MULTIPHASE SYSTEMS CUE CARDS

Power (Front).....	CC 10-2*	AESP-5a/A,O,E/C
(Back).....	CC 10-2*	AESP-5b/A,O,E/B
MPS (Front).....	CC 10-3*	AESP-11a/A/C
(Back).....	CC 10-4*	AESP-11b/A/B
ASC/RTLS/TAL RESTRING		
(Front).....	CC 10-5*	AESP-10a/A,E/B
ENTRY RESTRING (Back)...	CC 10-6*	AESP-10b/A,E/B
MPS He TK LK		
(Front).....	CC 10-7*	AESP-12a/A/C
(Back).....	CC 10-7*	AESP-12b/A/B
ET SEP		
(Front).....	CC 10-8*	AESP-13a/A/B
(Back).....	CC 10-8*	AESP-13b/A/B
AOA DEORBIT MIXED XFD		
BURN PREP (Front).....	CC 10-9*	AESP-8a/A/C
BURN (Back).....	CC 10-10*	AESP-8b/A/B
OMS-1 MIXED XFD		
(Front).....	CC A10-11*	AESP-9a/A/C
(Back).....	CC A10-12*	AESP-9b/A/B
Pilot Overhead Flip		
Book.....	See FB 11-2 thru FB 11-26	
Pilot Flip Book.....	See FB 12-2 thru FB 12-24	
CDR Flip Book.....	See FB 13-2 thru FB 13-18	

(*) - Omit from flight book x

AESP/ALL/GEN B

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SPACELAB CLASS 2 AND 3 ALARMS.....	MS 14-1

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APU/HYD

APU/HYDRAULICS

MS 1-1

AESP/ALL/A,E/GEN B

APU/HYD

APU SHUTDN

1. APU OPERATE - OFF
FUEL TK VLV - CL
CNTLR PWR - OFF
AUTO SHUTDN (three) - INH
FUEL PUMP/VLV COOL A,B (two) - AUTO

If one APU failed:

2. Powered Flight or TAEM:
APU SPEED SEL (two) - HI
3. MM 104: APU SPEED SEL (two) - NORM

If two APUs failed:

4. APU SPEED SEL (one) - HI
5. MM 104 (except TAL):
APU SPEED SEL (one) - NORM

APU PUMP LEAK P (✓MCC)

Post MECO & Pre-TAEM if two good APUs:

1. APU SHUTDN
2. When in MM602/304, APU COOLDOWN

APU SPD HI (✓CRT)

Aff APU SPEED SEL - HI

APU OVERSPEED (> 129%)

APU SHUTDN

APU OIL OVERTEMP

1. BLR CNTLR HTR - B

If two good APUs, OIL IN T rising, and

Post SE PRESS, OUT T > 355 or

MM602/304, OUT T > 305 or

MM603/305, OUT T > 380, then

2. APU SHUTDN
3. APU COOLDOWN

APU FUEL TK VLV T

If APU FUEL TANK VLV T > 160 or 250 (H)

1. Aff cb APU FU TK VLV ENA A(B) - op >>

If APU FUEL TANK VLV T is O(L), NO COMM,
Post MECO, & other 2 APUs good, step 1

APU THERM (T HI)

If APU GG/FU PMP HTR or APU TK/FU LINE

HTR fail ON (↑):

1. Aff HTR - OFF

APU UNDERSPEED

'PRL SYS X ↓' or if APU has shutdown:

1. APU SHUTDN
2. When in MM602/304, APU COOLDOWN

APU COOLDOWN

At M = 1.2:

1. HYD MN PUMP PRESS - LO
2. APU CNTLR PWR - ON
FUEL TK VLV - OP
OPERATE - START ORIDE/RUN
(start watch)

At H = 15k or at 3 min:

3. APU OPERATE - cycle OFF, then
START ORIDE/RUN

At Wheel Stop:

4. APU SHUTDN

APU RESTART

1. HYD MN PUMP PRESS - LO
2. APU CNTLR PWR - ON
FUEL TK VLV - OP

If COOLDOWN for > 3.5 min or INJ T < 400:

3. APU OPERATE - START/RUN

If not:

4. APU OPERATE - START ORIDE/RUN (3.5 min)
If, after 1.5 min, APU INJ T not decr and
two good APUs: APU SHUTDN >>

If restart successful:

5. HYD MN PUMP PRESS - NORM >>

If restart unsuccessful:

6. APU SHUTDN

HYD PRESS (LOW) G51

Pre MECO:

If 'PRL SYS X +' and APU still operating:

1. APU AUTO SHUTDN (two) - INH
2. SPEED SEL (two) - HI

Post MECO:

PRL SYS	HYD PRESS	PROCEDURE
'↓'	P > 300	HYD MN PUMP PRESS - LO Go to step 3
	P < 300	APU SHUTDN
blank	meter and CRT P < 2600	If first HYD sys degraded: HYD MN PUMP PRESS - LO Go to step 3
		If two HYD sys degraded: HYD MN PUMP PRESS (two) - NORM, then: LO on system with lowest pressure Go to step 3

3. APU AUTO SHUTDN - INH
4. At TAEM: APU SPEED SEL (two) - HI

HYD ACCUM P (LOW)**ASCENT**

POST MECO:

1. Aff HYD CIRC PUMP - ON

BRAKE P 1/3 (2/3)

1. LG HYD ISOL VLVs 1,3(2,3) - CL
Hold 5 sec, √tb - CL

After NGTD:

2. LG HYD ISOL VLV 1(2) - OP
Hold 5 sec, tb - OP

HYD RSVR T

1. BLR CNTLR/HTR - B

If after SINGLE ENG PRESS:

HYD RSVR T > 250:

2. HYD MN PUMP PRESS - LO

HYD RSVR T > 268 and rising:

3. APU SHUTDN

4. When in MM602/304: APU COOLDOWN

HYD RSVR QTY (LOW)

Post MECO if qty decr:

1. Aff MPS/TVC ISOL VLV - CL (5 sec)

2. Aff LG HYD ISOL VLV - CL (5 sec)

MM104 (not TAL): if still decr:

3. APU SHUTDN >>

TAL/MM602/304: if still decr:

4. Aff HYD MN PUMP PRESS - LO

5. Good APU AUTO SHUTDN (two) - INH

6. At TAEM: Good APU SPEED SEL (two) - HI

If second sys fail:

7. HYD MN PUMP PRESS (two) - NORM

W/B QTY (LOW)

1. Note QTY

2. BLR CNTLR/HTR - B

If QTY was zero >>

Otherwise wait 2 min, then:

3. BLR CNTLR/HTR - A

4. ✓QTY

If QTY change < 3

5. BLR CNTLR/HTR - B >>

If QTY change ≥ 3

If AOA/MM 301-303:

6. APU SHUTDN

7. M = 10, APU RESTART, then

If MM 602/304:

8. Cycle BLR PWR to maintain
200 < LUBE OIL IN T < 290 (C/W)

If TAEM:

9. No action reqd

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COMMUNICATIONS SECTION

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COMMUNICATIONS SECTION

COMM

COMM

MS 2-1

AESP/ALL/A,E/GEN B

COMM

COMM LOST (MULTI PANELS)

1. AUD CTR - 2

No comm (✓UHF Sites):

2. If STDN/SGLS:

| S-BD PM CNTL-PNL, then CMD (pn1 C3)

If TDRS:

Config pn1 A1L for TDRS (APCL/COMM)

S-BD PM CNTL - PNL, then CMD (pn1 C3)

No comm:

3. Select best S-BD PM ANT

No comm:

4. S-BD PM ANT - GPC

ICOM LOST

1. AUD CNTL - Sel ALT

No ICOM:

2. AUD CTR - 2

[Faint, mostly illegible text covering the majority of the page, possibly representing a list or a set of instructions.]

DPS ASCENT

**DPS
ASC**

PASS GPC FAIL**ASCENT**

1. Aff FCS CH - OFF
 2. If 2 GPC/FA/FCS CH ↓:
 - Good FCS CHs - ORIDE
 - ✓MPS CMD
 3. If 2 on 2 split/2 GPC ↓: ET SEP - MAN
 4. OMS I'CONNECT FAIL (SE ROLL CNTL/CONT DUMP)
 5. ✓BIG 'X', then GPC/CRT XX EXEC
 6. ✓MULT DATA PATH LOSS
- Post MECO:
7. ASAP, GPC MODE - STBY,HALT
 8. B/U LH2 VLV - OP
 9. If GPC 1(4) ↓: L(R) OMS - sel SEC
 10. If GPC 1(4) failed post ET SEP & no restrg:
 - FF MDM - OFF,ON
 - IMU - des

DPS

BFS GPC FAIL

1. Post SRB SEP: FES PRI A - ON
- Post ET SEP:
2. GPC MODE - STBY,HALT, pause, STBY,RUN
OUTPUT - NORM
 3. If recovered: PRO to OPS 302; load TGTs (PEG7)
GPC OUTPUT - B/U >>
 4. If SM only: GPC MODE - STBY, then step 6
 5. GPC MODE - HALT
 6. If no comm: sel best S-BD PM ANT
 7. If RTLS < 120K: H2O PUMP LOOP 1,2 (two) - ON
NH3 CNTLR A(B) - SEC/ON

FF MDM I/O ERROR651

1. I/O RESET; If recovered >>
 2. ✓MULT DATA PATH LOSS
- Post MECO
- If no BFS 'BCE STRG X PASS':
3. FF MDM - OFF,ON then I/O RESET
 - If not recovered, IMU - des
 - If FF1(4): L(R) OMS - Sel SEC GMBL

FA MDM I/O ERROR

1. I/O RESET
- If recovered: Aff FCS CH - ORIDE,AUTO if reqd
2. Aff FCS CH - OFF
 3. If 2 GPC/FA/FCS CH ↓: Good FCS CHs - ORIDE
 4. OMS I'CONNECT FAIL (SE ROLL CNTL/CONT DUMP)
 5. ✓MULT DATA PATH LOSS

MS 3-2A

AESP/ALL/A/GEN B

Post MECO:

ASCENT

6. B/U LH2 VLV - OP
7. If FA1(4): L(R) OMS - sel SEC
If no BFS 'BCE STRG X PASS':
8. OMS not burning:
FA MDM - OFF, ON then step 1

FF(FA) MDM OUTPUT FAULT

(Take action only if annun by entire set)

If single 'MDM OUTPUT':

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

If both FF & FA annun:

2. I/O RESET: BFS I/O RESET if reqd
If msgs repeat: Go to PASS GPC FAIL >>
3. Aff FCS CH - ORIDE, AUTO if reqd

PL MDM I/O ERROR

1. BFS I/O RESET
2. If PL2 ↓: Post SRB SEP: FES PRI A - ON
3. If PL2 ↓ & no comm: Sel best S-BD PM ANT
4. If RTLS < 120K:
NH3 CNTLR A(B) - SEC/ON
H2O PUMP LOOP 1,2 (two) - ON

PCM I/O ERROR

OI PCMMU PWR - 2

BCE STRG X (no 'MDM OUTPUT' msg) G51

1. If IMU - des
I/O RESET
If recovered: IMU - sel >>
3. ✓MULT DATA PATH LOSS

SUM WORD ICC (If TAL/AOA)

1. Prior to OPS transition, aff GPC: STBY, HALT

CRT LOST

MULTI

1. CRT PWR - OFF, ON; If recovered >>
If PASS CRT:
 2. GPC/CRT - same GPC/aff CRT; If recovered >>
 3. BFC CRT SEL - aff CRT go to step 5
- If BFS CRT:
 4. BFC CRT SEL - unaff CRT if recovered >>
5. In PASS: deassign aff CRT, assign CRT 4

MS 3-3A

AESP/ALL/A/GEN B

DUAL CRT CMDRS

1. If PASS: BFC CRT SEL - aff CRT
2. If BFS: BFC CRT DISP - OFF
3. If cleanup reqd: CRT PWR - OFF,ON

**BFS INADVERTENT DISENGAGE/UNSUCCESSFUL
ENGAGE**

(Lightning Strike)

1. CDR and PLT RHC ENGAGE pb - depress

If no response

2. BFS OUTPUT - Norm,B/U
3. CDR,PLT RHC ENGAGE pb - depress

ASC/RTLS/TAL RESTRING

1. Config MCI(3) NBAT as reqd
Post MECO:
2. ASAP, failed GPC(s) - STBY,HALT
If ASC/RTLS:
 3. OPS Mode Recall:
OPS XXX PRO
 4. BFS I/O RESET
- IF TAL:
 5. OPS 301 PRO
 6. BFS OPS 301 PRO
7. Config FCS CH(s):
each GPC cmds equal
no. of CH(s): (See Table)
8. G53 at OPS 3 (TAL): Recovered
SURF FBK - sel (if reqd)

		AVAILABLE FCS CHs		
		4	3	2
AVAILABLE GPCs	3	3 chs - AUTO 1 ch - OFF	3 chs - AUTO 1 ch - OFF	2 chs - ORIDE 2 chs - OFF
	2	4 chs - ORIDE	2 chs - ORIDE 2 chs - OFF	2 chs - ORIDE 2 chs - OFF

MULTIPLE DATA PATH LOSS (Non-Recov) ASCENT
 If two FA MDMs lost during OMS burn, man shutdn
 of one or both OMS ENG reqd

FAILURE	TYPE	ACTIONS
GPC/FF1&2	B or I/O	Use R BODY FLAP & TRIM ENA SWs MM102, RTLS, TAL: BFS NO-GO (AAs) (Note) Post ET SEP: If no OMS-1 or DELAYED BURNS, go to 'MPS DUMP OMS BURN'
	I/O or FF2 I/O & FF1 B	RTLS, TAL: INH ADTA to G&C FLY THETA LIMITS (ADTA 1,2,3 ↓)
GPC/FF1&3	B or I/O	MM102, RTLS, TAL: BFS NO-GO (AAs) (Note)
GPC/FF2&3	B or I/O	MM102, RTLS, TAL: BFS NO-GO (AAs) (Note)
GPC/FF3&4	B or I/O	Use L BODY FLAP & TRIM ENA SWs
	I/O or FF3 I/O & FF4 B	RTLS, TAL: INH ADTA to G&C FLY THETA LIMITS (ADTA 2,3,4 ↓)
GPC/FA1&2	D or I/O	BFS NO-GO (RGAs) (Note) SRB SEP: BFS OPS 103 PRO
	I/O	ET SEP: MPS FDLN RLF ISOL (two) - OP Preburn: L OMS ENG - OFF (TVC) Pre MPS dump: MPS PREVLVs (six) - OP
GPC/FA1&3	D or I/O	BFS NO-GO (RGAs) (Note) SRB SEP: BFS OPS 103 PRO
	I/O	ET SEP: MPS FDLN RLF ISOL (two) - OP TAL: MPS LH2 FILL/DRAIN INBOARD, OUTBOARD - OP Preburn: R OMS ENG - OFF (IGN) Pre MPS dump: MPS PREVLVs (six) - OP
GPC/FA1&4	I/O	ET SEP: MPS FDLN RLF ISOL (two) - OP Preburn: L OMS ENG - OFF (IGN) Pre MPS dump: MPS PREVLVs (six) - OP
GPC/FA2&3	D or I/O	BFS NO-GO (RGAs) (Note) Post MECO: Expect 'SEP INH' (Feedline Disc fail)
	I/O	ET SEP: MPS FDLN RLF ISOL (two) - OP Preburn: L OMS ENG - OFF (IGN) Pre MPS dump: MPS PREVLVs (six) - OP
GPC/FA2&4	D or I/O	SRB SEP: BFS OPS 103 PRO Post MECO: Expect 'SEP INH' (Feedline Disc fail)
	I/O	Preburn: R OMS ENG - OFF (IGN) Pre MPS dump: MPS PREVLVs (six) - OP
GPC/FA3&4	D or I/O	SRB SEP: BFS OPS 103 PRO
	I/O	ET SEP: MPS FDLN RLF ISOL (two) - OP TAL: MPS LH2 FILL/DRAIN INBOARD, OUTBOARD - OP Preburn: R OMS ENG - OFF (TVC) Pre MPS dump: MPS PREVLVs (six) - OP

NOTE
 If data path loss not due to MDM fail, BFS is
 GO and will pick up MDMs when engaged

DPS
ENT

DPS ENTRY

MS 3-1E

AESP/ALL/E/GEN B

PASS GPC FAIL

ENTRY

1. GPC MODE - STBY, HALT
2. Aff FCS CH - OFF
3. If 2 GPC/FA/FCS CH +: Good FCS CHs - ORIDE
4. Aff IMU - des
5. If STRG 1(2): CDR(PLT) sws - green dot
6. ✓MULT DATA PATH LOSS

BFS INADVERTENT DISENGAGE/UNSUCCESSFUL ENGAGE
(Lightening Strike)

1. CDR and PLT RHC ENGAGE pb - depress
- If no response
2. BFS OUTPUT - Norm, B/U
 3. CDR, PLT RHC ENGAGE pb - depress

DPS

BFS GPC FAIL

1. BFS MODE - STBY, HALT
 2. BFS MODE - STBY
- If recovered:
3. PRO to MM304
- If full BFS cap:
4. BFS MODE - RUN >>
- If only BFS SM works:
5. BFS OUTPUT - NORM, then step 8
- If not recovered:
6. BFS MODE - HALT
OUTPUT - NORM
- If PASS GPC cmding PL1/2 also +:
7. S-BD PM ANT - man sel
 8. If AOA/TAL At 120K:
NH3 A(B) - SEC/ON
H2O PUMP LOOP 1,2 (two) - ON

FF MDM I/O ERROR

G51 G53

1. IMU - des
 2. I/O RESET
 3. If recovered:
FF1(2,3): NAV DELTA zero update
IMU - sel
BFS I/O RESET >>
- If no BFS 'BCE STRG X PASS':
4. Port Mode
If recovered, step 3
 5. BFS I/O RESET
 6. FF MDM - OFF, ON then step 2
If not recovered:
FF MDM - OFF then step 7
- If BFS 'BCE STRG X PASS':

MS 3-2E

AESP/ALL/E/GEN B

7. If FF1(2): CDR(PLT) sws - green dot **ENTRY**
8. ✓MULT DATA PATH LOSS

FA MDM I/O ERROR **G53**

1. I/O RESET
 2. If recovered: Aff FCS CH - ORIDE,AUTO if reqd
If aff SURF FDBK des - rese1
BFS I/O RESET >>
 3. Aff FCS CH - OFF
 4. If 2 GPC/FA/FCS CH ↓: Good FCS CHs - ORIDE
 5. Aff SURF FDBK - des
- If no BFS 'BCE STRG X PASS':
6. Port Mode
If recovered, step 2
 7. BFS I/O RESET
 8. FA MDM - OFF,ON then step 1
- If not recovered:
FA MDM - OFF
Aff AFT RCS MANF ISOLs - CL, then step 9
- If BFS 'BCE STRG X PASS':
9. ✓MULT DATA PATH LOSS

FF(FA) MDM OUTPUT **FAULT**

- (Take action only if annun by entire set)
- If single 'MDM OUTPUT':
1. Go to FF(FA) MDM I/O ERROR >>
- If both FF & FA annun:
2. **G51** aff IMU - des
 3. I/O RESET; BFS I/O RESET if reqd
If msgs repeat: Go to PASS GPC FAIL >>
 4. **G50** NAV DELTA zero update
 5. **G51** IMU - rese1
 6. Aff FCS CH - ORIDE,AUTO if reqd

PL MDM I/O ERROR

1. BFS I/O RESET
- If recovered >>
2. Port Mode, then step 1
 3. Pre MM305: FES PRI B(A) - ON
 4. If PL2 ↓ & no comm: Sel best S-BD PM ANT
 5. If AOA/TAL < 120K: NH3 CNTLR A(B) - SEC/ON
H2O PUMP LOOP 1,2 (two) - ON

PCM I/O ERROR

OI PCMMU PWR - 2(1)

BCE STRG X (no 'MDM OUTPUT' msg)

G51

G53

1. If IMU - des
2. I/O RESET
3. If recovered & IMU: NAV DELTA zero update,
| then IMU - sel >>
If recovered & other >>
4. If NSP & LOS: PNL,CMD >>
5. Port Mode
BFS I/O RESET
6. If recovered, go to step 3
7. If 'A(B,C,D,IMU)':
 8. FF(A,B) or FA(C,D) MDM - OFF,ON
 9. I/O RESET
If FA: Aff FCS CH - ORIDE,AUTO if reqd
If recovered, go to step 3
10. If < 3Y, 2P jets/pod/dir:
G23 aff MANF STAT - ORIDE open
11. ✓MULT DATA PATH LOSS

ENTRY RESTRING

1. Failed GPC(s) - STBY,HALT
2. G51 Aff IMU - des
3. G53 Aff SURF FBK - des
4. Config MC3 NBAT
5. OPS Mode Recall:
OPS 30X PRO
6. BFS I/O RESET
7. Config FCS CH(s):
each GPC cmds equal no.
of CH(s): (See Table)
8. G53 Recovered SURF FBK - sel
9. If STRG 1(2,3) recovered:
G50 NAV DELTA zero update
G51 IMU - sel

		AVAILABLE FCS CHs		
		4	3	2
AVAILABLE GPCs	3	3 chs- AUTO 1 ch - OFF	3 chs- AUTO 1 ch - OFF	2 chs- ORIDE 2 chs- OFF
	2	4 chs- ORIDE	2 chs- ORIDE 2 chs- OFF	2 chs- ORIDE 2 chs- OFF

MULTIPLE DATA PATH LOSS (Non-Recov) ENTRY
 Assumes completion of 'FF(FA) MDM I/O ERROR' or
 'BCE BYPASS'

FAILURE	TYPE	ACTIONS
GPC/FF1&2	B	Use R BODY FLAP & TRIM ENA SWs BFS NO-GO (AAs) (Note)
	I/O FF2 I/O & FF1 B	INH ADTA TO G&C FLY THETA LIMITS (ADTA 1,2,3 ↓)
GPC/FF1&3	B or I/O	BFS NO-GO (AAs) (Note)
GPC/FF2&3	B or I/O	BFS NO-GO (AAs) (Note)
GPC/FF3&4	B	Use L BODY FLAP & TRIM ENA SWs
	I/O FF3 I/O & FF4 B	INH ADTA TO G&C FLY THETA LIMITS ADTA 2,3,4 ↓)
GPC/FA1&2 or GPC/FA1&3 or GPC/FA2&3	D or I/O	BFS NO-GO (RGAs) (Note)

NOTE

If data path loss not due to MDM fail, BFS
 is GO and will pick up MDMs when engaged

CRT LOST

MULTI

1. CRT PWR - OFF,ON; If recovered >>
- If PASS CRT:
 2. GPC/CRT - same GPC/aff CRT; If recovered >>
 3. BFC CRT SEL - aff CRT go to step 5
- If BFS CRT:
 4. BFC CRT SEL - unaff CRT if recovered >>
5. In PASS: deassign aff CRT, assign CRT 4

ECLS

ECLS

ECLS

CAB PRESS HIGH

If increasing: Open visors

If still incr:

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

O2 SYS 1,2 SPLY (two) - CL

CAB PRESS LEAK

CAB RELIEF (two) - CL

Close visors; SUIT O2 - ON

If RTLS/TAL:

O2/N2 CNTLR VLV 2 - OP

O2 TK1,2 HTR A,B (four) - AUTO

DIRECT O2 VLV - OP

SPACELAB If RTLS/TAL or AOA:

Remove Inner Hatch Caps (two)

Post MECO: O2 TK 3 HTR A,B (two) - AUTO

If V > 15K: MLS (three) - OFF; TAC (three) - OFF

If CAB PRESS decreases < 6.5 psia:

✓O2/N2 CNTLR VLV 2 - OP

CAB FAN (two) - ON

CAB PPO2 ABNORMAL

If PPO2 ≤ 2.70:

1. Close visors

If PPO2 ≥ 3.60:

2. Open visors

3. O2 SYS 1,2 SPLY (two) - CL

H2O LOOP PRESS LOW

Post Meco: Switch Loops

H2O LOOP PRESS HIGH

Deact pump

Post MECO: Switch Loops

CABIN FAN FAIL

Post MECO: Switch fans

If both Fans lost minimize use of:

CRT/INST/FLT CNTLR PWR

AV BAY FAN ΔP

Post MECO: Switch fans

If no joy, go to LOSS OF AV BAY COOLING

AV BAY TEMP HIGH

Post MECO: AV BAY FANS (two) - ON

If not decr: switch H2O LOOPS

If no joy, go to LOSS OF AV BAY COOLING

LOSS OF AV BAY COOLING

Bay 1: TAC 1, MLS 1 - OFF
Bay 2: TAC 2, MLS 2,3 - OFF
Bay 3: TAC 3 - OFF

FREON FLOW LOW

Switch pumps

LOSS OF 1 FREON LOOP

Bad LOOP FREON PUMP - OFF
If FREON LOOP 1(2) lost:
O2 SPLY VLV 1(2) (one) - CL
In good loop:
✓FLOW PROP VLV - ICH
Monitor EVAP OUT TEMP
If TAL/AOA/RTLS:
If LOOP 1 lost:
NH3 CNTLR A - OFF
B - PRI/GPC

If AOA: Go to LOSS OF 1 FREON LOOP (APCL, PWRDN)

LOSS OF 2 FREON LOOPS

Open visor
O2 SPLY VLV 1(2) (one) - CL
If ENTRY and V < 15K:
FREON PUMPS (two) - OFF >>
MSTR MADS PWR - OFF
CRT (two) - OFF
Panel L1: All switches off, except:
H2O PUMP LOOP 2 - ON
If AOA:
IMU FAN B - ON
MCC CMD Purge, then BFS PWR - OFF
Post ET SEP:
DC UTIL PWR - OFF
FCS CH 4 - OFF
GPC 4 - STBY,HALT,PWR - OFF
FF4, FA4 - OFF
ANNUN BUS SEL ACA 2/3 - OFF
If RTLS:
TACAN 1,2 - OFF
RADAR ALT 1 - OFF >>
If TAL/AOA/ENTRY:
All TAC/RA/MLS - OFF
Use one INST/FLT CNTLR PWR
If AOA:
Go to SYS AOA, LOSS OF TWO FREON LOOPS (AOA)

