

Malfunction Procedures

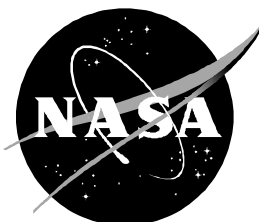
**Mission Operations Directorate
Operations Division**

**Generic, Rev E
March 24, 2000**

NOTE
For STS-101 and subsequent flights

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



United Space Alliance

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MALFUNCTION PROCEDURES

GENERIC REV E (Mar 24, 2000)

PCN-8 (Jan 11, 2002) Sheet 1 of 1

List of Implemented Change Requests (482s):

MAL-1414 MULTI-1567
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NOTE
For STS-109 and subsequent flights

Incorporate the following:

1. Replace iii thru xii
2. Replace A5-17 & A5-18, B5-17 & B5-18, 5-41 & 5-42
A5-72a & A5-72b, A5-99 thru A5-102, B5-72a & B5-72b, B5-99 thru B5-102
3. Replace A7-95 & A7-96, A7-117 & A7-118, A7-127 thru A7-130, A7-151 & A7-152,
A7-161 & A7-162, 7-183 & 7-184
4. Replace 10-31 & 10-32

Prepared by: _____
Book Manager

Approved by: _____
Manager, Shuttle Procedures Management (USA)

Accepted by: _____
FDF Subsystem Manager (NASA)

Encl: 44 pages

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

MISSION OPERATIONS DIRECTORATE

MALFUNCTION PROCEDURES

GENERIC, REVISION E
March 24, 2000

PREPARED BY:

Harold L. Scott
Book Manager

APPROVED BY:

Deborah J. Jackson
Supervisor, Procedures Management (USA)

ACCEPTED BY:

John W. Bearley
FDF Subsystem Manager (NASA)

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Incorporates the following:					
482#:	MAL-1345	MAL-1352	MAL-1357A	MAL-1363	MULTI-1487
	MAL-1348B	MAL-1353	MAL-1358	MAL-1364	MULTI-1497
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	MAL-1351	MAL-1356	MAL-1361	MULTI-1465	

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DO35/H. Scott	281-483-0670
APU/HYD	DF05/B. Doremus	281-483-0680
COMM	DF2/S. Murray	281-483-4061
C/W	DF7/J. Azbell	281-483-0748
DPS	DF2/T. Murphy	281-483-0857
ECLS	DF8/P. Hasbrook DF7/M. Fitzpatrick	281-483-0768 281-483-0758
EPS	DF7/J. Azbell	281-483-0742
GNC	DF6/K. Dwyer	281-483-2476
MECH	DF4/B. Doremus	281-483-0680
OMS/RCS	DF6/C. Koerner	281-483-2617
PDRS	DF4/D. Pallesen	281-483-0634

MALFUNCTION PROCEDURES

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A1-21	MEDS/GEN E	A2-40	deleted

* - Omit from flight book

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NOTE A

The identified MAL represents a support procedure that is entered from other procedures or on MCC call

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NOTE B

Refer to BFS FSM INDEX for msg

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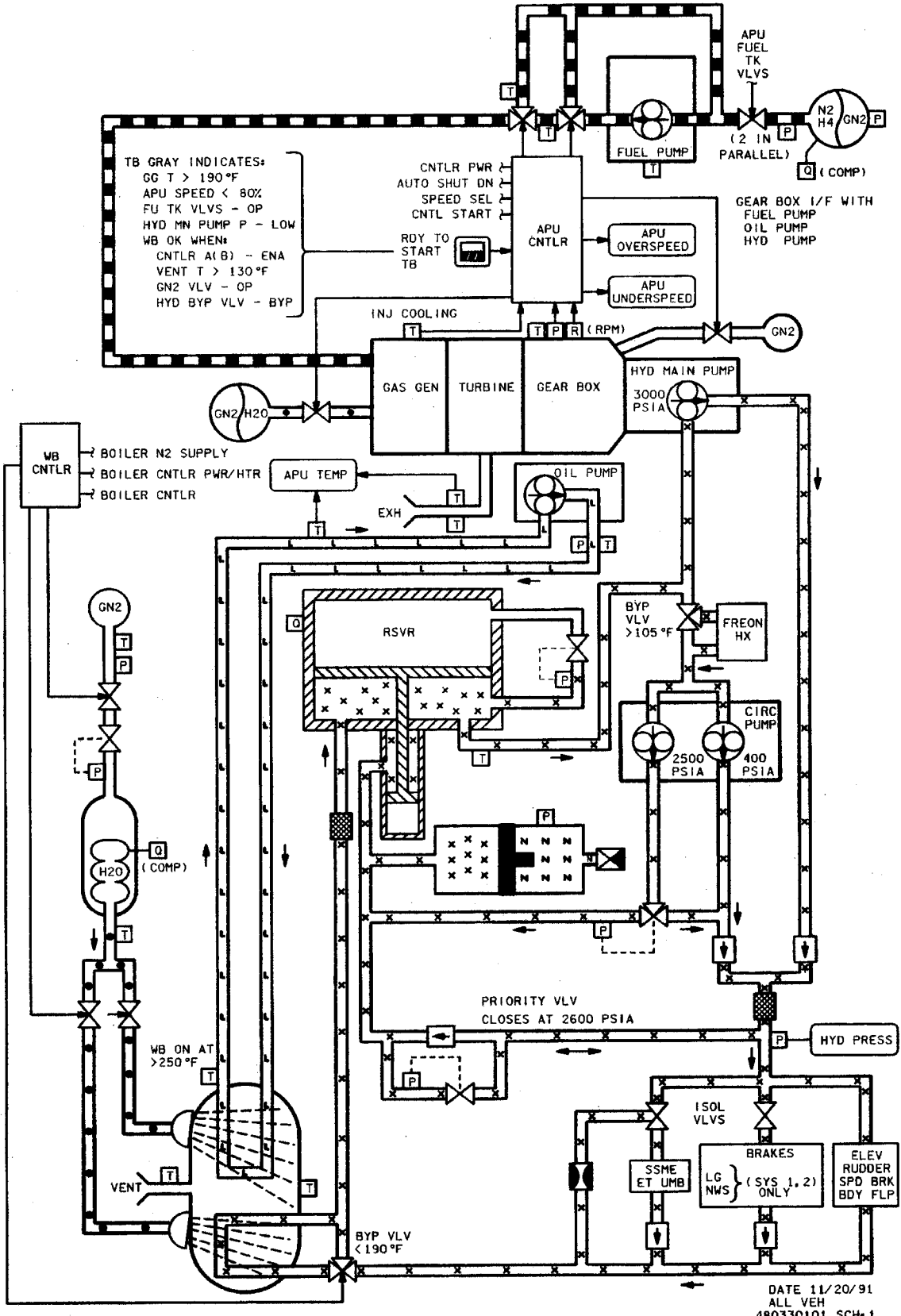
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APU/HYD

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APU/HYD



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APU/HYD

SM
ALERT

S86 APU
FUEL 1(2,3)

If:
APU 1(2,3) FUEL
QTY < 50% or
APU 1(2,3)
FUEL TK P
< 100 psia
> 350 psia

BFS

SM2 APU
1(2,3)

If:
APU 1(2,3) FUEL
QTY < 20%

Nominal Config:

(R2)
APU OPER
1(2,3) - OFF
APU FUEL TK VLV
1(2,3) - CL

**1.1a APU FUEL QTY ↓
APU FUEL TK P ↑↓**

1				
SM 86 APU/ HYD				
• Match indications in chart to determine failure				
(MDU) APU FUEL PRESS	(CRT) APU FU TK P psia	(CRT) APU FU OUT P psia	(CRT) APU FUEL QTY %	FAILURE
500	↑ or 500 (H)	> 140	100	XDCR SHIFT OR FAILURE ① → APU/HYD SSR-4
decr	decr	decr	decr	HYDRAZINE OR N2 LEAKING → APU/HYD 5 SSR-5 steps 1 to 4
0	0(L)	0	0	N2 LEAKED OUT
-50, steady	50 ↓	0	~0	HYDRAZINE LEAKED OUT
0	0(L)	> 140	0	XDCR SHIFT OR FAILURE ① → APU/HYD SSR-4

① Puts qty
computation in error.
FU OUT P XDCR
may be substituted in
fuel qty calculation

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APU/HYD

SM
ALERT

S86 APU
FUEL 1(2,3)

If:
APU 1(2,3) FUEL
QTY < 50% or
APU 1(2,3)
FUEL TK P
< 100 psia
> 350 psia

BFS
SM2 APU
1(2,3)

If:
APU 1(2,3) FUEL
QTY < 20%

Nominal Config:
(R2)
APU OPER
1(2,3) - OFF
APU FUEL TK VLV
1(2,3) - CL

**1.1a APU FUEL QTY ↓
APU FUEL TK P ↑↓**

1				
SM 86 APU/ HYD				
• Match indications in chart to determine failure				
(F8) APU FUEL PRESS ind - psia Pnl F8R Meter ①	(CRT) APU FU TK P psia	(CRT) APU FU OUT P psia	(CRT) APU FUEL QTY %	FAILURE
500	↑ or 500 (H)	> 140	100	XDCR SHIFT OR FAILURE ② → APU/HYD SSR-4
decr	decr	decr	decr	HYDRAZINE OR N2 LEAKING → APU/HYD SSR-5 steps 1 to 4
0	0(L)	0	0	N2 LEAKED OUT
-50, steady	50 ↓	0	~0	HYDRAZINE LEAKED OUT
0	0(L)	> 140	0	XDCR SHIFT OR FAILURE ② → APU/HYD SSR-4

① Instr pwr must
be ON for meter
readout

② Puts qty
computation in error.
FU OUT P XDCR
may be substituted in
fuel qty calculation

NOM

APU/HYD

SM ALERT

S88 APU TANK T 1(2,3)

If:
TK SURF 1(2,3) < 45 degF or
TK HTR 1(2,3) < 45 degF
> 140 degF

S88 APU FU LN 1(2,3)

If:
FEED LN 1(2,3) < 45 degF or
PUMP IN 1(2,3) < 45 degF
> 125 degF or
TEST LN T1 1(2,3) < 45 degF
> 110 degF or
TEST LN T2 1(2,3) < 45 degF
> 150 degF or
DRN LN T1 1(2,3) < 48 degF
> 95 degF or
DRN LN T2 < 48 degF 1(2,3)
> 140 degF 1(3)
> 195 degF (2)

S88 APU FU PMP 1(2,3)

If:
PUMP OUT T 1(2,3) < 50 degF
> 210 degF or
PUMP BYP LN T 1(2,3) < 60 degF
> 200 degF or
GGVM SPLY LN T 1(2,3) < 60 degF
> 200 degF

S88 APU H2O T 1(2,3)

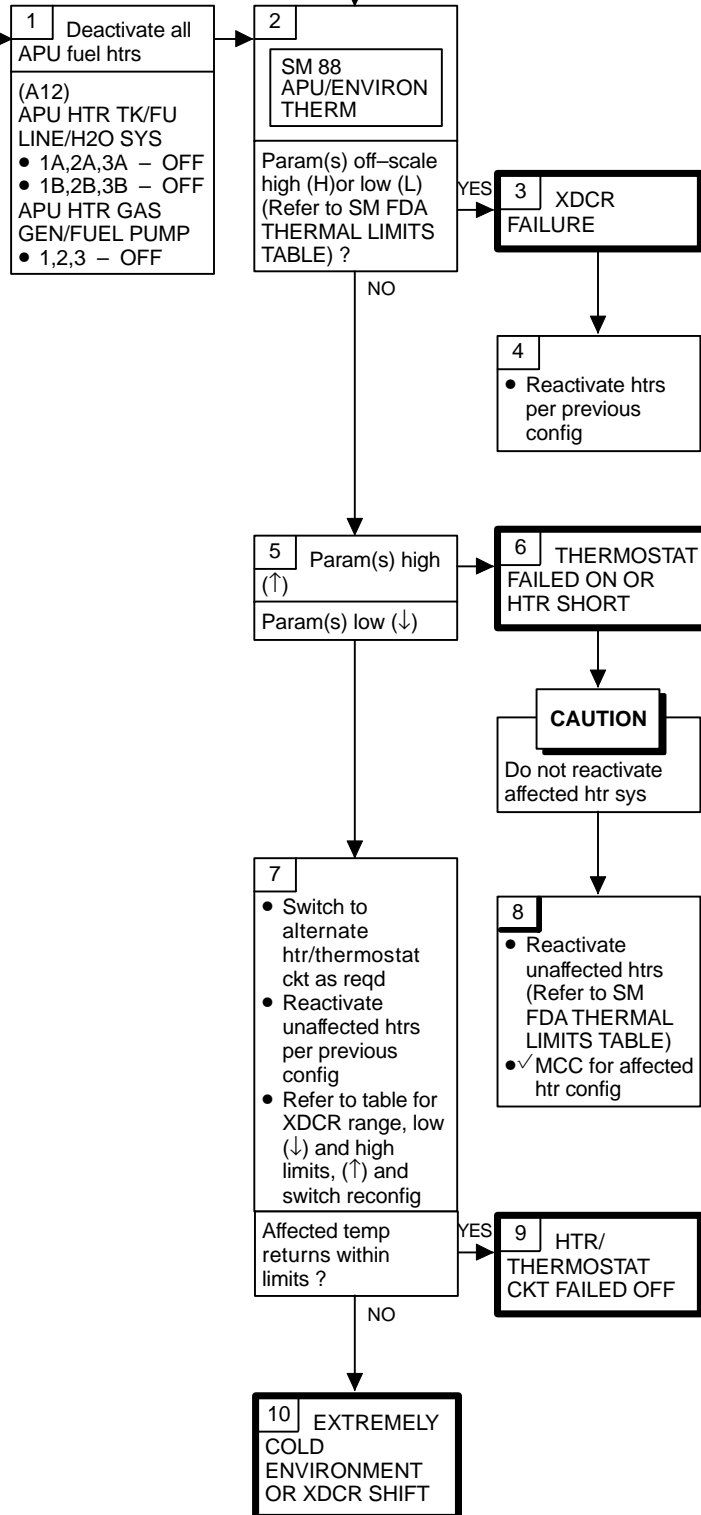
If:
H2O LN INJ < 40 degF 1(2,3)
> 110 degF 1(3)
> 195 degF (2)

Nominal Config:

(A12)
APU HTR GAS GEN/FUEL PUMP 1,2,3 (three) – A AUTO(B AUTO)
APU HTR TK/FU LINE/H2O SYS 1A,2A,3A (three) – AUTO(OFF)
1B,2B,3B (three) – OFF (AUTO)
(R2)
APU CNTLR PWR 1,2,3 (three) – OFF

1.1b TK SURF T ↓, TK HTR T ↑↓, TEST LN T1(T2) ↑↓, FEED LN T ↑↓, PUMP IN T ↑↓, PUMP DRN LN T1(T2) ↑↓, PUMP OUT T ↑↓, PUMP BYP LN T ↑↓, GG SUPPLY LN T ↑↓, H2O LN INJ T ↑↓

ORB PKT C/L, APU FUEL T



APU/HYD 1.1b (Cont)

SM FDA THERMAL LIMITS TABLE

PARAM	XDCR RANGE degF	LOW LIMIT degF	HIGH LIMIT degF	SWITCHES
FUEL T TK SURF	0-160	45		(A12) APU HTR TK/FU LINE/H2O/SYS (1)
TK HTR	0-160	45	140	
TEST LN 1	0-250	45	110	1B(2B,3B) - AUTO(OFF)
LN 2	0-250	45	150	1A(2A,3A) - OFF(AUTO)
FEED LN	0-250	45	120	
PUMP IN	0-250	45	125	
DRN LN 1	0-250	43	95	
LN 2	0-250	43	140 (2) (3)	
H2O LN INJ	-75-300	40	110 (4)	
PUMP OUT	0-250	50	210	(A12) (1)
BYP LN	0-400	60	200	APU HTR GAS GEN/ FUEL PUMP 1(2,3)
GGVM SPLY LN	0-450	60	200	A AUTO OR B AUTO

(1) If subsequent failure occurs in remaining htr ckt, consult MCC

(2) SYS 2 upper limit is 195 degF; lower limit is 48 degF

(3) Because of Xdcr location, FU PUMP DRN LN T1 and T2 may not be equal. Generally, T2 will be higher than T1, which is more evident on SYS 2

(4) SYS 2 upper limit is 190 degF

APU/HYD

1.1c APU FUEL TK VLV T ↑↓

SM ALERT

S86 FU TK VLV 1(2,3)

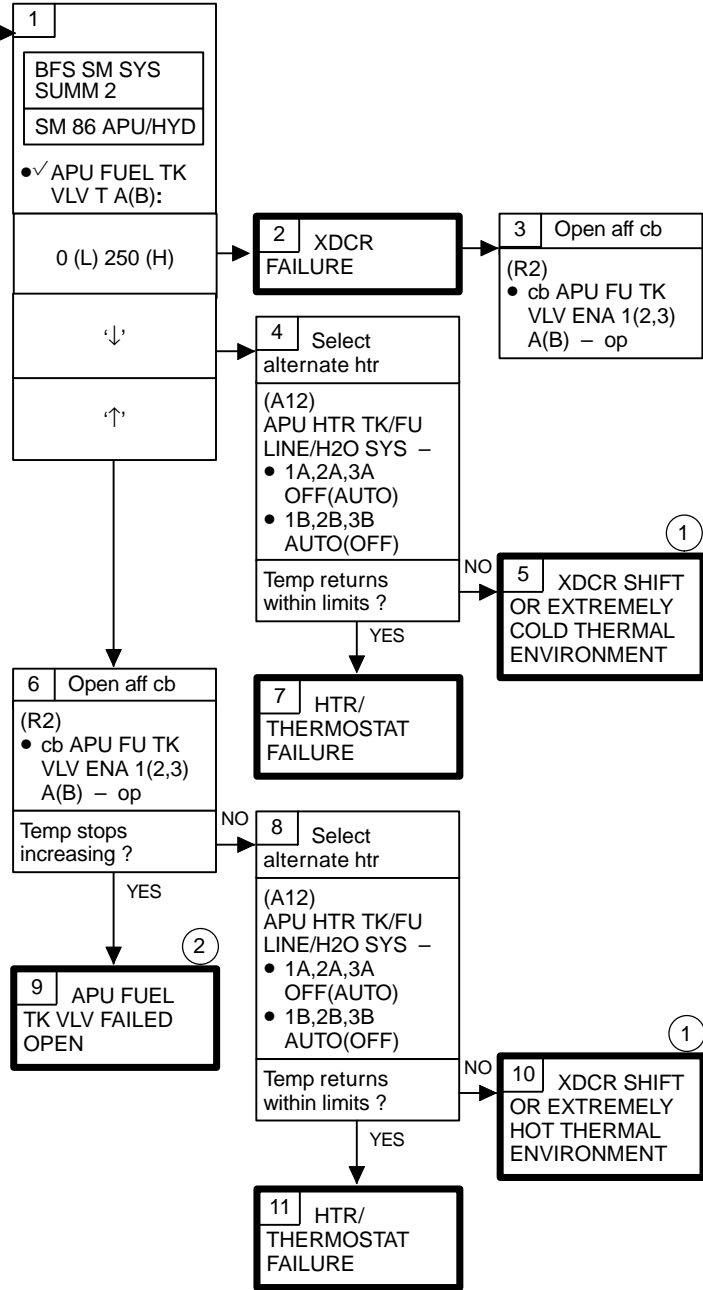
BFS

SM2 FU TK VLV APU

If:
 APU 1(2,3) FUEL TK VLV T A(B)
 < 45 degF
 > 140 degF

Nominal Config:
 (A12)
 APU HTR TK/FU LINE/H2O SYS
 1A(2A,3A) – AUTO(OFF)
 1B(2B,3B) – OFF (AUTO)

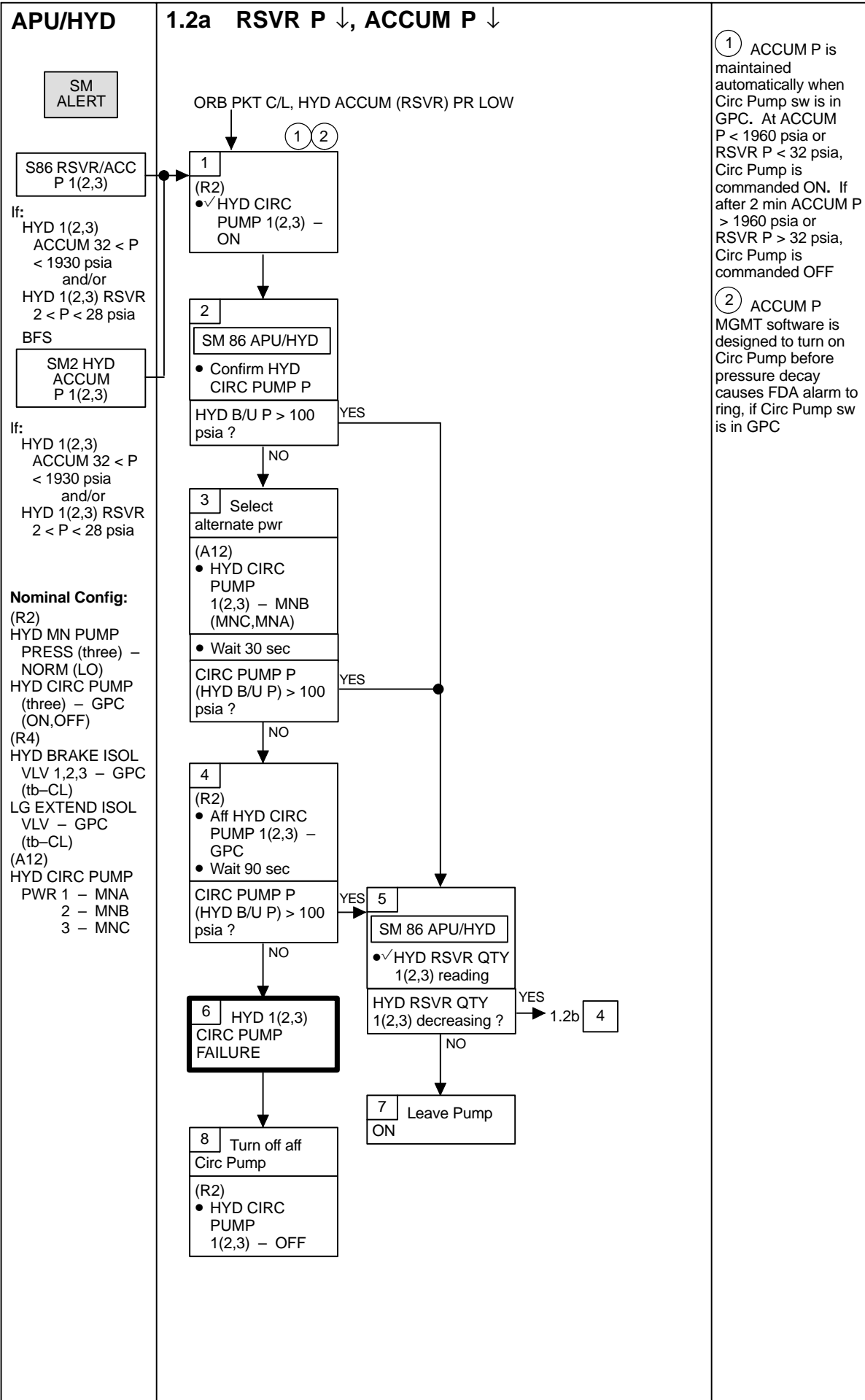
(R2)
 APU OPER
 1(2,3) – OFF
 APU FUEL TK VLV 1(2,3) – CL
 cb APU FU TK VLV ENA 1A(2A,3A) – cl
 ENA 1B(2B,3B) – cl



- ① MCC has access to alternate Xdcrs
- ② Normal operation of APU available through other fuel tk vlv

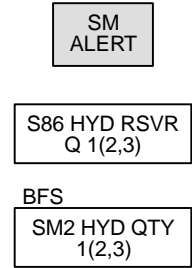
HYD

1.2



APU/HYD

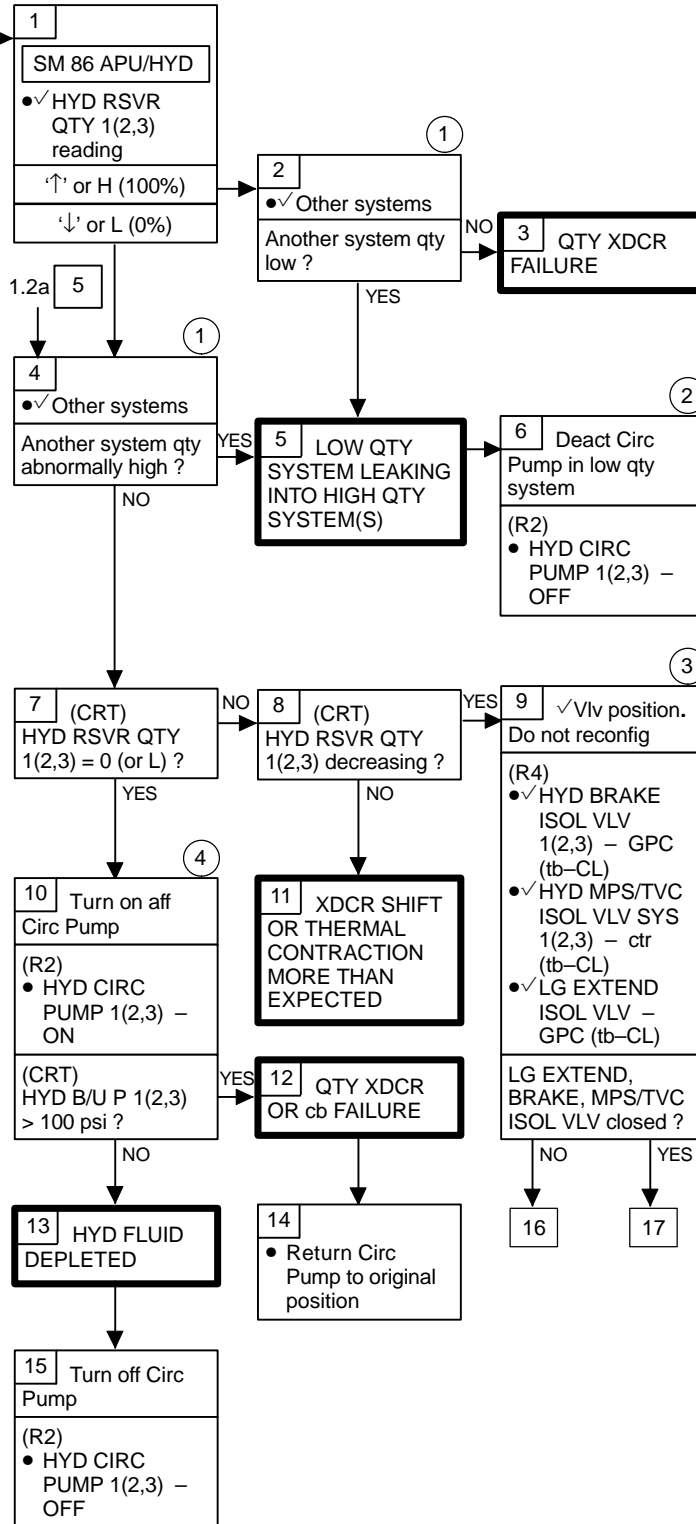
1.2b HYD RSVR QTY ↑↓



If:
HYD RSVR
QTY 1(2,3)
< 40% or
> 95%

Nominal Config:
(L4:O)
cb AC1 ΦB HYD
QTY 1 - cl
cb AC2 ΦB HYD
QTY 2 - cl
cb AC3 ΦB HYD
QTY 3 - cl

APU OFF Config:
(R2)
HYD MN PUMP
PRESS (three) -
NORM (LO)
HYD CIRC PUMP
(three) - GPC
(ON,OFF)
BLR CNTLR/HTR
(three) - A(B)
BLR PWR (three) -
OFF
BLR N2 SPLY
(three) - OFF
(R4)
HYD BRAKE ISOL
VLV 1,2,3 - GPC
(tb-CL)
LG EXTEND ISOL
VLV - GPC
(tb-CL)
HYD MPS/TVC ISOL
VLV SYS (three) -
ctr (tb-CL)



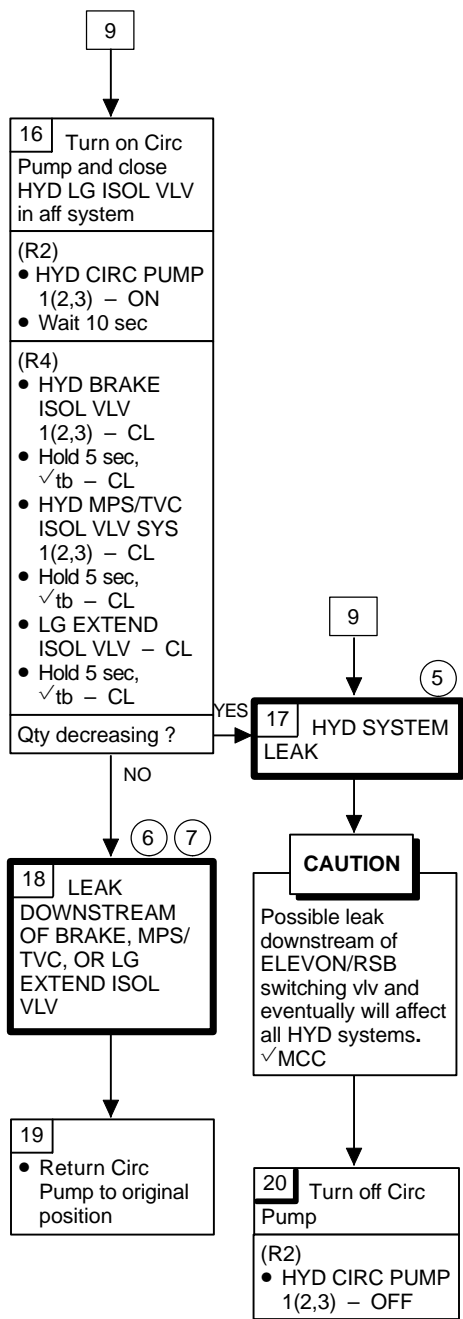
① Normal operating qty approx 60%, but compare qty with previous reading

② May be possible to pump fluid from high to low system by pressurizing high qty system relative to low qty system

③ Circ Pumps or APUs must be operating in order to operate HYD BRAKE ISOL VLV, HYD MPS/TVC VLV, or LG EXTEND ISOL VLV if reqd

④ If BFS SM 2, use HYD PRESS 1(2,3)

APU/HYD 1.2b (Cont)



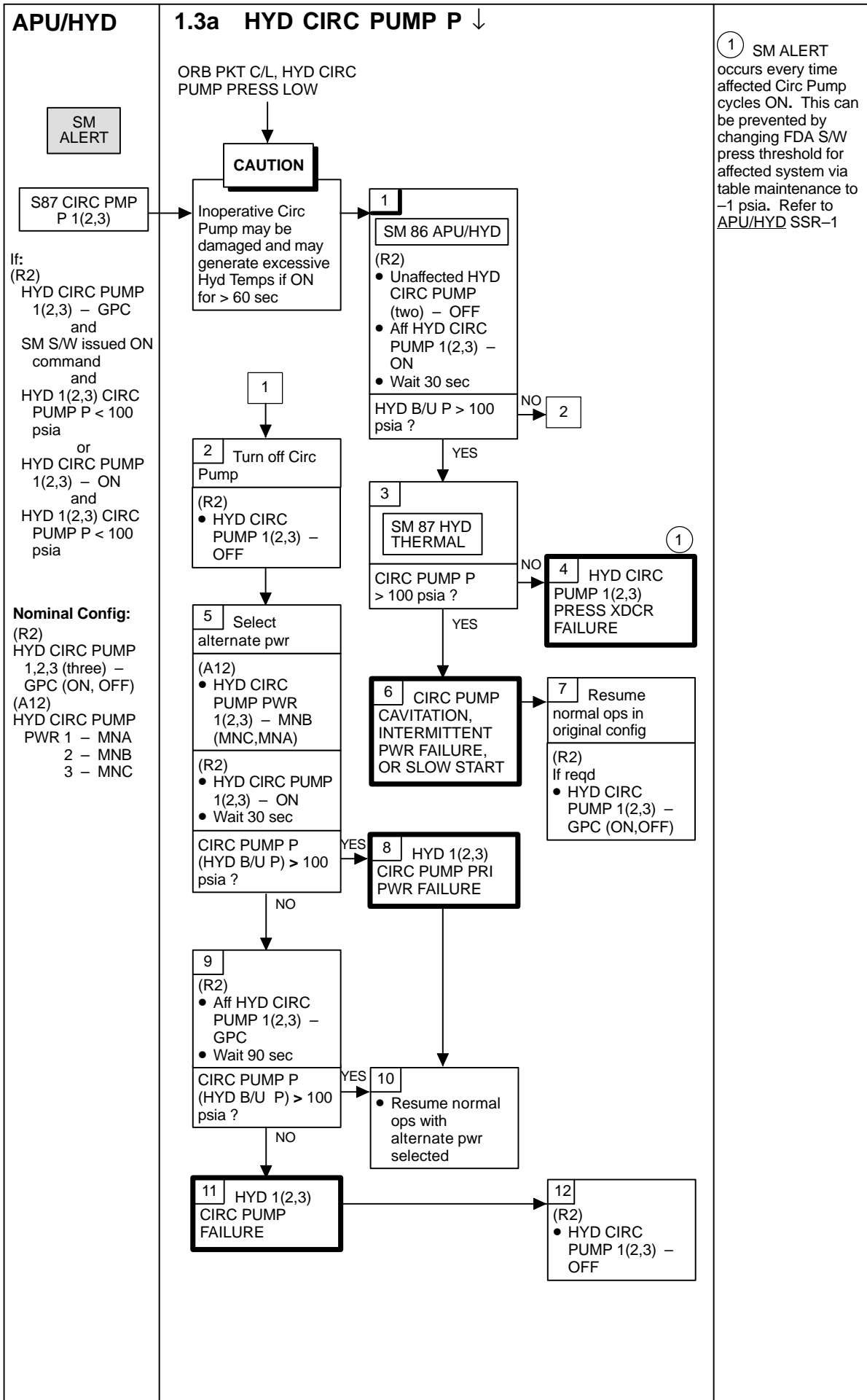
⑤ Hyd system may be lost for entry, depending on size of leak. Sys should remain OFF unless another system lost

⑥ Since GNC on entry S/W will open LG EXTEND ISOL VLV prior to landing and HYD BRAKE ISOL VLV after touchdown, vlv must be reclosed

⑦ Do not operate MPS/TVC vlv in affected system for SSME HYD Repress prior to entry

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**THERMAL
HYD**
1.3



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APU/HYD SSR-1 CIRC PUMP PRESS XDCR FAILURE WORKAROUND

To inhibit FDA alarm for affected Circ Pump

1. For Hyd Circ Pump 1 Press Xdcr failure:

SM 60 SM TABLE MAINT

ITEM 1 +0 5 8 0 1 3 7 EXEC

If Xdcr failed '↓' (low), or DSC LOSS (L), or OI MDM failed (M), ITEM 2 -1 EXEC

If Xdcr failed '↑' (high), ITEM 5 +8 0 1 EXEC

2. For Hyd Circ Pump 2 Press Xdcr failure:

SM 60 SM TABLE MAINT

ITEM 1 +0 5 8 0 2 3 7 EXEC

If Xdcr failed '↓' (low), or DSC LOSS (L), or OI MDM failed (M), ITEM 2 -1 EXEC

If Xdcr failed '↑' (high), ITEM 5 +8 0 1 EXEC

3. For Hyd Circ Pump 3 Press Xdcr failure:

SM 60 SM TABLE MAINT

ITEM 1 +0 5 8 0 3 3 7 EXEC

If Xdcr failed '↓' (low), or DSC LOSS (L), or OI MDM failed (M), ITEM 2 -1 EXEC

If Xdcr failed '↑' (high), ITEM 5 +8 0 1 EXEC

APU/HYD SSR-2 SIMULTANEOUS CIRC PUMP ON/GPC OPS

To allow normal GPC ops of other two Circ Pumps after failure of X Circ Pump Press Xdcr or manual ON ops of X Circ Pump

1. For Circ Pump 1, Press Xdcr failure or manual ON ops:

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 1 7 4 2 EXEC

ITEM 17 +8 0 0 EXEC

2. For Circ Pump 2, Press Xdcr failure or manual ON ops:

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 1 8 4 2 EXEC

ITEM 17 +8 0 0 EXEC

3. For Circ Pump 3, Press Xdcr failure or manual ON ops:

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 1 9 4 2 EXEC

ITEM 17 +8 0 0 EXEC

APU/HYD SSR-3 CIRC PUMP XDCR FAILURE WORKAROUND

To allow normal GPC ops of Circ Pumps after accumulator or reservoir press or temp xdcr failure. Procedure changes corresponding upper and lower S/W limits to off-scale low, effectively removing xdcr from Circ Pump control. No action reqd for those params listed in the following tables that have FDA limits off-scale low or blank. They have been already removed from Circ Pump control.

The accumulator pressure sensors have only lower limit of 1960 psia as shown in tables. Low limit for accumulator pressure should be changed to -110. Low limit for reservoir pressure should be changed to -2. Only one item entry is reqd for accumulator or reservoir pressure sensor failure

SM 60 SM TABLE MAINT

ITEM 16 +__ (A) __ EXEC
ITEM 17 -8_0 EXEC
ITEM 16 +__ (B) __ EXEC
ITEM 17 -8_0 EXEC

- (A) Choose the appropriate lower limit parameter ID number from table
- (B) Choose the appropriate upper limit parameter ID number from table

APU/HYD SSR-3 (Cont)

HYDRAULIC SYSTEM 1 PARAMS

Param Name	Pump SW Control Constants				FDA	
	Low limit		High limit		Low limit	High limit
	ID Number	Value	ID Number	Value	degF	degF
LINE TEMPS						
ELEVON LOB1	0921728	0 degF	0921729	20 degF	-10	250
ROB1	0921722	0 degF	0921723	20 degF	-10	250
RD/SB PDU1	0921738	-10 degF	0921739	20 degF	-15	250
FUS1	0921736	0 degF	0921737	20 degF	-10	250
BDYFLP FUS1	0921718	0 degF	0921719	20 degF	-10	250
HYD						
ACCUM P1	0921740	1960 psi	NONE		1930 psi	
RSVR P1	0920142	32 psi	NONE		42 psi	

HYDRAULIC SYSTEM 2 PARAMS

Param Name	Pump SW Control Constants				FDA	
	Low limit		High limit		Low limit	High limit
	ID Number	Value	ID Number	Value	degF	degF
LINE TEMPS						
ELEVON LIB2	0921822	0 degF	0921823	20 degF	-10	250
ROB2	0921816	0 degF	0921817	20 degF	-10	250
RD/SB PDU2	0921832	-10 degF	0921833	20 degF	-15	250
FUS2	0921830	0 degF	0921831	20 degF	-10	250
BDYFLP PDU2	0921814	-10 degF	0921815	20 degF	-15	250
HYD						
ACCUM P2	0921834	1960 psi	NONE		1930 psi	
RSVR P2	0920143	32 psi	NONE		42 psi	

HYDRAULIC SYSTEM 3 PARAMS

Param Name	Pump SW Control Constants				FDA	
	Low limit		High limit		Low limit	High limit
	ID Number	Value	ID Number	Value	degF	degF
LINE TEMPS						
ELEVON LOB3	0921920	0 degF	0921921	20 degF	-10	250
RIB3	0921918	0 degF	0921919	20 degF	-10	250
RD/SB PDU3	0921930	-10 degF	0921931	20 degF	-15	250
BDYFLP PDU3	0921914	-10 degF	0921915	20 degF	-15	250
HYD						
ACCUM P3	0921932	1960 psi	NONE		1930 psi	
RSVR P3	0920144	32 psi	NONE		42 psi	

APU/HYD SSR-4

APU FU TK P XDCR FAILURE WORKAROUND

Selection of alternate Xdcr for APU fuel comp

1. For APU 1 QTY:

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 2 1 5 0 EXEC
ITEM 17 +0 EXEC
ITEM 16 +0 9 2 2 1 5 2 EXEC
ITEM 17 +1 EXEC

2. For APU 2 QTY:

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 2 2 5 0 EXEC
ITEM 17 +0 EXEC
ITEM 16 +0 9 2 2 2 5 2 EXEC
ITEM 17 +1 EXEC

3. For APU 3 QTY:

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 2 3 5 0 EXEC
ITEM 17 +0 EXEC
ITEM 16 +0 9 2 2 3 5 2 EXEC
ITEM 17 +1 EXEC

APU/HYD SSR-5

APU FUEL LEAK (NONISOLATABLE)

- Before proceeding, ✓MCC
- R2 1. STEAM VENT HTR ACTIVATE
 BLR PWR X – ON
 ✓CNTLR/HTR (three) – B(A)
- O14:F,
 O15:F,
 O16:F
 O17:A
 C3
 O6
 C3(A6U)
2. GNC CONFIG
 ASA (four) – ON
 ATVC (four) – ON
 ✓FCS CH (four) – AUTO
 ✓MDM All FF and FA – ON
 GNC I/O RESET
 ✓DAP: A/AUTO/VERN
- O14:F,
 O15:F
3. DPS CONFIG
 ✓MMU 1,2 – ON
 Perform G2 TO G8 TRANSITION (ORB OPS, DPS)
 1: GNC, FCS/DED DIS C/O
4. APU PRESTART
 2: SM 86 APU/HYD
- CRT2
 R4
- ✓APU,HYD,W/B status no '↑' or '↓' (except HYD B/U)
 ✓LG EXTEND ISOL VLV (tb-CL)
 ✓HYD BRAKE ISOL VLV X tb – CL
 CIRC PUMP (three) – OFF
 BLR N2 SPLY X – ON
 ✓APU AUTO SHUTDN (three) – ENA
 CNTLR PWR X – ON
 HYD MN PUMP PRESS X – LO
 ✓APU SPEED SEL (three) – NORM
 ✓OPER (three) – OFF
 ✓FUEL TK VLV (three) – CL
 ✓cb APU FU TK VLV ENA (six) – cl
- Inform MCC: READY FOR APU START
- Wait for MCC GO
- R2 5. APU START
 APU FUEL TK VLV X – OP
 ✓APU/HYD RDY X tb – gray
 * If tb – bp, ✓MCC *
- 00:00
 R2
 HYD/APU
 R2
- Start Event Timer
 APU OPER X – START/RUN
 ✓HYD PRESS X ind – LOW green
 ✓APU/HYD RDY X tb – bp
 * If APU did not start normally: *
 * APU OPER X – OFF *
 * FUEL TK VLV X – CL *
 * ✓Shutdn (hyd press) *
 * Report APU F7 Its *
 * APU CNTLR PWR X – OFF *
 * ✓MCC *
- HYD MN PUMP PRESS X – NORM
 ✓HYD PRESS X ind – HI green
- HYD/APU
- R4 6. MPS/TVC ISOL VLV CONFIG
 HYD MPS/TVC ISOL VLV X – OP
 Hold 5 sec, ✓tb – OP

APU/HYD SSR-5 (Cont)

- CRT1 7. AEROSURFACE DRIVE
SURF DR START – ITEM 10 EXEC (*)

NOTE

Pos '↓' may be indicated until HYD SYS is warm

- C3 * If FCS CH failure (↓) port status, reset aff FCS CH: *
* FCS CH – ORIDE *
* – AUTO *

8. SECONDARY ACTUATOR CHECK

If Secondary Actuator Check has not been performed:

After ≥ 30 sec of aerosurface drive:

SURF DR STOP – ITEM 11 EXEC (*)

✓Surfaces not moving

NOTE

If port does not bypass during check, bypass aff port after APU shutdn:

SEC ACT BYPASS – ITEM 21 +X X EXEC

If aff port still does not bypass:

SEC ACT RESET – ITEM 22 +X X EXEC

(See DPS DICT, GNC, OPS G8 FOR ITEM ENTRY values)

- CRT1 a. ✓ POS STIM ENA, ITEM 20 – (*)
C3 b. ✓ FCS CH 1,2,3,4 – AUTO
CRT1 c. SEC ACT CK, CH 1 – ITEM 15 EXEC (*)
d. ✓ All CH 1 ports bypass '↓'
STOP – ITEM 19 EXEC (*)
C3 e. FCS CH 1 – ORIDE
CRT1 ✓ All CH 1 ports reset (no ↓)
C3 FCS CH 1 – AUTO
f. Repeat steps c thru e for CH 2, 3, 4
CRT1 g. NEG STIM – ITEM 20 EXEC (no *)
h. Repeat steps b thru f

CRT1 SURF DR START – ITEM 10 EXEC (*)

9. APU FUEL DEPLETION AND AERO DRIVE TERMINATION

After APU shuts down due to fuel depletion:

CRT1 SURF DR STOP – ITEM 11 EXEC (*)

NOTE

'AERO DRIVE' Fault Msg may occur after APU shutdown

- R2 10. APU SHUTDOWN
BLR PWR X – OFF
APU OPER X – OFF
FUEL TK VLV X – CL
✓Shutdn (hyd press)
APU CNTLR PWR X – OFF
BLR N2 SPLY X – OFF

R2 11. HYD RECONFIG
HYD CIRC PUMP X – ON
Wait 10 sec

R4 HYD MPS/TVC ISOL VLV X – CL
Hold 5 sec, ✓tb – CL

R2 HYD CIRC PUMP (three) – GPC

12. GNC/DPS RECONFIG

Perform G8 TO G2 TRANSITION (ORB OPS, DPS)

F8 INST PWR – OFF
O14:F, ASA (four) – OFF
O15:F,
O16:F

O17:A ATVC (four) – OFF

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APU/HYD SSR-4

APU FU TK P XDCR FAILURE WORKAROUND

Selection of alternate Xdcr for APU fuel comp

1. For APU 1 QTY:

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 2 1 5 0 EXEC
ITEM 17 +0 EXEC
ITEM 16 +0 9 2 2 1 5 2 EXEC
ITEM 17 +1 EXEC

2. For APU 2 QTY:

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 2 2 5 0 EXEC
ITEM 17 +0 EXEC
ITEM 16 +0 9 2 2 2 5 2 EXEC
ITEM 17 +1 EXEC

3. For APU 3 QTY:

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 2 3 5 0 EXEC
ITEM 17 +0 EXEC
ITEM 16 +0 9 2 2 3 5 2 EXEC
ITEM 17 +1 EXEC

APU/HYD SSR-5

APU FUEL LEAK (NONISOLATABLE)

- Before proceeding, ✓MCC
- R2 1. STEAM VENT HTR ACTIVATE
 BLR PWR X – ON
 ✓CNTLR/HTR (three) – B(A)
- O14:F,
 O15:F,
 O16:F
 O17:A
 F8
 C3
 O6
 C3(A6U)
2. GNC CONFIG
 ASA (four) – ON
 ATVC (four) – ON
 INST PWR – ON
 ✓FCS CH (four) – AUTO
 ✓MDM All FF and FA – ON
 GNC I/O RESET
 ✓DAP: A/AUTO/VERN
- O14:F,
 O15:F
3. DPS CONFIG
 ✓MMU 1,2 – ON
 Perform G2 TO G8 TRANSITION (ORB OPS, DPS)
 1: GNC, FCS/DED DIS C/O
4. APU PRESTART
 2: SM 86 APU/HYD
- CRT2
 R4
- ✓APU,HYD,W/B status no '↑' or '↓' (except HYD B/U)
 ✓LG EXTEND ISOL VLV (tb-CL)
 ✓HYD BRAKE ISOL VLV X tb – CL
 CIRC PUMP (three) – OFF
 BLR N2 SPLY X – ON
 ✓APU AUTO SHUTDN (three) – ENA
 CNTLR PWR X – ON
 HYD MN PUMP PRESS X – LO
 ✓APU SPEED SEL (three) – NORM
 ✓OPER (three)three – OFF
 ✓FUEL TK VLV (three) – CL
 ✓cb APU FU TK VLV ENA (six) – cl
- Inform MCC: READY FOR APU START
- Wait for MCC GO
- R2 5. APU START
 APU FUEL TK VLV X – OP
 ✓APU/HYD RDY X tb – gray
 * If tb – bp, ✓MCC *
- 00:00
 R2
 F8
 R2
- Start Event Timer
 APU OPER X – START/RUN
 ✓HYD PRESS X ind – LOW green
 ✓APU/HYD RDY X tb – bp
- * If APU did not start normally: *
 * APU OPER X – OFF *
 * FUEL TK VLV X – CL *
 * ✓Shutdn (hyd press) *
 * Report APU F7 Its *
 * APU CNTLR PWR X – OFF *
 * ✓MCC *
- F8
 ✓HYD MN PUMP PRESS X – NORM
 ✓HYD PRESS X ind – HI green
- R4 6. MPS/TVC ISOL VLV CONFIG
 HYD MPS/TVC ISOL VLV X – OP
 Hold 5 sec, ✓tb – OP

NOM

MAL/NOM/GEN E

APU/HYD SSR-5 (Cont)

- CRT1 7. AEROSURFACE DRIVE
SURF DR START – ITEM 10 EXEC (*)

NOTE

Pos '↓' may be indicated until HYD SYS is warm

- C3 * If FCS CH failure (↓) port status, reset aff FCS CH: *
* FCS CH – ORIDE *
* – AUTO *

8. SECONDARY ACTUATOR CHECK
If Secondary Actuator Check has not been performed:
After ≥ 30 sec of aerosurface drive:
SURF DR STOP – ITEM 11 EXEC (*)
✓ Surfaces not moving

NOTE

If port does not bypass during check, bypass aff port after APU shutdn:

SEC ACT BYPASS – ITEM 21 +X X EXEC

If aff port still does not bypass:

SEC ACT RESET – ITEM 22 +X X EXEC

(See DPS DICT, GNC, OPS G8 FOR ITEM ENTRY values)

- CRT1 a. ✓ POS STIM ENA, ITEM 20 – (*)
C3 b. ✓ FCS CH 1,2,3,4 – AUTO
CRT1 c. SEC ACT CK, CH 1 – ITEM 15 EXEC (*)
d. ✓ All CH 1 ports bypass '↓'
STOP – ITEM 19 EXEC (*)
C3 e. FCS CH 1 – ORIDE
CRT1 ✓ All CH 1 ports reset (no ↓)
C3 FCS CH 1 – AUTO
f. Repeat steps c thru e for CH 2, 3, 4
CRT1 g. NEG STIM – ITEM 20 EXEC (no *)
h. Repeat steps b thru f

- CRT1 SURF DR START – ITEM 10 EXEC (*)

9. APU FUEL DEPLETION AND AERO DRIVE TERMINATION
After APU shuts down due to fuel depletion:

- CRT1 SURF DR STOP – ITEM 11 EXEC (*)

NOTE

'AERO DRIVE' Fault Msg may occur after APU shutdown

- R2 10. APU SHUTDOWN
BLR PWR X – OFF
APU OPER X – OFF
FUEL TK VLV X – CL
✓ Shutdn (hyd press)
APU CNTLR PWR X – OFF
BLR N2 SPLY X – OFF

- R2 11. HYD RECONFIG
HYD CIRC PUMP X – ON
Wait 10 sec
R4 HYD MPS/TVC ISOL VLV X – CL
Hold 5 sec, ✓ tb – CL
R2 HYD CIRC PUMP (three) – GPC

12. GNC/DPS RECONFIG
Perform G8 TO G2 TRANSITION (ORB OPS, DPS)
F8 INST PWR – OFF
O14:F, ASA (four) – OFF
O15:F,
O16:F
O17:A ATVC (four) – OFF

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APU/HYD SSR-6

APU FU TK T XDCR FAILURE WORKAROUND

Inputting a temperature constant for the APU Fuel Comp

1. For APU 1 QTY:

SM 88 APU/ENVIRON THERM

Note: APU 1 TK HTR T

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 2 1 6 0 EXEC

ITEM 17 +0 EXEC

ITEM 16 +0 9 2 2 1 4 0 EXEC

ITEM 17 +APU 1 TK HTR T (from SPEC 88) EXEC

2. For APU 2 QTY:

SM 88 APU/ENVIRON THERM

Note: APU 2 TK HTR T

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 2 2 6 0 EXEC

ITEM 17 +0 EXEC

ITEM 16 +0 9 2 2 2 4 0 EXEC

ITEM 17 +APU 2 TK HTR T (from SPEC 88) EXEC

3. For APU 3 QTY:

SM 88 APU/ENVIRON THERM

Note: APU 3 TK HTR T

SM 60 SM TABLE MAINT

ITEM 16 +0 9 2 2 3 6 0 EXEC

ITEM 17 +0 EXEC

ITEM 16 +0 9 2 2 3 4 0 EXEC

ITEM 17 +APU 3 TK HTR T (from SPEC 88) EXEC

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COMM

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	'S76 KU-GMBL A TEMP' - KU GMBL TEMP A ↑,		
	'S76 KU-GMBL B TEMP' - KU GMBL TEMP B ↑,		
	'S76 KU-GYRO TEMP' - KU GYRO TEMP ↑,		
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	SSR-25 OM1		2-57
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	SSR-30 OM3		2-62

COMM
2

COMM SSR-31 OI DSC LOST:	OP1	2-63
SSR-32	OP2	2-63

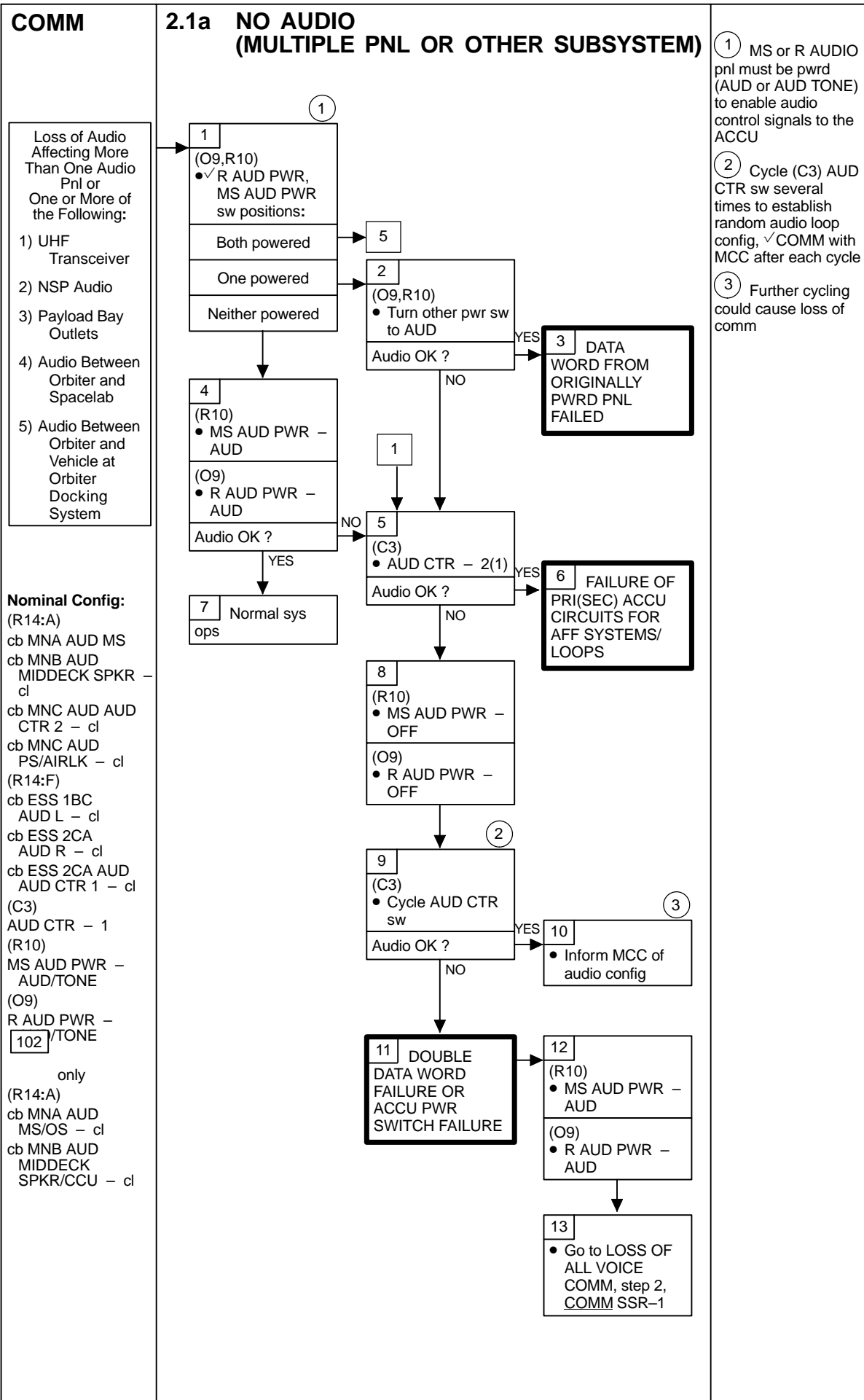
The following Fault Msgs have no corresponding MAL procedures in this book:

- TFL FAIL
- S76 COMM CAMR OVERTEMP
- PA2(1) OVERTEMP
- PA2(1) OUTPUT LO
- NSP 2(1) BITE
- COMSEC 2(1) BITE
- BCE BYP KU

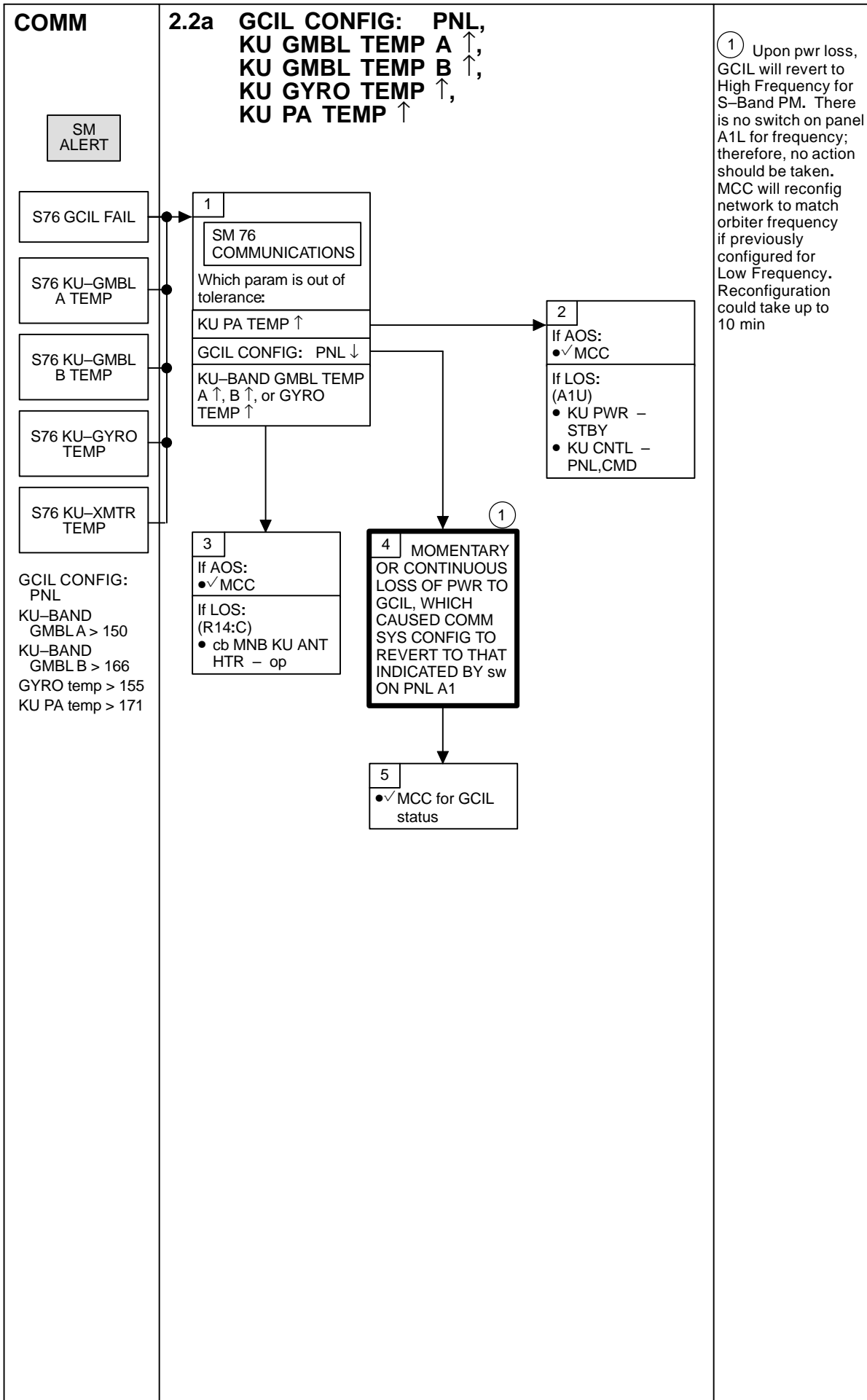
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AUDIO

2.1



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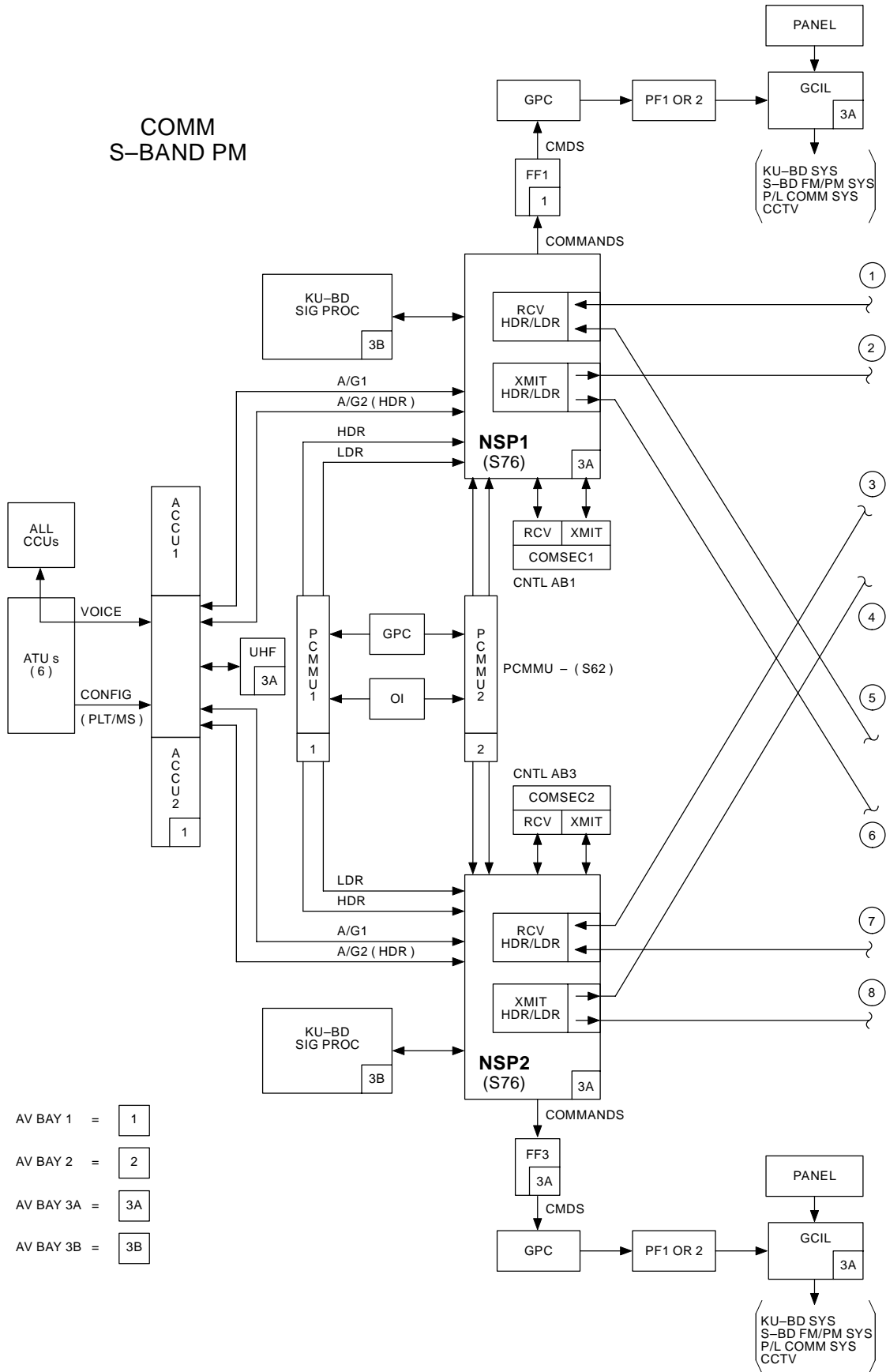


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S-BD/UHF
2.3

SB-SYS 1 PWR: CNTLBC1 AND MNBFLC2

COMM
S-BAND PM

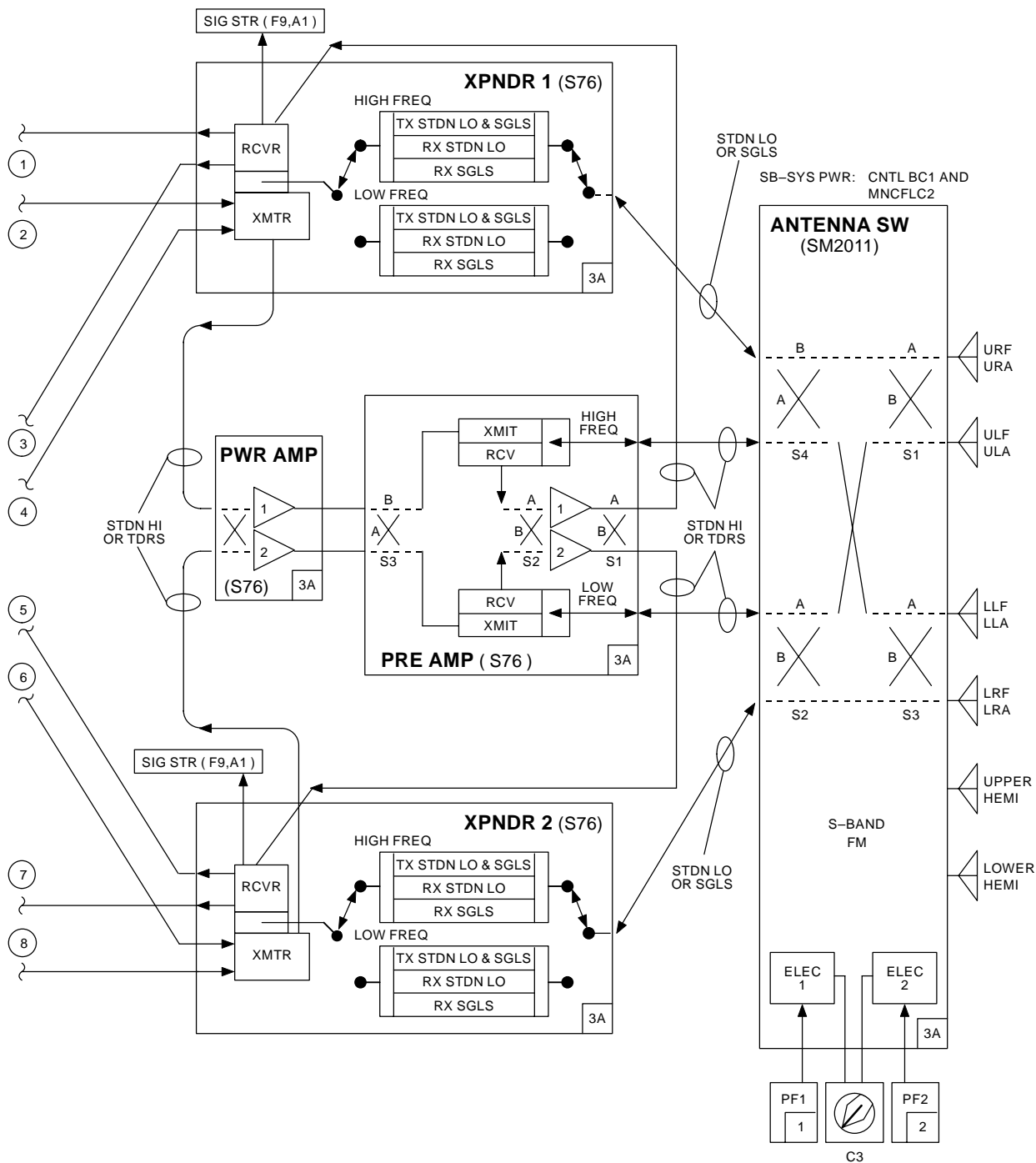


- AV BAY 1 = 1
- AV BAY 2 = 2
- AV BAY 3A = 3A
- AV BAY 3B = 3B

S-BD/UHF

2.3

SB-SYS 2 PWR: CNTLBC2 AND MNCFLC3



UPLINK/DOWNLINK COMMUNICATIONS TABLE

SITE ID	SITE TYPE	UPLINK DATA RATE ENCRYPTED OR CLEAR	DOWNLINK DATA RATE		UHF	TV	COMMENTS
			ENCRYPTED	CLEAR			
BDA							Decommissioned
CAN							Decommissioned
CTS	SGLS	HI/LO	HI/LO	HI/LO			
DFR	STDN	HI/LO	HI/LO	HI/LO	•	•	
DGS	SGLS	HI/LO	HI/LO	HI/LO			
GDX							Decommissioned
GTS	SGLS	HI/LO	HI/LO	HI/LO			
HTS	SGLS	HI/LO	HI/LO	HI/LO			
JSC	STDN	HI/LO	HI/LO	HI/LO	•	•	Emergency Only
MAD							Decommissioned
MIL	STDN	HI/LO	HI/LO	HI/LO	•	•	
NHS	SGLS	HI/LO	HI/LO	HI/LO			
OTS	SGLS	HI/LO	HI/LO	HI/LO	•		
VTS	SGLS	HI/LO	HI/LO	HI/LO			
WLP	STDN	HI/LO	HI/LO	HI/LO	•		

Three-letter site designators may be inhibited on SM 2011 by MCC if site use was not planned. Check World Map for sites that may be inhibited. Decommissioned sites are included in this table because they may appear on SM 2011 even though they have no orbiter communications equipment.

COMM

2.3a NO S-BD COMM: TDRS

① Assumes Ku-Band deployed activated and comm mode

From ORB PKT, COMM LOST, step 12

Nominal Config:
Switches selected to SYS 1 (pnl mode backup)
(R14:A)
cb MNA AUD MS - cl
cb MNB AUD MIDDECK SPKR - cl
cb MNC AUD AUD CTR 2 - cl
cb MNC AUD PS/AIRLK - cl
(R14:B)
cb MNA UHF - cl
cb MNC UHF - cl
(R14:F)
cb ESS 1BC AUD L - cl
cb ESS 2CA AUD R - cl
cb ESS 2CA AUD CTR 1 - cl
(R10)
MS AUD PWR - AUD/TONE
(O9)
R AUD PWR - AUD/TONE

102 only
(R14:A)
cb MNA AUD MS/OS - cl
cb MB AUD MIDDECK SPKR/CCU - cl

1 Verify comm system config

SM 76 COMMUNICATIONS

- √ Display
- S-BAND PM TDRS
- ANT ELEC 1 ON
- XPNDR 1 ON
- PREAMP 1 ON
- PWR AMPL 1
- OPER 1 ON
- STBY 1 STBY
- NSP 1
- BITE GOOD
- UL DATA SOURCE S
- DATA RATE XMIT HI
- RCV HI
- CODING XMIT ON
- RCV ON
- GCIL CONFIG CMD

Displayed config matches A1L switches ?

2 Check for Ku-Band coverage

(A1U)

- √ SIGNAL STR sw - Ku

Meter > 1 ?

3 Reconfigure to Ku receive

(A1L)

- NSP UPLK DATA - Ku
- √ NSP CODING XMIT - ON
- NSP CODING RCV - OFF

(C3)

- √ S-BD PM CNTL - PNL

Two-way voice ?