EVAP OUT TEMP HIGH (Rads not cold soaked) MULTI

If temp high in only one loop, snsr failed >>

1. If V < 12K (entry only):
H2O PUMP LOOP 1,2 (two) - ON
NH3 CNTLR A(B) - SEC/ON >>
2. FES PRI A - OFF
B - ON (wait 30 sec)
If T decr >>
3. FES PRI B - OFF
SEC - ON (HI LOAD ena) (wait 30 sec)
If T decr:
TOP EVAP HTRS (three) - OFF
RAD BYP VLV (four) - MAN, RAD FLOW >>
4. HI LOAD EVAP - OFF
DUCT HTR - OFF (wait 30 sec)
If T decr:
RAD BYP VLV (four) - MAN, RAD FLOW >>
5. TOP EVAP HTRS (three) - OFF
RAD BYP VLV (four) - MAN, RAD FLOW
6. If TAL/AOA & MM304 or RTLS and MM602:
H2O PUMP LOOP 1 (two) - ON,B
✓LOOP 2 - ON
NH3 CNTLR A(B) - SEC/ON (wait 60 sec)
7. If T inc: MSTR MADSPWR - OFF

EVAP OUT TEMP HIGH (Rads cold soaked) ENTRY

If temp high in only one loop, snsr failed >>

1. If V < 12K:
RAD CNTLR LOOP (two) - OFF,
then AUTO B(A) (wait 90 sec)
If T decr >>
NH3 CNTLR A(B) - PRI/GPC >>
2. FES PRI B(A) - OFF
A(B) - ON (wait 30 sec)
If T decr >>
3. FES PRI A(B) - OFF
SEC - ON (HI LOAD ena) (wait 30 sec)
If T decr:
TOP EVAP HTRS (three) - OFF >>
4. HI LOAD EVAP - OFF
DUCT HTR - OFF (wait 30 sec)
If T decr >>
5. TOP EVAP HTRS (three) - OFF
RAD BYP VLV (two) - AUTO
CNTLR LOOP (two) - AUTO A(B) (wait 90 sec)
If RAD BYP VLV tb (two) - RAD >>

6. H2O PUMP LOOP 1 (two) - ON,B
 √2 - ON
 NH3 A(B) - SEC/ON (wait 60 sec)
7. If T inc: MSTR MADS PWR - OFF

O2(H2) CRYO P/T HIGH

CRYO O2(H2) TK HTR (two) - OFF

O2(H2) CRYO LK(all tanks)

1. O2(H2) TK HTRS (six) - AUTO

If P still decr:

2. MANF VLV TK1,2 (two) - CL

If TK1(2) P decr:

MANF VLV TK2(1) - OP

√ECS Supply:

If O2 TK1(2) P decr:

3. Aff O2 SYS SPLY - CL

4. If O2 TK1(2) P stops decr (ECS leak):

MANF VLV TK1,2 (two) - OP >>

√TK Leg:

If O2 (H2) TK1(2,3/4/5) P decr:

5. BUS TIE

Post MECO:

6. FC SHUTDN

EVAP OUT TEMP LOW

If low in only one loop, snsr failed >>

1. H2O PUMP LOOP 1 (two) - ON,B

2. FLOW PROP VLV LOOP 1,2 tb (two) - ICH

3. If either RAD BYP VLV tb - RAD:

RAD CNTLR OUT TEMP - HI (wait 90 sec)

4. If FREON EVAP OUT TEMP < 32:

NH3 CNTLR A,B (two) - SEC/ON (wait 1 min)

5. If FREON EVAP OUT TEMP < 32:

FREON PUMP LOOP 2 - OFF

NH3 CNTLR B - OFF

O2 SYS SPLY - CL >>

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CONFIDENTIAL - SECURITY INFORMATION

EPS

EPS

EXCLUDED FROM AUTOMATIC DOWNGRADING AND DECLASSIFICATION

GROUP 1

MS 5-1

AESP/ALL/A,E/GEN B

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EPS

MS 5-2

AESP/ALL/A,E/GEN B

PLT

MN BUS UNDER V/FC V - AMPS

PROBLEM	ACTION
MN V LO < 26.4 & FC V LO < 26.6 & FC AMP HI or LO Δ > 50	SHORT OR DEGRADED FC 1. MSTR MADS PWR - OFF (ASCENT) Pre MECO: If AC VOLTS < 95, go to 2 ASAP Post MECO: 2. Do Step 3 of FC SHUTDN If FC VOLTS < 32.5 (FC SHORT) 3. FC REAC VLV - CL 4. BUS TIE, PWRDN >> If FC VOLTS > 32.5 (BUS SHORT) 5. ✓BUS LOSS
MN V LO < 21 & FC V HI > 32 & FC AMPS LO < 20	FC Disconnect 1. MSTR MADS PWR - OFF (ASCENT) 2. FC/MN BUS - ON 3. BUS TIE Post MM602/304 Trans: If FC3 VOLTS > 32: PL PRI FC3 - ON MNC - ON, then If any FC VOLTS > 32 and POST MECO - FC SHUTDN

FC STACK T

1. MSTR MADS PWR - OFF
2. BUS TIE (Cue Card), then:
If STACK T > 243 and incr:
3. FC SHUTDN (Cue Card)

FC EXIT T

1. MSTR MADS PWR - OFF
2. BUS TIE (Cue Card), then:
If EXIT T > 170 and incr:
| 3. FC SHUTDN (Cue Card) >>
If EXIT T < 131 and decr and no COMM:
4. FC SHUTDN (Cue Card)

FC END HTR FAIL

- If FC 2 >>
If FC SS 1(3) ΔV inc > 10 mV in 4 min:
1. FC SHUTDN

FC REAC VLV CLOSED

1. FC REAC (three) - OP
 2. BUS TIE
- If FC COOL P < 50:
3. FC SHUTDN

FC COOLANT PUMP ΔP LOW

1. ✓cb FC PUMP - c1 (PNL L4:C)
 2. FC - START (10 sec or ΔP tb-gray)
- If EXIT T > 170 & not decr or RDY tb - bp
(30 sec after start):
3. Go to FC SHUTDN >>
- If FC EXIT T norm and RDY tb - gray:
4. BUS TIE, ✓MCC (5 min max), monitor AC AMPS
 5. FC - STOP
- If AMPS decr 0.7-0.9 AMP/φ:
6. FC - START (hold 30 sec if ΔP tb-bp)
 7. If AMPS incr 0.7-0.9 AMP/φ >>
- If Δ not 0.7-0.9 AMP/φ, Go to FC SHUTDN

FC SHUTDOWN (CL PMP lost: < 6 min)

1. Pre OMS 2 or Entry:
MSTR MADS PWR - OFF
2. If not tied, Bus Tie
If ORB (not D/O Prep), kW > 18:
MN BUS TIE (three) - ON
3. ESS BUS SOURCE FC - OFF
FC/MN BUS - OFF
FC - STOP (1 sec)
4. FC REAC VLV - CL
≥ MM105, ✓PWRDN

BUS TIE (Do not tie Bus short)

If MN Volts > 20: Bus Tie

If MN Volts < 20 and Post SRB SEP:

1. Pre MECO: CDR: Perform AC Multi ϕ
2. Aff AC BUS SNSR (3 if Pre MECO) - OFF
3. cb AC CONTR (three) - cl
4. INV/AC BUS - OFF (tb-OFF)
5. INV PWR - OFF (tb-OFF)
6. If MNB(C) dn, CAB FAN B(A) - OFF
7. Bus Tie
8. INV PWR - ON (tb-ON)
9. INV/AC BUS - ON (tb-ON)
10. cb AC CONTR (three) - op
11. Post MECO: AC BUS SNSR - AUTO TRIP
12. Post PWRDN: \checkmark CAB FAN B(A) - ON
13. GNC, I/O RESET

MN/AC
BUS

FC pH \downarrow 1(2,3) or FC DELTA V 1(2,3)

1. BUS TIE
If pH \downarrow and FC SS 1(2,3) $\Delta V > 150$
-or- FC SS $\Delta V > 150$ and incr:
 2. FC SHUTDN >>
3. Wait 2 min after BUS TIE, then record
 Δ AMPS between aff and tied FC

MULTI
PLT

MN/AC
BUS

Post SRB SEP	MNA or AC1 Multi ϕ FREON PUMP LOOP 1 - B TOP EVAP HTR NOZ L - B AUTO DUCT - B HI LOAD DUCT HTR - B	CDR
Post MECO	AV BAY 3 FAN A - ON B - OFF ANNUN BUS SEL ACA 1 - MNB	
ENTRY	Config Pn1 L1 ANNUN BUS SEL ACA1 - MNB FAILED: NH3 A PRI NWS, UHF HI PWR XMIT, L-HUD	
Post SRB SEP	MNB or AC2 Multi ϕ TOP EVAP HTR NOZ R - B AUTO	
Post MECO	CAB FAN A - ON, B - OFF HUMIDITY SEP A - ON, B - OFF IMU FAN A - ON, B - OFF AV BAY 1 FAN A - ON, B - OFF 2 FAN B - ON, A - OFF ANNUN BUS SEL ACA 2/3 - MNC	
ENTRY	Config Pn1 L1 ✓cb AC3 ϕ A LG SNSR 1 - c1 ANNUN BUS SEL ACA 2/3 - MNC FAILED: NH3 B SEC	
Post SRB SEP	MNC or AC3 Multi ϕ FREON PUMP LOOP 2 - B FES CNTLR PRI A - OFF B - ON	
Post MECO	H2O PUMP LOOP 1 - ON 2 - OFF	
ENTRY	Config Pn1 L1 ✓cb AC2 ϕ A LG SNSR 2 - c1 FAILED: NH3 A SEC B PRI R - HUD	

MNA or AC1 Multi ϕ

BLR CNTLR/HTR 3 - B
MSTR MADS PWR - OFF (ASCENT)
AC BUS SNSR (three) - OFF
OMS I'CONNECT FAIL (SE ROLL CNTL/CONT DUMP)
FC SHUTDN

Post MECO:

L OMS - sel SEC
B/U LH2 VLV - OP
FAILED: SPI, L INST, TAC 1
MLS 1, RA 1, NWS, L - HUD

MNB or AC2 Multi ϕ

BLR CNTLR/HTR 1 - B
MSTR MADS PWR - OFF (ASCENT)
AC BUS SNSR (three) - OFF
OMS I'CONNECT FAIL (SE ROLL CNTL/CONT DUMP)
FC SHUTDN

Post MECO:

SIG CONDR FREON A - AC3
B/U LH2 VLV - OP
FAILED: R INST, TAC 2
MLS 2, RA 2

MNC or AC3 Multi ϕ

S-BD PM CNTL - PNL CMD
BLR CNTLR/HTR 2 - B
MSTR MADS PWR - OFF (ASCENT)
AC BUS SNSR (three) - OFF
OMS I'CONNECT FAIL (SE ROLL CNTL/CONT DUMP)
FC SHUTDN

Post MECO:

SIG CONDR FREON B - AC2
R OMS - sel SEC
FAILED: TAC 3, MLS 3, R - HUD

PLT |

AC

AC VOLT HIGH (> 123)

1. Aff AC BUS SNSR - AUTO TRIP
2. AC BUS SNSR (three) - OFF
3. ✓BUS LOSS

**MULTI
PLT**

AC VOLT LOW or OVERLOAD (< 110)

1. If in AUTO TRIP, ✓BUS LOSS >>
2. AC BUS SNSR (three) - OFF

MULTI

If V < 95 (ASC) or V < 110 (ENT):

Confirm with F9 meter

3. If single Φ & V > 10:

If INV/AC BUS tb - ON (INV +)

cb AC CONTR - c1

INV/AC BUS - OFF

INV PWR - OFF

cb AC CONTR - op

If other Φ AMPS > 14, repeat above

If INV/AC BUS tb - OFF (SNSR +)

cb AC CONTR - c1

INV/AC BUS - ON

cb AC CONTR - op

4. If multi Φ (Bus short)

Affected cb AC CONTR (three) - c1

INV/AC BUS - OFF (tb-OFF)

INV PWR - OFF (tb-OFF)

cb AC CONTR (three) - op

5. ✓BUS LOSS

AC1 Φ C

BLR CNTLR/HTR 3 - B

AC2 Φ A

BLR CNTLR/HTR 1 - B

AC2 Φ B (Post MECO)

SIG CONDR FREON A - AC3

AC3 Φ A

BLR CNTLR/HTR 2 - B

AC3 Φ B (Post MECO)

SIG CONDR FREON B - AC2

Any AC ϕ B

CDR

Post MECO: Turn on both AV BAY FANS

AC1 - AV BAY 2

AC2 - AV BAY 3

AC3 - AV BAY 1

3 ϕ MOTORS STOPPED

PLT

1. Determine AC BUS

FC1 & FREON PUMP 1A: AC1

FC2 & AV BAY 1B & 2A: AC2

FC3 & FREON PUMP 2A: AC3

2. AC BUS SNSR (three) - OFF

3. Isolate ϕ A:

cb AC CONTR - c1

INV/AC BUS - OFF

If FC PUMP tb - gray: \checkmark BUS LOSS >>

If FC PUMP tb - bp:

INV/AC BUS - ON

cb AC CONTR - op

Repeat 3 for ϕ B, ϕ C, then:

4. If FC PUMP tb - bp: go to AC MULTI ϕ

CNTL/ESS

CNTL/ESS

CNTLAB1,2,3

TOP EVAP HTR DUCT - B
HI LOAD DUCT HTR - B

**ASCENT
CDR**

CNTLAB3

If BFS ENG reqd:
Use PLT's RHC, then GPCs 1,2,4 - STBY,HALT
BFS I/O RESET

FAILED: NWS

CNTLBC1

TOP EVAP HTR NOZ L - B AUTO

CNTLBC3

TOP EVAP HTR NOZ R - B AUTO

CNTLCA1

NO BFS ENGAGE
Post SRB SEP: FES PRI A - ON
Failed: NWS

GRTLS/ENTRY

CNTLAB1

Use R TRIM & BDY FLP sw
FAILED: NH3 A SEC, FES PRI B GPC

CNTLAB2

CDR Display - green dot
FAILED: NH3 B SEC, L - HUD, FES PRI B ON
H2O LOOP 1,A ON

CNTLAB3

If BFS ENG reqd:
Use PLT's RHC, then GPCs 1,2,4 - STBY,HALT
BFS I/O RESET

FAILED: NWS

CNTLBC1 Use R TRIM & BDY FLP sw

FAILED: R-HUD

CNTLBC2

FAILED: NH3 B PRI, FES SEC GPC
H2O LOOP 1,B ON

CNTLBC3

FAILED: NH3 A PRI, FES SEC ON

CNTLCA1

NO BFS ENGAGE
FAILED: NH3 B SEC, FES PRI A GPC
H2O LOOP 2 GPC
NWS

CNTLCA2

FAILED: NH3 A SEC, FES PRI A ON

CNTLCA3

MULTI

FAILED: NWS

CNTL BUS V LOW
✓BUS LOSS

PLT

CNTLAB1:
Use R TRIM & BDY FLP sws

CNTLAB2:
FWD RCS MANF ISOL 1 - CL
FAILED: L - HUD

CNTLAB3
BLR CNTLR/HTR 1,3 (two) - B
G51 RCS RM MANF CL OVRD - ITEM 41 EXEC
If BFS ENG reqd:
Use PLT's RHC, then GPCs 1,2,4 - STBY,HALT
BFS I/O RESET
If encryption reqd: S-BD PM CNTL - PNL then
CMD
If no OMS 1 BURN or DELAYED BURNS, Go to
MPS DUMMY OMS BURN

CNTLBC1
Use R TRIM & BDY FLP sws
FAILED: R - HUD

CNTLBC2
S-BD PM CNTL - PNL,CMD
FWD RCS MANF ISOL 2 - CL
PLT Displays - Green Dot
Use L TRIM & BDY FLP sws

CNTLBC3
BLR CNTLR/HTR 1,2 (two) - B
G51 RCS RM MANF CL OVRD - ITEM 41 EXEC
If no OMS 1 BURN or DELAYED BURNS, Go to
MPS DUMMY OMS BURN

CNTLCA1
NO BFS ENGAGE

CNTLCA2
FWD RCS MANF ISOL 3 - CL
Use L TRIM & BDY FLP sws

CNTLCA3
BLR CNTLR/HTR 2,3 (two) - B

ESS BUS V LOW
1. ESS BUS SOURCE MN - OFF,ON (✓Volts)
If regained:
2. FC - START (10 sec or ΔP tb-gray) >>
If not regained:
3. FC SHUTDN (< 6 min), ✓BUS LOSS

PWRDN

FC PWRDN ENTRY

CDR

LOSS OF 1 FC

1. ✓CAB FAN B(A) - ON
2. If V < 15K >>
3. HUMIDITY SEP (two) - OFF
4. FLASH EVAP FDLN HTR SPLY (two) - OFF

LOSS OF 2ND FC

1. MDM PL1 - OFF
2. FCS CH 4 - OFF
- GPC MODE 4 - STBY,HALT
- PWR 4 - OFF
- MDM FF4,FA4 - OFF
3. If V > 10K:
✓CAB FAN B(A) - ON
4. M = 2.9: CAB FAN (two) - OFF
- AV BAY FAN (six) - OFF

PWRDN

ESS1BC

L AUD CNTL - R (CDR can't talk)
Pri C/W & Matrix lost

MULTI

ESS2CA

AUD CTR - 2
R AUD CNTL - L (PLT can't talk)

ESS3AB

No BFS engage
CSM lost

**FC PWRDN
PLT**

**PLT
ENTRY**

**ENTRY
LOSS OF 1 FC**

1. If V < 15K: >>
2. One CRT/INST/FLT CNTLR PWR - OFF
3. TAC/RA/MLS - OFF
4. DC UTIL PWR - OFF

LOSS OF 2ND FC

1. MSTR MADS PWR - OFF
 2. Do LOSS OF 1 FC
- If FC pwr 2 MN BUSES
3. MN BUS TIE (two) - OFF
 4. Tie good FC/BUS to unpowered bus
 5. I/O RESET, then step 6
- If FC pwr 1 MN BUS
6. FC SHUTDN
 7. Use only one 02 TK HTR in one tk
Use only one H2 TK HTR in one tk
 8. PNL R1: Payload sws (seven) - OFF

EMER PWRDN

**FC/MAIN BUS
(THREE) - OFF
ESS BUS SOURCE FC
(THREE) - OFF
VISOR/GREEN APPLE**

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1. The purpose of this document is to provide information regarding the use of the GNC system.

2. The GNC system is designed to provide a secure and reliable means of communication between the user and the system.

3. The GNC system is used to provide a secure and reliable means of communication between the user and the system.

4. The GNC system is used to provide a secure and reliable means of communication between the user and the system.

5. The GNC system is used to provide a secure and reliable means of communication between the user and the system.

6. The GNC system is used to provide a secure and reliable means of communication between the user and the system.

GNC

7. The GNC system is used to provide a secure and reliable means of communication between the user and the system.

8. The GNC system is used to provide a secure and reliable means of communication between the user and the system.

9. The GNC system is used to provide a secure and reliable means of communication between the user and the system.

10. The GNC system is used to provide a secure and reliable means of communication between the user and the system.

GNC

MS 6-1

AESP/ALL/A,E/GEN B

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

1. ✓MCC **G53**

If 2 FCS CH + on any actuator or no insight

2. Remaining FCS CH (two) - ORIDE

RHCL(R)

If first fail:

1. No action >>

If second fail (dilemma):

2. Aft FLT CNTLR PWR - OFF

G51 ROLL MODE SW **G51**

If ROLL MODE ≠ SW POS:

1. AUTO SEL - ITEM 42

DISPLAY SW L(R)

1. L(R) Disp Sws (eight) - green dot

RM FAIL IMU **BFS G51**

1. Aff IMU - dese1

RM DLMA IMU **G51 **BFS G51****

1. ✓MCC, bad IMU - dese1 (PASS & BFS) >>

2. If no MCC: dese1 lower # IMU with '?' (PASS)

ADTA FAIL/DLMA * **G51**

1. If FAIL and data good: rese1 >>

2. If DLMA and data agrees: dese1, rese1 one ADTA >>

3. If bad probe: stow >>

If bad ADTA:

4. If accessible, bad ADTA cb - op >>

If cb not accessible, then

5. Dese1 bad ADTA

If bad ADTA candidate for BFS then,

6. BFS, ADTA to G&C - INH

7. Post BFS engage - stow probe,

ADTA to G&C - AUTO

If bad ADTA(s) not identified

8. ADTA to G&C - INH

9. Fly Theta limits

* If 3 ADTAs failed: ADTA to G&C - INH (PASS)
and Fly Theta limits

GNC

RM FAIL TAC

G50

(RM LIMITS: 6 DEG, 0.5 NM)

1. If data good - des, rese1 >>
2. If failure verified - desel in BFS

RM DLMA TAC

G50

1. If both data good - des, rese1 one TACAN in DLMA >>
2. ✓TACAN MODE (three) - GPC
3. If 'RM FAIL TAC' - des failed TACAN in BFS >>
4. If continuous self test - select T/R (three)
5. If one bad TACAN identified - bad TACAN OFF

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OMS

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OMS

OMS TEMP DURING DUMP (N/A CONT)

[G51] INH I'CNCT

If aff OMS FU IN P > **[232]**, go to ENG FAIL

If aff OMS FU IN P < **[197]**, go to PRPLT FAIL

Pc LOW DURING DUMP (N/A CONT)

ENG VLV < 70%: ENG FAIL

ENG VLV > 70%:

[G51] INH I'CNCT

If aff OMS OX IN P > **[227]**, go to ENG FAIL

If aff OMS OX IN P < **[136]**, go to PRPLT FAIL

ENG FAIL (During Dump)

Failed OMS ENG - OFF

Pre MECO: **[G51]** ENA I'CNCT

MM304: **[G51]** INH I'CNCT

Balance prop by XFEED

PRPLT FAIL (During Dump)

Aff OMS ENG - OFF

Failed OMS XFEED (two) - CL

Pre MECO: After 2:00 min, good OMS ENG - OFF

MM304: Good OMS ENG - OFF

OMS N2 TK P LOW

(N/A DURING RTLS/TAL/ATO DUMP)

√N2 TK P decr (meter & CRT)

OMS ENG - ARM

If OMS N2 REG P decr: OMS ENG - OFF >>

If OMS N2 REG P not decr & subs RTLS/TAL/ATO:

OMS ENG (two) - ARM/PRESS

OMS N2 REG P HIGH

OMS ENG - ARM

MULTI

OMS

OMS SECURE

MULTI

If leak, G51 VENT DOORS - OP

Affected: OMS ENG - OFF

XFEED (two) - CL

TK ISOL (two) - CL

He PRESS (two) - CL

If leak isolated or FU TK leak and post D/O

burn:

G51 VENT DOORS - CL

OMS XFEED (OPS 1&3)

MULTI

XFEED: R TO L

L,R OMS XFEED (four) - OP

L OMS TK ISOL (two) - CL

He PRESS/VAP ISOL (two) - CL

XFEED: L TO R

L,R OMS XFEED (four) - OP

R OMS TK ISOL (two) - CL

He PRESS/VAP ISOL (two) - CL

XFEED RETURN: OMS TO OMS

L,R OMS TK ISOL (four) - OP

XFEED (four) - CL

OMS TK P (FU or OX) LOW (✓ENG IN P) ASCENT

If Dumping ATO:

[G51] INH I'CONNECT
Good OMS ENG - OFF
Failed OMS XFEED (two) - CL
When aff OMS ENG Pc < 80%:
Aff OMS ENG - OFF >>

If Dumping RTLS/TAL: [BFS, GNC SYS SUMM 2]

When aff AFT QTY < 20% or either OMS
He P < 2000: [G51] INH I'CONNECT
Failed OMS XFEED (two) - CL
When aff OMS ENG Pc < 80%:
Aff OMS ENG - OFF
After 2:00 min, good OMS ENG - OFF >>

If Dumping CONT: [BFS, GNC SYS SUMM 2]

When affected AFT QTY < 20% or either OMS
He P < 2000: [G51] DUMP OFF
Failed OMS XFEED (two) - CL >>

If Not Dumping:

When FU IN P < 216 or OX IN P < 151:

[G51] INH I'CONNECT
Aff OMS ENG - OFF
XFEED (two) - CL

If subs RTLS/TAL:

If FU IN P > 216 and OX IN P > 151:

Aff OMS XFEED (two) - OP
ENG - ARM/PRESS

[G51] ENA I'CONNECT

Go to 'If Dumping RTLS/TAL'

If repress NO JOY after 2:00 min

Good OMS ENG - OFF >>

If subs ATO DUMP:

Good OMS ENG - OFF
If FU IN P > 216 and OX IN P > 151
Aff OMS ENG - ARM/PRESS >>

Post MECO (N/A RTLS/TAL)

If OMS 1 reqd:

At TIG-2: Aff He PRESS (two) - OP
OMS ENG (two) - ARM/PRESS

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

OMS SECURE

At TIG -15 sec: RCS +X to TIG +1 sec

Post Burn: OMS SECURE

Go to OMS TK P FU(OX) LOW (ASC PKT, OMS) >>

If OMS 1 not reqd:

OMS SECURE

Go to OMS TK P FU(OX) LOW (ASC PKT, OMS)

OMS He TK P LOW
(✓CRT & meter)

OMS 1/2
ASCENT

If Dumping ATO:
[G51] INH I'CNECT
OMS XFEED (four) - OP
Good OMS TK ISOL (two) - CL
When leaking He P < 640:
OMS ENG (two) - OFF
If Dumping RTLS/TAL
When leaking He P < 640:
[G51] INH I'CNECT
When affected OMS ENG Pc < 72%:
Aff OMS ENG - OFF
After 2:00 min, good OMS ENG - OFF >>
If Dumping CONT:
When leaking He P < 640:
[G51] DUMP OFF >>
If Not Dumping (✓MCC):
OMS ENG (two) - OFF
Good OMS XFEED (two) - CL
Leaking OMS XFEED (two) - OP
[G51] DUMP ARM, START
When leaking He P < 640 or
 $\Delta T = \quad$ sec:
[G51] DUMP STOP
Post MECO: (N/A RTLS/TAL/CONT)
[G51] DUMP ARM, START
If Dump completed:
XFEED from good OMS
✓OMS ENG (two) - ARM/PRESS
Perf DELAY ATO OMS 1:
If Dump not completed:
If leaking He P > \quad :
OMS ENG (two) - ARM/PRESS
Perform ON TIME OMS 1
Go to OMS He TK P LOW
(Cue Card, BURN MONITOR)
If leaking He P < \quad :
Perf DELAY ATO OMS 1
XFEED from good OMS
OMS ENG (two) - ARM/PRESS
Go to OMS He TK P LOW
(Cue Card, BURN MONITOR)

OMS 1/2

MS A7-5 AESP/ALL/A/GEN B

OMS 1/2

OMS-1 MIXED XFD

NOTE: DO NOT USE RCS MASTER XFD sw

1. Perform AOA-S (ASC OMS TGTS)
2. L,R OMS TK ISOL (four) - CL (tb-CL)
XFEED (four) - CL (tb-CL)
3. AFT L,R RCS XFEED (four) - CL (tb-CL)
4. ✓ Master RCS XFEED - OFF

Set up GPC vlvs SPEC 01

✓HEX 27 *

BIT RESET - ITEM 23 EXEC

Configure ADD ID/DESIRED Addresses

ADD ID	DESIRED
28 03F45	29
30 03FCB	31
32 0403D	33
34 0409B	35

} From Tables 1-8

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

ADD ID	DESIRED
28 03F49	29
30 03FCF	31
32 04041	33
34 0409F	35

} From Tables 1-8

6. WRITE - ITEM 25 EXEC
Perform RECONFIG:
L,R OMS TK ISOL (four) - GPC
XFEED (four) - GPC
(✓tb config from Table)
OMS-1 will be SE or +xRCS (ck Tables for ENG)
7. During AOS: ✓vlv config, TGT w/MCC
8. If OMS ENG burn:
OMS L or R
TRIM: P +0.0, LY +5.2, RY -5.2
L(R) OMS ENG - ARM/PRESS (Other OMS
ENG - OFF)
TIG -:15 EXEC
MAN REPRESS FROM L & R OMS He TKS
(240 < TK P < 250)
If +XRCS burn
✓Good OMS TK P > RCS TK P
OMS ENG - OFF
L,R RCS XFEED (four) - OP
TK ISOL (six) - CL
THC +X (✓OMS % vs RCS burn time)
MAN REPRESS FROM L & R OMS He TKS
(240 < TK P < 250)
9. POST BURN, OMS HE VAP ISOL (4) - CL
10. Perform POST OMS 1 BURN (ASC C/L)
EXCEPT:
DO NOT RECONFIGURE OMS VLVs
For OMS-2 TGTS, PRPLT = 0 (ITEM 18 +0)
Use AOA DEORBIT MIXED XFD BURN (next page)
(For OMS-2 BURN)

OMS 1/2

MS A7-6 AESP/ALL/A/GEN B

OMS He TK P LOW
(✓CRT & meter)

**DIRECT
ASCENT**

If Dumping ATO:
| G51 INH I'CNECT
| OMS XFEED (four) - OP
| Good OMS TK ISOL (two) - CL
| When leaking He P < 640:
| OMS ENG (two) - OFF
If Dumping RTLS/TAL/CONT
| When leaking He P < 640:
| G51 INH I'CNECT
| When affected OMS ENG Pc < 72%:
| Aff OMS ENG - OFF
| After 2:00 min, good OMS ENG - OFF >>
If Dumping CONT:
| When leaking He P < 640:
| G51 DUMP OFF >>
If Not Dumping (✓MCC):
| OMS ENG (two) - OFF
| Good OMS XFEED (two) - CL
| Leaking OMS XFEED (two) - OP
| G51 DUMP ARM, START
| When leaking He P < 640 or
| $\Delta T = \boxed{\quad}$ sec:
| G51 DUMP STOP
Post MECO (N/A RTLS/TAL/CONT)
| G51 DUMP ARM, START
If OMS 1 reqd
| Go to OMS He TK P LOW
| (Cue Card, BURN MONITOR) >>
If OMS 1 not reqd
| Go to OMS He TK P LOW (ASC PKT, OMS)

DIRECT

MS B7-5 AESP/ALL/A/GEN B

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MS B7-6 AESP/ALL/A/GEN B

AOA DEORBIT MIXED XFD BURN PREP

NOTE: Do Not Use RCS MASTER XFD sw

- 1. L,R OMS TK ISOL (four) - CL (tb-CL)
XFEED (four) - CL (tb-CL)
He ISOL (four) - CL (tb-CL)
- 2. AFT L,R RCS XFEED (four) - CL (tb-CL)

✓Master RCS XFEED - OFF

- 3. Set up GPC vlvs **SPEC 0**

✓HEX 27*

BIT RESET - ITEM 23 EXEC

Configure ADD ID/DESIRED Addresses

ADD ID	DESIRED	
28 03F45	29	} From Tables 1-8
30 03FCB	31	
32 0403D	33	
34 0409B	35	

WRITE - ITEM 25 EXEC

- 4. BIT SET - ITEM 22 EXEC

ADD ID	DESIRED	
28 03F49	29	} From Tables 1-8
30 03FCF	31	
32 04041	33	
34 0409F	35	

WRITE - ITEM 25 EXEC

- 5. Perform RECONFIG:

L,R OMS TK ISOL (four) - GPC

XFEED (four) - GPC

(✓tb config from Table)

OMS BURN will be SE or +XRCS (ck Tables for ENG)

- 6. During AOS: ✓vlv config w/MCC

- 7. Perform POST - OMS 1 BURN (ASC C/L) EXCEPT:

DO NOT RECONFIGURE OMS VALVES

For deorbit burn

TGT AOA

PRPLT = 0 (item 18 +0)

Use AOA DEORBIT MIXED XFD BURN

(next page) for DEORBIT BURN

AOA DEORBIT MIXED XFD BURN

MM302 ✓OMS L or R, or +XRCS
 CNTRLR PWR (two) - ON
 Enter TGO + 10 sec
 ✓DAP - AUTO (PASS)/DISC
 ADI - LVLH/HI/MED
 ✓L,R OMS TK ISOL (four) - GPC
 XFEED (four) - GPC
 (✓tb config from Table)
 If OMS BURN
 ✓TRIM: P +0.0, LY +5.2, RY -5.2
 TIG -2:00 OMS ENG - ARM/PRESS
 -:15 EXEC (NO EXEC > TIG +)
 :00 TIG (✓Pc, ΔVTOT, ENG VLVs; start watch)
 MAN REPRESS FROM L and R OMS He TKs
 *OMS ENG FAIL: *
 * ✓Good OMS Tk P > RCS Tk P *
 * OMS ENG - OFF *
 * L,R RCS XFEED (four) - OP *
 * TK ISOL (six) - CL *
 * THC +X (✓OMS% vs RCS BURN TIME) *
 * TRIM INPLANE X,Z RESIDUALS < .5 FPS *
 * Go to ASC C/L POST DEORBIT BURN RECONFIG >> *
 *OMS PRPLT FAIL *
 * THC +X to TGT HP or TOT AFT QTY 1 % *
 * If CUR HP ≤ PRI HP , FRCS to PRI SITE *
 * If CUR HP > PRI HP and ≤ B/U HP , *
 * FRCS to B/U SITE *
 * If CUR HP > B/U HP , THC +X to *
 * B/U HP *
 * or TOT AFT QTY 2 ; FRCS to B/U SITE *
 * *
 * MNVR to -X ATT (Pitch UP at 3'/sec to VGOz = *
 * (+)1/4 VTOT) *
 * THC -X *
 * CUTOFF VGOx = 0, RELEASE THC *
 * AFT RCS RECONFIG *
 * Trim inplane X,Z RESIDUALS < .5 FPS *
 If + XRCS BURN
 ✓Good OMS TK P > RCS TK P
 OMS ENG - OFF
 L,R RCS XFEED (four) - OP
 TK ISOL (six) - CL
 TIG :00, THC +X
 Man Repress from L and R OMS He TKS
 TRIM INPLANE X,Z RESIDUALS < .5 FPS
 Go to ASC C/L POST DEORBIT BURN RECONFIG >>
 *OMS PRPLT FAIL *
 *(Perform OMS PRPLT FAIL procedure above) *

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

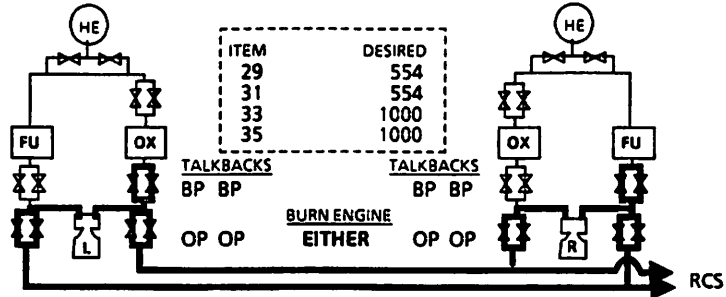


TABLE 2
L OMS OX TK AND R OMS FU TK FAILED

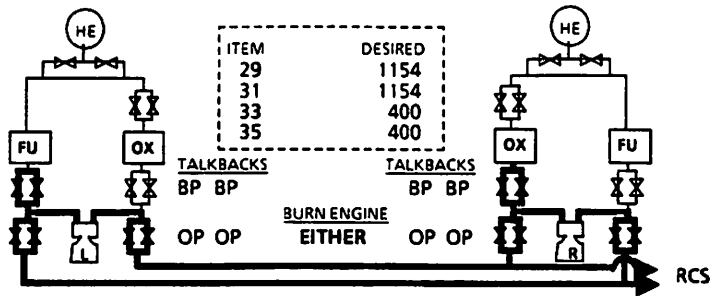


TABLE 3
L OMS FU TK AND R OMS OX INLET FAILED

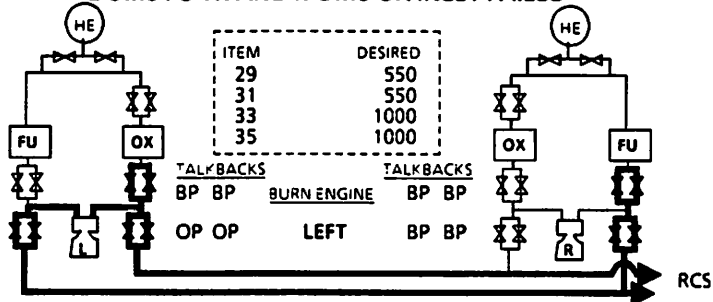
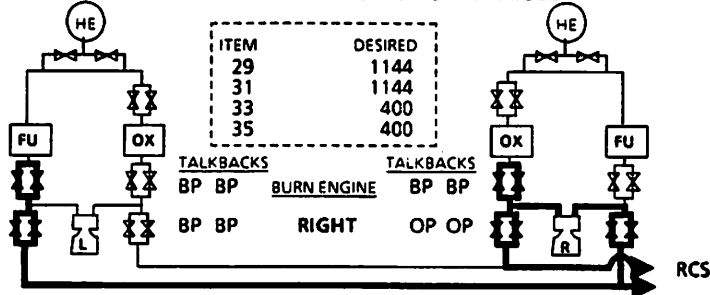


TABLE 4
L OMS OX INLET AND R OMS FU TK FAILED



OMS
I'CNTECT
FAIL

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

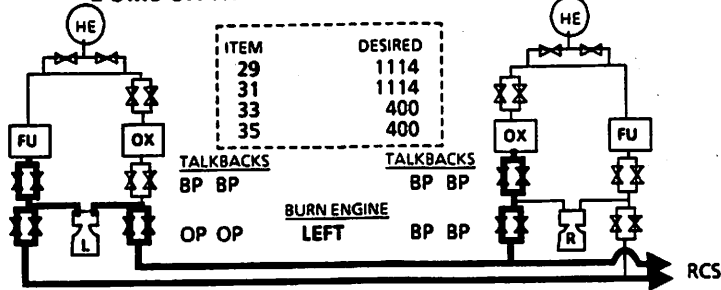


TABLE 6
L OMS FU INLET AND R OMS OX TK FAILED

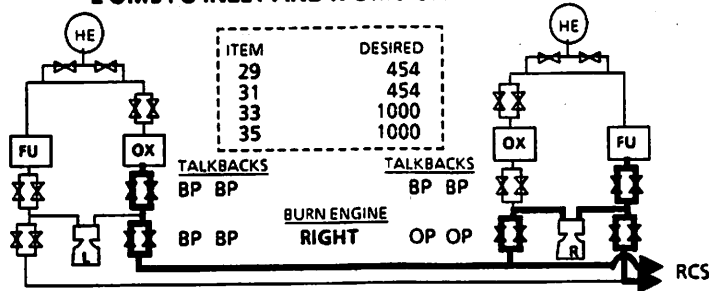


TABLE 7
L OMS OX INLET AND R OMS FU INLET FAILED

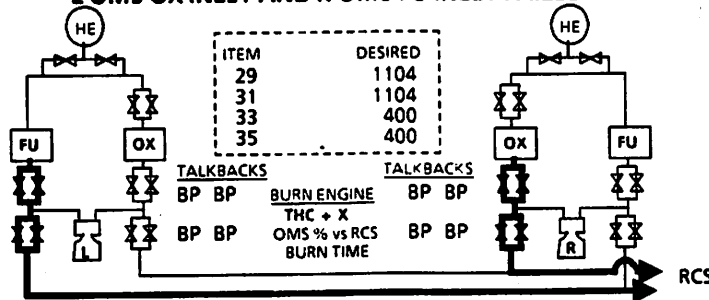
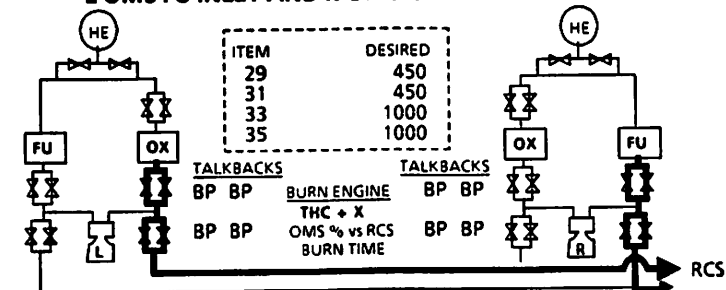


TABLE 8
L OMS FU INLET AND R OMS OX INLET FAILED



**OMS I'CONNECT FAIL - SE ROLL CNTL
(Failure before SE ROLL CNTL)**

GPC/FA MDM FAIL

L,R RCS TK ISOL (six) - CL, then GPC

MNB,C FAIL

AC1,2,3 FAIL

No Action

**OMS I'CONNECT FAIL - CONT DUMP PRE-MECO/OPS 6
(Failure before DUMP START)**

GPC/FA MDM FAIL

L,R RCS TK ISOL (six) - CL, then GPC

[G51] DUMP ARM - START

Prior to FAST SEP:

[G51] DUMP STOP

MNA,B,C FAIL

AC1,2,3 FAIL

No Action

DO NOT START DUMP

-----MECO-----

**OMS I'CONNECT FAIL - CONT DUMP POST MECO/OPS 6
(Failure before DUMP START)**

[G51] DUMP START

DO NOT START DUMP

**OMS I'CONNECT FAIL - SE ROLL CNTL
(Failure after SE ROLL CNTL)**

GPC/FA MDM FAIL

No Action

AC1/MNA FAIL

No Action

AC2/MNB FAIL

No Action

AC3/MNC FAIL

L,R RCS XFEED 3/4/5 (two) - OP

**OMS I'CONNECT FAIL - CONT DUMP PRE-MECO/OPS 6
(Failure after DUMP START)**

GPC/FA MDM FAIL

No Action

AC1/MNA FAIL

No Action

AC2/MNB FAIL

No Action

AC3/MNC FAIL

L,R RCS XFEED 3/4/5 (two) - OP

-----MECO-----

**OMS I'CONNECT FAIL - CONT DUMP POST MECO/OPS 6
(Failure after DUMP START)**

GPC/FA MDM FAIL

No Action

AC1/MNA FAIL

No Action

AC2/MNB FAIL

No Action

AC3/MNC FAIL

L,R RCS XFEED 3/4/5 (two) - OP

**OMS I'CONNECT FAIL - OMS He TK P LOW
CONT DUMP PRE-MECO
(Failure before DUMP START)**

GPC/FA MDM FAIL

L,R RCS TK ISOL (six) - CL, then GPC

AC1/MNA FAIL

L,R RCS MANF 3,4 (four) - CL

AC2/MNB FAIL

L,R RCS MANF 3,4 (four) - CL

XFEED 3/4/5 (two) - CL

AC3/MNC FAIL

L,R MANF 1,2 (four) - CL

If RTLS prior to ET SEP all closed RCS
manifolds - stagger OP

**OMS I'CONNECT FAIL - OPS 304 DUMP
(Failure before DUMP START)**

GPC/FA MDM FAIL

L,R OMS XFEED (four) - OP

RCS XFEED (four) - OP

TK ISOL (six) - CL

[G51] ENA I'CONNECT

DUMP ARM, START

After DUMP START + 20 sec:

L,R RCS TK ISOL (six) - GPC

At DUMP complete:

L,R OMS XFEED (four) - CL

MNA,B,C FAIL Do not dump if I'CONNECT ENA

AC1,2,3 FAIL

L,R OMS XFEED (four) - OP

RCS XFEED (four) - OP

TK ISOL (six) - OP

[G51] ENA I'CONNECT

DUMP ARM, START

After DUMP START: L,R RCS He PRESS (four) - CL

At DUMP complete: L,R RCS He PRESS (four) - OP
OMS XFEED (four) - CL

**OMS I'CONNECT FAIL - OMS He TK P LOW
CONT DUMP PRE-MECO
(Failure after DUMP START)**

GPC/FA MDM FAIL

No Action

AC1/MNA FAIL

No Action

AC2/MNB FAIL

No Action

AC3/MNC FAIL

L,R RCS XFEED 3/4/5 (two) - OP

**OMS I'CONNECT FAIL - OPS 304 DUMP
(Failure after DUMP START)**

GPC/FA MDM FAIL

No Action

AC1/MNA FAIL

No Action

AC2/MNB FAIL

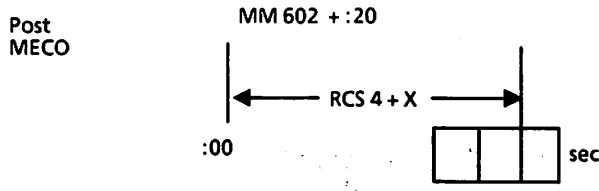
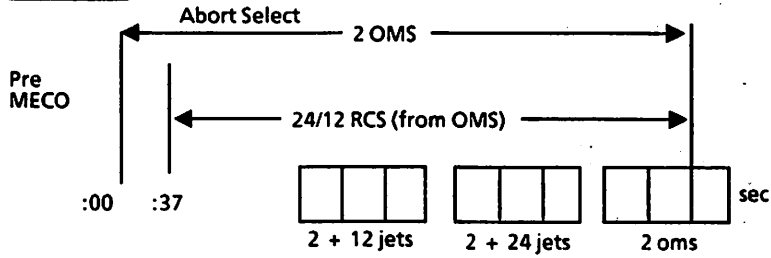
No Action

AC3/MNC FAIL

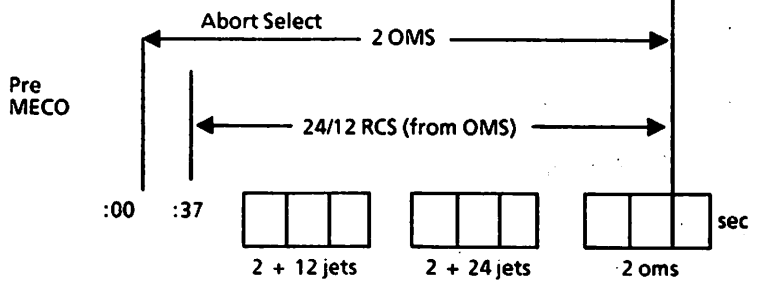
L,R RCS XFEED 3/4/5 (two) - OP

RTLS/TAL DUMPS

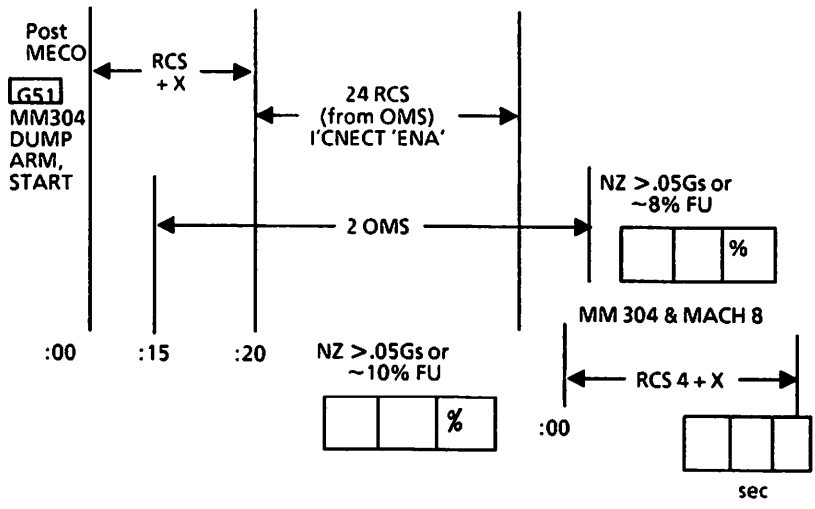
RTLS DUMP



TAL DUMP

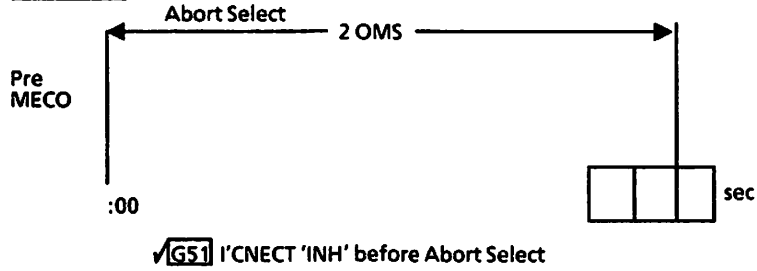


OPS 304 DUMP

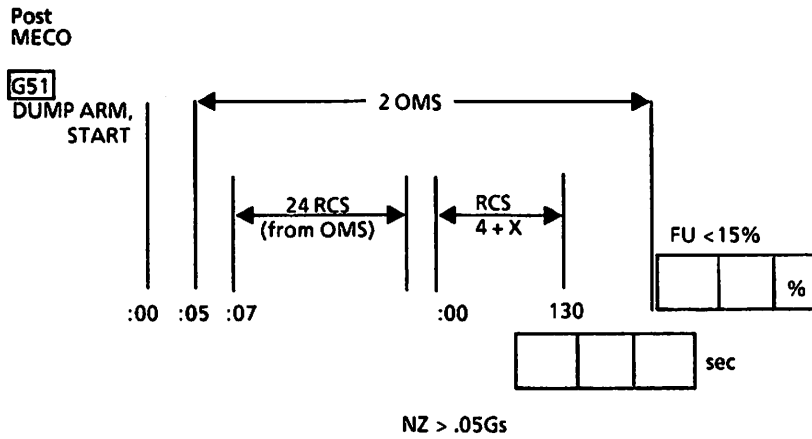
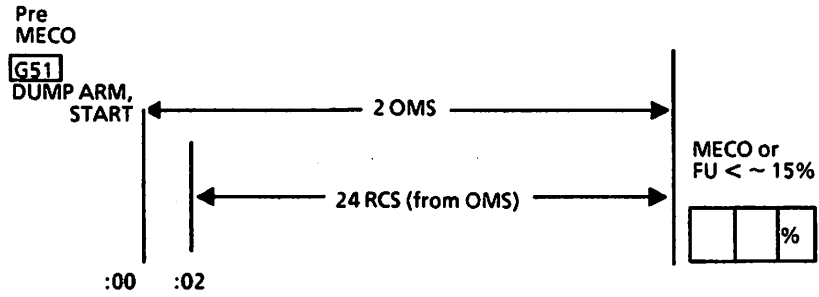


ATO/CONTINGENCY DUMPS

ATO DUMP



CONTINGENCY DUMP



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MS 7-18 AESP/ALL/A,E/GEN B

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RCS

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RCS TK P HIGH (FU or OX)

(✓MANF P)

1. He PRESS (two) - CL

2. A - OP

If He P decr:

3. He PRESS A - CL

B - OP

AFT RCS TK P LOW (FU or OX) (✓MANF P)

ASCENT

1. If Pre ET SEP: ET SEP - MAN (N/A RTLS)

2. XFEED from good RCS

3. ET SEP - AUTO

AFT RCS LK (Post ET SEP NOM/ATO/AOA)

MULTI

Secure affected RCS

RCS JET FAIL (LEAK)

If OX/FU Qty diverging:

1. RCS MANF ISOL - CL

RCS JET FAIL (ON)

1. RCS MANF ISOL - CL

If MANF P > 130 and stable (false alarm):

2. RCS MANF ISOL - OP

3. ✓AFT RCS RM LOSS (ENTRY)

RCS JET FAIL (OFF)

ENTRY

If > 1 jet/pod/dir failed:

1. G23 Reset jets

2. DES INH * (Reprioritize)

RM DLMA MANF

MULTI

If MANF tb - bp: MANF - GPC

If MANF tb - OP or sw not thrown

G51 RCS RM MANF CL OVRD - ITEM 41 EXEC

AFT RCS RM LOSS

If loss of jet RM and > 3Y, 2P jets/pod/dir:

1. G23 DES INH twice (Reprioritize, reset RM)

2. Aff jet - desel >>

If total RM loss (BCE) and < 3Y, 2P jets/pod/dir:

3. Aff MANF STAT - ovrđ op

AFT RCS RECONFIG

TK ISOL (six) - OP, GPC

XFEED (four) - CL, GPC

RCS

AFT RCS LK (Pre ET SEP)**ASCENT**

N/A During Dump/SE Roll Cnt1

(✓He P decr; CRT & meter)