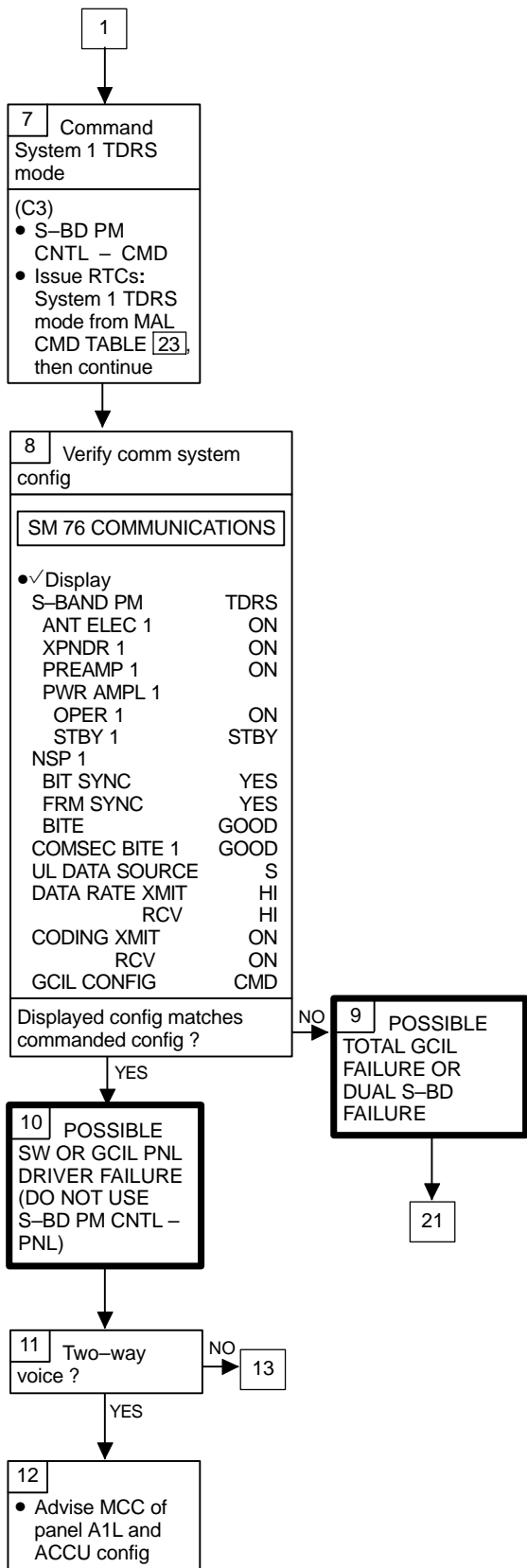
4 POSSIBLE ANT ELEC SW, S-BD FREQ OR DUAL S-BD FAILURE

5 DUAL NSP OR UNEXPLAINED FAILURE

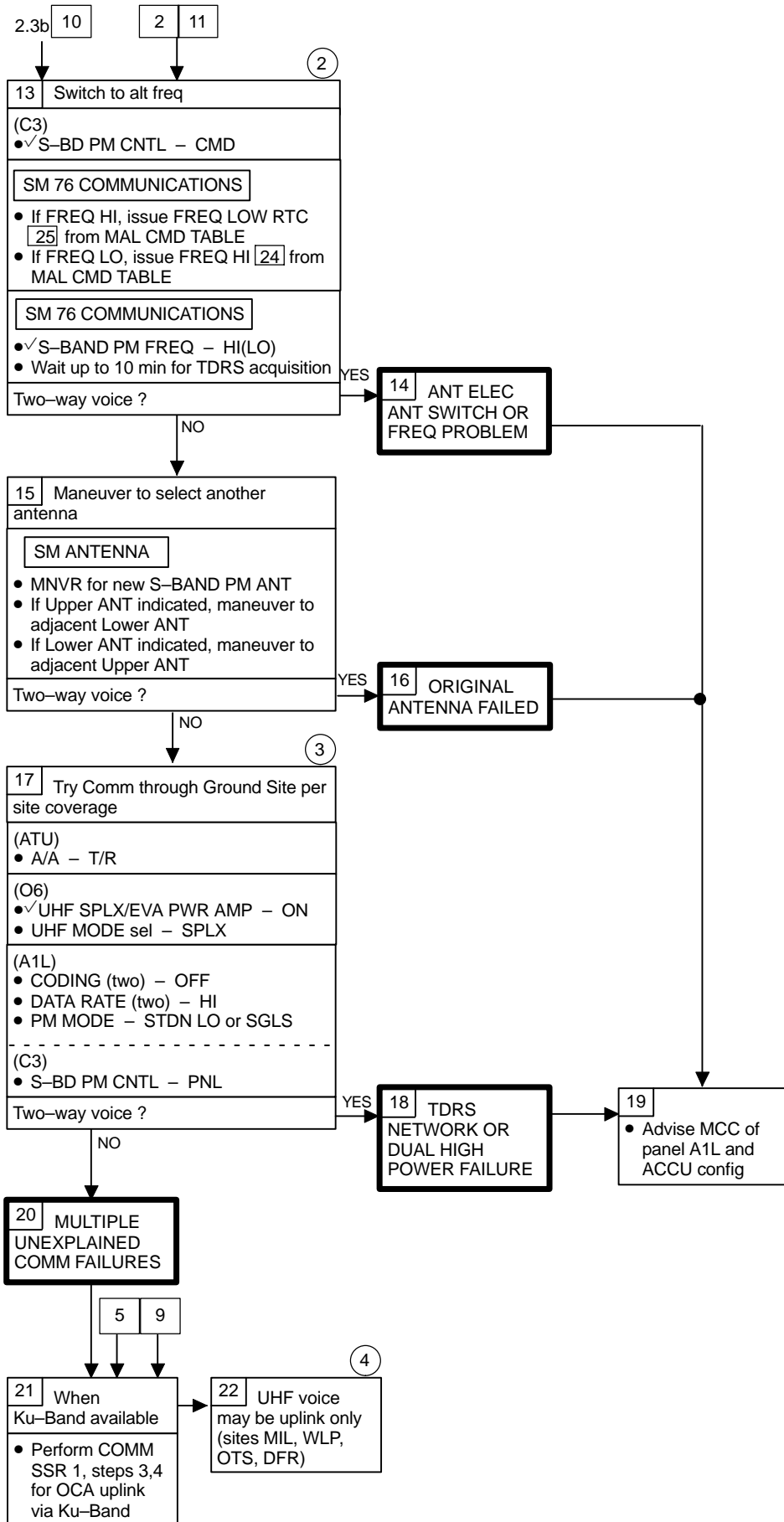
6 Advise MCC of panel A1L and ACCU config

21

COMM 2.3a (Cont)



COMM 2.3a (Cont)



- ② Payloads may have conflict with alt freq
- ③ Ground sites are generally not active during Orb phase. Minimum 2 hr to call up
- ④ UHF sites may not be active. Minimum 2 hr to call up

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COMM

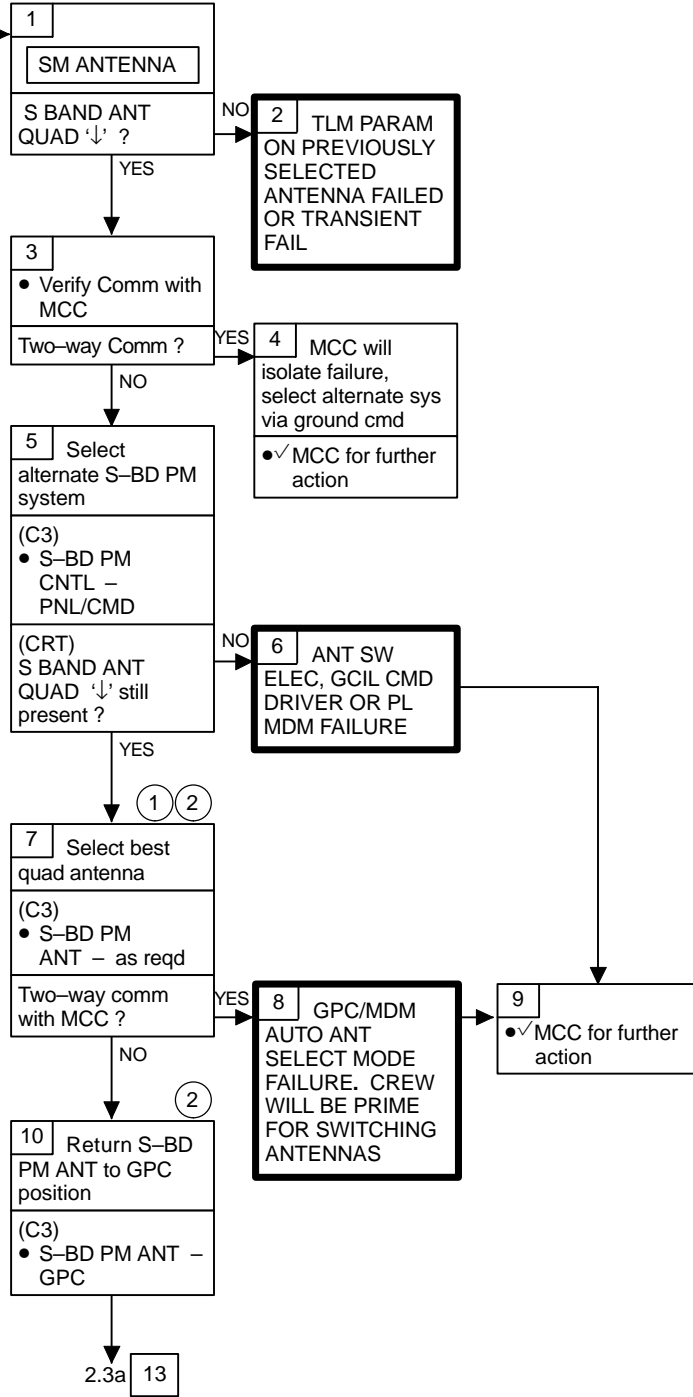
2.3b 'ANTENNA'

SM ALERT

ANTENNA

If:
Actual selected quad antenna not the same as SW commanded antenna, MDM OF3 or OF4 failure, antenna electronics failure, CNTL BC1 failure, PF MDM failure

Nominal Config:
(C3)
S-BD PM
ANT - GPC
CNTL - CMD
(A1L)
S-BD PM
ANT SW ELEC - 1
PRE AMP - 1
PWR AMPL STBY - 1
PWR AMPL OPER - 1
XPNDR - 1
NSP PWR - 1



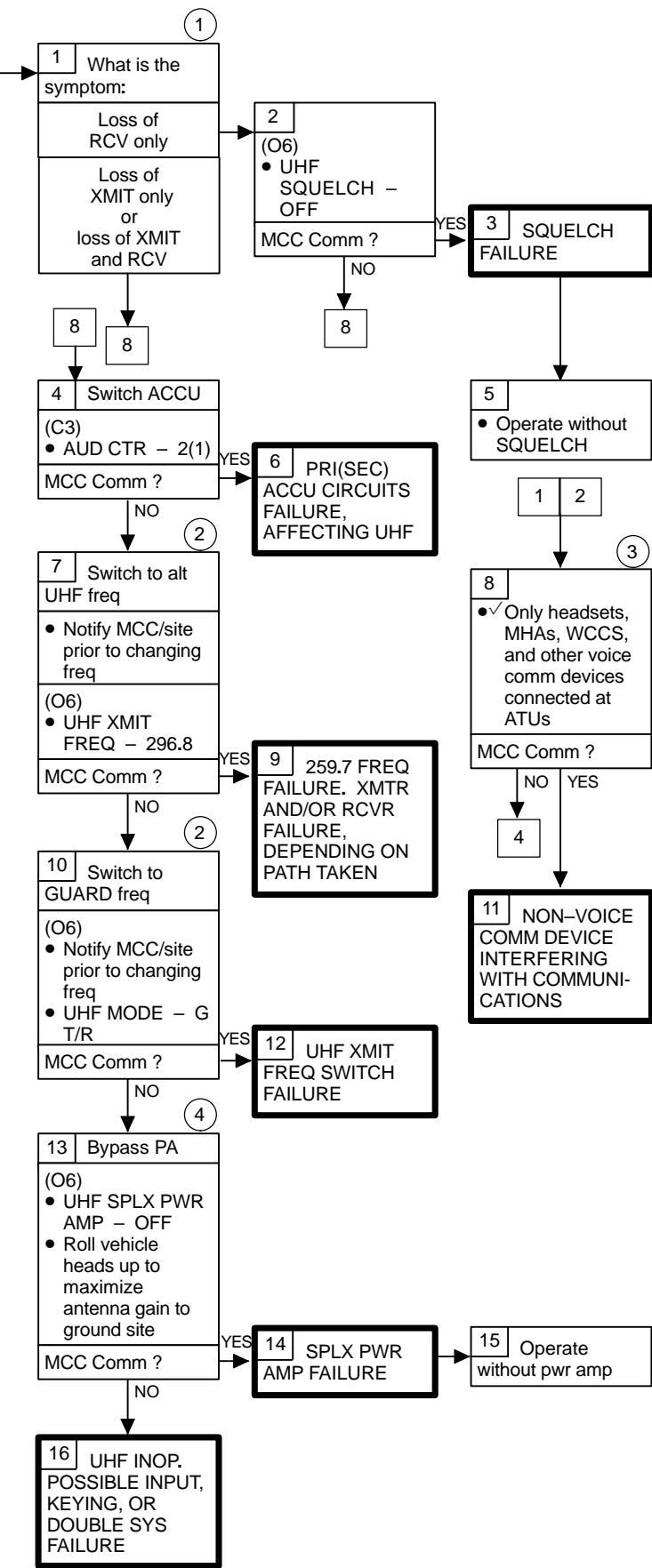
- ① Switch failures may prevent certain antennas from being selected
- ② Pause 2 sec between antenna selections

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COMM

2.3c NO UHF VOICE (MULTI PNLS)

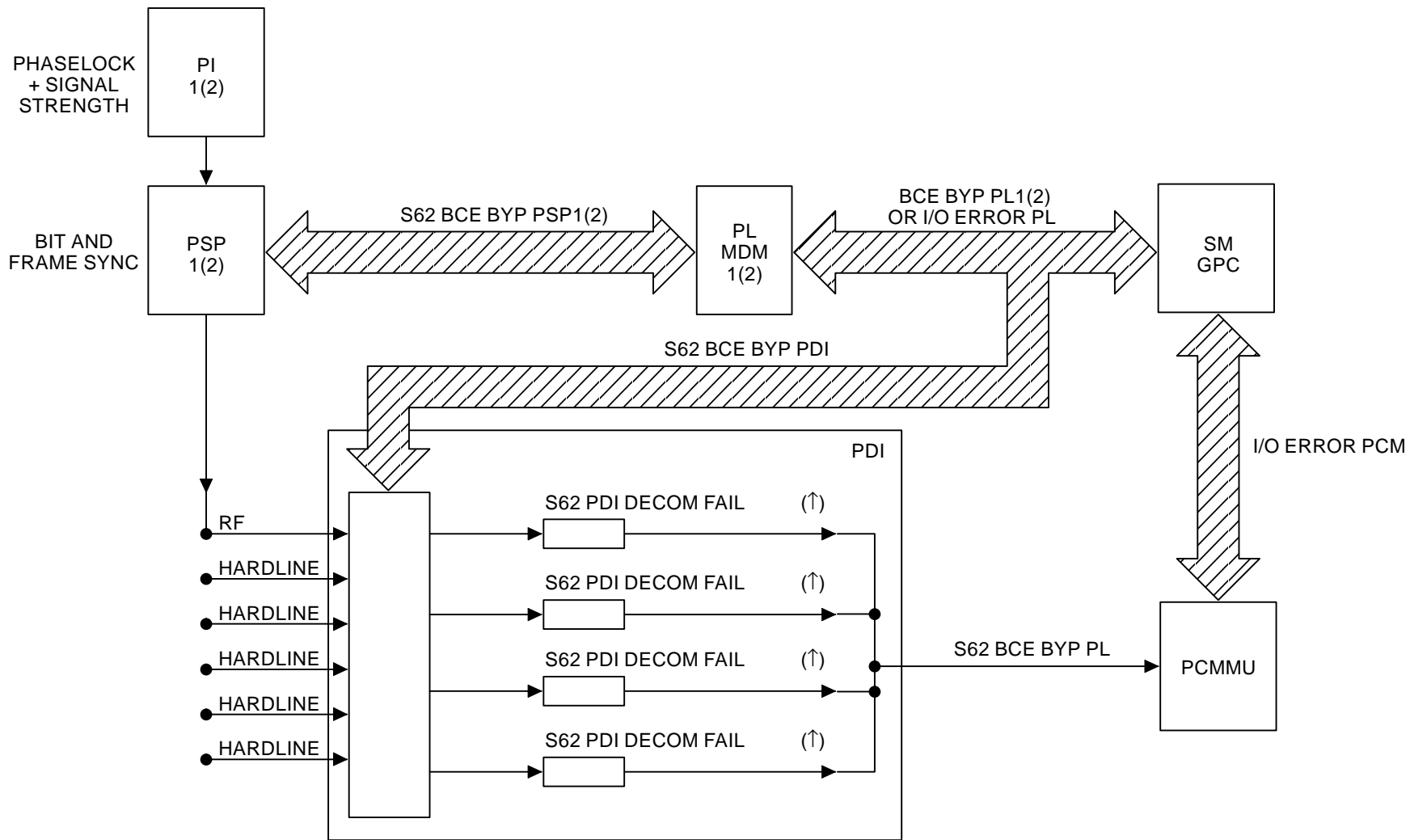
Nominal Config:
 (R14:B)
 cb MNA,MNC
 UHF - cl
 (O6)
 UHF MODE - SPLX
 UHF XMIT FREQ - 259.7
 UHF SPLX PWR AMP - ON
 UHF SQUELCH - ON
 (A1R)
 AUD CTR UHF A/A - T/R



- ① XMTR range is 350 miles with PWR AMP
- ② Up to 30 sec may be reqd for MCC/site response
- ③ Example: PADM provides constant UHF key if ATU configured to T/R. Loss of UHF comm would result
- ④ This step will limit UHF XMIT range

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PL COMM MALFUNCTION POINTS



12/14/99

2-20

MAL/ALL/GEN E

COMM

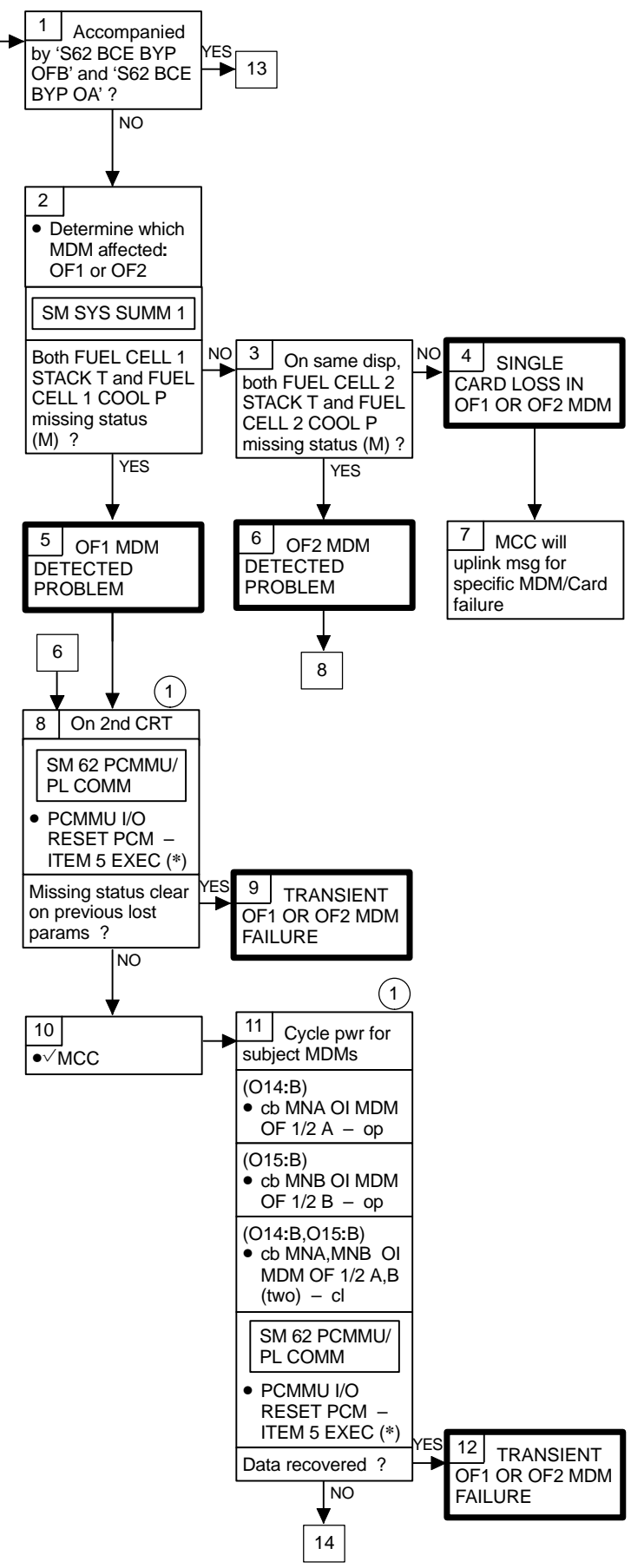
2.4a 'S62 BCE BYP OFA'

SM ALERT

S62 BCE BYP OFA

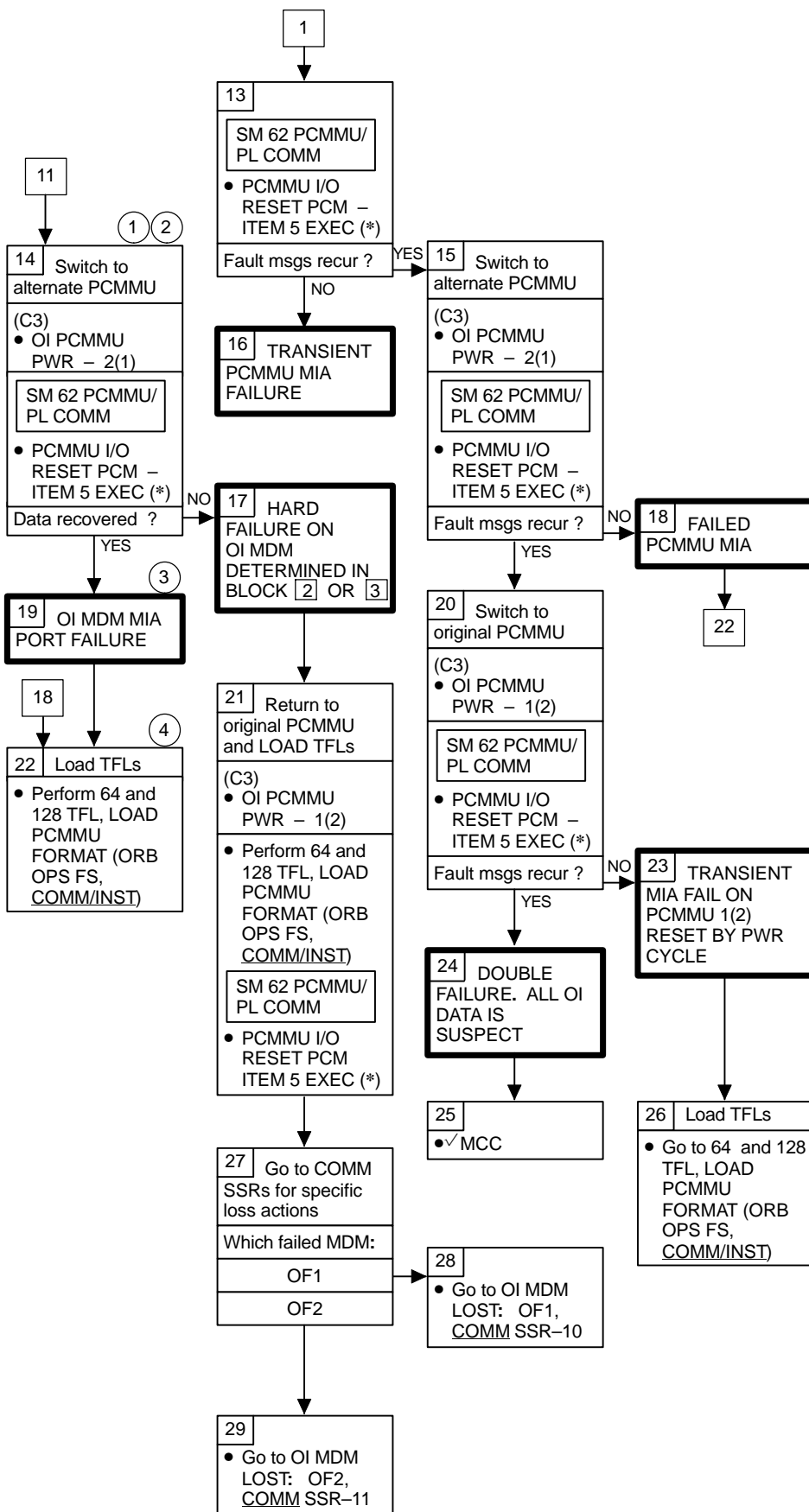
If:
OF1 or OF2 MDM failure, or Card failure in OF1 or OF2, or OF1/OF2 MDM data path PCMMU failure

Nominal Config:
(C3)
OI PCMMU PWR – 1
(O14:B,O15:B)
cb MNA,MNB OI MDM 1/2 A,B (two) – cl



① I/O RESET PCM may cause additional SM alerts if previous OI failure, PDI not pwrd ON, PDI not receiving payload data which is FDAAd

COMM 2.4a (Cont)



- ① I/O RESET PCM may cause additional SM alerts if previous OI failure, PDI not pwr ON, PDI not receiving payload data which is FDAd
- ② Advise MCC of PCMMU switch
- ③ Full data recovered by PCMMU switch. Redundant path to OF1(2) MDM lost
- ④ Change PCDECOM connections (O5,MO30F) as reqd

COMM

2.4b 'S62 BCE BYP OFB'

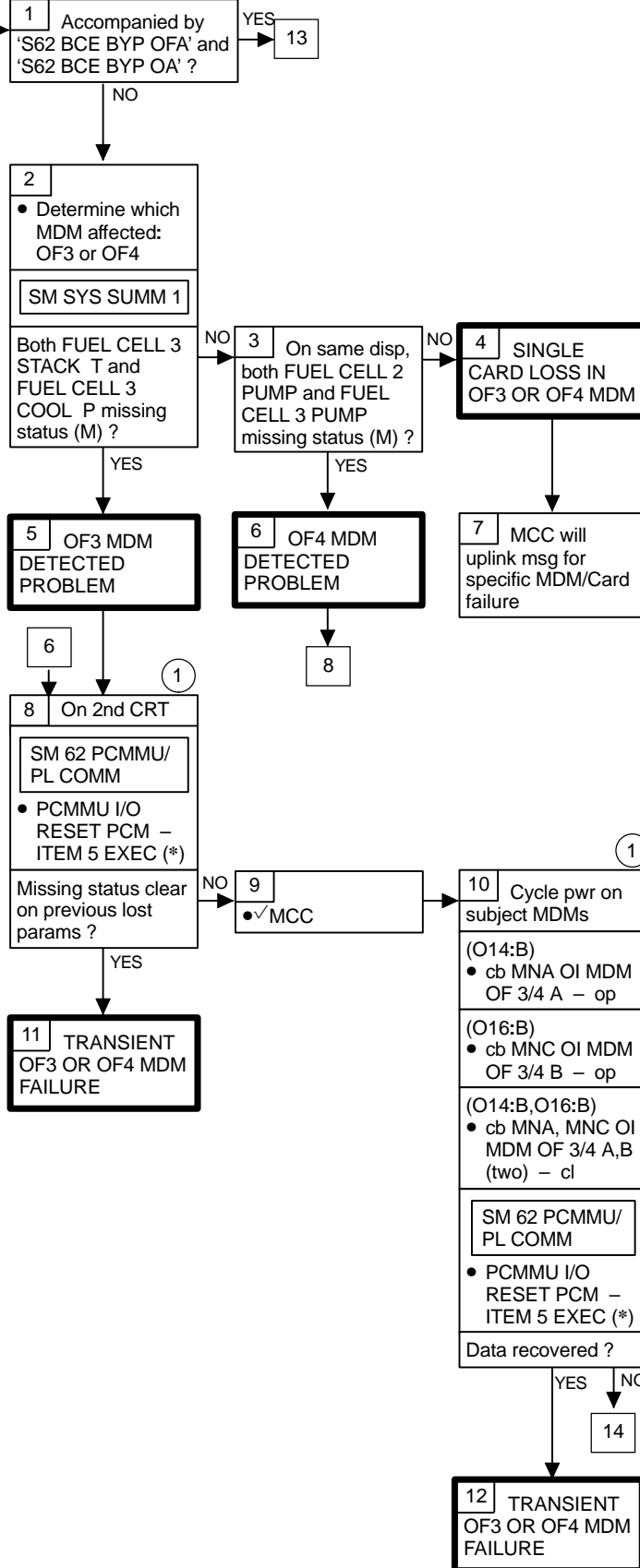
SM ALERT

S62 BCE BYP OFB

If:
OF3 or OF4 MDM failure, or Card failure in OF3 or OF4, or OF3/OF4 MDM data path to PCMMU failure

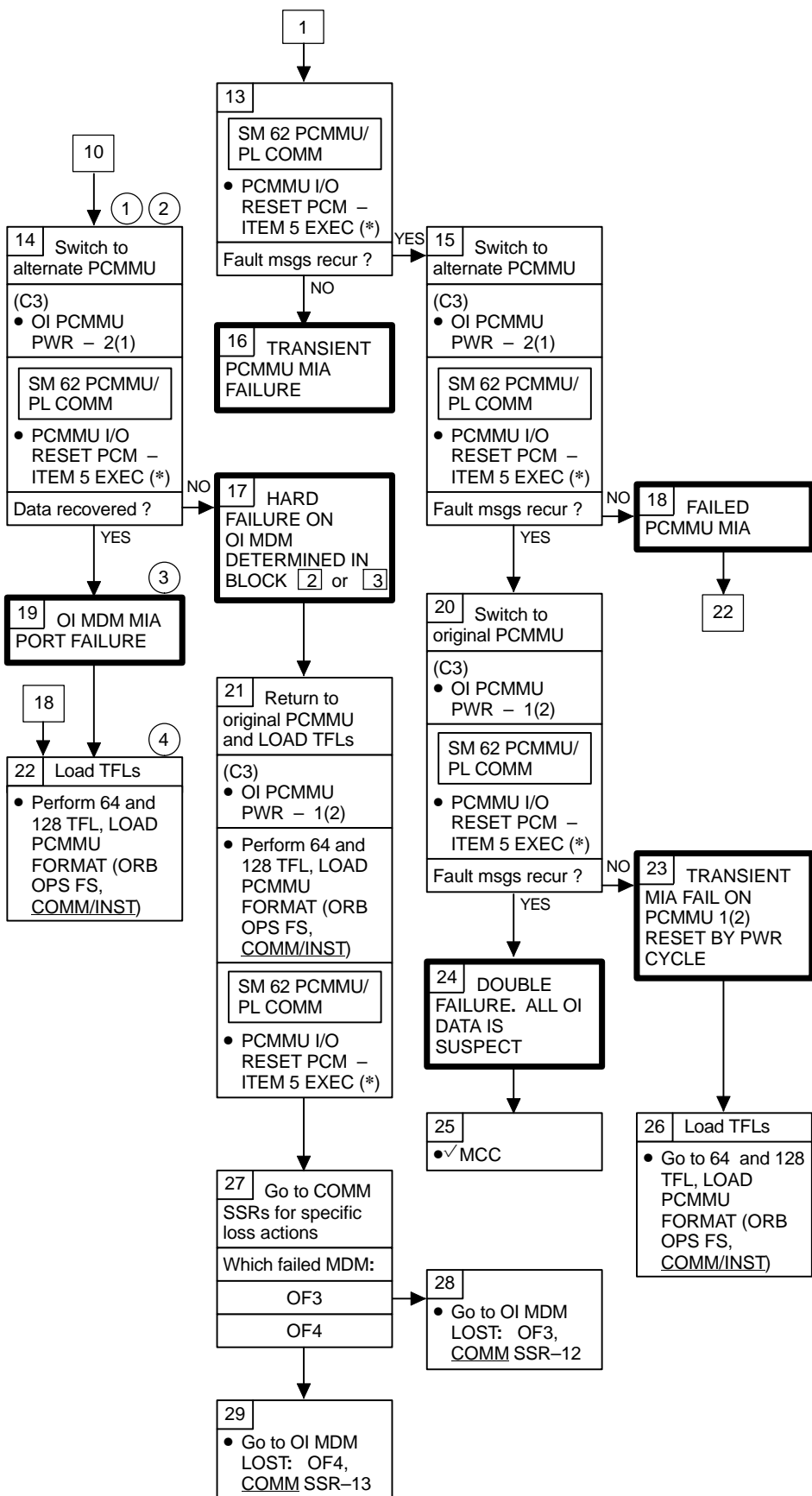
Nominal Config:

(C3)
OI PCMMU PWR - 1
(O14:B,O15:B)
cb MNA,MNB OI MDM OF 3/4 A,B (two) - cl



① I/O RESET PCM may cause additional SM alerts if previous OI failure, PDI not pwr'd ON, PDI not receiving payload data which is FDAAd

COMM 2.4b (Cont)



- ① I/O RESET PCM may cause additional SM alerts if previous OI failure, PDI not pwr'd ON, PDI not receiving payload data which is FDAd
- ② Advise MCC of PCMMU switch
- ③ Full data recovered by PCMMU switch. Redundant path to OF3(4) MDM lost
- ④ Change PCDECOM connections (O5,MO30F) as req'd

COMM

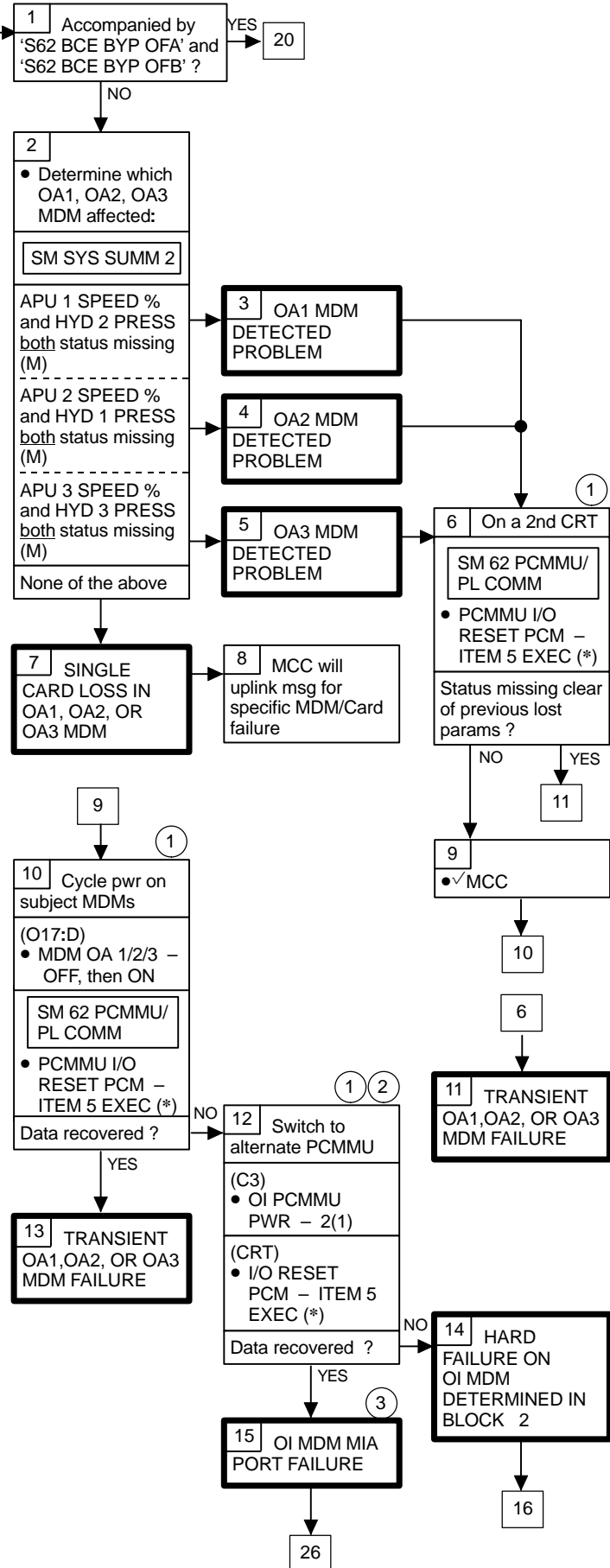
2.4c 'S62 BCE BYP OA'

SM ALERT

S62 BCE BYP OA

If:
 OA1 or OA2 or
 OA3 MDM failure
 or Card failure in
 OA1(OA2,OA3)
 or OA1/OA2/OA3
 data path to
 PCMMU failure

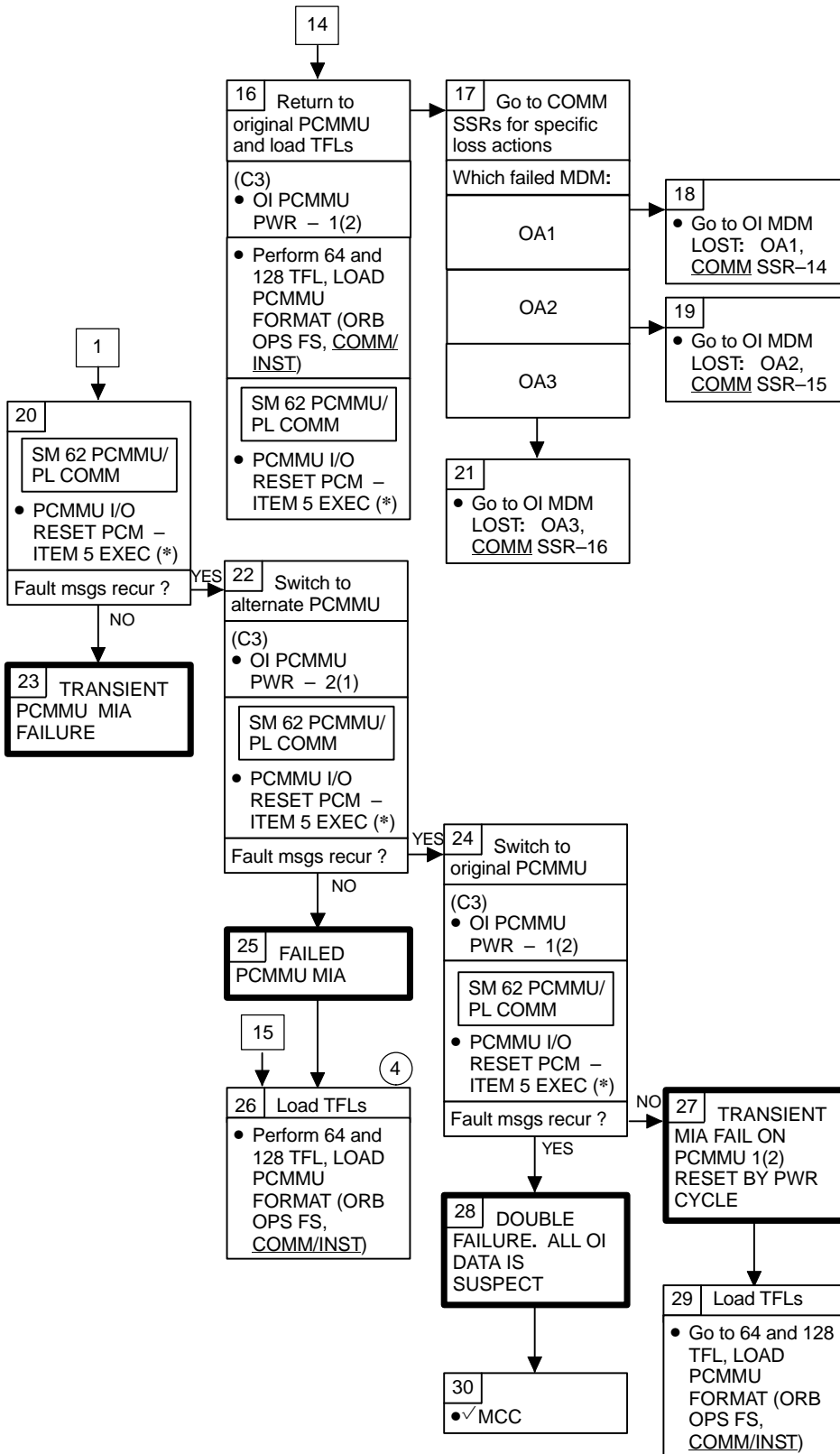
Nominal Config:
 (C3)
 OI PCMMU PWR –
 1
 (O17:D)
 MDM OA 1/2/3 –
 ON



- ① I/O RESET PCM may cause additional SM alerts if previous OI failure, PDI not pwr'd ON, PDI not receiving payload data which is FDA'd
- ② Advise MCC of PCMMU switch
- ③ Full data recovered by PCMMU switch. Redundant path to OA1(2,3) MDM lost

COMM 2.4c (Cont)

④ Change PCDECOM connections (O5,MO30F) as reqd



COMM

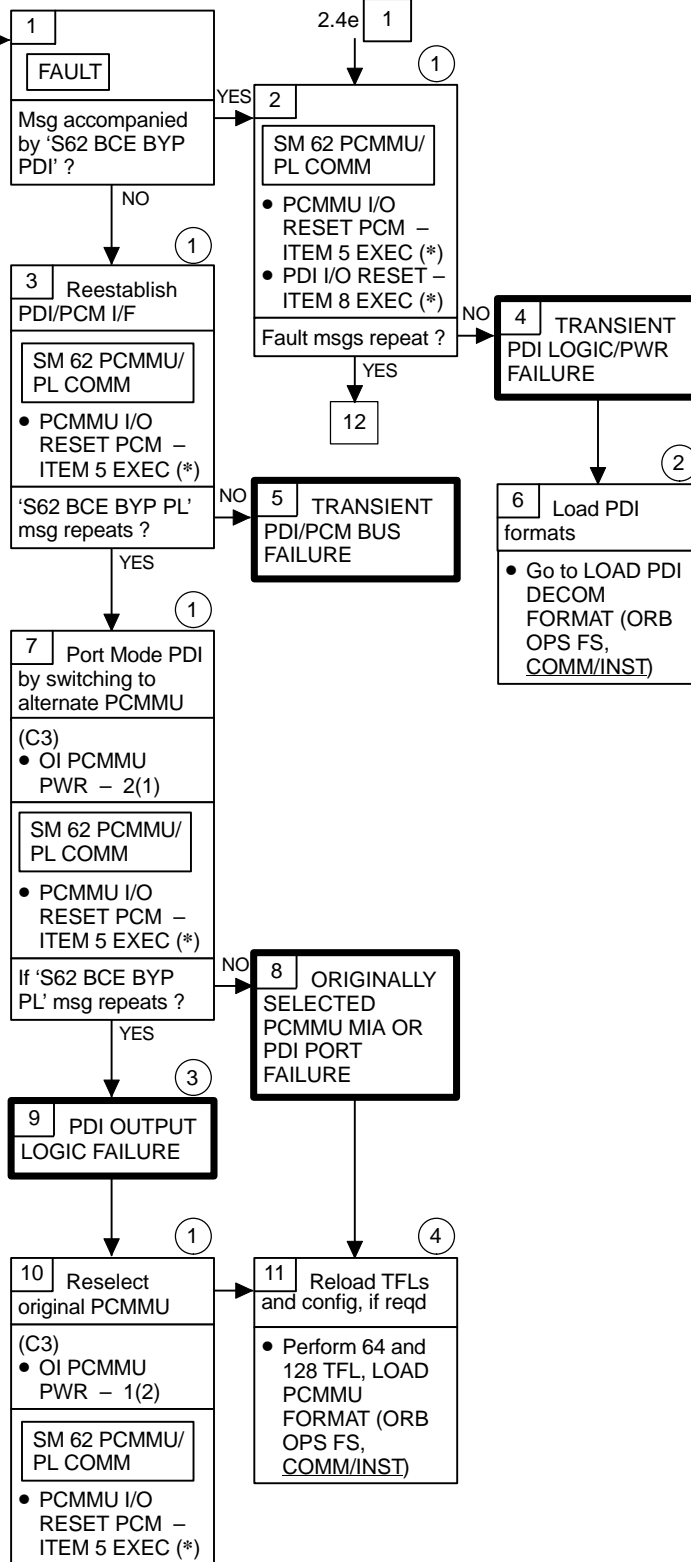
2.4d 'S62 BCE BYP PL'

SM ALERT

S62 BCE BYP PL

If:
PDI port failure or PCMMU port failure or PDI to PCMMU data path failure

Nominal Config:
(C3)
OI PCMMU PWR - 1(2)
(A1L)
PL DATA INTLVR PWR - ON



① I/O RESET PCM may cause additional SM alerts if previous OI failure, PDI not pwr'd ON, PDI not receiving payload data which is FDAd

② MCC can uplink PDI loads when SM SPEC 62 is resumed

③ IFM available whenever spare PDI is manifested

④ Change PCDECOM connections (O5,MO30F) as reqd

COMM

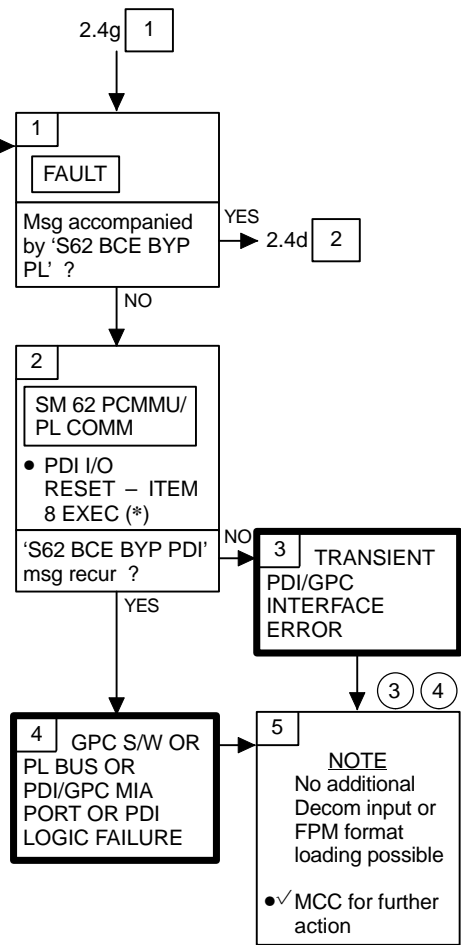
2.4e 'S62 BCE BYP PDI'

SM ALERT

S62 BCE BYP PDI (1) (2)

If: PDI PL Bus port failure or GPC port failure or PDI to GPC data path failure

Nominal Config:
(A1L)
PL DATA INTLVR
PWR - ON



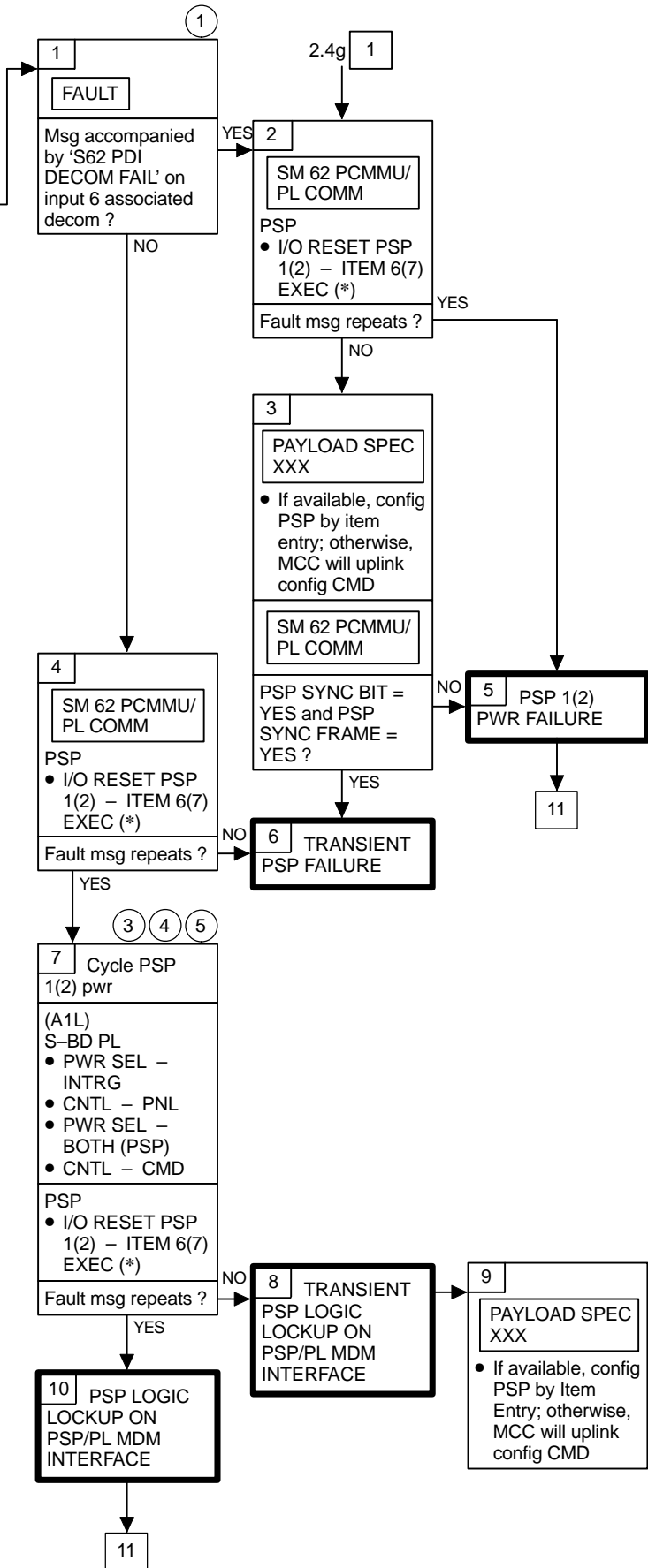
- (1) May occur prior to 'I/O ERROR PL1' msg, which requires Mal procedure for that error condition be performed
- (2) Msg will occur if SM I/O RESET accomplished and PDI pwrd off
- (3) Internal PDI logic lockup may be cleared by PDI pwr cycle. However, this will cause loss of currently loaded formats. Do not cycle pwr without MCC direction
- (4) May be possible to clear if GPC MIA or GPC S/W with an SM GPC switch. ✓MCC for further action

COMM

2.4f 'S62 BCE BYP PSP 1(2)'

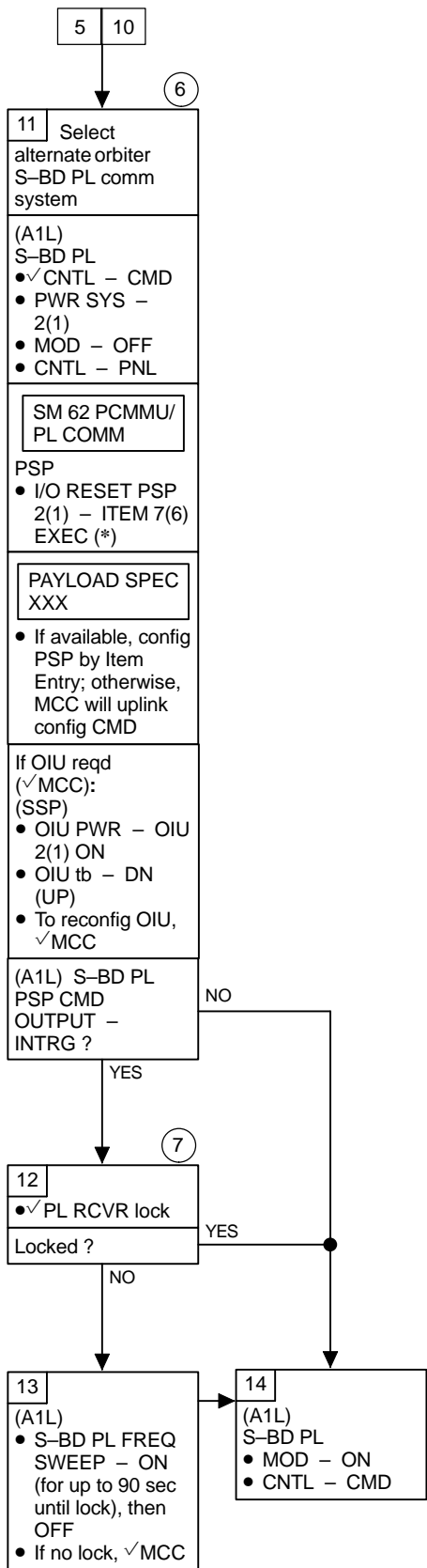
If:
 PSP/PL MDM Interface fails or
 PSP pwr off or
 PSP pwr supply failure

Nominal Config:
 (A1L)
 S-BD PL
 CNTL - CMD
 PWR SYS - 1
 PWR SEL - BOTH
 PSP CMD
 OUTPUT - INTRG (PL UMB)



- ① PDI DECOM FDA must be enabled to receive 'S62 PDI DECOM FAIL' and ↑
- ② Msg occurs if PSP pwr off
- ③ 'S62 PDI DECOM FAIL' fault msg may occur during PSP pwr cycle
- ④ PSP config will be lost in next block steps
- ⑤ S-BD PL PWR SEL sw position should reflect current operational requirements

COMM 2.4f (Cont)



- ⑥ Selection of alternate S-BD PL sys will cause temporary loss of RF to PL
- ⑦ Indications of PL RCVR lock vary with flight

COMM

2.4g 'S62 PDI DECOM FAIL'

① Data on display driven by failed DECOM may be static

SM ALERT

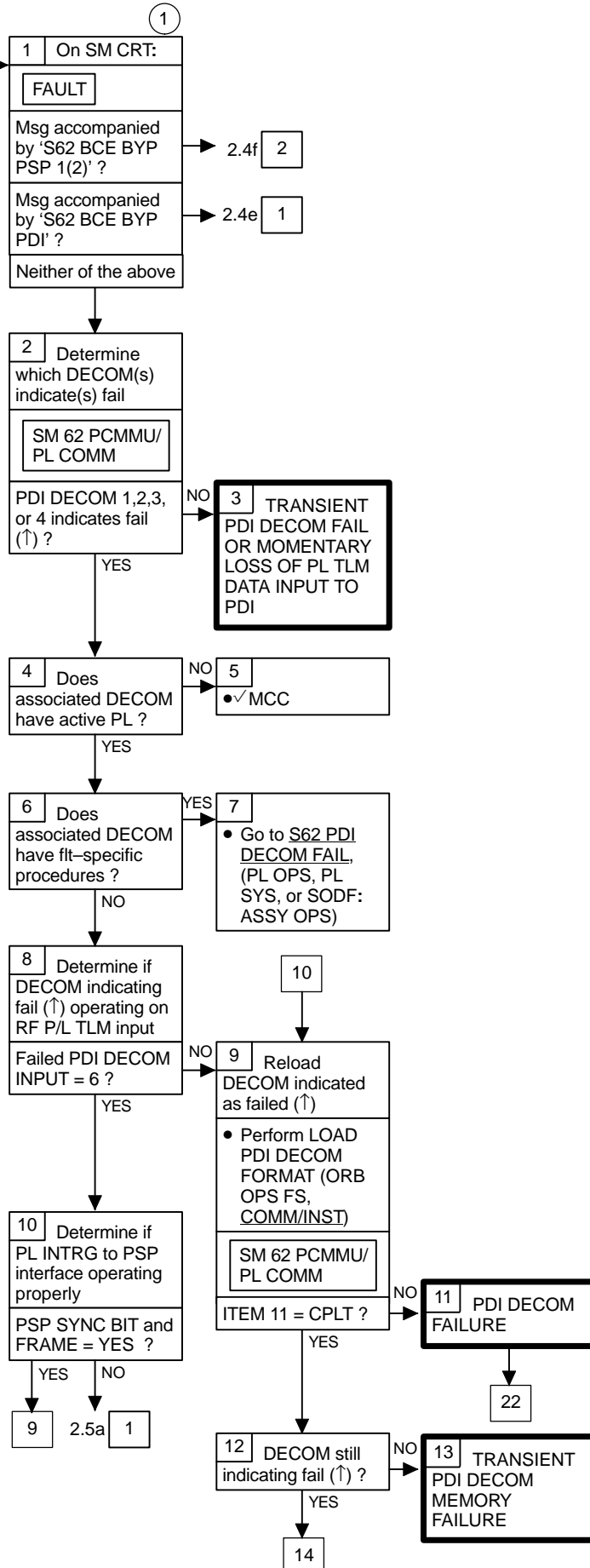
S62 PDI DECOM FAIL

If:
 PDI Decom fails, or
 PL to orbiter PI
 RF link fails, or PL
 TLM output to PDI
 fails, or PSP/PDI
 hardline failure

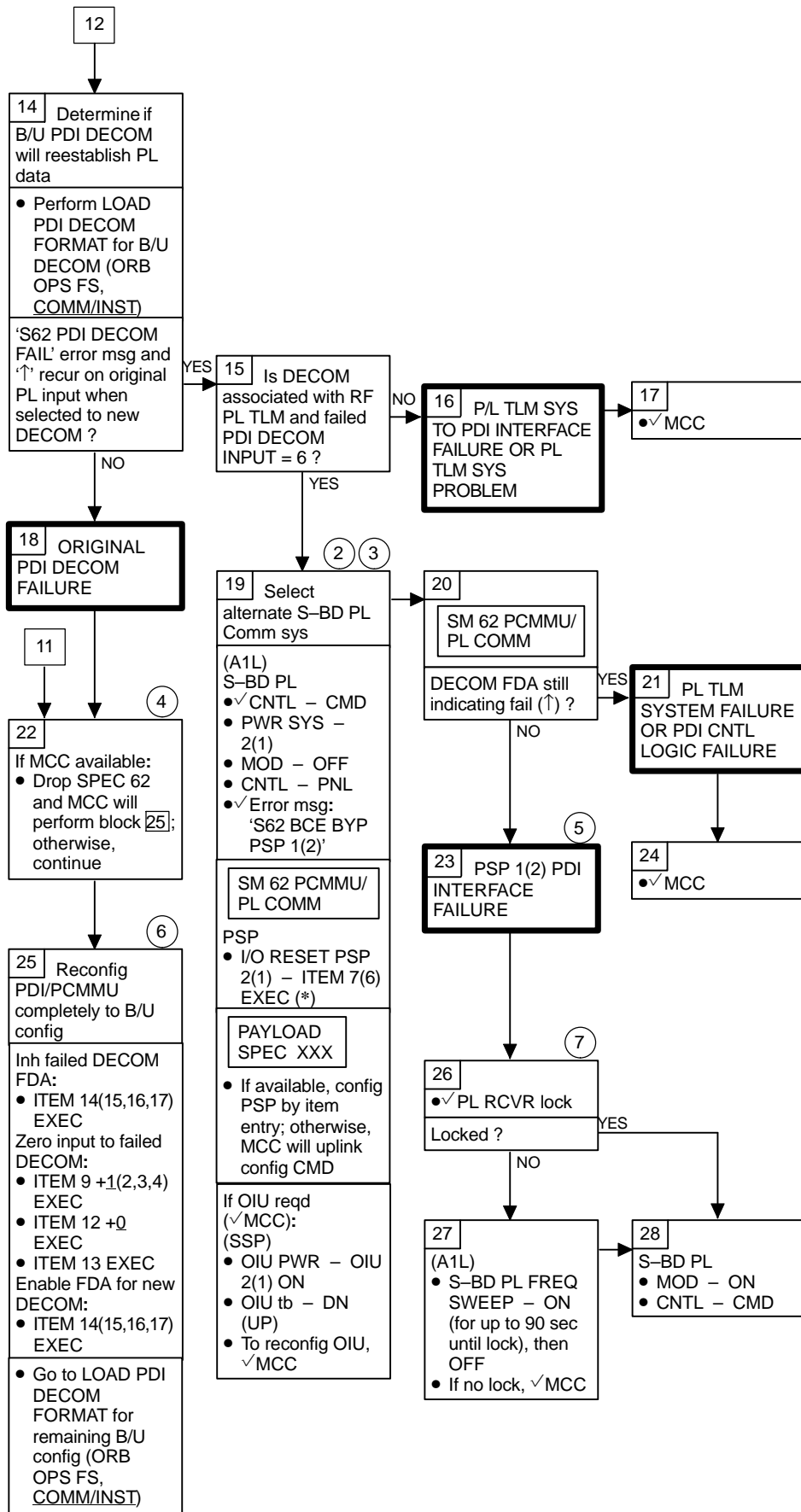
Nominal Config:
 (A1L)
 PL DATA INTLVR
 PWR - ON

SM 62 PCMMU/PL COMM

DECOM FDA
 ENA - ITEM 14
 (15,16,17) = ENA
 (*)
 (A1L)
 S-BD PL
 PWR SYS - 1
 PWR SEL -
 BOTH
 PSP CMD
 OUPUT -
 INTRG(PL UMB)



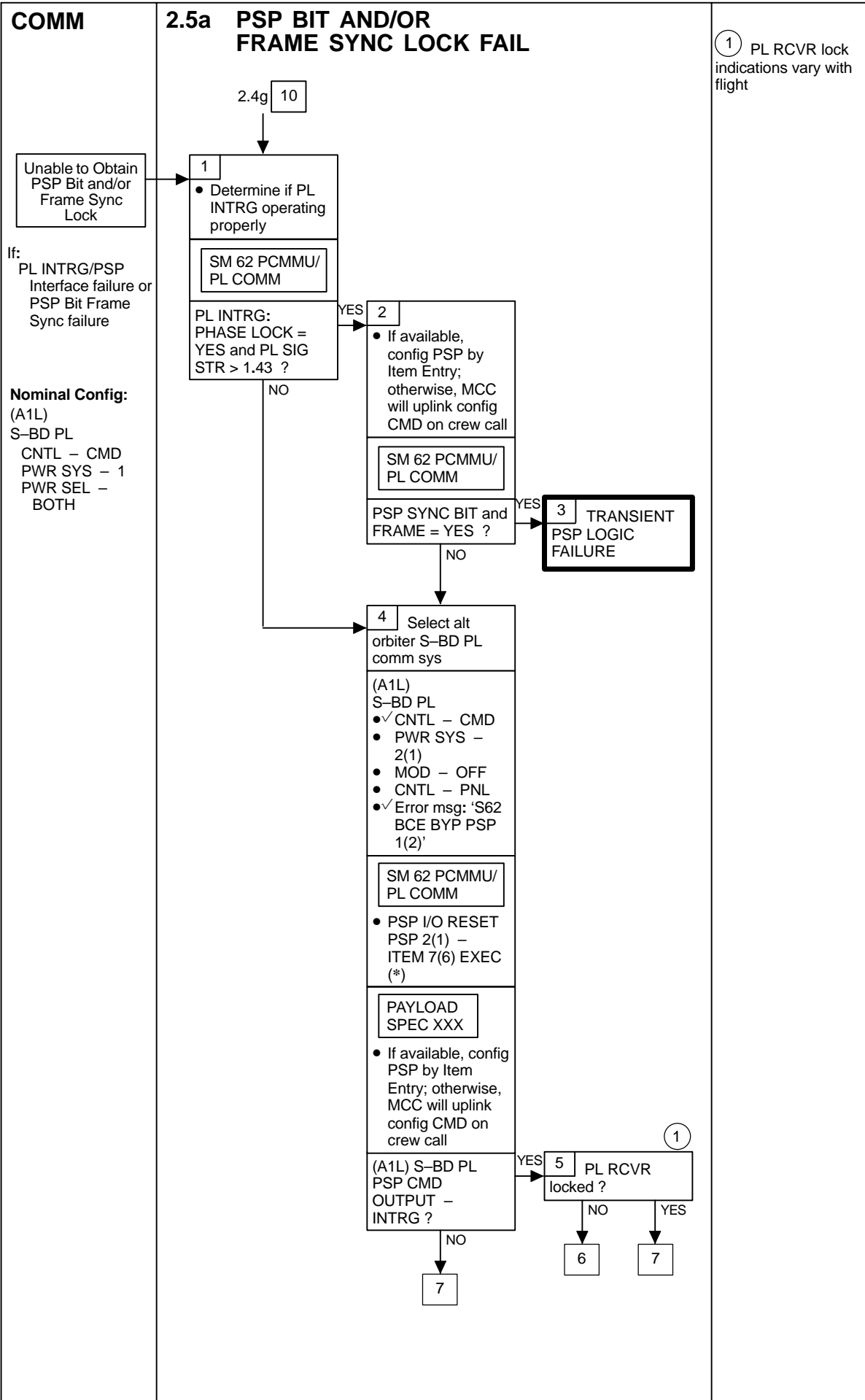
COMM 2.4g (Cont)



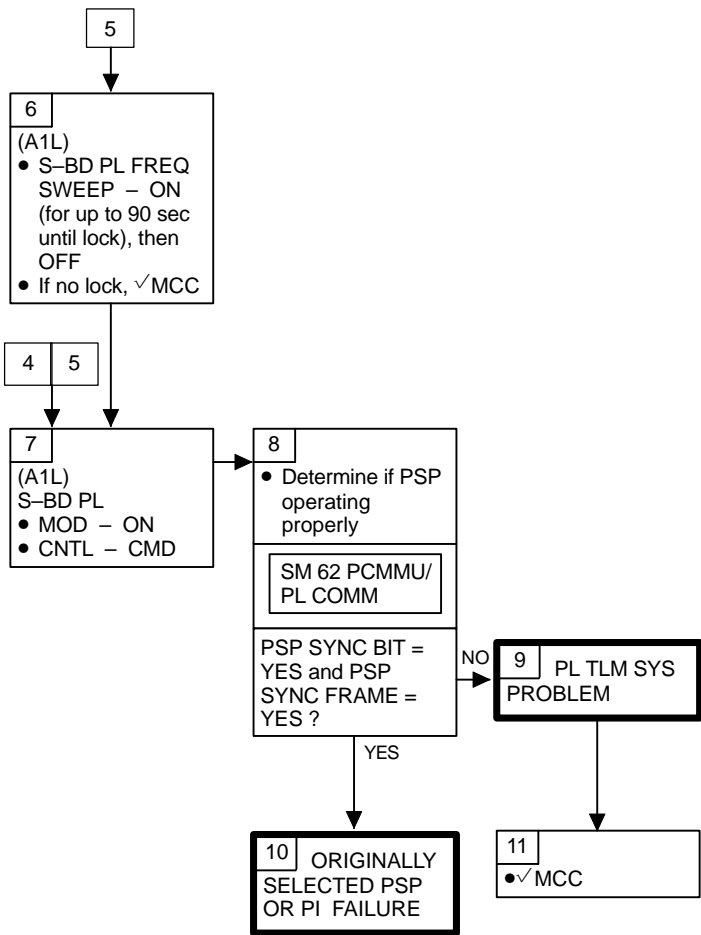
- ② Selection of alternate S-BD PL sys will cause temporary loss of RF to PL
- ③ Some payloads, on a flight-specific basis, may not be supported by PL comm string 2
- ④ MCC TFL/DFL loads cannot be performed with SPEC 62 active
- ⑤ Original orbiter S-BD PL TLM sys lost
- ⑥ B/U DECOM config requires a TFL change
- ⑦ PL RCVR lock indications vary with flight

PSP BIT 2.5

PSP BIT
2.5



COMM 2.5a (Cont)



O I D S C
2.6

COMM

2.6a OI DSC LOSS

① Loss of signal conditioning will usually (but not always) cause display of off-scale low value for that param. 'L' will be displayed adjacent to this value

①
Multiple Params Indicate Off-Scale Low (Displaying 'L')

S69 FUEL CELL
S69 FUEL CELL H2O
S86 FU TK VLV 1(2,3)
S86 RSVR/ACC P 1(2,3)
S88 APU/FU PMP 1(2,3)

Simultaneous occurrence of these fault msgs indicates DSC OM3 problem

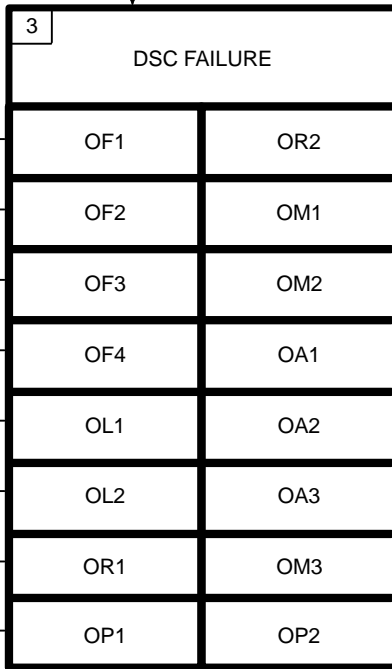
Nominal Config:

(O14:B)
cb MNA OI SIG CONDOR OF 1/4 A - cl
(O15:B)
cb MNB OI SIG CONDOR OF 1/4 B - cl
(O15:B)
cb MNB OI SIG CONDOR OF 2/3 A - cl
(O16:B)
cb MNC OI SIG CONDOR OF 2/3 B - cl
(O14:B)
cb MNA OI SIG CONDOR OM 1/2 A - cl
(O15:B)
cb MNB OI SIG CONDOR OM 1/2 B - cl
(O17:C)
SIG CONDOR OL 1/2 - ON OR 1/2 - ON
(O17:D)
SIG CONDOR OA 1/2/3 - ON
(O15:B)
cb MNB OI SIG CONDOR OM3 A - cl
(O16:B)
cb MNC OI SIG CONDOR OM3 B - cl

(EDO only)
(R14:B)
cb MNA PALLET/ DSC 1A/2B - cl
cb MNB PALLET/ DSC 1B - cl
cb MNC PALLET/ DSC 2A - cl

1
• Match param indicators on displays to determine failed DSC

2
• cb(s) for particular DSC



```

XXXXXXXXXX/078      SM SYS SUMM 1 XX X DDD/HH:MM:SS
                                DDD/HH:MM:SS
SMOKE      1/A      2/B      DC VOLTS      1/A      2/B      3/C
CABIN      OF1      FC      CABIN      OM1      OM2      OM2
L/R F D    OF3      OF2      MAIN      OM2      OM2      OM1
AV BAY 1    OF2      OF3      ESS      OM2      OM2      OM1
          2 OF1      OF3
          3 OF1      OF2      CNTL 1  X OF1  X OF2  X OF3 X
CABIN     OF2
PRESS     OF2
dP/dT-EQ  OF3 ± X.XXXS AC
02 CONC  XXX.XS
PP02     OF1      OF2      VOLT Φ A  OF1      OF2      OF3
FAN ΔP    OF1      Φ B      OF1      OF2      OF3
HX OUT T  OF1      Φ C      OF1      OF2      OF3
02 FLOW   OF1      OF2      AMPS Φ A  XX.XS  XX.XS  XX.XS
N2 FLOW   OF1      OF2      Φ B      XX.XS  XX.XS  XX.XS
IMU FAN   AXS BXS CXS  Φ C      XX.XS  XX.XS  XX.XS
ΔV FC1    FC2      FC3      FUEL CELL
SS1 XXXS  XXXS  XXXS  AMPS      OM1      OM1      OM1
SS2 XXXS  XXXS  XXXS  REAC VLV  XS      XS      XS
SS3 XXXS  XXXS  XXXS  STACK T   OM1      OM2      OM2
TOTAL AMPS XXXS  EXIT T     OM1      OM2      OM2
          KW     XS  COOL P     OM1      OM2      OM2
          PUMP  XS  XS      XS
    
```


COMM 2.6a (Cont)

XXXX / XXX / 079					SM	SYS	SUMM	2	XXX	DDD / HH : MM : SS	
										DDD / HH : MM : SS	
CRYO TK		1	2	3	4	5					
H2	PRESS	XXXXS	XXXXS	XXXXS	XXXXS	XXXXS					
O2	PRESS	XXXXS	XXXXS	XXXXS	XXXXS	XXXXS					
HTR	T1	OM1	OM1	OM1	OM2	OF2					
	T2	OM2	OM2	OF3	OF3	OF3					
APU		1	2	3	HYD		1	2	3		
TEMP	EGT	OA1	OA2	OA3	PRESS	OA2	OA1	OA3			
B / U	EGT	OA2	OA3	OA1	RSVR	T	OA1	OA2	OA3		
OIL	IN	OA1	OA2	OA3	P	OA1	OA2	OA3			
	OUT	OA2	OA3	OA1	QTY	OA1	OA2	OA3			
SPEED	%	OA1	OA2	OA3	W / B						
FUEL	QTY	XXXXS	XXXXS	XXXXS	H2O	QTY	XXXXS	XXXXS	XXXXS		
PMP	LK P	OM3	OM3	OM3	BYP	VLV	XXXXS	XXXXS	XXXXS		
OIL	OUT P	OA1	OA2	OA3	THERM	CNTL	1	2			
AV	BAY				H2O	PUMP P	OF2	OF3			
TEMP		OF2	OF3	OF1	FREON	FLOW	OF2	OF3			
FAN	ΔP	X . XXXS	X . XXXS	X . XXXS	EVAP	OUT T	OA2	OA3			
(X X)											