(✓TK P; if '↑', go to TK P HIGH)

1. ET SEP - MAN (N/A RTLS)
2. Aff RCS MANF (five) - CL
Aff RCS TK ISOL (three) - CL
3. If single MANF leak:
| Reopen RCS except bad MANF
| ✓TK ISOL(s) - GPC
4. If TK leg leak (two MANF):
| Reopen RCS except bad leg
| ✓Good leg TK ISOL(s) - GPC
| Aff RCS XFEED - CL
5. If no MANF P decr:
L,R RCS XFEED (four) - OP
Aff RCS:
MANF 1,2,3,4 (four) - OP
He PRESS (two) - CL
MSTR XFEED - feed from good side
6. If MANF or TK leg and QTY < 75%:
MSTR XFEED - feed from good side
7. If RTLS/TAL: G51 AFT RCS - INH
8. ET SEP - AUTO

AFT RCS LK (GRTLS/304/305)**ENTRY**

(✓He P decr; CRT & meter)

(✓TK P; if '↑', go to TK P HIGH)

1. Open vent doors.
After proc complete: If not OX TK lk and M > 3,
Cl vent drs
2. If RTLS/TAL: G51 AFT RCS - INH
3. Secure 3/4/5 MANFs & TK ISOLs
✓If single MANF leak: Reopen, except bad MANF >>
4. ✓If TK leg leak (two MANF): Leave leak leg CL
Aff RCS XFEED - CL >>
5. Reopen (leave MANF 5 GPC (tb-CL))
✓TK ISOL(s) - GPC, then repeat for 1/2 leg
6. He PRESS (two) - CL, ✓if He TK leak:
He PRESS (two) - OP, at He P < 456 - XFEED >>
7. ✓If PRPLT TK leak (FU/OX TK P diverge):
He PRESS (two) - OP, when QTY = 0 - XFEED >>
8. He PRESS (two)-OP, ✓if He leg leak (He P decr):
Cycle He PRESS so 200 < TK P < 245, at
He P < 456 - XFEED >>
9. Assume MANF 5 leak

MS 8-3

AESP/ALL/A,E/GEN B

INTERCONNECT (OPS 1 & 3):

I'CONNECT L OMS to RCS:

1. L OMS He PRESS/VAP ISOL (two) - OP
2. XFEED (two) - OP
3. L,R RCS XFEED (four) - OP
TK ISOL (six) - CL

I'CONNECT R OMS to RCS:

1. R OMS He PRESS/VAP ISOL (two) - OP
2. XFEED (two) - OP
3. L,R RCS XFEED (four) - OP
TK ISOL (six) - CL

I'CONNECT TK SWITCH:

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

RCS CONSTRAINTS

RCS to RCS Xfeed Initiation

On-orbit, $\Delta P < 80$

Entry, $\Delta P < 55$ and ACCEL < 48

Evacuated Manf

No repress for jet fail ON;

Otherwise, repress one at a time

XFEED: RCS to RCS

If AUTO XFEED:

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

If MANUAL XFEED:

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

XFEED RETURN: RCS to RCS

If AUTO FEED:

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
TK ISOL (six) - OP, GPC
XFEED (four) - CL, GPC
4. MSTR RCS XFEED - OFF

FWD RCS LK**ASCENT**

(✓He P decr: CRT & meter)

(✓TK P, if '↑', go to TK P HIGH)

- If RTLS: 1. RCS SECURE
 2. Post PPD - reopen RCS
 3. Post ET SEP - RCS SECURE >>

If Pre ET SEP (N/A RTLS):

4. ET SEP - MAN
5. RCS SECURE
6. If single MANF leak:
 Reopen RCS, except bad MANF
 ET SEP - AUTO >>
7. If TK leg leak: (two MANF P Low)
 Reopen RCS, except bad leg
 ET SEP - AUTO >>
8. If PRPLT TK P decr:
 Post MECO:
 9. Rate DAMP with ARCS
 10. Reopen FRCS
 If TK P > 200 & QTY > 0%:
 11. ET SEP - AUTO
 12. Post ET SEP - RCS SECURE >>
 If TK P < 200 or QTY = 0%:
 13. RCS SECURE
 14. DAP - MAN, PITCH - PULSE
 15. THC - X and hold
 16. ET SEP - AUTO
 17. At SEP:
 THC +Z (3 sec)
 THC -Z (2 sec) (-.2°/sec)
 COAST (15 sec)
 THC +X (10 sec) (-.5°/sec)
18. OPS 104 PRO, DAP - AUTO >>
19. Otherwise: (He TK or He leg)
 Post MECO - reopen RCS
 20. ET SEP - AUTO
 21. Post ET SEP - RCS SECURE >>

If Post ET SEP - RCS SECURE

RCS SECURE**MULTI**

- If leak: G51 VENT DOORS - OP
 RCS MANF ISOL (five) - CL
 XFEED (two) - CL
 TK ISOL (all) - CL
 He PRESS (two) - CL

MPS

MPS

MS 9-1

AESP/ALL/A/GEN B

MPS

MPS DATA

SSME limits automatically inhibited

✓MCC

No comm: Assume MPS CMD

MPS CMD, HYD or ELEC (Stuck Throttles)

1. If in bucket: ME LIMIT SHUT DN - INH
2. If one stuck throttle and > 23K
 (TAL > 22.5K/RTLS: ΔR = C0)
 If MPS CMD:
 Manual engine shutdn (AC/PB)
 If MPS HYD or ELEC
 If '1st Stage Perf NOM' or RTLS/TAL
 No action reqd
 If '1st Stage Perf LOW' or no comm
 Manual engine shutdn (AC/PB)
3. If two stuck throttles and > 23K
 Shut down one engine (AC/PB) per priorities
 (1) CMD (2) HYD (3) ELEC

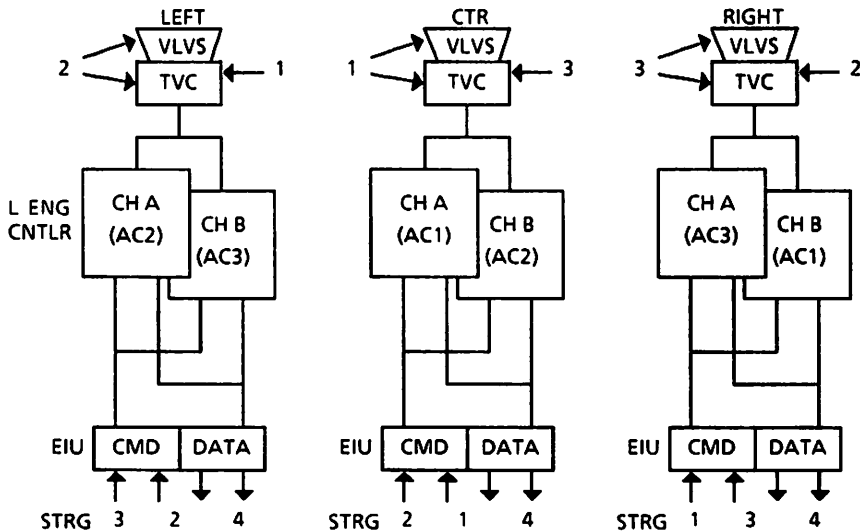
ENG/HYD	SHUTDN ENG
C/1+R/3	C
L/2+C/1	L
L/2+R/3	R

If two CMD: Manual shutdn (AC/PB)
 2nd CMD at 24.5K

**MULTI MPS CMD/DATA
(No MECO Confirm)**

Post MECO:

MN ENG SHUTDN pb (three) - push (simo)
HYD



MS 9-2

AESP/ALL/A/GEN B

ENG FAIL **MPS**

AC BUS SNSR (three) - OFF

If MPS Data:

MN ENG SHUTDN pb - push

LH2 ET ULL PRESS

✓MCC

Post SRB SEP/Pre MECO

If 3 of 3 < 31.6:

1. MPS LH2 ULL PRESS - OP
when 3 of 3 > 34.5 - AUTO

If 2 of 3 > 34 & third < 31.6:

2. MPS LH2 ULL PRESS - OP
when third > 34.5 - AUTO

POST MECO

LH2 MANF PRESS HIGH

If MANF P LH2 > 60:

MPS PRPLT dump seq - start ASAP

LO2 MANF PRESS HIGH

If MANF P LO2 > 249:

MPS PRPLT dump seq - start ASAP

MPS DUMMY OMS BURN (Pass only)

✓/Load TIG

TIG-2:

✓MPS dump seq - GPC

OMS ENG (two) - OFF

TIG-:15 EXEC

TIG-:05 +X until OMS ↓

'ET SEP MAN' **G51** **ET SEP**

Post MECO:

ET SEP AUTO - ITEM 38 (BFS 28)

To override ET 'SEP INH':

ET SEP SEP - ITEM 39 (BFS 29)

MPS He TK LK Pre ET SEP

If He REG P ↑ or ↓:

1. Aff He ISOL - CL

Otherwise:

2. He ISOL A -CL

If no decr in dP/dT:

3. He ISOL A - OP
B - CL

No decr in dP/dT:

4. He ISOL B - OP

If TK P < 1150 or REG P < 679:

5. Aff He
I'CNECT - IN OP

At ET SEP:

6. He I'CNECT - GPC >>

**MPS He TK LK
Post ET SEP (Not RTLs)**

If TK P < 1150:

1. Aff
He ISOL (two) - CL

If second TK P < 1150:

2. PNEU He ISOL - CL

Pneu He LK P < 3800

1. PNEU He ISOL - CL,
√MCC

No COMM; REG P < 715
and ↓:

At TMECO - 30 sec:

2. He ISOL - OP (5 sec)
3. L ENG He XOVR - OP

CUE
CARDS

MULTIPHASE SYSTEMS CUE CARDS

FAB USE ONLY

CC 10-1

AESP/ALL/A,O,E/GEN B

CUE CARDS

TOP

EMER PWRDN
FC/MAIN BUS
(THREE) - OFF
ESS BUS SOURCE FC
(THREE) - OFF
VISOR/GREEN APPLE

- FC SHUTDOWN (CL PMP Lost - 6 min)**
- 1 Pre OMS 2 or Entry
MSTR MADSPWR - OFF
 - 2 If not tied, Bus Tie
If ORB (not D/O Prep), LW - 18.
MN BUS TIE (three) ON
 - 3 ESS BUS SOURCE FC OFF
FC/MN BUS OFF
FC STOP (1 sec)
 - 4 FC REAC VLV CI \geq MM105, \sqrt PWRDN
AESP-5a/A,O,E/C

- BUS TIE (Do Not Tie Bus Short)**
 If MN Volts $>$ 20: Bus Tie
 If MN Volts $<$ 20 and Post SRB Sep: **POWER**
- 1 Pre MECO CDR Perform Ac Multi ϕ
 - 2 All AC BUS SNSR (3 if Pre MECO) - OFF
 - 3 cb AC CONTR (three) - cl
 - 4 INV/AC BUS - OFF (tb OFF)
 - 5 INV PWR - OFF (tb OFF)
 - 6 If MNB(C) dn, CAB FAN B(A)-OFF
 - 7 Bus Tie
 - 8 INV PWR - ON (tb-ON)
 - 9 INV/AC BUS - ON (tb-ON)
 - 10 cb AC CONTR (three) - op
 - 11 Post MECO AC BUS SNSR - AUTO TRIP
 - 12 Post PWRDN \sqrt CAB FAN B(A) - ON
 - 13 GNC, I/O RESET

TOP
 BACK OF 'POWER'

HOOK
 VELCRO

HOOK
 VELCRO

HOOK
 VELCRO

AESP-5b/A,O,I/B

FAB USE ONLY

CC 10-2

AESP/ALL/A,O,E/GEN B

TOP

MPS DATA
 SSME limits automatically inhibited
 /MCC
 No comm: Assume MPS CMD

MPS CMD, HYD or ELEC (Stuck Throttles)

- If in bucket: ME LIMIT SHUT DN - INH
- If one stuck throttle and > 23K (TAL > 22.5K/RTLS:ΔR = CO)
 - If MPS CMD & no MCC comm: Man eng shutdn (AC/PB)
 - If MPS HYD or ELEC:
 - If 1st Stage Perf NOM or RTLS/TAL: No action reqd
 - If 1st Stage Perf LOW or no comm: Man eng shutdn (AC/PB)
- If two stuck throttles and > 23K: Shut down one eng (AC/PB) per priorities (1) CMD (2) HYD (3) ELEC
 - If two HYD:

ENG/HYD	SHUTDN ENG (AC/PB)
C/1+R/3	C
L/2+C/1	L
L/2+R/3	R
 - If two CMD: Man shutdn (AC/PB)
 2nd CMD at 24.5K

MPS

LH2 ET ULL PRESS
 /MCC
 Post SRB SEP/Pre MECO
 If 3 of 3 < 31.6:
 1. MPS LH2 ULL PRESS - OP when 3 of 3 > 34.5 - AUTO
 If 2 of 3 > 34 & third < 31.6:
 2. MPS LH2 ULL PRESS - OP when third > 34.5 - AUTO

POST MECO

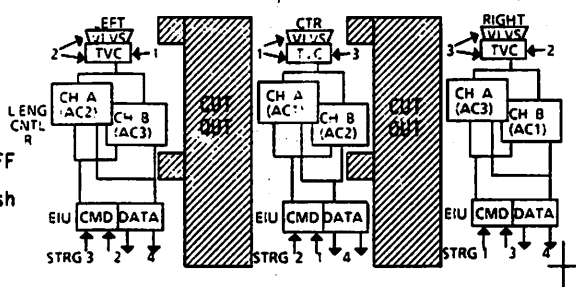
LH2 MANF PRESS HIGH
 If MANF P LH2 > 60:
 MPS PRPLT dump seq-start ASAP

LO2 MANF PRESS HIGH
 If MANF P LO2 > 249:
 MPS PRPLT dump seq-start ASAP

MULTI MPS CMD/DATA
 (No MECO Confirm)
 Post MECO:
 MN ENG SHUTDN pb (three) - push (simo)

ENG FAIL
 AC BUS SNSR (three) - OFF
 If MPS Data:
 MN ENG SHUTDN pb - push

AESP-11a/A/C

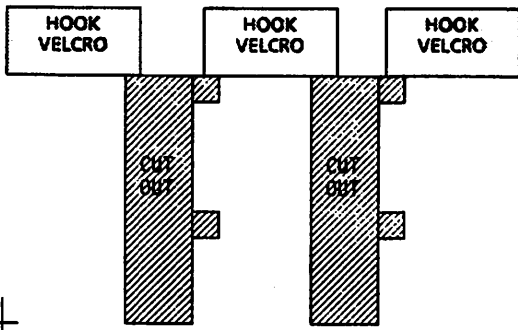


FAB USE ONLY

CC 10-3

AESP/ALL/A/GEN B

TOP
BACK OF 'MPS'



AESP-11b/A/B

FAB USE ONLY

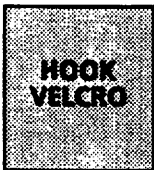
CC 10-4

AESP/ALL/A/GEN B

TOP

ASC/RTLS/TAL RESTRING

- 1. Config MC1(3) NBAT as reqd
- Post MECO:
- 2. ASAP, failed GPC(s) - STBY,HALT
- If ASC/RTLS:
 - 3. OPS Mode Recall: OPS XXX PRO
 - 4. BFS I/O RESET
- If TAL:
 - 5. OPS 301 PRO
 - 6. BFS OPS 301 PRO
- 7. Config FCS CH(s):
each GPC cmds equal
no. of CH(s): (See Table)
- 8. **G53** at OPS 3 (TAL): Recovered
SURF FBK - sel (if reqd)



	AVAILABLE FCS CHs		
	4	3	2
3 AVAILABLE GPCs	3 chs- AUTO 1 ch -OFF	3 chs- AUTO 1 ch - OFF	2 chs- ORIDE 2 chs- OFF
2 AVAILABLE GPCs	4 chs-ORIDE	2 chs- ORIDE 2 chs- OFF	2 chs- ORIDE 2 chs- OFF

AESP-10a/A,E/B

FAB USE ONLY

CC 10-5

AESP/ALL/A,E/GEN B

TOP
BACK OF 'ASC/RTLS/TAL RESTRING'

ENTRY RESTRING

1. Failed GPC(s) - STBY,HALT
2. **G51** Aff IMU - des
3. **G53** Aff SURF FBK - des
4. Config MC3 NBAT
5. OPS Mode Recall:
OPS 30X PRO
6. BFS I/O RESET
7. Config FCS CH(s):
each GPC cmds equal no.
of CH(s): (See Table)
8. **G53** Recovered SURF FBK - sel
9. If STRG 1(2,3) recovered:
G50 NAV DELTA zero update
G51 IMU - sel



		AVAILABLE FCS CHs		
		4	3	2
AVAILABLE GPCs	3	3 chs - AUTO 1 ch - OFF	3 chs - AUTO 1 ch - OFF	2 chs - ORIDE 2 chs - OFF
	2	4 chs - ORIDE	2 chs - ORIDE 2 chs - OFF	2 chs - ORIDE 2 chs - OFF

AESP-10b/A,E/B

FAB USE ONLY

CC 10-6

AESP/ALL/A,E/GEN B

TOP

TOP
BACK OF 'MPS He'

MPS He TK LK

Pre ET SEP

If He REG P ↑ or ↓:

1. Aff He ISOL - CL

Otherwise:

2. He ISOL A - CL

If no decr in dP/dT:

3. He ISOL A - OP

B - CL

No decr in dP/dT:

4. He ISOL B - OP

If TK P < 1150 or

REG P > 679:

5. Aff He I'CONNECT -
IN OP

At ET SEP:

6. He I'CONNECT - GPC >>

MPS He TK LK

Post ET SEP (Not RTLS)

If TK P < 1150:

1. Aff He ISOL (two) -
CL

If second TK P < 1150:

2. PNEU He ISOL - CL

Pneu He LK P < 3800

1. PNEU He ISOL - CL,
✓MCC

No COMM; REG P < 715

and ↓:

At TMECO -30 sec:

2. He ISOL-OP (5 sec)

3. L ENG He XOVR - OP

AESP-12a/A/C

**HOOK
VELCRO**

AESP-12b/A/C

FAB USE ONLY

CC 10-7

AESP/ALL/A/GEN B

TOP

'ET SEP MAN' G51 ET SEP

Post Meco:

ET SEP AUTO - ITEM 38 (BFS 28)

To override ET 'SEP INH':

ET SEP SEP - ITEM 39 (BFS 29)

AESP-13a/A/B

TOP

BACK OF 'ET SEP'

V
H
E
L
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C
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AESP-13b/A/B

V
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FAB USE ONLY

CC 10-8

AESP/ALL/A/GEN B

TOP

HOOK
VELCRO

HOOK
VELCRO

AOA DEORBIT MIXED XFD BURN PREP

NOTE: Do Not Use RCS MASTER XFD sw

1. L,R OMS TK ISOL (four) - CL (tb-CL)
 XFEED (four) - CL (tb-CL)
 He ISOL (four) - CL (tb-CL)
2. AFT L,R RCS XFEED (four) - CL (tb-CL)
 ✓Master RCS XFEED - OFF
3. Set up GPC vlvs SPEC 0
 ✓HEX 27*

BIT RESET - ITEM 23 EXEC
Configure ADD ID/DESIRED Addresses

ADD ID	DESIRED	
28	03F45	} From Tables 1-8
30	03FCB	
32	0403D	
34	0409B	

WRITE - ITEM 25 EXEC

4. BIT SET - ITEM 22 EXEC

ADD ID	DESIRED	
28	03F49	} From Tables 1-8
30	03FCF	
32	04041	
34	0409F	

WRITE - ITEM 25 EXEC

5. Perform RECONFIG:
 L,R OMS TK ISOL (four) - GPC
 XFEED (four) - GPC
 (✓tb config from Table)
 OMS BURN will be SE or + xRCS
 (ck Tables for ENG)
6. During AOS: ✓vlv config w/MCC
7. Perform POST - OMS 1 BURN (ASC C/L) EXCEPT:
 DO NOT RECONFIGURE OMS VLVS
 For deorbit burn
 TGT AOA
 PRPLT = 0 (ITEM 18 +0)
 Use AOA DEORBIT MIXED XFD BURN
 (next page) for DEORBIT BURN

AESP-8a/A/C

FAB USE ONLY

CC 10-9

AESP/ALL/A/GEN B

TOP
BACK OF 'AOA DEORBIT MIXED XFD BURN PREP'

HOOK
VELCRO

HOOK
VELCRO

AOA DEORBIT MIXED XFD BURN

MM302 /OMS L or R, or +XRCS
 CNTRLR PWR (two) - ON
 Enter TGO + 10 sec
 ✓DAP - AUTO(PASS)/DISC
 ADI - LVLH/HI/MED
 ✓L,R OMS TK ISOL (four) - GPC
 XFEED (four) - GPC
 (✓tb config from Table)

if OMS BURN

✓TRIM: P +0.0, LY +5.2, RY -5.2
 TIG -2:00 OMS ENG - ARM/PRESS
 - :15 EXEC (NO EXEC > TIG +)
 :00 TIG (✓Pc, ΔVTOT, ENG VLVs; start watch)
 MAN REPRESS FROM L and R OMS He TKs

***OMS ENG FAIL:**

- ✓Good OMS Tk P > RCS Tk P
- OMS ENG - OFF
- L,R RCS XFEED (four) - OP
- TK ISOL (six) - CL
- THC + X (✓OMS% vs RCS BURN TIME)
- TRIM INPLANE X,Z RESIDUALS < .5 FPS
- Go to ASC C/L POST DEORBIT BURN RECONFIG >>

***OMS PRPLT FAIL**

- THC + X to TGT HP or TOT AFT QTY 1 %
- If CUR HP ≤ PRI HP , FRCS to PRI SITE
- If CUR HP > PRI HP and ≤ B/U HP
- FRCS to B/U SITE
- If CUR HP > B/U HP , THC + X to
- B/U HP
- or TOT AFT QTY 2 ; FRCS to B/U SITE
- MNVR to -X ATT [Pitch UP at 3°/sec to VGOz = (+)1/4 VTOT]
- THC -X

***CUTOFF VGOx = 0, RELEASE THC**

- AFT RCS RECONFIG
- Trim inplane X,Z RESIDUALS < .5 FPS

if +XRCS BURN

- ✓Good OMS TK P > RCS TK P
- OMS ENG - OFF
- L,R RCS XFEED (four) - OP
- TK ISOL (six) - CL
- TIG :00, THC + X
- Man Repress from L and R OMS He TKs
- TRIM INPLANE X,Z RESIDUALS < .5 FPS
- Go to ASC C/L POST DEORBIT BURN RECONFIG >>

***OMS PRPLT FAIL**

- (Perform OMS PRPLT FAIL procedure above)

FAB USE ONLY

CC 10-10

AESP-8b/A/B

AESP/ALL/A/GEN B

TOP

HOOK
VELCRO

HOOK
VELCRO

OMS-1 MIXED XFD OMS 1/2

NOTE: Do Not Use RCS MASTER XFD sw

1. Perform AOA-S (ASC, OMS TGTS)
2. L,R OMS TK ISOL (four) - CL (tb-CL)
XFEED (four) - CL (tb-CL)
3. AFT L,R RCS XFEED (four) - CL (tb-CL)
✓ Master RCS XFEED - OFF
4. Set up GPC vlvs **SPECO**
✓ HEX 27*

BIT RESET - ITEM 23 EXEC
Configure ADD ID/DESIRED Addresses

ADD ID	DESIRED	
28 03F45	29	} From Tables 1-8
30 03FCB	31	
32 0403D	33	
34 0409B	35	

WRITE - ITEM 25 EXEC

5. BIT SET - ITEM 22 EXEC

ADD ID	DESIRED	
28 03F49	29	} From Tables 1-8
30 03FCF	31	
32 04041	33	
34 0409F	35	

WRITE - ITEM 25 EXEC

6. Perform RECONFIG:
L,R OMS TK ISOL (four) - GPC
XFEED (four) - GPC
(✓tb config from Table)
OMS-1 will be SE or + xRCS (ck Tables for ENG)
7. During AOS: ✓vlv config, TGT w/MCC
8. If OMS ENG burn:
OMS L or R
TRIM: P + 0.0, LY + 5.2, RY - 5.2
L(R) OMS ENG - ARM/PRESS (Other OMS ENG - OFF)
TIG - .15 EXEC
MAN REPRESS FROM L & R OMS He TKS
(240 < TK P < 250)
If + xRCS burn
✓ Good OMS TK P > RCS TK P
OMS ENG - OFF
L,R RCS XFEED (four) - OP
TK ISOL (six) - CL
THC + X (✓OMS % vs RCS burn time)
Man Repress from L & R OMS He TKS
(240 < TK P < 250)
9. POST BURN, OMS He VAP ISOL (4) - CL
10. Perform POST - OMS 1 BURN (ASC C/L)
EXCEPT:
DO NOT RECONFIGURE OMS VLVS
For OMS-2 TGTS, PRPLT = 0 (ITEM 18 + 0)
Use AOA DEORBIT MIXED XFD BURN (Next page)
(FOR OMS-2 BURN)

OMS 1/2

AESP-9a/A/C

FAB USE ONLY

CC A10-11

AESP/ALL/A/GEN B

TOP
BACK OF 'OMS 1 MIXED XFD'

HOOK
VELCRO

HOOK
VELCRO

FAB USE ONLY

CC A10-12

AESP-9b/A/B

AESP/ALL/A/GEN B

PLT
OVRHD
BOOK

PLT OVERHEAD FLIP BOOK

PLT OVHD

FB 11-1

AESP/ALL/A,E/GEN B

FAB USE ONLY

FAB REMOVES TAB FROM THIS PAGE ONLY

TOP

MOUNT ON LEFT SIDE OF BACKBOARD FACING 'OMS I'CONNECT FAIL - SE ROLL CNTL (failure after SE ROLL CNTL)'

PILE

OMS I'CONNECT FAIL - SE ROLL CNTL
(Failure before SE ROLL CNTL)