XXXX / XXX / 089					PRPLT	THERMAL	XX	X	DDD / HH : MM : SS	
									DDD / HH : MM : SS	
POD		L	R							
OMS	TK	OX	OL2	OR2	OMS	CRSFD	L	R	C	
		FU	OL1	OR1	XFD	OX	OA1	OA2	OA3	
ENG	I / F	OX	OL1	OR1		GMBL	LN	OA1	OA2	
		FU	OL2	OR2	DRN	OX	OA3	OA3		
		OX	VLV	OL1	OR1					
		FU	INJ	OL1	OR1					
WEB	KEEL	1	OL2	OR2						
		2	OL2	OR2						
	Y	OB	OL2	OR2	BLD	AFT	FUS	OA3	OA3	
		UP	OL1	OR1		PL	BAY	OM1	OM2	
OX	DRN	PNL	1	OL1	OR1	OX	QD	OF3		
			2	OL1	OR1					
ENG	COVER	OM1	OM2							
	SERV	PNL	OL2	OR2	FWD	RCS	FU	OX		
GSE	SERV	PNL	OL2	OR2		LINE	T1	OF2	OF4	
TEST	HE / OX	1	OL1	OR1			T2	OF4	OF2	
		2	OL2	OR2	AFT	RCS	L	R		
					MANF	1	OX	OL1	OR1	
					DRN	PNL	1	OL2	OR2	
							2	OL2	OR2	
					VERN	PNL	1	OL2	OR2	
							2	OL2	OR2	
(X X)										

COMM SSR

COMM SSR-1

LOSS OF ALL VOICE COMM

1. Perform NO AUDIO, COMM, 2.1a
2. Install AUDIO CTR BYP CONNECTORS
Perform ACCU BYPASS CONNECTOR INSTALLATION (IFM, PROCEDURES A THRU F) for CDR and PLT ATUs

L12
A1U

If still no COMM but CMD capability confirmed (ORB PKT, COMM, COMM LOST multi panels), MCC will attempt telecon via OCA

If Ku-Band not deployed/activated:

3. Perform KU-BD ANT DEPLOY and KU-BD ACTIVATION (ORB OPS, COMM/INST):
4. Configure for OCA telecon (ORB OPS, PGSC, VIDEO CONFERENCING) in low rate
PDIP KU BD RATE - LOW
KU SIG PROC LDR - PL DIGITAL
✓KU PWR - ON
✓KU MODE - COMM
✓KU - GPC
KU CNTL - PNL

If no OCA capability (CMD OK) and voice still cannot be established:

5. Perform next day PLS
6. Use Scratch Pad line(s) to inform MCC of no voice and for other msgs (MCC monitors all Scratch Pad lines)

NOTE

For letters above F, use ROW/COLUMN combinations below; i.e., 2B = N.
Use '..' when msg requires > 1 Scratch Pad line (expect ERR)

		COLUMN					
		A	B	C	D	E	F
R O W	1	G	H	I	J	K	L
	2	M	N	O	P	Q	R
	3	S	T	U	V	W	X
	4	Y	Z				

Standard Responses

- 11 YES
- 22 NO
- 33 MSG RCVD - STBY
- 44 MSG RCVD - WILCO
- 55 DON'T KNOW
- 66 RESEND MSG
- 77 REFERENCE MSG
- 88 ? (DON'T UNDERSTAND - PLEASE CLARIFY)
- 99 MISSION STATUS - OK
- 00 MISSION STATUS - PROBLEM IDENTIFIED, PLEASE ADVISE
- AA PAGE NUMBER

EX:

ITEM 01 +77 (02) +924 (03) +88
'Reference Msg 924; Don't Understand - Please Clarify'

7. MCC will acknowledge by lighting Abort light:
ON for at least 1 min, then OFF = MSG RCVD - STBY
ON for 10 sec, then OFF = YES
ON for 10 sec, then OFF for 10 sec, ON for 10 sec, then OFF = NO

If still no Comm, and no CMD:

8. Minimize perturbations and deorbit
Cease payload ops which cause vehicle movement
Do not perform any unnecessary attitude maneuvers, vents, dumps, or purges
Perform reqd attitude maneuvers, vents, dumps and purges as close to Deorbit Burn as possible
Go to -ZLV nose-forward attitude until Deorbit Prep

OPS 202 PRO

GNC XXXX MNVR YYYY

If PEG 7 Δ Vs = 0 and TIG in future, then Deorbit to PLS at TIG in target set

Otherwise:

Deorbit within next 13 hr if $H_p \geq 120$ nmi or within next 9 hr if $105 \leq H_p < 120$ or loss according to following priorities:

- a. Next light CONUS opportunity
- b. Next CONUS opportunity
- c. Next lighted ELS opportunity

COMM SSR

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EXPLANATORY NOTES FOR OI MDM/DSC LOSS SSRs

NOTE

OI MDM/DSC Loss action items are based on loss of specific OI MDM or DSC. Each procedure defines crew actions reqd because of the lost measurements on failed OI MDM or DSC

For each procedure, the following assumptions/guidelines are used:

1. Only on-orbit and sleep configs are addressed. Entry changes will be uplinked with entry sw list changes
2. Only a few lost measurements have possible recoveries. Many Mal procedures will remain unusable. Actions reqd maximize capability
3. Pwr consumption is not a consideration. Loads will be balanced after the fact by MCC
4. Procedures include primary C/W inhibits (DSC only). MCC will do TMBUs to assure safe monitoring/control only, with no general TMBU of all affected measurements
5. Procedures do not represent a complete list of measurements affected. Procedures include only those measurement losses that are significant to crew and those with possible actions
6. Params affected by OI MDM loss will have 'M' displayed adjacent to them. Those params affected by DSC loss will have 'L' displayed adjacent to them (params displayed on meter will be pegged low). Do not use these data

COMM SSR-10
OI MDM LOST: OF1

ACTIONS	MEASUREMENT LOSS	NOTES
If on PCS SYS 1: • Perform RECONFIG TO ALT PCS SYS, ECLS SSR-3	Most PCS 1 measurements	① If condensation in cabin, ✓MCC
(L1) • AV BAY 3 FAN A,B (two) – ON 1 • HUM SEP A,B (two) – ON If on IMU FAN A: • IMU FAN B(C) – ON • A – OFF • Monitor Cabin Fan flow by feel During sleep periods: • CAB FAN A,B (two) – ON • Maintain LiOH Canister(s) changeout schedule per cue card and FLIGHT PLAN	Av Bay 3 Fan ΔP temp (MCC cannot assess) Hum Sep A,B (two) Speed Snsr Waste Qty 1 IMU Fan ΔP A Speed Snsr Cab Fan ΔP	② Buses will be untied for entry. MCC will TMBU FC ΔAMPS 2 limits and notify crew. If loss of comm, reset limits to present value ± 40 ③ WST TK will be dumped by time (≈2%/min) to provide ullage to make EOM, MCC will provide the time ④ This action activates redundant htrs on Supply H2O Dump Line, Waste H2O Dump Line, Vacuum Vent Line
	PPCO2 (MCC cannot assess)	⑤ Recoverable by TMBU ⑥ Smoke Det H/W Alarm still available
(R1) 2 • MN BUS TIE B,C (two) – ON (tb-ON)	FC 1 pH Snsr FC2 SS1 ΔV SS2 ΔV SS3 ΔV	⑦ Xdcrs on disp SM 87 HYD THERMAL will show 'M' for some parameters ⑧ Visibility into Truss Flange temps lost
(L1) If FLASH EVAP CNTLR PRI B enabled: • Perform FES RESTART ECLS SSR-5, using PRI A	Most FES Feedline A Htr measurements	⑨ One of two temps in each zone lost ⑩ Vlv position is normally closed. Position can be verified during EMU recharge
(R14:C) • cb MNB KU ANT HTR – op	Ku Gyro temp monitoring	
3 • ✓MCC about performing WASTE H2O DUMP	Waste Qty 1	
4 (ML86B:A) • cb MNA,MNB H2O LINE HTR A, HTR B (two) – cl • Perform ECLS COMPUTATION INHIBIT, ECLS SSR-14, TABLE D for faulty parameters: 925522 SYS 1 N2 TK2 T 925524 SYS 2 N2 TK2 T	Waste H2O Dump Line T 5 N2 Qty (two) 1,2 (OV103,104) N2 Qty 2 (OV102,105)	
	6 Smoke Det A Concn Av Bay 2 6 A Concn Av Bay 3 6 Concn Cabin	
	7 HYD sys temps	
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	CO2 Cntrl 1 DC pwr indication CO2 Cntrl 1 BED A press VAC press CO2 Cntrl 1 malf indication CO2 Cntrl 2 AC pwr indication CO2 Cntrl 2 BED B press	
(ML86B:C) • cb MNA,MNB EXT ARLK HTR STRUC (two) – cl	If no internal airlock: 8 External Airlock LCG EV 1 Supply Line press External Airlock Fwd and Aft Truss Flange temps 9 External Airlock H2O Line Zone 1 Htr A temp External Airlock H2O Line Zone 2 Htr B temp 10 External Airlock H2O Shutoff Vlv position	

COMM SSR-11
OI MDM LOST: OF2

ACTIONS	MEASUREMENT LOSS	NOTES
If on PCS SYS 2: • Perform RECONFIG TO ALT PCS SYS, ECLS SSR-3	Most PCS Sys 2 measurements	① Use interchanger flow to monitor H2O Loop 1 performance if reqd
(L1) • AV BAY 1 FAN (two) – ON • √H2O PUMP LOOP 2 – ON • H2O PUMP LOOP 1 – OFF	Av Bay 1 Fan ΔP temp (MCC cannot assess) 1 Most H2O Loop 1 measurements	② Crossover vlv needs to be checked and TKC unisolated to equalize tks to provide leak protection
• Do not don Biomed Electrodes	EGG 1,2 Telemetry	③ Buses will be untied for entry. MCC will TMBU FC ΔAMPS 3 limits and notify crew. If loss of comm, reset limits to present value ± 40
2 (R11L) • √SPLY H2O TKC INLET, OUTLET (two) – OP (tb-OP)	Sply H2O Qty B Qty D	④ Recoverable by TMBU
3 (R1) • MN BUS TIE C,A (two) – ON (tb-ON)	FC3 SS1 ΔV SS2 ΔV SS3 ΔV	⑤ This action activates dual hrs on Supply H2O Dump Line, Waste H2O Dump Line, Vacuum Vent Line
SM 66 ENVIRONMENT • Monitor AIRLK P and dP/dT for cabin integrity on-orbit	Cabin Press Snsr	⑥ Smoke det H/W Alarm still available
• Perform ECLS COMPUTATION INHIBIT, ECLS SSR-14, TABLE D for faulty parameter: 925530 SYS 2 N2 PRESS	4 N2 Qty 2	⑦ Zone 1 temps verify proper switch config
	FC2 pH Snsr	⑧ Vestibule Temp 2 available
5 (ML86B:A) • cb MNA,MNB H2O LINE HTR A, HTR B (two) – cl	Sply H2O Dump Line T	⑨ Structural temps verify proper switch config
	6 Smoke Det A Concn Av Bay 1 6 Smoke Det B Concn Av Bay 3 6 Smoke Det Concn Right Flt Deck	⑩ Vlvs still operational. Alternate vlvs available
	7 If no internal airlock: External Airlock LCG EV 2 Supply Line press External Airlock H2O Line Zone 1 MNA,B,C Htr ON status 8 Vestibule Temp 1 9 EXT A/L Struc Htr MNA,B Htr ON status 10 Vestibule Isolation Vlv 1 and Depress Vlv 1 op/cl positions	

COMM SSR-12
OI MDM LOST: OF3

ACTIONS	MEASUREMENT LOSS	NOTES
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">SM 66 ENVIRONMENT</div> <ul style="list-style-type: none"> • Monitor Cabin Press for cabin leaks 	Cabin dP/dT	① Use Interchanger flow to monitor H2O Loop 2 performance if reqd
(L1) <ul style="list-style-type: none"> • AV BAY 2 FAN (two) – ON 	Av Bay 2 Fan ΔP Av Bay 2 temp (MCC cannot assess)	② Raises H2O Loop 1 Pump Out P Limit
<ul style="list-style-type: none"> • H2O PUMP LOOP 1 – ON • H2O LOOP 1 BYP MODE – AUTO • H2O PUMP LOOP 2 – OFF • H2O LOOP 2 BYP MODE – MAN 	1 Most H2O Loop 2 measurements	③ Lowers H2O Loop 2 Pump Out P Limit
2 (R13U) <ul style="list-style-type: none"> • C/W PARAM SEL tw (three) – 105 • C/W LIMIT SET VALUE tw (three) – 1.50 • C/W LIMIT SET LIMIT – LOWER • C/W LIMIT SET FUNC – SET • C/W PARAM SEL tw (three) – 115 • C/W LIMIT SET VALUE tw (three) – 0.65 • C/W LIMIT SET LIMIT – LOWER • C/W LIMIT SET FUNC – SET • C/W PARAM SEL tw – > 119 3		④ Causes loss of FC Auto purge capability
When reqd: <ul style="list-style-type: none"> • Perform FUEL CELL PURGE – MANUAL (ORB OPS, EPS) (Cue Card) (Assume SM 2 not available when using Cue Card) 	4 FC Purge Line temps FC3 pH Snsr	⑤ Avoids nuisance alarms
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">SM 60 SM TABLE MAINT</div> 5 Inhibit S–BD ANT QUAD Alert: <ul style="list-style-type: none"> • Param ID – ITEM 1 +0 9 2 1 0 4 9 EXEC • INH – ITEM 10(15) EXEC 	Antenna Select feedbacks	⑥ SM 76 COMM display S–BD PM mode static, SM GPC will continue selecting ANT for the mode shown
(L1) If FLASH EVAP CNTLR PRI A enabled: <ul style="list-style-type: none"> • Perform FES RESTART, ECLS SSR–5, using PRI B 	Most FES Feedline B Htr measurements	⑦ Force TDRS antenna pointing
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">SM ANTENNA</div> 6 If TDRS: <ul style="list-style-type: none"> • GPC OVRD – ITEM 19 EXEC (*) 7	S–BD mode	⑧ Recoverable by TMBU
<ul style="list-style-type: none"> • Perform ECLS COMPUTATION INHIBIT, ECLS SSR–14, TABLE D for faulty parameters: 925521 SYS 1 N2 TK1 T 925523 SYS 2 N2 TK1 T 925529 SYS 1 N2 PRESS 	8 N2 Qty (two) 1,2	⑨ Xdcrs on disp SM 87 HYD THERMAL will show ‘M’ for some parameters
(Continued)	9 HYD sys temps (Continued)	

COMM SSR-12 (Cont)
OI MDM LOST: OF3

ACTIONS	MEASUREMENT LOSS	NOTES
<ul style="list-style-type: none"> • Terminate all SUPPLY H2O Dump operations through dump nozzle • If Supply H2O Dump reqd, perform SUPPLY WATER DUMP USING FES (ORB OPS, ECLS) 	Supply H2O Noz T A,B (two)	⑩ For leak detection
<ul style="list-style-type: none"> • Terminate all WASTE H2O Dump operations through dump nozzle 	Waste H2O Noz T A,B (two)	⑪ Smoke Det H/W Alarm still available
(R11L) 10 • ✓ SPLY H2O TKC INLET, OUTLET (two) – OP (tb–OP)	Supply H2O Qty C	⑫ F9 meter still available
	11 Smoke Det B Conc n Av Bay 1 Bay 2	⑬ Zone 2 temps verify proper switch config
	11 Smoke Det Conc n Left Flt Deck	⑭ Both htrs activated since only one Vestibule temp available
	12 FC 1,2,3 Amps	⑮ Vestibule Temp 1 available
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: <ul style="list-style-type: none"> • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS) 	CO2 Cntrl 1 AC pwr indication CO2 Cntrl 1 BED ΔP CO2 Cntrl PPCO2 CO2 Cntrl 2 DC pwr indication CO2 Cntrl 2 BED A press CO2 Cntrl 2 malf indication	⑯ Both htrs activated since visibility into temps lost
(ML86B:C) <ul style="list-style-type: none"> • cb MNA,MNB EXT ARLK HTR VEST (two) – cl • cb MNA,MNB EXT ARLK HTR STRUC (two) – cl 	If no internal airlock: 13 External Airlock H2O Line Zone 2 MNA,B,C Htr ON status 14 External Airlock Vestibule MNA,B Htr ON status 15 Vestibule Temp 2 16 External Airlock Lower Bulkhead temp External Airlock H2O Line Zone 1 and 2 LCG 2 temp External Airlock H2O Line Zone 2 QD Pnl temp 17 Vestibule Isolation Vlv 2 op/cl positions	⑰ Vlv still operational. Alternate vlvs available

COMM SSR-13
OI MDM LOST: OF4

ACTIONS	MEASUREMENT LOSS	NOTES
When reqd: • Perform FUEL CELL PURGE – MANUAL (ORB OPS, EPS) (Cue Card) (Assume SM 2 not available when using Cue Card)	FC Auto Purge Start discretess	① No SM alerts for CCTV overtemp
• During CCTV Camr ops, monitor CCTV Camr temps on Monitor	1 CCTV Camr overtemp discrete	② May get Antenna alerts when manually operating (C3) S-BD PM ANT sw (loss of position discrete to SM)
• Perform CIRC PUMP XDCR FAILURE WORKAROUND, APU/HYD SSR-3, for 'M' Xdcrs on display SM 87 HYD THERMAL	HYD sys temps	③ Buses will be untied for entry. MCC will TMBU FC ΔAMPS 1 limits and notify crew. If loss of comm, reset limits to present value ± 40
If Topping Evap enabled: (L1) • TOP EVAP HTR DUCT – A/B	Fwd,Aft Topping Duct Htr measurements	④ Vlv still operational. Alternate vlvs available
If High Load Evap enabled: (L1) • HI LOAD DUCT HTR – A/B	Hi Load Outbd Duct Htr measurements	⑤ Loss of PSP command
	2 S-BD Quad Ant Sel 1/2 – GPC	
(A12) • APU HTR TK/FU LINE/H2O/SYS 1A,1B, 3A,3B (four) – AUTO	APU H2O sys temps (Htr mon)	
3 (R1) • MN BUS TIE A,B (two) – ON (tb-ON)	FC1 SS1 ΔV SS2 ΔV SS3 ΔV	
	4 If no internal airlock, Vestibule Vlv 2 op/cl position	
	5 PSP output port telemetry	

COMM SSR-14
OI MDM LOST: OA1

ACTIONS	MEASUREMENT LOSS	NOTES
<ul style="list-style-type: none"> • Perform Circ Pump Seq procedures for Circ Pump 1, CIRC PUMP PRESS XDCR FAILURE WORKAROUND, APU/HYD SSR-1 and SIMULTANEOUS CIRC PUMP ON/GPC OPS, APU/HYD SSR-2 	HYD sys pressures and seq discretetes	① GPC capability to monitor HYD Accumulator and Reservoir pressure lost for sys 1 ② Loss of fuel injector temperature is no-go for non-critical on-orbit burns. The engine will be used for deorbit
<ul style="list-style-type: none"> • Perform CIRC PUMP XDCR FAILURE WORKAROUND, APU/HYD SSR-3, for 'M' Xdcrs on display SM 87 HYD THERMAL 	1 HYD sys temps HYD sys 1 Accumulator and Reservoir pressure	
	APU 1 Fuel Qty (Meter and CRT)	
If High Load Evap Enabled: (L1) <ul style="list-style-type: none"> • HI LOAD DUCT HTR – A/B 	Hi Load Inbd Duct Htr measurement	
(A14) <ul style="list-style-type: none"> • RCS/OMS HTR OMS CRSFD LINES (two) – AUTO 	Partial insight into OMS CRSFD Line Htr ops	
2 L OMS no-go for on-orbit burns	L OMS Fu Inj T	

**COMM SSR-12
OI MDM LOST: OF3**

ACTIONS	MEASUREMENT LOSS	NOTES
<p>SM 66 ENVIRONMENT</p> <ul style="list-style-type: none"> • Monitor Cabin Press for cabin leaks 	Cabin dP/dT	<p>① Use Interchanger flow to monitor H2O Loop 2 performance if reqd</p>
<p>(L1)</p> <ul style="list-style-type: none"> • AV BAY 2 FAN (two) – ON 	Av Bay 2 Fan ΔP Av Bay 2 temp (MCC cannot assess)	<p>② Raises H2O Loop 1 Pump Out P Limit</p>
<ul style="list-style-type: none"> • H2O PUMP LOOP 1 – ON • H2O LOOP 1 BYP MODE – AUTO • H2O PUMP LOOP 2 – OFF • H2O LOOP 2 BYP MODE – MAN 	1 Most H2O Loop 2 measurements	<p>③ Lowers H2O Loop 2 Pump Out P Limit</p>
<p>(R13U)</p> <ul style="list-style-type: none"> • C/W PARAM SEL tw (three) – 105 • C/W LIMIT SET VALUE tw (three) – 1.50 • C/W LIMIT SET LIMIT – LOWER • C/W LIMIT SET FUNC – SET • C/W PARAM SEL tw (three) – 115 • C/W LIMIT SET VALUE tw (three) – 0.65 • C/W LIMIT SET LIMIT – LOWER • C/W LIMIT SET FUNC – SET • C/W PARAM SEL tw – > 119 		<p>④ Causes loss of FC Auto purge capability</p> <p>⑤ Avoids nuisance alarms</p> <p>⑥ SM 76 COMM display S–BD PM mode static, SM GPC will continue selecting ANT for the mode shown</p>
<p>When reqd:</p> <ul style="list-style-type: none"> • Perform FUEL CELL PURGE – MANUAL (ORB OPS, EPS) (Cue Card) (Assume SM 2 not available when using Cue Card) 	4 FC Purge Line temps FC3 pH Snsr	<p>⑦ Force TDRS antenna pointing</p>
<p>SM 60 SM TABLE MAINT</p> <p>5 Inhibit S–BD ANT QUAD Alert:</p> <ul style="list-style-type: none"> • Param ID – ITEM 1 +0 9 2 1 0 4 9 EXEC • INH – ITEM 10(15) EXEC 	Antenna Select feedbacks	<p>⑧ Recoverable by TMBU</p>
<p>(L1)</p> <p>If FLASH EVAP CNTLR PRI A enabled:</p> <ul style="list-style-type: none"> • Perform FES RESTART, ECLS SSR–5, using PRI B 	Most FES Feedline B Htr measurements	<p>⑨ Xdcrs on disp SM 87 HYD THERMAL will show ‘M’ for some parameters</p>
<p>SM ANTENNA</p> <p>6 If TDRS:</p> <ul style="list-style-type: none"> • GPC OVRD – ITEM 13 EXEC (*) 	S–BD mode	
<ul style="list-style-type: none"> • Perform ECLS COMPUTATION INHIBIT, ECLS SSR–14, TABLE D for faulty parameters: 925521 SYS 1 N2 TK1 T 925523 SYS 2 N2 TK1 T 925529 SYS 1 N2 PRESS 	8 N2 Qty (two) 1,2	
<p>(Continued)</p>	9 HYD sys temps (Continued)	

COMM SSR-12 (Cont)
OI MDM LOST: OF3

ACTIONS	MEASUREMENT LOSS	NOTES
<ul style="list-style-type: none"> • Terminate all SUPPLY H2O Dump operations through dump nozzle • If Supply H2O Dump reqd, perform SUPPLY WATER DUMP USING FES (ORB OPS, ECLS) 	Supply H2O Noz T A,B (two)	⑩ For leak detection ⑪ Smoke Det H/W Alarm still available ⑫ F9 meter still available
<ul style="list-style-type: none"> • Terminate all WASTE H2O Dump operations through dump nozzle 	Waste H2O Noz T A,B (two)	⑬ Zone 2 temps verify proper switch config
(R11L) 10 • ✓ SPLY H2O TKC INLET, OUTLET (two) – OP (tb–OP)	Supply H2O Qty C	⑭ Both htrs activated since only one Vestibule temp available ⑮ Vestibule Temp 1 available
	11 Smoke Det B Concn Av Bay 1 Bay 2	⑯ Both htrs activated since visibility into temps lost
	11 Smoke Det Concn Left Flt Deck	⑰ Vlv still operational. Alternate vlvs available
	12 FC 1,2,3 Amps	
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: <ul style="list-style-type: none"> • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS) 	CO2 Cntrl 1 AC pwr indication CO2 Cntrl 1 BED ΔP CO2 Cntrl PPCO2 CO2 Cntrl 2 DC pwr indication CO2 Cntrl 2 BED A press CO2 Cntrl 2 malf indication	
(ML86B:C) <ul style="list-style-type: none"> • cb MNA,MNB EXT ARLK HTR VEST (two) – cl • cb MNA,MNB EXT ARLK HTR STRUC (two) – cl 	If no internal airlock: 13 External Airlock H2O Line Zone 2 MNA,B,C Htr ON status 14 External Airlock Vestibule MNA,B Htr ON status 15 Vestibule Temp 2 16 External Airlock Lower Bulkhead temp External Airlock H2O Line Zone 1 and 2 LCG 2 temp External Airlock H2O Line Zone 2 QD Pnl temp 17 Vestibule Isolation Vlv 2 op/cl positions	

COMM SSR-13
OI MDM LOST: OF4

ACTIONS	MEASUREMENT LOSS	NOTES
When reqd: • Perform FUEL CELL PURGE – MANUAL (ORB OPS, EPS) (Cue Card) (Assume SM 2 not available when using Cue Card)	FC Auto Purge Start discretess	① No SM alerts for CCTV overtemp
• During CCTV Camr ops, monitor CCTV Camr temps on Monitor	1 CCTV Camr overtemp discrete	② May get Antenna alerts when manually operating (C3) S-BD PM ANT sw (loss of position discrete to SM)
• Perform CIRC PUMP XDCR FAILURE WORKAROUND, APU/HYD SSR-3, for 'M' Xdcrs on display SM 87 HYD THERMAL	HYD sys temps	③ Buses will be untied for entry. MCC will TMBU FC ΔAMPS 1 limits and notify crew. If loss of comm, reset limits to present value ± 40
If Topping Evap enabled: (L1) • TOP EVAP HTR DUCT – A/B	Fwd,Aft Topping Duct Htr measurements	④ Vlv still operational. Alternate vlvs available
If High Load Evap enabled: (L1) • HI LOAD DUCT HTR – A/B	Hi Load Outbd Duct Htr measurements	
	2 S-BD Quad Ant Sel 1/2 – GPC	
(A12) • APU HTR TK/FU LINE/H2O/SYS 1A,1B, 3A,3B (four) – AUTO	APU H2O sys temps (Htr mon)	
(R1) 3 • MN BUS TIE A,B (two) – ON (tb-ON)	FC1 SS1 ΔV SS2 ΔV SS3 ΔV	
	4 If no internal airlock, Vestibule Vlv 2 op/cl position	
	PSP output port telemetry	

COMM SSR-14
OI MDM LOST: OA1

ACTIONS	MEASUREMENT LOSS	NOTES
<ul style="list-style-type: none"> • Perform Circ Pump Seq procedures for Circ Pump 1, CIRC PUMP PRESS XDCR FAILURE WORKAROUND, APU/HYD SSR-1 and SIMULTANEOUS CIRC PUMP ON/GPC OPS, APU/HYD SSR-2 	HYD sys pressures and seq discretetes	① GPC capability to monitor HYD Accumulator and Reservoir pressure lost for sys 1 ② Loss of fuel injector temperature is no-go for non-critical on-orbit burns. The engine will be used for deorbit
<ul style="list-style-type: none"> • Perform CIRC PUMP XDCR FAILURE WORKAROUND, APU/HYD SSR-3, for 'M' Xdcrs on display SM 87 HYD THERMAL 	1 HYD sys temps HYD sys 1 Accumulator and Reservoir pressure	
If High Load Evap Enabled: (L1) <ul style="list-style-type: none"> • HI LOAD DUCT HTR – A/B 	Hi Load Inbd Duct Htr measurement	
(A14) <ul style="list-style-type: none"> • RCS/OMS HTR OMS CRSFD LINES (two) – AUTO 	Partial insight into OMS CRSFD Line Htr ops	
2 L OMS no-go for on-orbit burns	L OMS Fu Inj T	

**COMM SSR-15
OI MDM LOST: OA2**

ACTIONS	MEASUREMENT LOSS	NOTES
When reqd: • Perform FUEL CELL PURGE – MANUAL (ORB OPS, EPS) (Cue Card) (Assume SM 2 not available when using Cue Card)	1 FC Purge Line temps	① Causes loss of FC Auto purge capability
• Perform Circ Pump Seq procedures for Circ Pump 2, CIRC PUMP PRESS XDCR FAILURE WORKAROUND, APU/HYD SSR-1, and SIMULTANEOUS CIRC PUMP ON/GPC OPS, APU/HYD SSR-2	HYD sys pressures, and seq discretes	② GPC capability to monitor HYD Accumulator and Reservoir pressure lost for sys 2
• Perform CIRC PUMP XDCR FAILURE WORKAROUND, APU/HYD SSR-3, for 'M' Xdcrs on display SM 87 HYD THERMAL	2 HYD sys temps HYD sys 2 Accumulator and Reservoir pressure	③ Loss of fuel injector temperature is no-go for non-critical on-orbit burns. The engine will be used for deorbit
	APU 2 Fuel Qty (Meter and CRT)	④ Recoverable by TMBU
(A14) • RCS/OMS HTR OMS CRSFD LINES (two) – AUTO	Partial insight into OMS CRSFD Line Htr ops	
3 R OMS no-go for on-orbit burns	R OMS Fu Inj T	
• Perform ECLS COMPUTATION INHIBIT, ECLS SSR-14, TABLE D for faulty parameter: 925525 SYS 1 N2 TK3 T	4 N2 Qty 1 (OV102,105)	
	If no internal airlock, External Airlock H2O Transfer Line press	

COMM SSR-16
OI MDM LOST: OA3

ACTIONS	MEASUREMENT LOSS	NOTES
(A14) • RCS/OMS HTR OMS CRSFD LINES – A AUTO,B AUTO	OMS/RCS Htr monitoring temps	① GPC capability to monitor HYD Accumulator and Reservoir pressure lost for sys 3
• Perform Circ Pump Seq procedures for Circ Pump 3, CIRC PUMP PRESS XDCR FAILURE WORKAROUND, APU/HYD SSR-1 and SIMULTANEOUS CIRC PUMP ON/GPC OPS, APU/HYD SSR-2	HYD sys pressures and seq discretes	② Recoverable by TMBU
• Perform CIRC PUMP XDCR FAILURE WORKAROUND, APU/HYD SSR-3, for 'M' Xdcrs on display SM 87 HYD THERMAL	1 HYD sys temps HYD sys 3 Accumulator and Reservoir pressure	
	APU 3 Fuel Qty (Meter and CRT)	
• Go to ECLS COMPUTATION INHIBIT, ECLS SSR-14, TABLE D for faulty parameter: 925526 SYS 1 N2 TK4 T	2 N2 Qty 1 (OV102,105)	

COMM SSR-17
OI DSC LOST: OF1

ACTIONS	MEASUREMENT LOSS	NOTES
If on PCS Sys 1: • Perform RECONFIG TO ALT PCS SYS, <u>ECLS</u> SSR-3	Most PCS 1 measurements	① Turn on both Cabin Fans for sleep
1 (L1) • Monitor Cabin Fan by feel • During sleep periods: CAB FAN A,B (two) – ON	Cab Fan ΔP	② C/W channels 14,34,54,104,114 also lost but high limit-sensed only
2 (R13U) • C/W PARAM SEL tw (three) – 034 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 074 • C/W PARAM – INH • C/W PARAM SEL tw (three) – > 119	PPO2 A Cab Fan ΔP	③ WST TK will be dumped by time (≈2%/min) to provide ullage to make EOM. MCC will provide the time
	(A1R) PL Rcdr Mode tb logic lost	④ This action activates redundant htrs on Supply H2O Dump Line, Waste H2O Dump Line, and Vacuum Vent Line
(R14:C) • cb MNB KU ANT HTR – op	Ku Gyro temp monitoring	⑤ Smoke Det H/W Alarm still available
3 • √MCC about performing WASTE H2O DUMP	Waste Qty 1	⑥ Both htrs activated since visibility into temps lost
4 (ML86B:A) • cb MNA,MNB H2O LINE HTR A,HTR B (two) – cl	Waste H2O Dump Line T	⑦ Alternate temps available in each zone
	Sply H2O Qty A	
	5 Smoke Det A Concn Av Bay 2 5 A Concn Av Bay 3 5 Concn Cabin	
(ML86B:C) • cb MNA,MNB EXT ARLK HTR STRUC (two) – cl	6 If no internal airlock: External Airlock Fwd and Aft Truss Flange temps 7 External Airlock H2O Line Zone 1 Htr A temp External Airlock H2O Line Zone 2 Htr B temp	

COMM SSR-18
OI DSC LOST: OF2

ACTIONS	MEASUREMENT LOSS	NOTES
<p>GNC 23 RCS</p> <p>RCS FWD</p> <ul style="list-style-type: none"> • ITEM 1 EXEC <p>Reprioritize jets:</p> <p>DES INH on F3,4 jets:</p> <ul style="list-style-type: none"> • F3L ITEM 10 EXEC (*) • F4R ITEM 14 EXEC (*) • F3U ITEM 18 EXEC (*) • F3D ITEM 24 EXEC (*) • F4D ITEM 28 EXEC (*) • F3F ITEM 32 EXEC (*) <ul style="list-style-type: none"> • Reselect auto deselected jets (2) <p>Increase PRI Jet Fail Limit:</p> <ul style="list-style-type: none"> • ITEM 4+4 EXEC <p>Override Manf vlv status to CL for F3,4 Manifolds:</p> <p>OVRD MANF VLVS</p> <ul style="list-style-type: none"> • F3 ITEM 42 EXEC (CL) • F4 ITEM 43 EXEC (CL) 	<p>Jet Pc, Pc discrete, Injector temps (Jet fail-off, leak RM detection)</p>	<p>① Auto overpressure protection lost for Fwd RCS Oxidizer Dual Reg failure</p> <p>② (O3) FWD RCS OXID He TK PRESS and FWD RCS FUEL PRPLT TK P and FWD RCS FUEL PRPLT TK P ind on meter is lost. FWD RCS OXID and FUEL PRPLT QTY ind on meter is invalid</p> <p>③ C/W param 24,64,84 also lost, but high limit-sensed only</p>
<p>(O8)</p> <ul style="list-style-type: none"> • FWD RCS MANF ISOL 5 – CL (tb-CL), then GPC 	<p>Jet Injector temps (Jet leak RM detection)</p>	
<ul style="list-style-type: none"> • Perform LOSS OF VERNIER (ORB OPS, RCS) 		
<p>GNC SYS SUMM 2</p> <p>2 • Monitor FWD RCS He ΔP for leaks. If FWD RCS leak suspected, secure sys and call MCC</p> <ul style="list-style-type: none"> • ✓ MCC for sleep config 	<p>1 Fwd RCS Tk, Manf Press, Qty (Fwd leak detection)</p>	
<p>If on PCS SYS 2:</p> <ul style="list-style-type: none"> • Perform RECONFIG TO ALT PCS SYS, <u>ECLS</u> SSR-3 	<p>Most PCS 2 measurements</p>	
<p>2 (R13U)</p> <p>C/W PARAM SEL tw (three) – 004</p> <ul style="list-style-type: none"> • C/W PARAM – INH <p>C/W PARAM SEL tw (three) – 016</p> <ul style="list-style-type: none"> • C/W PARAM – INH <p>C/W PARAM SEL tw (three) – 044</p> <ul style="list-style-type: none"> • C/W PARAM – INH <p>C/W PARAM SEL tw (three) – 105</p> <ul style="list-style-type: none"> • C/W PARAM – INH <p>C/W PARAM SEL tw (three) – 106</p> <ul style="list-style-type: none"> • C/W PARAM – INH <p>C/W PARAM SEL tw (three) – > 119</p>	<p>3 Cab Press</p> <p>FRCS Fu Tk ULL P</p> <p>PPO2 B</p> <p>H2O Pump P1</p> <p>Freon Flow 1</p>	
	<p>(A1R) Ops Rcdrs 1(2) Mode tb (two) logic</p>	
<p>(Continued)</p>	<p>(Continued)</p>	

COMM SSR-18 (Cont)

OI DSC LOST: OF2

ACTIONS		MEASUREMENT LOSS	NOTES
4	(R11L) • ✓ SPLY H2O TKC INLET, OUTLET (two) – OP (tb-OP)	Sply H2O Qty B,D	④ Crossover vlv needs to be checked and TKC unisolated to equalize tks to provide leak protection ⑤ This action activates redundant htrs on Supply H2O Dump Line, Waste H2O Dump Line, Vacuum Vent Line ⑥ Smoke Det H/W Alarm still available
	<div style="border: 1px solid black; padding: 2px;">SM 66 ENVIRONMENT</div> <ul style="list-style-type: none"> • Monitor AIRLK P and dP/dT for cabin integrity on-orbit 	Cabin Press Snsr	
5	(ML86B:A) • cb MNA, MNB H2O LINE HTR A, HTR B (two) – cl	Sply H2O Dump Line T	
		6 Smoke Det A Concn Av Bay 1 6 Smoke Det B Concn Av Bay 3 6 Smoke Det Concn Right Flt Deck	
		If no internal airlock, External Airlock LCG EV 2 Supply Line press	

COMM SSR-19

OI DSC LOST: OF3

ACTIONS		MEASUREMENT LOSS	NOTES
	<div style="border: 1px solid black; padding: 2px;">SM 66 ENVIRONMENT</div> <ul style="list-style-type: none"> • Monitor CABIN PRESS for cabin leaks on-orbit 	Cabin dP/dT	① C/W params 51,71,94 are also lost, but high limit-sensed only ② Smoke Det H/W Alarm still available ③ Fwd RCS PASS Fu qty degraded, BFS Fu qty lost ④ Both htrs activated since visibility into temps lost ⑤ Crossover vlv needs to be checked and TKC unisolated to equalize tks to provide leak protection
	(R13U) • C/W PARAM SEL tw (three) – 115 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 116 • C/W PARAM – INH • C/W PARAM SEL tw (three) – > 119	1 H2O Pump P2 Freon Flow 2	
		2 Smoke Det B Concn Av Bay 1 2 Bay 2 2 Smoke Det Concn Left Flt Deck	
		3 Fwd RCS Fu Tk T	
	(ML86B:C) • cb MNA, MNB EXT ARLK HTR STRUC (two) – cl	4 If no internal airlock: External Airlock Lower Bulkhead temp External Airlock H2O Line Zone 1,2 LCG 2 temp External Airlock H2O Line Zone 2 QD Pnl temp	
5	(R11L) • ✓ SPLY H2O TKC INLET, OUTLET (two) – OP (tb-OP)	Sply H2O Qty C	

COMM SSR-20
OI DSC LOST: OF4

ACTIONS	MEASUREMENT LOSS	NOTES
<p>GNC 23 RCS</p> <p>RCS FWD</p> <ul style="list-style-type: none"> • ITEM 1 EXEC <p>Reprioritize jets:</p> <p>DES INH on F1,2 JETS</p> <ul style="list-style-type: none"> • F1L ITEM 8 EXEC (*) • F2R ITEM 12 EXEC (*) • F1U ITEM 16 EXEC (*) • F2U ITEM 20 EXEC (*) • F1D ITEM 22 EXEC (*) • F2D ITEM 26 EXEC (*) • F1F ITEM 30 EXEC (*) • F2F ITEM 34 EXEC (*) • Reselect auto deselected jets (2) <p>Increase PRI Jet Fail Limit:</p> <ul style="list-style-type: none"> • ITEM 4+4 EXEC <p>Override Manf vlv status to CL for F1,2 Manifolds:</p> <p>OVRD MANF VLVS</p> <ul style="list-style-type: none"> • F1 ITEM 40 EXEC (CL) • F2 ITEM 41 EXEC (CL) 	<p>Jet Pc, Pc discrete, Injector temps (Jet fail-off, leak RM detection)</p>	<p>① Without F1F, F2F no low Z translation capability; -X only one jet (usually 2)</p> <p>② Auto overpressure protection lost for Fwd RCS Fuel Dual Reg failure</p> <p>③ (O3) FWD RCS Fuel He TK P and FWD RCS OXID PRPLT TK P ind on meter is lost</p>
<p>GNC SYS SUMM 2</p> <ul style="list-style-type: none"> • ✓ MCC for sleep config 	<p>2 Fwd RCS TK and Manf Press and Qty</p>	
<p>(R13U)</p> <ul style="list-style-type: none"> • C/W PARAM SEL tw (three) - 006 • C/W PARAM - INH • C/W PARAM SEL tw (three) - > 119 	<p>Fwd RCS OX Tk ULL P</p>	
	<p>If no internal airlock, External Airlock LCG EV 1 Supply Line press</p>	

COMM SSR-21
OI DSC LOST: OL1

ACTIONS	MEASUREMENT LOSS	NOTES
<p>GNC 23 RCS</p> <p>RCS L</p> <ul style="list-style-type: none"> • ITEM 2 EXEC <p>Reprioritize jets:</p> <p>DES INH on L1,2 JETS</p> <ul style="list-style-type: none"> • L2L ITEM 10 EXEC (*) • L1L ITEM 14 EXEC (*) • L2U ITEM 18 EXEC (*) • L1U ITEM 20 EXEC (*) • L2D ITEM 26 EXEC (*) • L1A ITEM 32 EXEC (*) <p>• Reselect auto deselected jets (2)</p> <p>Increase PRI Jet Fail Limit:</p> <ul style="list-style-type: none"> • ITEM 4+3 EXEC <p>Override Manf vlv status to CL for L1,2 Manifolds:</p> <p>OVRD MANF VLVS</p> <ul style="list-style-type: none"> • L1 ITEM 40 EXEC (CL) • L2 ITEM 41 EXEC (CL) 	<p>Jet Pc, Pc discrete, Injector temps (Jet fail-off, leak RM detection)</p>	<p>① Prior to deorbit, override L1 Manf vlv status to op</p> <p>② Auto overpressure protection lost for L RCS Oxidizer Dual Reg failure</p> <p>③ (O3) L RCS OXID He TK P, L RCS OXID PRPLT TK P, L OMS He P, and L OMS FU TK P ind on meter is lost. L RCS OXID PRPLT QTY ind on meter is invalid</p> <p>④ Loss of fuel injector temp is no-go for noncritical on-orbit burns. Engine will be used for deorbit</p>
<p>(O7)</p> <ul style="list-style-type: none"> • AFT L RCS MANF ISOL 5 - CL (tb-CL), then GPC <ul style="list-style-type: none"> • Perform LOSS OF VERNIER RCS (ORB OPS, RCS) 	<p>Jet Injector temps (Jet leak RM detection)</p>	
<p>GNC SYS SUMM 2</p> <ul style="list-style-type: none"> • Monitor L RCS He ΔP for leaks. If L RCS leak suspected, secure sys and call MCC • ✓ MCC for sleep config 	<p>2 Left RCS Tank and Manf Press and Qty (leak detection lost)</p>	
<p>(R13U)</p> <ul style="list-style-type: none"> • C/W PARAM SEL tw (three) - 017 • C/W PARAM - INH • C/W PARAM SEL tw (three) - 036 • C/W PARAM - INH • C/W PARAM SEL tw (three) - 056 • C/W PARAM - INH • C/W PARAM SEL tw (three) - > 119 	<p>L OMS Fu Tk ULL pressure</p> <p>L RCS OX Tk ULL pressure</p> <p>L RCS leak</p>	
<p>4 L OMS no-go for on-orbit burns</p>	<p>L OMS Fu Inj T</p>	

COMM SSR-22
OI DSC LOST: OL2

ACTIONS	MEASUREMENT LOSS	NOTES
<p>GNC 23 RCS</p> <p>RCS L</p> <ul style="list-style-type: none"> • ITEM 2 EXEC <p>Reprioritize jets</p> <p>DES INH on L3,4 jets:</p> <ul style="list-style-type: none"> • L4L ITEM 8 EXEC (*) • L3L ITEM 12 EXEC (*) • L4U ITEM 16 EXEC (*) • L4D ITEM 24 EXEC (*) • L3D ITEM 28 EXEC (*) • L3A ITEM 30 EXEC (*) <p>• Reselect auto deselected jets (2)</p> <p>Increase PRI Jet Fail Limit:</p> <ul style="list-style-type: none"> • ITEM 4+3 EXEC <p>Override Manf vlv status to CL for L3,4 Manifolds:</p> <p>OVRD MANF VLVS</p> <p>1</p> <ul style="list-style-type: none"> • L3 ITEM 42 EXEC (CL) • L4 ITEM 43 EXEC (CL) 	<p>Jet PC, PC discrete, Injector temps (Jet fail-off, leak RM detection)</p>	<p>① Prior to deorbit, override L3 Manf vlv status to OP</p> <p>② Auto overpressure protection lost for L RCS Fuel Dual Reg failure</p> <p>③ (O3) L RCS FUEL He TK P, L OMS OXID TK P, and (F7) L OMS N2 TK P, L OMS Pc ind on meter is lost. (O3) L RCS FUEL PRPLT QTY ind on meter is invalid</p>
<p>GNC SYS SUMM 2</p> <p>3</p> <ul style="list-style-type: none"> • Monitor L RCS He ΔP for leaks. If L RCS leak suspected, secure sys and call MCC • ✓ MCC for sleep config 	<p>2 Left RCS TK and Manf Press and Qty (leak detection lost)</p>	
<ul style="list-style-type: none"> • P/I OMS Burn Monitor Cue Card to (1) Monitor GMBL Angles and BALL Vlvs for left OMS performance (2) • Perform OMS Pc LOW for L OMS ↓ 	<p>L OMS PC</p>	
<p>(R13U)</p> <p>3</p> <ul style="list-style-type: none"> • C/W PARAM SEL tw (three) – 007 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 046 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 056 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 027 • C/W PARAM – INH • C/W PARAM SEL tw (three) – > 119 	<p>L OMS OX Tk ULL pressures</p> <p>L RCS Fu Tk ULL pressures</p> <p>L RCS leak</p> <p>L OMS PC</p>	

COMM SSR-23
OI DSC LOST: OR1

ACTIONS	MEASUREMENT LOSS	NOTES
<p>GNC 23 RCS</p> <p>RCS R</p> <ul style="list-style-type: none"> • ITEM 3 EXEC <p>Reprioritize jets:</p> <p>DES INH on R1,2 jets</p> <ul style="list-style-type: none"> • R2R ITEM 10 EXEC (*) • R1R ITEM 14 EXEC (*) • R2U ITEM 18 EXEC (*) • R1U ITEM 20 EXEC (*) • R2D ITEM 26 EXEC (*) • R1A ITEM 30 EXEC (*) <ul style="list-style-type: none"> • Reselect auto deselected jets (2) <p>Increase PRI Jet Fail Limit:</p> <ul style="list-style-type: none"> • ITEM 4+3 EXEC <p>Override Manf vlv status to CL for R1,2 Manifolds:</p> <p>OVRD MANF VLVS</p> <ul style="list-style-type: none"> • R1 ITEM 40 EXEC (CL) • R2 ITEM 41 EXEC (CL) 	<p>Jet PC, PC discrete, Injector temps (Jet fail-off, leak RM detection)</p>	<p>① Prior to deorbit, override R1 Manf vlv status to OP</p> <p>② Loss of fuel injector temp is no-go for noncritical on-orbit burns. Engine will be used for deorbit</p> <p>③ Auto overpressure protection lost for R RCS Oxidizer Dual Reg failure</p> <p>④ (O3) R RCS OXID He TK P, R RCS OXID PRPLT TK P, R OMS FUEL TK P and (F7) R OMS He P ind on meter is lost. (O3) R RCS OXID PRPLT QTY ind on meter is invalid</p>
<p>(O7)</p> <ul style="list-style-type: none"> • AFT R RCS MANF ISOL 5 - CL (tb-CL), then GPC <ul style="list-style-type: none"> • Perform LOSS OF VERNIER (ORB OPS, RCS) 	<p>Jet Injection temps (Jet leak RM detection)</p>	
<p>GNC SYS SUMM 2</p> <p>4</p> <ul style="list-style-type: none"> • Monitor R RCS He ΔP for leaks. If R RCS leak suspected, secure sys and call MCC • ✓ MCC for sleep config 	<p>3 Right RCS Tk and Manf Press and Qty (leak detection lost)</p>	
<p>(R13U)</p> <p>4</p> <ul style="list-style-type: none"> • C/W PARAM SEL tw (three) - 066 • C/W PARAM - INH • C/W PARAM SEL tw (three) - 047 • C/W PARAM - INH • C/W PARAM SEL tw (three) - 086 • C/W PARAM - INH • C/W PARAM SEL tw (three) - > 119 	<p>R RCS OX ULL pressure</p> <p>R OMS Fu Tk ULL pressure</p> <p>R RCS leak</p>	
<p>2 R OMS no-go for on-orbit burns</p>	<p>R OMS Fu Inj T</p>	

COMM SSR-24
OI DSC LOST: OR2

ACTIONS	MEASUREMENT LOSS	NOTES
<p style="border: 1px solid black; padding: 2px; display: inline-block;">GNC 23 RCS</p> <p>RCS R ● ITEM 3 EXEC Reprioritize jets: DES INH on R3,R4 JETS ● R4R ITEM 8 EXEC (*) ● R3R ITEM 12 EXEC (*) ● R4U ITEM 16 EXEC (*) ● R4D ITEM 24 EXEC (*) ● R3D ITEM 28 EXEC (*) ● R3A ITEM 32 EXEC (*) ● Reselect auto deselected jets (2) Increase PRI Jet Fail Limit: ● ITEM 4+3 EXEC Override Manf vlv status to CL for R3,4 Manifolds OVRD MANF VLVS 1 ● R3 ITEM 42 EXEC (CL) ● R4 ITEM 43 EXEC (CL)</p>	<p>Jet Pc, Pc discrete, Injector temps (Jet fail-off, leak RM detection)</p>	<p>① Prior to deorbit, override R3 Manf vlv status to OP</p> <p>② Auto overpressure protection lost for R RCS Fuel Dual Reg failure</p> <p>③ (O3) R RCS FUEL He TK P, R RCS FUEL PRPLT TK P, R OMS OXID TK P and (F7) R OMS N2 TK P, R OMS PC ind on meter is lost. (O3) R RCS FUEL PRPLT QTY ind on meter is invalid</p>
<p style="border: 1px solid black; padding: 2px; display: inline-block;">GNC SYS SUMM 2</p> <p>3 ● Monitor R RCS He ΔP for leaks. If R RCS leak suspected, secure sys and call MCC ● ✓ MCC for sleep config</p> <p>● P/I OMS Burn Monitor Cue Card to (1) Monitor GMBL Angles and BALL Vlvs for right OMS performance (2) ● Perform OMS Pc LOW for R OMS '↓'</p>	<p>2 Right RCS Tank and Manf Press and Qty (leak detection lost)</p> <p>R OMS PC</p>	
<p>(R13U) 3 ● C/W PARAM SEL tw (three) – 037 ● C/W PARAM – INH ● C/W PARAM SEL tw (three) – 076 ● C/W PARAM – INH ● C/W PARAM SEL tw (three) – 086 ● C/W PARAM – INH ● C/W PARAM SEL tw (three) – 057 ● C/W PARAM – INH ● C/W PARAM SEL tw (three) – > 119</p>	<p>R OMS OX Tk ULL pressure</p> <p>R RCS Fu ULL pressure</p> <p>R RCS leak</p> <p>R OMS PC</p>	

**COMM SSR-25
OI DSC LOST: OM1**

ACTIONS	MEASUREMENT LOSS	NOTES
(A14) • RCS/OMS HTR OMS CRSFD LINES (two) – A AUTO, B AUTO	OMS/RCS Htr monitoring temps	① Causes loss of FC Auto purge capability
When reqd: • Perform FUEL CELL PURGE – MANUAL (ORB OPS, EPS) (Cue Card) (Assume SM 2 not available when using Cue Card)	1 FC Purge O2 Vent Line temp FC Purge H2 Vent Line temp 2	② C/W params 1,21,41 are lost also, but high limit-sensed only
2 (R13U) • C/W PARAM SEL tw (three) – 062 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 023 • C/W PARAM – INH • C/W PARAM SEL tw (three) – > 119	FC1 Stack temp MNC Volts	③ Recoverable by TMBU
• Perform CIRC PUMP XDGR FAILURE WORKAROUND, APU/HYD SSR-3 for 'L' Xdcrs on display SM 87 HYD THERMAL	HYD sys temps	
If FLASH EVAP CNTLR PRI B enabled: • Perform FES RESTART, ECLS SSR-5, using PRI A	Most FES Feedline A Htr measurements	
• Perform ECLS COMPUTATION INHIBIT, ECLS SSR-14, TABLE D for faulty parameters: 925522 SYS 1 N2 TK2 T 925524 SYS 2 N2 TK2 T 925529 SYS 1 N2 PRESS	3 N2 Qty (two) 1,2	

COMM SSR-26
OI DSC LOST: OM2

ACTIONS	MEASUREMENT LOSS	NOTES
(A14) • RCS/OMS HTR OMS CRSFD LINES – A AUTO, B AUTO	OMS/RCS Htr monitoring temps	① C/W params 11,31,61,72,82 are lost also, but high limit-sensed only
1 (R13U) • C/W PARAM SEL tw (three) – 072 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 082 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 003 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 013 • C/W PARAM – INH • C/W PARAM SEL tw (three) – >119	FC 2,3 Stack Temp MNA,MNB Volts	② GPC capability to monitor HYD Accumulator pressure lost for 2,3 systems. HYD Reservoir pressure monitoring remains ③ Recoverable by TMBU ④ Vestibule Temp 2 available ⑤ Vestibule Temp 1 available
• Perform CIRC PUMP XDCR FAILURE WORKAROUND, APU/HYD SSR-3 for 'L' Xdcrs, on display SM 87 HYD THERMAL	HYD sys temps	
	2 HYD sys 2,3 Accumulator pressures	
If FLASH EVAP CNTLR PRI A enabled: • Perform FES RESTART, ECLS SSR-5, using PRI B	Most FES Feedline B Htr measurements	
If Topping Evap enabled: (L1) • TOP EVAP HTR DUCT – A/B	Fwd,Aft Topping Duct Htr measurements	
If High Load Evap enabled: (L1) • HI LOAD DUCT HTR – A/B	HI Load Outbd Duct Htr measurements	
• Perform ECLS COMPUTATION INHIBIT, ECLS SSR-14, TABLE D for faulty parameters: 925521 SYS 1 N2 TK1 T 925523 SYS 2 N2 TK1 T 925525 SYS 1 N2 TK3 T 925530 SYS 2 N2 PRESS	3 N2 Qty (two) 1,2	
(A12) • APU HTR TK/FU LINE/H2O/SYS 1A,1B, 3A,3B (four) – AUTO	APU H2O sys temps (Htr mon)	
	If no internal airlock: External Airlock H2O Transfer Line press 4 Vestibule Temp 1 5 Vestibule Temp 2	

COMM SSR-27
OI DSC LOST: OA1

ACTIONS	MEASUREMENT LOSS	NOTES
(A14) • RCS/OMS HTR OMS CRSFD LINES (two) – A AUTO, B AUTO	OMS/RCS Htr monitoring temps	① CW params 11,31,61, 72,82 are lost also, but high limit-sensed only
• Perform CIRC PUMP XDCR FAILURE WORKAROUND, APU/HYD SSR-3 for 'L' Xdcrs, on display SM 87 HYD THERMAL	HYD sys temps	
• Perform CIRC PUMP PRESS XDCR FAILURE WORKAROUND, APU/HYD SSR-1 for Circ Pump 1	HYD Circ Pump 1 press	
	APU 1 Fuel Qty (Meter and CRT)	
(R13U) 1 • C/W PARAM SEL tw (three) – 009 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 039 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 099 • C/W PARAM – INH • C/W PARAM SEL tw (three) – > 119	MPS He Tk P C MPS He REG P C HYD B/U P 1	
If High Load Evap enabled: (L1) • HI LOAD DUCT HTR – A/B	Hi Load Inbd Duct Htr measurement	

COMM SSR-28
OI DSC LOST: OA2

ACTIONS	MEASUREMENT LOSS	NOTES
(A14) • RCS/OMS HTR OMS CRSFD LINES – A AUTO, B AUTO	OMS/RCS Htr monitoring temps	① Causes loss of FC Auto Purge capability
When reqd: • Perform FUEL CELL PURGE – MANUAL (ORB OPS, EPS) (Cue Card) (Assume SM 2 not available when using Cue Card)	1 FC Purge H2 Vent Line temp 1	② C/W params 18,48,69 are lost also, but high limit-sensed only
• Perform CIRC PUMP XDCC FAILURE WORKAROUND, <u>APU/HYD SSR-3</u> , for 'L' Xdcrs on display SM 87 HYD THERMAL	HYD sys temps	
• Perform CIRC PUMP PRESS XDCC FAILURE WORKAROUND, <u>APU/HYD SSR-1</u> , for Circ Pump 2	HYD Circ Pump 2 press	
• Perform APU FUEL TANK P XDCC FAILURE WORKAROUND, <u>APU/HYD</u> <u>SSR-4</u> for APU 2 • Perform APU FUEL TANK T XDCC FAILURE WORKAROUND, <u>APU/HYD</u> <u>SSR-6</u> for APU 2	APU 2 FUEL TK P APU 2 FUEL TK SURF T	
2 (R13U) • C/W PARAM SEL tw (three) – 107 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 019 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 049 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 109 • C/W PARAM – INH • C/W PARAM SEL tw (three) – > 119	EVAP OUT T 1 MPS He Tk P L MPS He REG P L HYD B/U P 2	
(O7) • AFT R RCS MANF ISOL 5 – CL (tb-CL), then GPC	Jet Injector temps (Jet leak RM detection)	
• Go to LOSS OF VERNIER (ORB OPS, RCS)		

COMM SSR-29
OI DSC LOST: OA3

ACTIONS	MEASUREMENT LOSS	NOTES
(A14) • RCS/OMS HTR OMS CRSFD LINES – A AUTO, B AUTO	OMS/RCS Htr monitoring temps	① C/W params 28,58,59,117 lost also, but high limit–sensed only
• Perform CIRC PUMP PRESS XDCR FAILURE WORKAROUND, APU/HYD SSR–1, for Circ Pump 3	HYD Circ Pump 3 press	② Recoverable by TMBU
1 (R13U) • C/W PARAM SEL tw (three) – 029 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 059 • C/W PARAM – INH • C/W PARAM SEL tw (three) – 117 • C/W PARAM – INH • C/W PARAM SEL tw (three) – > 119	MPS He Tk P R MPS He REG P R EVAP OUT T 2	
• Perform CIRC PUMP XDCR FAILURE WORKAROUND, APU/HYD SSR–3, for 'L' Xdcrs on display SM 87 HYD THERMAL	HYD sys temps	
• Perform APU FUEL TANK P XDUCER FAILURE WORKAROUND, APU/HYD SSR–4 for APU 3 • Perform APU FUEL TANK T XDUCER FAILURE WORKAROUND, APU/HYD SSR–6 for APU 3	APU 3 FUEL TK P APU 3 FUEL TK SURF T	
• Go to ECLS COMPUTATION INHIBIT, ECLS SSR–14, TABLE D for faulty parameter: 925526 SYS 1 N2 TK4 T	2 N2 Qty 1 (OV102,105)	

COMM SSR-30
OI DSC LOST: OM3

ACTIONS	MEASUREMENT LOSS	NOTES
	1 HYD sys 1 Accumulator pressure	① GPC capability to monitor HYD Accumulator pressure lost for system 1. HYD Reservoir pressure monitoring remains

COMM SSR-31
OI DSC LOST: OP1

ACTIONS	MEASUREMENT LOSS	NOTES
<p>1 NONE</p>	<p>MNA PPCA1 Volts, Tks 6,8 Tk Press, Qty, EDO Pallet temp measurements</p>	<p>① Loss of instrumentation only</p>

COMM SSR-32
OI DSC LOST: OP2

ACTIONS	MEASUREMENT LOSS	NOTES
<p>1 NONE</p>	<p>MNB PPCA2 Volts, Tks 7,9 Tk Press, Qty, EDO Pallet temp measurements</p>	<p>① Loss of instrumentation only</p>

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C/W

<u>4.1</u>	<u>PRIMARY C/W</u>	
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4.1c	NONRESETTABLE MA LT OR TONE	4-8
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4.2a	NONRESETTABLE BACKUP C/W ALARM LT	4-22
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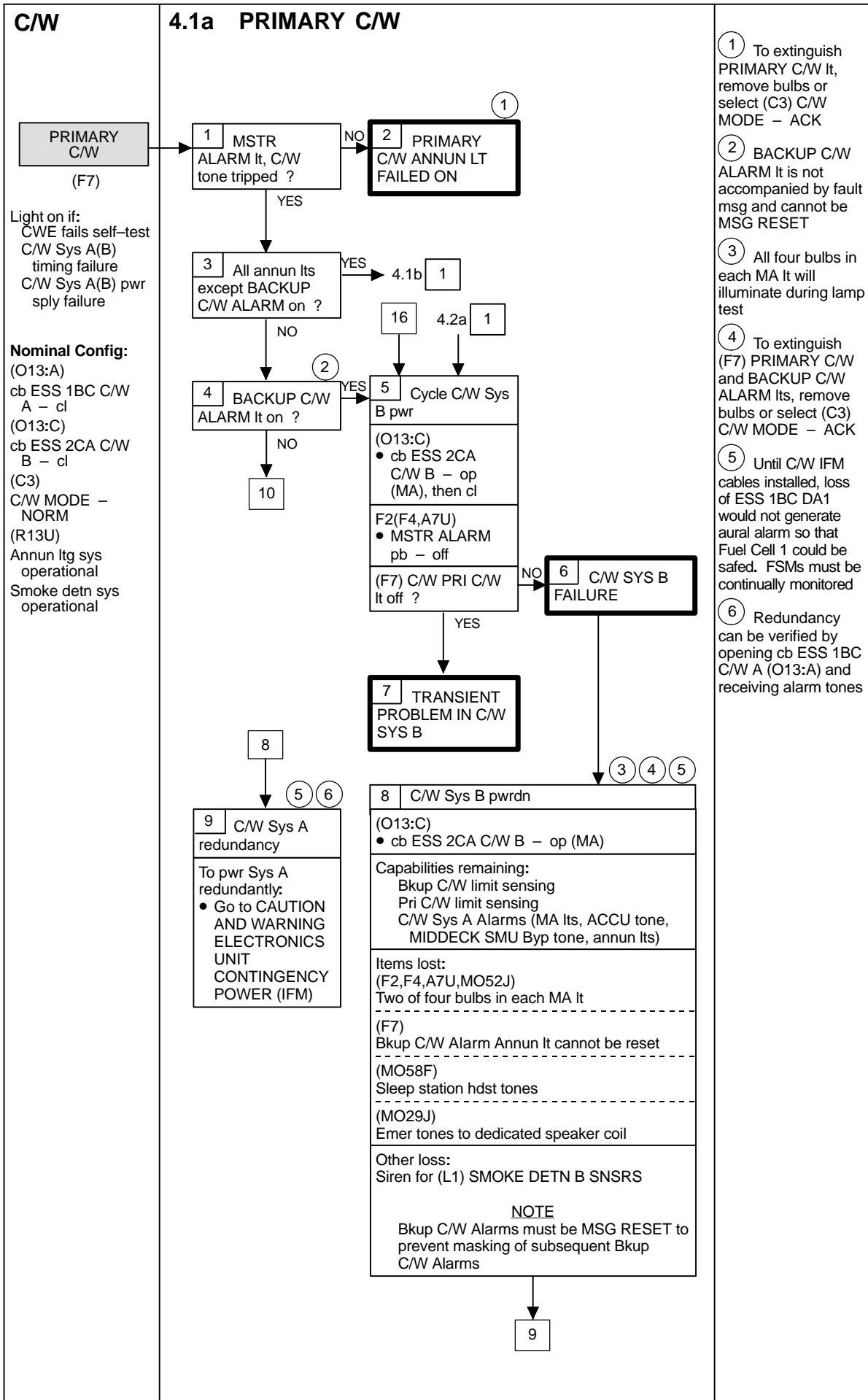
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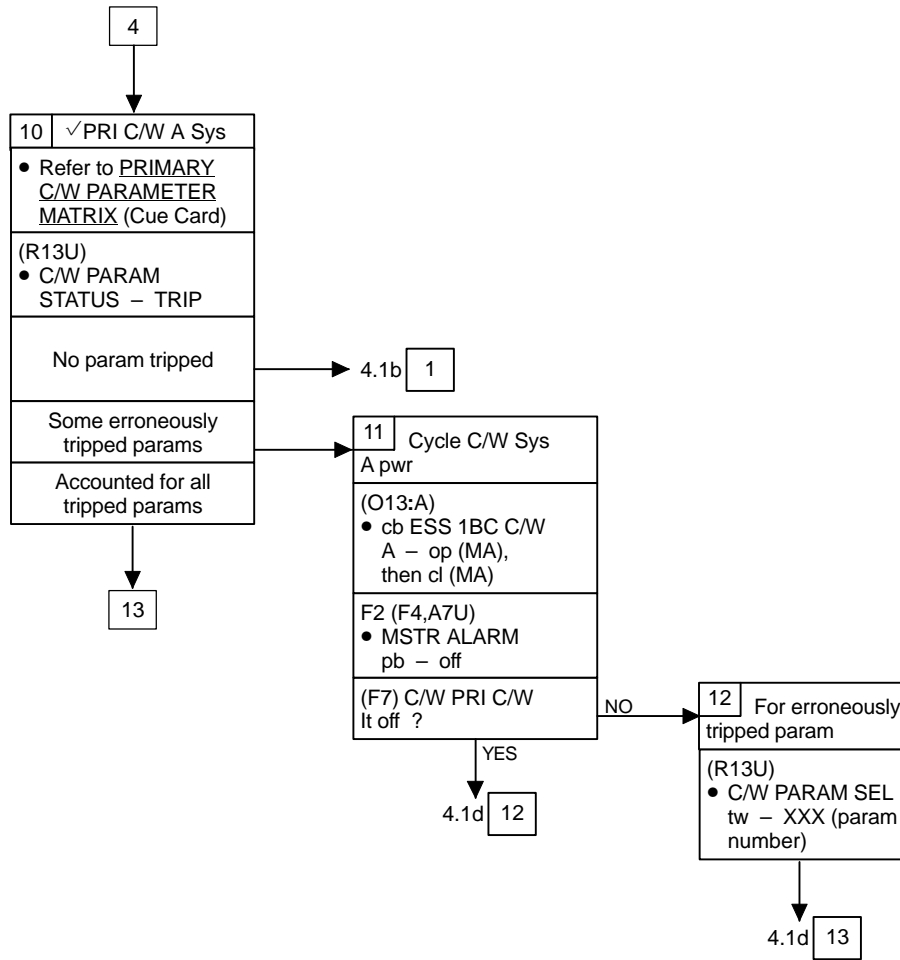
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**PRIMARY
C/W**

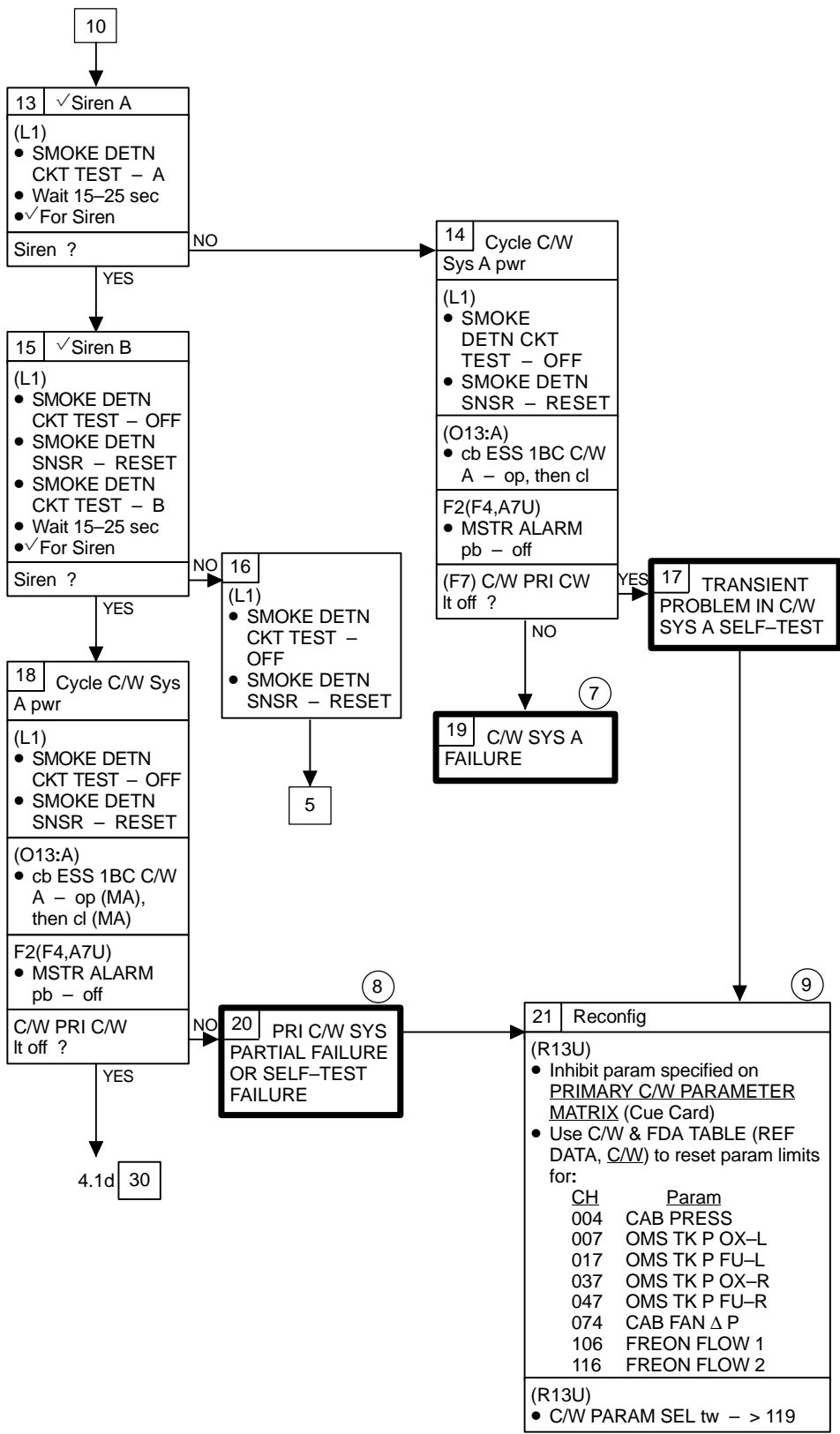
4.1



C/W 4.1a (Cont)



C/W 4.1a (Cont)



⑦ For any nuisance alarms that cannot be inhibited, use 4.1b 5 to pwrn PRI C/W or use 4.1c 28 to disable tone

⑧ Notify MCC of tripped params. Param combinations will give clue to failure

⑨ All primary C/W params were enabled and their limits reset to default (PROM) value when cb ESS 1BC C/W A closed

C/W

4.1b ALL ANNUN LTS ON EXCEPT BACKUP C/W ALARM

All Annun Lts On Except Backup C/W Alarm (F7)

Caused by:
C/W Sys A pwr supply failure

Nominal Config:
(O13:A)
cb ESS 1BC C/W A - cl
(O13:C)
cb ESS 2CA C/W B - cl
(C3)
C/W MODE - NORM
(R13U)
Annun lgt sys operational
Smoke detn sys operational

4.1a 3
4.1a 10

1 Cycle C/W Sys A pwr

Expect MSTR ALARM: (O13:A)

- cb ESS 1BC C/W A - op, then cl

F2(F4,A7U)

- MSTR ALARM pb - off

(F7)
C/W PRI C/W It off ?

2 TRANSIENT INDUCED PWR SPLY OR TIMING FAILURE

4.2b 7

3 C/W SYS A PWR SPLY OR TIMING FAILURE

4 Reconfig

(R13U)

- Inhibit param specified on PRIMARY C/W PARAMETER MATRIX (Cue Card)
- Use C/W & FDA TABLE (REF DATA, C/W) to reset param limits for:

CH	Param
004	CAB PRESS
007	OMS TK P OX-L
017	OMS TK P FU-L
037	OMS TK P OX-R
047	OMS TK P FU-R
074	CAB FAN ΔP
106	FREON FLOW 1
116	FREON FLOW 2

(R13U)

- C/W PARAM SEL tw (three) - > 119

5 Sys A and PRI C/W pwr dn

Expect MSTR ALARM: (O13:A)

- cb ESS 1BC C/W A - op

Capabilities remaining:
Bkup C/W limit sensing
C/W Sys B Alarms (MSTR ALARM lts, ACCU, sleep station tones)

Items lost:
(F7)
All C/W annun lts

(R13U)
C/W status pnl lts, functions

(F2,F4,A7U,MO52J)
Two of four bulbs in each MA It

(A2)
Emer tones to dedicated speaker coil

(MO42F)
Bypass tones to MIDDECK SMU

Other losses:
Pri C/W limit sensing and siren for (L1)
SMOKE DETN A SNSRS
OI TLM Of MASTER ALARM

6 C/W Sys B redundancy

To pwr Sys B redundantly:

- Go to CAUTION AND WARNING ELECTRONICS UNIT CONTINGENCY POWER (IFM)

① All primary C/W params were enabled and their limits reset to default (PROM) value when cb ESS 1BC C/W A closed

② All four bulbs in each MA It will illuminate during lamp test

③ Until C/W IFM cables installed, loss of ESS 2CA DA2 would not trigger aural alarm so that Fuel Cell 2 could be safed within 9 min. FSMs must be continually monitored

④ Redundancy can be verified by opening cb ESS 2CA C/W B (O13:C) and receiving alarm tones

C/W 4.1c (Cont)

11

3 4

12 C/W Sys B redundancy

To pwr Sys B redundantly:

- Perform CAUTION AND WARNING ELECTRONICS UNIT CONTINGENCY POWER (IFM)

8

14 Reconfig

(R13U)

- Inhibit param specified on PRIMARY C/W PARAMETER MATRIX (Cue Card)
- Use C/W & FDA TABLE (REF DATA, C/W) to reset param limits for:

CH	Param
004	CAB PRESS
007	OMS TK P OX-L
017	OMS TK P FU-L
037	OMS TK P OX-R
047	OMS TK P FU-R
074	CAB FAN Δ P
106	FREON FLOW 1
116	FREON FLOW 2

(R13U)

- C/W PARAM SEL tw - > 119

9

5 6 7

13 C/W Sys B pwr dn

(O13:C)

- cb ESS 2CA C/W B - op (MA)

Capabilities remaining:

- Bkup C/W limit sensing
- Pri C/W limit sensing
- C/W Sys A Alarms (MA lts, ACCU tone, MIDDECK SMU Byp tone, annun lts)

Items lost:

(F2,F4,A7U,MO52J)

Two of four bulbs in each MA It

(F7)

Bkup C/W Alarm Annun It cannot be reset

(MO58F)

Sleep station hdst tones

(MO29J)

Emer tones to dedicated speaker coil

Other loss:

Siren for (L1) SMOKE DETN B SNSRS

NOTE

Bkup C/W Alarms must be MSG RESET to prevent masking of subsequent Backup C/W Alarms

6

15 √C/W Sys B

(O13:C)

- cb ESS 2CA C/W B - op (MA)

F2(F4,A7U)

- MSTR ALARM pb - off

MSTR ALARM It off ?

YES → 17

NO → 11

11

20 Param status

(O13:C)

- cb ESS 2CA C/W B - cl

F2(F4,A7U)

- MSTR ALARM pb - off

(R13U)

- C/W PARAM STATUS - INH (hold during next step)
- C/W MEM - CLEAR, then READ

All tripped parameters inhibited ?

NO → 21

YES → 27

17 C/W SYS B ALARM FAILED ON

16

(O5,O9,L9,A13,R10,MO42F,MO58F)

- AUD PWR (seven) - as reqd

1 7 9

18 (R13U)

- C/W TONE VOL B - ccw (using screwdriver)

(O5,O9,A13,R10,MO42F,MO58F)

- AUD PWR (seven) - as reqd

(O13:C)

- cb ESS 2CA C/W B - cl

F2(F4,A7)

- MSTR ALARM pb - off

7 10

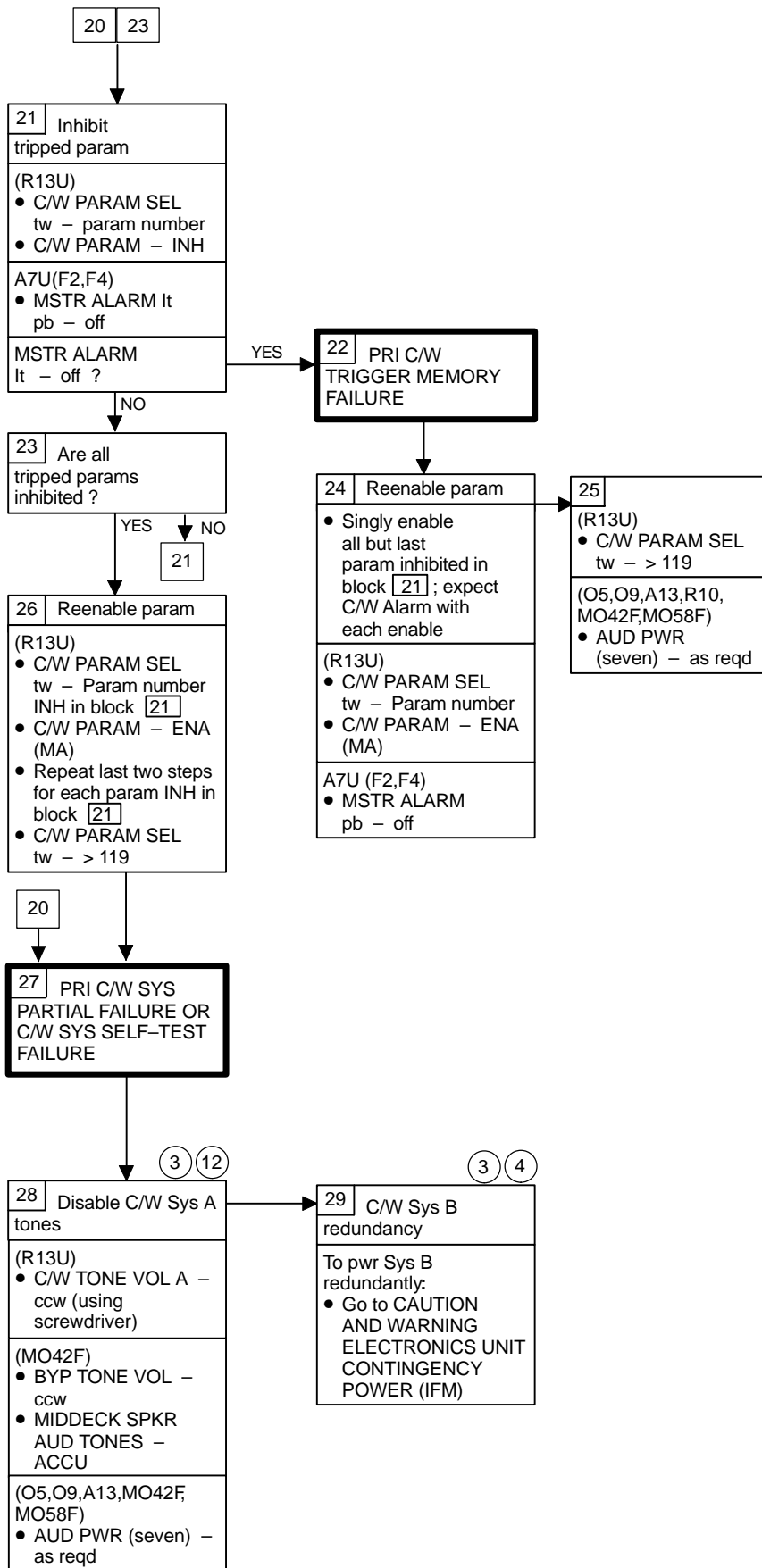
19 C/W Sys A redundancy

To pwr Sys A redundantly:

- Go to CAUTION AND WARNING ELECTRONICS UNIT CONTINGENCY POWER (IFM)

- 1 Illuminated MA It bulbs are mounted in sealed assy
- 3 Until C/W IFM cables installed, loss of ESS 2CA DA2 would not trigger aural alarm so that Fuel Cell 2 could be safed within 9 min. FSMs must be continually monitored
- 4 Redundancy can be verified by opening cb ESS 2CA C/W B (O13:C) and receiving alarm tones
- 5 All four bulbs in each MA It will illuminate during lamp test
- 6 To extinguish (F7) PRIMARY C/W and BACKUP C/W ALARM lts, remove bulbs or select (C3) C/W MODE - ACK
- 7 Until C/W IFM cables installed, loss of ESS 1BC DA1 would not generate aural alarm so that Fuel Cell 1 could be safed. FSMs must be continually monitored
- 8 All primary C/W params were enabled and their limits reset to default (PROM) value when cb ESS 1BC C/W A closed
- 9 Lost C/W Sys B alarm tones except for emer tones in Middeck speaker. Sleep Station Hdst has constant tone
- 10 Redundancy can be verified by opening cb ESS 1BC C/W A (O13:A) and receiving alarm tones
- 11 Additional lts which light during C/W MEM - READ indicate tripped params that are not inhibited

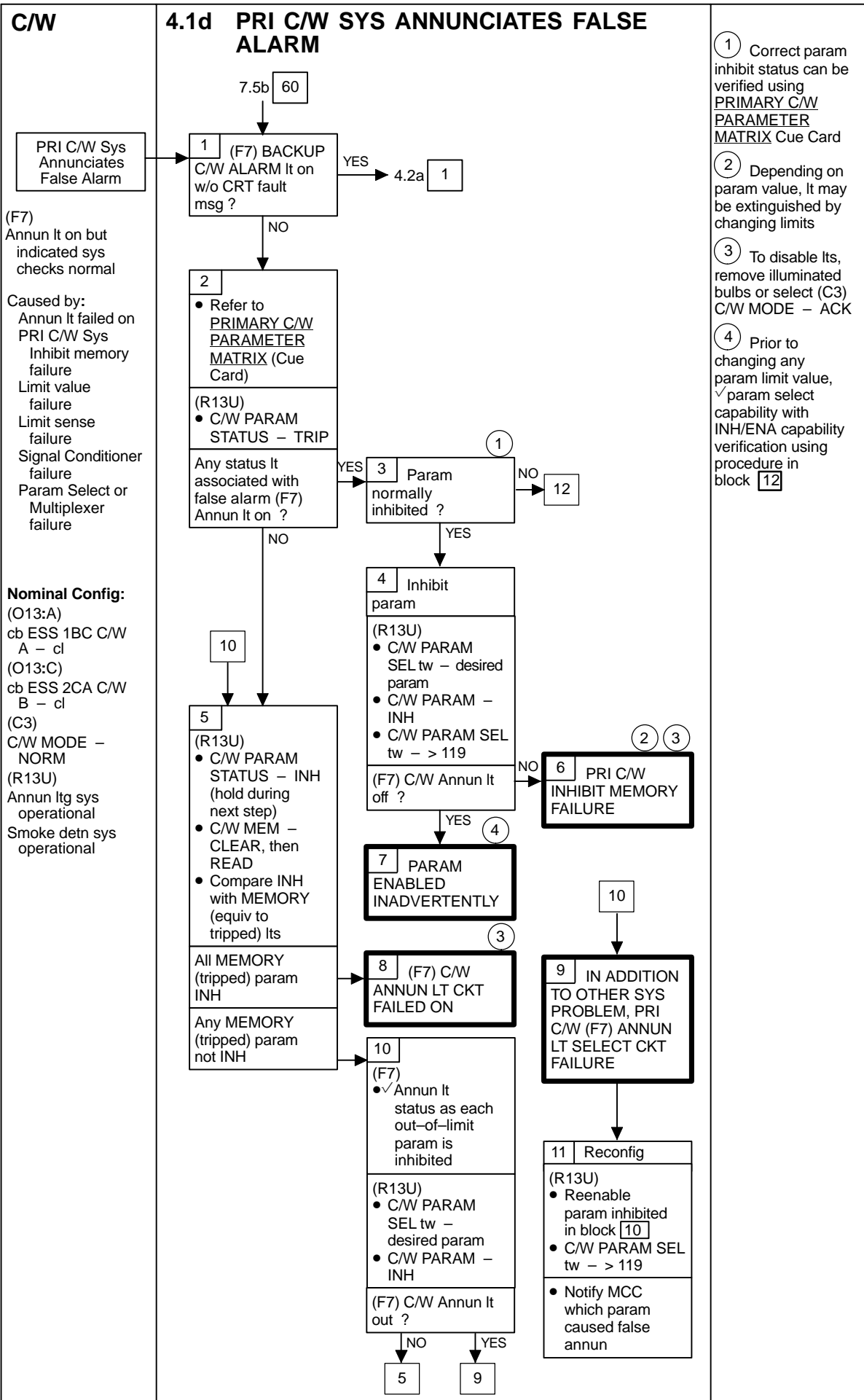
C/W 4.1c (Cont)



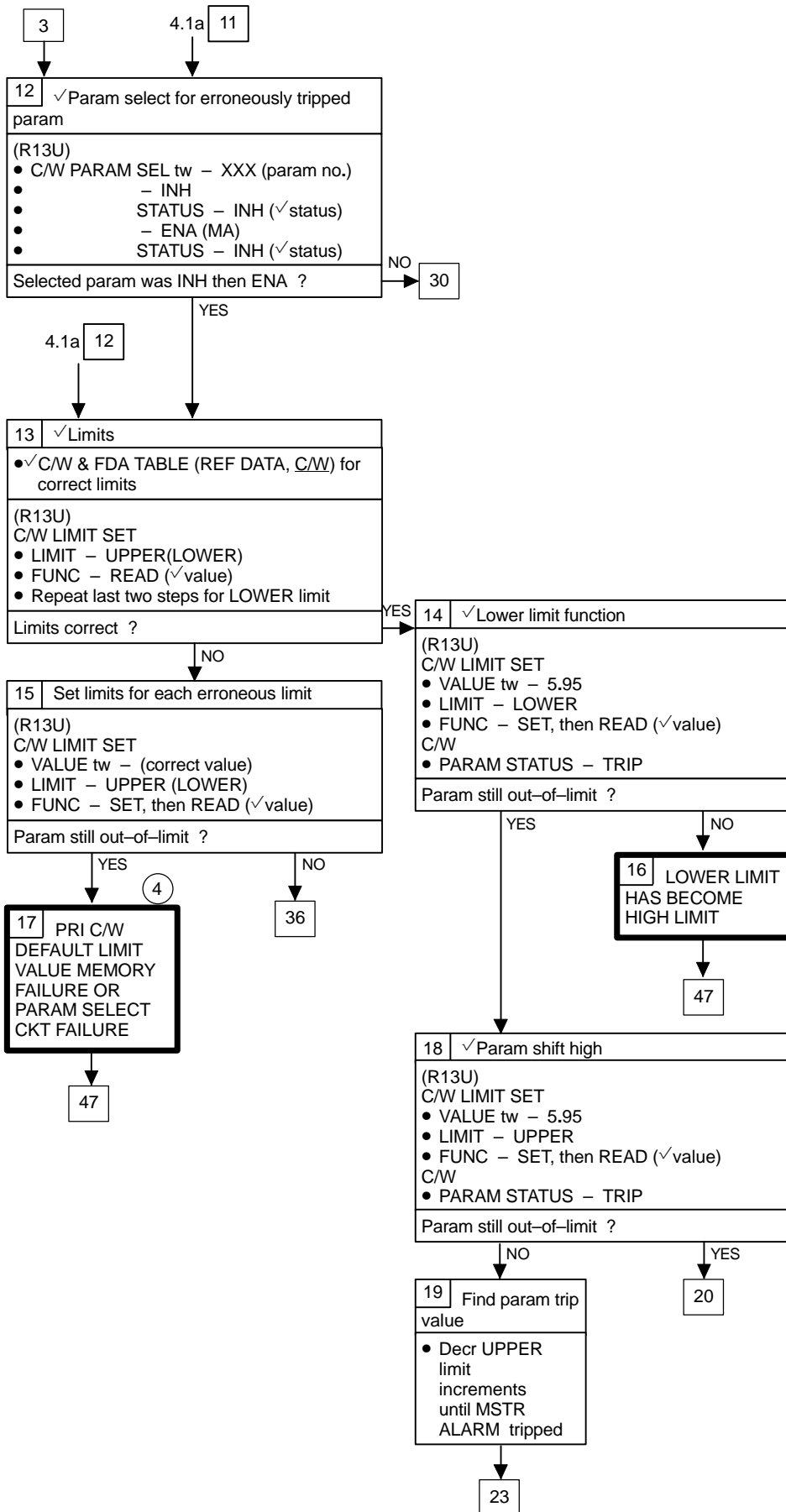
③ Until C/W IFM cables installed, loss of ESS 2CA DA2 would not trigger aural alarm so that Fuel Cell 2 could be safed within 9 min. FSMs must be continually monitored

④ Redundancy can be verified by opening cb ESS 2CA C/W B (O13:C) and receiving alarm tones

⑫ Should still have PRI C/W limit sensing with (F7) Annun Its and emer tone alarms via OS speaker

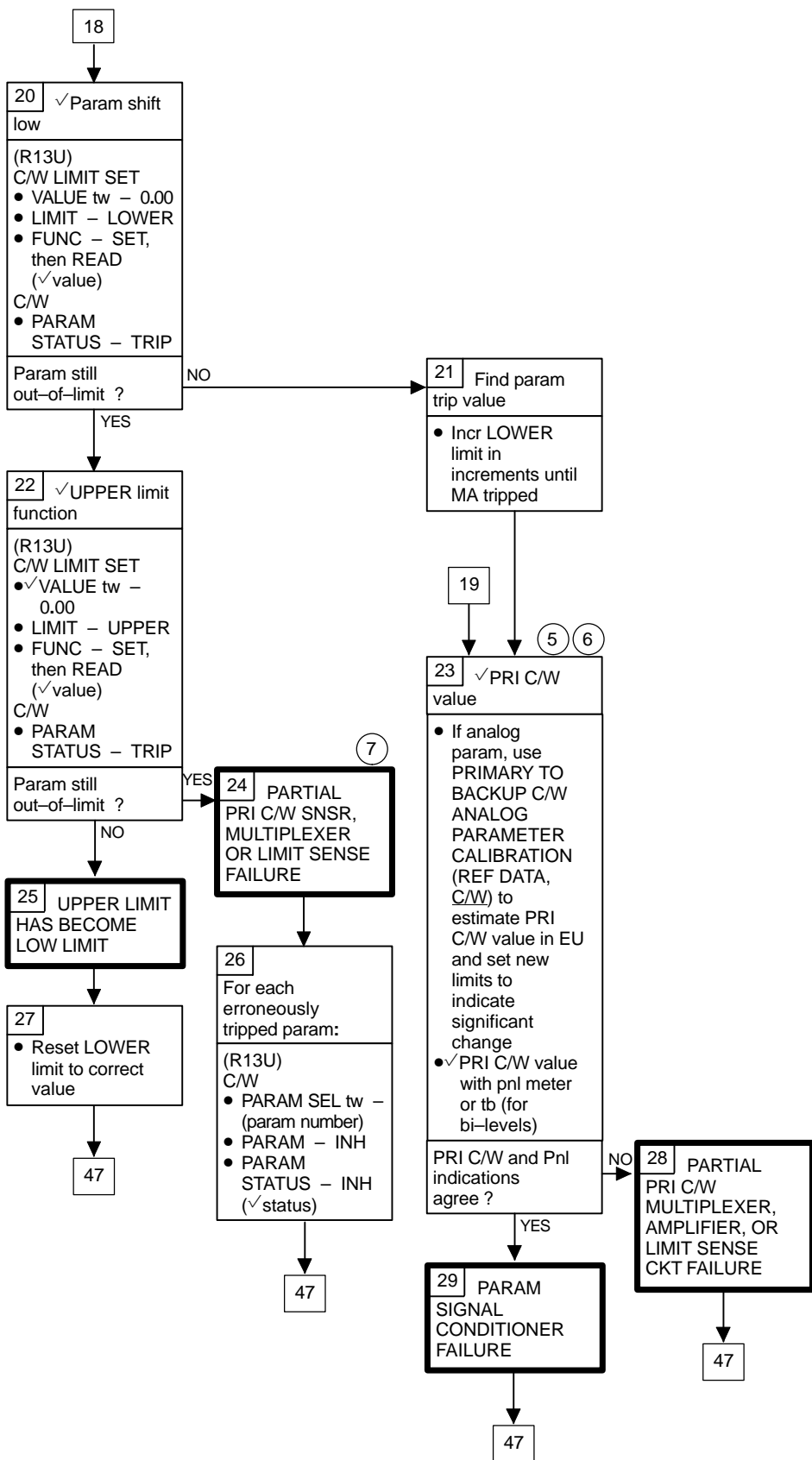


C/W 4.1d (Cont)



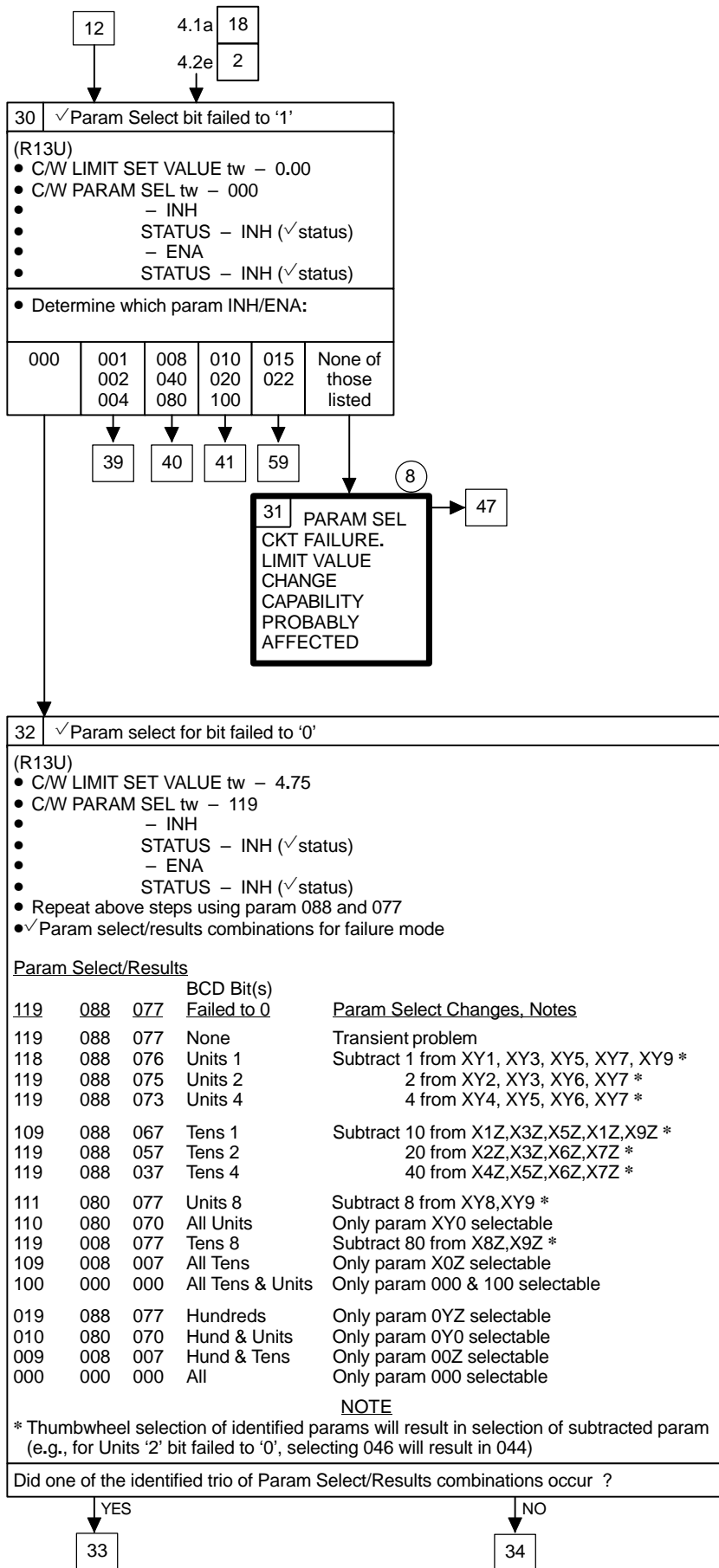
④ Prior to changing any param limit value, ✓ param select capability with INH/ENA capability verification using procedure in block 12

C/W 4.1d (Cont)



- ⑤ Notify MCC of change in PRI C/W param and limit values
- ⑥ Bi-level params are identified in NOTES column of C/W & FDA TABLE (REF DATA, C/W)
- ⑦ If pnl indicator and PRIMARY C/W param values agree, snsrs output failed

C/W 4.1d (Cont)



⑧ Prior to changing param limit, ✓ that desired param and an unused param are selectable using two INH/ENA cycles (see procedure in block 12), then ✓ desired limit value change capability on unused param

C/W 4.1d (Cont)

32
 33 TRANSIENT PROBLEM OR PARAM SEL BIT(s) FAILED TO '0'

35 If pnl O13 cb ESS 1BC C/W A cycled op then cl:
 • ✓ Param inhibited per PRIMARY C/W PARAMETER MATRIX (Cue Card)
 • Use C/W & FDA TABLE (REF DATA, C/W) to reset param limits for:

CH	Param
004	CAB PRESS
007	OMS TK P OX-L
017	OMS TK P FU-L
037	OMS TK P OX-R
047	OMS TK P FU-R
074	CAB FAN ΔP
106	FREON FLOW 1
116	FREON FLOW 2

(R13U)
 If hundreds bit or tens '2' or '4' bit failed to '0':
 • C/W PARAM SEL tw - 089

If hundreds bit or tens '2' or '4' bit not failed to '0':
 • C/W PARAM SEL tw > 119 and < 170

15 38
 4.2e 7

36 Select and inhibit unused param
 (R13U)
 • C/W PARAM SEL tw - 089 (or other param)
 • C/W PARAM - INH
 • C/W PARAM STATUS - INH (✓status)

Selected param INH ?

38
 • C/W PARAM - ENA
 • Select another unused, uninhibited param from PRIMARY C/W PARAMETER MATRIX (Cue Card). Do not select Param 000, 001, 002, 004, 008, 016, 020, 040, or 080

36

32 8
 34 PARAM SEL CKT FAILURE. LIMIT VALUE CHANGE CAPABILITY PROBABLY AFFECTED

47

37 ✓ Limit value for bit failed to '1'

C/W LIMIT SET
 • VALUE tw - 0.00
 • LIMIT - UPPER
 • FUNC - SET, then READ (✓value)

Which value read ?

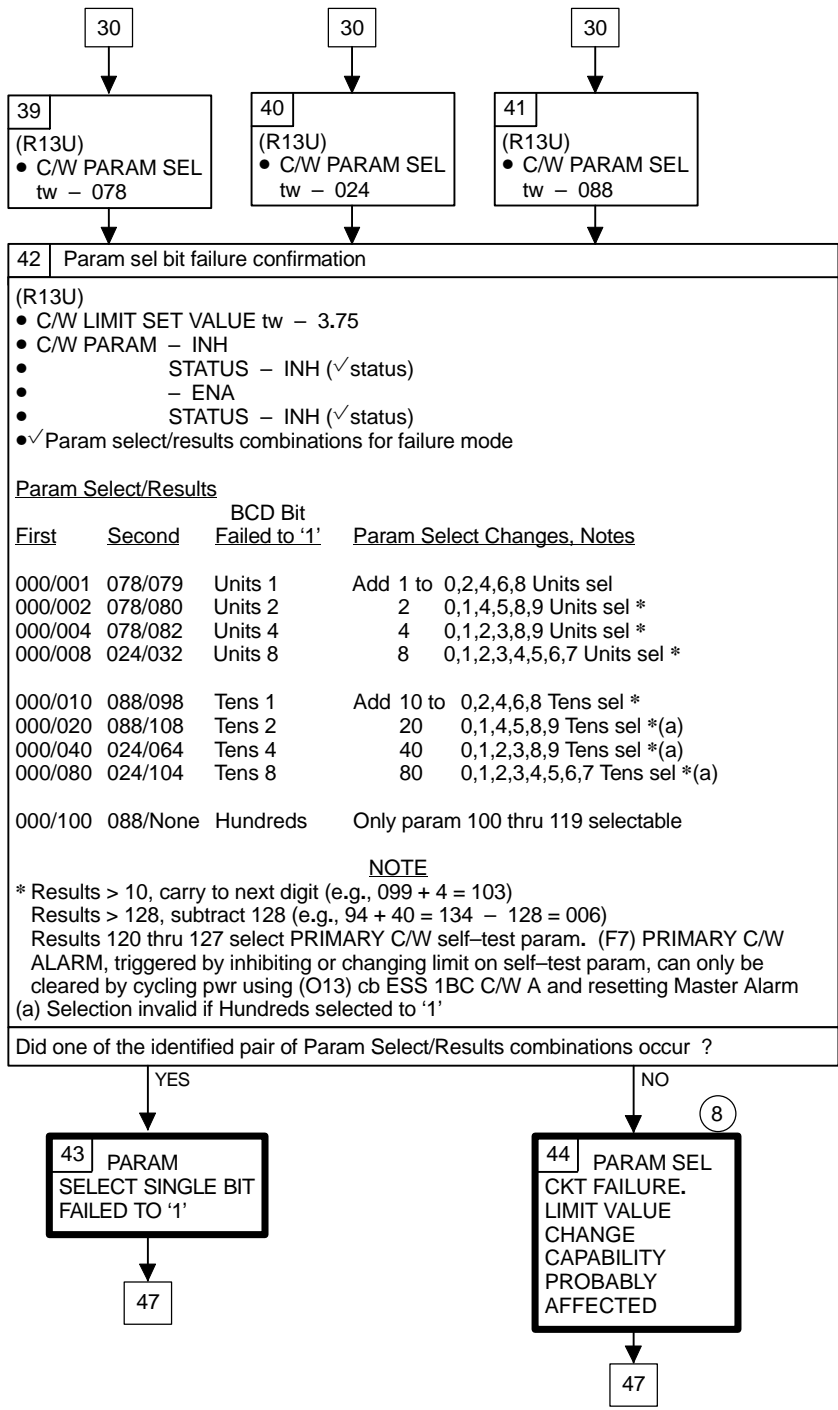
None of those listed	0.05	0.10	0.60	2.00	0.00
	0.20	0.80	1.50		
	0.40	1.00	4.00		

45 48 49 62 50 55

8 Prior to changing param limit, ✓ that desired param and an unused param are selectable using two INH/ENA cycles (see procedure in block 12), then ✓ desired limit value change capability on unused param

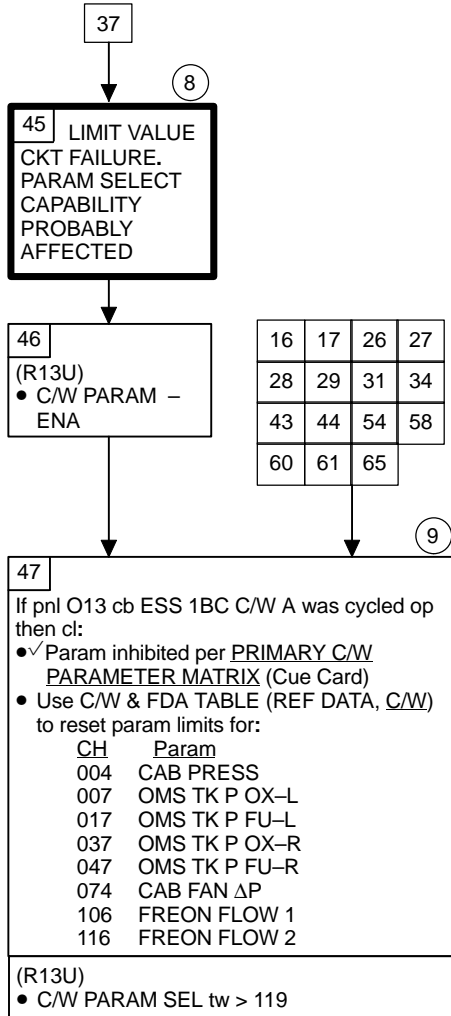
9 All primary C/W params were enabled and their limits reset to default (PROM) value when cb ESS 1BC C/W A closed

C/W 4.1d (Cont)



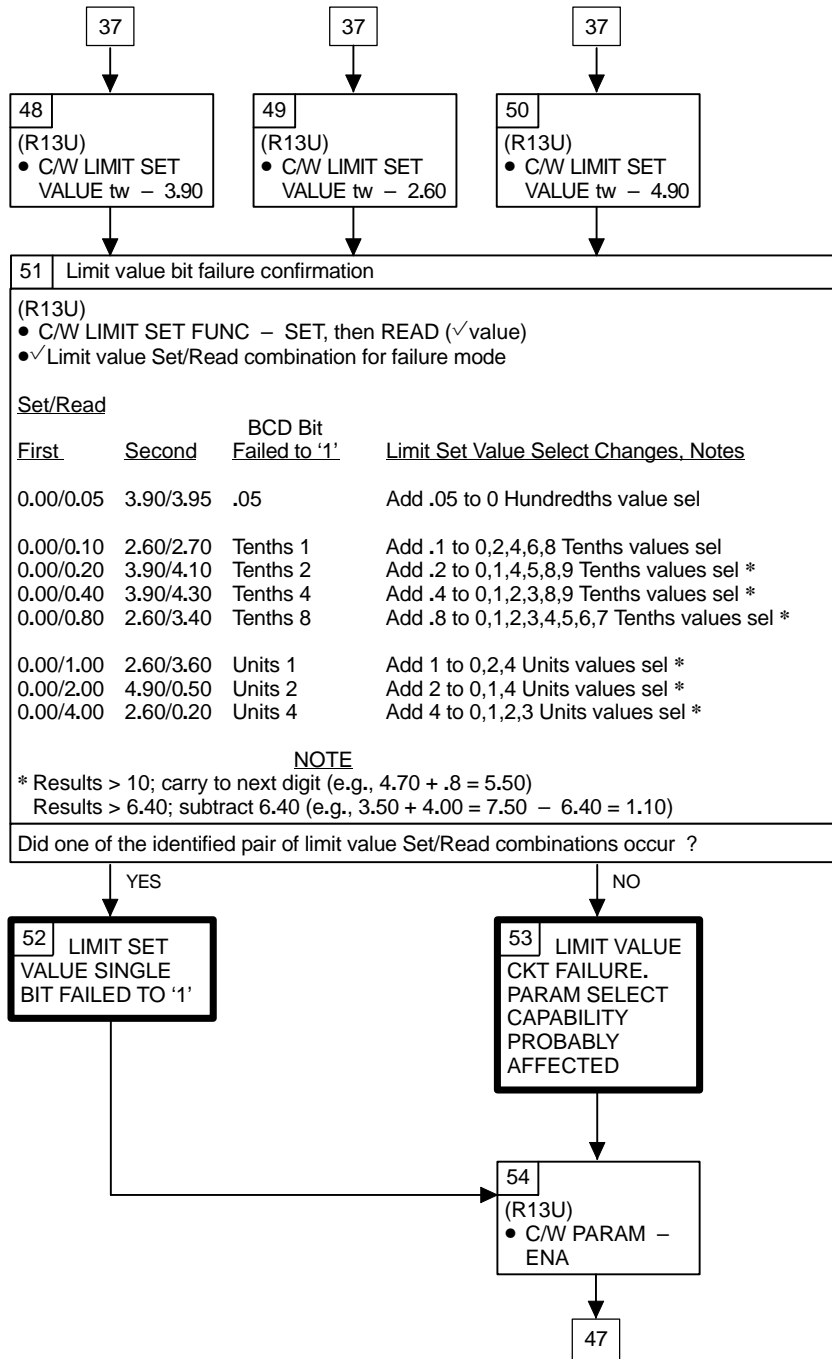
⑧ Prior to changing param limit, ✓ that desired param and an unused param are selectable using two INH/ENA cycles (see procedure in block 12), then ✓ desired limit value change capability on unused param

C/W 4.1d (Cont)



- ⑧ Prior to changing param limit, ✓ that desired param and an unused param are selectable using two INH/ENA cycles (see procedure in block 12), then ✓ desired limit value change capability on unused param
- ⑨ All primary C/W params were enabled and their limits reset to default (PROM) value when cb ESS 1BC C/W A closed

C/W 4.1d (Cont)



37

55 | ✓Limit value for bit(s) failed to '0'

(R13U)

- C/W LIMIT SET VALUE tw – 3.65
- FUNC – SET, then READ (✓value)
- Repeat above steps using limit value of 5.95
- ✓Limit value Set/Read result combinations for failure mode

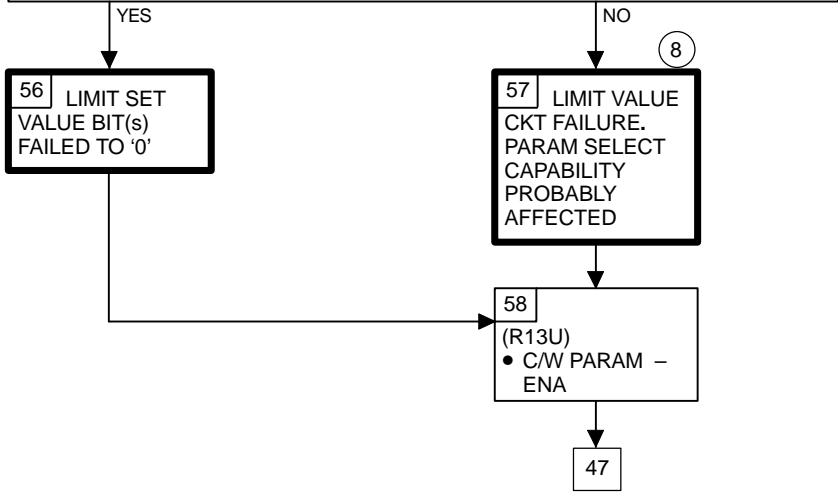
Value Results

3.65	5.95	BCD Bit(s) Failed to '0'	Limit Value Select Changes
3.65	5.95	None	Transient problem
3.60	5.90	.05	Subtract .05 from X.Y5*
3.65	5.85	Tenths 1	Subtract .1 from X.1Z, X.3Z, X.5Z, X.7Z, X.9Z *
3.45	5.95	Tenths 2	.2 X.2Z, X.3Z, X.6Z, X.7Z *
3.25	5.95	Tenths 4	.4 X.4Z, X.5Z, X.6Z, X.7Z *
3.65	5.15	Tenths 8	.8 X.8Z, X.9Z *
3.05	5.05	All Tenths	Only X.0Z selectable
3.00	5.00	.05 & All Tenths	X.00 selectable
2.65	4.95	Units 1	Subtract 1 from 1.YZ, 3.YZ, 5.YZ *
1.65	4.95	Units 2	2 2.YZ, 3.YZ *
3.65	1.95	Units 4	4 4.YZ, 5.YZ *
0.65	0.95	All Units	Only 0.YZ selectable
0.05	0.05	Units & Tenths	Only 0.0Z selectable
0.60	0.90	Units & .05	Only 0.Y0 selectable
0.00	0.00	All	Only 0.00 selectable

NOTE

* Thumbwheel selection of identified limit value will result in selection of subtracted limit value (e.g., for Tenths '2' bit failed to '0', selecting 3.60 will result in 3.40)

Did one of the identified pair of limit value Set/Read combinations occur ?



8 Prior to changing param limit, ✓ that desired param and an unused param are selectable using two INH/ENA cycles (see procedure in block 12), then ✓ desired limit value change capability on unused param

30

59 ✓ For Param Select tw signal short

(R13U)

- C/W LIMIT SET VALUE tw – 3.75
- PARAM SEL – 099
 - INH
 - STATUS – INH (✓status)
 - ENA
 - STATUS – INH (✓status)
- Repeat above steps using param 055
- ✓ Param select/results combinations for failure mode

Param Sel/Results

000	099	055	tw Bit Shorted	Param Select Changes, Notes
015	099	055	Units 1	Param XY1, XY3, XY5, XY7, XY9 selectable *
015	105	065	Units 2	XY2, XY3, XY6, XY7 selectable *
015	105	055	Units 4	XY4, XY5, XY6, XY7 selectable *
015	099	065	Units 8	XY8, XY9 selectable *
022	099	055	Tens 1	Param X1Z, X3Z, X5Z, X7Z, X9Z selectable *
022	031	027	Tens 2	02Z, 03Z, 06Z, 07Z selectable *(a)
022	031	055	Tens 4	04Z, 05Z, 06Z, 07Z selectable *(a)
022	099	027	Tens 8	08Z, 09Z selectable *(a)

NOTE

* Param selections other than those indicated will cause all four bits in the failed group to become a '1'. For 'Units' failure this would add 15 to the Hundreds and Tenths selection. For 'Tens' failure this would add 150 to the Hundreds and Units selection. If > 128, subtract 128 from resulting number to find param selected

(a) Selection invalid if Hundreds selected to '1'

Did one of the identified trio of Param Sel/Results combinations occur ?

YES

NO

60 PARAM SELECT tw SIGNAL SHORTED

61 PARAM SELECT CKT FAILURE

4

47

47

4 Prior to changing any param limit value, ✓ param select capability with INH/ENA capability verification using procedure in block 12

C/W 4.1d (Cont)

37

62 ✓For limit value tw signal short

(R13U)

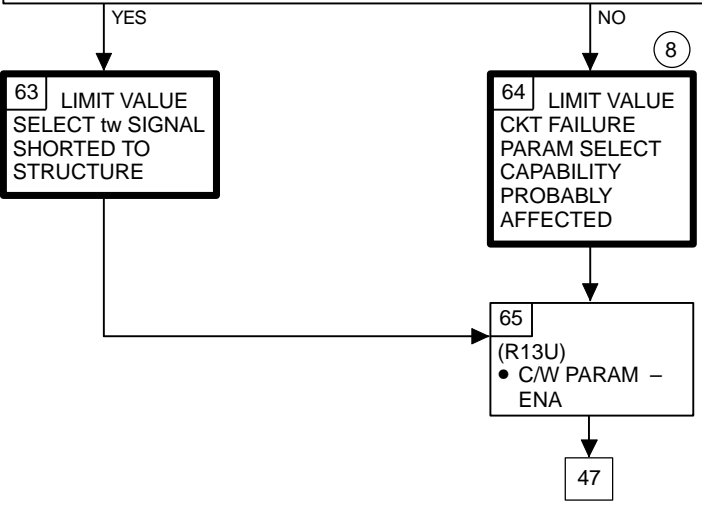
- C/W LIMIT SET VALUE tw – 3.60
- FUNC – SET, then READ (✓value)
- Repeat above steps using limit value of 2.50
- ✓Limit value Set/Read result combinations for failure mode

Value Result		tw BCD	Signal	Shorted	Limit Value Select Changes, Notes
0.60	3.60	1.50	Units 1		Value 1.YZ, 3.YZ, 5.YZ selectable *
0.60	3.60	2.50	Units 2		Value 2.YZ, 3.YZ selectable *
0.60	1.20	1.10	Units 4		Value 4.YZ, 5.YZ selectable *
1.50	4.50	2.50	Tenths 1		Value X.1Z, X.3Z, X.5Z, X.7Z, X.9Z selectable *
1.50	3.60	3.50	Tenths 2		Value X.2Z, X.3Z, X.6Z, X.7Z selectable *
1.50	3.60	2.50	Tenths 4		Value X.4Z, X.5Z, X.6Z, X.7Z selectable *
1.50	4.50	3.50	Tenths 8		Value X.8Z, X.9Z selectable *

NOTE

* Limit value selections other than those indicated will cause all bits in failed 'Units' or 'Tenths' group to become a '1'. For 'Units' failure this would add 7.00 to the Tenths and Hundredths selection. Subtract 6.40 from resulting number to determine the value selected (e.g., selecting 3.45 with Units '4' bit shorted would result in 7.45 – 6.40 = 1.50). For 'Tenths' failure this would add 1.50 to selected Units and Hundredths value (e.g., Selecting 3.45 with Tenths '2' bit shorted would result in 1.50 + 3.05 = 4.55). If resultant number greater than 6.40, subtract 6.40 as in 'Units' failure

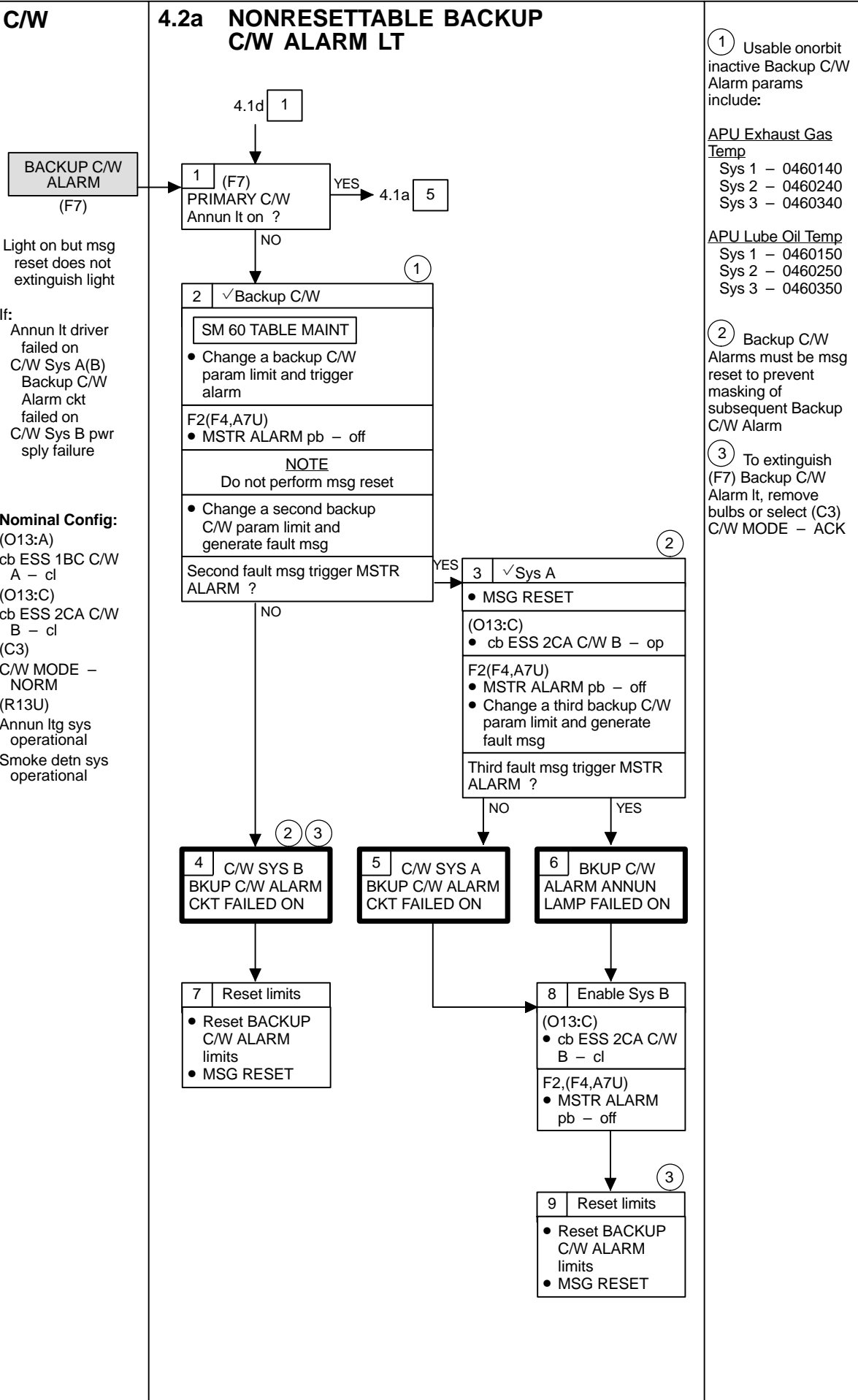
Did one of identified trio of limit Value Result combinations occur ?



8 Prior to changing param limit, ✓ that desired param and an unused param are selectable using two INH/ENA cycles (see procedure in block 12), then ✓ desired limit value change capability on unused param

OTHER C/W

4.2



C/W

4.2b MA LT & C/W TONE – NO ANNUN LT

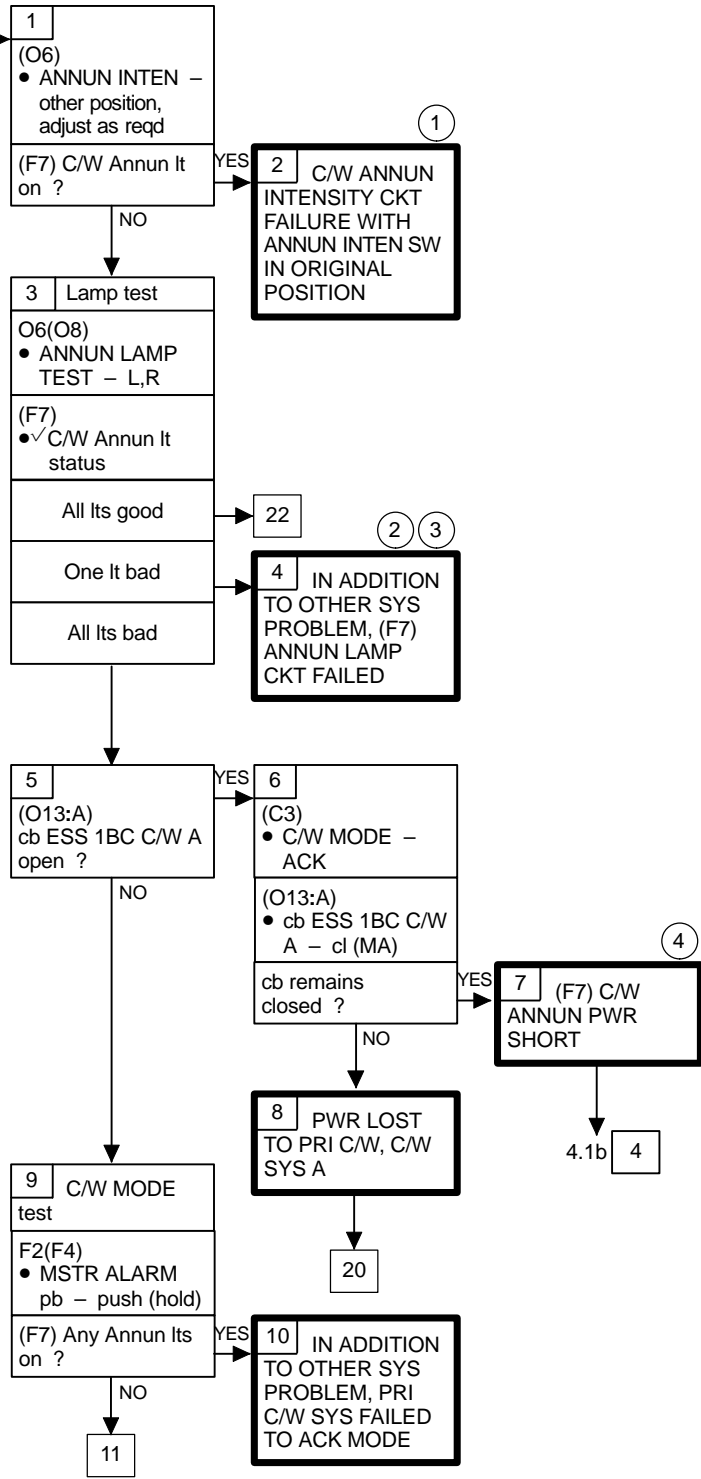
MSTR ALARM Lt and C/W Tone. No Annun Lt

If:

- ANNUN INTEN failure
- Annun Lt failure
- Annun pnl pwr failure
- C/W mode failure to ACK
- Transient
- Bkup C/W sys Alarm with C/W Sys A input failure
- PRI C/W tone enable failure

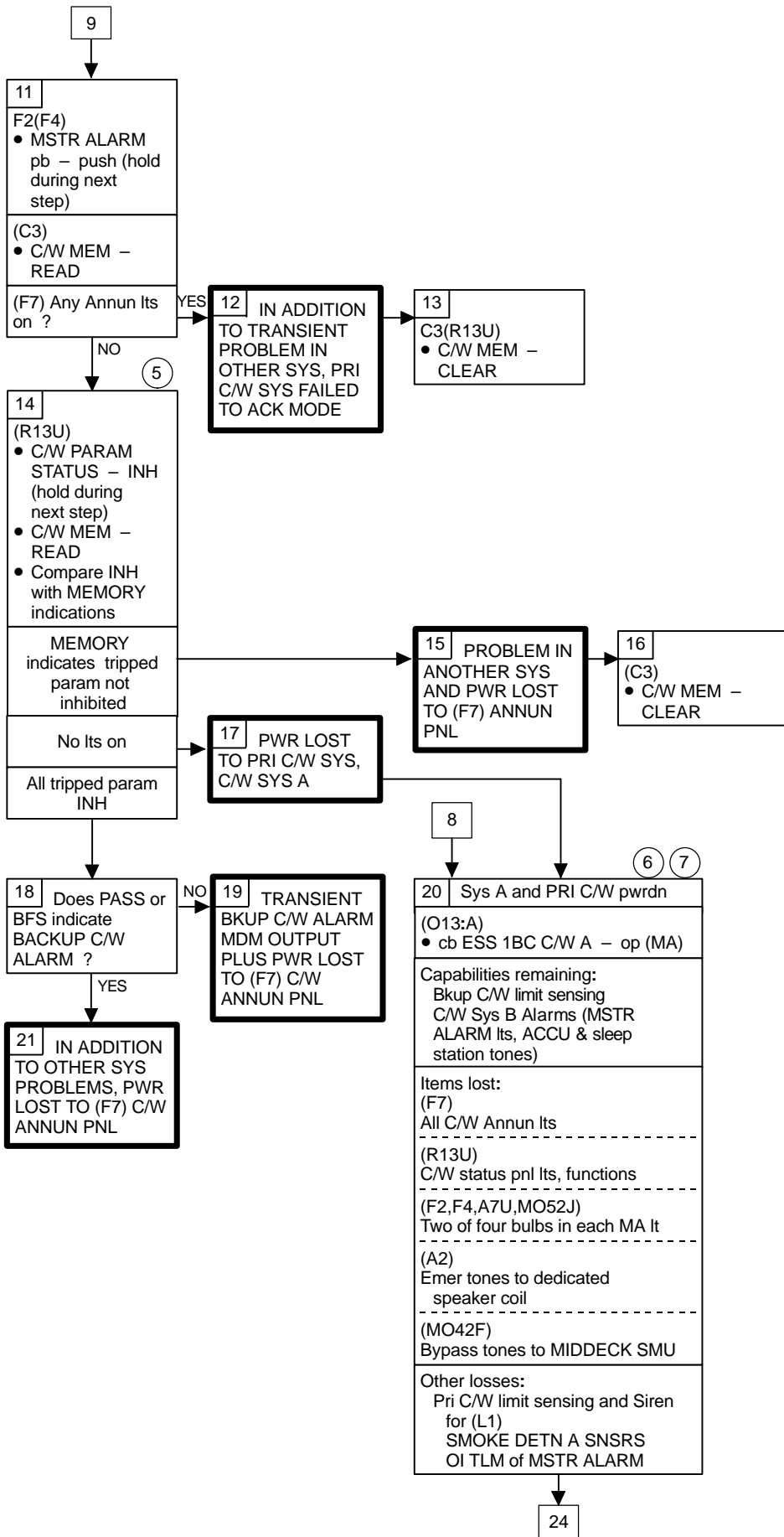
Nominal Config:

(O13:A)
cb ESS 1BC C/W A – cl
(O13:C)
cb ESS 2CA C/W B – cl
(C3)
C/W MODE – NORM
(R13U)
Annun ltg sys operational
Smoke detn sys operational



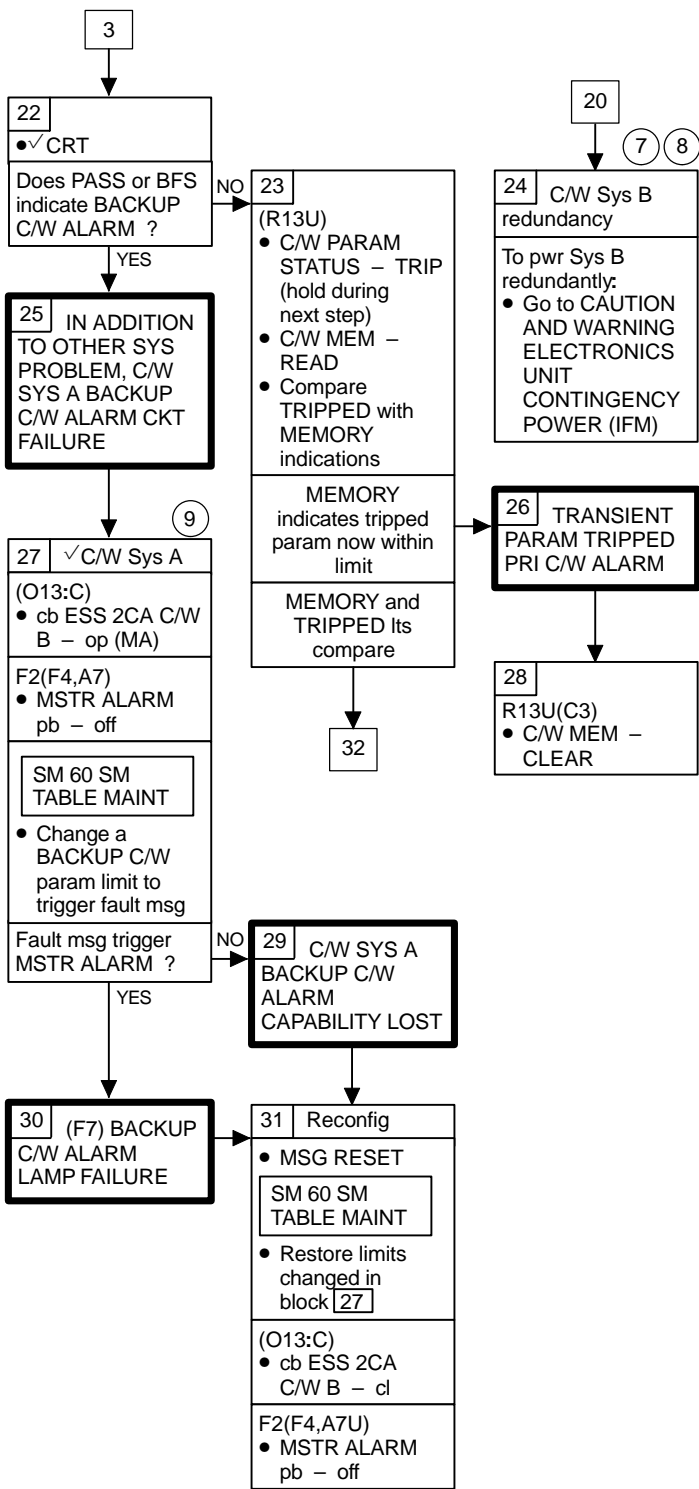
- ① ANNUN INTEN sw must be in non-failed position for normal (F7) C/W lts ops
- ② Verify lamp holder properly seated
- ③ If reqd, IFM LIGHTBULB CHANGEOUT procedure may be used to swap bulbs with spare annunciator
- ④ Use pnl A7U (MO52J) MSTR ALARM pb to reset alarms. If pnl F2(F4) pb must be used, pressing pb quickly may allow MA to reset without tripping cb. Pnl F7 annunciator lost

C/W 4.2b (Cont)



- ⑤ Additional Its which light during C/W MEM - READ indicate tripped params that are not inhibited
- ⑥ All four bulbs in each MA It will illuminate during lamp test
- ⑦ Until C/W IFM cables installed, loss of ESS 2CA DA2 would not trigger aural alarm so that Fuel Cell 2 could be safed within 9 min. FSMs must be continually monitored

C/W 4.2b (Cont)



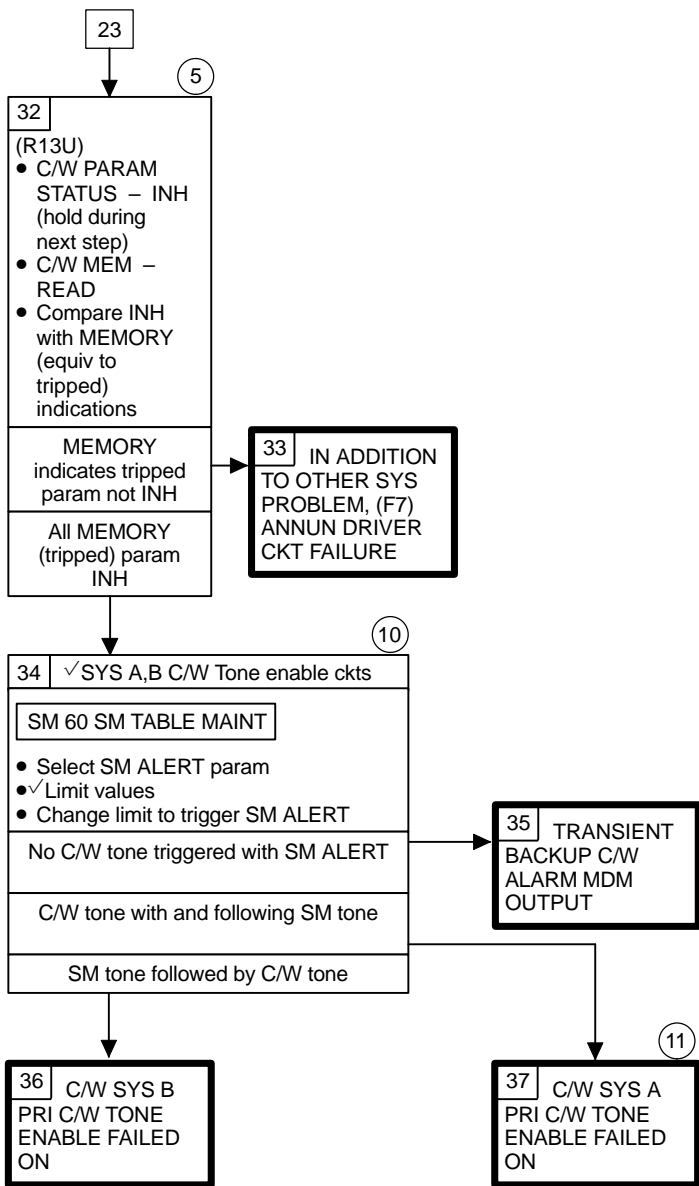
⑦ Until C/W IFM cables installed, loss of ESS 2CA DA2 would not trigger aural alarm so that Fuel Cell 2 could be safed within 9 min. FSMs must be continually monitored

⑧ Redundancy can be verified by opening cb ESS 2CA C/W B (O13:C) and receiving alarm tones

⑨ Usable onorbit inactive BACKUP C/W ALARM params include:
APU Exhaust Gas Temp
Sys 1 – 0460140
Sys 2 – 0460240
Sys 3 – 0460340

APU Lube Oil Temp
Sys 1 – 0460150
Sys 2 – 0460250
Sys 3 – 0460350

C/W 4.2b (Cont)



⑤ Additional lts which light during C/W MEM - READ indicate tripped params that are not inhibited

⑩ Usable SM ALERT params include:
FC H2O LNT
 Sys 1 - 0450412
 Sys 2 - 0450281
 Sys 3 - 0450381
FC H2O VLV T
 Sys 1 - 0450412
 Sys 2 - 0450422
 Sys 3 - 0450432

⑪ SM alert tone will trigger C/W tone without MA It. Requires MA reset. Klaxon or Siren will also trigger C/W tone

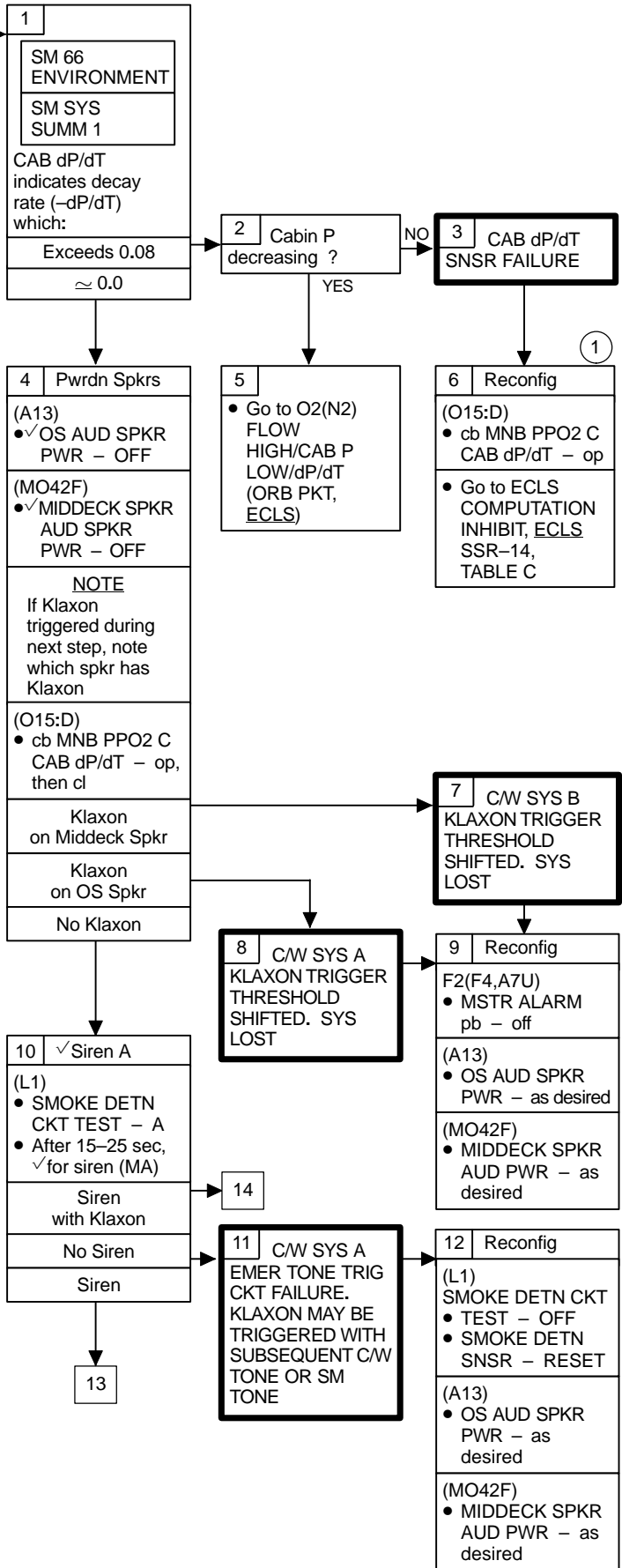
C/W

4.2c KLAXON – NO RAPID dP/dT

KLAXON – No Rapid dP/dT

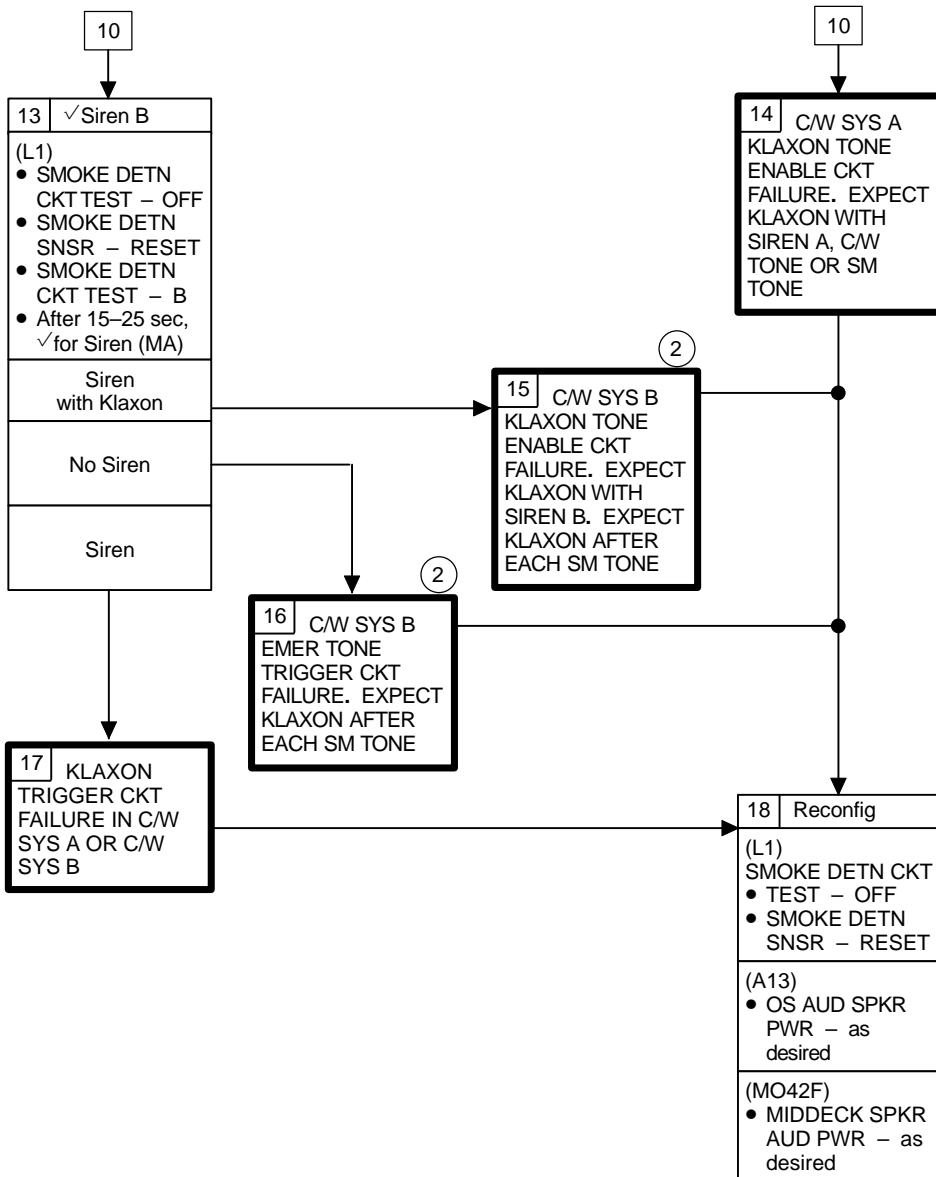
If:
 Snsr failure
 Alarm threshold shift
 C/W SYS A(B)
 Klaxon tone trigger or enable ckt failure

Nominal Config:
 (O13:A)
 cb ESS 1BC C/W A – cl
 (O13:C)
 cb ESS 2CA C/W B – cl
 (C3)
 C/W MODE – NORM
 (R13U)
 Annu Itg sys operational
 Smoke detn sys operational



① Loss of pwr to cb MNB PPO2 C CAB dP/dT results in loss of dP/dT and PPO2 C sensors

C/W 4.2c (Cont)



② ACCU VOX selects C/W Sys A over C/W Sys B tone. If C/W Sys A tone not present, expect Klaxon with C/W tone

C/W

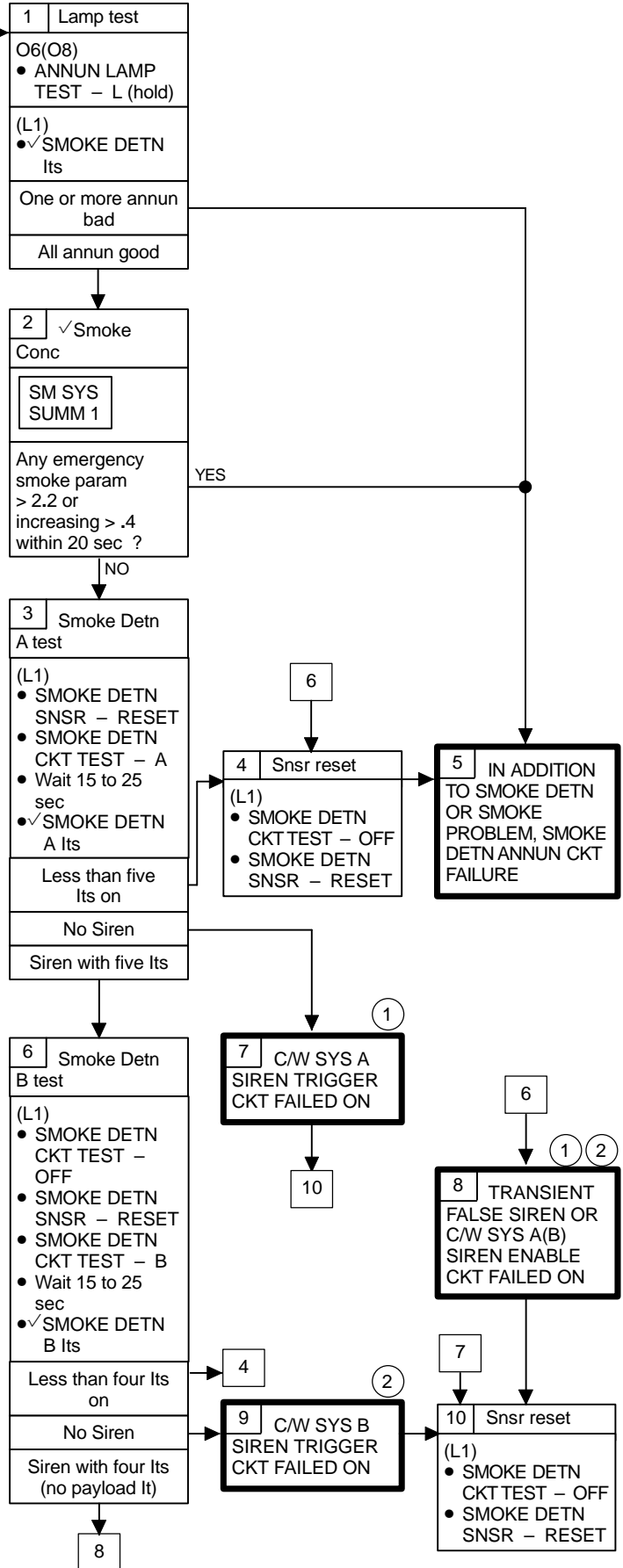
4.2d SIREN – NO SMOKE DETN LT

SIREN – No Smoke Detn Lt

If:
Smoke Detn Lt failure
C/W Sys A(B) Siren trigger or enable ckt failed

Nominal Config:

(O13:A)
cb ESS 1BC C/W A – cl
(O13:C)
cb ESS 2CA C/W B – cl
(C3)
C/W MODE – NORM
(R13U)
Annun Itg sys operational
Smoke detn sys operational



① If C/W Sys A failed, Siren may occur with Klaxon, C/W tone, or SM tone

② If C/W Sys B failed, Siren may occur with Klaxon or after SM tone. Since ACCU VOX selects C/W Sys A over C/W Sys B tone, expect Siren with C/W tone if C/W Sys A tone not present

C/W

4.2e PRI C/W SYS FAILS TO ANNUNCIATE OUT-OF-LIMIT PARAM

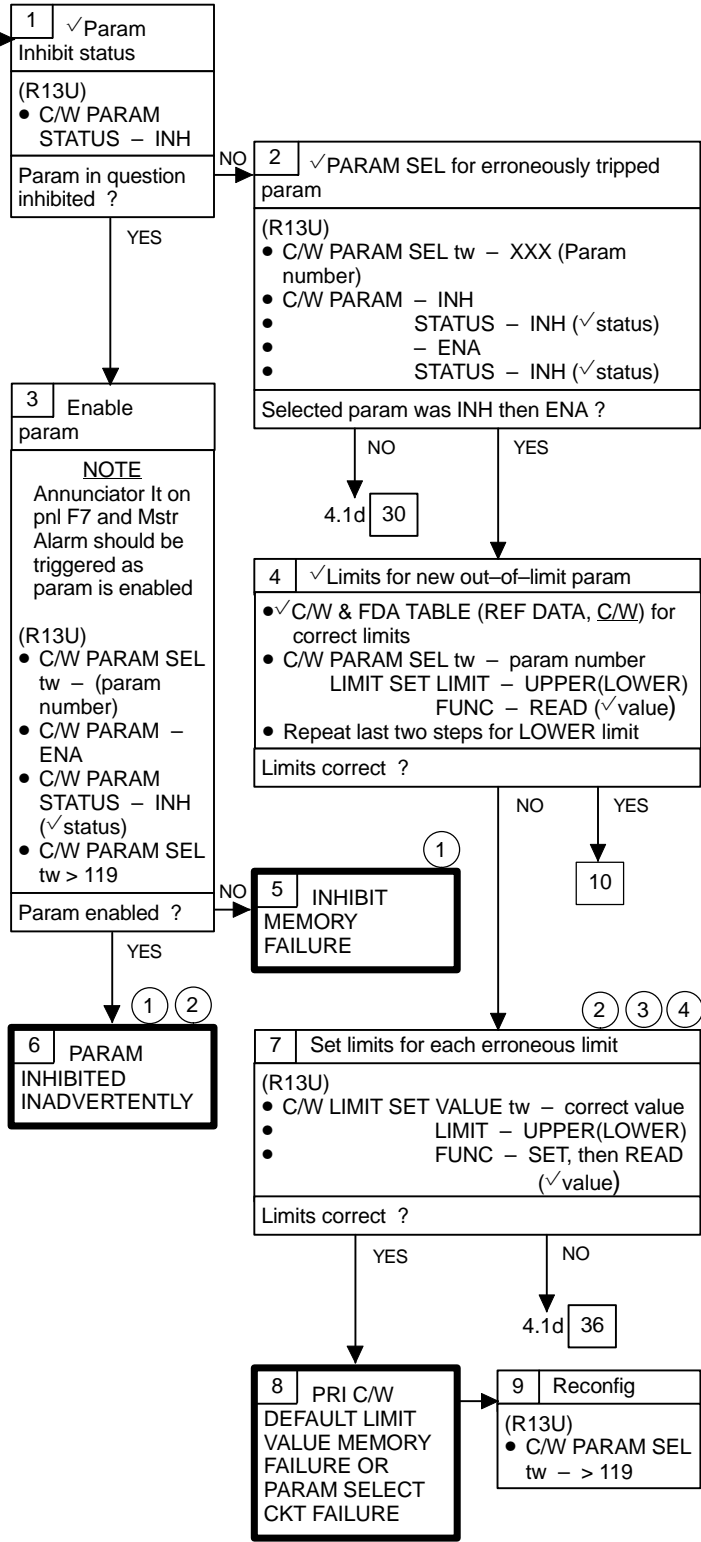
PRI C/W Sys Fails to Annun Out-of-Limit Param

C/W Alarm triggered by Backup C/W Sys

If:
Pri C/W Sys Snr Multiplexer
Limit Value Limit Sense
Inhibit Memory or Param Select failure

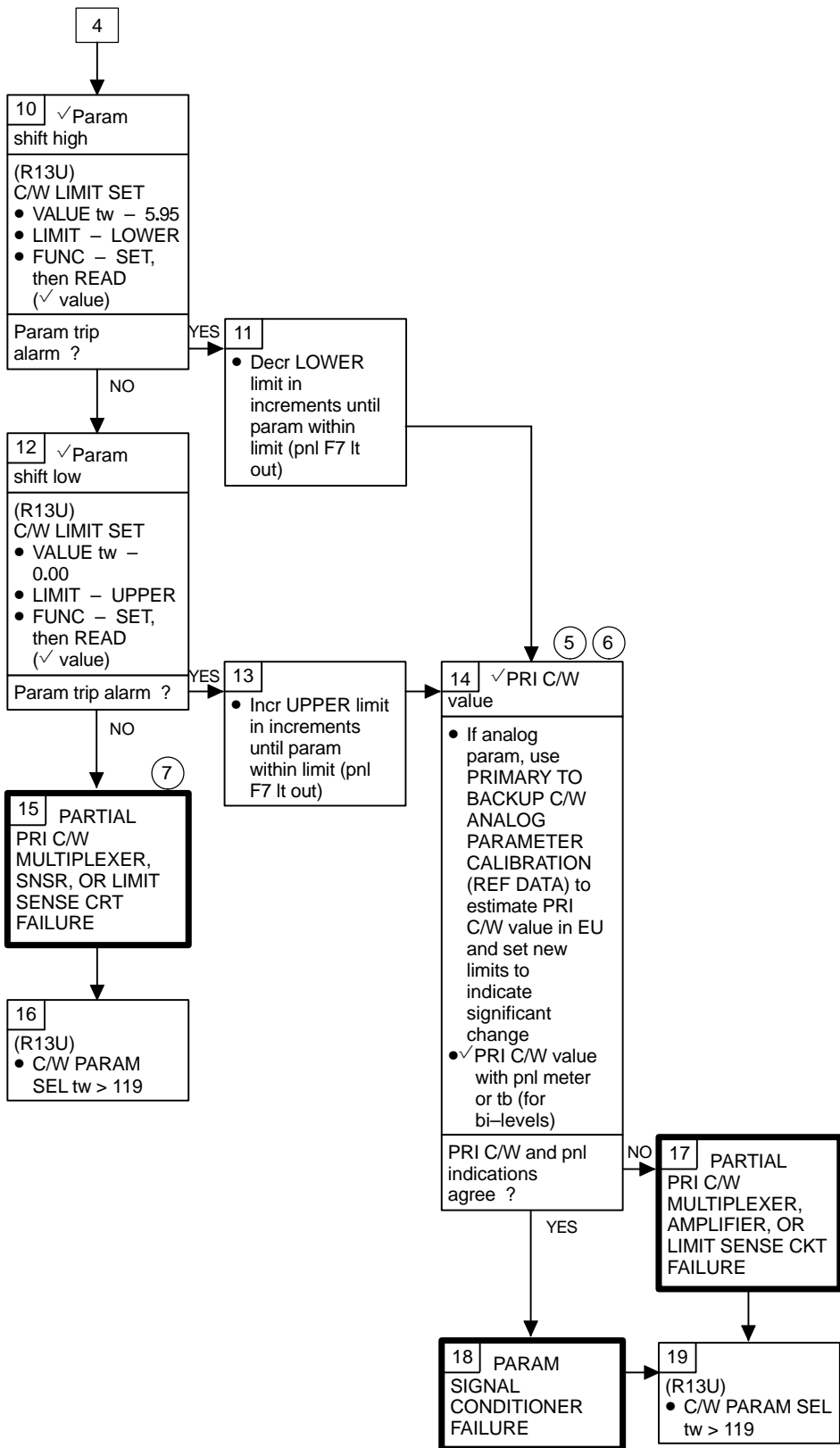
Nominal Config:

- (O13:A) cb ESS 1BC C/W A - cl
- (O13:C) cb ESS 2CA C/W B - cl
- (C3) C/W MODE - NORM
- (R13U) Annun Itg sys operational
- Smoke detn sys operational



- Correct Param Inhibit status can be verified using PRIMARY C/W PARAMETER MATRIX (Cue Card)
- Prior to changing any limit value, ✓PARAM SEL capability with an INH/ENA capability verification using procedure in block 2
- If time permits, ✓all enabled param limits
- Limits entered from pnl R13 use different memory than default limits

C/W 4.2e (Cont)



- ⑤ Notify MCC of change in PRI C/W param and limit values
- ⑥ Bi-level params are identified in NOTES column of C/W & FDA Table (REF DATA, C/W)
- ⑦ If pnl indication and primary C/W param values agree, Snsr or Signal Conditioner failed

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DPS

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The following Fault Msgs have no corresponding MAL procedures in this book:

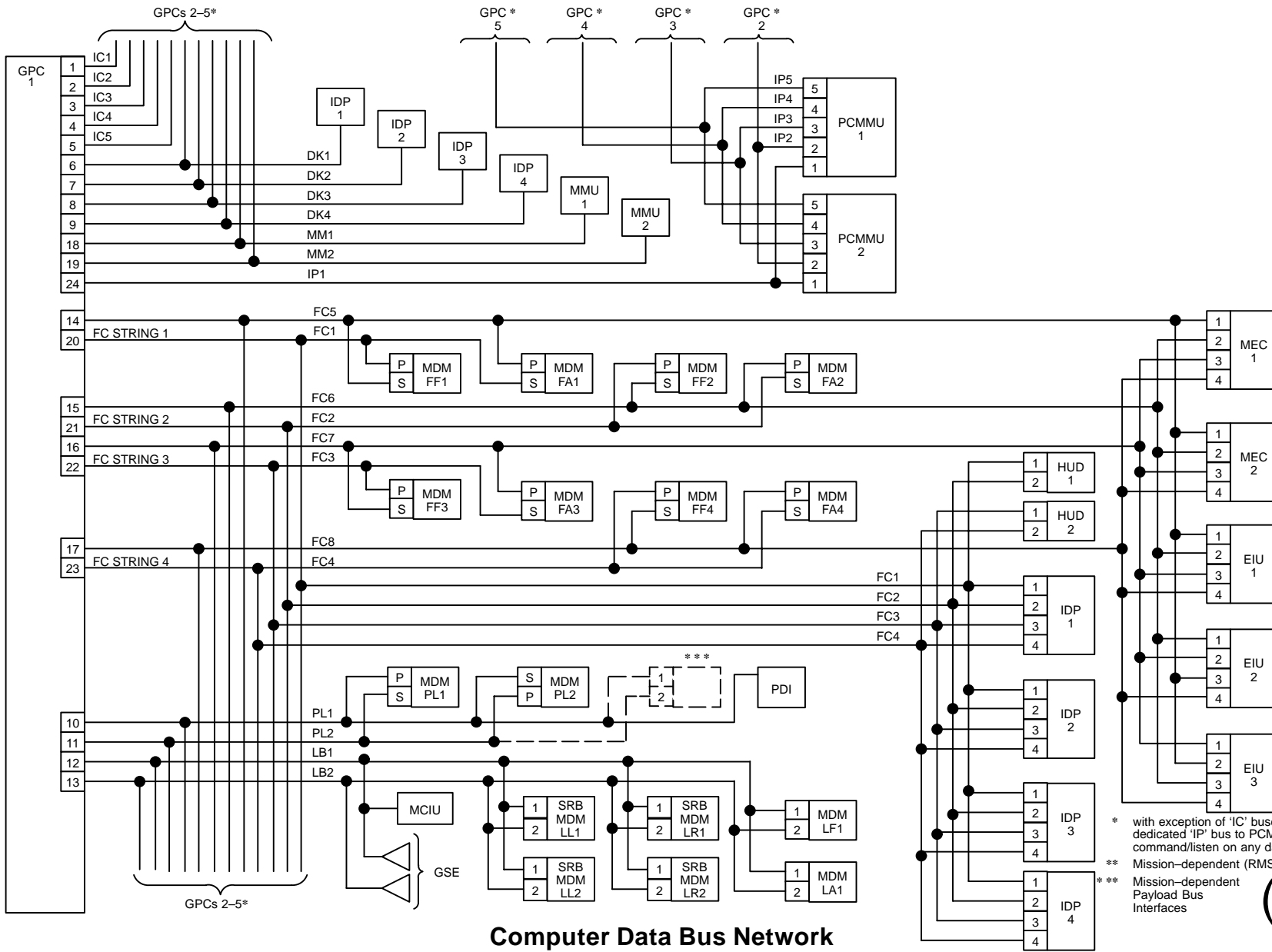
GPC FSM

- BCE STRG 1(2,3,4) PASS (BFS)
- BCE BYP KU
- CM BUF BSY CRT 1(2,3,4)
- DK XMTR 1(2,3,4) (BFS)
- > 3 DEU
- GPC 5
- GPC CONF
- GPC PWR (BFS)
- ILLEGAL ENTRY
- MDM OUTPUT FF(FA)
- PASS GPC BITE
- SUMWORD ICC
- TFL FAIL (BFS)
- TFL LOAD FAIL (PASS)
- TIME TONE

MEDS FSM

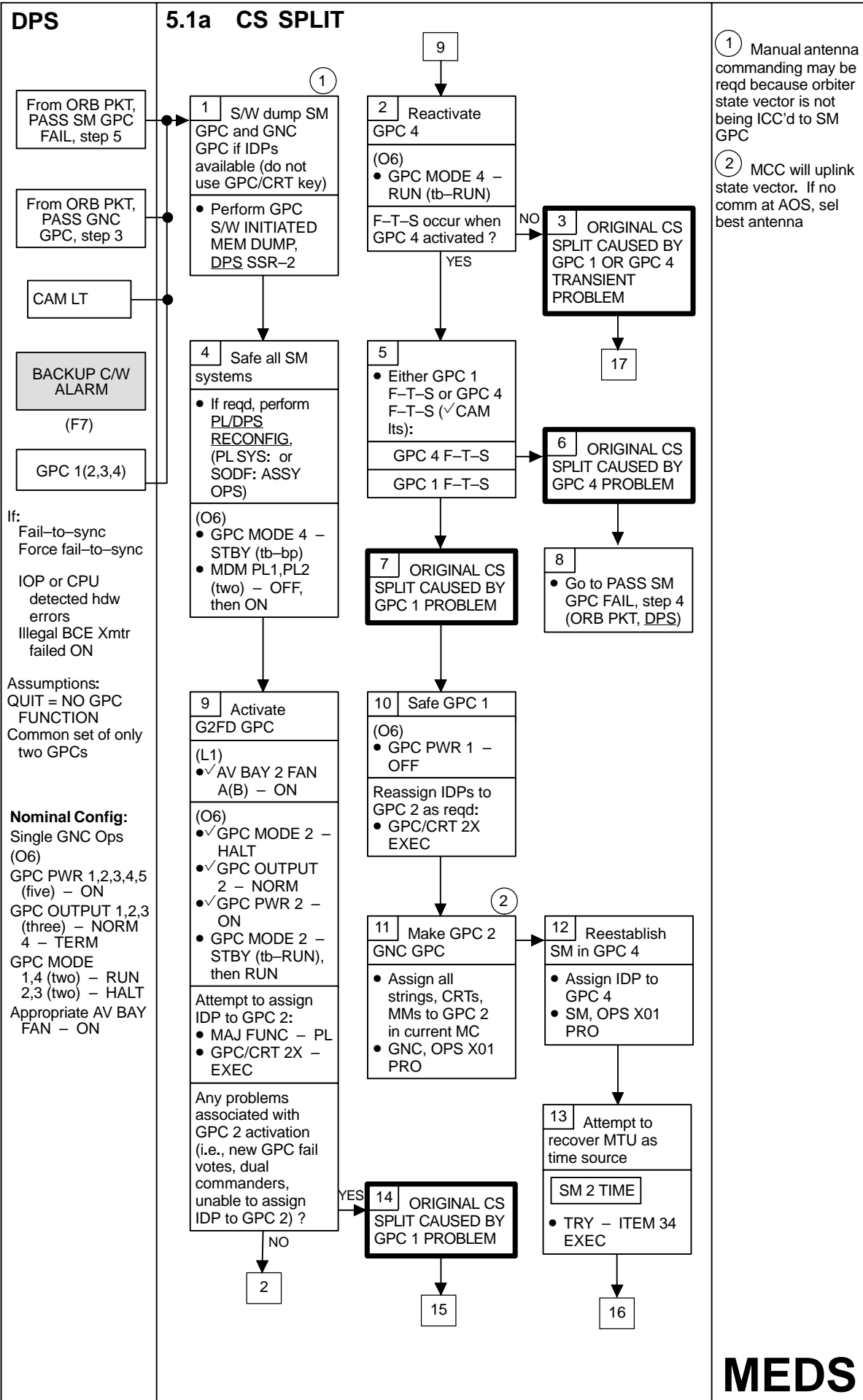
- CHECKSUM FAIL IDP 1(2,3,4)
- MDU LOAD FAIL mduX
- OPERATOR REQUEST FAIL mduX
- PORT CHANGE mduX

MEDS

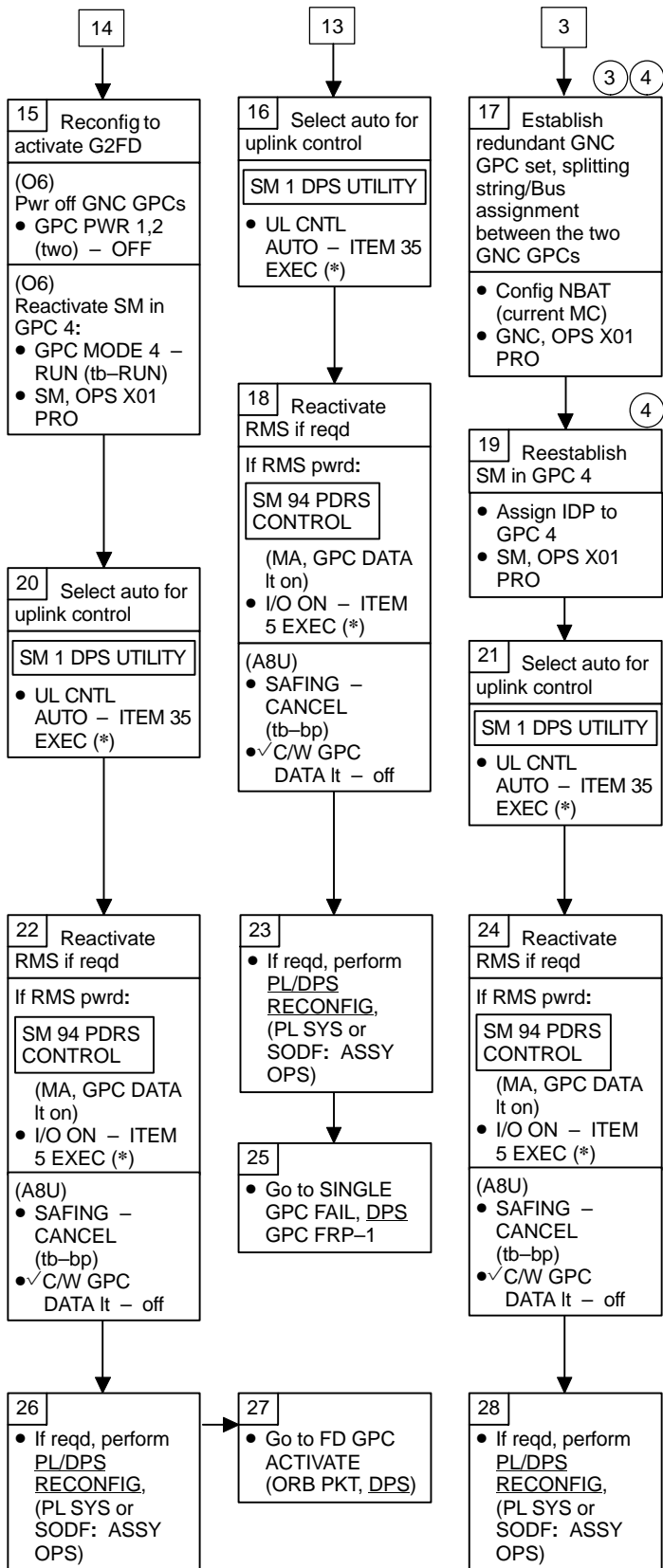


Computer Data Bus Network

* with exception of 'IC' buses between GPCs and dedicated 'IP' bus to PCMMUs, any GPC can command/listen on any data bus
 ** Mission-dependent (RMS reqd)
 *** Mission-dependent Payload Bus Interfaces
 (FLEX MDMs, FLEX PAIRS)



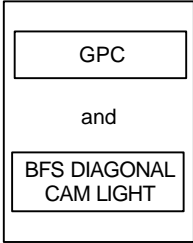
DPS 5.1a (Cont)



- ③ If single GNC config reqd, on MCC call, make GPC1 G2FD
- ④ Upon completion of procedure, MCC may request certain CRTs be pwrd on 10 sec to ensure DEU EQUIV uplink I/F to both GNC and SM

DPS

5.1b 'BFS GPC FAIL (BITE)' (ORBIT)

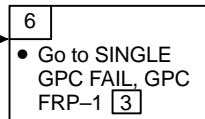
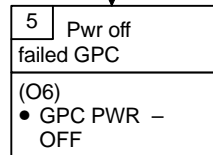
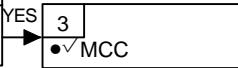
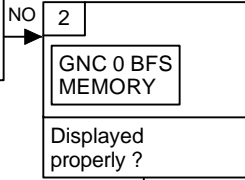
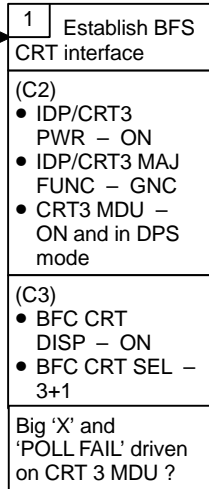


If:
IOP watchdog Timer times out (~3.1 sec)
or
two restarts within consecutive major cycles

SM ALERT

GPC BITE

If:
BFS S/W initiates restart



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DPS

5.2a 'I/O ERROR MMU 1(2)'

SM ALERT

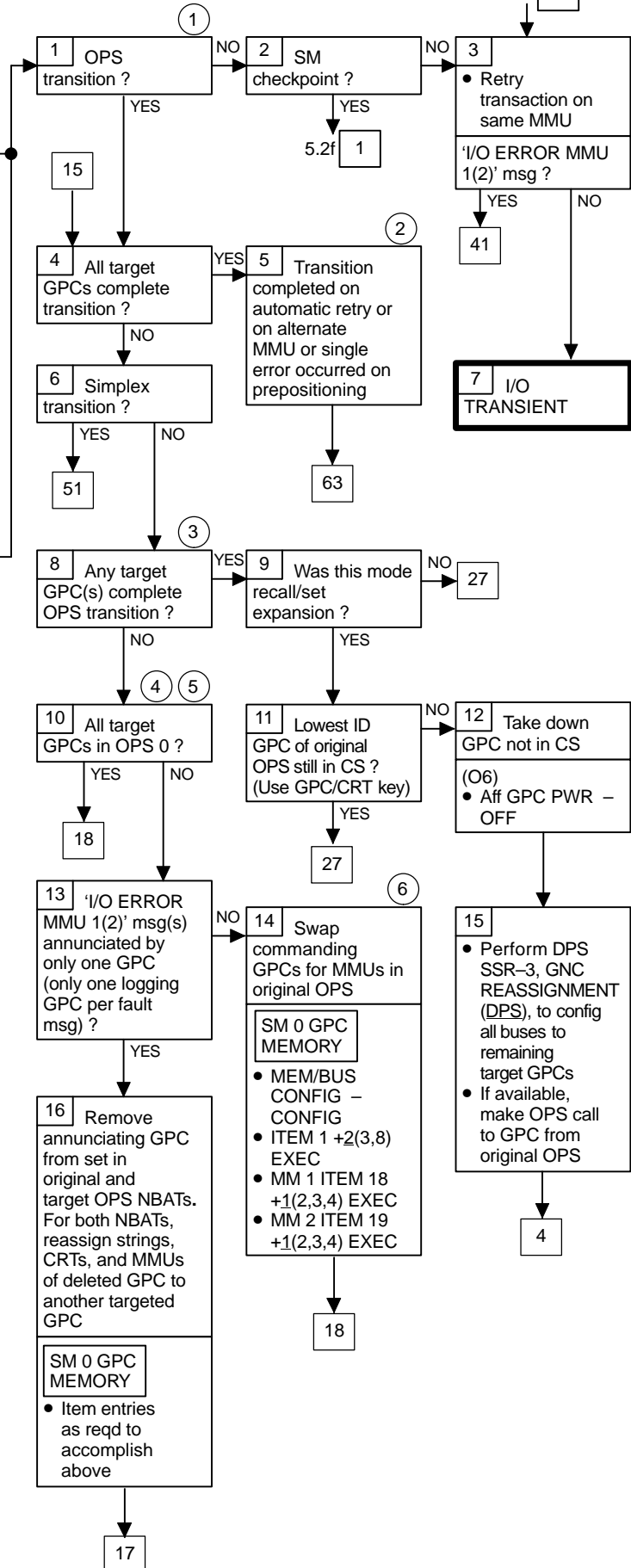
I/O ERROR MMU 1(2)

If:
CHECKSUM, I/O transient, BCE failure, MMU failure, or source GPC failure

During:
Display roll-in, OPS transition
SM checkpoint
TFL/DFL
MM patch

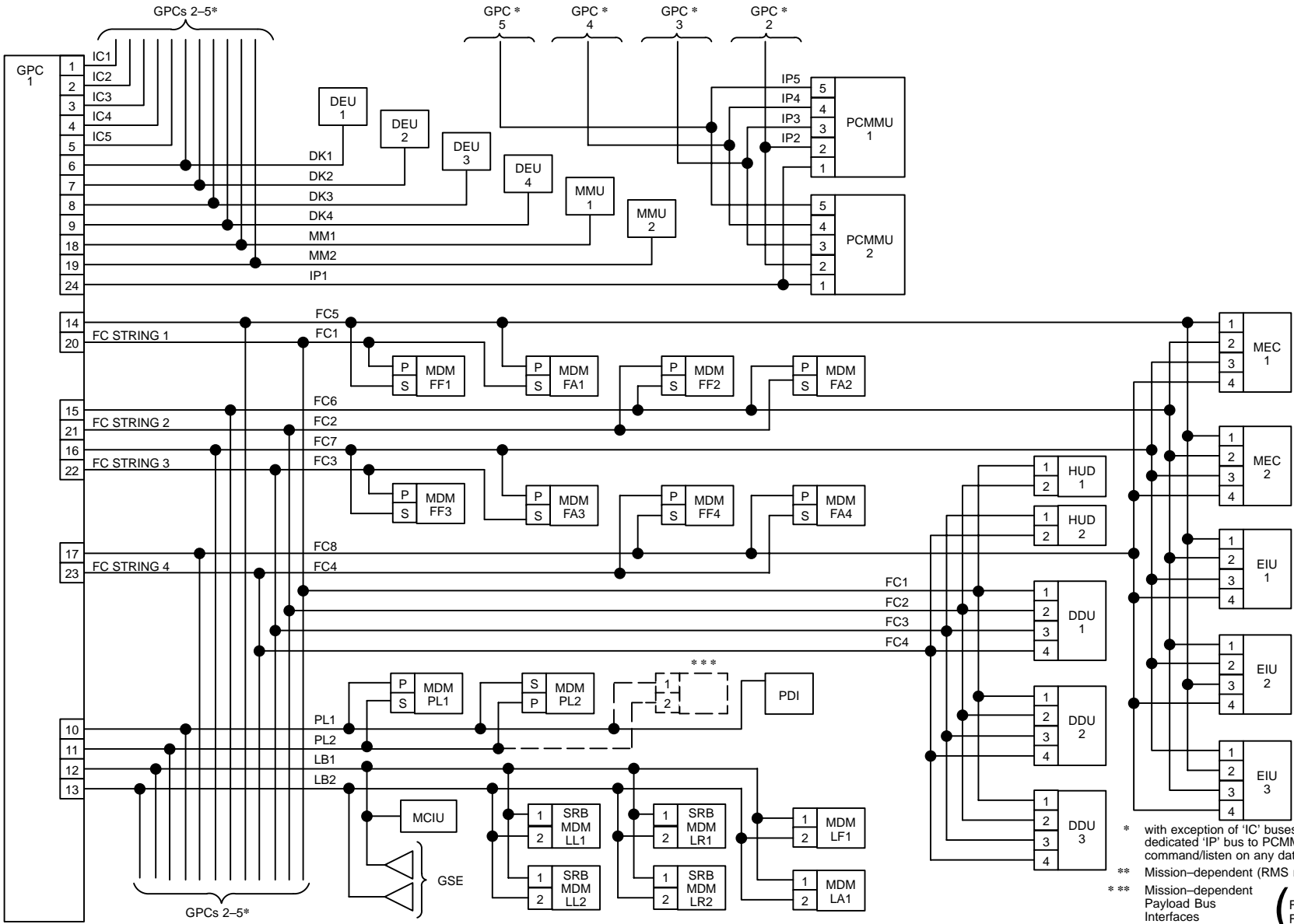
From ORB PKT, FD GPC ACTIVATE, step 1

Nominal Config:
(O14:F)
MMU 1 - ON
(O15:F)
MMU 2 - ON
(O6)
IPL SOURCE - OFF



- ① Any previously failed MMU should be prime selected for GNC prior to OPS transition
- ② Health of affected MMU can be verified by GNC OPS transition (with MCC concurrence), SM roll-in request, or IMU checkpoint read
- ③ RS target GPC(s) not receiving overlay will F-T-S, but remain in OPS 0 of common set. For GPCs not receiving overlay, IDPs are still assigned per new OPS NBAT. Any IDPs targeted for F-T-S GPCs distributed to lowest number GPC of new target set
- ④ If GPC fail votes and fault msgs and 'OFF/BUSY MMU' msg(s) occur, then GPCs are in CS OPS 0. Transition unsuccessful because of MMU or commanding GPC Xmtr failure, and alt MMU OFF/BSY or selected for IPL. For two GPC RS, will get off-diagonal CAM lights. For three or more GPC RS, will get I-fail
- ⑤ For all RS GPCs in OPS 0, CRT assignments are determined by target NBAT
- ⑥ Software uses NBAT of original OPS to select GPC to command each MMU for prepositioning

NOM

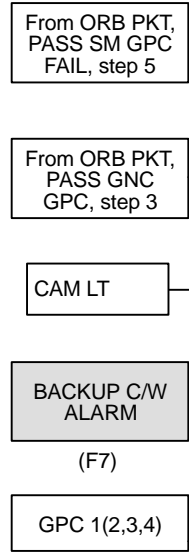


Computer Data Bus Network

* with exception of 'IC' buses between GPCs and dedicated 'IP' bus to PCMMUs, any GPC can command/listen on any data bus
 ** Mission-dependent (RMS reqd)
 *** Mission-dependent Payload Bus Interfaces
 (FLEX MDMs, FLEX PAIRS)

DPS

5.1a CS SPLIT



If:
 Fail-to-sync
 Force fail-to-sync
 IOP or CPU detected hwd errors
 Illegal BCE Xmtr failed ON

Assumptions:
 QUIT = NO GPC FUNCTION
 Common set of only two GPCs

Nominal Config:
 Single GNC Ops (O6)
 GPC PWR 1,2,3,4,5 (five) – ON
 GPC OUTPUT 1,2,3 (three) – NORM
 4 – TERM
 GPC MODE 1,4 (two) – RUN
 2,3 (two) – HALT
 Appropriate AV BAY FAN – ON

1 S/W dump SM GPC and GNC GPC if CRTs available (do not use GPC/CRT key)

- Perform GPC S/W INITIATED MEM DUMP, DPS SSR-2

4 Safe all SM systems

- If reqd, perform PL/DPS RECONFIG, (PL SYS or SODF: ASSY OPS)

(O6)

- GPC MODE 4 – STBY (tb-bp)
- MDM PL1,PL2 (two) – OFF, then ON

9 Activate G2FD GPC

(L1)

- AV BAY 2 FAN A(B) – ON

(O6)

- GPC MODE 2 – HALT
- GPC OUTPUT 2 – NORM
- GPC PWR 2 – ON
- GPC MODE 2 – STBY (tb-RUN), then RUN

Attempt to assign CRT to GPC 2:

- CRT 1(2,3,4) MF – PL
- GPC/CRT 2X – EXEC

Any problems associated with GPC 2 activation (i.e., new GPC fail votes, dual commanders on CRTs, unable to assign CRT to GPC 2)?

2 Reactivate GPC 4

(O6)

- GPC MODE 4 – RUN (tb-RUN)

F-T-S occur when GPC 4 activated?

5

- Either GPC 1 F-T-S or GPC 4 F-T-S (✓CAM lts):
- GPC 4 F-T-S
- GPC 1 F-T-S

7 ORIGINAL CS SPLIT CAUSED BY GPC 1 PROBLEM

10 Safe GPC 1

(O6)

- GPC PWR 1 – OFF

Reassign CRTs to GPC 2 as reqd:

- GPC/CRT 2X EXEC

11 Make GPC 2 GNC GPC

- Assign all strings, CRTs, MMs to GPC 2 in current MC
- GNC, OPS X01 PRO

14 ORIGINAL CS SPLIT CAUSED BY GPC 1 PROBLEM

3 ORIGINAL CS SPLIT CAUSED BY GPC 1 OR GPC 4 TRANSIENT PROBLEM

6 ORIGINAL CS SPLIT CAUSED BY GPC 4 PROBLEM

8

- Go to PASS SM GPC FAIL, step 4 (ORB PKT, DPS)

12 Reestablish SM in GPC 4

- Assign CRT to GPC 4
- SM, OPS X01 PRO

13 Attempt to recover MTU as time source

SM 2 TIME

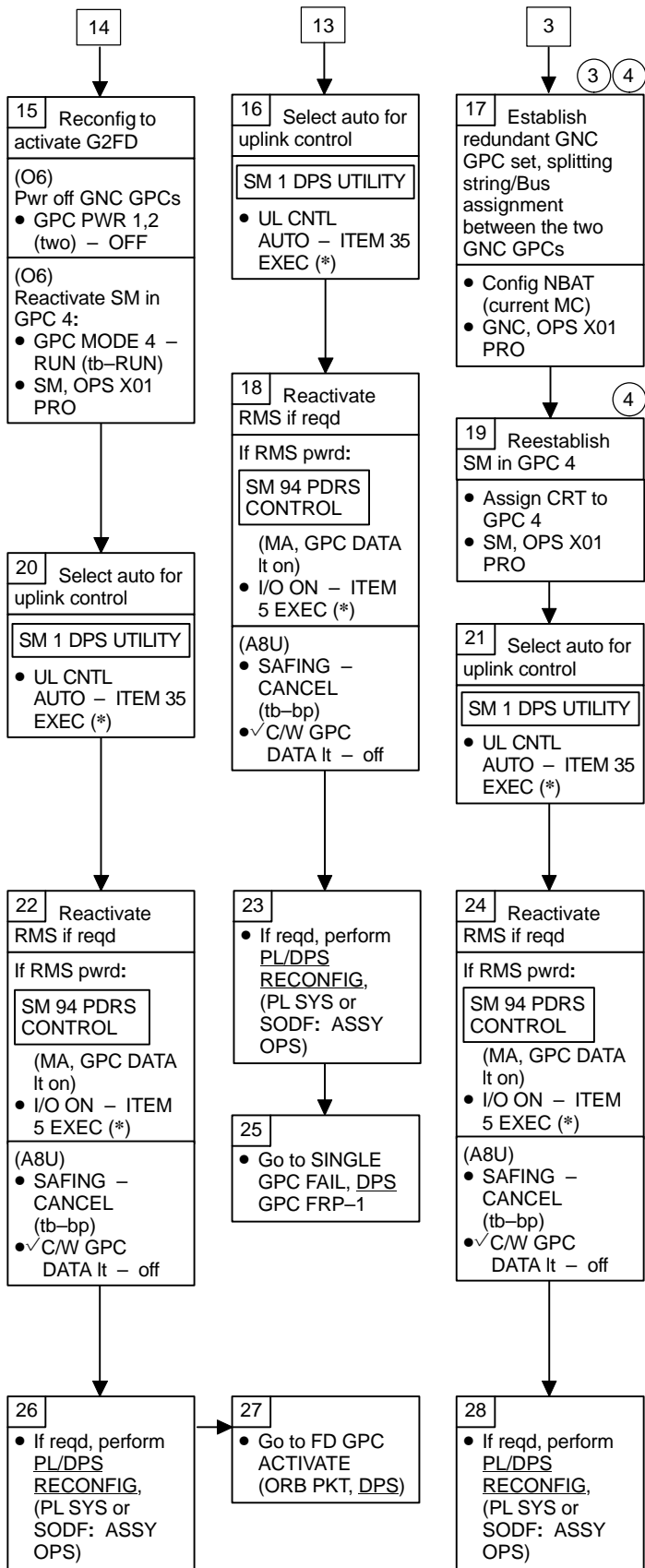
- TRY – ITEM 34 EXEC

1 Manual antenna commanding may be reqd because orbiter state vector is not being ICC'd to SM GPC

2 MCC will uplink state vector. If no comm at AOS, sel best antenna

NOM

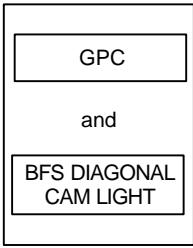
DPS 5.1a (Cont)



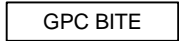
- ③ If single GNC config reqd, on MCC call, make GPC1 G2FD
- ④ Upon completion of procedure, MCC may request certain CRTs be pwr'd on 10 sec to ensure DEU EQUIV uplink I/F to both GNC and SM

DPS

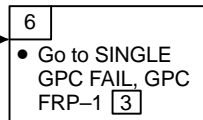
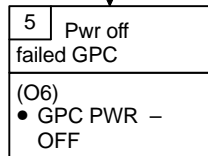
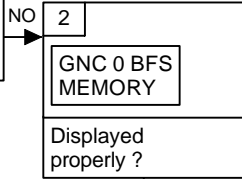
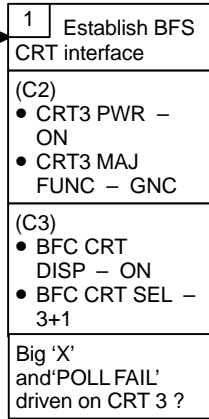
5.1b 'BFS GPC FAIL (BITE)' (ORBIT)



If:
IOP watchdog Timer times out (~3.1 sec)
or
two restarts within consecutive major cycles



If:
BFS S/W initiates restart



NOM

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DPS

5.2a 'I/O ERROR MMU 1(2)'

SM ALERT

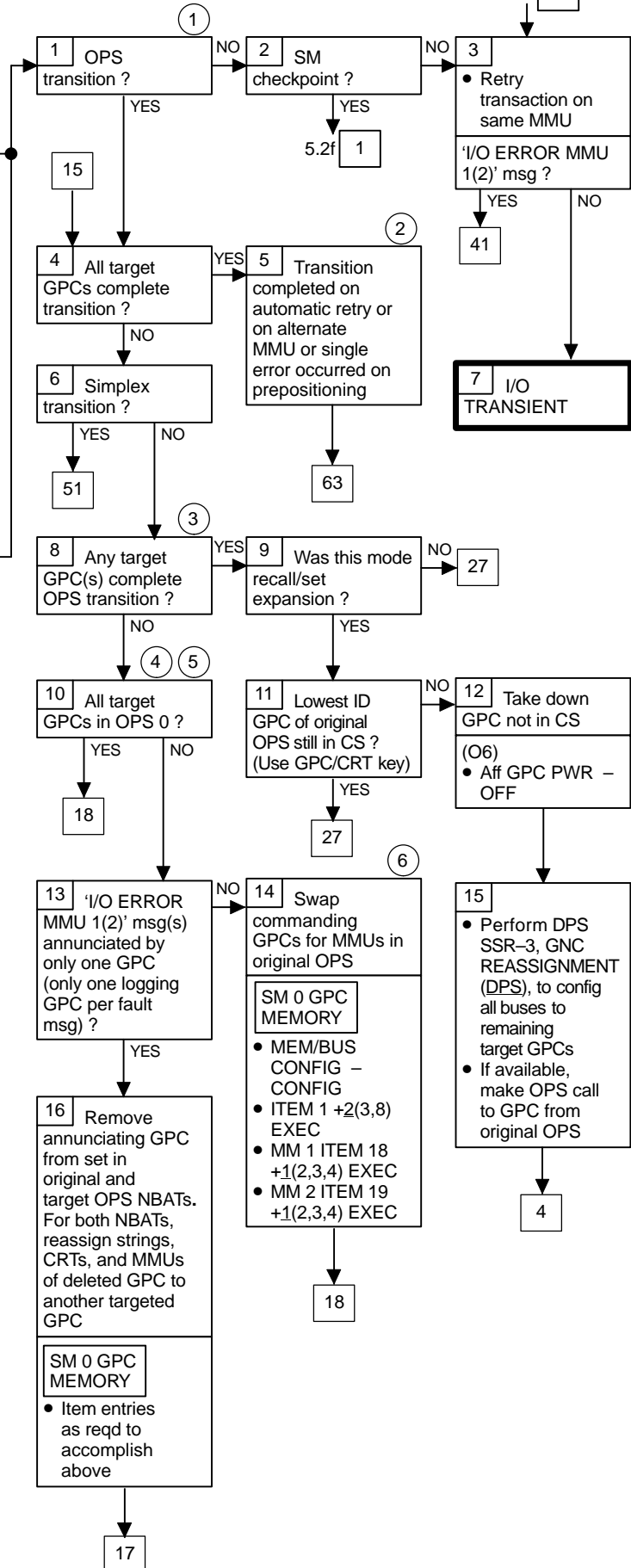
I/O ERROR MMU 1(2)

If:
CHECKSUM, I/O transient, BCE failure, MMU failure, or source GPC failure

During:
Display roll-in DEU IPL, OPS transition SM checkpoint TFL/DFL MM patch

From ORB PKT, FD GPC ACTIVATE, step 1

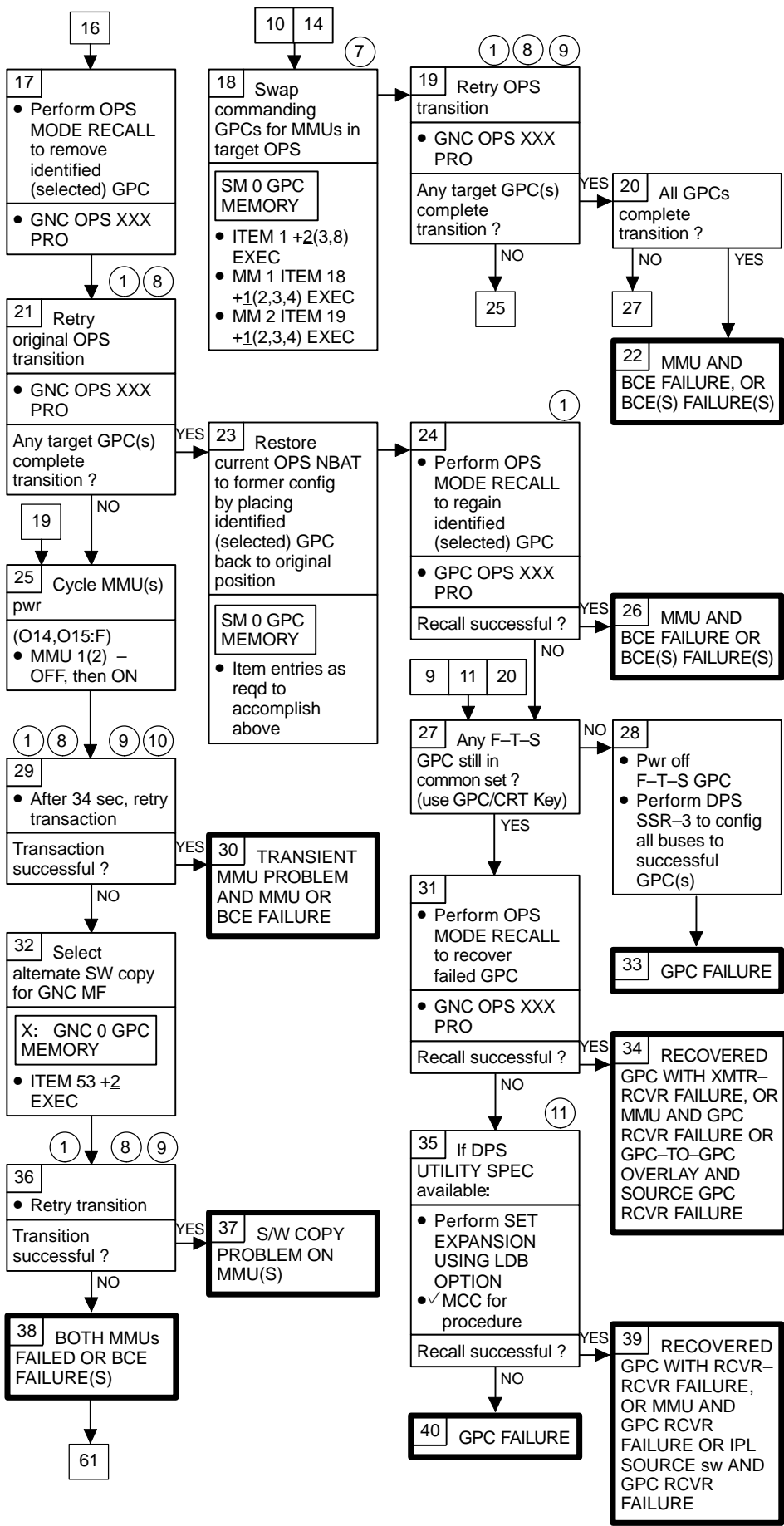
Nominal Config:
(O14:F)
MMU 1 - ON
(O15:F)
MMU 2 - ON
(O6)
IPL SOURCE - OFF



- ① Any previously failed MMU should be prime selected for GNC prior to OPS transition
- ② Health of affected MMU can be verified by GNC OPS transition (with MCC concurrence), SM roll-in request, or IMU checkpoint read
- ③ RS target GPC(s) not receiving overlay will F-T-S, but remain in OPS 0 of common set. For GPCs not receiving overlay, CRTs are still assigned per new OPS NBAT. Any CRTs targeted for F-T-S GPCs distributed to lowest number GPC of new target set
- ④ If GPC fail votes and fault msgs and 'OFF/BUSY MMU' msg(s) occur, then GPCs are in CS OPS 0. Transition unsuccessful because of MMU or commanding GPC Xmtr failure, and alt MMU OFF/BSY or selected for IPL. For two GPC RS, will get off-diagonal CAM lights. For three or more GPC RS, will get I-fail
- ⑤ For all RS GPCs in OPS 0, CRT assignments are determined by target NBAT
- ⑥ Software uses NBAT of original OPS to select GPC to command each MMU for prepositioning

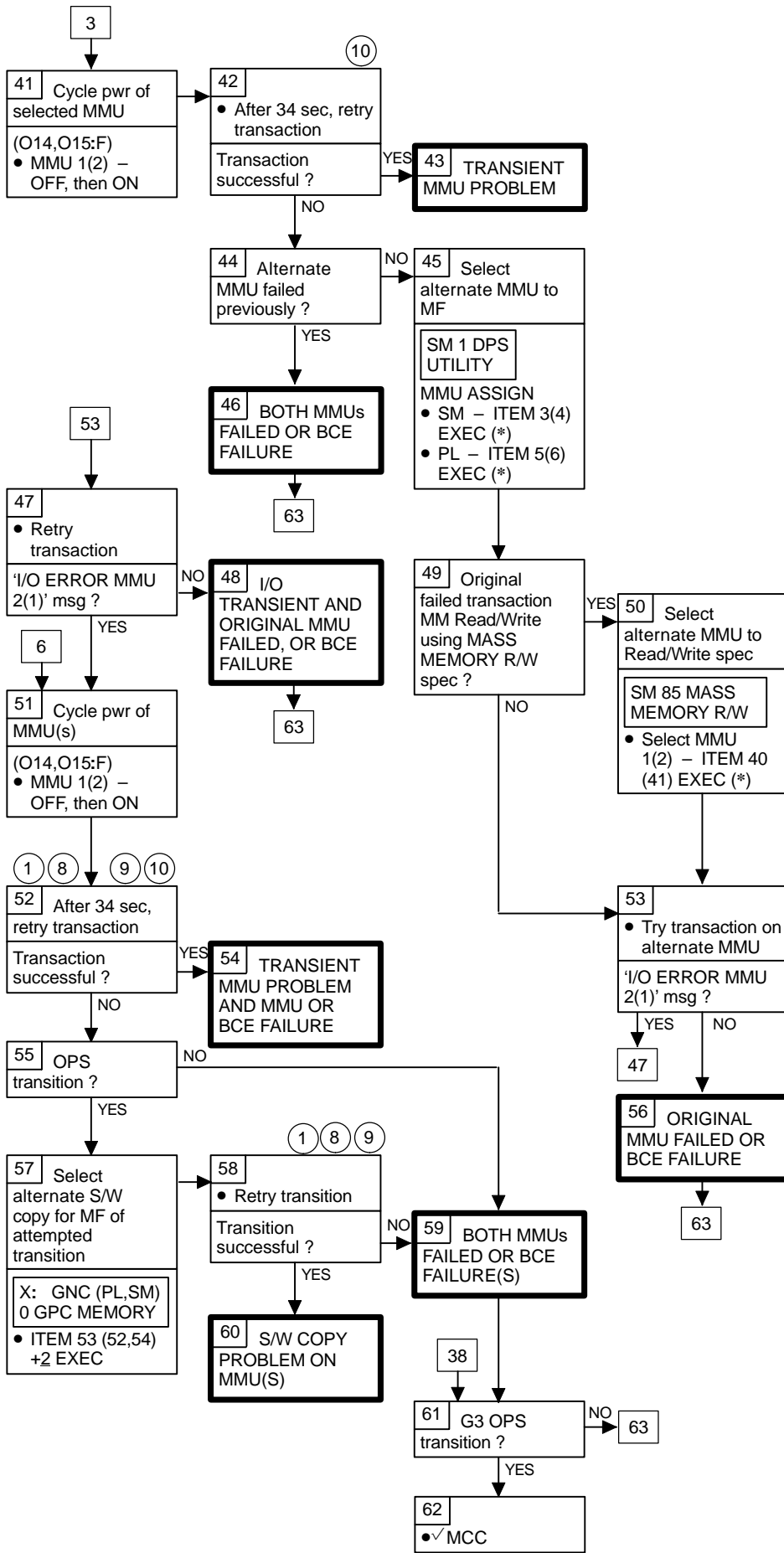
NOM

DPS 5.2a (Cont)



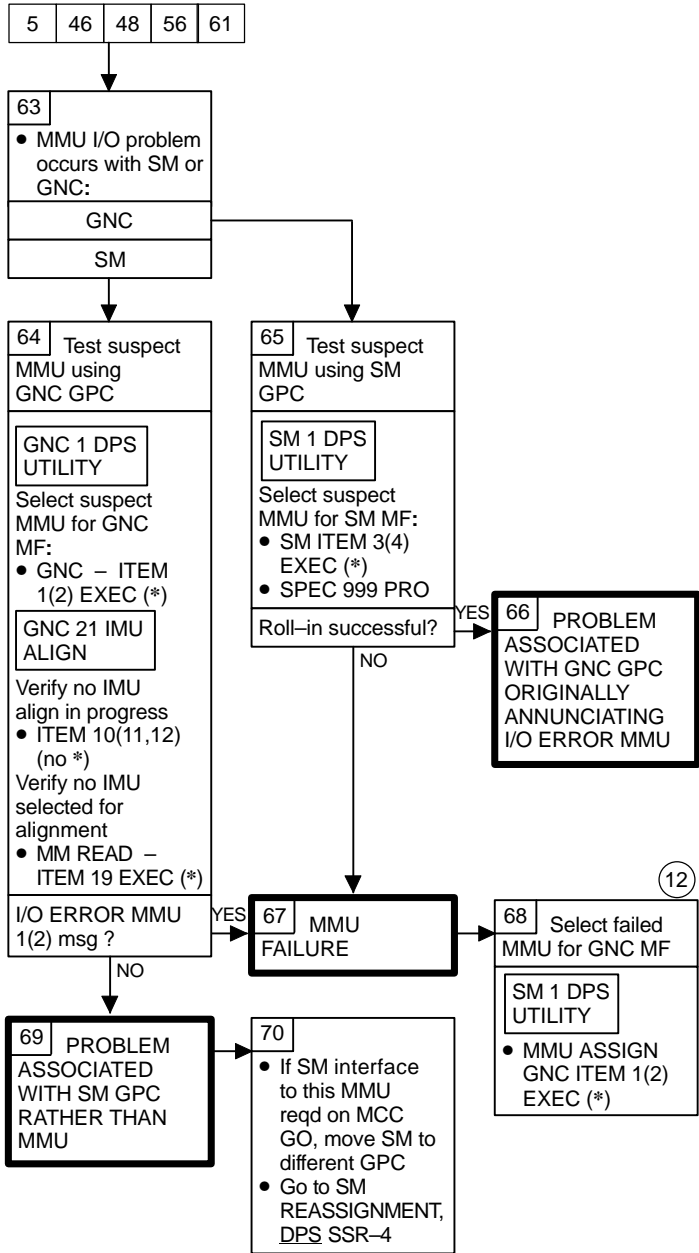
- ① Any previously failed MMU should be prime selected for GNC prior to OPS transition
- ⑦ Software uses NBAT of target OPS to select GPC to command each MMU for the overlay reads
- ⑧ OPS transition may require up to 68 sec to complete
- ⑨ If original transition G2/G8 and in OPS 0, transition to G2, then G8 to avoid illegal entry msg
- ⑩ Cycling pwr causes positioning of tape which may require up to 34 sec
- ⑪ If SPEC not available, GPC may be recoverable using R/W to select LDB option

DPS 5.2a (Cont)



- ① Any previously failed MMU should be prime selected for GNC prior to OPS transition
- ⑧ OPS transition may require up to 68 sec to complete
- ⑨ If original transition G2/G8 and in OPS 0, transition to G2, then G8 to avoid illegal entry msg
- ⑩ Cycling pwr causes positioning of tape which may require up to 34 sec

DPS 5.2a (Cont)



12 Selecting failed MMU for GNC MF protects against GPC RCV failures occurring after OPS transition prepositioning

DPS

5.2b 'OFF/BUSY MMU 1(2)'

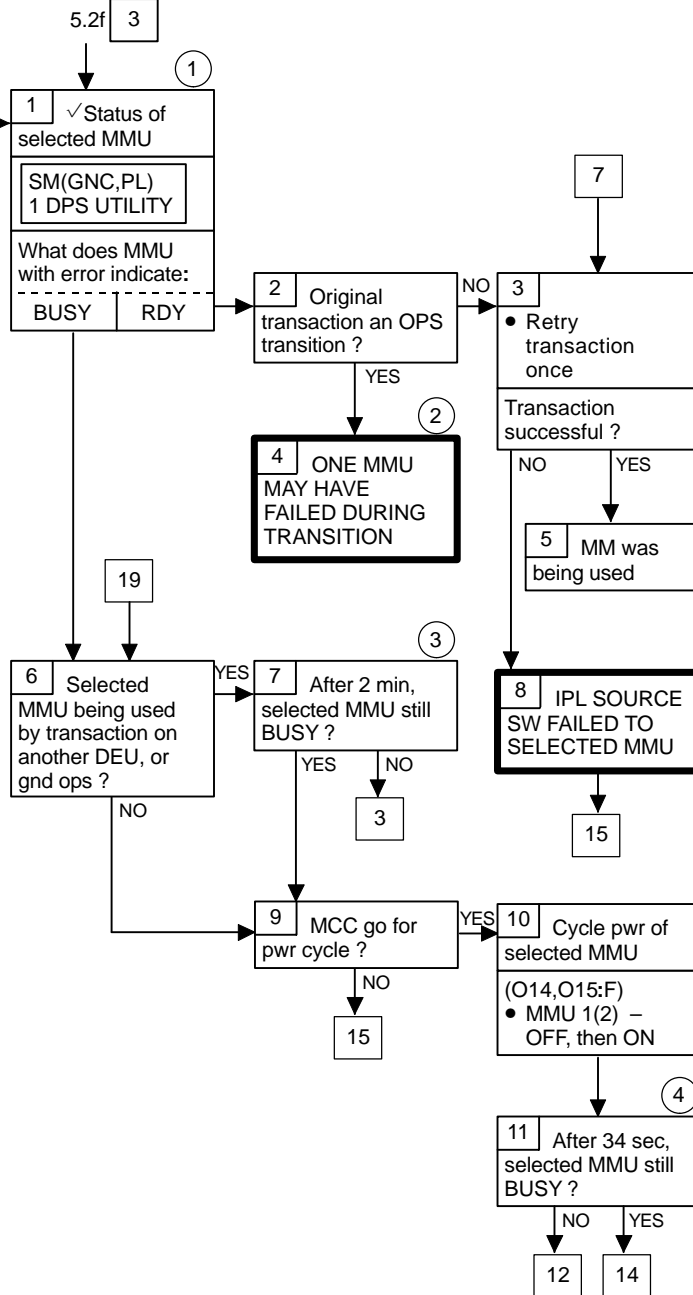
SM ALERT

OFF/BUSY MMU 1(2)

If:
MMU OFF
MMU selected for IPL on normal transaction
MMU BUSY

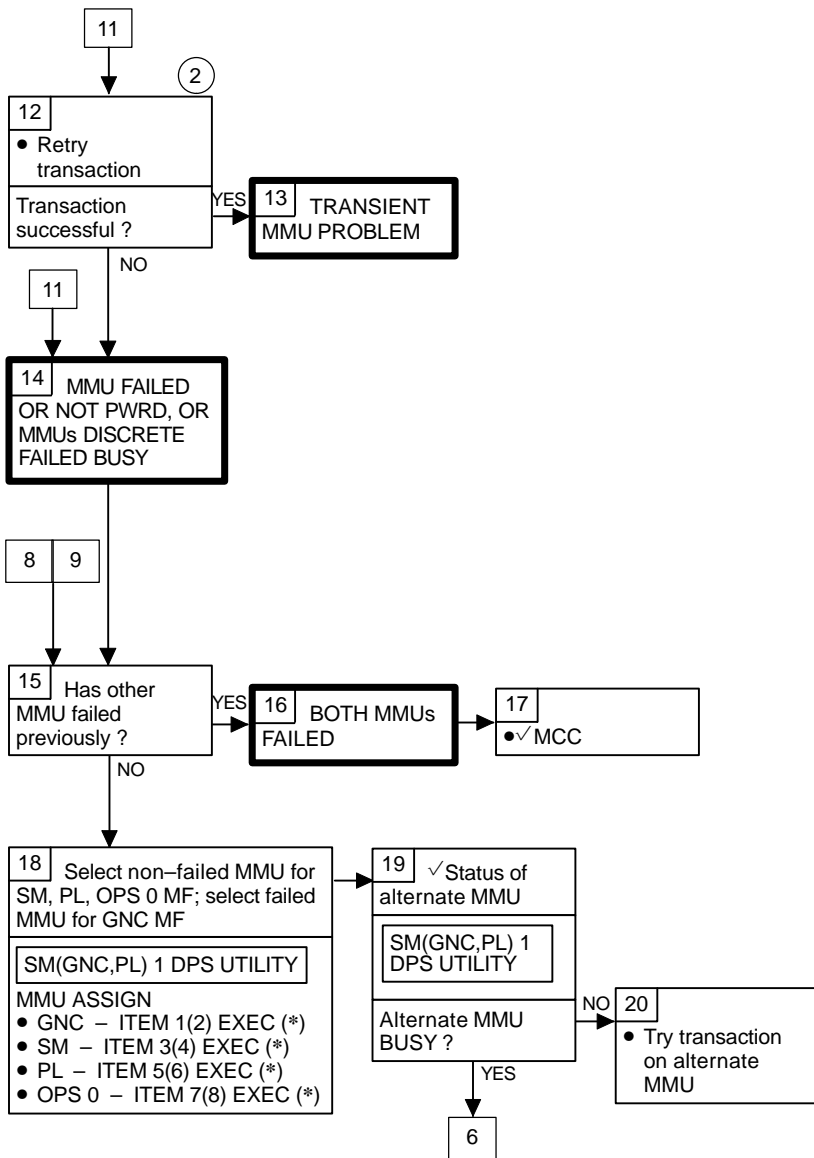
From ORB PKT, FD GPC ACTIVATE, step 1

Nominal Config:
(O14:F)
MMU 1 - ON
(O15:F)
MMU 2 - ON
(O6)
IPL SOURCE - OFF



- ① If OPS XTION and GPC fail votes and msgs occur, then GPCs are in CS OPS 0 caused by MMU or commanding GPC XMTR failure, and alternate MMU off/busy or selected for IPL. For two GPC RS, will get off-diagonal CAM lights. For three or more GPC RS, will get I-fail
- ② Health of affected MMU can be verified by GNC OPS XTION (with MCC concurrence) or SM roll-in request
- ③ If MMU busy for > 70 sec (non-IPL), or > 2 min (IPL), MMU assumed failed. For MCC implemented use of MMU, time may be considerably longer
- ④ Cycling pwr causes positioning of tape which may require up to 34 sec

DPS 5.2b (Cont)



② Health of affected MMU can be verified by GNC OPERATION (with MCC concurrence) or SM roll-in request

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DPS

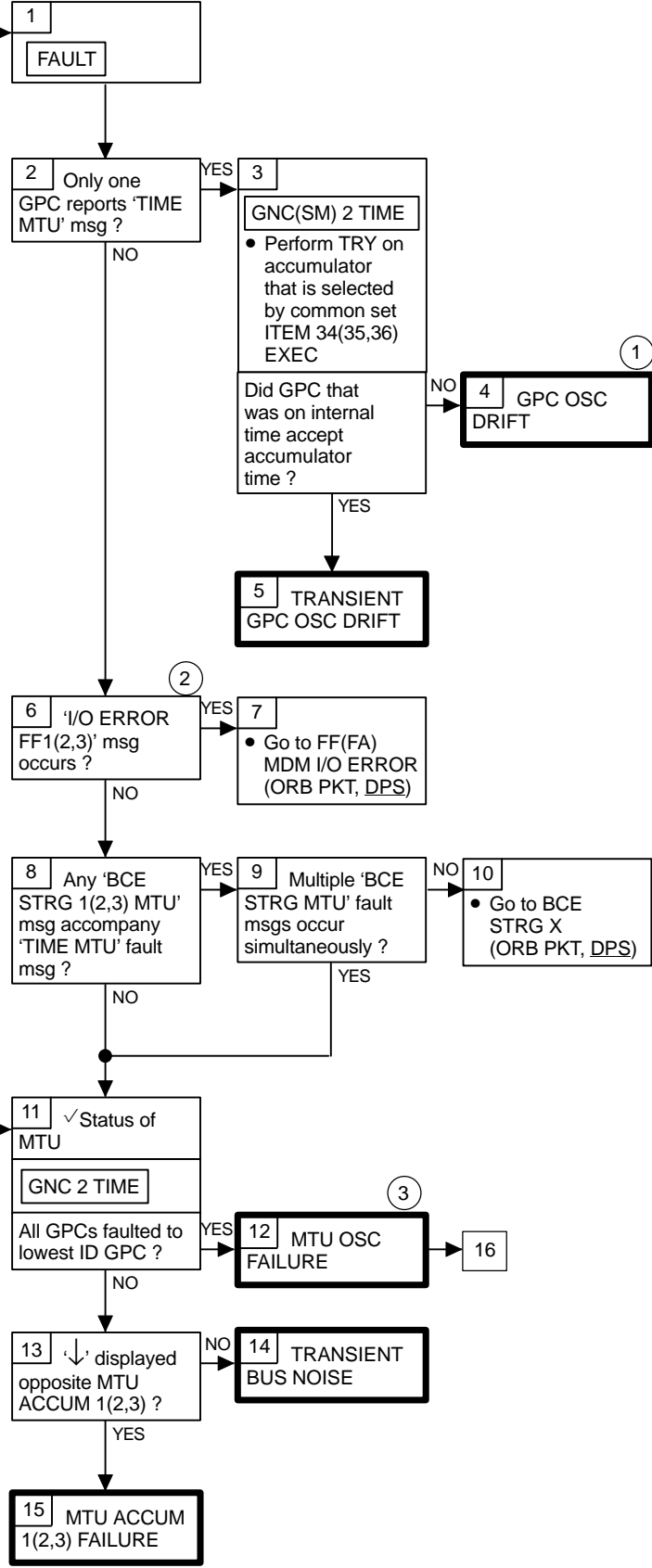
5.2d 'TIME MTU'

SM ALERT
TIME MTU

If: GPC GMT time source change

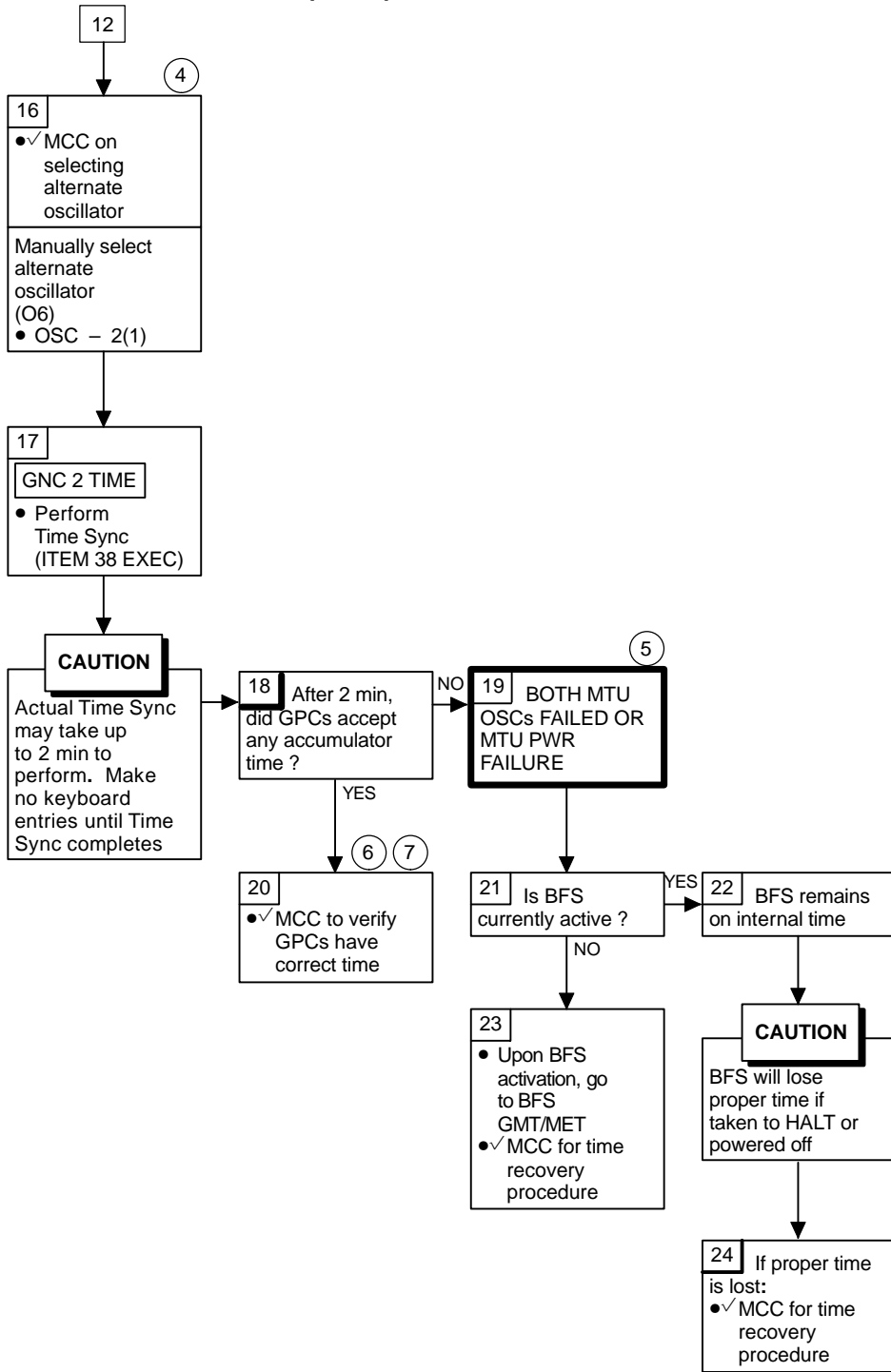
Nominal Config:
(O6)
MTU - AUTO
(O13:A)
cb ESS 1BC MTU
A - cl
(O13:C)
cb ESS 2CA MTU
B - cl

From ORB PKT,
BCE STRG X,
step 5



- ① If GPC is on its own internal time, loss-of-sync may occur
- ② If 'I/O ERROR' has occurred, failure caused by equipment other than MTU
- ③ Electronics on OSC board have failed in portion of MTU not covered by auto switch circuitry

DPS 5.2d (Cont)

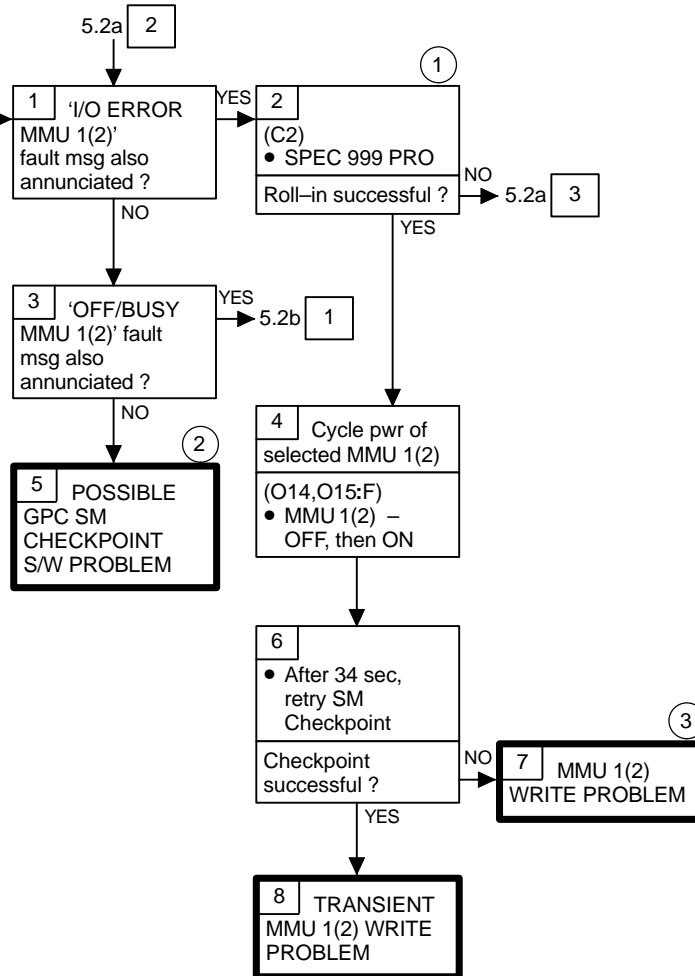


- ④ Crew cannot tell which oscillator is currently selected
- ⑤ GPCs will remain on internal time
- ⑥ '↓' on any remaining accumulators does not indicate problem. As long as GPCs accepted some accumulator time, time will update properly
- ⑦ MTU GMT and MET may have errors. D&C Timers are invalid until time is corrected. Action will extinguish any It on D&C Timers and reenable MTU sync signals