GPC/FA MDM FAIL

L,R RCS TK ISOL (six) - CL, then GPC

MNA,B,C FAIL

AC1,2,3 FAIL

No Action

PLT
OVRHD
BOOK

OMS I'CONNECT FAIL - CONT DUMP PRE-MECO/OPS 6
(Failure before DUMP START)

GPC/FA MDM FAIL

L,R RCS TK ISOL (six) - CL, then GPC

G51 DUMP ARM, START

Prior to FAST SEP:

G51 DUMP STOP

MNA,B,C FAIL

AC1,2,3 FAIL

No Action

DO NOT START DUMP

----- MECO -----

OMS I'CONNECT FAIL - CONT DUMP POST MECO/OPS 6
(Failure before DUMP START)

G51 DUMP STOP

DO NOT START DUMP

PLT OVHD

FB 11-2

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP

HOOK

I'CN
FAIL
OMS

**OMS I'CONNECT FAIL - SE ROLL CNTL
(Failure after SE ROLL CNTL)**

GPC/FA MDM FAIL

No Action

AC1/MNA FAIL

No Action

AC2/MNB FAIL

No Action

AC3/MNC FAIL

L,R RCS XFEED 3/4/5 (two) - OP

**OMS I'CONNECT FAIL - CONT DUMP PRE-MECO/OPS 6
(Failure after DUMP START)**

GPC/FA MDM FAIL

No Action

AC1/MNA FAIL

No Action

AC2/MNB FAIL

No Action

AC3/MNC FAIL

L,R RCS XFEED 3/4/5 (two) - OP

----- MECO -----

**OMS I'CONNECT FAIL - CONT DUMP POST MECO/OPS 6
(Failure after DUMP START)**

GPC/FA MDM FAIL

No Action

AC1/MNA FAIL

No Action

AC2/MNB FAIL

No Action

AC3/MNC FAIL

L,R RCS XFEED 3/4/5 (two) - OP

PLT OVHD

FB 11-3

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP
BACK OF 'OMS I'CONNECT FAIL - SE ROLL CNTL'

+
I'CN
FAIL

PILE

OMS I'CONNECT FAIL - OMS He TK P LOW CONT DUMP
PRE-MECO
(Failure before DUMP START)

GPC/FA MDM FAIL

L,R RCS TK ISOL (six) - CL, then GPC

AC1/MNA FAIL

L,R RCS MANF 3,4 (four) - CL

AC2/MNB FAIL

L,R RCS MANF 3,4 (four) - CL
XFEED 3/4/5 (two) - CL

AC3/MNC FAIL

L,R MANF 1,2 (four) - CL

If RTLS prior to ET SEP all closed RCS manifolds -
stagger OP

OMS I'CONNECT FAIL - OPS 304 DUMP
(Failure before DUMP START)

GPC/FA MDM FAIL

L,R OMS XFEED (four) - OP

RCS XFEED (four) - OP

TK ISOL (six) - CL

G51 ENA I'CONNECT
DUMP ARM, START

After DUMP START +20 sec: L,R RCS TK ISOL (six) - GPC

At DUMP complete: L,R OMS XFEED (four) - CL

MNA,B,C FAIL - Do not dump if I'CONNECT ENA

AC1,2,3 FAIL

L,R OMS XFEED (four) - OP

RCS XFEED (four) - OP

TK ISOL (six) - OP

G51 ENA I'CONNECT
DUMP ARM, START

After DUMP START: L,R RCS He PRESS (four) - CL

After DUMP complete: L,R RCS He PRESS (four) - OP
OMS XFEED (four) - CL

PLT OVHD

FB 11-4

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP



**OMS I'CONNECT FAIL - OMS He TK P LOW CONT DUMP
PRE-MECO
(Failure after DUMP START)**

GPC/FA MDM FAIL

No Action

AC1/MNA FAIL

No Action

AC2/MNB FAIL

No Action

AC3/MNC FAIL

L,R RCS XFEED 3/4/5 (two) - OP

**RTLS/
TAL
DUMPS**

**OMS I'CONNECT FAIL - OPS 304 DUMP
(Failure after DUMP START)**

GPC/FA MDM FAIL

No Action

AC1/MNA FAIL

No Action

AC2/MNB FAIL

No Action

AC3/MNC FAIL

L,R RCS XFEED 3/4/5 (two) - OP

PLT OVHD

FB 11-5

AESP/ALL/A,E/GEN B

FAB USE ONLY

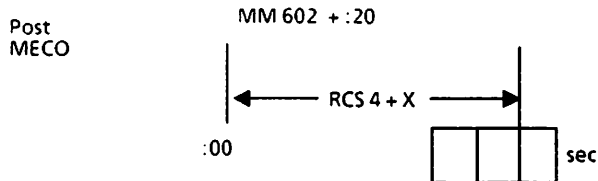
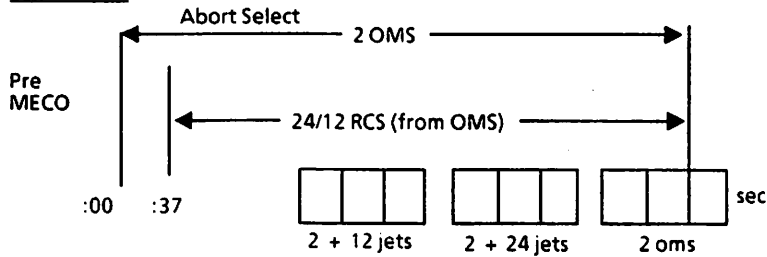
TOP
 BACK OF 'OMS I'CONNECT FAIL - OMS He TK P Low CONT DUMP PRE-MECO'

PILE

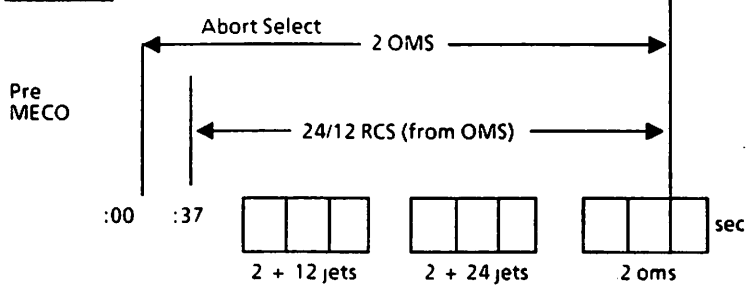
RTLS/TAL DUMPS

I'CN
 FAIL
 OMS

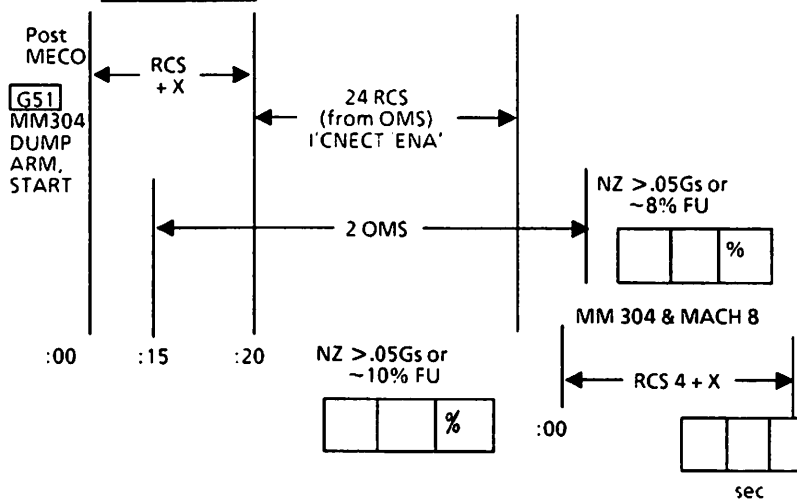
RTLS DUMP



TAL DUMP



OPS 304 DUMP



PLT OVHD

FB 11-6

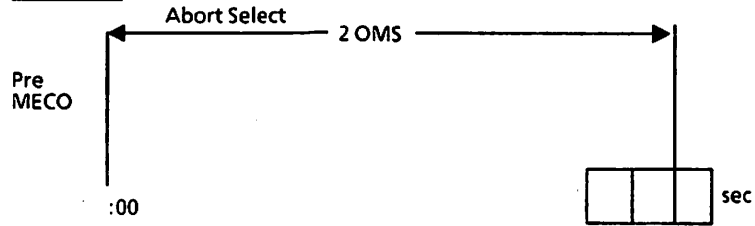
AESP/ALL/A,E/GEN B

FAB USE ONLY

ATO/CONTINGENCY DUMPS

HOOK

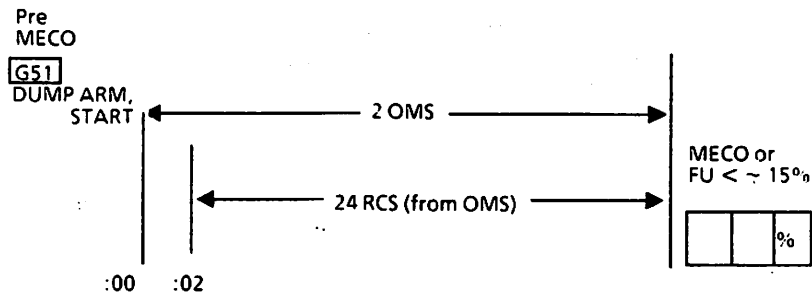
ATO DUMP



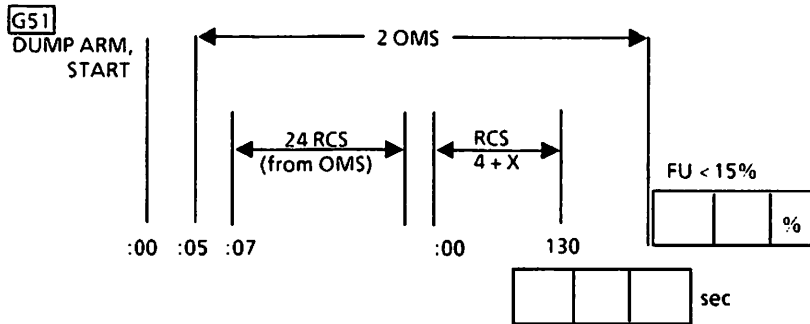
√G51 I'CONNECT 'INH' before Abort Select

CONTINGENCY DUMP

OMS



Post MECO



NZ > .05Gs

PLT OVHD

FB 11-7

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP
BACK OF 'ATO/CONTINGENCY DUMPS'



PILE



OMS SECURE

MULTI

If leak, **G51** VENT DOORS - OP

Affected: OMS ENG - OFF

XFEED (two) - CL

TK ISOL (two) - CL

He PRESS (two) - CL

If leak isolated or FU TK leak and post D/O burn:

G51 VENT DOORS - CL

OMS N2 TK P LOW (N/A DURING RTLS/TAL/ATO DUMP)

ASCENT

✓N2 TK P decr (meter & CRT)

OMS ENG - ARM

If OMS N2 REG P decr: OMS ENG - OFF >>

If OMS N2 REG P not decr & subs RTLS/TAL/ATO:

OMS ENG (two) - ARM/PRESS

ATO/
CONT
DUMPS

OMS N2 REG P HIGH

MULTI

OMS ENG - ARM

PLT OVHD

FB 11-8

AESP/ALL/A,E/GEN B



FAB USE ONLY

OMS TK P FU(OX) LOW (✓ENG IN P)

ASCENT

HOOK

If Dumping ATO:

G51 INH I'CONNECT

Good OMS ENG - OFF

Failed OMS XFEED (two) - CL

When affected OMS ENG Pc < 80%: Aff OMS ENG - OFF >>

If Dumping RTLS/TAL: BFS, GNC SYS SUMM 2

When affected AFT QTY < 20% or either OMS

He P < 2000: G51 INH I'CONNECT

Failed OMS XFEED (two) - CL

When affected OMS ENG Pc < 80%: Aff OMS ENG - OFF

After 2:00 min, good OMS ENG - OFF >>

If Dumping CONT: BFS, GNC SYS SUMM 2

When affected AFT QTY < 20% or either OMS

He P < 2000: G51 DUMP OFF

Failed OMS XFEED (two) - CL >>

If not Dumping:

When FU IN P < 216 or OX IN P < 151:

G51 INH I'CONNECT

Aff OMS ENG - OFF

XFEED (two) - CL

If subs RTLS/TAL:

If FU IN P > 216 and OX IN P > 151:

Aff OMS XFEED (two) - OP

ENG - ARM/PRESS

G51 ENA I'CONNECT

Go to 'If Dumping RTLS/TAL'

If repress no joy after 2:00 min

Good OMS ENG - OFF >>

If subs ATO Dump:

Good OMS ENG - OFF

If FU IN P > 216 and OX IN P > 151

Aff OMS ENG - ARM/PRESS >>

Post MECO (N/A RTLS/TAL)

If OMS 1 reqd

AT TIG -2: Aff He PRESS (two) - OP

OMS ENG (two) - ARM PRESS

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

OMS SECURE

At TIG -15 sec: RCS+X to ign +1 sec

Post Burn: OMS SECURE

Go to OMS TK P FU(OX) LOW (ASC PKT, OMS) >>

If OMS 1 not reqd

OMS SECURE

Go to OMS TK P FU(OX) LOW (ASC PKT, OMS)

**OMS
T&
Pc**

PLT OVHD

FB 11-9

AESP/ALL/A,E/GEN B

FAB USE ONLY

+

PILE

+

OMS TEMP DURING DUMP (N/A CONT)

G51 INH I'CONNECT

If aff OMS FU IN P > **232**, go to ENG FAIL

If aff OMS FU IN P < **197**, go to PRPLT FAIL

Pc LOW DURING DUMP (N/A CONT)

ENG VLV < 70%: ENG FAIL

ENG VLV > 70%:

G51 INH I'CONNECT

If aff OMS OX IN P > **227**, go to ENG FAIL

If aff OMS OX IN P < **136**, go to PRPLT FAIL

OMS
Tk P

ENG FAIL (During Dump)

Failed OMS ENG - OFF

Pre MECO: **G51** ENA I'CONNECT

MM 304: ✓**G51** INH I'CONNECT

Balance prop by XFEED

PRPLT FAIL (During Dump)

Aff OMS ENG - OFF

Failed OMS XFEED (two) - CL

Pre MECO: After 2:00 min, good OMS ENG - OFF

MM304: Good OMS ENG - OFF

MPS DUMMY OMS BURN (PASS ONLY)

✓/Load TIG

TIG -2:

✓MPS dump seq - GPC

OMS ENG (two) - OFF

TIG -:15 EXEC

TIG -:05 +X until OMS ↓

+

PLT OVHD

FB 11-10

AESP/ALL/A,E/GEN B

+

FAB USE ONLY

TOP

HOOK

OMS He TK P LOW
(✓CRT & meter)

ASCENT
OMS 1/2

If Dumping ATO:

- [G51] INH I'CONNECT
- OMS XFEED (four) - OP
- Good OMS TK ISOL (two) - CL
- When leaking He P < 640:
- OMS ENG (two) - OFF

If Dumping RLTS/TAL:

- When leaking He P < 640:
- [G51] INH I'CONNECT
- When affected OMS ENG Pc < 72%:
- Aff OMS ENG - OFF
- After 2:00 min, good OMS ENG - OFF

If Dumping CONT:

- When leaking He P < 640:
- [G51] DUMP OFF >>

If Not Dumping (✓MCC):

- OMS ENG (two) - OFF
- Good OMS XFEED (two) - CL
- Leaking OMS XFEED (two) - OP
- [G51] DUMP ARM, START
- When leaking He P < 640 or

$\Delta T = \square$ sec:

[G51] DUMP STOP

Post MECO (N/A RLTS/TAL/CONT):

[G51] DUMP ARM, START

If Dump completed:

- XFEED from good OMS
- ✓OMS ENG (two) - ARM/PRESS
- Perform DELAY ATO OMS 1

If Dump not completed:

- If leaking He P > \square :
- OMS ENG (two) - ARM/PRESS
- Perform ON TIME OMS 1
- Go to OMS He TK P LOW
- (Cue Card, BURN MONITOR)

- If leaking He P < \square :
- Perform DELAY ATO OMS 1
- XFEED from good OMS
- OMS ENG (two) - ARM/PRESS
- Go to OMS He TK P LOW
- (Cue Card, BURN MONITOR)

OMS
XFEED

PLT OVHD

FB A11-11

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP
BACK OF 'OMS He TK P LOW'

+

PILE

| +

OMS XFEED (OPS 1&3):

MULTI

XFEED: R TO L
L,R OMS XFEED (four) - OP
L OMS TK ISOL (two) - CL
He PRESS/VAP ISOL (two) - CL
XFEED: L TO R
L,R OMS XFEED (four) - OP
R OMS TK ISOL (two) - CL
He PRESS/VAP ISOL (two) - CL

XFEED RETURN: OMS to OMS

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

**OMS
1/2**

+

PLT OVHD

FB A11-12

AESP/ALL/A,E/GEN B

| +

FAB USE ONLY

TOP

HOOK

OMS He TK P LOW
(✓CRT & meter)

**ASCENT
DIRECT**

If Dumping ATO:

- [G51] INH I'CONNECT
- OMS XFEED (four) - OP
- Good OMS TK ISOL (two) - CL
- When leaking He P < 640:
- OMS ENG (two) - OFF

If Dumping RLTS/TAL:

- When leaking He P < 640:
- [G51] INH I'CONNECT
- When affected OMS ENG Pc < 72%:
- Aff OMS ENG - OFF
- After 2:00 min, good OMS ENG - OFF

If Dumping CONT:

- When leaking He P < 640:
- [G51] DUMP OFF >>

If Not Dumping (✓MCC):

- OMS ENG (two) - OFF
- Good OMS XFEED (two) - CL
- Leaking OMS XFEED (two) - OP
- [G51] DUMP ARM, START
- When leaking He P < 640 or $\Delta T = \square$ sec:
- [G51] DUMP STOP

Post MECO (N/A RLTS/TAL/CONT)

[G51] DUMP ARM, START

If OMS 1 reqd

- Go to OMS He TK P LOW
- (Cue Card, BURN MONITOR) >>

If OMS 1 not reqd

Go to OMS He TK P LOW (ASC PKT, OMS)

**OMS
XFEED**

PLT OVHD

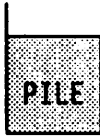
FB B11-11

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP
BACK OF 'OMS He Tk P LOW' - DIRECT

+



| +

OMS XFEED (OPS 1&3):

MULTI

XFEED: R TO L
L,R OMS XFEED (four) - OP
L OMS TK ISOL (two) - CL
He PRESS/VAP ISOL (two) - CL

XFEED: L TO R
L,R OMS XFEED (four) - OP
R OMS TK ISOL (two) - CL
He PRESS/VAP ISOL (two) - CL

XFEED RETURN: OMS to OMS

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

**OMS
DIRECT**

+

PLT OVHD

FB B11-12

AESP/ALL/A,E/GEN B

| +

FAB USE ONLY



RCS TK P HIGH (FU or OX)

(√MANF P)

1. He Press (two) - CL
2. He Press A - OP

If He P decr:

3. He PRESS A - CL
B - OP

ASCENT

AFT RCS TK P LOW (FU or OX)

(√MANF P)

1. If Pre ET SEP: ET SEP - MAN(N/A RTLS)
2. XFEED from good RCS
3. ET SEP - AUTO

AFT RCS LK

(Post ET SEP NOM/ATO/AOA)

Secure affected RCS

MULTI

RCS JET FAIL (LEAK)

If OX/FU Qty diverging:

1. RCS MANF ISOL - CL

RCS JET FAIL (ON)

1. RCS MANF ISOL - CL

If MANF P > 130 and stable (false alarm)

2. RCS MANF ISOL - OP
3. √AFT RCS RM LOSS (ENTRY)

RCS JET FAIL (OFF)

If > 1 jet/pod/dir failed:

1. **G23** Resel jets
2. DES INH * (Reprioritize)

ENTRY

RM DLMA MANF

If MANF tb - bp: MANF - GPC

If MANF tb - OP or sw not thrown

G51 RCS RM MANF CL OVRD - ITEM 41 EXEC

MULTI

**AFT
LK**

AFT RCS RM LOSS

If loss of jet RM and > 3Y, 2P jets/pod/dir:

1. **G23** DES INH twice (Reprioritize, Reset RM)
2. Aff jet - desel >>

If total RM loss (BCE) and < 3Y, 2P jets/pod/dir:

3. Aff MANF STAT - oride op

AFT RCS RECONFIG

TK ISOL (six) - OP, GPC

XFEED (four) - CL, GPC

PLT OVHD

FB 11-13

AESP/ALL/A,E/GEN B

TOP
BACK OF 'RCS' (CONT)

PILE AFT RCS LK (Pre ET SEP)

ASCENT

- N/A During Dump/SE Roll Cnt1
(✓He P decr; CRT & meter)
(✓TK P; if '↑', go to TK P HIGH)
1. ET SEP - MAN (N/A RTLS)
 2. Aff RCS MANF (five) - CL
Aff RCS TK ISOL (three) - CL
 3. If single MANF leak:
Reopen RCS except bad MANF
✓TK ISOL (S) - GPC
 4. If TK leg leak (two MANF):
Reopen RCS except bad leg
✓Good leg TK ISOL(S) - GPC
Aff RCS XFEED - CL
 5. If no MANF P decr:
L,R RCS XFEED (four) - OP
Aff RCS:
MANF 1,2,3,4 (four) - OP
He PRESS (two) - CL
MSTR XFEED - feed from good side
 6. If MANF or TK leg and QTY < 75%:
MSTR XFEED - feed from good side
 7. If RTLS, TAL: **G51** AFT RCS - INH
 8. ET SEP - AUTO

**RCS
TK
&LK** AFT RCS LK (GRTLS/304/305)

ENTRY

- (✓He P decr; CRT & meter)
(✓TK P; if '↑', go to TK P HIGH)
1. Open vent doors.
After proc complete: If not OX TK 1k and M > 3,
Cl vent drs
 2. If RTLS TAL: **G51** AFT RCS - INH
 3. Secure 3/4/5 MANFs & TK ISOLs
✓If single MANF leak: Reopen except bad MANF >>
 4. ✓If TK leg leak (two MANF): leave leak leg cl
Aff RCS XFEED - CL >>
 5. Reopen (leave MANF 5 GPC (tb-CL)),
✓TK ISOL(s) - GPC, then repeat for 1/2 leg
 6. He PRESS (two) - CL, ✓if He TK leak:
He PRESS (two) - OP, at He P < 456 - XFEED >>
 7. ✓If PRPLT TK leak (FU/OX TK P diverge):
He PRESS (two) - OP, when QTY = 0 - XFEED >>
 8. He PRESS (two) - OP, ✓if He leg leak (He P decr):
Cycle He PRESS so 200 < TK P < 245, at
He P < 456 - XFEED >>
 9. Assume MANF 5 leak

PLT OVHD

FB 11-14

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP

HOOK

INTERCONNECT (OPS 1 & 3):

I'CONNECT L OMS to RCS:

1. L OMS He PRESS/VAP ISOL (two) - OP
2. L OMS XFEED (two) - OP
3. L,R RCS XFEED (four) - OP
TK ISOL (six) - CL

I'CONNECT R OMS to RCS:

1. R OMS He PRESS/VAP ISOL (two) - OP
2. R OMS XFEED (two) - OP
3. L,R RCS XFEED (four) - OP
TK ISOL (six) - CL

I'CONNECT TK SWITCH:

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

XFD
RCS

PLT OVHD

FB 11-15

AESP/ALL/A,E/GEN B

FAB USE ONLY

PILE

RCS CONSTRAINTS

RCS to RCS Xfeed Initiation

On-orbit, $\Delta P < 80$

Entry, $\Delta P < 55$ and ACCEL < 48

Evacuated Manf

No repress for jet fail ON;

Otherwise, repress one at a time

XFEED: RCS to RCS

If AUTO XFEED:

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

If MANUAL XFEED:

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

XFEED RETURN: RCS to RCS

If AUTO XFEED:

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

If MANUAL XFEED:

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

I'CN
OMS/
RCS

PLT OVHD

FB 11-16

AESP/ALL/A,E/GEN B

FAB USE ONLY

ASCENT

HOOK

FWD RCS LK

(✓He P decr: CRT & meter)

(✓TK P; if '↑', go to TK P HIGH)

If RTLS:

1. RCS SECURE
2. Post PPD - reopen RCS
3. Post ET SEP - RCS SECURE >>

If Pre ET SEP (N/A RTLS):

4. ET SEP - MAN
5. RCS SECURE
6. If single MANF leak:
 - Reopen RCS, except bad MANF
 - ET SEP - AUTO >>
7. If TK leg leak: (two MANF P Low)
 - Reopen RCS, except bad leg
 - ET SEP - AUTO >>
8. If PRPLT TK P decr:
 - Post MECO:
 9. RATE DAMP with ARCS
 10. Reopen FRCS
 - If TK P > 200 & QTY > 0%:
 11. ET SEP - AUTO
 12. Post ET SEP - RCS SECURE >>
 - If TK P < 200 or QTY = 0%:
 13. RCS SECURE
 14. DAP - MAN, PITCH - PULSE
 15. THC -X and hold
 16. ET SEP - AUTO
 17. At SEP:
 - THC +Z (3 sec)
 - THC -Z (2 sec) (-.2°/sec)
 - COAST (15 sec)
 - THC +X (10 sec)(-.5°/sec)
 18. OPS 104 PRO, DAP - AUTO >>
19. Otherwise: (He TK or He leg)
 - Post MECO - reopen RCS
 - 20. ET SEP - AUTO
 - 21. Post ET SEP - RCS SECURE >>

If Post ET SEP - RCS SECURE**RCS SECURE**

MULTI

If leak, **G51** VENT DOORS - OP

- RCS MANF ISOL (five) - CL
- XFEED (two) - CL
- TK ISOL (all) - CL
- He PRESS (two) - CL

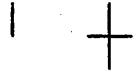
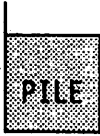
PLT OVHD

FB 11-17

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP
BACK OF 'FWD RCS LK'



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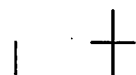
FWD
RCS
LK



PLT OVHD

FB 11-18

AESP/ALL/A,E/GEN B



FAB USE ONLY



OMS-1 MIXED XFD

NOTE: Do Not Use RCS MASTER XFD sw

1. Perform AOA-S (ASC, OMS TGTS)
2. L,R OMS TK ISOL (four) - CL (tb-CL)
XFEED (four) - CL (tb-CL)
3. AFT L,R RCS XFEED (four) - CL (tb-CL)
✓Master RCS XFEED - OFF
4. Set up GPC vlvs **SPEC 0**
✓HEX 27*
BIT RESET - ITEM 23 EXEC
Configure ADD ID/DESIRED Addresses

OMS 1/2

ADD ID	DESIRED	
28 03F45	29	} From Tables 1-8
30 03FCB	31	
32 0403D	33	
34 0409B	35	

WRITE - ITEM 25 EXEC

5. BIT SET - ITEM 22 EXEC

ADD ID	DESIRED	
28 03F49	29	} From Tables 1-8
30 03FCF	31	
32 04041	33	
34 0409F	35	

WRITE - ITEM 25 EXEC

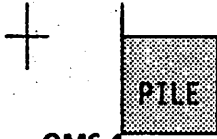
AESP/ALL/A/GEN B

6. Perform RECONFIG:
L,R OMS TK ISOL (four) - GPC
XFEED (four) - GPC
(✓tb config from Table)
OMS-1 will be SE or +XRCS (ck Tables for ENG)
7. During AOS: ✓vlv config, TGT w/MCC
8. If OMS ENG burn:
 - OMS L or R
 - TRIM: P +0.0, LY +5.2, RY -5.2
 - L(R) OMS ENG - ARM/PRESS (Other OMS ENG - OFF)
 - TIG -:15 EXEC
 - MAN REPRESS FROM L & R OMS He TKS (240 < TK P < 250)
 - If +XRCS burn
 - ✓Good OMS TK P > RCS TK P
 - OMS ENG - OFF
 - L,R RCS XFEED (four) - OP
 - TK ISOL (six) - CL
 - THC +X (✓OMS % vs RCS burn time)
 - Man Repress from L & R OMS He TKS (240 < TK P < 250)
9. POST BURN, OMS HE VAP ISOL (four) - CL
10. Perform POST OMS 1 BURN (ASC C/L)
EXCEPT:
DO NOT RECONFIGURE OMS VLVs
For OMS-2 TGTS, PRPLT = 0 (ITEM 18 +0)
Use AOA DEORBIT MIXED XFD BURN

PLT OVHD (Next page) for OMS-2 BURN

FB A11-19

TOP
BACK OF 'OMS-1 MIXED XFD'



OMS-1
MXD
XFD

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PLT OVHD

FB A11-20

AESP/ALL/A/GEN B

FAB USE ONLY

TOP

AOA DEORBIT MIXED XFD BURN PREP

NOTE: Do Not Use RCS MASTER XFD sw



1. L,R OMS TK ISOL (four) - CL (tb-CL)
 XFEED (four) - CL (tb-CL)
 He ISOL (four) - CL (tb-CL)
2. AFT L,R RCS XFEED (four) - CL (tb-CL)
 ✓Master RCS XFEED - OFF
3. Set up GPC vlvs **SPEC 0**
 ✓HEX 27*
 BIT RESET - ITEM 23 EXEC
 Configure ADD ID/DESIRED Addresses

AOA
XFD
BURN

ADD ID	DESIRED	
28 03F45	29	} From Tables 1-8
30 03FCB	31	
32 0403D	33	
34 0409B	35	

WRITE - ITEM 25 EXEC

4. BIT SET - ITEM 22 EXEC

ADD ID	DESIRED	
28 03F49	29	} From Tables 1-8
30 03FCF	31	
32 04041	33	
34 0409F	35	

WRITE - ITEM 25 EXEC

5. Perform RECONFIG:
 L,R OMS TK ISOL (four) - GPC
 XFEED (four) - GPC
 (✓tb config from Table)
 OMS BURN - will be SE or +XRCS
 (ck Tables for ENG)
6. During AOS: ✓vlv config w/MCC
7. Perform POST - OMS 1 BURN (ASC C/L) EXCEPT:
 DO NOT RECONFIGURE OMS VLVS
 For deorbit burn
 TGT AOA
 PRPLT = 0 (ITEM 18 +0)
 Use AOA DEORBIT MIXED XFD BURN
 (next page) for DEORBIT BURN

PLT OVHD

FB 11-21

AESP/ALL/A/GEN B

FAB USE ONLY

TOP
BACK OF 'AOA DEORBIT MIXED XFD BURN PREP'

PILE

AOA DEORBIT MIXED XFD BURN

MM302 /OMS L or R, or +XRCS
CNTLR PWR (two) - ON

Enter TGO +10 sec
/DAP - AUTO (PASS)/DISC
ADI - LVLH/HI/MED
/L,R OMS TK ISOL (four) - GPC
XFEED (four) - GPC
(/tb config from Table)

AOA
BURN
PREP

If OMS BURN

/TRIM: P +0.0, LY +5.2, RY -5.2
TIG -2:00 OMS ENG - ARM/PRESS
- :15 EXEC (NO EXEC > TIG +)
:00 TIG (/Pc, ΔVTOT, ENG VLVs; start watch)
MAN REPRESS FROM L and R OMS He TKs

*OMS ENG FAIL:

* /Good OMS Tk P > RCS Tk P
* OMS ENG - OFF
* L,R RCS XFEED (four) - OP
* TK ISOL (six) - CL
* THC +X (/OMS% vs RCS BURN TIME)
* TRIM INPLANE X,Z RESIDUALS < .5 FPS
* Go to ASC C/L POST DEORBIT BURN RECONFIG >>

*OMS PRPLT FAIL

* THC +X to TGT HP or TOT AFT QTY 1 %
* If CUR HP ≤ PRI HP , FRCS to PRI SITE
* If CUR HP > PRI HP and ≤ B/U HP ,
* FRCS to B/U SITE
* If CUR HP > B/U HP , THC +X to ,
* B/U HP
* or TOT AFT QTY 2 ; FRCS to B/U SITE
*
* MNVR to -X ATT (Pitch UP at 3'/sec to VGOz =
* (+)1/4 VTOT)

* THC -X

*CUTOFF VGOx = 0, RELEASE THC

* AFT RCS RECONFIG

* Trim inplane X,Z RESIDUALS < .5 FPS

If +XRCS BURN

/Good OMS TK P > RCS TK P
OMS ENG - OFF
L,R RCS XFEED (four) - OP
TK ISOL (six) - CL
TIG :00, THC +X

Man Repress from L and R OMS He TKs

TRIM INPLANE X,Z RESIDUALS < .5 FPS

Go to ASC C/L POST DEORBIT BURN RECONFIG >>

*OMS PRPLT FAIL

*(Perform OMS PRPLT FAIL procedure above) *

PLT OVHD

FB 11-22

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP

ASCENT



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

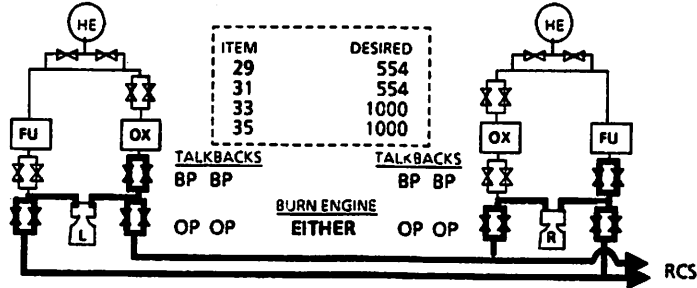
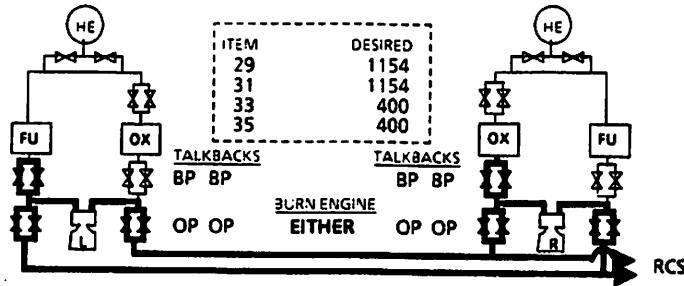


TABLE 2
L OMS OX TK AND R OMS FU TK FAILED



MXD
XFD
TBLS

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

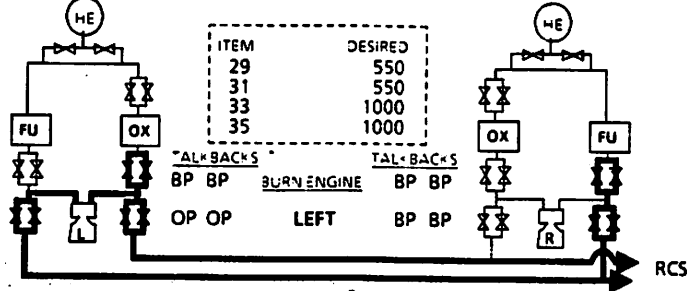
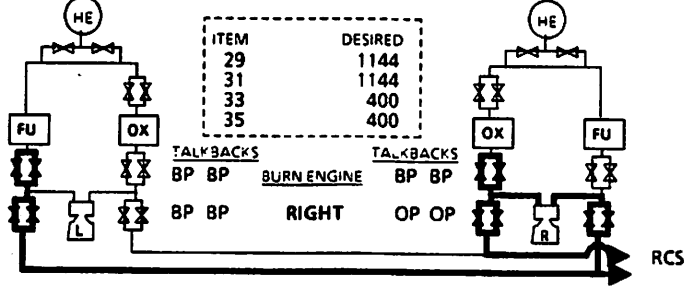


TABLE 4
L OMS OX INLET AND R OMS FU TK FAILED



PLT OVHD

FB 11-23

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP
BACK OF 'OMS TABLES'

PILE

ASCENT

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

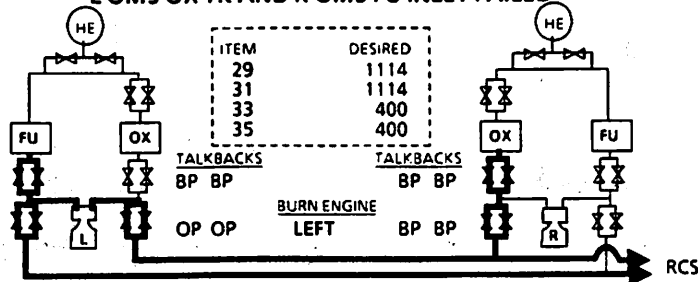


TABLE 6
L OMS FU INLET AND R OMS OX TK FAILED

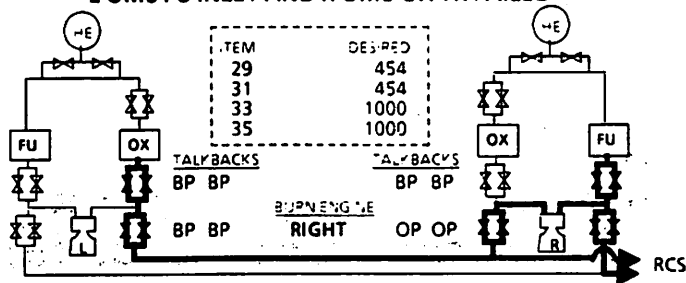


TABLE 7
L OMS OX INLET AND R OMS FU INLET FAILED

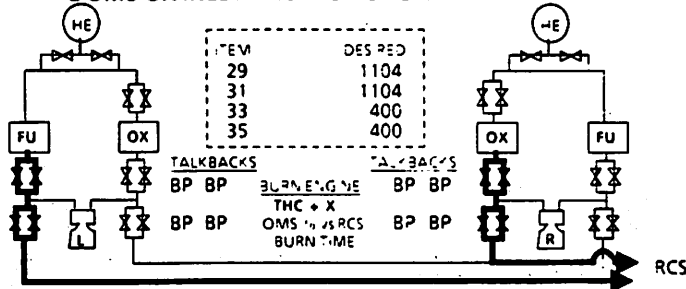
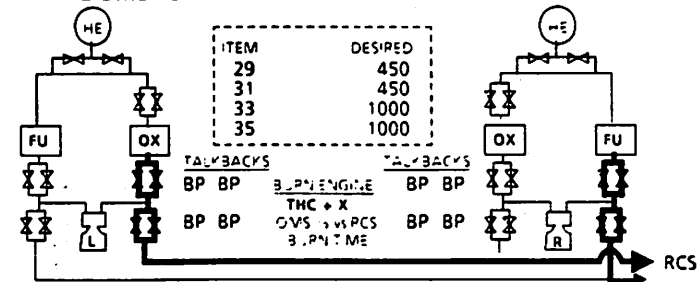


TABLE 8
L OMS FU INLET AND R OMS OX INLET FAILED



MXD
XFD
TBL5

PLT OVHD

FB 11-24

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP
MOUNT ON RIGHT SIDE OF BACKBOARD FACING 'OMS TABLES'



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PLT OVHD

FB 11-25

AESP/ALL/A,E/GEN B

FAB USE ONLY

NOTE
OMIT FROM FB PAGINATION WORKSHEET

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PLT OVHD

FB 11-26

AESP/ALL/A,E/GEN B

FAB USE ONLY

+

|

|

+

PLT FLIP BOOK

PLT FLIP
BOOK

PLT WND

FB 12-1

AESP/ALL/A,E/GEN B

+

|

|

+

FAB USE ONLY

FAB REMOVES TAB FROM THIS PAGE ONLY
TOP
MOUNT ON LEFT SIDE OF BACKBOARD FACING 'HYD'



APU SHUTDN

1. APU OPERATE - OFF
FUEL TK VLV - CL
CNTLR PWR - OFF
AUTO SHUTDN (three) - INH
FUEL PUMP/VLV COOL A,B (two) - AUTO

If one APU failed:

2. Powered Flight or TAEM:
APU SPEED SEL (two) - HI
3. MM 104: APU SPEED SEL (two) - NORM

If two APUs failed:

4. APU SPEED SEL (one) - HI
5. MM 104 (except TAL):
APU SPEED SEL (one) - NORM

APU PUMP LEAK P (✓MCC)

Post MECO & Pre-TAEM if two good APUs:

1. APU SHUTDN
2. When in MM602/304, APU COOLDOWN

APU SPD HI (✓CRT)

Aff APU SPEED SEL - HI

APU OVERSPEED (> 129%)

APU SHUTDN

APU OIL OVERTEMP

1. BLR CNTLR/HTR - B
If two good APUs, OIL IN T rising, and
Post SE PRESS, OUT T > 355 or
MM602/304, OUT T > 305 or
MM603/305, OUT T > 380, then
2. APU SHUTDN
3. APU COOLDOWN

APU THERM (T HI)

If APU GG/FU PMP HTR or APU TK/FU LINE

HTR fail on (+):

1. Aff HTR - OFF

PLT FLIP
BOOK

PLT WND

FB 12-2

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP

HOOK

APU UNDERSPEED

'PRL SYS X ↓' or if APU has shutdown:

1. APU SHUTDN
2. When in MM602/304, APU COOLDOWN

APU COOLDOWN

At M = 1.2:

1. HYD MN PUMP PRESS - LO
2. APU CNTLR PWR - ON
FUEL TK VLV - OP
OPERATE - START ORIDE/RUN (start watch)

At h = 15K or at 3 min:

3. APU OPERATE - cycle OFF, then START
ORIDE/RUN

At Wheel Stop:

4. APU SHUTDN

APU RESTART

1. HYD MN PUMP PRESS - LO
2. APU CNTLR PWR - ON
FUEL TK VLV - OP

If COOLDOWN for > 3.5 min, or INJ T < 400:

3. APU OPERATE - START/RUN

If not:

4. APU OPERATE - START ORIDE/RUN (3.5 min)

If, after 1.5 min, APU INJ T not decr and two good APUs: APU SHUTDN >>

If restart successful:

5. HYD MN PUMP PRESS - NORM >>

If restart unsuccessful:

6. APU SHUTDN

APU FUEL TK VLV T

If APU FUEL TANK VLV T > 160 or 250 (H)

1. Aff cb APU FU TK VLV ENA A(B) - op >>

If APU FUEL TANK VLV T is 0(L), NO COMM, Post MECO, & other 2 APUs good, step 1

HYD

PLT WND

FB 12-3

AESP/ALL/A,E/GEN B

FAB USE ONLY

PILE

HYD PRESS (LOW) G51

Pre MECO:

If 'PRL SYS X + ' and APU still operating:

1. APU AUTO SHUTDN (two) - INH
2. SPEED SEL (two) - HI

Post MECO:

PRL SYS	HYD PRESS	PROCEDURE
' + '	P > 300	HYD MN PUMP PRESS - LO Go to step 3
	P < 300	APU SHUTDN
blank	meter and CRT P < 2600	If first HYD sys degraded: HYD MN PUMP PRESS - LO Go to step 3
		If two HYD sys degraded: HYD MN PUMP PRESS (two) - NORM, then: LO on system with lowest pressure Go to step 3

3. APU AUTO SHUTDN - INH
4. At TAEM: APU SPEED SEL (two) - HI

HYD ACCUM P (LOW)

ASCENT

POST MECO:

1. Aff HYD CIRC PUMP - ON

BRAKE P 1/3(2/3)

1. LG HYD ISOL VLVs 1,3(2,3) - CL
Hold 5 sec, √tb - CL

After NGTD:

2. LG HYD ISOL VLV 1(2) - OP
Hold 5 sec, √tb - OP

APU

PLT WND

FB 12-4

AESP/ALL/A,E/GEN B

TOP

HOOK

COMM
CRYO

HYD RSVR T

1. BLR CNTLR/HTR - B

If after SINGLE ENG PRESS:

HYD RSVR T > 250:

2. HYD MN PUMP PRESS - LO

HYD RSVR T > 268 and rising:

3. APU SHUTDN

4. When in MM602/304: APU COOLDOWN

HYD RSVR QTY (LOW)

Post MECO if qty decr:

1. Aff MPS/TVC ISOL VLV - CL (5 sec)

2. Aff LG HYD ISOL VLV - CL (5 sec)

MM104 (not TAL) if still decr:

3. APU SHUTDN >>

TAL/MM602/304 if still decr:

4. Aff HYD MN PUMP PRESS - LO

5. Good APU AUTO SHUTDN (two) - INH

6. At TAEM: Good APU SPEED SEL (two) - HI

If second sys fail:

7. HYD MN PUMP PRESS (two) - NORM

W/B QTY (LOW)

1. Note Qty

2. BLR CNTLR/HTR - B

If QTY was zero >>

Otherwise wait 2 min, then:

3. BLR CNTLR/HTR - A

4. √QTY

If QTY change < 3

5. BLR CNTLR/HTR - B >>

If QTY change ≥ 3

If AOA/MM301-303:

6. APU SHUTDN

7. M = 10, APU RESTART, then

If MM602/304:

8. Cycle BLR PWR to maintain
200 < LUBE OIL IN T < 290 (c/w)

If TAEM:

9. No action reqd

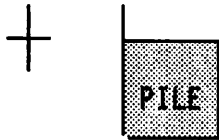
PLT WND

FB 12-5

AESP/ALL/A,E/GEN B

FAB USE ONLY

TOP
BACK OF 'HYD' (CONT)



HYD
W/B

COMM LOST (MULTI PANELS)

1. AUD CTR - 2
No comm(✓UHF Sites):
2. If STDN/SGLS:
 - | S-BD PM CNTL-PNL, then CMD (pn1 C3)If TDRS:
 - Config pn1 A1L for TDRS (APCL/COMM)
 - S-BD PM CNTL-PNL, then CMD (pn1 C3)No comm:
3. Select best S-BD PM ANT
No comm:
4. S-BD PM ANT - GPC

ICOM LOST

1. AUD CNTL - Sel ALT
No ICOM:
2. AUD CTR - 2

PLT WND

FB 12-6

AESP/ALL/A,E/GEN B

TOP



O2(H2) CRYO P/T HIGH
CRYO O2(H2) TK HTR (two) - OFF

O2(H2) CRYO LK (all tanks)

1. O2(H2) TK HTRS (six) - AUTO

If P still decr:

2. MANF VLV TK1,2 (two) - CL

If TK1(2) P decr:

MANF VLV TK2(1) - OP

√ECS Supply:

If O2 TK1(2) P decr:

3. Affected O2 SYS SPLY - CL

4. If O2 TK1(2) P stops decr (ECS leak):

MANF VLV TK1,2 (two) - OP >>

√TK Leg:

If O2 (H2) TK1(2,3/4/5) P decr:

5. BUS TIE

Post MECO:

6. FC SHUTDN

DPS
ASC

PLT WND

FB 12-7

AESP/ALL/A,E/GEN B

FAB USE ONLY

+

FILE

ASCENT

+

PASS GPC FAIL

1. Aff FCS CH - OFF
2. If 2 GPC/FA/FCS CH ↓:
Good FCS CHs - ORIDE
√MPS CMD
3. If 2 on 2 split/2 GPC ↓: ET SEP MODE - MAN
4. OMS I'CONNECT FAIL (SE ROLL CNTL/CONT DUMP)
5. √BIG 'X', then GPC/CRT XX EXEC
6. √MULT DATA PATH LOSS

COMM
CRYO

Post MECO:

7. ASAP, GPC MODE - STBY,HALT
8. B/U LH2 VLV - OP
9. If GPC 1(4) ↓: L(R) OMS - sel SEC
10. If GPC 1(4) failed post ET SEP & no restrg:
FF MDM - OFF,ON
IMU - des

BFS GPC FAIL

1. Post SRB SEP: FES PRI A - ON
- Post ET SEP:
2. GPC MODE - STBY,HALT, pause, STBY,RUN
OUTPUT - NORM
 3. If recovered: PRO to OPS 302; load TGTS (PEG7)
GPC OUTPUT - B/U >>
 4. If SM only: GPC MODE - STBY, then step 6
 5. GPC MODE - HALT
 6. If no comm: sel best S-BD PM ANT
 7. If RTLS < 120K: H2O PUMP LOOP 1,2 (two) - ON
NH3 CNTLR A(B) - SEC/ON

FF MDM I/O ERROR G51

1. I/O RESET; If recovered >>
 2. √MULT DATA PATH LOSS
- Post MECO
- If no BFS 'BCE STRG X PASS':
3. FF MDM - OFF,ON then I/O RESET
If not recovered, IMU - des
If FF 1(4):L(R) OMS - sel SEC GMBL

FA MDM I/O ERROR

1. I/O RESET
If recovered: Aff FCS CH - ORIDE,AUTO if reqd
 2. Aff FCS CH - OFF
 3. If 2 GPC/FA/FCS CH ↓: Good FCS CHs - ORIDE
 4. OMS I'CONNECT FAIL (SE ROLL CNTL/CONT DUMP)
 5. √MULT DATA PATH LOSS
- Post MECO:
6. B/U LH2 VLV - OP
 7. If FA1(4): L(R) OMS - sel SEC
- If no BFS 'BFS STRG X PASS':
8. OMS not burning:
FA MDM - OFF, ON then step 1

+

PLT WND

FB 12-8

AESP/ALL/A,E/GEN B

+

HOOK

FF(FA) MDM OUTPUT **FAULT**

(Take action only if annun by entire set)

If single 'MDM OUTPUT':

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

If both FF & FA annun:

2. I/O RESET; BFS I/O RESET if reqd

If msgs repeat: Go to PASS GPC FAIL >>

3. Aff FCS CH - ORIDE,AUTO if reqd

PL MDM I/O ERROR**ASCENT**

1. BFS I/O RESET

2. If PL2 ↓: Post SRB SEP: FES PRI A - ON

3. If PL2 ↓ & no comm: Sel best S-BD PM ANT

4. If RTLS < 120K:

NH3 CNTLR A(B) - SEC/ON

H2O PUMP LOOP 1,2 (two) - ON

**DPS
ENT****PCM I/O ERROR**

1. OI PCMMU PWR - 2

BCE STRG X **G51** (no 'MDM OUTPUT' msg)

1. If IMU - des

2. I/O RESET

If recovered: IMU - sel >>

3. ✓MULT DATA PATH LOSS

CRT LOST**MULTI**

1. CRT PWR - OFF,ON; If recovered >>

If PASS CRT:

| 2. GPC/CRT - same GPC/aff CRT; If recovered >>

| 3. BFC CRT SEL - aff CRT go to step 5

If BFS CRT:

4. BFC CRT SEL - unaff CRT If recovered >>

5. In PASS: deassign aff CRT, assign CRT 4

DUAL CRT CMDRS

1. If PASS: BFC CRT SEL - aff CRT

2. If BFS: BFC CRT DISP - OFF

3. If cleanup reqd: CRT PWR - OFF,ON

PLT WND

FB 12-9

AESP/ALL/A,E/GEN B

TOP
BACK OF 'DPS (ASCENT)' (CONT)

+

PILE

ENTRY

+

PASS GPC FAIL

1. GPC MODE - STBY,HALT
2. Aff FCS CH - OFF
3. If 2 GPC/FA/FCS CH †: Good FCS CHs - ORIDE
4. Aff IMU - des
5. If STRG 1(2): CDR(PLT) sws - green dot
6. ✓MULT DATA PATH LOSS

BFS GPC FAIL

1. BFS MODE - STBY,HALT
 2. BFS MODE - STBY
- If recovered:
3. PRO to MM304
- If full BFS cap:
4. BFS MODE - RUN >>
- If only BFS SM works:
5. BFS OUTPUT - NORM, then step 8
- If not recovered:
6. BFS MODE - HALT
OUTPUT - NORM
- If PASS GPC cmding PL1/2 also †:
7. S-BD PM ANT - man sel
 8. If AOA/TAL at 120K: NH3 A(B) - SEC/ON
H2O PUMP LOOP 1,2 (two) - ON

DPS
ASC

FF MDM I/O ERROR [G51] [G53]

1. IMU - des
 2. I/O RESET
 3. If recovered:
FF1(2,3): NAV DELTA zero update
IMU - sel
BFS I/O RESET >>
- If no BFS 'BCE STRG X PASS':
4. Port Mode
If recovered, step 3
 5. BFS I/O RESET
 6. FF MDM - OFF,ON then step 2
If not recovered:
FF MDM - OFF then step 7
- If BFS 'BCE STRG X PASS':
7. If FF1(2): CDR(PLT) sws - green dot
 8. ✓MULT DATA PATH LOSS