5.2f CHECKPOINT FAIL

If:
 MMU OFF
 MMU BUSY
 MMU selected for IPL
 Checksum Error
 I/O Transient
 MMU write failure
 MMU failure

Nominal Config:
 (O14:F)
 MMU 1 – ON
 (O15:F)
 MMU 2 – ON
 (O6)
 IPL SOURCE – OFF



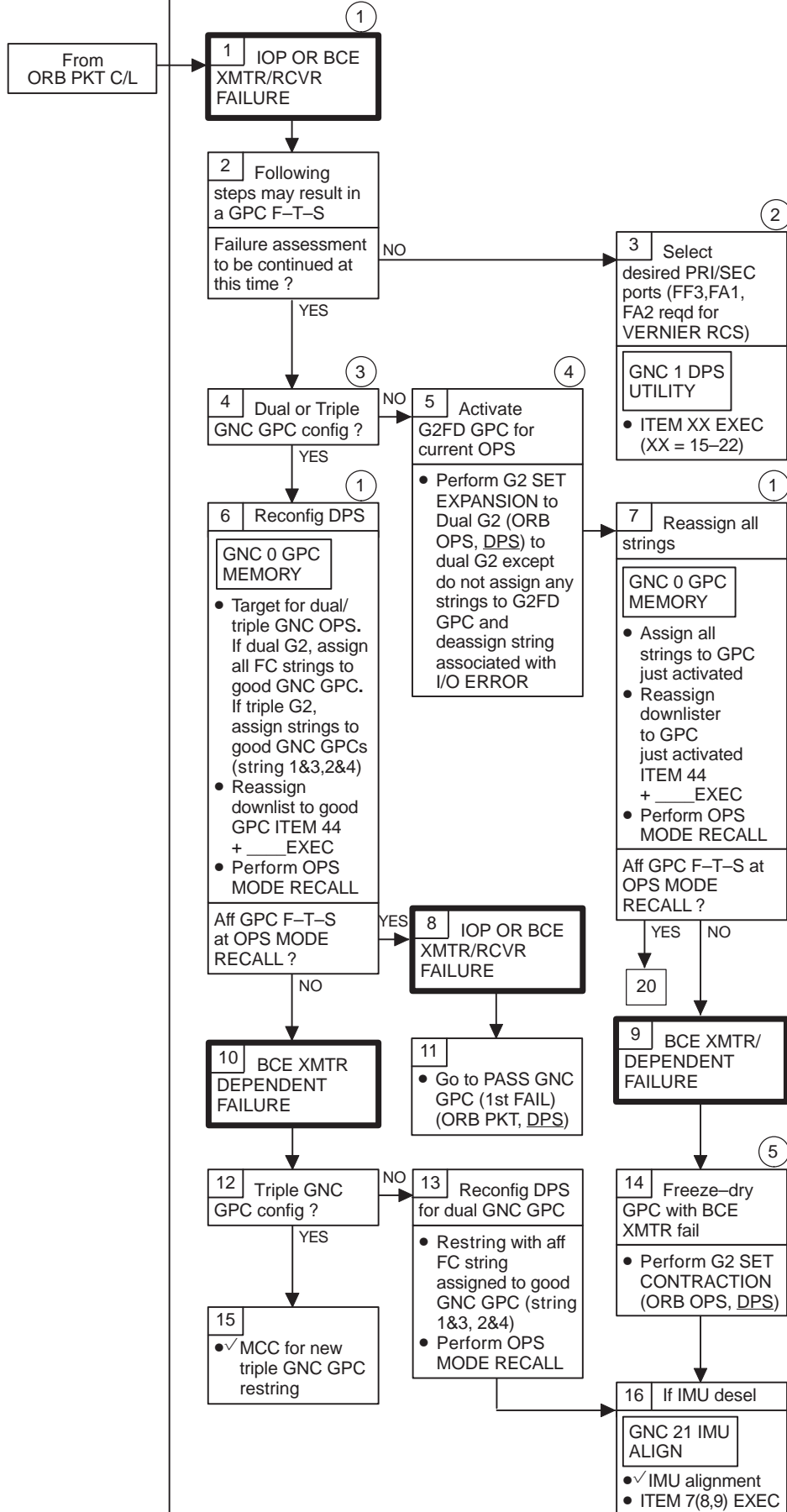
- ① SPEC 999 may be blank
- ② MMUs may be used for all other transactions. ✓ MCC for possible S/W dump of SM GPC
- ③ Affected MMU may be used for any tape read transaction including OPS transitions, TFL loads, and SM roll-in displays

MDM

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5.3

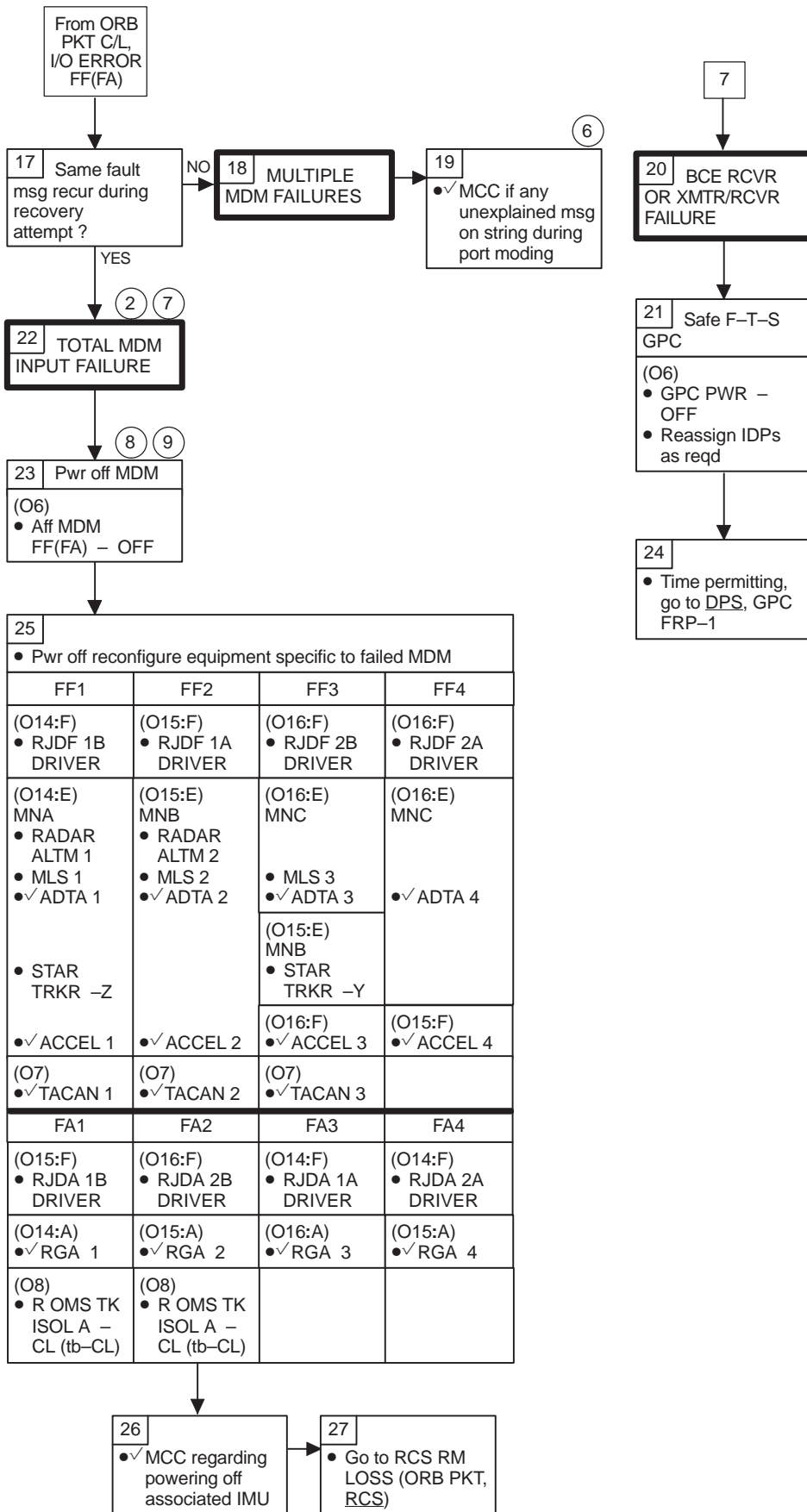
5.3a 'I/O ERROR FF(FA)'



- ① Mult MDM or GPC failures indicated if 'I/O ERROR' msg reoccurs after restrung with no F-T-S at blocks 6 or 7. ✓ MCC
- ② Go to MDM (REF) for summary of data lost on non-recovered MDM
- ③ BCE XMTR/RCVR failures cannot be differentiated from BCE XMTR only failures in single GNC GPC configs. Failure mode will affect DPS config in G3
- ④ Original GPC will F-T-S before overlays can be transferred to G2FD GPC if original GPC has BCE receiver failure on Flt Critical 1,2,3 if affected string is not deassigned for set expansion. Flt Critical 4 problem is handled same as Flt Critical 1,2,3 for procedure simplicity
- ⑤ If G8 OPS, delay G2 freeze-dry activity until after transition back to G2

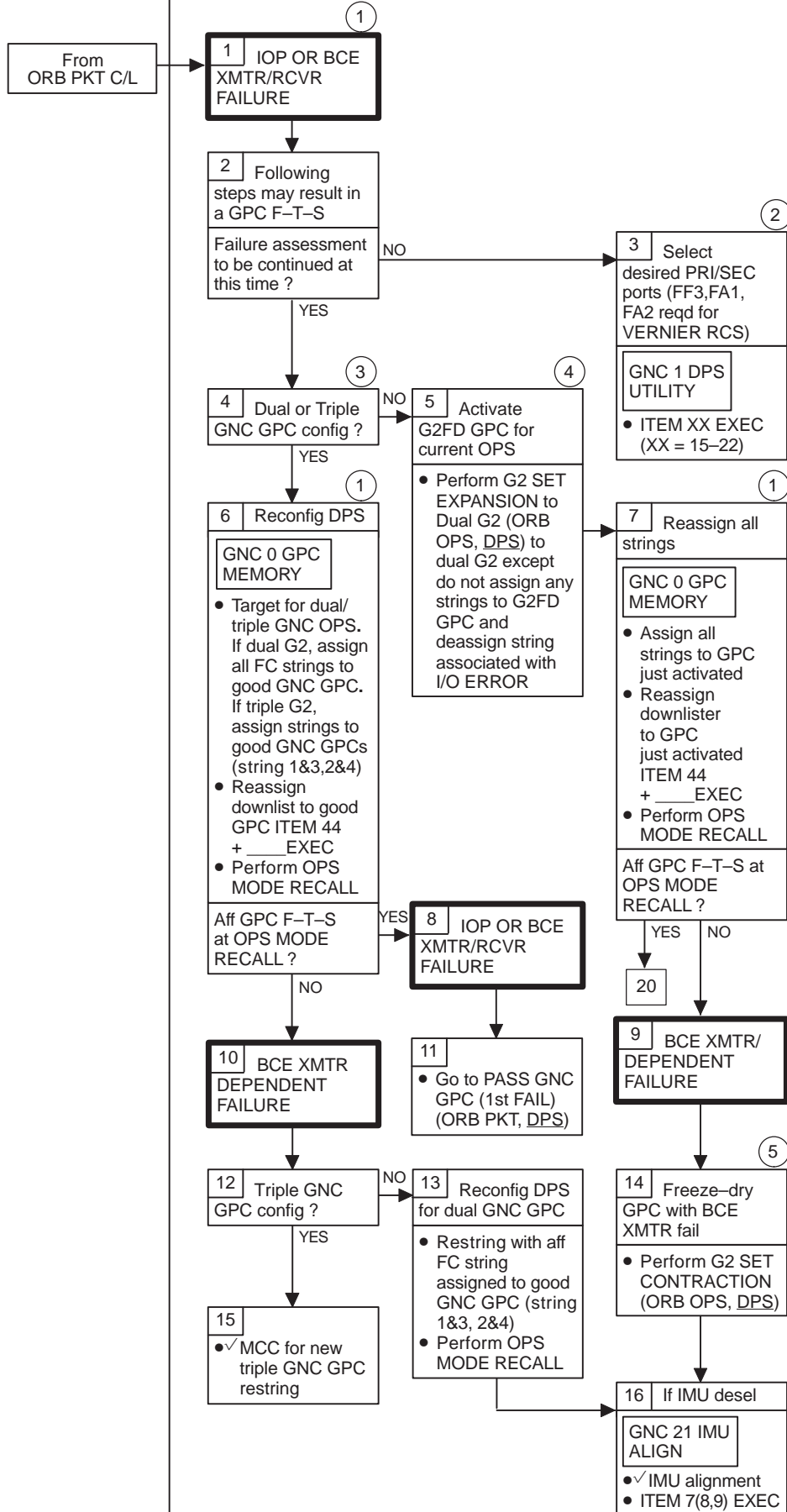
MEDS

DPS 5.3a (Cont)



- ② Go to **MDM** (REF) for summary of data lost on non-recovered MDM
- ⑥ Multiple MDM failures if any: 'BCE STRG' 'MDM OUTPUT' during attempt to recover 'I/O ERROR' 'I/O ERROR' during attempt to recover 'MDM OUTPUT'
- ⑦ Outputs may be good, erroneous or non-existent. At later time, MCC may wish to perform MM202 OMS TVC chk to assess MDM's output capability
- ⑧ If next ELEC, ECLS, APU/HYD, GNC, RCS, or DPS failure causes loss of fail-safe capability in FCS or RCS, the MDM may be repowered in order to regain any remaining output capability
- ⑨ If failed MDM is FF1, FF2, or FF3, MDM may be candidate for MDM CHANGEOUT (IFM). ✓MCC

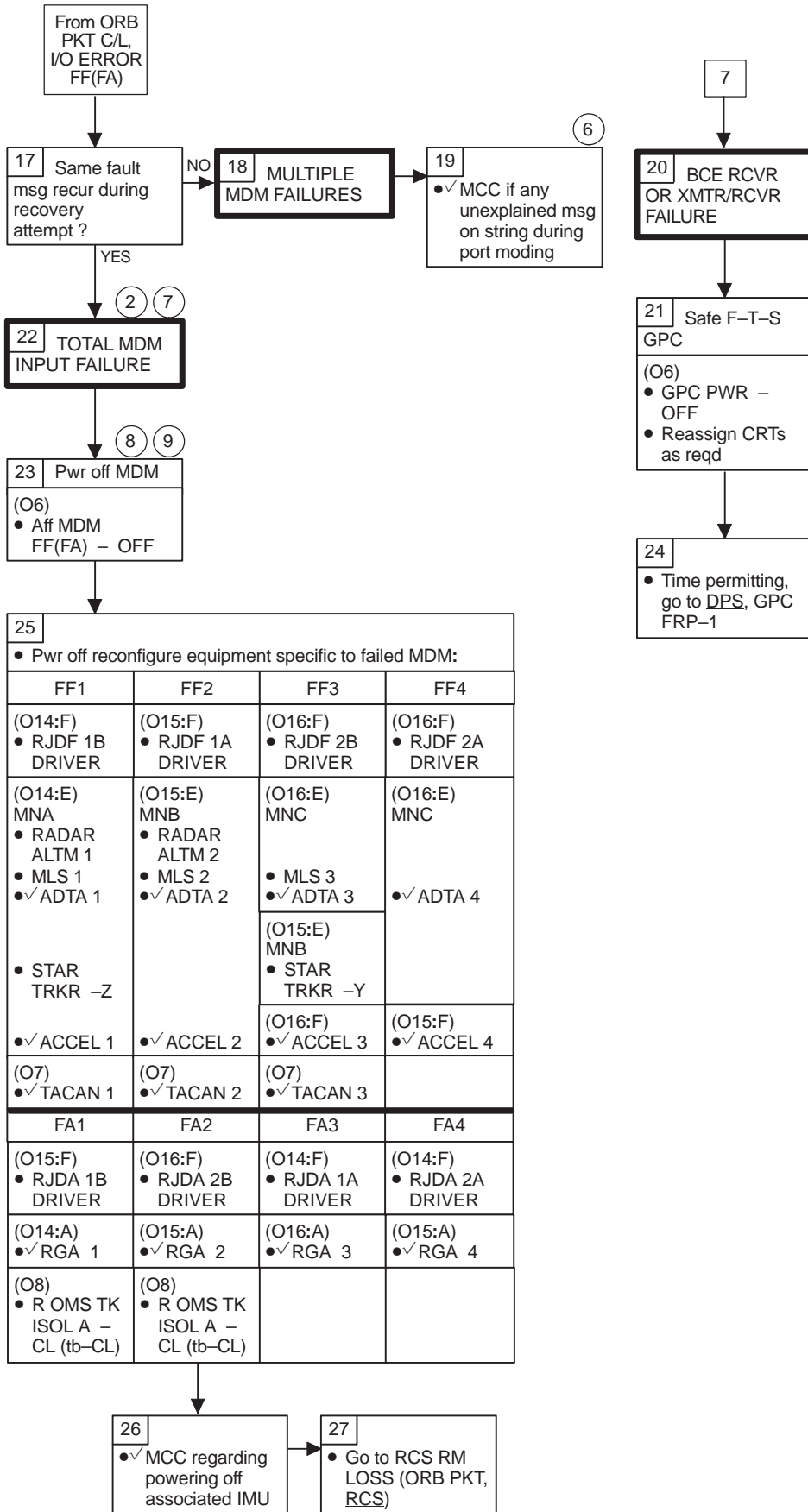
5.3a 'I/O ERROR FF(FA)'



- ① Mult MDM or GPC failures indicated if 'I/O ERROR' msg reoccurs after restrung with no F-T-S at blocks 6 or 7. ✓ MCC
- ② Go to MDM (REF) for summary of data lost on non-recovered MDM
- ③ BCE XMTR/RCVR failures cannot be differentiated from BCE XMTR only failures in single GNC GPC configs. Failure mode will affect DPS config in G3
- ④ Original GPC will F-T-S before overlays can be transferred to G2FD GPC if original GPC has BCE receiver failure on Flt Critical 1,2,3 if affected string is not deassigned for set expansion. Flt Critical 4 problem is handled same as Flt Critical 1,2,3 for procedure simplicity
- ⑤ If G8 OPS, delay G2 freeze-dry activity until after transition back to G2

NOM

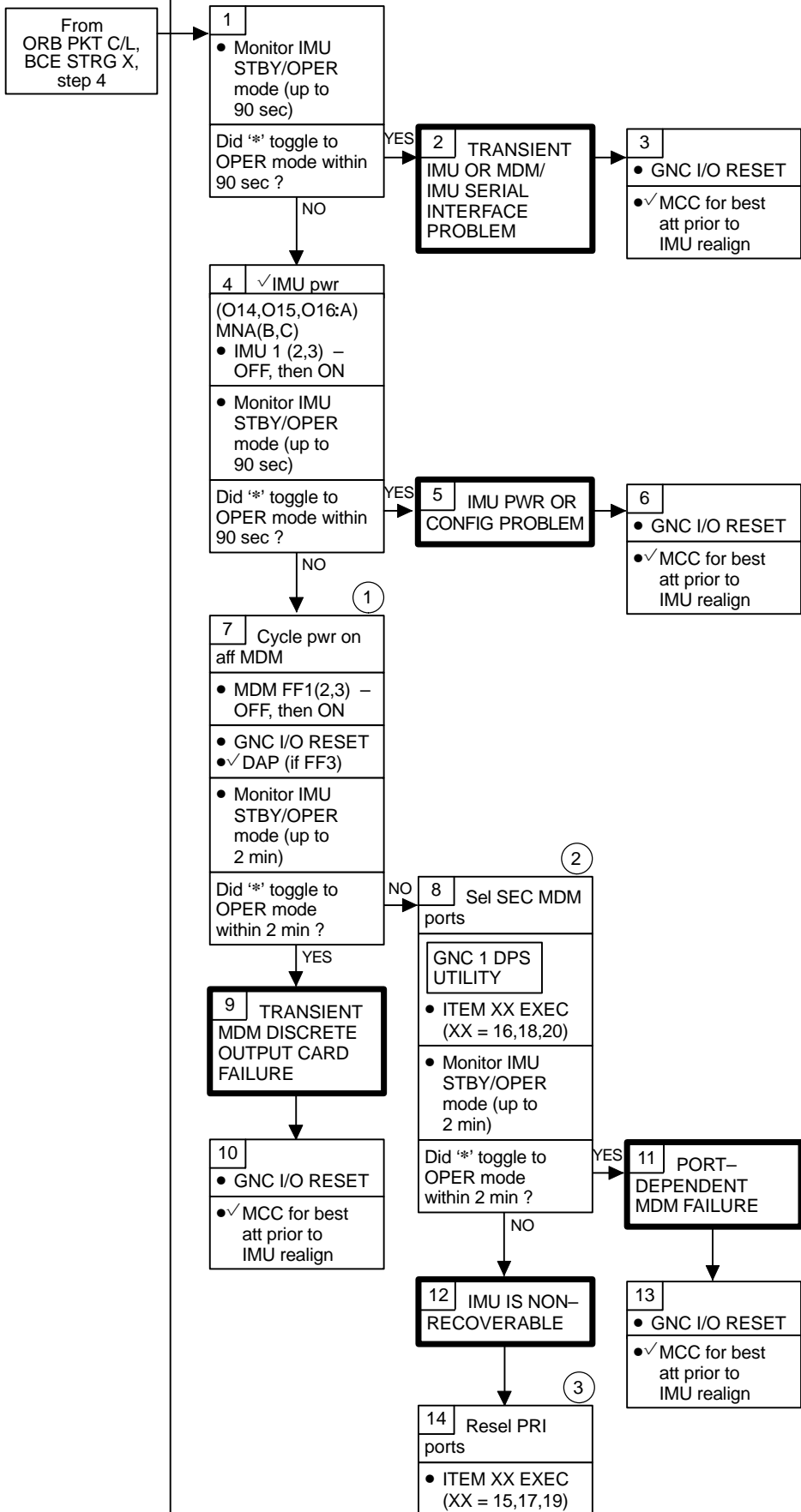
DPS 5.3a (Cont)



- ② Go to **MDM** (REF) for summary of data lost on non-recovered MDM
- ⑥ Multiple MDM failures if any: 'BCE STRG' 'MDM OUTPUT' during attempt to recover 'I/O ERROR' 'I/O ERROR' during attempt to recover 'MDM OUTPUT'
- ⑦ Outputs may be good, erroneous or non-existent. At later time, MCC may wish to perform MM202 OMS TVC chk to assess MDM's output capability
- ⑧ If next ELEC, ECLS, APU/HYD, GNC, RCS, or DPS failure causes loss of fail-safe capability in FCS or RCS, the MDM may be repowered in order to regain any remaining output capability
- ⑨ If failed MDM is FF1, FF2, or FF3, MDM may be candidate for MDM CHANGEOUT (IFM).
✓MCC

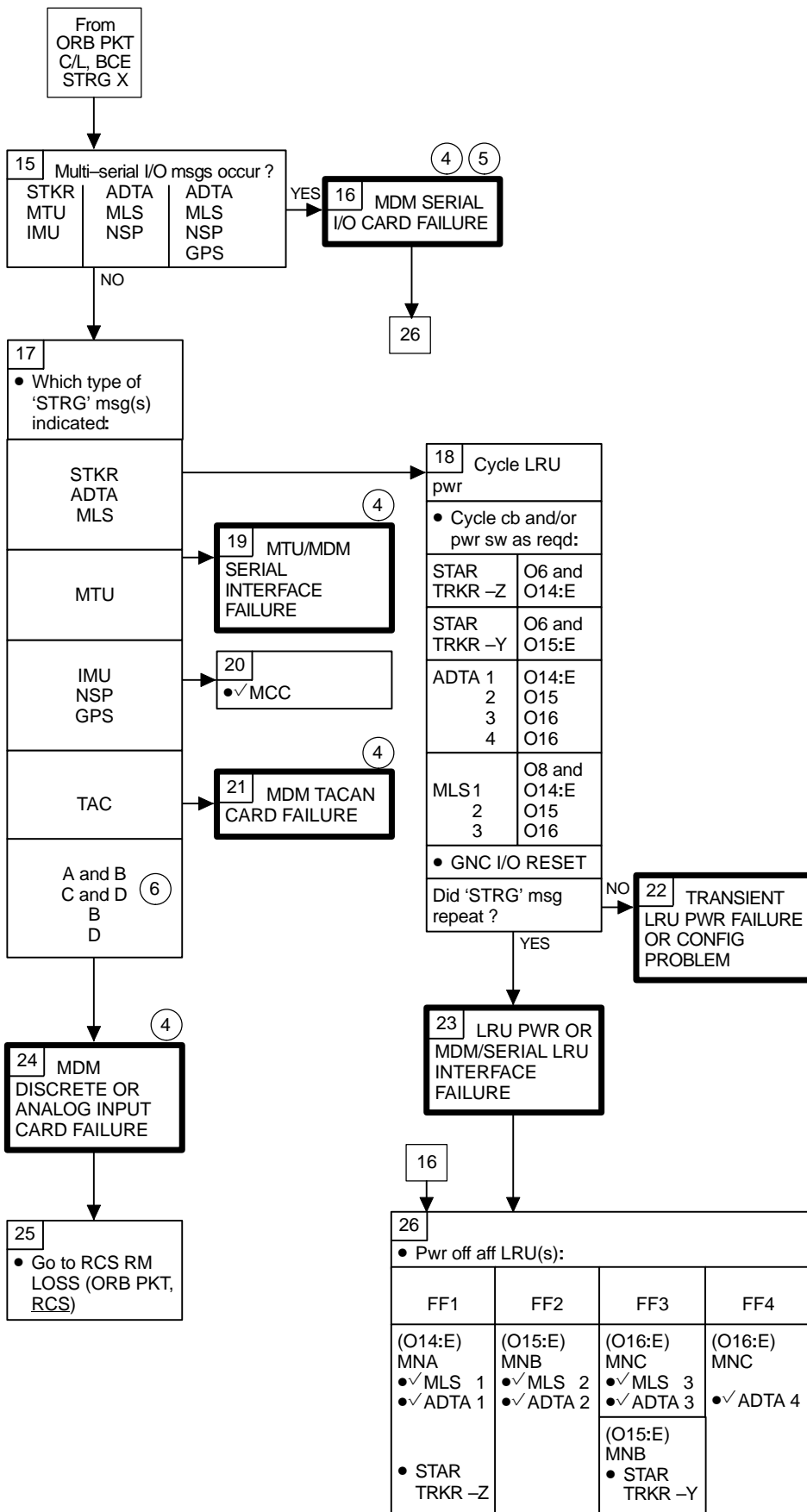
NOM

5.3b 'BCE STRG X'



- ① If VERNIER RCS sel and FF3 pwr cycled, DAP will downmode to free drift at MDM pwr cycle. Crew action reqd to resel DAP
- ② Following MDM port moding, if either 'I/O ERROR' or 'MDM OUTPUT' fault msg occurs, mode MDM ports back to PRI and ✓MCC
- ③ ✓MCC regarding powering off associated IMU

DPS 5.3b (Cont)



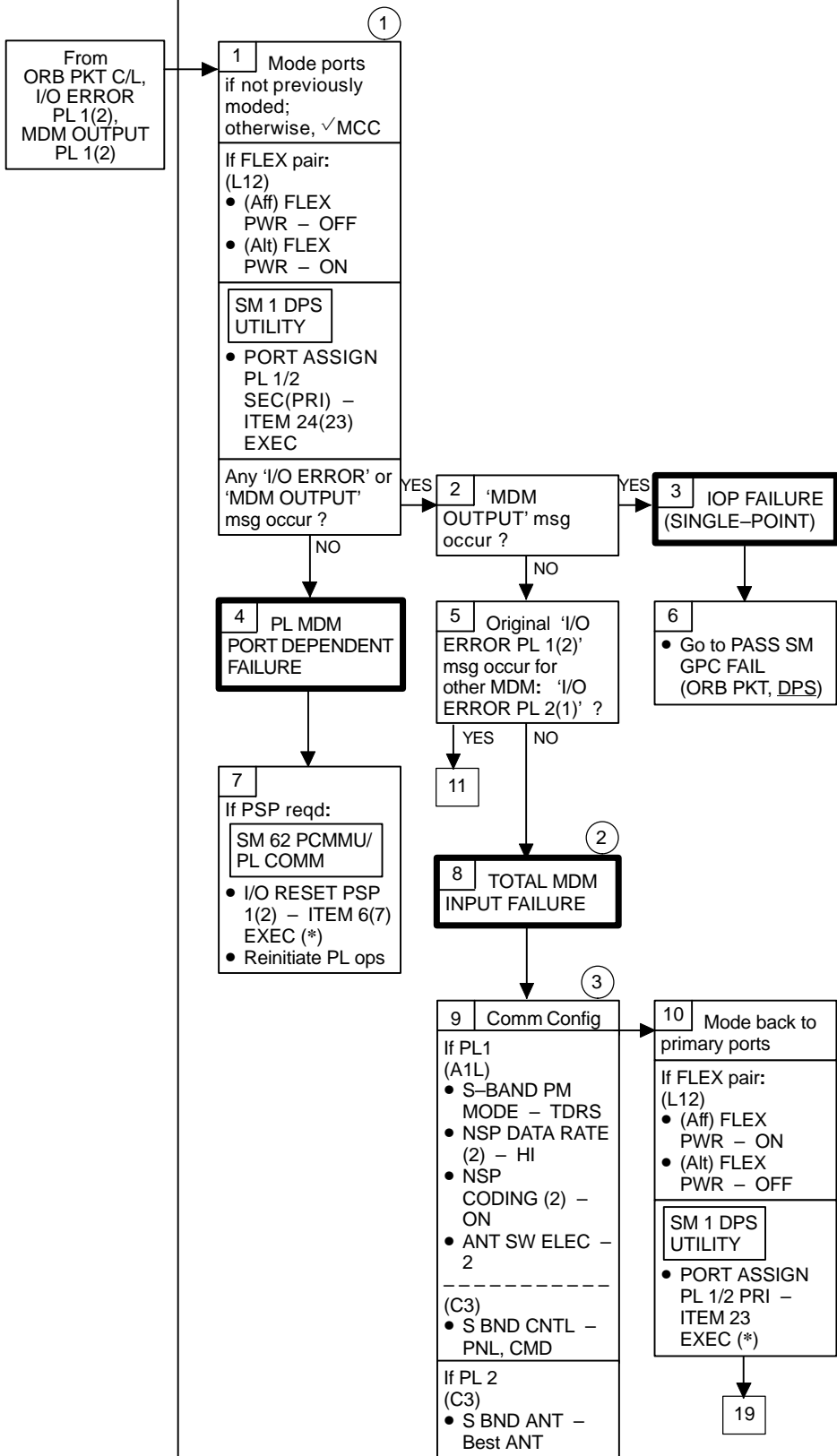
④ Go to **MDM** (REF) for summary of data lost on nonrecovered MDM

⑤ Total serial I/O card failures may result in single or multiple 'BCE STRG' msgs:

Card Adrs	G2	G8
03	IMU MTU STKR	IMU MTU STKR
11	NSP GPS	MLS ADTA NSP GPS

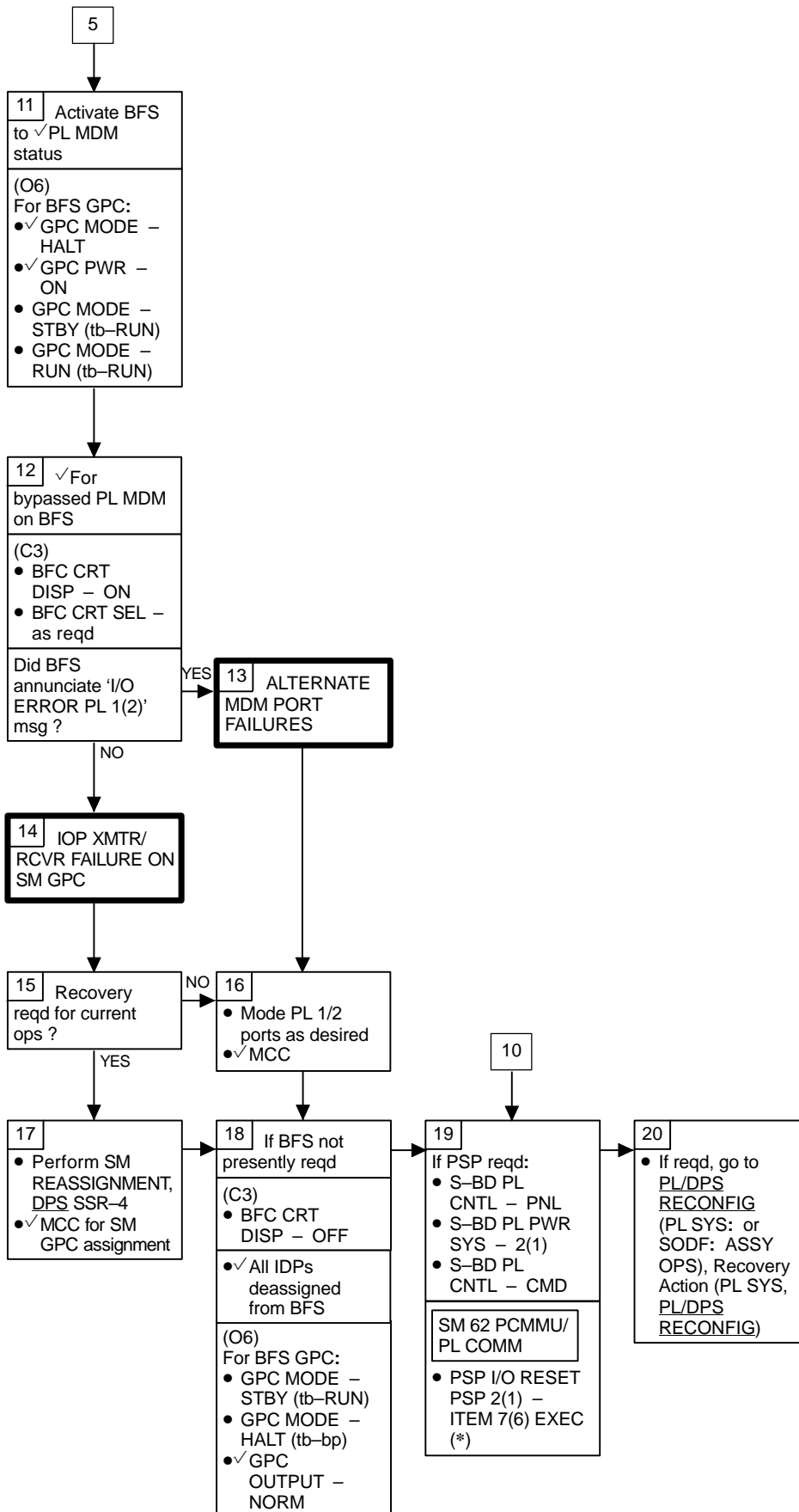
⑥ 'BCE STRG A(C)' msgs will always occur in combination with 'BCE STRG B(D)' msg (MDM card failure) or in combination with 'I/O ERROR' msg or 'MDM OUTPUT' msg (IOP or total MDM failure)

5.3c 'I/O ERROR PL1(2)'
'MDM OUTPUT PL1(2)'



- ① Port moding and I/O RESET causes fault msgs to occur for all previously bypassed LRU(s), BTU(s), Payload Signal Processor, mission selectable processes, and mission unique processes
- ② MDM outputs may still be good. MCC will advise if MDM should be turned off. Refer to MDM (REF DATA) for summary of data
- ③ 140 sec pwr-amp warmup

DPS 5.3c (Cont)



MEDS

DPS

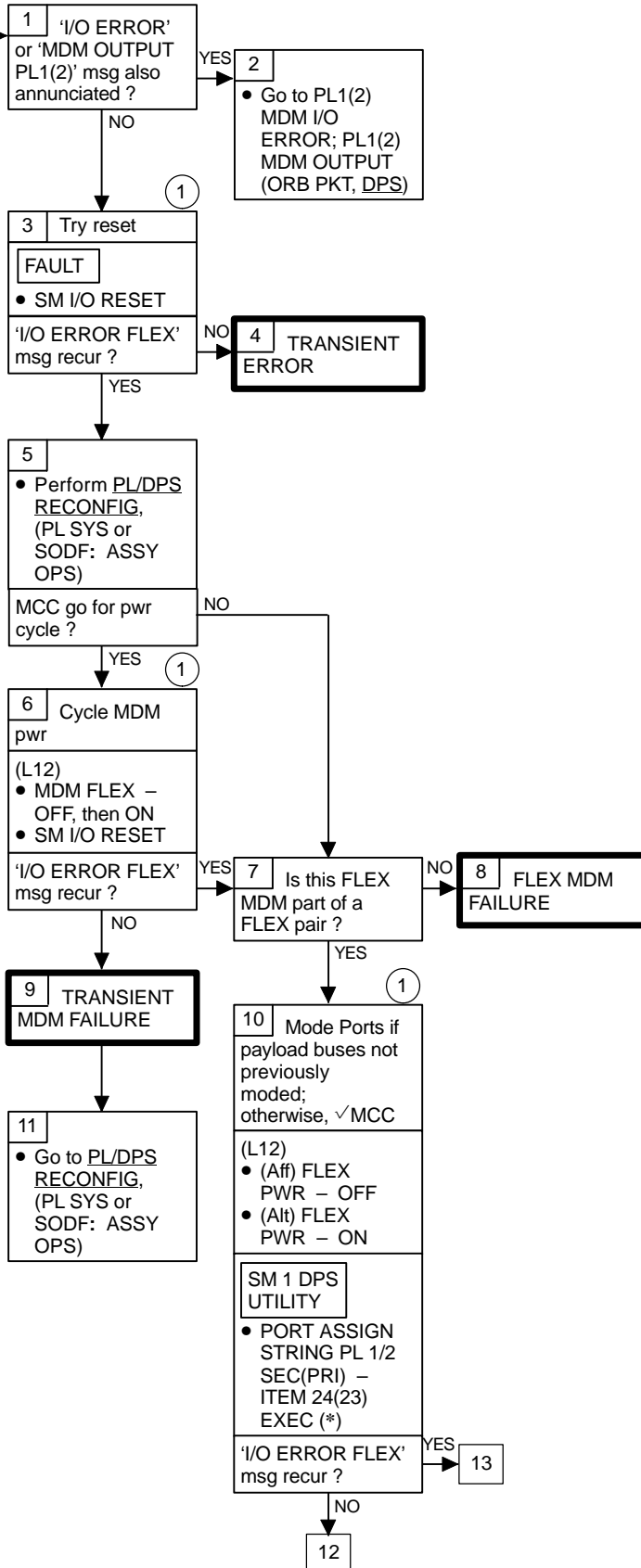
5.3e 'I/O ERROR FLEX'

SM ALERT

I/O ERROR FLEX

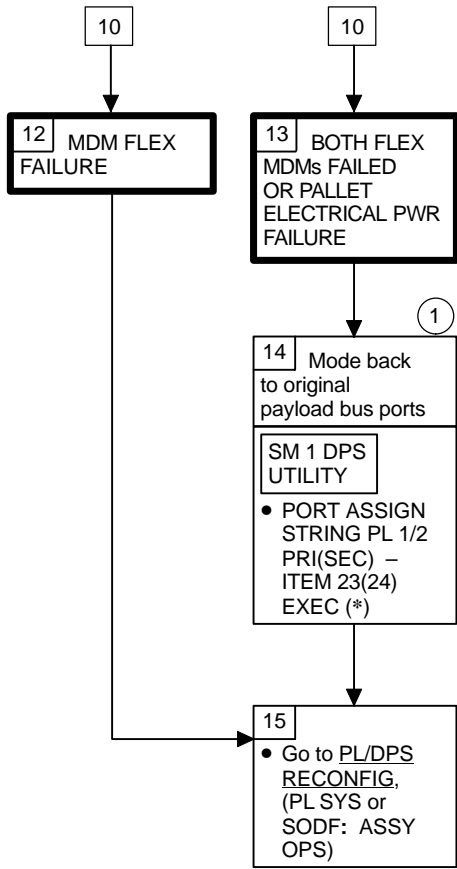
If: MDM FLEX failure
IOP failure
IOP Xmtr/Rcvr failure
Pallet electrical failure

Nominal Config:
(L12)
MDM FLEX - ON
or
MDM FLEX 1(2) - ON
MDM FLEX 2(1) - OFF



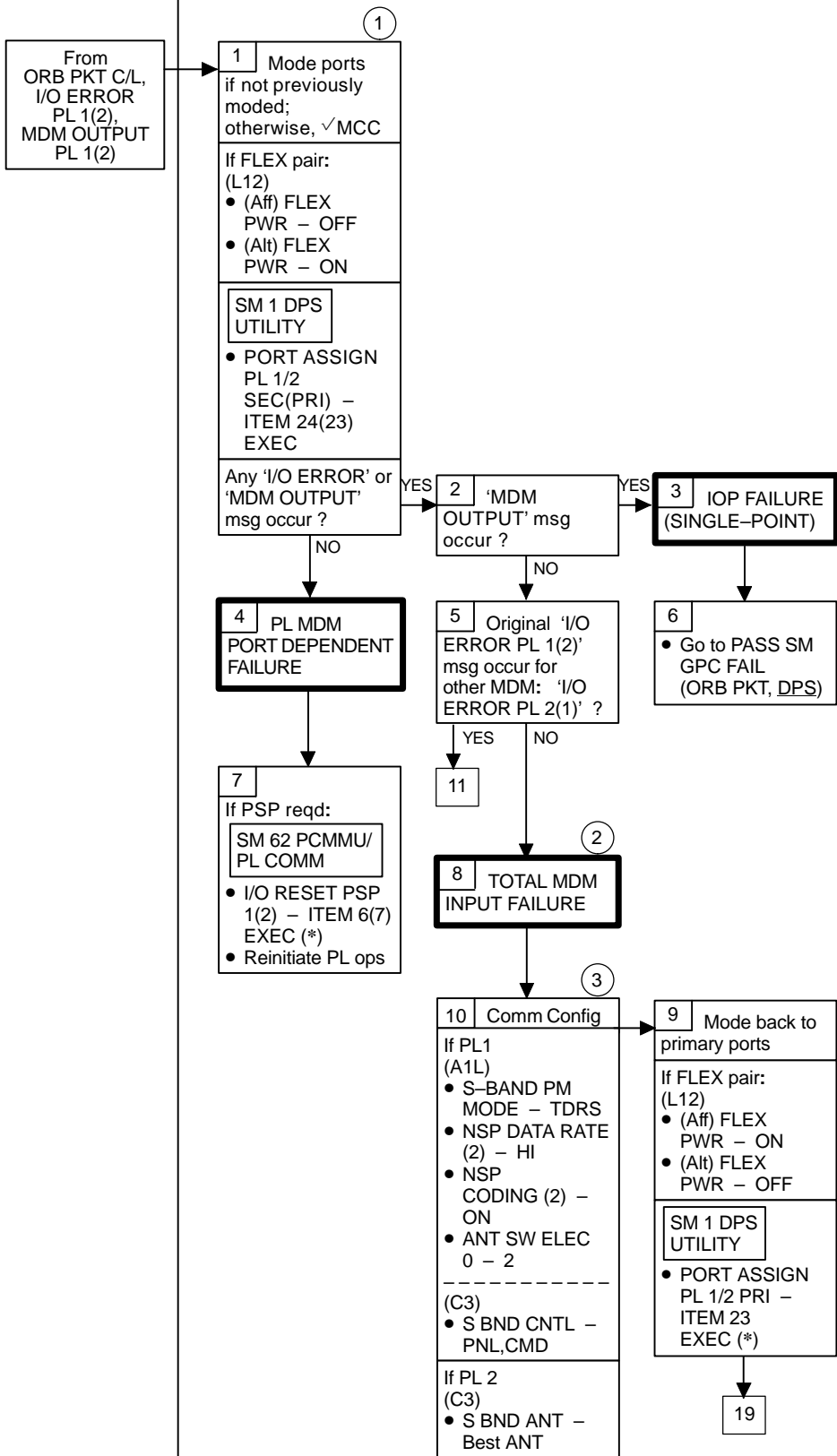
① Port moding and I/O RESET causes fault msgs to occur for all previously bypassed LRU(s), BTU(s), Payload Signal Processor, mission selectable processes, and mission unique processes

MEDS



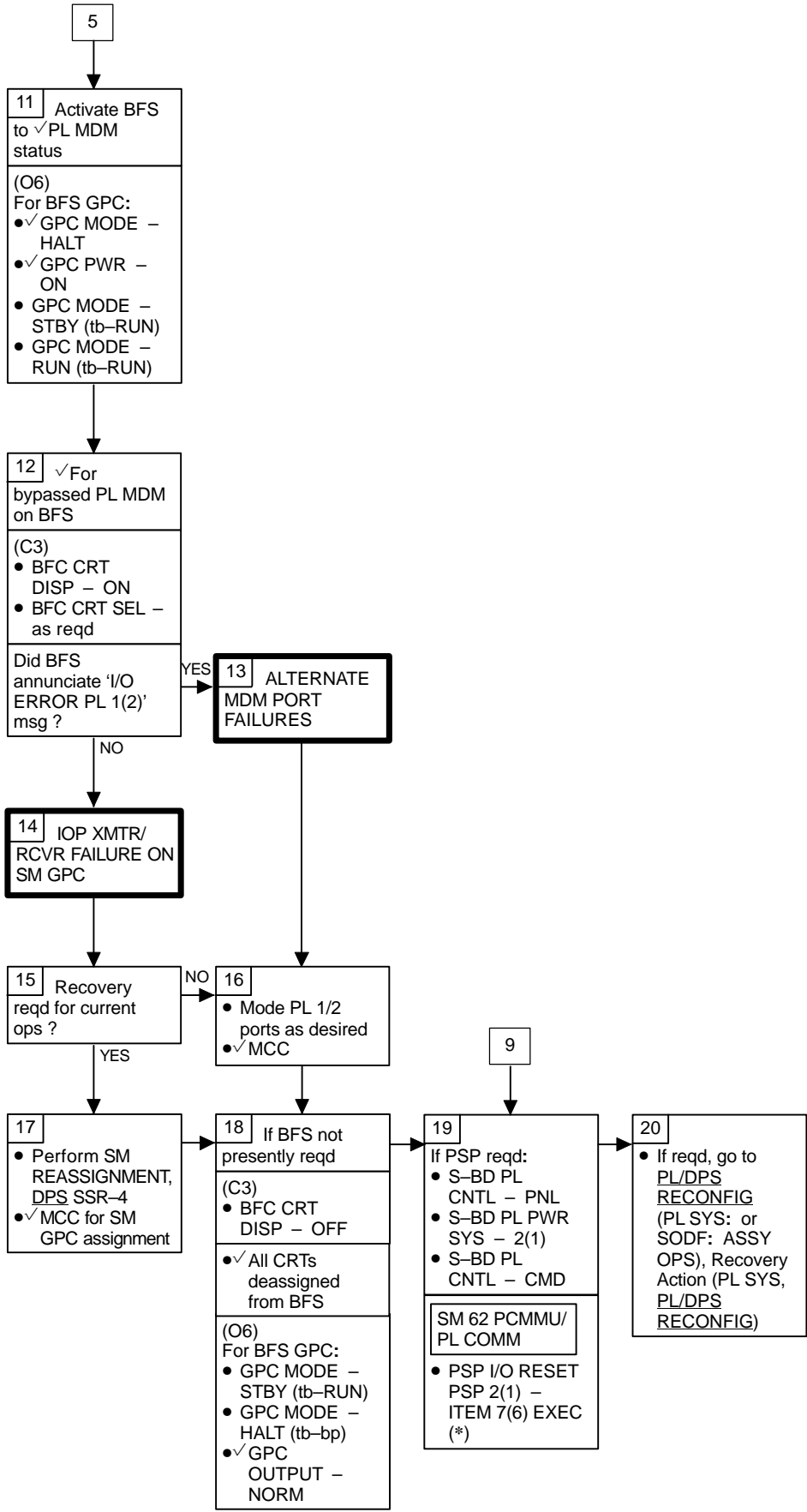
① Port moding and I/O RESET causes fault msgs to occur for all previously bypassed LRU(s), BTU(s), Payload Signal Processor, mission selectable processes, and mission unique processes

5.3c 'I/O ERROR PL1(2)'
'MDM OUTPUT PL1(2)'



- ① Port moding and I/O RESET causes fault msgs to occur for all previously bypassed LRU(s), BTU(s), Payload Signal Processor, mission selectable processes, and mission unique processes
- ② MDM outputs may still be good. MCC will advise if MDM should be turned off. Refer to MDM (REF DATA) for summary of data
- ③ 140 sec pwr-amp warmup

DPS 5.3c (Cont)



NOM

DPS

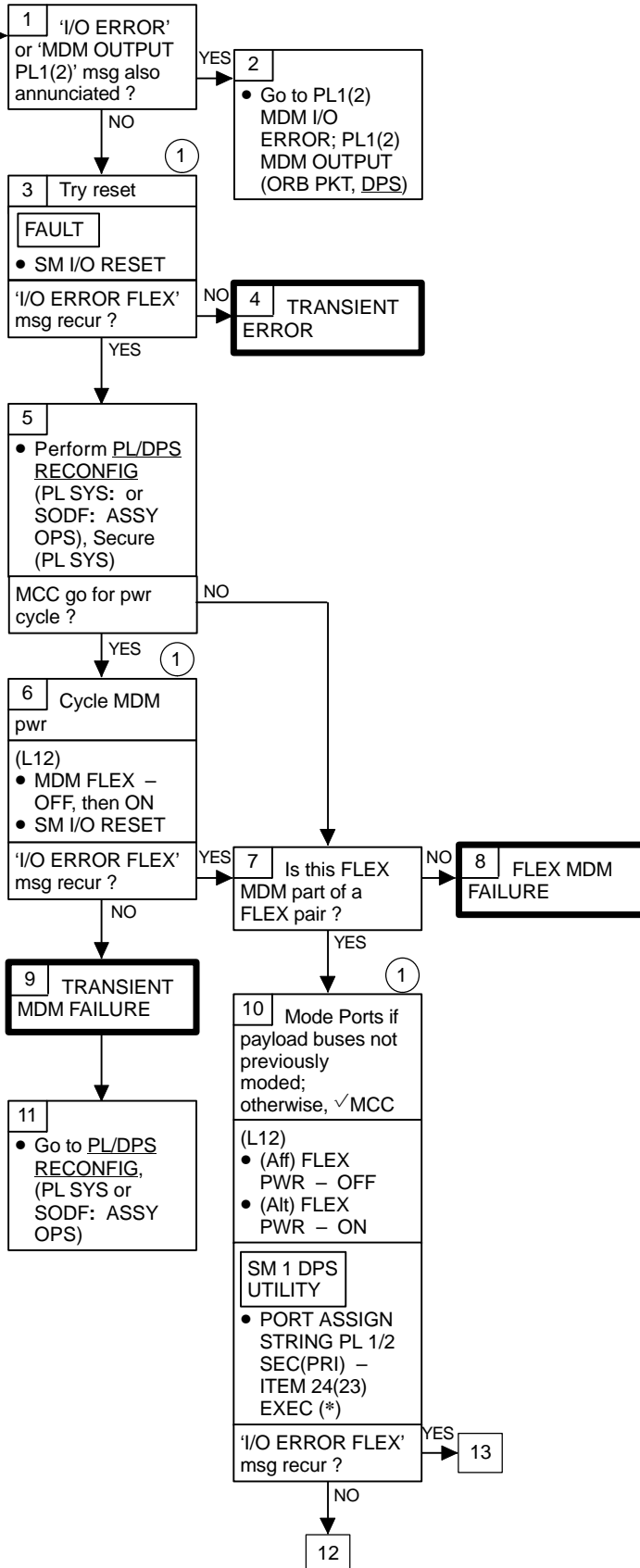
5.3e 'I/O ERROR FLEX'

SM ALERT

I/O ERROR FLEX

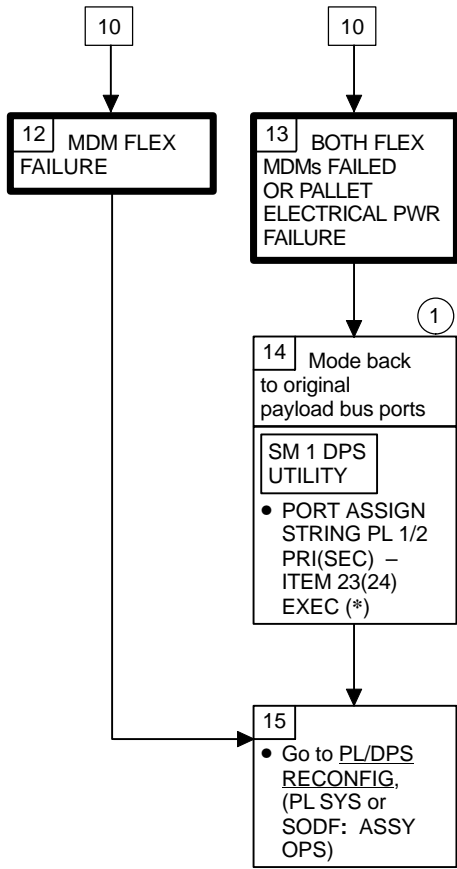
If: MDM FLEX failure
IOP failure
IOP Xmtr/Rcvr failure
Pallet electrical failure

Nominal Config:
(L12)
MDM FLEX - ON
or
MDM FLEX 1(2) - ON
MDM FLEX 2(1) - OFF



① Port moding and I/O RESET causes fault msgs to occur for all previously bypassed LRU(s), BTU(s), Payload Signal Processor, mission selectable processes, and mission unique processes

NOM



① Port moding and I/O RESET causes fault msgs to occur for all previously bypassed LRU(s), BTU(s), Payload Signal Processor, mission selectable processes, and mission unique processes

DPS

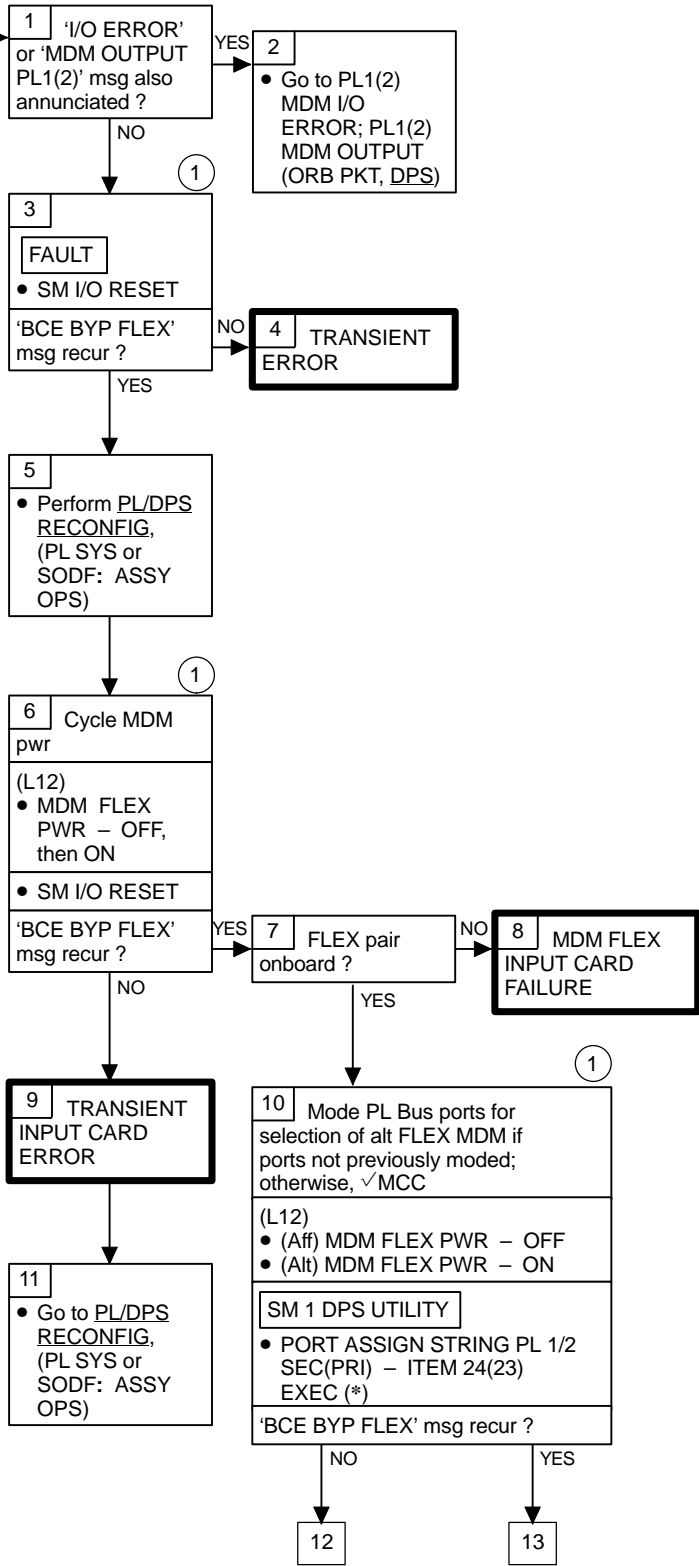
5.3f 'BCE BYP FLEX'

SM
ALERT

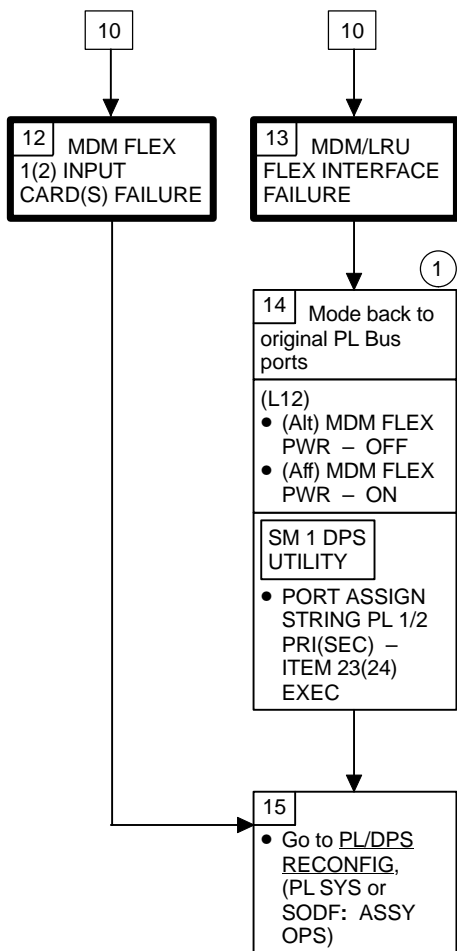
BCE BYP FLEX

If:
MDM FLEX Card failure
MDM/LRU FLEX interface failure
IOP failure
IOP Xmtr/Rcvr failure

Nominal Config:
(L12)
MDM FLEX – ON
or
MDM FLEX 1(2) – ON
MDM FLEX 2(1) – OFF



① Port moding or I/O RESET causes fault msgs to occur for all previously bypassed LRU(s), BTU(s), Payload Signal Processor, mission selectable processes, and mission unique processes



① Port moding or I/O RESET causes fault msgs to occur for all previously bypassed LRU(s), BTU(s), Payload Signal Processor, mission selectable processes, and mission unique processes

DPS

5.4a 'I/O ERROR CRT 1(2,3,4)'

SM ALERT

I/O ERROR CRT 1(2,3,4)

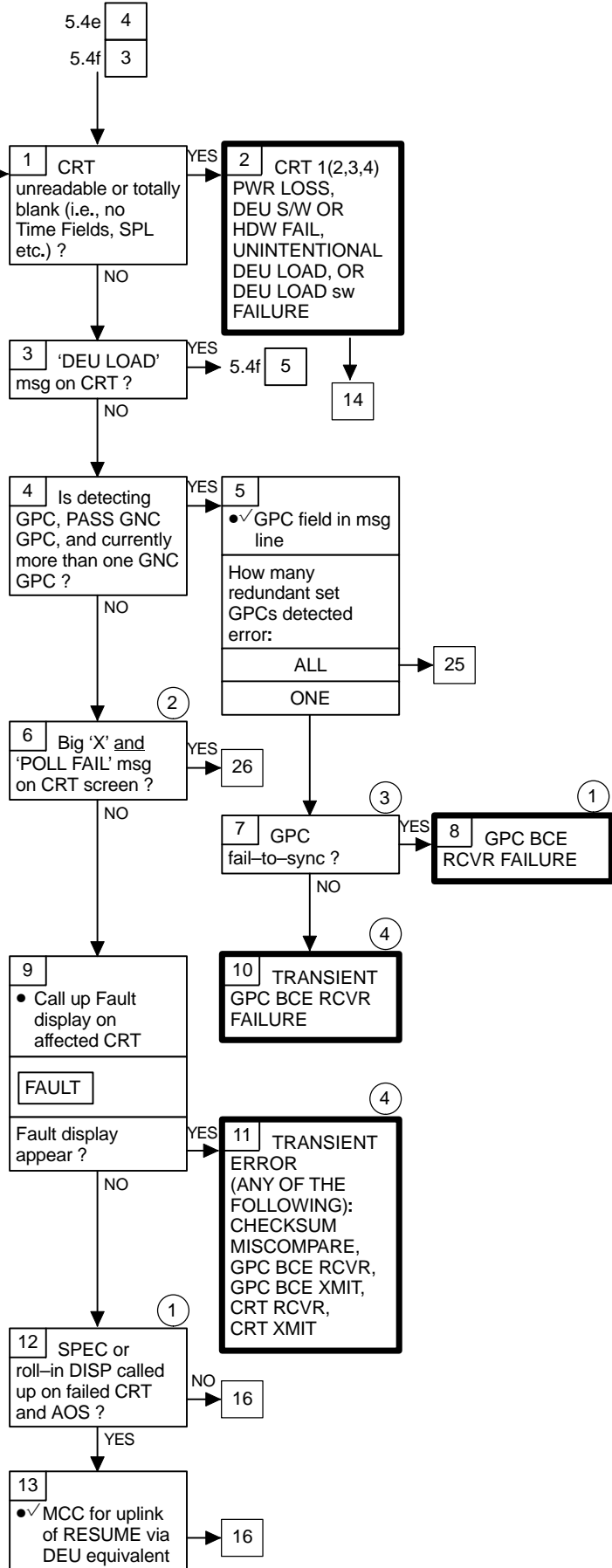
If:

- Checksum mismatch
- GPC BCE 6(7,8,9) Rcvr failure
- GPC BCE 6(7,8,9) Xmtr failure
- CRT 1(2,3,4) Rcvr failure
- CRT 1(2,3,4) Xmtr failure
- CRT 1(2,3,4) pwr loss
- DEU S/W or HDW failure
- Unintentional DEU load
- DEU load sw failure

Nominal Config:
(C2)

- CRT1,2 PWR – ON/OFF
- CRT3 PWR – OFF (R11L)
- CRT4 PWR – ON(OFF)

(For CRTs 1,2,4: two of three will remain ON as reqd)

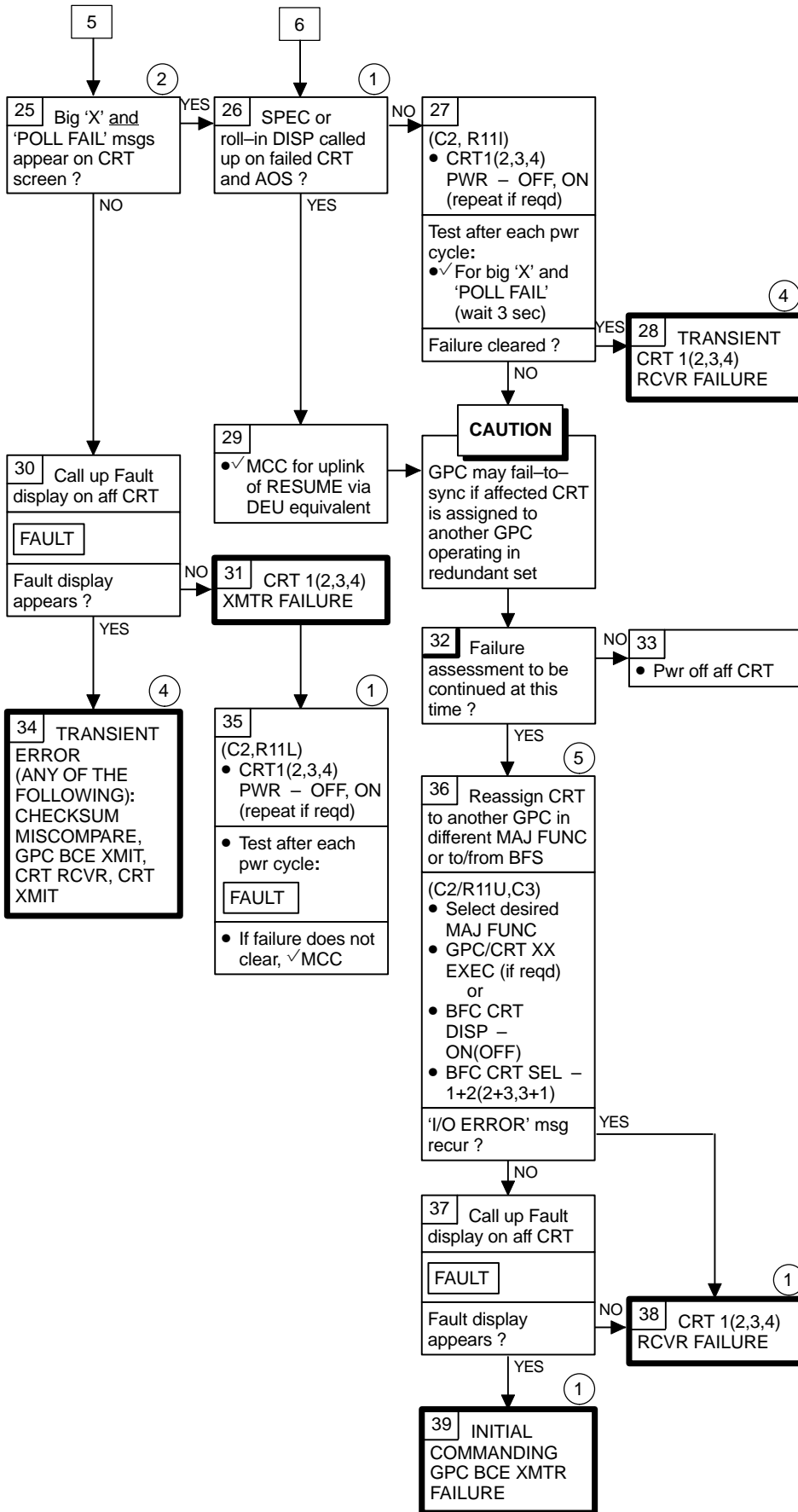


- ① If failure does not clear, any SPEC or roll-in DISP active or buried on failed CRT will be trapped in GPC SW and counted against 2 SPEC/roll-in DISP limit per MF. Affected SPECS/roll-in DISPs are still available on other CRTs. SPEC/roll-in DISP can be released via OPS transition or DEU equivalent RESUME. If DISP was called up over a SPEC, two DEU equivalent RESUMES may be reqd
- ② Both big 'X' and 'POLL FAIL' msgs appear for complete data path failure. Appearance of only one msg indicates either GPC or DEU internal S/W or HDW error has occurred. ✓MCC
- ③ GPC will fail-to-sync after two consecutive nonuniversal I/O errors
- ④ Any kybd entry just prior to I/O ERROR CRT 1(2,3,4)' msg may have to be reentered

MCDS

5.4

DPS 5.4a (Cont)



- ① If failure does not clear, any SPEC or roll-in DISP active or buried on failed CRT will be trapped in GPC SW and counted against 2 SPEC/roll-in DISP limit per MF. Affected SPECs/roll-in DISPs are still available on other CRTs. SPEC/roll-in DISP can be released via OPS transition or DEU equivalent RESUME. If DISP was called up over a SPEC, two DEU equivalent RESUMES may be reqd
- ② Both big 'X' and 'POLL FAIL' msgs appear for complete data path failure. Appearance of only one msg indicates either GPC or DEU internal S/W or HDW error has occurred. ✓MCC
- ④ Any kybd entry just prior to 'I/O ERROR CRT 1(2,3,4)' msg may have to be reentered
- ⑤ GPC/CRT key input must be made on kybd with active GPC interface. Always use PASS kybd to avoid dual commanders. If assigning CRT to/from BFS, always deassign CRT first. Note that BFC CRT DISPLAY/SELECT sw will override any GPC/CRT kybd entry

DPS

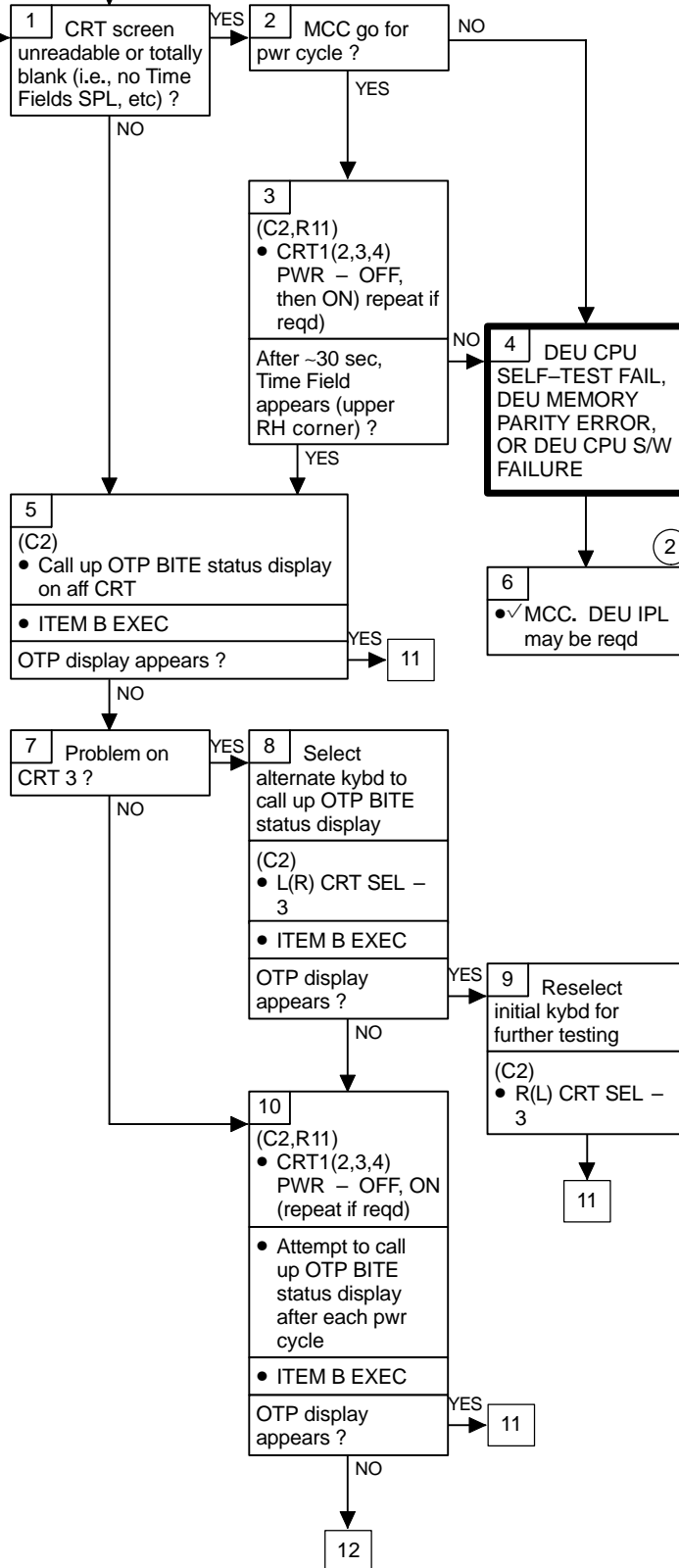
5.4b 'CRT BITE 1(2,3,4)'

SM
ALERT

- ①
- CRT BITE 1(2,3,4)**
- If:
- Kybd Adapter A failure
 - Kybd Adapter B failure
 - DEU memory parity error
 - DEU CPU self-test failure
 - DEU pwr transient (BFS annunciated only)
 - Keycode compare failure
 - DEU CPU S/W failure