+

PLT WND

FB 12-10

AESP/ALL/A,E/GEN B

+

FA MDM I/O ERROR G53

ENTRY

HOOK

1. I/O RESET
2. If recovered:
 - Aff FCS CH - ORIDE,AUTO if reqd
 - If aff SURF FDBK des - resel
 - BFS I/O RESET >>
3. Aff FCS CH - OFF
4. If 2 GPC/FA/FCS CH ↓:
 - Good FCS CHs - ORIDE
5. Aff SURF FDBK - des
- If no BFS 'BCE STRG X PASS':
 6. Port Mode
 - If recovered, go to step 2
 7. BFS I/O RESET
 8. FA MDM - OFF,ON then step 1
 - If not recovered:
 - FA MDM - OFF
 - Aff AFT RCS MANF ISOLs - CL, then step 9
- If BFS 'BCE STRG X PASS':
 9. ✓MULT DATA PATH LOSS

FF(FA) MDM OUTPUT FAULT

(Take action only if annun by entire set)

DPS
MDP

- If single 'MDM OUTPUT':
1. Go to FF(FA) MDM I/O ERROR >>
- If both FF & FA annun:
2. G51 aff IMU - des
 3. I/O RESET; BFS I/O RESET if reqd
 - If msgs repeat: Go to PASS GPC FAIL >>
 4. G50 NAV DELTA zero update
 5. G51 IMU - resel
 6. Aff FCS CH - ORIDE,AUTO if reqd

PL MDM I/O ERROR

1. BFS I/O RESET
 - If recovered >>
2. Port Mode, then step 1
3. Pre MM305: FES PRI B(A) - ON
4. If PL2 ↓ & no comm: Sel best S-BD PM ANT
5. If AOA/TAL < 120K: NH3 CNTLR A(B) - SEC/ON
 - H2O PUMP LOOP 1,2 (two) - ON

PCM I/O ERROR

1. OI PCMMU PWR - 2(1)

PLT WND

FB 12-11

AESP/ALL/A,E/GEN B

TOP
BACK OF 'FA MDM I/O ERROR'

PILE

BCE STRG X G51 G53 (no 'MDM OUTPUT' msg)

1. If IMU - des
2. I/O RESET
3. If recovered & IMU: NAV DELTA zero update
 then IMU - sel >>
 If recovered & other >>
4. If NSP & LOS: PNL, CMD >>
5. Port Mode
 BFS I/O RESET
6. If recovered, go to step 3
7. If 'A(B,C,D,IMU)':
 8. FF(A,B) or FA(C,D) MDM - OFF,ON
 9. I/O RESET
 If FA: Aff FCS CH - ORIDE,AUTO if reqd
 If recovered, go to step 3
10. If < 3Y, 2P jets/pod/dir:
 G23 aff MANF STAT - ORIDE open
11. ✓MULT DATA PATH LOSS

DPS
ENT

MULTIPLE DATA PATH LOSS (Non-Recov) ENTRY

Assumes completion of 'FF(FA) MDM I/O ERROR' or 'BCE BYPASS'

FAILURE	TYPE	ACTIONS
GPC/FF1&2	B	Use R BODY FLAP & TRIM ENA SWs BFS NO-GO (AAs) (Note)
	J/O FF2 I/O & FF1 B	INH ADTA to G&C FLY THETA LIMITS (ADTA 1,2,3 ↓)
GPC/FF1&3	B or I/O	BFS NO-GO (AAs) (Note)
GPC/FF2&3	B or I/O	BFS NO-GO (AAs) (Note)
GPC/FF3&4	B	Use L BODY FLAP & TRIM ENA SWs
	J/O FF3 I/O & FF4 B	INH ADTA to G&C FLY THETA LIMITS (ADTA 2,3,4 ↓)
GPC/FA1&2 or GPC/FA1&3 or GPC/FA2&3	D or I/O	BFS NO-GO (RGAs) (Note)

NOTE
If data path loss not due to MDM fail, BFS is GO and will pick up MDMs when engaged

PLT WND

FB 12-12

AESP/ALL/A,E/GEN B



MULTIPLE DATA PATH LOSS (Non-Recov) ASCENT

If two FA MDMs lost during OMS burn, man shutdn of one or both OMS ENG reqd

FAILURE	TYPE	ACTIONS
GPC/FF1&2	B or I/O	Use R BODY FLAP & TRIM ENA SWs MM102, RTLS, TAL: BFS NO-GO (AAs) (Note) Post ET SEP: If no OMS-1 or DELAYED BURNS, go to MPS DUMMY OMS BURN
	I/O or FF2 I/O & FF1 B	RTLS, TAL: INH ADTA to G&C FLY THETA LIMITS (ADTA 1,2,3 ↓)
GPC/FF1&3	B or I/O	MM102, RTLS, TAL: BFS NO-GO (AAs) (Note)
GPC/FF2&3	B or I/O	MM102, RTLS, TAL: BFS NO-GO (AAs) (Note)
GPC/FF3&4	B or I/O	Use L BODY FLAP & TRIM ENA SWs
	I/O or FF3 I/O & FF4 B	RTLS, TAL: INH ADTA to G&C FLY THETA LIMITS (ADTA 2,3,4 ↓)
GPC/FA1&2	D or I/O	BFS NO-GO (RGAs) (Note) SRB SEP: BFS OPS 103 PRO
	I/O	ET SEP: MPS FDLN RLF ISOL (two) - OP Preburn: L OMS ENG - OFF (TVC) Pre MPS dump: MPS PREVLVs (six) - OP
GPC/FA1&3	D or I/O	BFS NO-GO (RGAs) (Note) SRB SEP: BFS OPS 103 PRO
	I/O	ET SEP: MPS FDLN RLF ISOL (two) - OP TAL: MPS LH2 FILL/DRAIN INBOARD, OUTBOARD - OP Preburn: R OMS ENG - OFF (IGN) Pre MPS dump: MPS PREVLVs (six) - OP
GPC/FA1&4	I/O	ET SEP: MPS FDLN RLF ISOL (two) - OP Preburn: L OMS ENG - OFF (IGN) Pre MPS dump: MPS PREVLVs (six) - OP
GPC/FA2&3	D or I/O	BFS NO-GO (RGAs) (Note) Post MECO: Expect 'SEP INH' (Feedline disc fail)
	I/O	ET SEP: MPS FDLN RLF ISOL (two) - OP Preburn: L OMS ENG - OFF (IGN) Pre MPS dump: MPS PREVLVs (six) - OP
GPC/FA2&4	D or I/O	SRB SEP: BFS OPS 103 PRO Post MECO: Expect 'SEP INH' (Feedline disc fail)
	I/O	Preburn: R OMS ENG - OFF (IGN) Pre MPS dump: MPS PREVLVs (six) - OP
GPC/FA3&4	D or I/O	SRB SEP: BFS OPS 103 PRO
	I/O	ET SEP: MPS FDLN RLF ISOL (two) - OP TAL: MPS LH2 FILL/DRAIN INBOARD, OUTBOARD - OP Preburn: L OMS ENG - OFF (IGN) Pre MPS dump: MPS PREVLVs (six) - OP

EPS
MN

NOTE
If data path loss not due to MDM fail, BFS is GO and will pick up MDMs when engaged

PLT WND

FB 12-13

AESP/ALL/A,E/GEN B

TOP
BACK OF 'MULTIPLE DATA PATH LOSS (ASCENT)'

PILE

MN BUS UNDER V/FC V - AMPS

PROBLEM	ACTION
MN V LO < 26.4 & FC V LO < 26.6 & FC AMP HI or LO $\Delta > 50$	<u>SHORT OR DEGRADED FC</u> 1. MSTR MADS PWR - OFF (ASCENT) Pre MECO: If AC VOLTS < 95, go to 2 ASAP Post MECO: 2. Do Step 3 of FC SHUTDN If FC VOLTS < 32.5 (FC SHORT) 3. FC REAC VLV - CL 4. BUS TIE, PWRDN >> If FC VOLTS > 32.5 (BUS SHORT) 5. ✓BUS LOSS
MN V LO < 21 & FC V HI > 32 & FC AMPS LO < 20	<u>FC DISCONNECT</u> 1. MSTR MADS PWR - OFF (ASCENT) 2. FC/MN BUS - ON 3. BUS TIE Post MM602/304 Trans: If FC3 VOLTS > 32: PL PRI FC3 - ON MNC - ON, then If any FC VOLTS > 32 and POST MECO - FC SHUTDN

DPS
MDP

PLT WND

FB 12-14

AESP/ALL/A,E/GEN B



MNA or AC1 Multi ϕ

BLR CNTLR/HTR 3 - B
MSTR MADS PWR - OFF (ASCENT)
AC BUS SNSR (three) - OFF
OMS I'NECT FAIL (SE ROLL CNTL/CONT DUMP)
FC SHUTDN

Post MECO:

L OMS - sel SEC

B/U LH2 VLV - OP

Failed: SPI, L INST, TAC 1

MLS 1, RA 1, NWS, L - HUD

MNB or AC2 Multi ϕ

BLR CNTLR/HTR 1 - B
MSTR MADS PWR - OFF (ASCENT)
AC BUS SNSR (three) - OFF
OMS I'NECT FAIL (SE ROLL CNTL/CONT ROLL)
FC SHUTDN

Post MECO:

SIG CONDR FREON A - AC3

B/U LH2 VLV - OP

Failed: R INST, TAC 2

MLS 2, RA 2

MNC or AC3 Multi ϕ

S-BD PM CNTL - PNL,CMD
BLR CNTLR/HTR 2 - B
MSTR MADS PWR - OFF (ASCENT)
AC BUS SNSR (three) - OFF
OMS I'NECT FAIL (SE ROLL CNTL/CONT DUMP)
FC SHUTDN

Post MECO:

SIG CONDR FREON B - AC2

R OMS - sel SEC

Failed: TAC 3, MLS 3, R - HUD

FUEL
CELL

PLT WND

FB 12-15

AESP/ALL/A,E/GEN B



FC PWRDN

ENTRY

LOSS OF 1 FC

1. If V < 15K >>
2. One CRT/INST/FLT CNTLR PWR - OFF
3. TAC/RA/MLS - OFF
4. DC UTIL PWR - OFF

LOSS OF 2ND FC

1. MSTR MADS PWR - OFF
 2. Do LOSS OF 1 FC
- If FC pwr 2 MN BUSES
3. MN BUS TIE (two) - OFF
 4. Tie good FC/BUS to unpowered bus
 5. I/O RESET, then Step 6
- If FC pwr 1 MN BUS
6. FC SHUTDN
 7. Use only one O2 TK HTR in one tk
Use only one H2 TK HTR in one tk
 8. PNL R1: Payload sws (seven) - OFF

FC pH ↓ 1(2,3) or FC DELTA V 1(2,3)

1. BUS TIE
If pH ↓ and FC SS 1(2,3) ΔV > 150
-or- FC SS ΔV > 150 and incr:
 2. FC SHUTDN >>
3. Wait 2 min after BUS TIE, then record
Δamps between aff and tied FC

MULTI

**EPS
MN**



PLT WND

FB 12-16

AESP/ALL/A,E/GEN B



HOOK

FC STACK T

1. MSTR MADS PWR - OFF
2. BUS TIE (Cue Card), then:
If STACK T > 243 and incr:
3. FC SHUTDN (Cue Card)

FC EXIT T

1. MSTR MADS PWR - OFF
2. BUS TIE (Cue Card), then:
If EXIT T > 170 and incr:
3. FC SHUTDN (Cue Card) >>
- If EXIT T < 131 and decr and no COMM:
4. FC SHUTDN (Cue Card)

FC END HTR FAIL

- If FC2 >>
If FC SS 1(3) ΔV inc > 10 mV in 4 min:
1. FC SHUTDN

FC REAC VLV CLOSED

1. FC REAC (three) - OP
2. BUS TIE
- If FC COOL P < 50:
3. FC SHUTDN

FC COOLANT PUMP ΔP LOW

1. \sqrt{FC} PUMP cb(s) - c1 (PNL L4:C)
2. FC - START (10 secs or ΔP tb-gray)
- If EXIT T > 170 & not decr or RDY tb - bp
(30 sec after start):
3. Go to FC SHUTDN >>
- If FC EXIT T norm and RDY tb - gray:
4. BUS TIE, \sqrt{MCC} (5 min max): Monitor AC AMPS
5. FC - STOP
- If AMPS decr 0.7-0.9 AMP/ ϕ :
6. FC - START (hold 30 sec if ΔP tb-bp)
7. If AMPS incr 0.7-0.9 AMP/ ϕ >>
- If Δ not 0.7-0.9 AMP/ ϕ , Go to FC SHUTDN

EPS
AC

PLT WND

FB 12-17

AESP/ALL/A,E/GEN B

TOP
BACK OF 'FC'



3 ϕ MOTORS STOPPED

1. Determine AC BUS
FC1 & FREON PUMP 1A: AC1
FC2 & AV BAY 1B & 2A: AC2
FC3 & FREON PUMP 2A: AC3
2. AC BUS SNSR (three) - OFF
3. Isolate ϕ A:
cb AC CONTR - c1
INV/AC BUS - OFF
If FC PUMP tb-gray: \checkmark BUS LOSS >>
If FC PUMP tb-bp:
INV/AC BUS - ON
cb AC CONTR - op
Repeat step 3 for ϕ B, ϕ C, then:
4. If FC PUMP tb - bp: go to AC MULTI ϕ

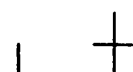
FUEL
CELL



PLT WND

FB 12-18

AESP/ALL/A,E/GEN B



FAB USE ONLY

**AC VOLT HIGH (> 123)**

MULTI

1. Aff AC BUS SNSR - AUTO TRIP
2. AC BUS SNSR (three) - OFF
3. √BUS LOSS

AC VOLT LOW or OVERLOAD (< 110)

MULTI

1. If in AUTO TRIP, √BUS LOSS >>
2. AC BUS SNSR (three) - OFF

If V < 95 (ASC) or V < 110 (ENT):

Confirm with F9 meter

3. If single Φ & V > 10:

If INV/AC BUS tb - ON (INV ↓)

cb AC CONTR - c1

INV/AC BUS - OFF

INV PWR - OFF

cb AC CONTR - op

If other Φ AMPS > 14,

repeat above

If INV/AC BUS tb - OFF (SNSR ↓)

cb AC CONTR - c1

INV/AC BUS - ON

cb AC CONTR - op

4. If multi Φ (Bus short):

Affected cb AC CONTR (three) - c1

INV/AC BUS - OFF (tb-OFF)

INV PWR - OFF (tb-OFF)

cb AC CONTR (three) - op

5. √BUS LOSS

AC1 Φ C

BLR CNTLR/HTR 3 - B

AC2 Φ A

BLR CNTLR/HTR 1 - B

AC2 Φ B (Post MECO)

SIG CONDR FREON A - AC3

AC3 Φ A

BLR CNTLR/HTR 2 - B

AC3 Φ B (Post MECO)

SIG CONDR FREON B - AC2

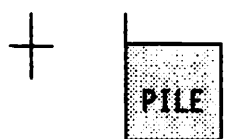
EPS
CNTL/
ESS

PLT WND

FB 12-19

AESP/ALL/A,E/GEN B

TOP
BACK OF 'EPS - AC VOLT'



CNTL BUS V LOW

√BUS LOSS

CNTLAB1

Use R TRIM & BDY FLP sws

CNTLAB2

FWD RCS MANF ISOL 1 - CL
FAILED: L HUD

CNTLAB3

BLR CNTLR/HTR 1,3 (two) - B
G51 RCS RM MANF CL OVRD - ITEM 41 EXEC
If BFS ENG reqd:
Use PLT's RHC, then GPCs 1,2,4 - STBY,HALT
BFS I/O RESET
If encryption reqd:
S-BD CNTL - PNL then CMD
If No OMS-1 BURN or DELAYED BURNS, Go to
MPS DUMMY OMS BURN

CNTLBC1

Use R TRIM & BDY FLP sws
FAILED: R HUD

CNTLBC2

S-BD PM CNTL - PNL,CMD
FWD RCS MANF ISOL 2 - CL
PLT Displays - Green Dot
Use L TRIM & BDY FLP sws

CNTLBC3

BLR CNTLR/HTR 1,2 (two) - B
G51 RCS RM MANF CL OVRD - ITEM 41 EXEC
If No OMS-1 BURN or DELAYED BURNS, Go to
MPS DUMMY OMS BURN

CNTLCA1

NO BFS ENGAGE

CNTLCA2

FWD RCS MANF ISOL 3 - CL
Use L TRIM & BDY FLP sws

CNTLCA3

BLR CNTLR/HTR 2,3 (two) - B

EPS
AC

PLT WND FB 12-20 AESP/ALL/A,E/GEN B

TOP

HOOK

GNC

ESS BUS V LOW

1. ESS BUS SOURCE MN - OFF,ON (✓Volts)

If regained:

2. FC - START (10 sec or ΔP tb-gray) >>

If not regained:

3. FC SHUTDN (< 6 min), ✓BUS LOSS >>

ESS1BC

L AUD CNTL - R (CDR lost comm)

Pri C/W & Matrix Lost

ESS2CA

AUD CNTL - 2

R AUD CNTL - L (lost comm)

ESS3AB

No BFS engage

CSM lost

PLT WND

FB 12-21

AESP/ALL/A,E/GEN B

FAB USE ONLY

EPS
CNTL
ESS

PILE

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

1. ✓MCC **G53**
- If 2 FC CH + on any actuator or no insight:
2. Remaining FCS CH (two) - ORIDE

RHC L(R)

- If first fail:
1. No action >>
- If second fail (dilemma):
2. Aff FLT CNTLR PWR - OFF

G51 ROLL MODE SW **G51**

- If ROLL MODE ≠ SW POS:
1. AUTO SEL - ITEM 42

DISPLAY SW L(R)

1. L(R) Disp Sws (eight) - green dot

RM FAIL IMU **BFS G51**

1. Aff IMU - desel

RM DLMA IMU **G51 **BFS G51****

1. ✓MCC, Bad IMU - desel (PASS & BFS) >>
2. If no MCC: desel lower # IMU with '?' (PASS)

ADTA FAIL/DLMA * **G51**

1. If FAIL and data good: resel >>
2. If DLMA and data agrees: desel, resel one ADTA >>
3. If bad probe: stow >>

If bad ADTA:

4. If accessible, bad ADTA cb - op >>
If cb not accessible, then
5. Desel bad ADTA
If bad ADTA candidate for BFS then,
6. BFS, ADTA to G&C - INH
7. Post BFS engage - stow probe,
ADTA to G&C - AUTO

If bad ADTA(s) not identified

8. ADTA to G&C - INH
9. Fly Theta limits

* If 3 ADTAs failed: ADTA to G&C - INH (PASS)
and Fly Theta limits

PLT WND

FB 12-22

AESP/ALL/A,E/GEN B

TOP
MOUNT ON RIGHT SIDE OF BACKBOARD FACING 'GNC'



RM FAIL TAC G50

(RM LIMITS: 6 DEG, 0.5 NM)

1. If data good - desel, resel >>
2. If failure verified: desel in BFS

RM DLMA TAC G50

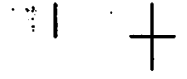
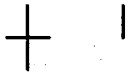
1. If both data good - desel, resel one TACAN in DLMA >>
2. ✓TACAN MODE (three) - GPC
3. If 'RM FAIL TAC' - desel failed TACAN in BFS >>
4. If continuous in self test - select T/R (three)
5. If one bad TACAN identified - bad TACAN OFF

PLT WND

FB 12-23

AESP/ALL/A,E/GEN B

FAB USE ONLY



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PLT WND

FB 12-24

AESP/ALL/A,E/GEN B



FAB USE ONLY

CDR FLIP BOOK

CDR FLIP
BOOK

CDR WND

FB 13-1 AESP/ALL/A,E/GEN B

FAB USE ONLY

+ |

| +

CDR FLIP
BOOK

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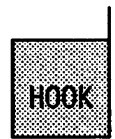
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CDR WND

FB 13-2 AESP/ALL/A,E/GEN B

| +

TOP



DPS
ASC

COMM LOST (MULTI PANELS)

1. AUD CTR - 2
No comm (✓UHF Sites):
2. If STDN/SGLS:
| S-BD PM CNTL - PNL, then CMD
If TDRS:
 Config pnl ALL for TDRS (APCL/COMM)
 S-BD PM CNTL - PNL, then CMD
No comm:
3. Select best S-BD PM ANT
No comm:
4. S-BD PM ANT - GPC

ICOM LOST

1. AUD CNTL - sel ALT
No ICOM:
2. AUD CTR - 2

CDR WND

FB 13-3

AESP/ALL/A,E/GEN B

FAB USE ONLY

+

PILE
COMM

ASCENT

PASS GPC FAIL

1. Aff FCS CH - OFF
 2. If 2 GPC/FA/FCS CH +:
Good FCS CHs - ORIDE
✓MPS CMD
 3. If 2 on 2 split/2 GPC +: ET SEP - MAN
 4. OMS I'CONNECT FAIL (SE ROLL CNTL/CONT DUMP)
 5. ✓BIG 'X', then GPC/CRT XX EXEC
 6. ✓MULT DATA PATH LOSS
- Post MECO:
7. ASAP, GPC MODE - STBY,HALT
 8. B/U LH2 VLV - OP
 9. If GPC 1(4) +: L(R) OMS - sel SEC
 10. If GPC 1(4) failed post ET SEP & no restrg:
FF MDM - OFF,ON
IMU - des

BFS GPC FAIL

1. Post SRB SEP: FES PRI A - ON
- Post ET SEP:
2. GPC MODE - STBY,HALT,pause,STBY,RUN
OUTPUT - NORM
 3. If recovered: PRO to OPS 302; load TGTs
(PEG7) GPC OUTPUT - B/U >>
 4. If SM only: GPC MODE - STBY, then step 6
 5. GPC MODE - HALT
 6. If no comm: sel best S-BD PM ANT
 7. If RTLS < 120K: H2O PUMP LOOP 1,2 (two) - ON
NH3 CNTLR A(B) - SEC/ON

FF MDM I/O ERROR

1. I/O RESET; If recovered >>
 2. ✓MULT DATA PATH LOSS
- Post MECO:
- If no BFS 'BCE STRG X PASS':
3. FF MDM - OFF,ON then I/O RESET
If not recovered, IMU - des
If FF1(4): L(R) OMS - sel SEC GMBL

FA MDM I/O ERROR

1. I/O RESET
- If recovered: Aff FCS CH - ORIDE, AUTO if reqd
2. Aff FCS CH - OFF
 3. If 2 GPC/FA/FCS CH +: Good FCS CHs - ORIDE
 4. OMS I'CONNECT FAIL (SE ROLL CNTL/CONT DUMP)
 5. ✓MULT DATA PATH LOSS
- Post MECO:
6. B/U LH2 VLV - OP
 7. If FA1(4): L(R) OMS - sel SEC
- If no BFS 'BCE STRG X PASS':
8. OMS not burning:
FA MDM - OFF,ON then step 1

+

CDR WND

FB 13-4

AESP/ALL/A/GEN B

+

HOOK

FF(FA) MDM OUTPUT **FAULT**

(Take action only if annun by entire set)

If single 'MDM OUTPUT':

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

If both FF & FA annun:

2. I/O RESET; BFS I/O RESET if reqd
If msgs repeat: Go to PASS GPC FAIL >>
3. Aff FCS CH - ORIDE,AUTO if reqd

PL MDM I/O ERROR**ASCENT**

1. BFS I/O RESET
2. If PL2 ↓: Post SRB SEP: FES PRI A - ON
3. If PL2 ↓ & no comm: Sel best S-BD PM ANT
4. If RTLS < 120K:
NH3 CNTLR A(B) - SEC/ON
H2O PUMP LOOP 1,2 (two) - ON

**DPS
ENT****PCM I/O ERROR**

OI PCMMU PWR - 2

BCE STRG X (no 'MDM OUTPUT' msg) **G51**

1. If IMU - des
I/O RESET
If recovered: IMU - sel >>
3. ✓MULT DATA PATH LOSS

SUMWORD ICC (IF TAL/AOA)

1. Prior to ops transition, aff GPC: STBY,HALT

CRT LOST**MULTI**

1. CRT PWR - OFF,ON; If recovered >>
- If PASS CRT:
2. GPC/CRT - same GPC/aff CRT; If recovered >>
 3. BFC CRT SEL - aff CRT go to step 5
- If BFS CRT:
4. BFC CRT SEL - unaff CRT If recovered >>
 5. In PASS: deassign aff CRT, assign CRT 4

DUAL CRT CMDRS

1. If PASS: BFC CRT SEL - aff CRT
2. If BFS: BFC CRT DISP - OFF
3. If cleanup reqd: CRT PWR - OFF,ON

BFS INADVERTENT DISENGAGE/UNSUCCESSFUL ENGAGE
(Lightning Strike)

1. CDR and PLT RHC ENGAGE pb - depress
- If no response
2. BFS OUTPUT - Norm,B/U
 3. CDR,PLT RHC ENGAGE pb - depress

CDR WND

FB 13-5

AESP/ALL/A/GEN B

TOP
BACK OF 'PL MDM I/O ERROR'

DPS
ASC
MULT

PILE	ENTRY
	<p>PASS GPC FAIL</p> <ol style="list-style-type: none">1. GPC MODE - STBY,HALT2. Aff FCS CH - OFF3. If 2 GPC/FA/FCS CH †: Good FCS CHs - ORIDE4. Aff IMU - des5. If STRG 1(2): CDR(PLT) sws - green dot6. ✓MULT DATA PATH LOSS <p>BFS GPC FAIL</p> <ol style="list-style-type: none">1. BFS MODE - STBY,HALT2. BFS MODE - STBY <p>If recovered:</p> <ol style="list-style-type: none">3. PRO to MM304 <p>If full BFS cap:</p> <ol style="list-style-type: none">4. BFS MODE - RUN >> <p>If only BFS SM works:</p> <ol style="list-style-type: none">5. BFS OUTPUT - NORM, then step 8 <p>If not recovered:</p> <ol style="list-style-type: none">6. BFS MODE - HALT OUTPUT - NORM <p>If PASS GPC cmding PL1/2 also †:</p> <ol style="list-style-type: none">7. S-BD PM ANT - man sel8. If AOA/TAL At 120K: NH3 A(B) - SEC/ON H2O PUMP LOOP 1,2 (two) - ON <p>FF MDM I/O ERROR G51 G53</p> <ol style="list-style-type: none">1. IMU - des2. I/O RESET3. If recovered: FF1(2,3): NAV DELTA zero update IMU - sel BFS I/O RESET >> <p>If no BFS 'BCE STRG X PASS':</p> <ol style="list-style-type: none">4. Port Mode If recovered, step 35. BFS I/O RESET6. FF MDM - OFF,ON then step 2 If not recovered: FF MDM - OFF then step 7 <p>If BFS 'BCE STRG X PASS':</p> <ol style="list-style-type: none">7. If FF1(2): CDR(PLT) sws - green dot8. ✓MULT DATA PATH LOSS

CDR WND

FB 13-6

AESP/ALL/E/GEN B

FA MDM I/O ERROR**G53****ENTRY****HOOK**

1. I/O RESET
2. If recovered: Aff FCS CH - ORIDE,AUTO if reqd
If aff SURF FDBK des - rese1
BFS I/O RESET >>
3. Aff FCS CH - OFF
4. If 2 GPC/FA/FCS CH ↓: Good FCS CHs - ORIDE
5. Aff SURF FDBK - des
- If no BFS 'BCE STRG X PASS':
 6. Port Mode
If recovered, step 2
 7. BFS I/O RESET
 8. FA MDM - OFF,ON then step 1
 - If not recovered:
FA MDM - OFF
Aff AFT RCS MANF ISOLs - CL, then step 9
- If BFS 'BCE STRG X PASS':
 9. ✓MULT DATA PATH LOSS

**DPS
ENT****FF(FA) MDM OUTPUT****FAULT**

- (Take action only if annun by entire set)
- If single 'MDM OUTPUT':
1. Go to FF(FA) MDM I/O ERROR >>
- If both FF & FA annun:
2. **G51** aff IMU - des
 3. I/O RESET; BFS I/O RESET if reqd
If msgs repeat: Go to PASS GPC FAIL >>
 4. **G50** NAV DELTA zero update
 5. **G51** IMU - rese1
 6. Aff FCS CH - ORIDE,AUTO if reqd

PL MDM I/O ERROR

1. BFS I/O RESET
- If recovered >>
2. Port Mode, then step 1
3. Pre MM305: FES PRI B(A) - ON
4. If PL2 ↓ & no comm: Select best S-BD PM ANT
5. If AOA/TAL < 120K: NH3 CNTLR A(B) - SEC/ON
H2O PUMP LOOP 1,2 (two) - ON

PCM I/O ERROR

1. OI PCMMU PWR - 2(1)

CDR WND

FB 13-7

AESP/ALL/E/GEN B

TOP
BACK OF 'FA MDM I/O ERROR'

FILE

- BCE STRG X (no 'MDM OUTPUT' msg) G51 G53
1. If IMU - des
 2. I/O RESET
 3. If recovered & IMU: NAV DELTA zero update,
| then IMU - sel >>
| If recovered & other >>
 4. If NSP & LOS: PNL,CMD >>
 5. Port Mode
BFS I/O RESET
 6. If recovered, go to step 3
 7. If 'A(B,C,D,IMU)':
 8. FF(A,B) or FA(C,D) MDM - OFF,ON
 9. I/O RESET
If FA: Aff FCS CH - ORIDE,AUTO if reqd
If recovered, go to step 3
 10. If < 3Y, 2P jets/pod/dir:
G23 aff MANF STAT - ORIDE open
 11. ✓MULT DATA PATH LOSS

DPS
ENT

CDR WND

FB 13-8

AESP/ALL/E/GEN B

TOP

HOOK

CAB PRESS HIGH

If increasing: Open visors

If still incr:

- N2 SYS 1,2 REG INLET (two) - CL
- O2 SYS 1,2 SPLY (two) - CL

CAB PRESS LEAK

CAB RELIEF (two) - CL

Close visors; suit O2 - ON

If RTLS/TAL:

- O2/N2 CNTLR VLV 2 - OP
- O2 TK1,2 HTR A,B (four) - AUTO
- DIRECT O2 VLV - OP

SPACELAB If RTLS/TAL or AOA:

- Remove Inner Hatch Caps (two)
- Post MECO: O2 TK 3 HTR A,B (two) - AUTO
- If V > 15K: MLS (three) - OFF; TAC (three) - OFF
- If CAB PRESS decreases < 6.5 psia:
- O2/N2 CNTLR VLV 2 - OP
- CAB FAN (two) - ON

H2O LOOP PRESS LOW

Post MECO: Switch loops

ECLS

H2O LOOP PRESS HIGH

Deact pump

Post MECO: Switch Loops

CABIN FAN FAIL

Post MECO: Switch fans

If both fans lost, minimize use of:
CRT/INST/FLT CNTLR PWR

AV BAY FAN ΔP

Post MECO: Switch fans

If no joy, go to LOSS OF AV BAY COOLING

LOSS OF AV BAY COOLING

- Bay 1: TAC 1, MLS 1 - OFF
- Bay 2: TAC 2, MLS 2,3 - OFF
- Bay 3: TAC 3 - OFF

AV BAY TEMP HIGH

Post Meco: AV BAY FANS (two) - ON

If not decr: Switch H2O Loops

If no joy, go to LOSS OF AV BAY COOLING

CAB PPO2 ABNORMAL

1. If PPO2 ≤ 2.70: Close visors
2. If PPO2 ≥ 3.60: Open visors
3. O2 SYS 1,2 SPLY (two) - CL

CDR WND

FB 13-9

AESP/ALL/A,E/GEN B

TOP
BACK OF 'CAB PRESS HIGH'



PILE



FREON FLOW LOW

Switch pumps

LOSS OF 1 FREON LOOP

Bad LOOP FREON PUMP - OFF

If FREON LOOP 1(2) lost:

 O2 SPLY VLV 1(2) (one) - CL

In good loop:

 ✓Flow PROP VLV - ICH

Monitor EVAP OUT TEMP

If TAL/AOA/RTLS:

 If Loop 1 lost:

 NH3 CNTLR A - OFF

 B - PRI/GPC

If AOA: go to LOSS OF 1 FREON LOOP (APCL, PWRDN)

LOSS OF 2 FREON LOOPS

Open visor

O2 SPLY VLV (TWO) - CL

If ENTRY and V < 15K:

 FREON PUMPS (two) - OFF >>

MSTR MADS PWR - OFF

CRT (two) - OFF

Panel L1: All switches off, except:

 H2O PUMP LOOP 2 - ON

 If AOA:

 IMU FAN B - ON

MCC CMD purge, then BFS GPC - STBY,HALT

 PWR - OFF

Post ET SEP:

 DC UTIL PWR - OFF

 FCS CH 4 - OFF

 GPC 4 - STBY,HALT,PWR - OFF

 FF4, FA4 - OFF

 ANNUN BUS SEL ACA 2/3 - OFF

If RTLS:

 TACAN 1,2 - OFF

 RADAR ALT 1 - OFF >>

If TAL/AOA/ENTRY:

 All TAC/RA/MLS - OFF

 Use one INST/FLT CNTLR PWR

 If AOA:

 Go to SYS AOA, LOSS OF TWO FREON LOOPS (AOA)

ECLS

CDR WND

FB 13-10 AESP/ALL/A,E/GEN B



MULTI

HOOK

EVAP OUT TEMP HIGH (Rads not cold soaked)

If temp high in only one loop, snsr failed >>

1. If V < 12K(entry only):
H2O PUMP LOOP 1,2 (two) - ON
NH3 CNTLR A(B) - SEC/ON >>
2. FES PRI A - OFF
B - ON (wait 30 sec): If T decr >>
3. FES PRI B - OFF
SEC - ON (HI LOAD ena) (wait 30 sec)
If T decr:
TOP EVAP HTRS (three) - OFF
RAD BYP VLV (four) - MAN, RAD FLOW >>
4. HI LOAD EVAP - OFF
DUCT HTR - OFF (wait 30 sec)
If T decr:
RAD BYP VLV (four) - MAN, RAD FLOW >>
5. TOP EVAP HTRS (three) - OFF
RAD BYP VLV (four) - MAN, RAD FLOW
6. If TAL/AOA & MM304 or RTLS and MM602:
H2O PUMP LOOP 1 (two) - ON,B
√LOOP 2 - ON
NH3 CNTLR A(B) - SEC/ON (wait 60 sec)
7. If T inc: MSTR MADS PWR - OFF

EVAP OUT TEMP HIGH (Rads cold soaked) ENTRY

If temp high in only one loop, snsr failed >>

1. If V < 12K:
RAD CNTLR LOOP (two) - OFF,
then AUTO B(A) (wait 90 sec)
If T decr >>
NH3 CNTLR A(B) - PRI/GPC >>
2. FES PRI B(A) - OFF
A(B) - ON (wait 30 sec)
If T decr >>
3. FES PRI A(B) - OFF
SEC - ON (HI LOAD ena) (wait 30 sec)
If T decr:
TOP EVAP HTRS (three) - OFF >>
4. HI LOAD EVAP - OFF
DUCT HTR - OFF (wait 30 sec)
If T decr >>
5. TOP EVAP HTRS (three) - OFF
RAD BYP VLV (two) - AUTO
CNTLR LOOP (two) - AUTO A(B) (wait 90 sec)
If RAD BYP VLV tb (two) - RAD >>
6. H2O PUMP LOOP 1 (two) - ON,B
√LOOP 2 - ON
NH3 CNTLR A(B) - SEC/ON (wait 60 sec)
7. If T inc: MSTR MADS PWR - OFF

EVAP

CDR WND

FB 13-11 AESP/ALL/A,E/GEN B

TOP
BACK OF 'EVAP OUT TEMP HIGH'

+



+

EVAP OUT TEMP LOW

If low in only one loop, snsr failed >>

1. H2O PUMP LOOP 1 (two) - ON,B
2. ✓FLOW PROP VLV LOOP 1,2 tb (two) - ICH
3. If either RAD BYP VLV tb - RAD:
RAD CNTLR OUT TEMP - HI (wait 90 sec)
4. If FREON EVAP OUT TEMP < 32:
NH3 CNTLR A,B (two) - SEC/ON (wait 1 min)
5. If FREON EVAP OUT TEMP < 32:
FREON PUMP LOOP 2 - OFF
NH3 CNTLR B - OFF
O2 SYS 2 SPLY - CL

EVAP

+

CDR WND

FB 13-12 AESP/ALL/A,E/GEN B

+

FAB USE ONLY orange (ascent) -----
green (entry) -----

TOP

HOOK

Post SRB SEP	MNA or AC1 Multi Φ FREON PUMP LOOP 1 - B TOP EVAP HTR NOZ L - B AUTO DUCT - B HI LOAD DUCT HTR - B	CDR
Post MECO	AV BAY 3 FAN A - ON B - OFF ANNUN BUS SEL ACA 1 - MNB	
ENTRY	Config Pnl L1 ANNUN BUS SEL ACA1 - MNB Failed: NH3 A PRI NWS, UHF HI PWR XMIT, L - HUD	
Post SRB SEP	MNB or AC2 Multi Φ TOP EVAP HTR NOZ R - B AUTO	
Post MECO	CAB FAN A - ON, B - OFF HUMIDITY SEP A - ON, B - OFF IMU FAN A - ON, B - OFF AV BAY 1 FAN A - ON, B - OFF 2 FAN B - ON, A - OFF ANNUN BUS SEL ACA 2/3 - MNC	
ENTRY	Config Pnl L1 ✓cb AC3 Φ A LG SNSR 1 - c1 ANNUN BUS SEL ACA 2/3 - MNC Failed: NH3 B SEC	
Post SRB SEP	MNC or AC3 Multi Φ FREON PUMP LOOP 2 - B FES CNTLR PRI A - OFF B - ON	
Post MECO	H2O PUMP LOOP 1 - ON 2 - OFF	
ENTRY	Config Pnl L1 ✓cb AC2 Φ A LG SNSR 2 - c1 FAILED: NH3 A SEC B PRI R - HUD	

AC
 Φ B

CDR WND

FB 13-13 AESP/ALL/A,E/GEN B

TOP
BACK OF 'MNA or AC1 MULTI φ'

+

PILE

| +

Any AC φB

Post MECO: Turn on both AV BAY FANS

AC1 - AV BAY 2

AC2 - AV BAY 3

AC3 - AV BAY 1

CDR

MN/AC
BUS

+

CDR WND

FB 13-14 AESP/ALL/A,E/GEN B

| +

FAB USE ONLY orange (ascent)
green (entry) -----

CNTLAB1,2,3

TOP EVAP HTR DUCT - B
HI LOAD DUCT HTR - B

**ASCENT
CDR**

HOOK

CNTLAB3

If BFS ENG reqd:
Use PLT's RHC, then GPCs 1,2,4 - STBY,HALT
BFS I/O RESET

Failed: NWS

CNTLBC1

TOP EVAP HTR NOZ L - B AUTO

CNTLBC3

TOP EVAP HTR NOZ R - B AUTO

CNTLCA1

No BFS ENGAGE
Post SRB SEP: FES PRI A - ON
Failed: NWS

CNTLAB1

Use R TRIM & BDY FLP sw
Failed: NH3 A SEC, FES PRI B GPC

**GRTLS/
ENTRY**

CNTLAB2

CDR Display - green dot
Failed: NH3 B SEC, L - HUD, FES PRI B ON
H2O LOOP 1,A ON

CNTLAB3

If BFS ENG reqd:
Use PLT's RHC, then GPCs 1,2,4 - STBY,HALT
BFS I/O RESET

Failed: NWS

CNTLBC1 Use R TRIM & BDY FLP sw

Failed: R - HUD

CNTLBC2

Failed: NH3 B PRI, FES SEC GPC
H2O LOOP 1,B ON

CNTLBC3

Failed: NH3 A PRI, FES SEC ON

CNTLCA1

No BFS ENGAGE
Failed: NH3 B SEC, FES PRI A GPC
H2O LOOP 2 GPC
NWS

**EPS
CNTL
ESS**

CNTLCA2

Failed: NH3 A SEC, FES PRI A ON

CNTLCA3

Failed: NWS

MULTI

CDR WND

FB 13-15 AESP/ALL/A,E/GEN B

PILE

FC PWRDN ENTRY	CDR
LOSS OF 1 FC	
1. ✓CAB FAN B(A) - ON	
2. If V < 15K >>	
3. HUMIDITY SEP (two) - OFF	
4. FLASH EVAP FDLN HTR SPLY (two) - OFF	
LOSS OF 2ND FC	
1. MDM PL1 - OFF	
2. FCS CH 4 - OFF	
GPC MODE 4 - STBY,HALT	
PWR 4 - OFF	
MDM FF4,FA4 - OFF	
3. If V > 10K:	
✓CAB FAN B(A) - ON	
4. M = 2.9: CAB FAN (two) - OFF	
AV BAY FAN (six) - OFF	

ESS1BC
L AUD CNTL - R (CDR can't talk)
Pri C/W & Matrix lost

MULTI

ESS2CA
AUD CTR - 2
R AUD CNTL - L (PLT can't talk)

EPS
CNTL
ESS

ESS3AB
No BFS ENGAGE
CSM lost

CDR WND

FB 13-16 AESP/ALL/A,E/GEN B

HOOK

FCS CH 1(2,3,4) (2nd FAIL)1. ✓MCC **G53**

If 2 FC CH + on any actuator or no insight:

2. Remaining FCS CH (two) - ORIDE

RHC L(R)

If first fail:

1. No action >>

If second fail (dilemma):

2. Aff FLT CNTLR PWR - OFF

G51 ROLL MODE SW **G51**

If ROLL MODE ≠ SW POS:

1. AUTO SEL - ITEM 42

DISPLAY SW L(R)

1. L(R) Disp Sws (eight) - green dot

RM FAIL IMU **BFS G51**

1. Aff IMU - desel

RM DLMA IMU**G51****BFS G51**

1. ✓MCC, Bad IMU - desel (PASS & BFS) >>

2. If no MCC: desel lower # IMU with '?' (PASS)

ADTA FAIL/DLMA***G51**

1. If FAIL and data good: resel >>

2. If DLMA and data agrees: desel, resel one ADTA >>

3. If bad probe: stow >>

If bad ADTA:

4. If accessible, bad ADTA cb - op >>

If cb not accessible, then

5. Desel bad ADTA

If bad ADTA candidate for BFS then,

6. BFS, ADTA to G&C - INH

7. Post BFS engage - stow probe,

ADTA to G&C - AUTO

If bad ADTA(s) not identified

8. ADTA to G&C - INH

9. Fly Theta limits

*If 3 ADTAs failed: ADTA to G&C - INH (PASS) and
Fly Theta limits

GNC

CDR WND

FB 13-17 AESP/ALL/A,E/GEN B

+

FILE

RM FAIL TAC **G50**

(RM LIMITS: 6 DEG, 0.5 NM)

1. If data good - desel, resel >>
2. If failure verified: desel in BFS

RM DLMA TAC **G50**

1. If both data good - desel, resel one TACAN in DLMA >>
2. ✓TACAN MODE (three) - GPC
3. If 'RM FAIL TAC' - desel failed TACAN in BFS >>
4. If continuous in self test - select T/R (three)
5. If one bad TACAN identified - bad TACAN OFF

GNC

+

CDR WND

FB 13-18 AESP/ALL/A,E/GEN B

+

HOOK

FWD RCS LK**ASCENT**

(✓He P decr: CRT & meter)

(✓TK P; if '+', go to TK P HIGH)

If RTLS:

1. RCS SECURE
2. Post PPD - reopen RCS
3. Post ET SEP - RCS SECURE >>

If Pre ET SEP (N/A RTLS):

4. ET SEP - MAN
5. RCS SECURE
6. If single MANF leak:
 - Reopen RCS, except bad MANF
 - ET SEP - AUTO >>
7. If TK leg leak: (two MANF P Low)
 - Reopen RCS, except bad leg
 - ET SEP - AUTO >>
8. If PRPLT TK P decr:
 - Post MECO:
 9. RATE DAMP with ARCS
 10. Reopen FRCS
 - If TK P > 200 & QTY > 0%:
 11. ET SEP - AUTO
 12. Post ET SEP - RCS SECURE >>
 - If TK P < 200 or QTY = 0%:
 13. RCS SECURE
 14. DAP - MAN, PITCH - PULSE
 15. THC -X and hold
 16. ET SEP - AUTO
 17. At SEP:
 - THC +Z (3 sec)
 - THC -Z (2 sec) (-.2°/sec)
 - COAST (15 sec)
 - THC +X (10 sec) (-.5°/sec)
 18. OPS 104 PRO, DAP - AUTO >>
19. Otherwise: (He TK or He leg)
 - Post MECO - reopen RCS
 - 20. ET SEP - AUTO
 - 21. Post ET SEP - RCS SECURE >>

If Post ET SEP - RCS SECURE

CDR WND

FB 13-19 AESP/ALL/A,E/GEN B

TOP
BACK OF 'FWD RCS LK'

+

PILE

|

+

C

C

This Page Intentionally Blank

C

5

C

+

CDR WND

|

FB 13-20 AESP/ALL/A,E/GEN B

|

+

C

FAB USE ONLY orange (ascent)
green (entry)

**SPACELAB - MODULE
CLASS 2 AND CLASS 3 ALARMS**

**SLM
ALARMS**

MS 14-1

AESP/SLM/A,E/GEN B

PL CL 2 ALARM

BFS, SM 206 S/L LAUNCH/ENTRY

AVIONICS FAN ΔP $\uparrow\uparrow$

1. AV FAN 1 - OFF
2 - LOW >>

H2O PUMP ΔP STAT \downarrow

1. H2O LOOP PUMP 1 - OFF
2 - ON

If H2O PUMP ΔP STAT - blank >>

|
If H2O PUMP Δ STAT \downarrow
Post MM105

2. If H2O PUMP OUT P \geq IN P +5 >>
3. PL PRI MNC - OFF
AUX - OFF

SLM
ALARMS

PL CL3 ALARM

BFS, SM 206 S/L LAUNCH/ENTRY

MAIN BUS VOLTS $\downarrow\uparrow$

If MAIN BUS VOLTS $\leq 24 \downarrow$:

1. PL PRI MNC - ON

If SS AC BUS V $\phi A, \phi B, \phi C$ (three) = 0 \downarrow :

2. PL PRI MNC - OFF

AUX - OFF

AUX BUS A/B U/V \downarrow

If CABIN PRESS \downarrow and PPO2 \downarrow :

Post SRB SEP:

1. \checkmark PL AUX - OFF, then ON

If CABIN PRESS \downarrow and PPO2 \downarrow :

2. PL PRI MNC - OFF

AUX - OFF

SS INV TEMP \downarrow

If SS INV TEMP \uparrow (≥ 122):

If EXP INV TEMP ≥ 115 :

1. H2O LOOP PUMP 1 - OFF

2 - ON

If SS INV TEMP > 131 :

2. SS INV - OFF

PL PRI MNC - OFF

AUX - OFF \gg

If EXP INV TEMP < 115 :

3. EXP INV - ON

S/S AC BUS - EXP INV

S/S INV - OFF

BFS, SM 206 S/L LAUNCH/ENTRY

SS AC BUS V ↑↑

If SS AC BUS V $\Phi A(\Phi B, \Phi C)$ ↑ (> 122):

Post MECO:

1. EXP INV - ON
S/S AC - EXP INV
S/S INV - OFF >>

If SS AC BUS V $\Phi A(\Phi B, \Phi C)$ ↓ (< 110):

If SS INV IN AMPS > 40 (continuous):

2. S/S INV - OFF
PL PRI MNC - OFF
AUX - OFF >>

If SS INV IN AMPS < 40 (normal):

Post SRB SEP:

3. EXP INV - ON
S/S AC BUS - EXP INV
S/S INV - OFF

SS INV IN AMPS ↑

If SS IN AMPS ↑ (≥ 40):

If SS AC BUS V $\Phi A(\Phi B, \Phi C)$ ↓ (< 110):

- S/S INV - OFF
PL PRI MNC - OFF
AUX - OFF >>

If SS AC BUS V $\Phi A, \Phi B, \Phi C$ (three) - normal (110-122V):

Post SRB SEP:

- EXP INV - ON
S/S AC BUS - EXP INV
S/S INV - OFF

**SPACELAB - PALLET
CLASS 2 AND CLASS 3 ALARMS**

**SLP
ALARMS**

MS 14-5

AESP/SLP/A,E/GEN B

SLP
ALARMS

TBD

MS 14-6

AESP/SLP/A,E/GEN B
NASA-JSC

FLIGHT DATA FILE
CORE DISTRIBUTION
04/07/88

JSC
AP/Directory
AP3/Support (2)
Pub. Information
CA7/Chief
DF24/INCO (4)
DF4/Crew Sys. (2)
DF75/Sys. Analysis Sect.
DG6/Rockwell
DH43/Lead FDF Coord
FAO
T/L
Flt. Act Br (10)
DH6/Branch Off
LC/Chief
Assist for Payloads
FC6/Shuttle Support Branch (5)
FF2/Chief
FH3/Chief
Support
EH4/Chief
ID/FDF Rep
JM2/Technical Library (3)
NS/Safety Div
SP4/Head
TM2/Mgr
VF/Manager
VF3/Support
VF5/CPCB Rep
VP/GFE Project Office
ZR1/Dual Library
SD-DET2 (2)
STIC Library

Allied/Bendix Aerospace
OAG Suite 450
10210 Greenbelt Rd
Seabrook, MD 20706
Attn: J. F. Ryan (3)

Boeing
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NASA Headquarters
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TP-TMS-B/LCC VITT Office
TV-PEO-2/J. C. Fairey

Marshall Space Flight Center
CN22D/Tech Doc Repos
EE45/R. Marmann
MDAC-HSV MS12C/
K. A. Jackson (2)
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Goddard Space Flight Center
405/J. B. Hartmann
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Charles Stark Draper Lab
MS4A/R. A. Larson

IBM - Houston
MC6272A/OBS T. O. Lib (2)

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C87/R. D. Bassett (2)

Rockwell - Houston
R12A/W. E. Smith
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Singer-Link - Houston
SMS Data Library

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13350 U.S. Highway 19
Clearwater, FL 33546
MS737-5/C. H. Crow

Martin-Marietta Corp. - Denver
- GOLDENROD -
G6245/Library
G6496/J. Barnes

Space Division
Worldway Postal Center
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Los Angeles, CA 90009
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CSTC
P.O. Box 3430
Sunnyvale, CA 94088
VOS/LtC W. Etbauer (10)

Wyle Laboratories
ARD/M. T. Suffredini

Wyle Laboratories
3000 Bowers Ave.
Santa Clara, CA 95051
G. Asher

LAB For ATMOS & SPACE PHYS.
5525 Central Ave.
Boulder, CO 80301
Attn: Alan Stern

Total 99

ASC/ENT SYSTEMS PROCEDURES
CORE DISTRIBUTION
04/11/88

JSC
DF22/Head
DF4/Chief
DF6/GNC (4)
DF7/Chief

Environ Sect (2)
Elect Sect (2)
Sys. Analysis Sect
Book Manager (20)
Sys AOA Bk Mgr
DG4/Comm/Inst (3)
PL Sect
DG46/MOD Tng Sect (2)
DG6/Control/Prop Sect (9)
DPS/NAV Sect (6)
DH6/Branch Office (3)
EE7/TCDFDF Mgr (2)
EH2/SAIL Testing
EH4/Support
EH5/Head
EP2/MPS Assm
WG/Deputy Mgr.

Rockwell - Houston
555 Gemini
Houston, TX 77058
ZC01/R. Linow (5)

RSOC - Houston
R18B/R. W. Hager

Kennedy Space Center
LSO-038/Tech Data (4)
LSO-207/J. Likon
LSO-217/D. Weinberg
TV-GDS-23/B. Register
TV-PEO-2/P. Puckett (2)

Marshall Space Flight Center
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FA01/B. Schrick
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