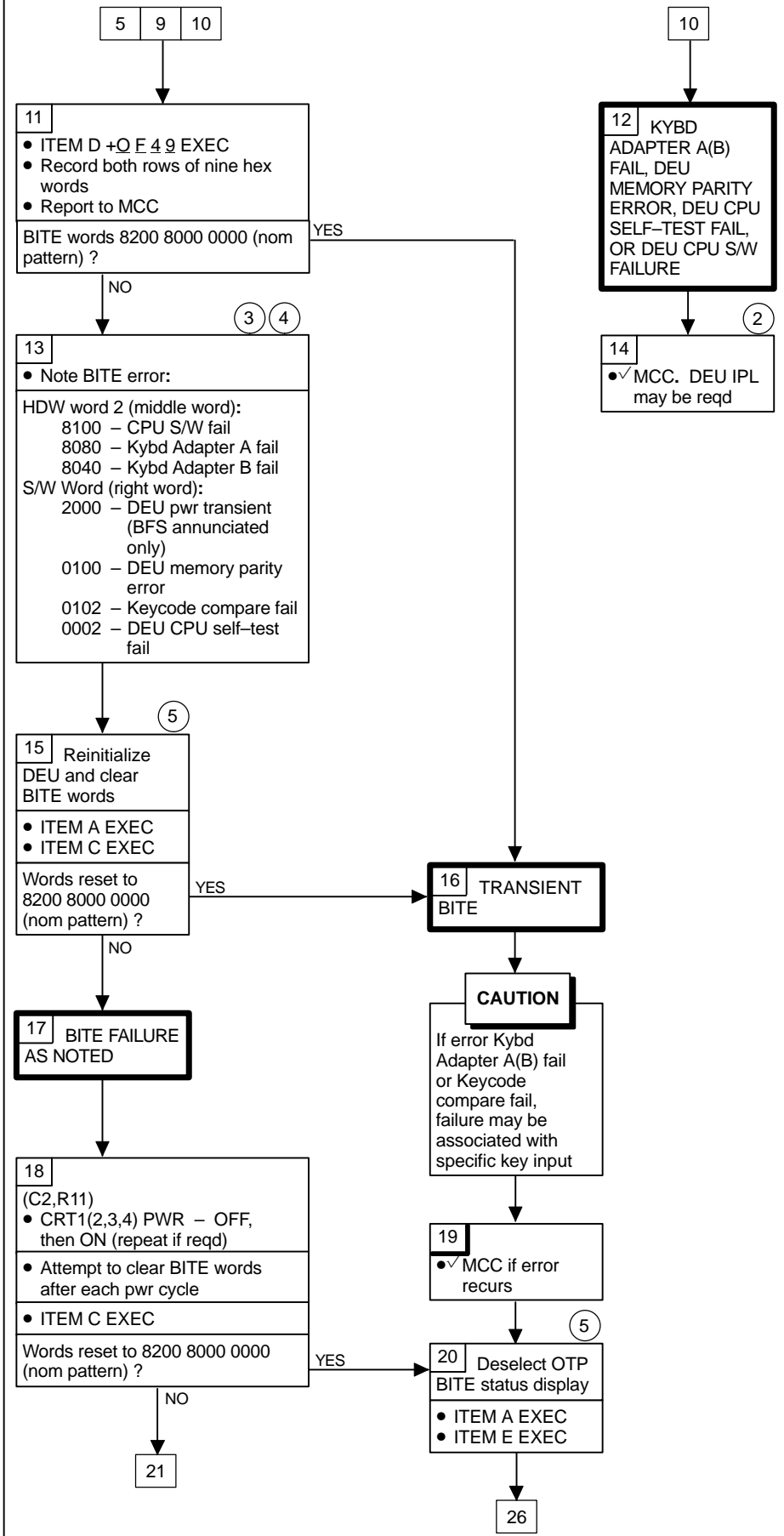
- Nominal Config:**
- (C2)
 - CRT1,2 PWR – ON (OFF)
 - CRT3 PWR – OFF (R11)
 - CRT4 PWR – ON (OFF)
 - (For CRTs 1,2,4: two out of three will remain ON as reqd)

5.4c 1
5.4d 1
5.4e 3



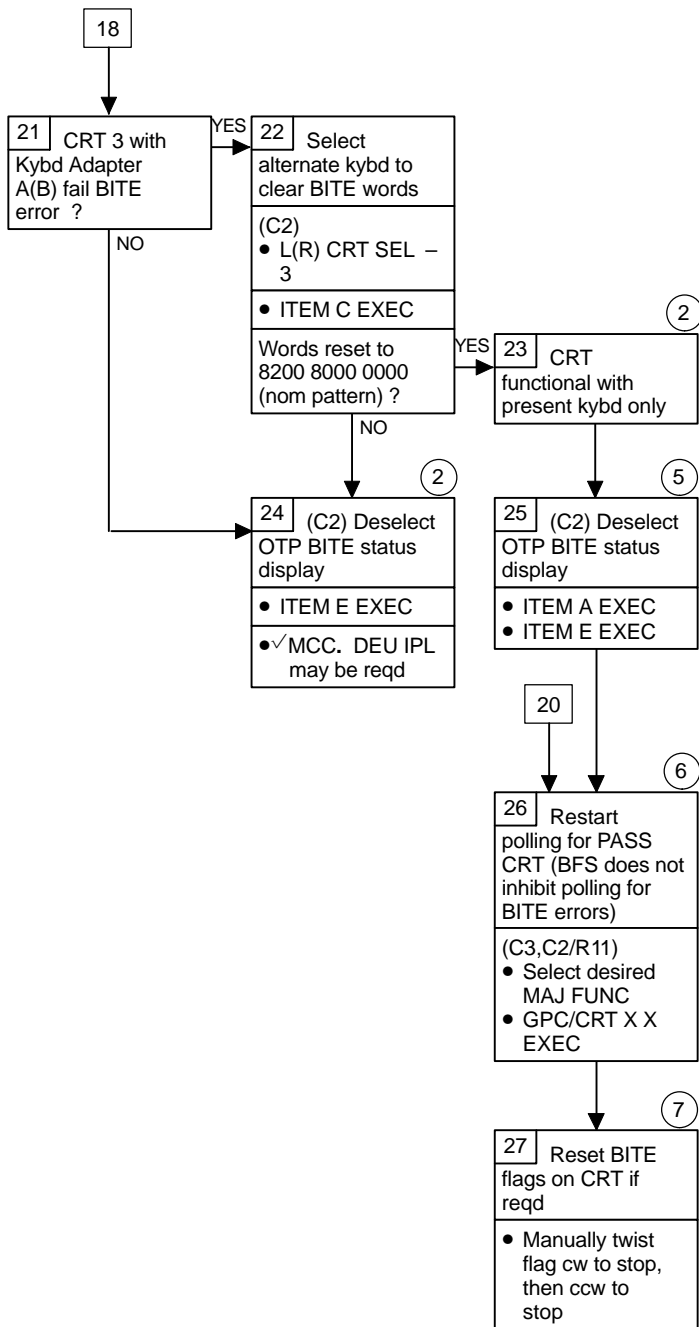
- ① 'POLL FAIL' msg should appear on affected PASS CRT. BFS does not inhibit polling for BITE errors
- ② User cannot RESUME CRT display. Any SPEC or roll-in DISP called on CRT will remain counted against 2 SPEC/2 roll-in DISP limit. SPEC/roll-in DISP can be released via OPS transition

DPS 5.4b (Cont)



- ② User cannot RESUME CRT display. Any SPEC or roll-in DISP called on CRT will remain counted against 2 SPEC/2 roll-in DISP limit. SPEC/roll-in DISP can be released via OPS transition
- ③ Listed status words for single failures only. Multiple failures summed. For multiple failures, record BITE words and continue
- ④ Probability exists for getting memory parity error when MF sw for affected CRT is moved from one position to another (i.e., GNC to SM) (SMS DO23)
- ⑤ Expect BITE words of 8202, 8100, 2000 after execution of ITEM A

DPS 5.4b (Cont)



② User cannot RESUME CRT display. Any SPEC or roll-in DISP called on CRT will remain counted against 2 SPEC/2 roll-in DISP limit. SPEC/roll-in DISP can be released via OPS transition

⑤ Expect BITE words of 8202, 8100, 2000 after execution of ITEM A

⑥ GPC/CRT key input must be made on kybd with active GPC interface. Always use PASS kybd to avoid dual commanders. If assigning CRT to/from BFS, deassign CRT first. Note that BFC CRT DISPLAY/SELECT sw will override any GPC/CRT kybd entry

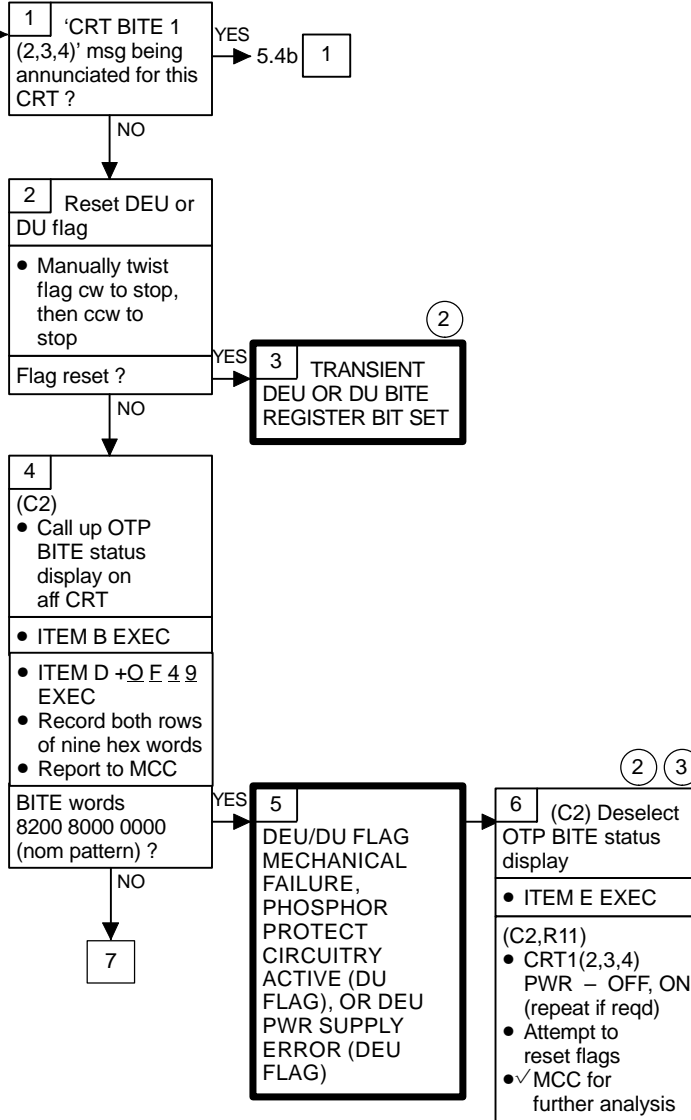
⑦ DEU flag tripped for CPU S/W fail, DEU memory parity error, or Kybd Adapter A/B fail errors. Continue CRT use

DPS

5.4c DEU OR DU FLAG TRIPPED

①
 DEU 1(2,3,4)
 or
 DU 1(2,3,4)
 Flag Tripped

If:
 Appropriate DEU
 BITE bit set
 Appropriate DU
 BITE bit set
 DEU/DU flag
 mechanical
 failure
 DEU pwr supply
 error



- ① Untripped flags all black; tripped flags are black and white. Flags may be inadvertently tripped during IPL, SASTP, or pwr transient. All DU errors except temperature status require arming by SASTP before being able to drive DU flag
- ② Continue CRT use
- ③ Cycling pwr may result in 'I/O ERROR CRT 1(2,3,4)' msg

DPS 5.4c (Cont)

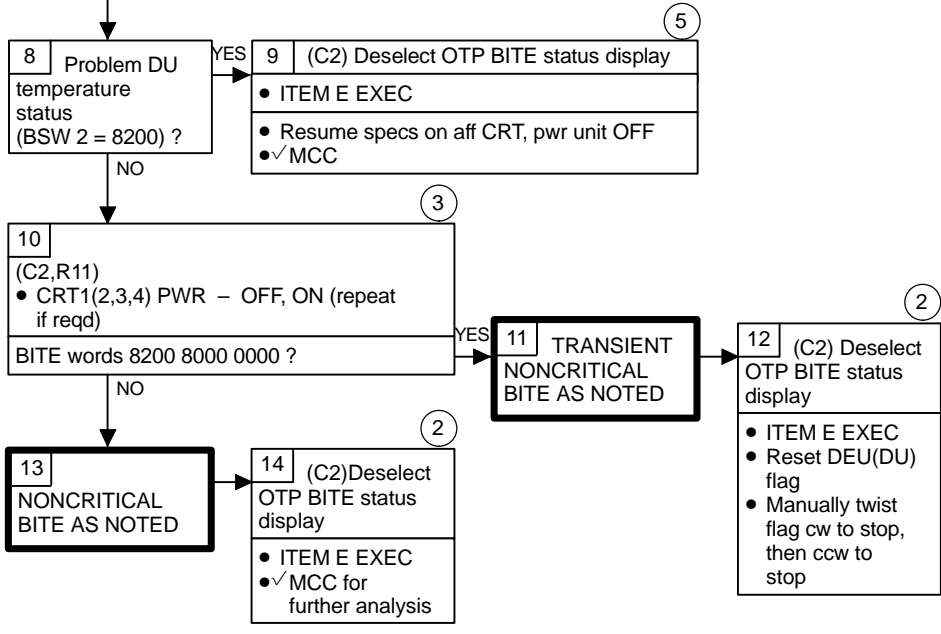
4

4

7

• Note which BITE bit error set:

BITE WORDS	FAILURE	FLAG TRIPPED
HEX CODE	BITE STATUS WORD 1 (left word)	
C200	IPL performed	---
A200	IPL error	DEU
9200	IPL circuit check error	---
8A00	Symbol generator intensity parity error	DEU
8600	Symbol generator sine-cosine parity error	DEU
8300	Symbol generator/character generator parity	DEU
8280	Oscillator error	DEU
8244	Analog zero deflection error (SASTP)	DEU
8224	Analog non-zero deflection error (SASTP)	DEU
8214	Analog pulse test fail (SASTP)	DEU
8208	Circle oscillator error	DEU
8202	Symbol generator display wrap error (SASTP)	DEU
8201	Symbol generator refresh error	DEU
	BITE STATUS WORD 2 (middle word)	
C000	DU deflection status	DU
A000	DU video status	DU
9000	DU phosphor protect status (not Flt units)	DU
8400	DU filament current status	DU
8200	DU temperature status	DU
8020	MIA echo check error	DEU
8012	MIA parity error	---
800A	MIA manchester error	---
8006	MIA bit count error	---
8001	DU power supply error	DU

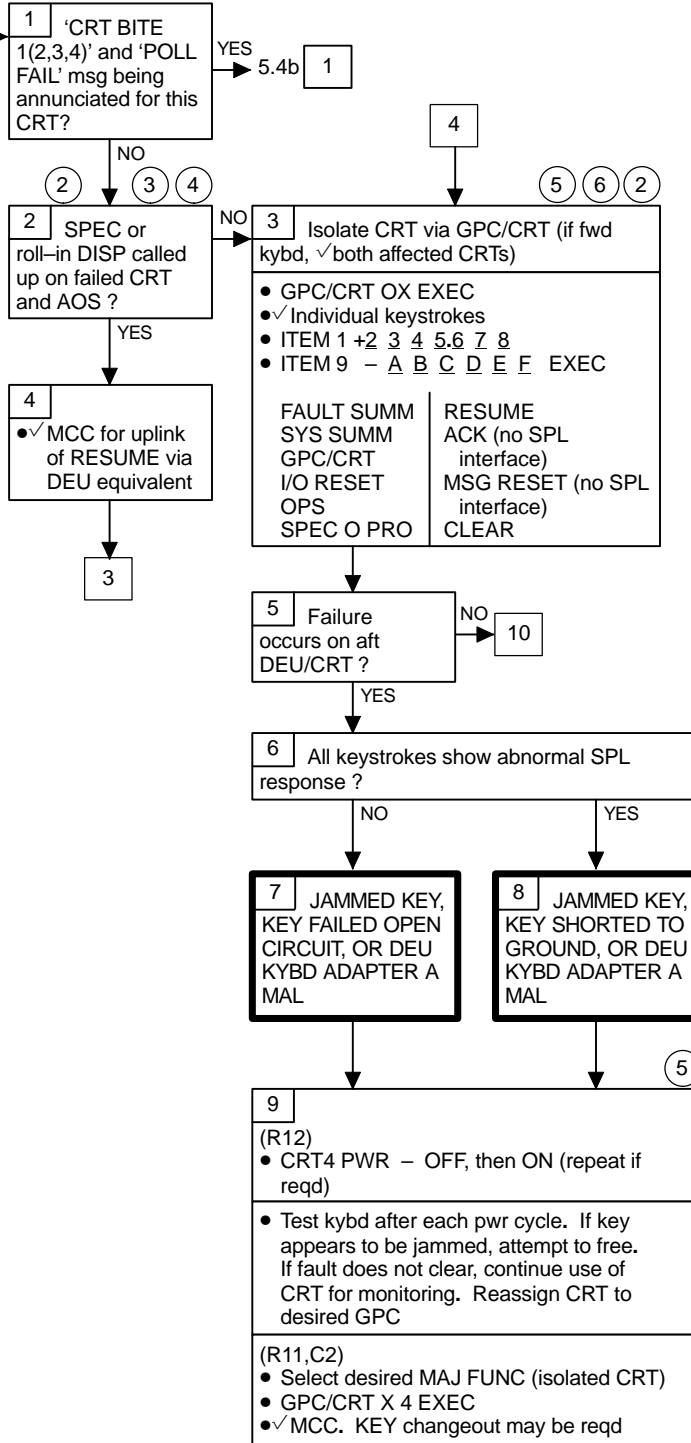


- 2 Continue CRT use
- 3 Cycling pwr may result in 'I/O ERROR CRT 1(2,3,4)' msg
- 4 Listed status words for single failures only. Multiple failures summed. For multiple failures, record BITE words and continue
- 5 Unit is force air-cooled via cabin fans. User should ✓ proper cabin fan ops

5.4d ABNORMAL SPL RESPONSE FROM KYBD INPUT

Abnormal SPL Response From Keyboard Input

If:
 Kybd failure:
 Key jammed
 Key failed open circuit
 Key shorted to ground
 DEU Kybd Adapter A(B) mal
 L(R) CRT SEL Switch mal



1 Abnormal means keystroke does not appear on SPL or wrong keystroke appears. User should always ✓CRT SEL sw position if applicable and repeat keystroke sequence prior to performing this procedure to eliminate user error and transients

2 SPECS and roll-in DISPs will be trapped in GPC software associated with failed CRT if GPC/CRT reassignment is performed and GPC/CRT interface is not regained. Affected SPECS and roll-in DISPs are still available on other CRTs, but trapped SPEC or roll-in DISP reduces SPEC or roll-in DISP allocation from 2 to 1 for associated major function

3 Trapped SPEC or roll-in DISP will be cleared at OPS transition if SPEC/DISP is not RESUMED and GPC/CRT interface is not regained

4 If DISP was called up over SPEC, two RESUME DEU equivalents may be reqd to clear trapped SPEC

5 GPC/CRT key input must be made on kybd with active GPC interface. Always use PASS kybd to avoid dual commanders. If assigning CRT to/from BFS, always deassign CRT first. BFC CRT DISPLAY/SELECT sw will override any GPC/CRT kybd entry

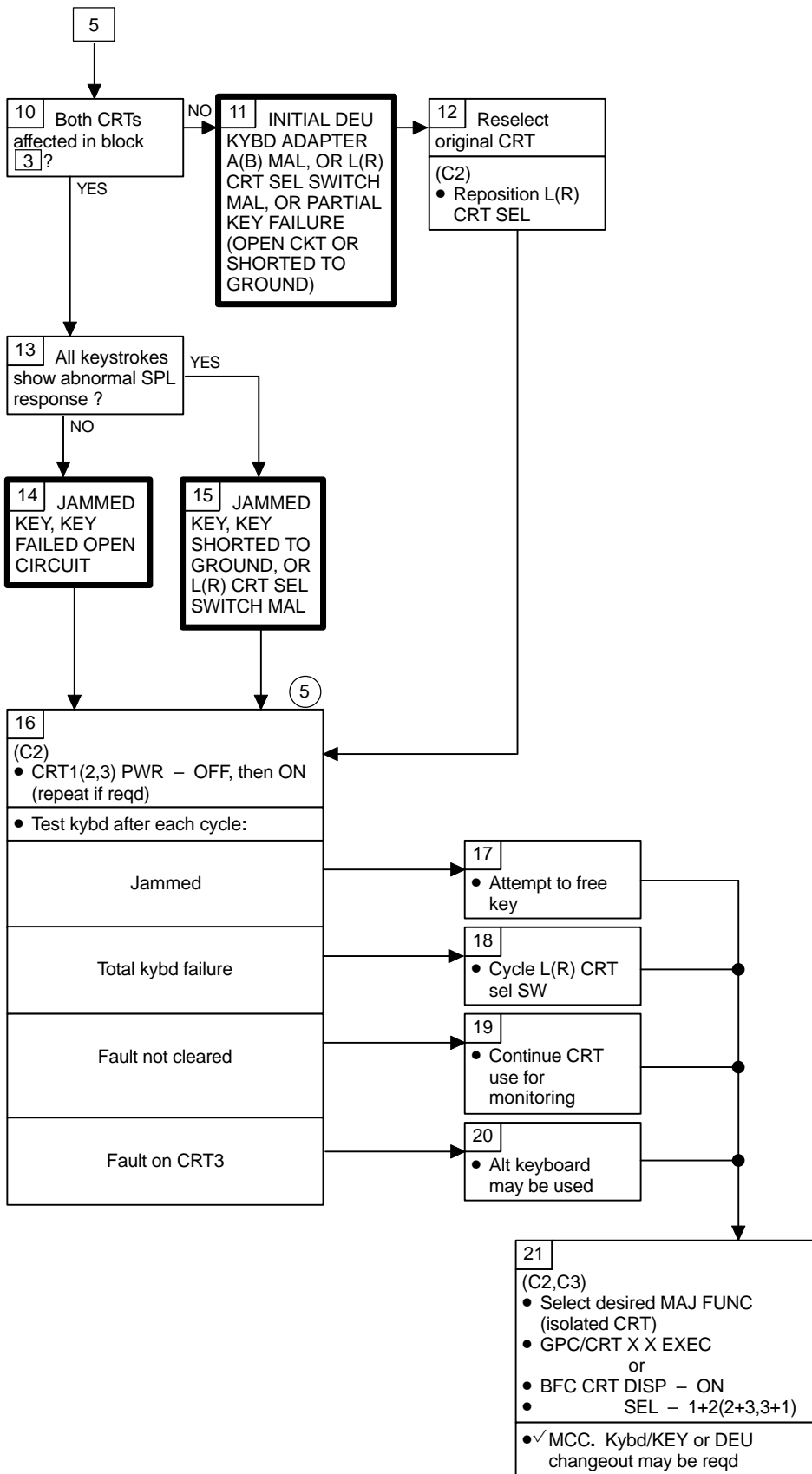
6 During kybd checkout, take note of multiple keystroke/SPL anomalies and report

(Notes cont in left column)

Notes (cont)

2 SPEC key also displays freeze function. Therefore, big 'X' will be removed upon depression of SPEC key and will reappear 3 sec after next keystroke. MSG RESET and ACK have no SPL interface. User should attempt to ✓these keys work properly when CRT assigned to GPC or ✓MCC for downlist verification

DPS 5.4d (Cont)

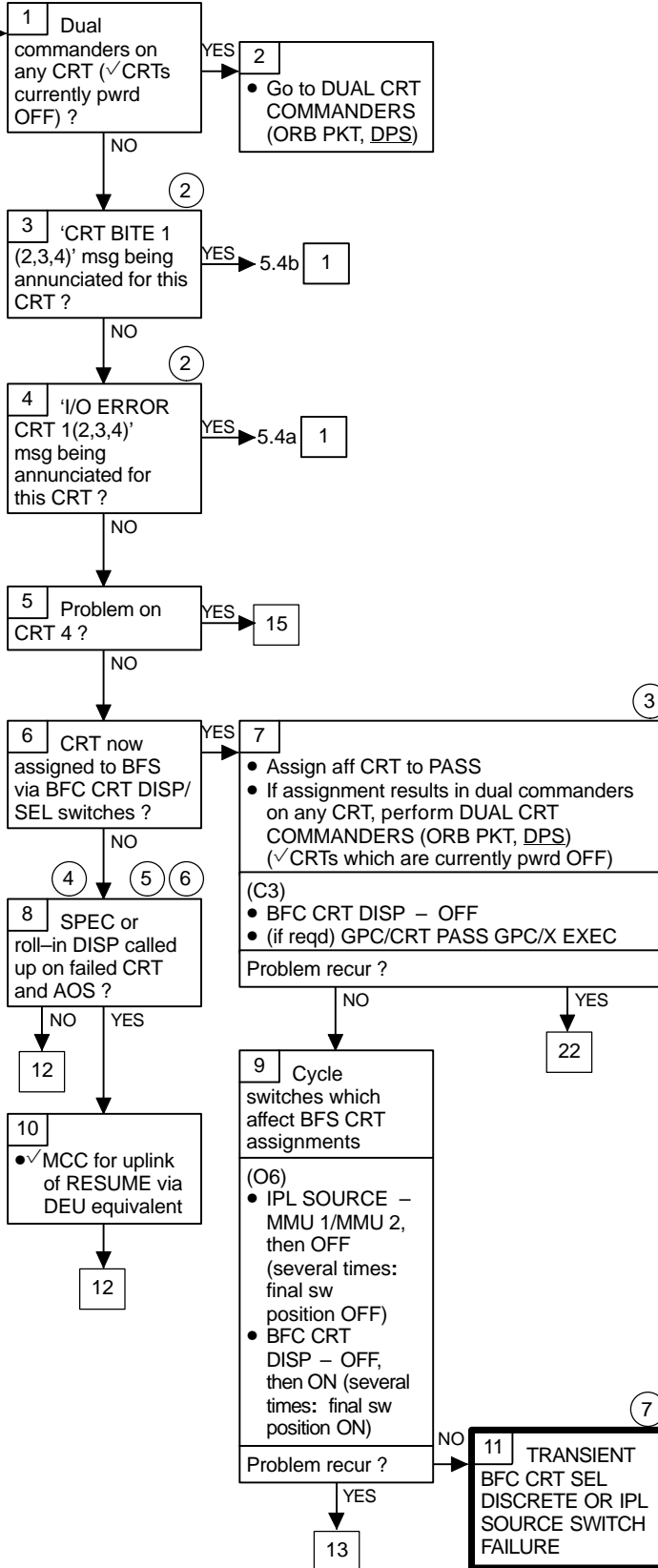


⑤ GPC/CRT key input must be made on kybd with active GPC interface. Always use PASS kybd to avoid dual commanders. If assigning CRT to/from BFS, always deassign CRT first. BFC CRT DISPLAY/SELECT sw will override any GPC/CRT kybd entry

DPS

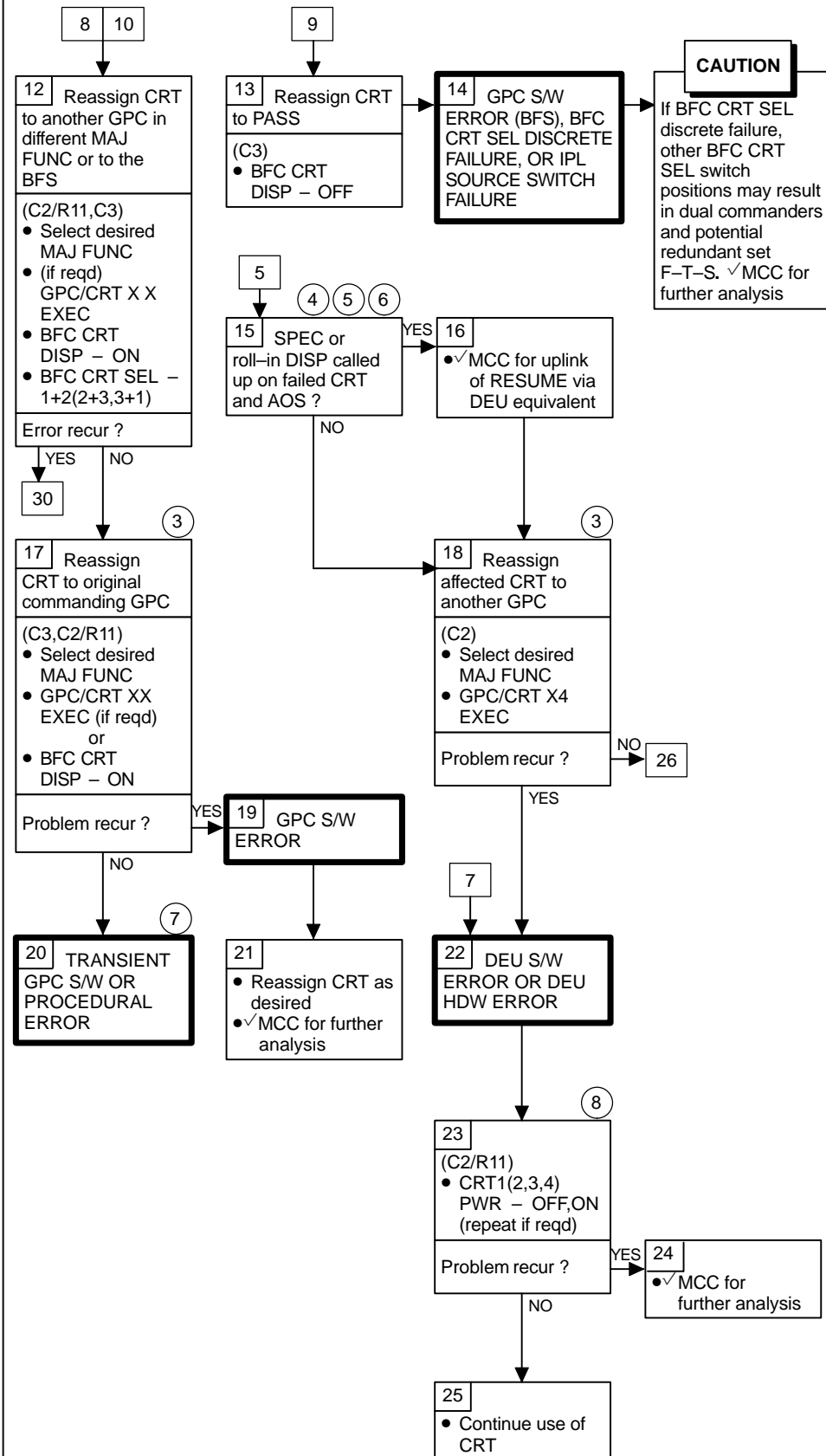
5.4e BIG 'X' ACROSS CRT AND/OR POLL FAIL

If:
 DEU S/W error
 DEU HDW error
 GPC S/W error
 BFS CRT SEL discrete failure
 BFC CRT DISP sw failure
 IPL SOURCE sw failure
 Procedural error



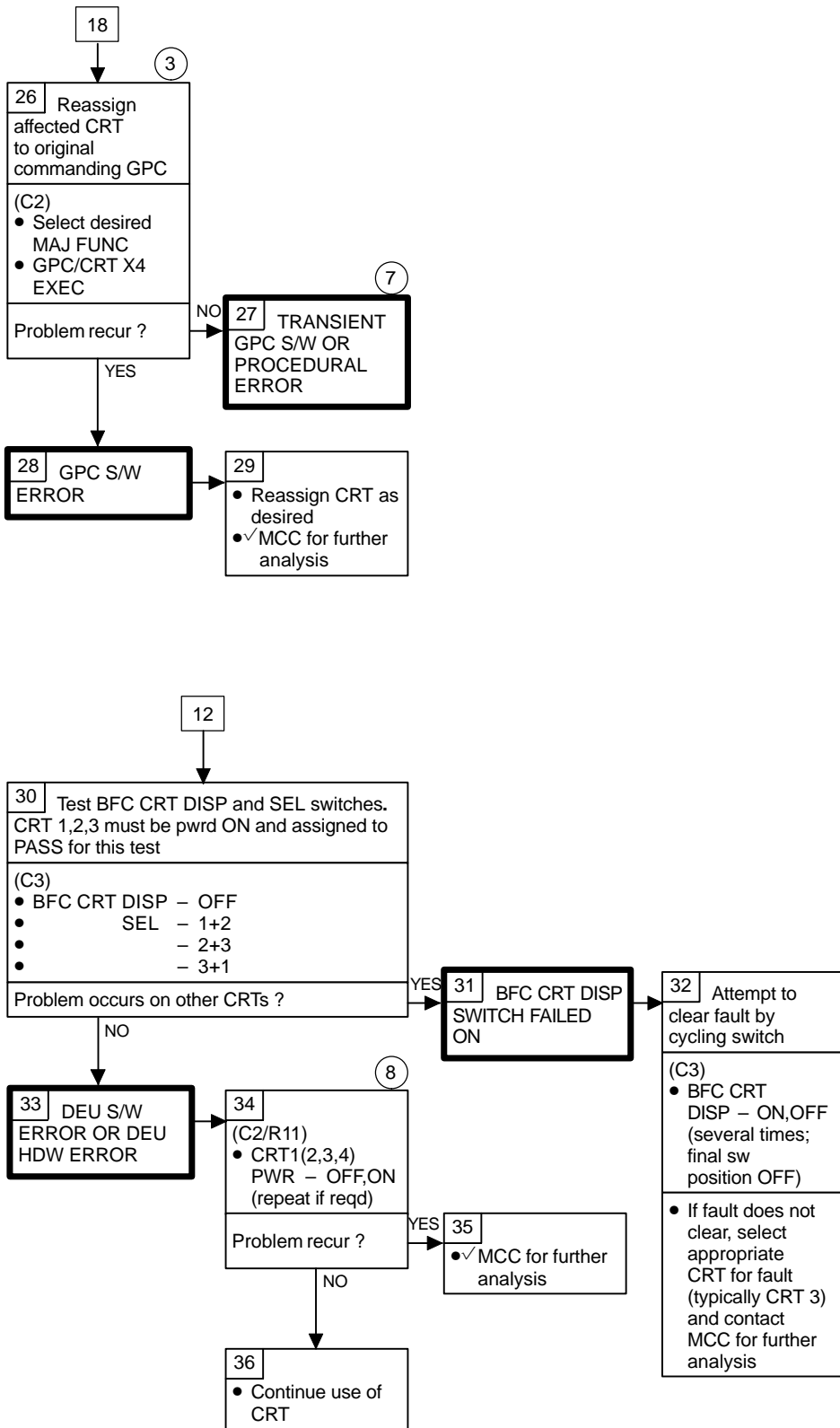
- ① Big 'X' appears when DEU does not receive display update commands for 3 sec. POLL FAIL appears when DEU does not receive poll or time update commands for 3 sec
- ② User may have to establish alternate CRT interface to BFS or PASS as appropriate in order to observe fault msgs
- ③ GPC/CRT key input must be made on kybd with active GPC interface. Always use PASS kybd to avoid dual commanders. If assigning CRT to/from BFS, always deassign CRT first. BFC CRT DISPLAY/SELECT sw will override any GPC/CRT kybd entry
- ④ SPECS and roll-in DISPs will be trapped in GPC software associated with failed CRT if GPC/CRT reassignment is performed and GPC/CRT interface is not regained. Affected SPECS and roll-in DISPs are still available on other CRTs, but trapped SPEC or roll-in DISP reduces SPEC or roll-in DISP allocation from 2 to 1 for associated major function
- ⑤ Trapped SPEC or roll-in DISP will be cleared at OPS transition if SPEC/DISP is not RESUMEd and GPC/CRT interface is not regained
- ⑥ If DISP was called up over SPEC, two RESUME DEU equivalents may be reqd to clear trapped SPEC
- ⑦ Continue use of CRT

DPS 5.4e (Cont)



- ③ GPC/CRT key input must be made on kybd with active GPC interface. Always use PASS kybd to avoid dual commanders. If assigning CRT to/from BFS, always deassign CRT first. BFC CRT DISPLAY/SELECT sw will override any GPC/CRT kybd entry
- ④ SPECS and roll-in DISPs will be trapped in GPC software associated with failed CRT if GPC/CRT reassignment is performed and GPC/CRT interface is not regained. Affected SPECS and roll-in DISPs are still available on other CRTs, but trapped SPEC or roll-in DISP reduces SPEC or roll-in DISP allocation from 2 to 1 for associated major function
- ⑤ Trapped SPEC or roll-in DISP will be cleared at OPS transition if SPEC/DISP is not RESUMEd and GPC/CRT interface is not regained
- ⑥ If DISP was called up over SPEC, two RESUME DEU equivalents may be reqd to clear trapped SPEC
- ⑦ Continue use of CRT
- ⑧ Cycling pwr may result in I/O ERROR CRT 1(2,3,4) msg

DPS 5.4e (Cont)



③ GPC/CRT key input must be made on kybd with active GPC interface. Always use PASS kybd to avoid dual commanders. If assigning CRT to/ from BFS, always deassign CRT first. BFC CRT DISPLAY/ SELECT sw will override any GPC/ CRT kybd entry

⑦ Continue use of CRT

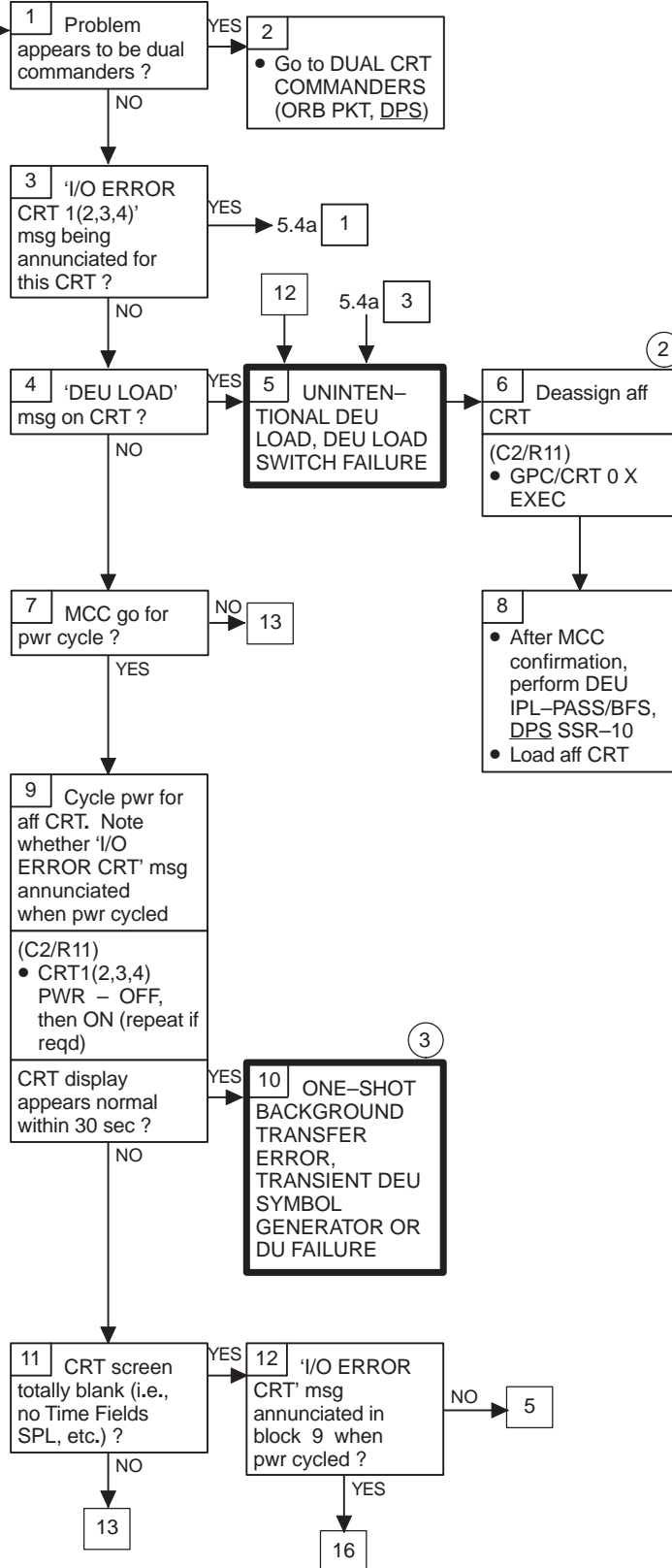
⑧ Cycling pwr may result in I/O ERROR CRT 1(2,3,4) msg

DPS

5.4f CRT DISPLAY ERROR (BLANK/UNREADABLE/ABNORMAL)

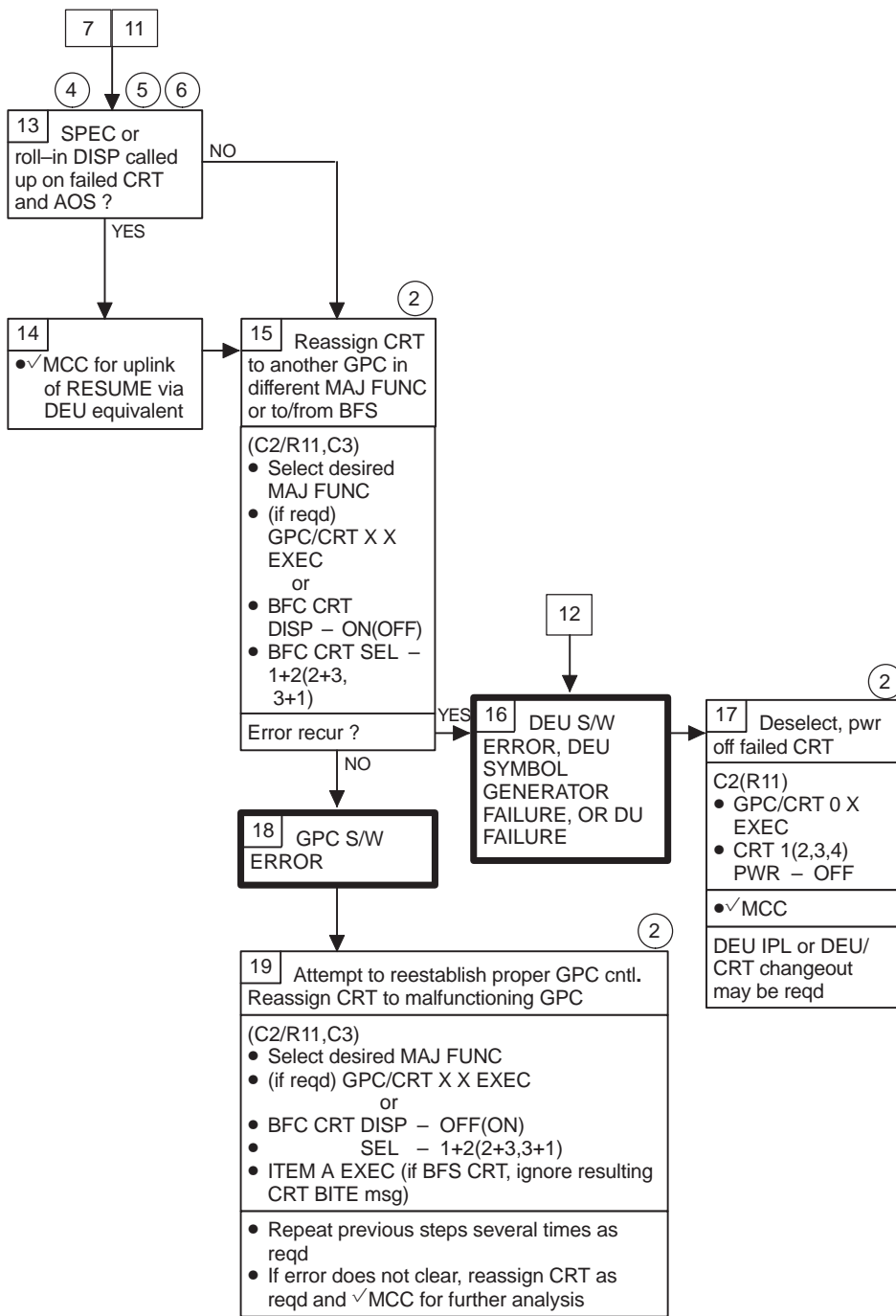
①
CRT 1(2,3,4) Display Error

If:
 One-shot background transfer error
 DEU symbol generator failure
 DU fail
 Unintentional DEU load
 DEU LOAD switch failure
 DEU S/W error
 GPC S/W error



- ① If screen blank, verify that BRIGHTENER cntl on CRT adjusted properly. If only time fields, SPL, msg line on CRT and assigned to BFS, ✓CRT MF sw not in PL
- ② GPC/CRT key input must be made on kybd with active GPC interface. Always use PASS kybd to avoid dual commanders. If assigning CRT to/from BFS, always deassign CRT first. BFC CRT DISPLAY/SELECT sw will override any GPC/CRT kybd entry
- ③ Continue use of CRT

DPS 5.4f (Cont)



② GPC/CRT key input must be made on kybd with active GPC interface. Always use PASS kybd to avoid dual commanders. If assigning CRT to/from BFS, always deassign CRT first. BFC CRT DISPLAY/SELECT sw will override any GPC/CRT kybd entry

④ SPECS and roll-in DISPs will be trapped in GPC software associated with failed CRT if GPC/CRT reassignment is performed and GPC/CRT interface is not regained. Affected SPECS and roll-in DISPs are still available on other CRTs, but trapped SPEC or roll-in DISP reduces SPEC or roll-in DISP allocation from 2 to 1 for associated major function

⑤ Trapped SPEC or roll-in DISP will be cleared at OPS transition if SPEC/ DISP is not RESUMEd and GPC/CRT interface is not regained

⑥ If DISP was called up over SPEC, two RESUME DEU equivalents may be reqd to clear trapped SPEC

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DPS

5.5a 'I/O ERROR PCM' (SM)

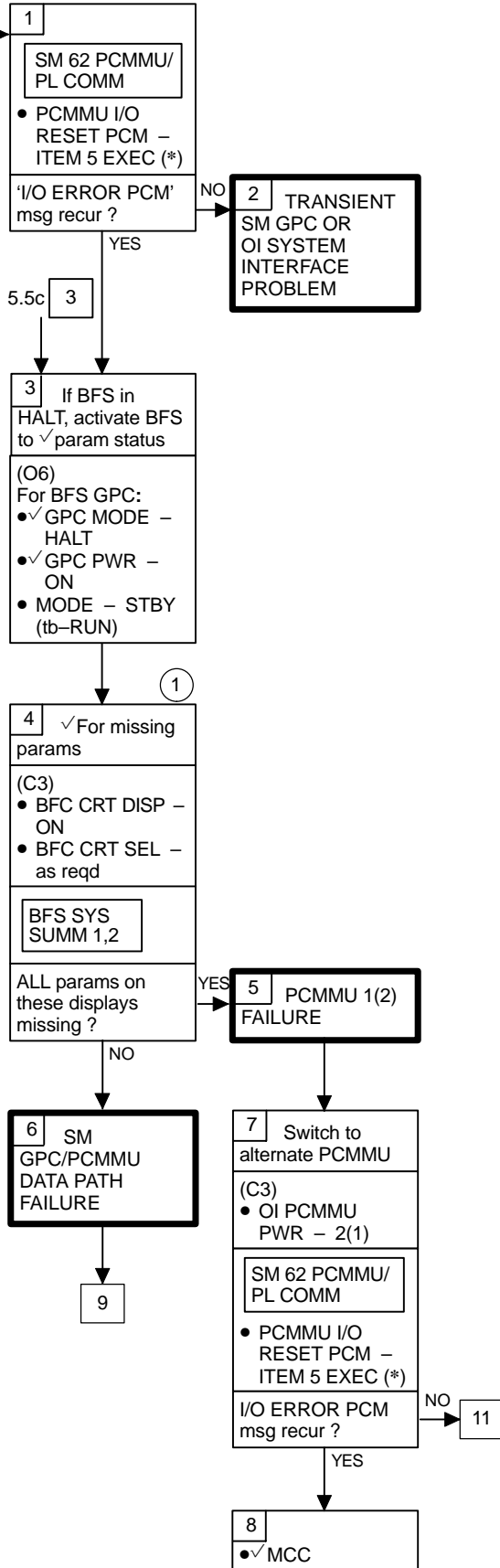
① Because of differences between PASS/BFS S/W implementation, ignore any BFS 'I/O ERROR PCM' fault msg

SM ALERT

I/O ERROR PCM

If data path fail from PCMMU to GPC:
SM BCE XMTR or RCVR fail
PCMMU MIA XMTR or RCVR fail
Total PCMMU fail

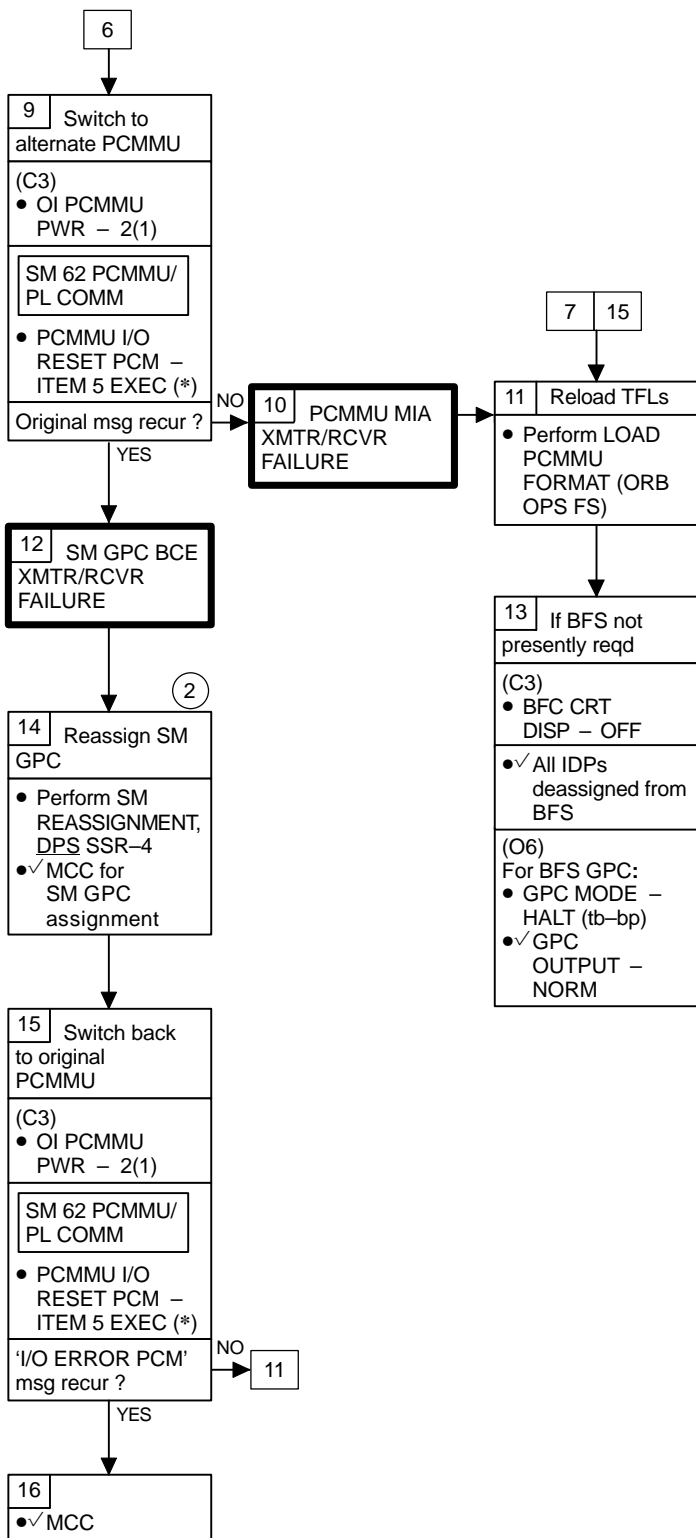
Nominal Config:
(C3)
OI PCMMU
PWR - 1
FORMAT - GPC



PCMMU

5.5

DPS 5.5a (Cont)



② BFS fault disp may be utilized for SM monitoring until PASS SM GPC reassigned

MEDS

DPS

5.5b 'I/O ERROR PCM' (BFS)

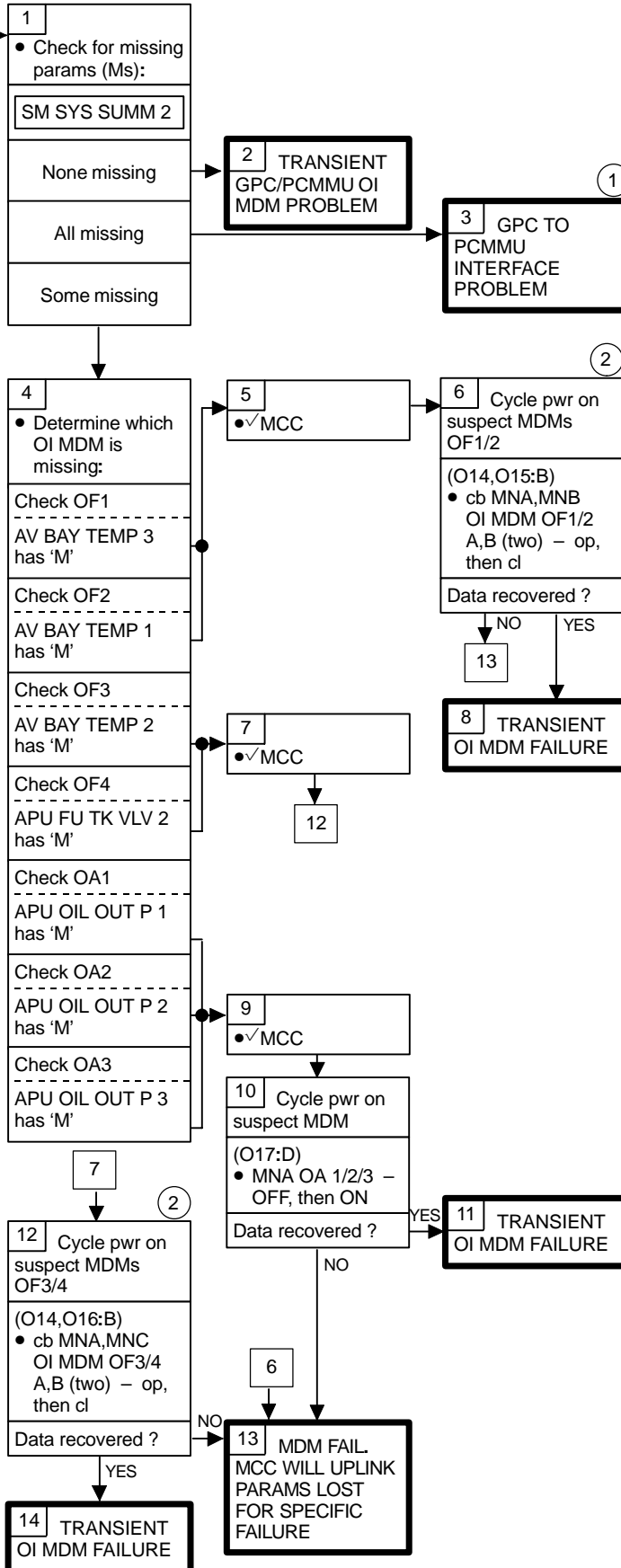
SM ALERT

I/O ERROR PCM

If:
Data Path fail from OI MDM to PCMMU or from PCMMU to GPC

Nominal Config:

(C3)
OI PCMMU
PWR - 1
FORMAT - GPC (O14,O15:B)
cb MNA,MNB OI MDM OF 1/2 A,B (two) - cl (O14,O16:B)
cb MNA,MNC OI MDM OF 3/4 A,B (two) - cl (O17:D)
MDM OA 1/2/3 - ON

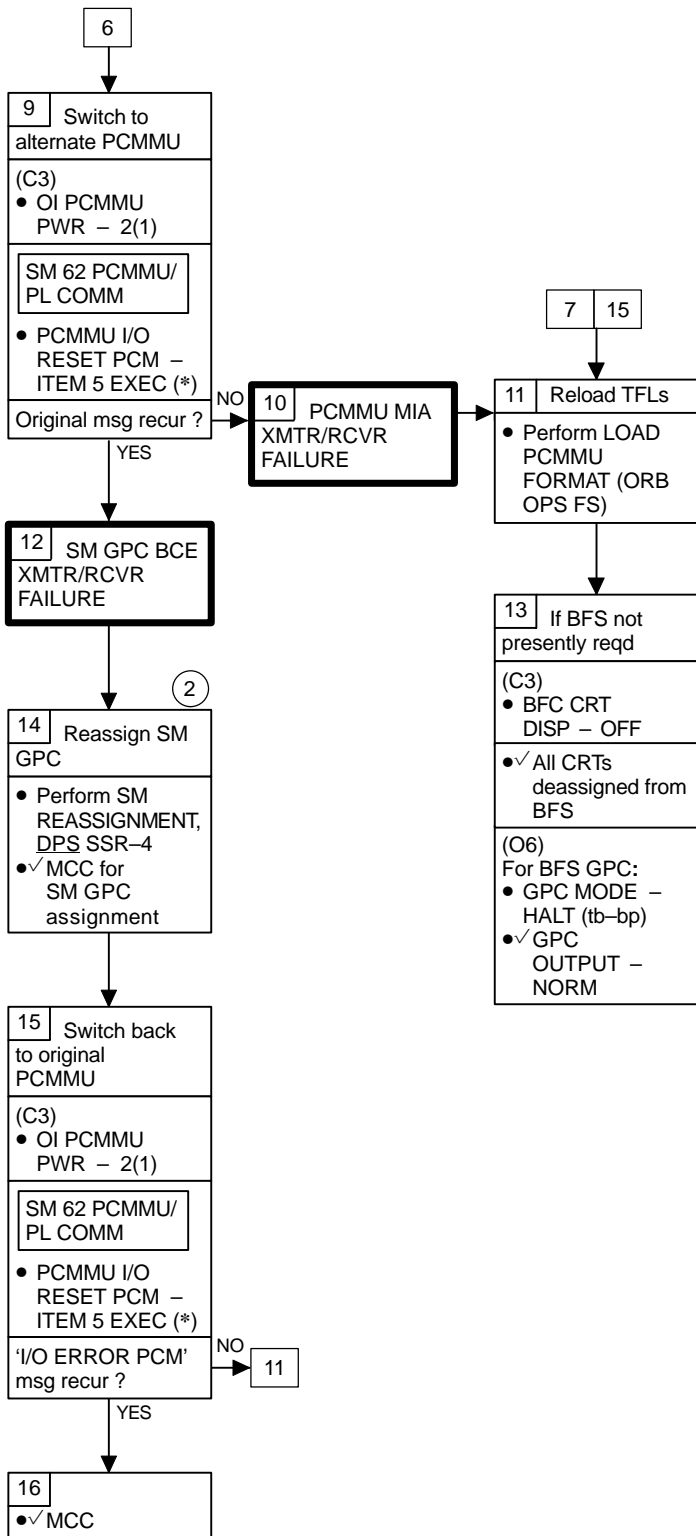


① ✓MCC regarding PCMMU switch. Selection of alternate PCMMU may preclude MCC viewing LDR telemetry

② Do not cycle open cb. ✓MCC

MEDS

DPS 5.5a (Cont)



② BFS fault disp may be utilized for SM monitoring until PASS SM GPC reassigned

NOM

DPS

5.5b 'I/O ERROR PCM' (BFS)

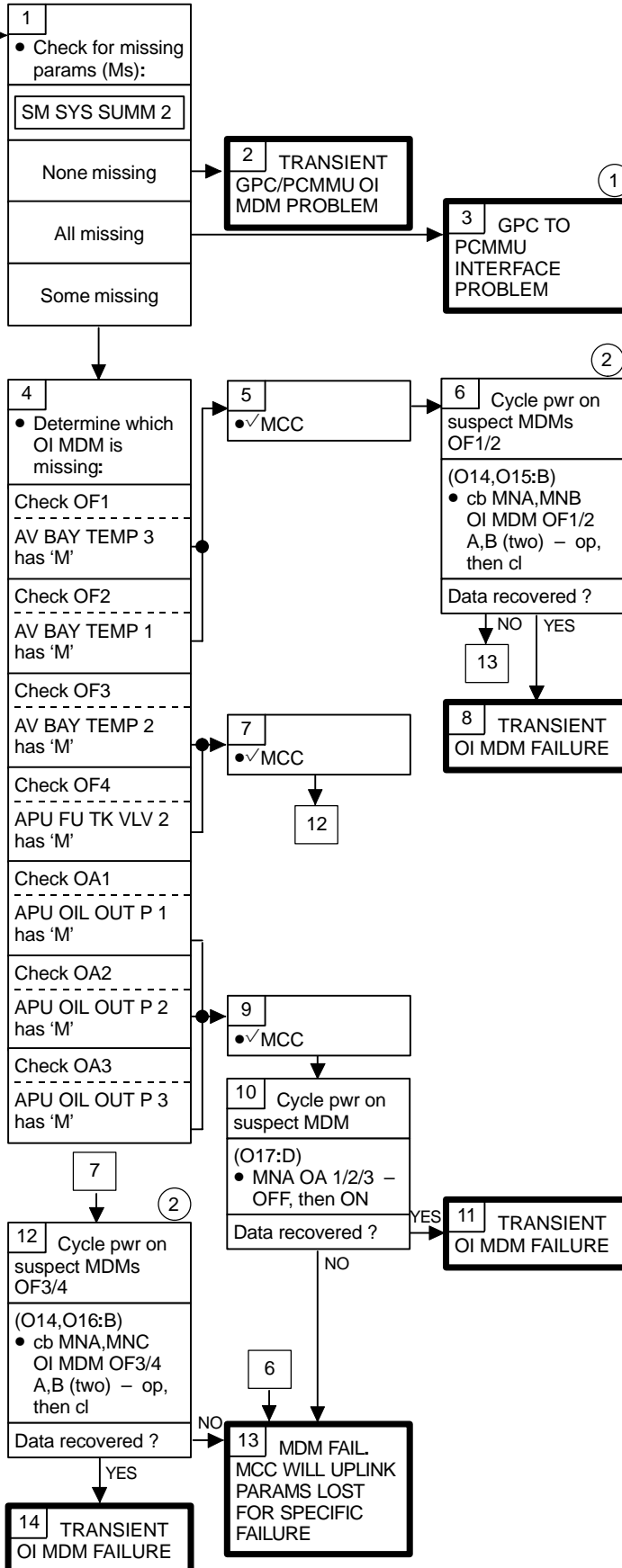
SM
ALERT

I/O ERROR
PCM

If:
Data Path fail
from OI MDM
to PCMMU or
from PCMMU
to GPC

Nominal Config:

(C3)
OI PCMMU
PWR - 1
FORMAT - GPC
(O14,O15:B)
cb MNA,MNB OI
MDM OF 1/2 A,B
(two) - cl
(O14,O16:B)
cb MNA,MNC OI
MDM OF 3/4 A,B
(two) - cl
(O17:D)
MDM OA 1/2/3 -
ON



① ✓MCC regarding PCMMU switch. Selection of alternate PCMMU may preclude MCC viewing LDR telemetry

② Do not cycle open cb. ✓MCC

NOM

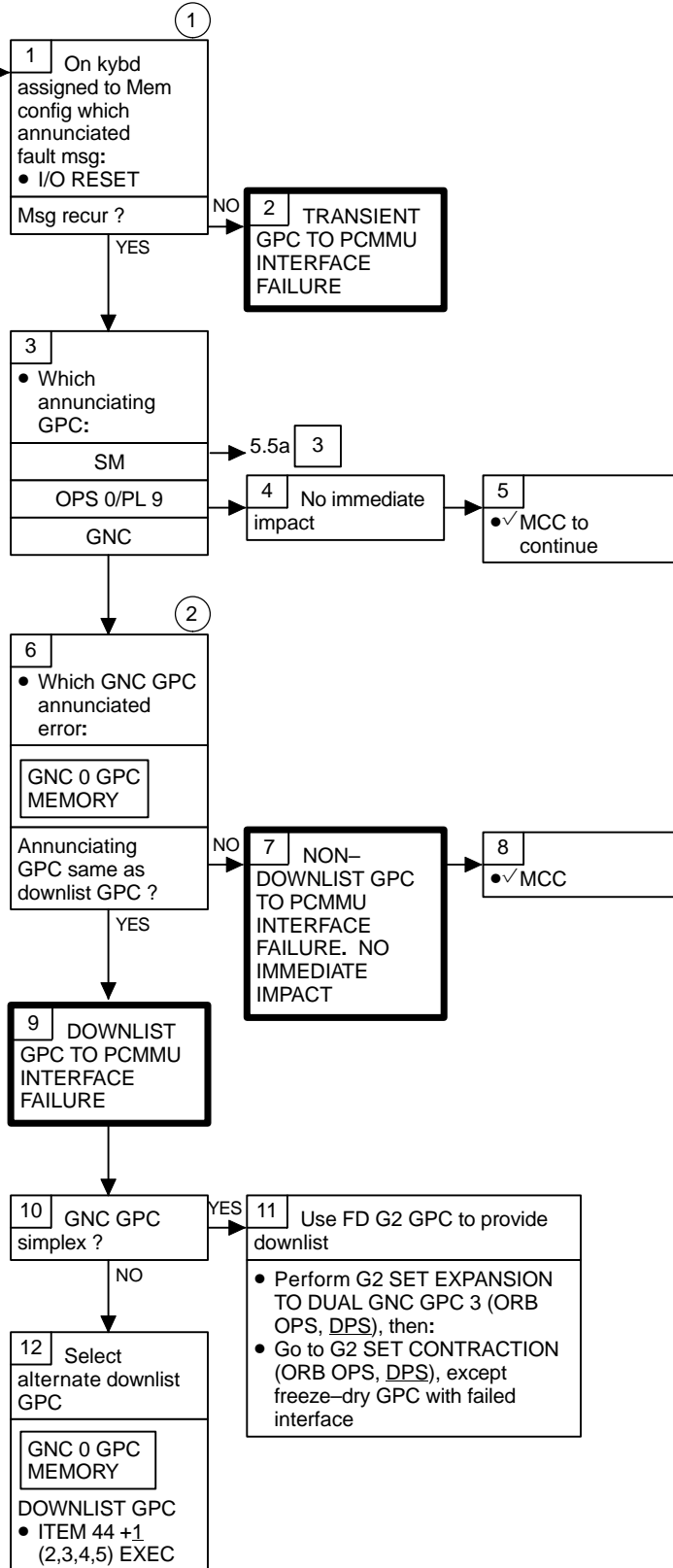
DPS

5.5c 'I/O ERROR D/L'

SM ALERT

I/O ERROR D/L

If:
IOP BCE xmtr fail
PCMMU fail



- ① I/O RESET not reqd to reestablish downlist. Action only verifies that anomaly continues
- ② All PASS GPCs output downlist. PCMMU ignores all but selected downlist GPC

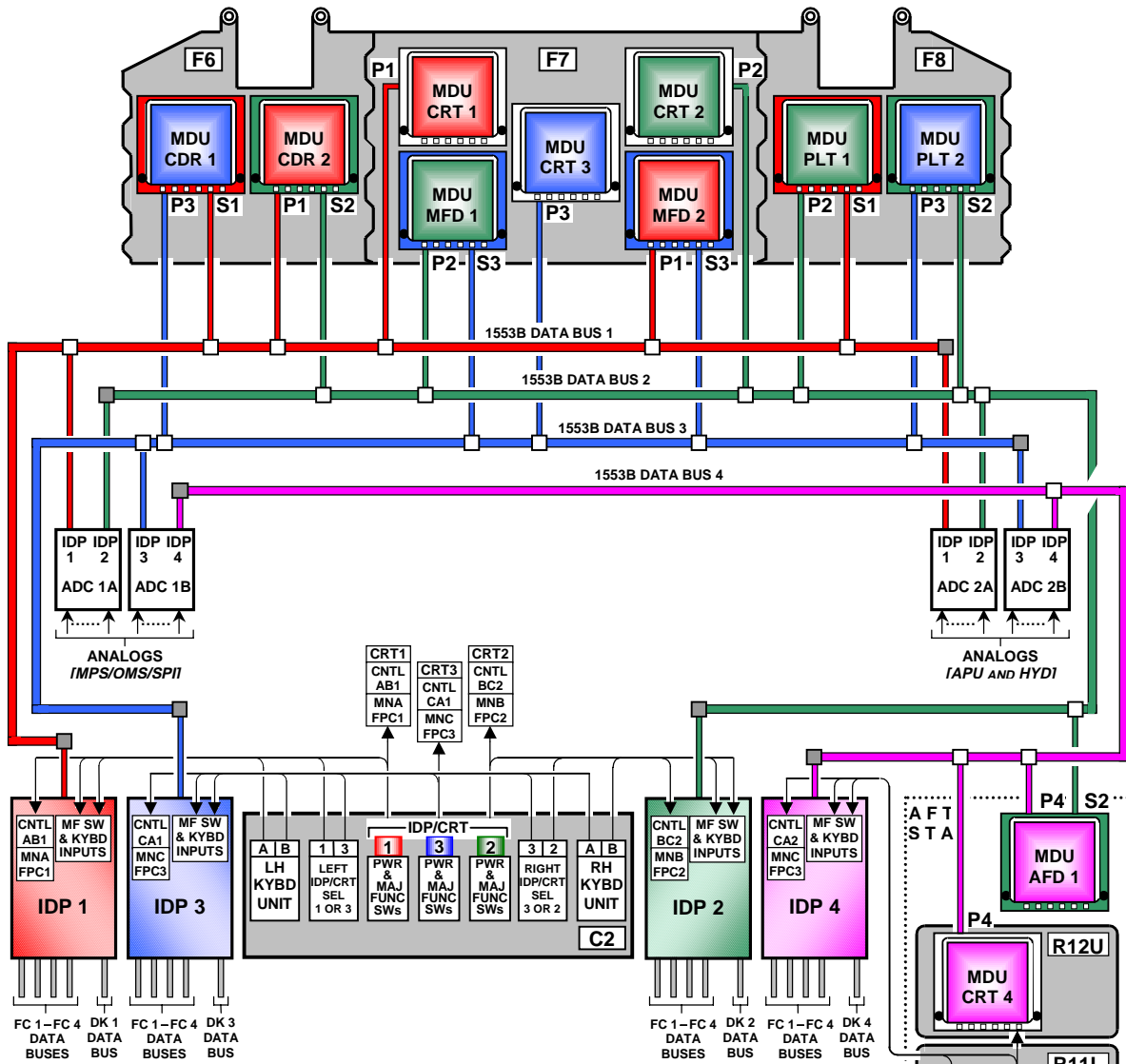
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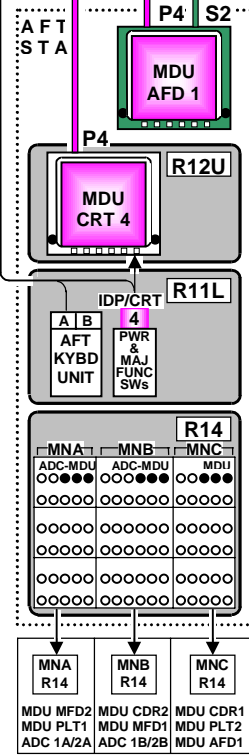
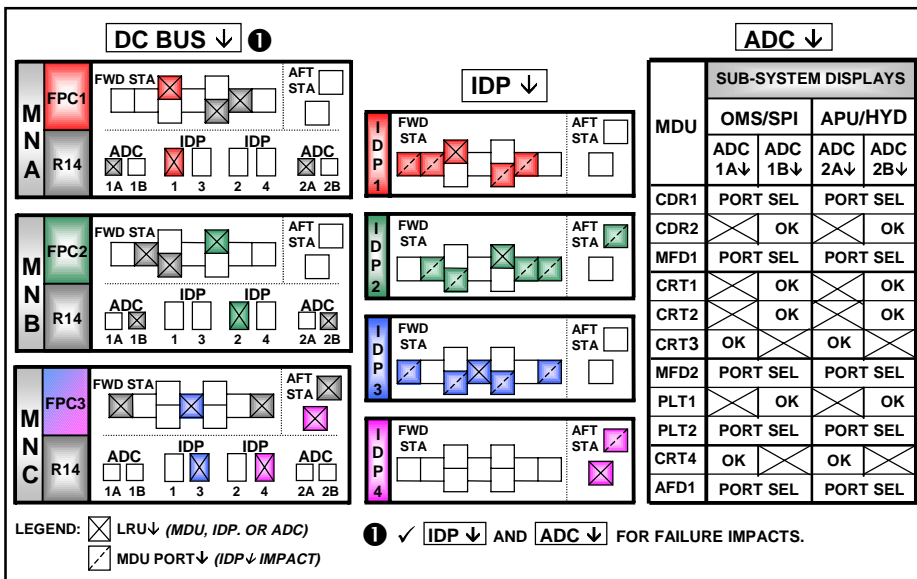
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Pages 5–49 through 5–70 WILL NOT BE APPLICABLE TO NOMINAL FLIGHT (NOM)

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MEDS OVERVIEW
[POWER AND INTERNAL 1553B DATA BUS CONFIGURATION]



MEDS

DPS

5.6a GPC 'I/O ERROR CRT 1(2,3,4)', 'BITE FAIL IDP 1(2,3,4)', 'IDP DEFAULT LOAD FAIL', 'VM LOAD IN PROGRESS'

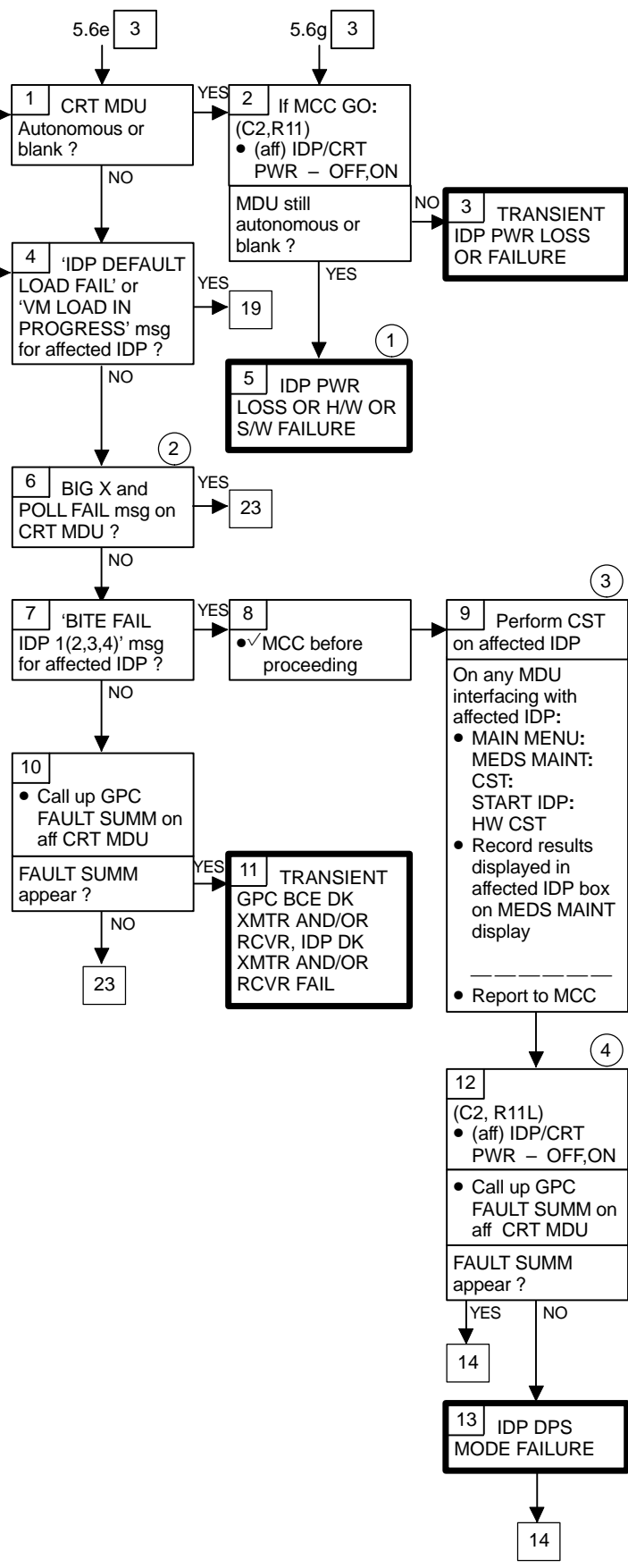
SM ALERT

GPC 'I/O ERROR CRT 1(2,3,4)', 'BITE FAIL IDP 1(2,3,4)'

'IDP DEFAULT LOAD FAIL', 'VM LOAD IN PROGRESS'

If:
 GPC BCE 6(7,8,9)
 XMTR and/or RCVR failure
 DK 1(2,3,4) BUS anomaly
 DK interface disabled at IDP 1(2,3,4)
 IDP 1(2,3,4) pwr loss
 IDP 1(2,3,4) H/W or S/W fail
 IDP 1(2,3,4) DK XMTR and/or RCVR fail

If:
 IDP 1(2,3,4) load sw failure
 Inadvertent IDP 1(2,3,4) load

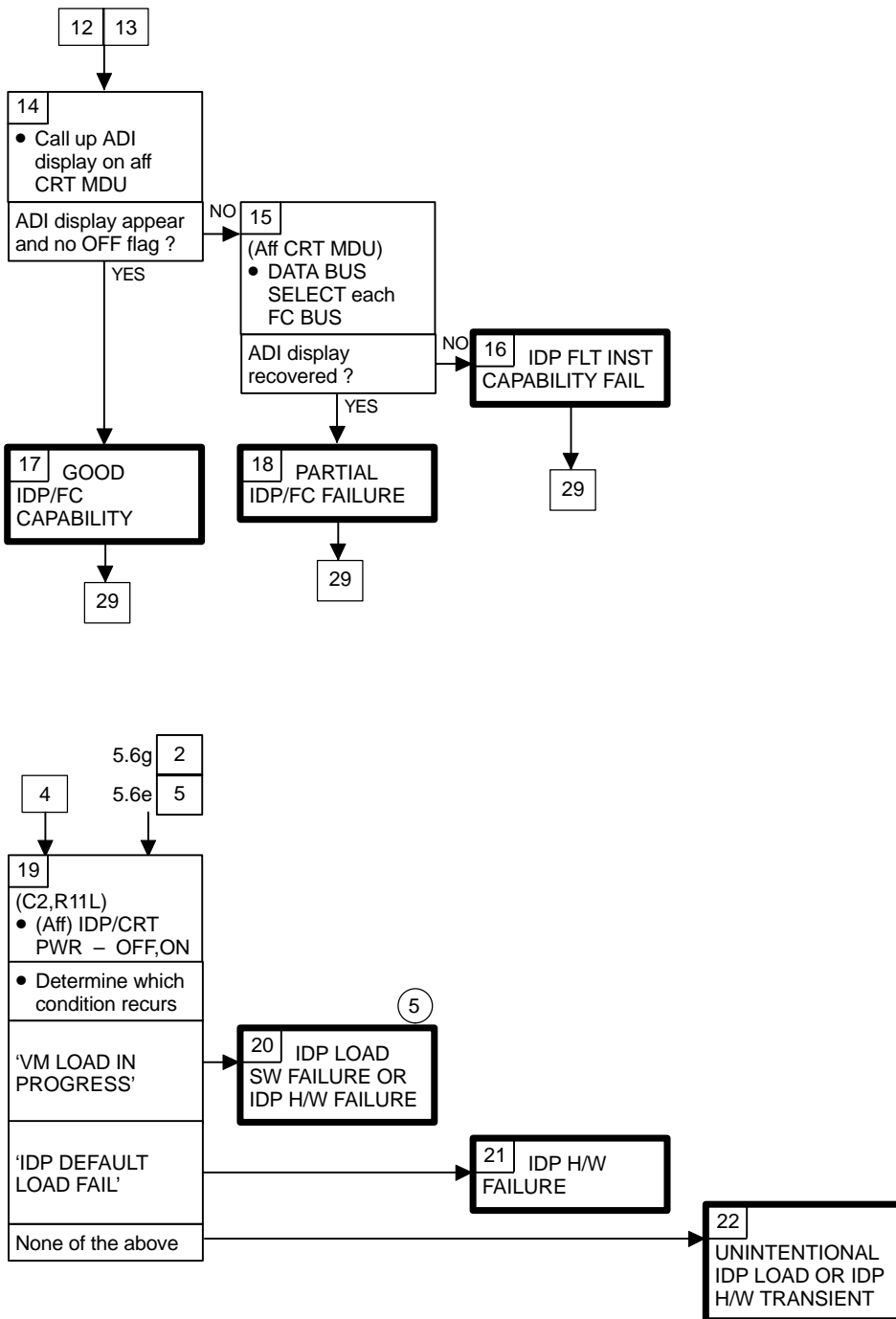


- ① ✓MCC for possible IFM replacement
- ② Both Big X and POLL FAIL msgs appear for complete GPC Data path failure. Appearance of only 1 msg indicates an internal GPC or IDP problem
- ③ Expect GPC 'I/O ERROR CRT X' message if a GPC is commanding the affected IDP. All other MDUs communicating with the IDP running CST will be temporarily inoperable. IDP CST results will be blank while H/W CST is running. IDP H/W CST takes ~75 sec. Nominal IDP CST result is '000000'
- ④ Following blocks will test IDP capabilities remaining after BITE

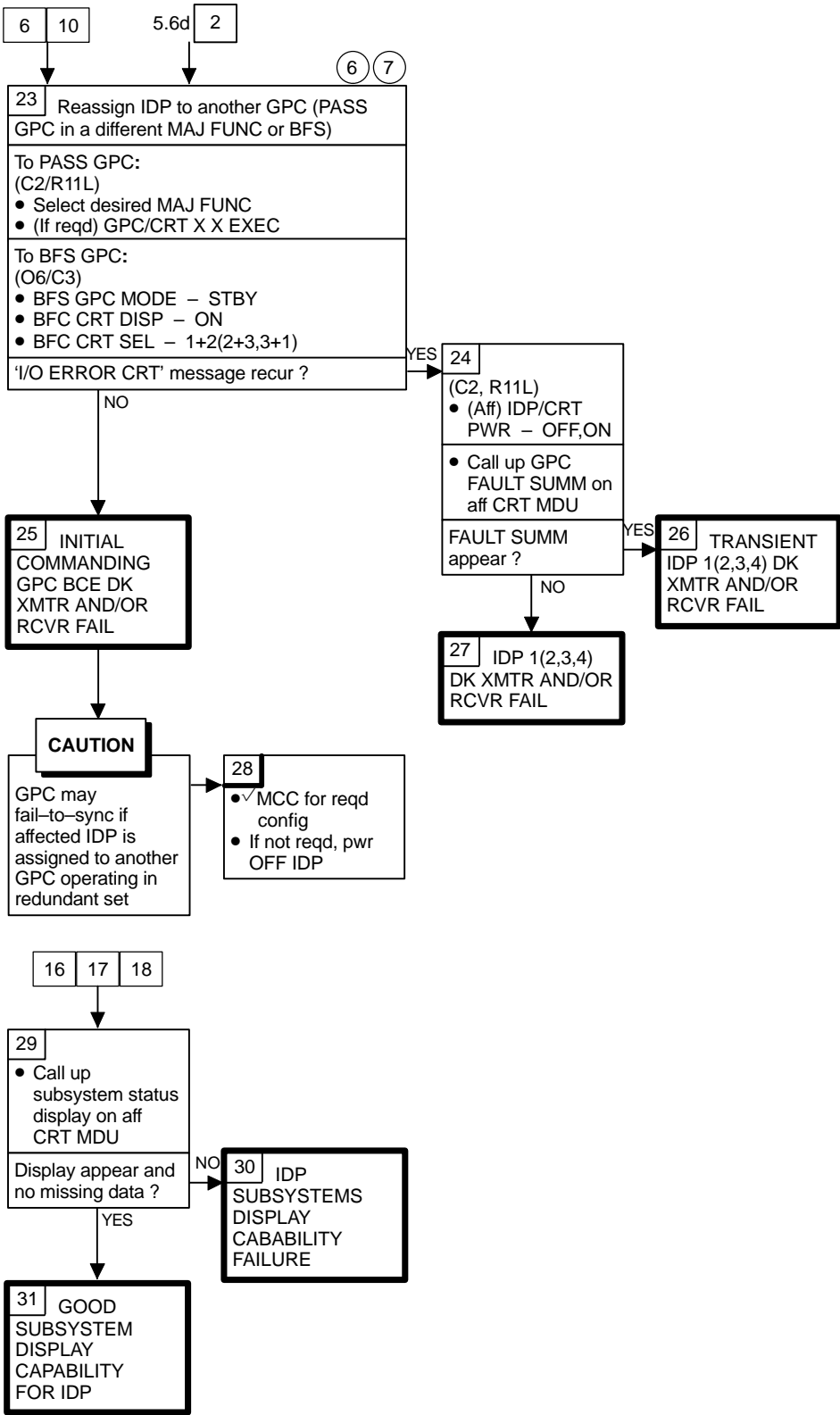
MEDS

DPS 5.6a (Cont)

⑤ IDP cannot be used in DPS mode



DPS 5.6a (Cont)



⑥ Any SPEC or Roll-In DISP active or buried on IDP will be counted against two SPEC/ two Roll-In DISP limit per MAJ FUNC. SPEC/Roll-In DISP can be released via an OPS transition or an IDP Equivalent RESUME (via MCC uplink)

⑦ GPC/CRT key input must be made on keyboard with active GPC interface. Always use PASS keyboard to avoid dual commanders. If assigning IDP to/from BFS, always deassign IDP first. Note that BFC CRT DISPLAY/SELECT sw will override any GPC/CRT kybd entry

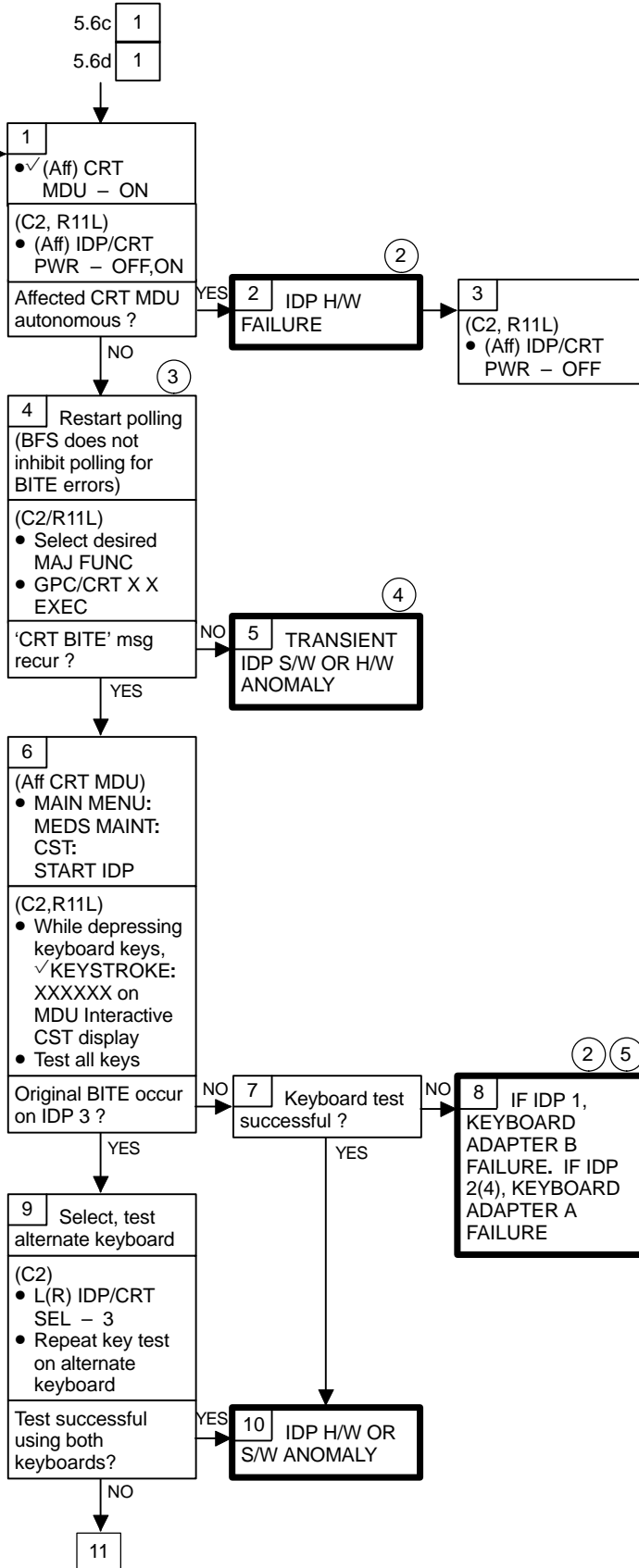
MEDS

5.6b 'CRT BITE 1(2,3,4)'

SM ALERT

①
'CRT BITE 1(2,3,4)'

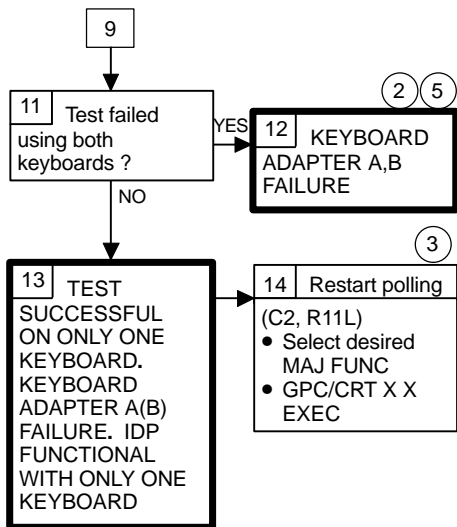
If:
IDP H/W or s/w failure
IDP pwr transient (BFS annunciated only)
Keyboard Adapter A and/or B failure



- ① 'POLL FAIL' msg should appear on affected MDU in DPS mode (PASS). BFS does not inhibit polling for BITE errors
- ② Any SPEC or Roll-In DISP active or buried on IDP will be counted against two SPEC/ two Roll-In DISP limit per MAJ FUNC. SPEC/Roll-In DISP can be released via an OPS transition or an IDP Equivalent RESUME (via MCC uplink)
- ③ GPC/CRT key input must be made on keyboard with active GPC interface. Always use PASS keyboard to avoid dual commanders. If assigning IDP to/from BFS, deassign IDP first. Note that BFC CRT DISPLAY/SELECT sw will override any GPC/CRT kybd entry
- ④ If error is Keyboard Adapter A(B) fail, failure may be associated with a specific key input
- ⑤ IDP can not be used in DPS mode. May be usable in FLT INST and subsystem display modes

MEDS

DPS 5.6b (Cont)



- ② Any SPEC or Roll-In DISP active or buried on IDP will be counted against two SPEC/ two Roll-In DISP limit per MAJ FUNC. SPEC/Roll-In DISP can be released via an OPS transition or an IDP Equivalent RESUME (via MCC uplink)
- ③ GPC/CRT key input must be made on keyboard with active GPC interface. Always use PASS keyboard to avoid dual commanders. If assigning IDP to/from BFS, deassign IDP first. Note that BFC CRT DISPLAY/SELECT sw will override any GPC/CRT keyboard entry
- ⑤ IDP can not be used in DPS mode. May be usable in FLT INST and subsystem display modes

MEDS

DPS

5.6c ABNORMAL RESPONSE FROM KEYBOARD INPUT

1
Abnormal Response from Keyboard Input

If:
Keyboard failure:
Key jammed
Key failed open circuit
Key shorted to ground
IDP Kybd Adapter A(B) mal
L(R) IDP/CRT Sel switch mal

1 'CRT BITE 1(2,3,4)' msg being annunciated for this IDP ?

YES 5.6b 1

2 Test IDP/CRT sel switch and keyboard

- If fwd keyboard, PWR ON both affected IDPs
- MAIN MENU: MEDS MAINT: CST: START IDP (If fwd keyboard, call up IDP CST on both aff IDPs simo)
- If fwd keyboard, verify 'ACTIVE KYBD: X,X' does not show the same keyboard active on both IDP displays
- Monitor 'KEYSTROKE: XXXXXXXXX' while depressing individual keystrokes
- Test all keys (using both IDPs if fwd keyboard)
- Record any abnormal response

Response nominal ?

YES 3 TRANSIENT KEY OR KEYBOARD ANOMALY

NO 4

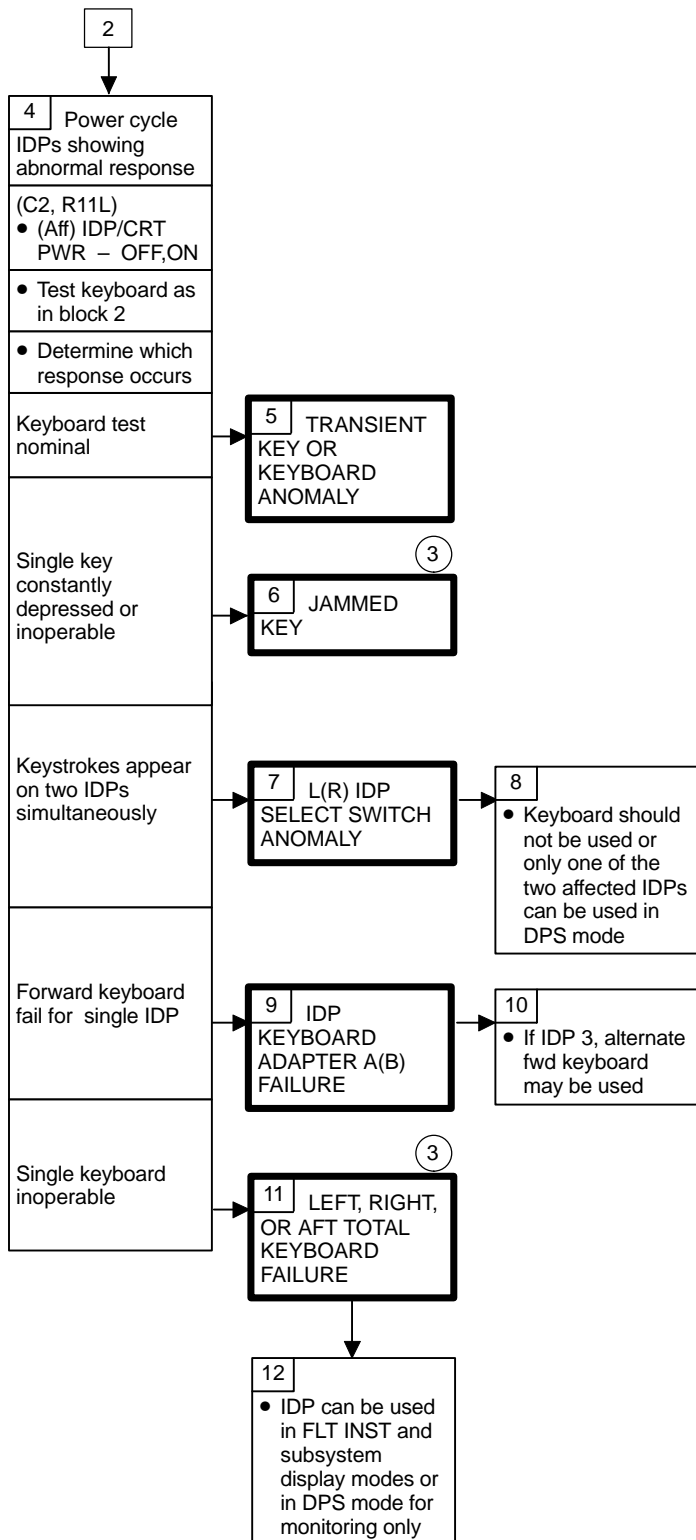
1 Abnormal means keystroke does not appear on scratch pad line or wrong keystroke appears. User should always check IDP/CRT SEL sw position if applicable and repeat keystroke sequence prior to performing this procedure to eliminate user error and transients

2 Any SPEC or Roll-In DISP active or buried on IDP will be counted against two SPEC/ two Roll-In DISP limit per MAJ FUNC. SPEC/Roll-In DISP can be released via an OPS transition or an IDP Equivalent RESUME (via MCC uplink)

MEDS

DPS 5.6c (Cont)

③ ✓MCC for possible IFM



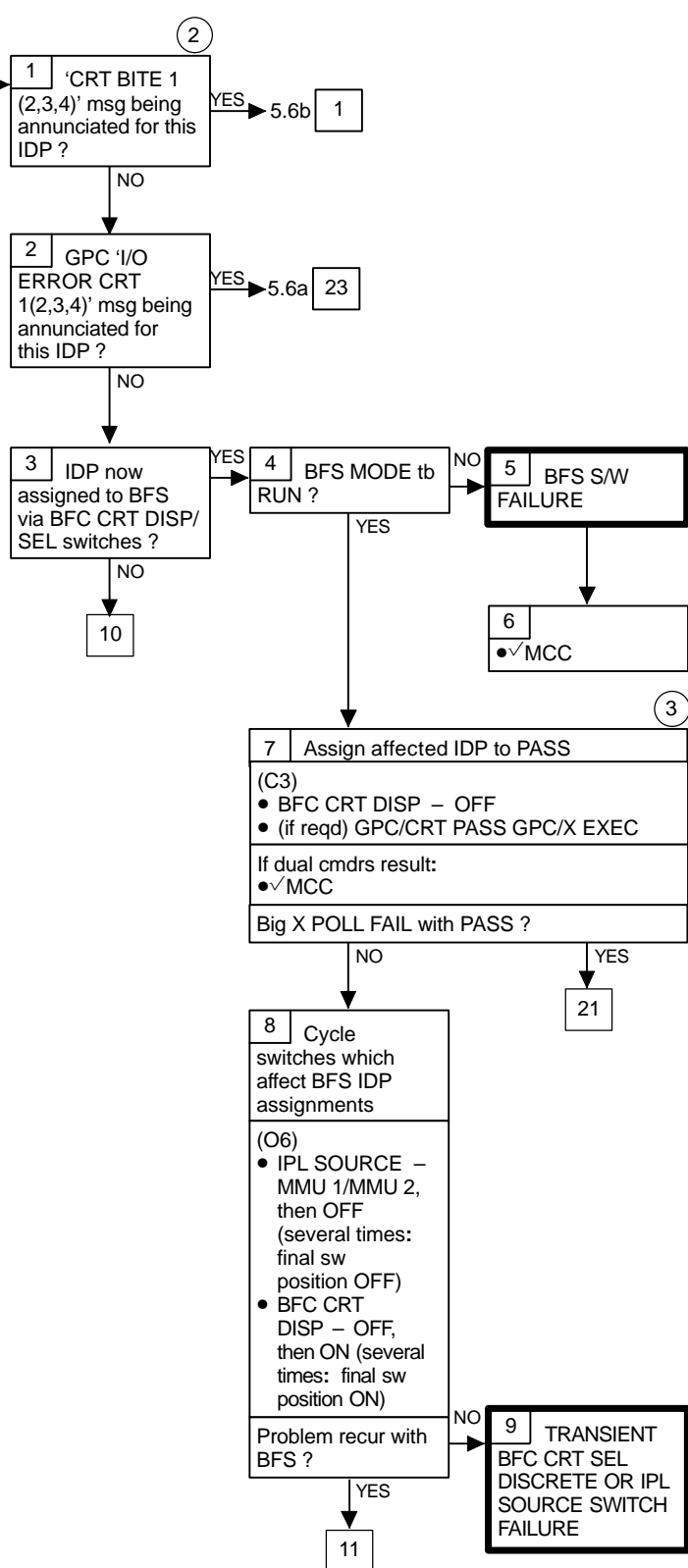
MEDS

DPS

5.6d BIG 'X' ACROSS MDU AND/OR 'POLL FAIL'

1
Big 'X'
Across MDU
and/or
'POLL FAIL'

If:
IDP S/W error
IDP H/W error
GPC S/W error
BFS CRT SEL
discrete failure
BFC CRT DISP sw
failure
IPL SOURCE sw
failure
Procedural error



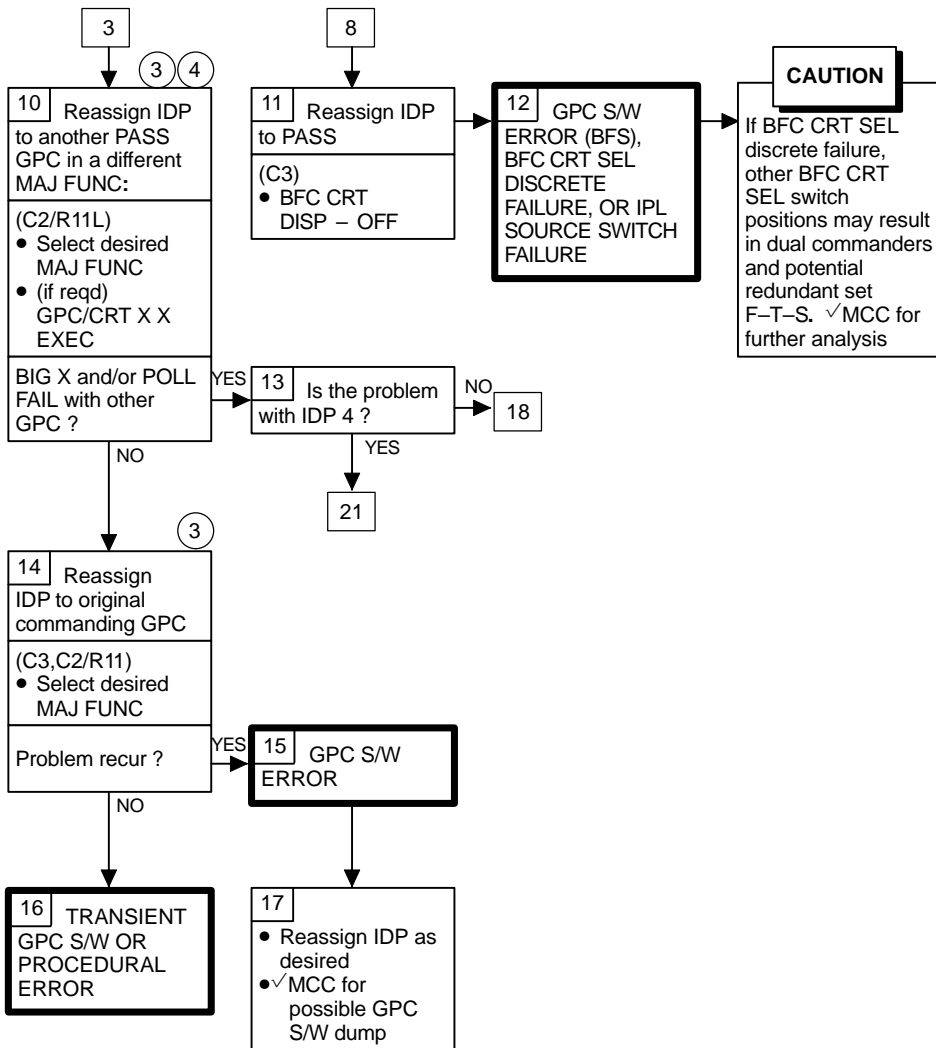
1 Big 'X' appears when IDP does not receive display update commands for 3 sec. 'POLL FAIL' appears when IDP does not receive poll or time update commands for 3 sec

2 User may have to establish alternate IDP interface to BFS or PASS or check with MCC as appropriate in order to observe fault msgs

3 GPC/CRT key input must be made on keyboard with active GPC interface. Always use PASS keyboard to avoid dual commanders. If assigning IDP to/from BFS, always deassign IDP first. BFC CRT DISPLAY/SELECT sw will override any GPC/CRT keyboard entry

MEDS

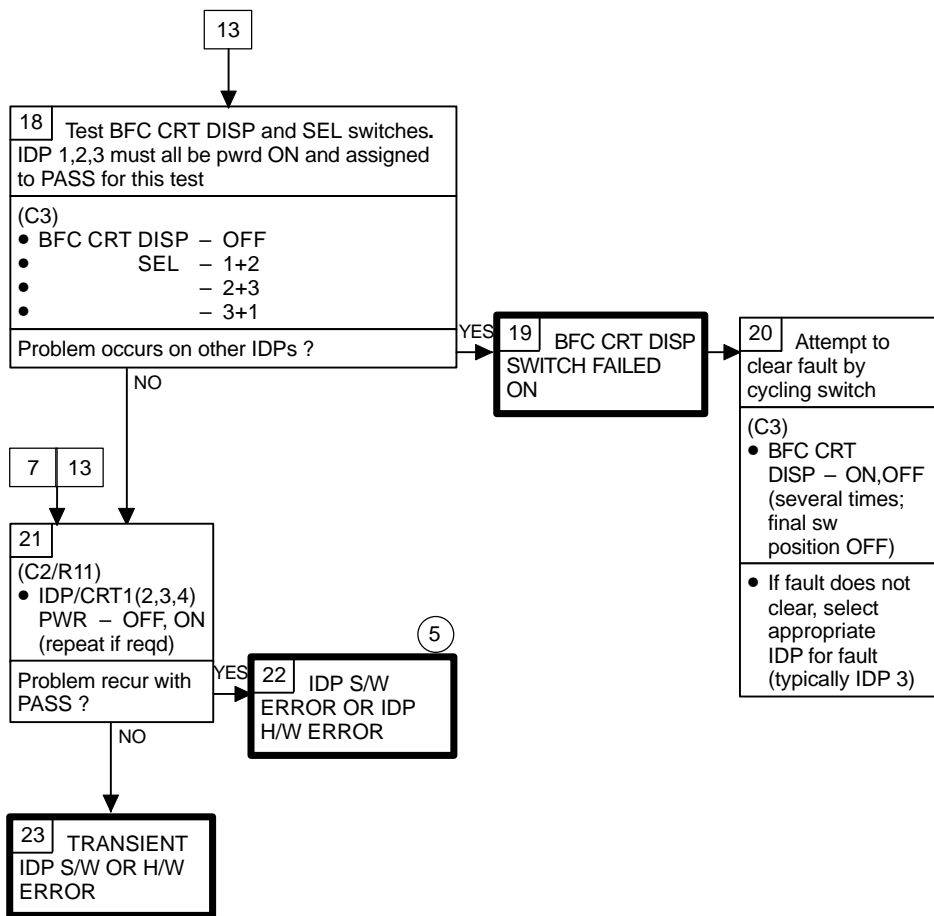
DPS 5.6d (Cont)



③ GPC/CRT key input must be made on keyboard with active GPC interface. Always use PASS keyboard to avoid dual commanders. If assigning IDP to/ from BFS, always deassign CRT first. BFC CRT DISPLAY/ SELECT sw will override any GPC/ CRT keyboard entry

④ Any SPEC or Roll-In DISP active or buried on IDP will be counted against two SPEC/ two Roll-In DISP limit per MAJ FUNC. SPEC/Roll-In DISP can be released via an OPS transition or an IDP Equivalent RESUME (via MCC uplink)

DPS 5.6d (Cont)



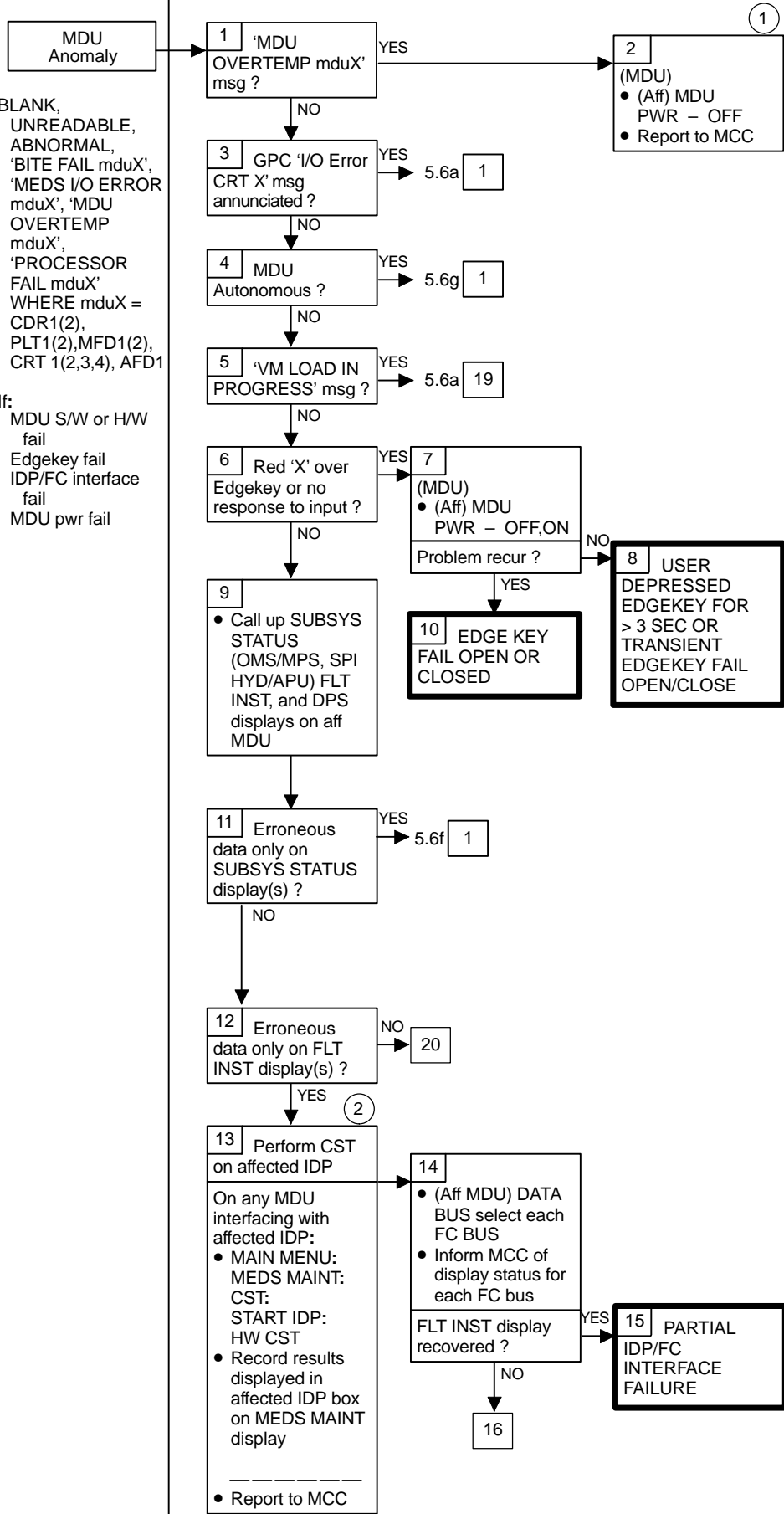
⑤ IDP can not be used in DPS mode. May be usable in FLT INST and subsystem display modes

DPS

5.6e MDU ANOMALY

BLANK, UNREADABLE, ABNORMAL, 'BITE FAIL mduX', 'MEDS I/O ERROR mduX', 'MDU OVERTEMP mduX', 'PROCESSOR FAIL mduX' WHERE mduX = CDR1(2), PLT1(2), MFD1(2), CRT 1(2,3,4), AFD1

If: MDU S/W or H/W fail
Edgekey fail
IDP/FC interface fail
MDU pwr fail

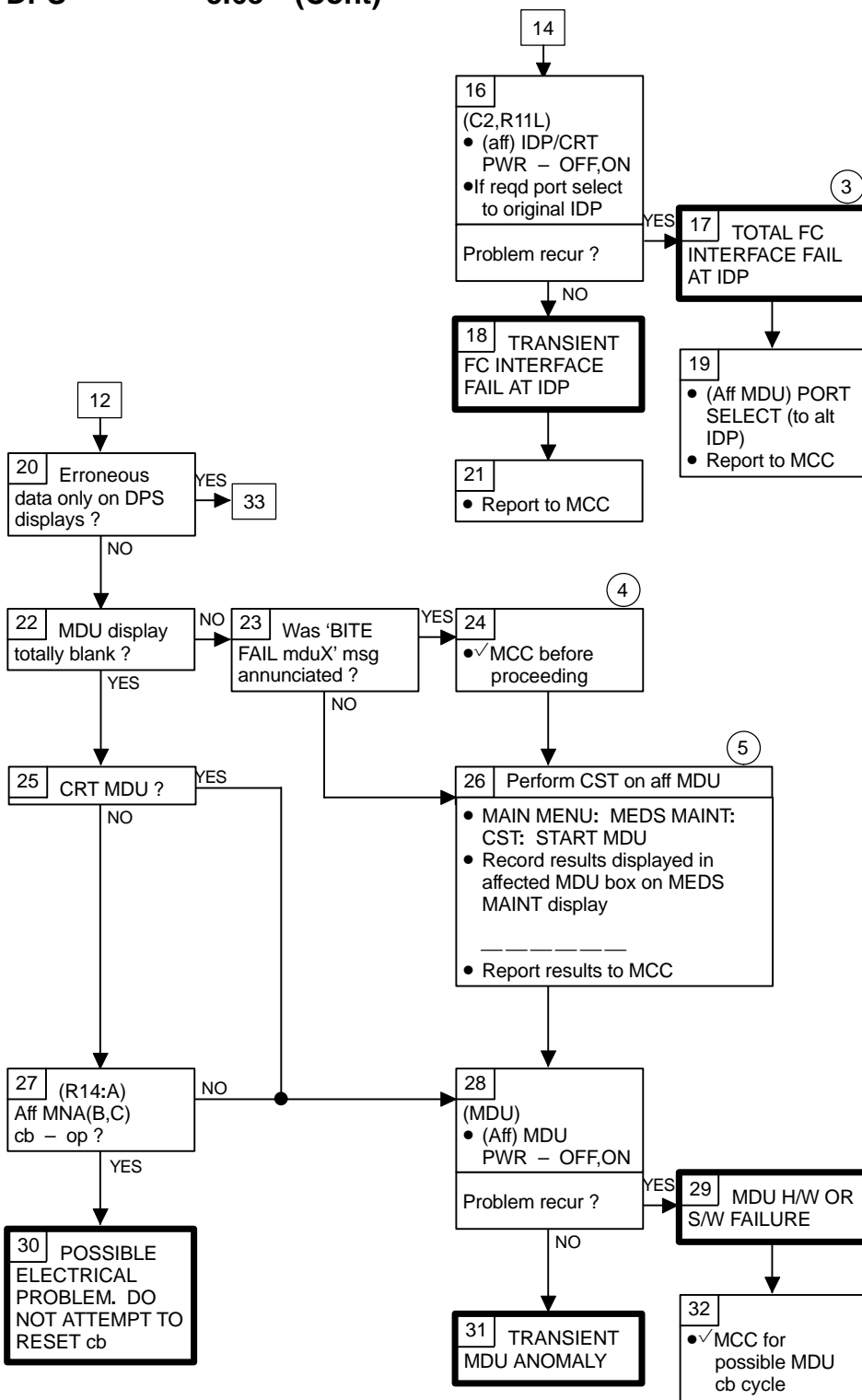


① Internal component has reached 212 degF. Do not repower unless asked by MCC

② Expect GPC 'I/O ERROR CRT X' message if GPC commanding the affected IDP. All other MDUs communicating with the IDP running CST will be temporarily inoperable. IDP CST results will be blank while H/W CST is running. IDP H/W CST takes ~75 sec. Nominal IDP CST result is '000000'

MEDS

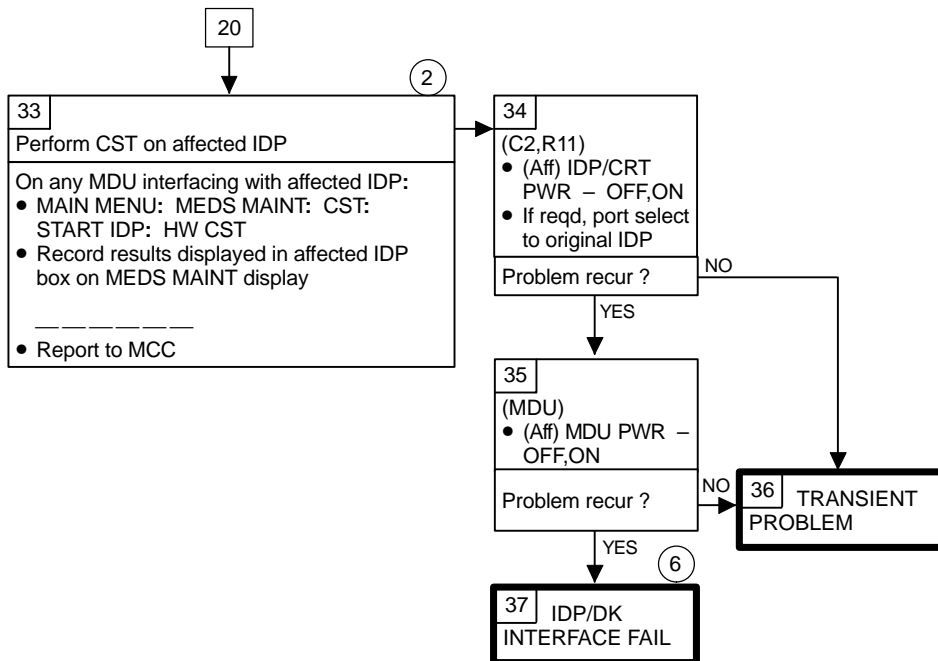
DPS 5.6e (Cont)



- ③ IDP cannot be used in FLT INST mode. May be usable in DPS and subsystem display modes
- ④ For MDU BITE caused by EEPROM failure, CST or pwr cycle should not be performed on MDU
- ⑤ Expect 'MEDS I/O ERROR MDU X' messages. MDU CST will take ~75 sec to reach the edgekey test. IDPs will not be able to communicate with MDU while it is executing its CST. Nominal MDU CST result is '0000FF'

MEDS

DPS 5.6e (Cont)



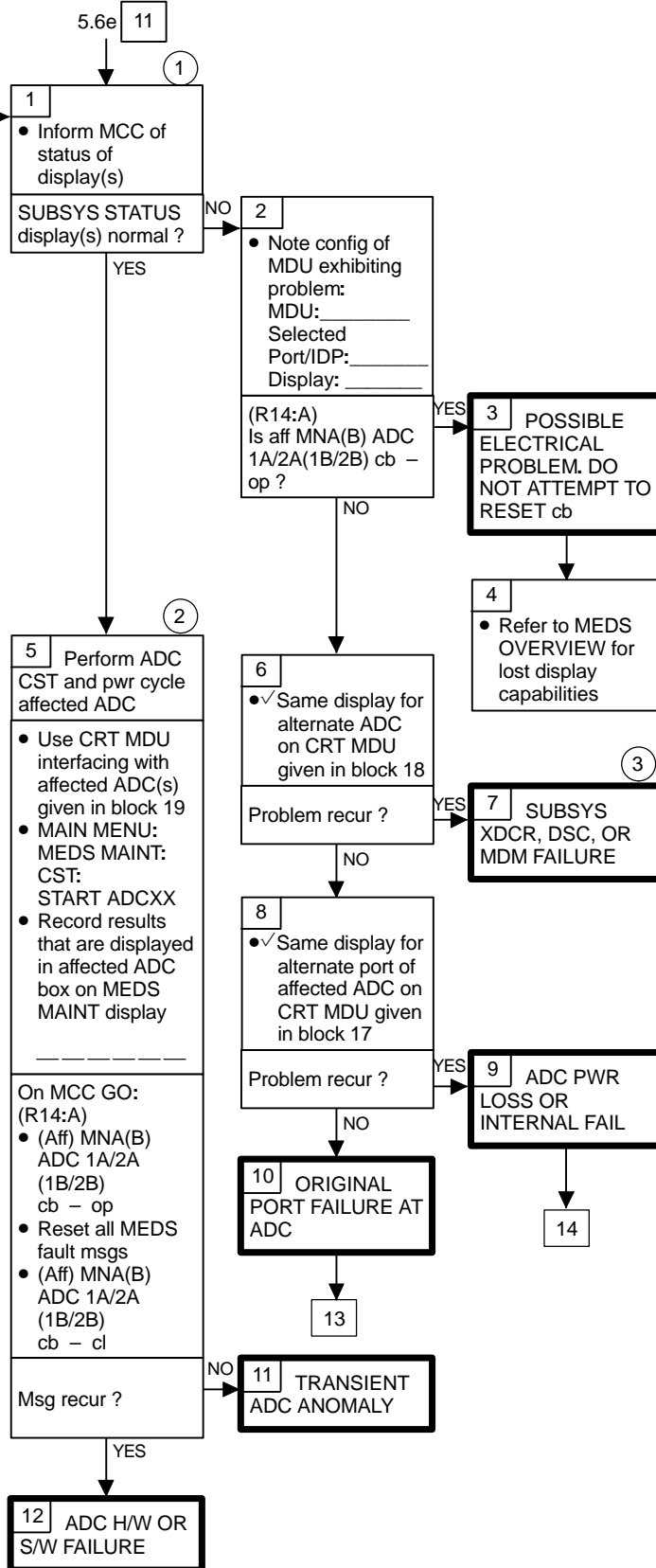
② Expect GPC 'I/O ERROR CRT X' message if GPC commanding the affected IDP. All other MDUs communicating with the IDP running CST will be temporarily inoperable. IDP CST results will be blank while H/W CST is running. IDP H/W CST takes ~75 sec. Nominal IDP CST result is '000000'

⑥ IDP cannot be used in DPS mode. May be used in FLT INST and subsystem display modes

MEDS

'BITE FAIL ADCX',
'PROCESSOR FAIL ADCX',
'MEDS I/O ERROR ADCX',
ABNORMAL SUBSYSTEM STATUS DISPLAY WHERE X = 1A, 1B, 2A, 2B

If:
ADC Port failure
ADC H/W failure
ADC S/W failure
ADC power loss/fail
Subsystem XDCR, DSC or MDM fail

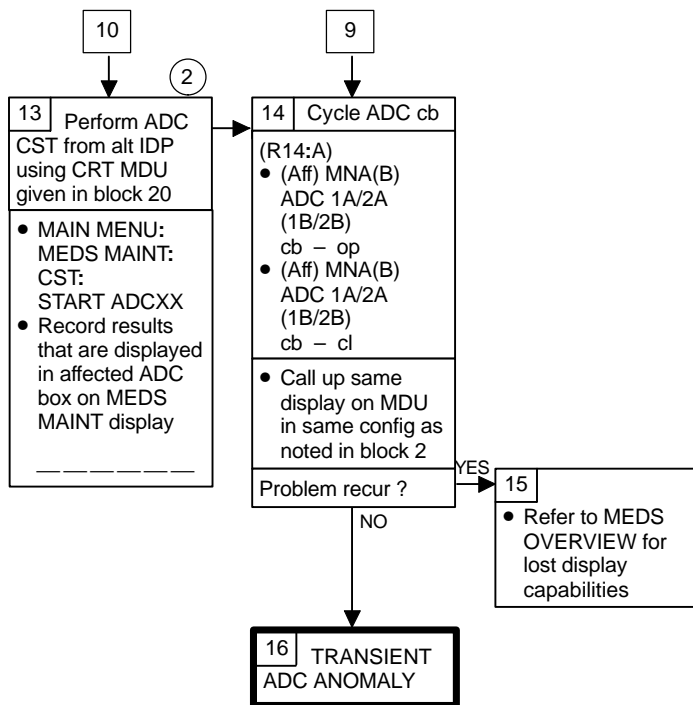


① If MEDS fault msg(s) annunciated, user may need to select OMS/MPS, SPI, and HYD/APU displays for annunciating IDP(s). ADC 1A and 1B provide OMS/MPS and SPI display data. ADC 2A and 2B provide HYD/APU display data. Reference MEDS overview

② ADC CST will be running while ADC CST result is blank. It will take 5 sec to complete CST. Nominal CST result is '000000'. Expect 'MEDS I/O ERROR ADCXX' msg

③ ✓MCC for other params possibly lost on same DSC or MDM card

DPS 5.6f (Cont)



② ADC CST will be running while ADC CST result is blank. It will take 5 sec to complete CST. Nominal CST result is '000000'. Expect 'MEDS I/O ERROR ADCXX' msg

④ The purpose of this chart is to select an MDU that will always be connected to the other IDP on the ADC associated with the problem. A CRT MDU is chosen since it will always be connected to that IDP

④

17 MDU with Subsys Display problem	Currently Selected Port (noted in block 2)	Use this CRT MDU
CDR1	Pri	CRT4
	Sec	CRT2
CDR2	Pri	CRT2
	Sec	CRT1
CRT1	-	CRT2
MFD1	Pri	CRT1
	Sec	CRT4
CRT3	-	CRT4
MFD2	Pri	CRT2
	Sec	CRT4
CRT2	-	CRT1
	Pri	CRT1
PLT1	Sec	CRT2
	Pri	CRT4
PLT2	Sec	CRT1
	-	CRT3
CRT4	Pri	CRT3
	Sec	CRT1
AFD1	Pri	CRT3
	Sec	CRT1

5

18	MDU with Subsys Disp Prob (noted in block 2)	Selected Port (noted in block 2)	Use this CRT MDU
CDR1		Pri	CRT1
		Sec	CRT4
CDR2		Pri	CRT4
		Sec	CRT4
CRT1		-	CRT4
MFD1		Pri	CRT4
		Sec	CRT1
CRT3		-	CRT1
MFD2		Pri	CRT4
		Sec	CRT1
CRT2		-	CRT4
PLT1		Pri	CRT4
		Sec	CRT4
PLT2		Pri	CRT1
		Sec	CRT4
CRT4		-	CRT1
AFD1		Pri	CRT1
		Sec	CRT4

6

19	Perform CST for this ADC	Use this CRT MDU
ADC1A		CRT1 or CRT2
ADC1B		CRT4 or CRT3
ADC2A		CRT1 or CRT2
ADC2B		CRT4 or CRT3

7

20	Affected Display (noted in block 2)	Selected IDP for Affected MDU (noted in block 2)	Perform CST for this ADC	Use this CRT MDU
OMS/MPS/SPI		IDP 1	ADC 1A	CRT2
		IDP 2	ADC 1A	CRT1
		IDP 3	ADC 1B	CRT4
		IDP 4	ADC 1B	CRT3
HYD/APU		IDP 1	ADC 2A	CRT2
		IDP 2	ADC 2A	CRT1
		IDP 3	ADC 2B	CRT4
		IDP 4	ADC 2B	CRT3

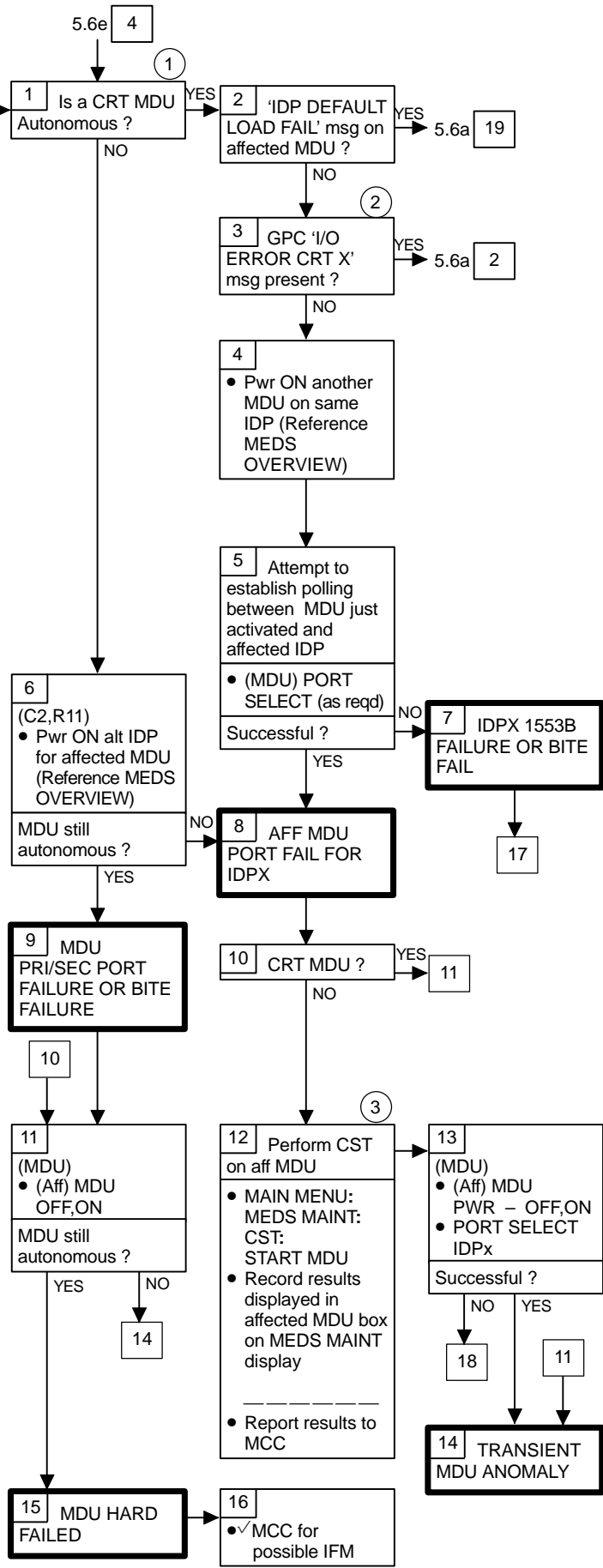
5 The purpose of this chart is to select an MDU that will always be connected to an IDP on the alternate ADC for the affected data. A CRT MDU is chosen since it will always be connected to that IDP

6 The purpose of this chart is to determine the MDU on which to perform the ADC CST. A CRT MDU is chosen, since it will always be connected to the aff ADC

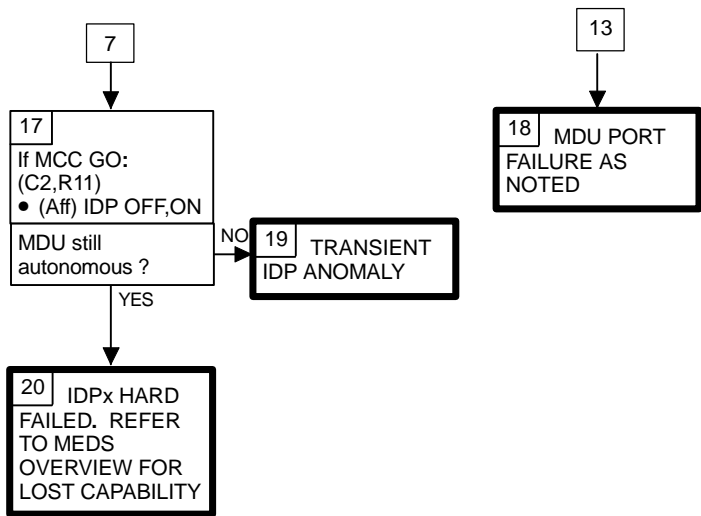
7 The purpose of this chart is to select the ADC on which to perform an ADC CST and an MDU driven by the IDP on the alternate port of the ADC. A CRT MDU is chosen since it will always be connected to that IDP

5.6g MDU IS AUTONOMOUS

If:
MDU dual port fail,
CRT MDU port fail,
MDU port fail & alt
IDP OFF, 1553B fail
for IDP



- ① If mult MDUs are autonomous, work MAL for CRT MDU
- ② User may have to establish alternate IDP interface to BFS or PASS or check with MCC as appropriate in order to observe fault msgs
- ③ Expect 'MEDS I/O ERROR MDU X' messages. MDU CST will take ~75 sec to reach the edgekey test. IDPs will not be able to communicate with MDU while it is executing its CST. Nominal MDU CST result is '0000FF'



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GPC FRP-1 SINGLE GPC FAIL

SINGLE GPC FAIL OBJECTIVE

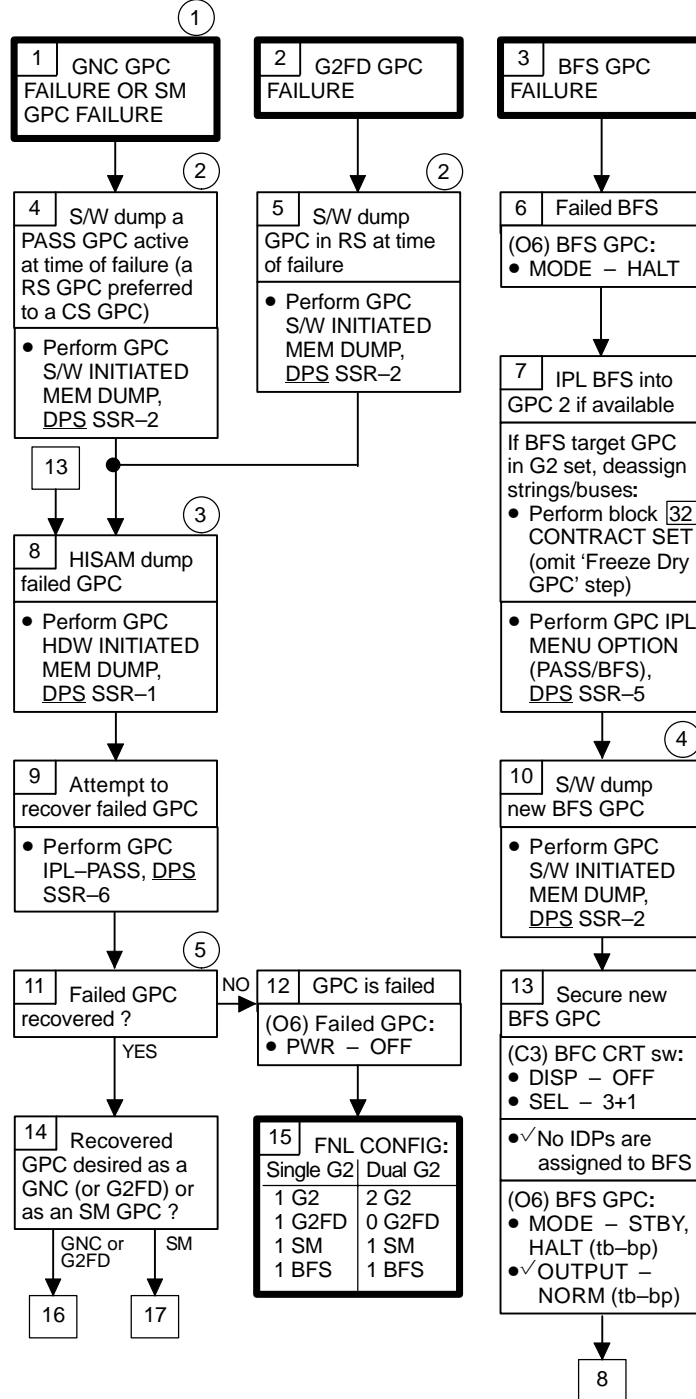
Attempt failed GPC recovery following on-orbit DPS reconfiguration via APCL, OPCL, MAL, or PI procedure. If recovered, target the 'transient' GPC as a redundant G2, G2FD, or SM based upon operational objectives. If RNDZ, EVA, or a critical burn requires a Dual G2 config, recovered GPC will be made a G2FD

SCOPE

Procedure designed to handle any single G2, SM, G2FD, or BFS GPC failure occurring during ascent or on-orbit prior to entry prep

ASSUMPTIONS

If a multiple G2 configuration is reqd shortly following the GPC recovery attempt, such DPS reconfiguration will be performed before or after GPC recovery and is not an embedded part of this FRP



① If GPC FRP-1 following failure of 'GNC RECOVERY VIA G2FD' (OPCL), the following uplinks may be reqd upon a GPC recovery:

- state vector
- ADI quaternions
- IMU gyro bias
- IMU accel bias

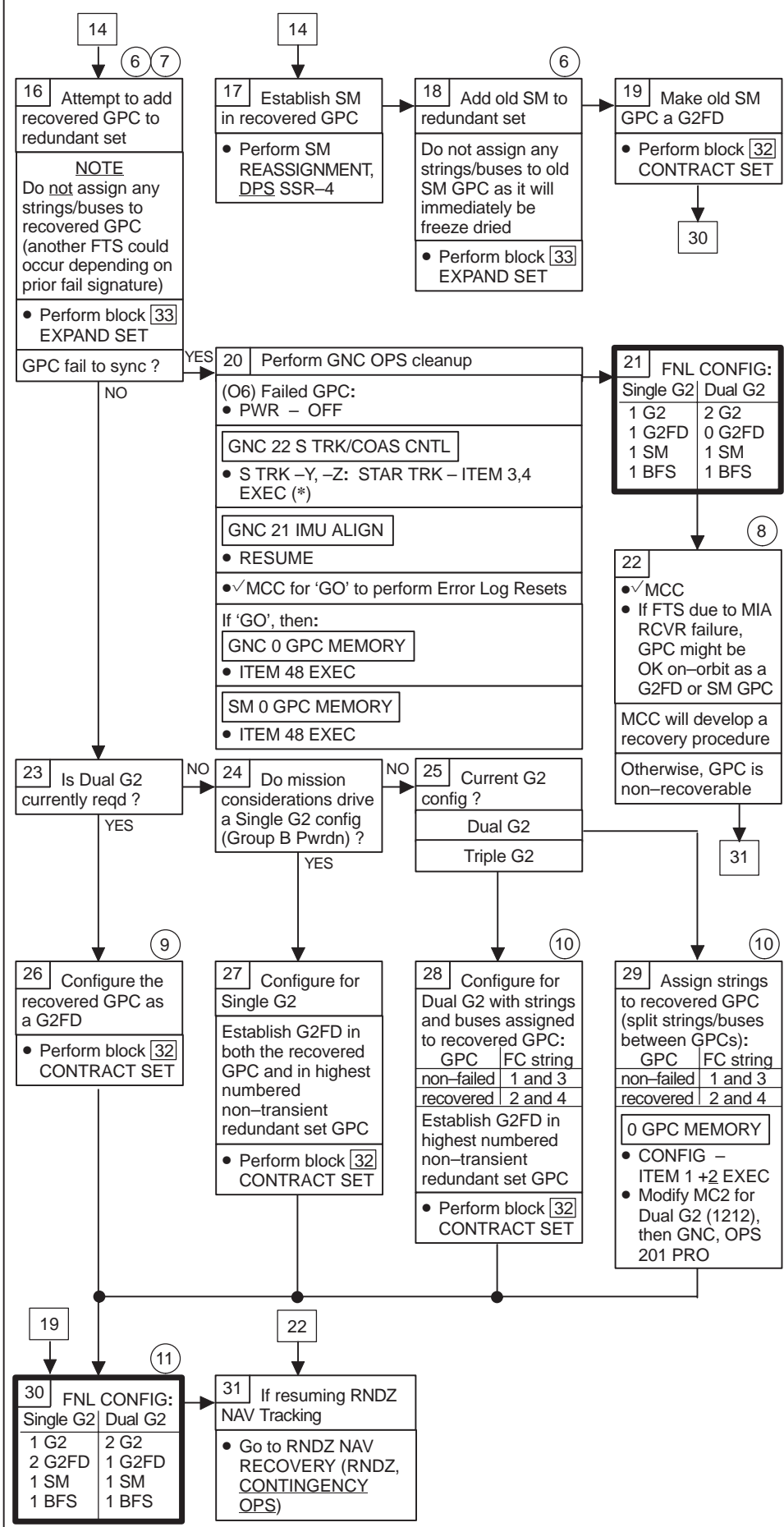
② S/W dump to capture GPC Sync Trace Log. MCC analysis of both S/W and H/W dumps may provide insight to the cause of a PASS GPC failure

③ Prior to BFS H/W dump, current TFL must be capable of supporting a BFS downlist

④ S/W dump to verify integrity of new BFS software load

⑤ If GPC is recovered, upon completion of FRP, MCC may request certain IDPs be powered on for about 30 sec to ensure MCC uplink interfaces to both GNC and SM

GPC FRP-1 (Cont)



- ⑥ This process establishes a GNC Major Function Base in the target G2. For the recovered GPC, the action verifies GPC can maintain redundant set sync
- ⑦ Action verifies no FC MIA receiver failure exists
- ⑧ 'Big Picture' recovery overview:

If failed GPC to be used as an SM, uplinked procedure will continue FRP after re-IPLing GPC in block [9]

If failed GPC to be used as a restricted G2FD source, after re-IPLing GPC, uplinked procedure will add recovered GPC to redundant set with the affected string deassigned, collapse set with string deassigned, freeze dry GPC, and finally, reassign string and perform a GNC OPS Mode Recall

If GPC later used as G2FD source, string Dual G2 must be deassigned before set expansion

- ⑨ After critical mission phase is complete, if OPS considerations will permit continued use of a Dual G2 config, then establish G2FD in a redundant GPC and add recovered GPC to Dual G2 set

- ⑩ MCC may correct NBAT if IMU config or other considerations drive alternate stringing [1221 or 1122 NBAT]

- ⑪ Assign string 4 to recovered GPC during Entry phase (a transient GPC)

MEDS

GPC FRP-1 (Cont)

ASSUMPTIONS (Block 32):

The crew will need to adjust the GPC Target Set and nominal bus assignment table (NBAT) string/bus assignments in the "Configure For Set Contraction" step below to accommodate the actual DPS configuration (✓MCC if GPC target set or NBAT string/bus assignments unclear)

32 CONTRACT SET

NOTE

Do not perform any keyboard item entries or switch throws 10 sec before and after making an OPS transition request

C3(A6U)
CRT

- If RNDZ NAV enabled:
DAP: LVLH
GNC UNIV PTG
CNCL – ITEM 21 EXEC

CRT

- CONFIGURE FOR SET CONTRACTION**
If MM202: GNC, OPS 201 PRO
GNC 0 GPC MEMORY
CONFIG – ITEM 1 +2 EXEC
Assign MC2 per table →

If:	Single G2	Dual G2
CONFIG GPC	2 10000	2 12000
STR 1	1	1
2	1	2
3	1	1
4	1	2
PL 1/2	0	0
CRT 1	1	1
2	1	2
3	0	0
4	1	2
L 1	0	0
2	0	0
MM 1	1	1
2	1	2

C3(A6U)
CRT

- OPS MODE RECALL** (12)
DAP: FREE
VERN(ALT)

CRT
C3(A6U)

GNC, OPS 201 PRO
Pause ~30 sec
(DAP settling), then
DAP: as reqd

CRTX

- FREEZE DRY GPC**
MAJ FUNC – PL
GPC/CRT G2FD/X EXEC
X PL GPC MEMORY
CONFIG – ITEM 45 +2 EXEC
GPC – ITEM 46 +2(3) EXEC
STORE – ITEM 47 EXEC
Store complete when MC = 02 (~30 sec)
✓ All IDPs deassigned from FD GPC

O6

GPC MODE G2FD – STBY (tb-bp)
– HALT (tb-bp)
– STBY (tb-RUN)
– HALT (tb-bp)

- CONFIG FOR CLEANUP**
GNC 22 S TRK/COAS CNTL
S TRK –Y, –Z: STAR TRK – ITEM 3,4 EXEC (*)
GNC 21 IMU ALIGN
RESUME

- CLEAR SOFTWARE FAIL VOTES** (13)
GNC 0 GPC MEMORY
ITEM 48 EXEC
SM 0 GPC MEMORY
ITEM 48 EXEC

(12) GNC downlist will default to lowest ID GPC in G2 set. MCC may request downlist change following OPS Mode Recall

(13) Crew "GO" for Error Log resets without prior MCC concurrence

MEDS

GPC FRP-1 (Cont)

ASSUMPTIONS (Block 33):

The crew will need to adjust the **GPC Target Set** in "Configure For Set Expansion" step below to accommodate the actual DPS configuration (✓MCC if GPC target set or NBAT string/bus assignments unclear)

Procedure assumes target GPC (recovered GPC or former SM GPC) is up and in 'RUN', which is normally the case. If target GPC not in common set, perform step 2 "Config G2FD GPC(s) For Set Expansion" of G2 SET EXPANSION procedure (DPS, ORB OPS)

33 EXPAND SET

NOTE

Do not perform any keyboard item entries or switch throws 10 sec before and after making an OPS transition request

C3(A6U)
CRT

- If RNDZ NAV enabled:
DAP: LVLH
GNC UNIV PTG
CNCL – ITEM 21 EXEC

- CONFIGURE FOR SET EXPANSION**

If MM202: GNC, OPS 201 PRO

GNC 0 GPC MEMORY

CONFIG – ITEM 1 +2 EXEC

Assign MC2 per table →

⑭

If:	Dual G2	Triple G2
CONFIG GPC	2 12000	2 12300
STR 1	↑	↑
2		
3		
4		
PL 1/2		
CRT 1	↓	↓
2		
3		
4		
L 1		
2		
MM 1		
2		

C3(A6U)
CRT

- OPS MODE RECALL** ⑮
DAP: FREE

C3(A6U)
CRT

GNC, OPS 201 PRO
Pause ~30 sec
(DAP settling), then

C3(A6U)
DAP: as reqd

⑭ Whether expanding G2 set to a Dual or Triple G2 config, modify only the GPC target set unless otherwise noted (don't assign strings or buses to target GPC)

⑮ GPC downlist will default to lowest ID GPC in G2 set. MCC may request downlist change following OPS Mode Recall

MEDS

GPC FRP-3 BFS GPC FAIL RECOVERY (ENTRY)

NOTE

Procedure assumes config shown as established by BFS GPC FAIL (ENT PKT, DPS). The following BFS uplinks may be necessary after completion of FRP:

- Guidance targets
- ADI quaternions
- IMU gyro bias
- IMU accelerometer bias
- TMBU

Procedure assumes deorbit planned. If deorbit not planned, config for ORBIT and go to SINGLE GPC FAIL, GPC FRP-1 (DPS)

Initial Config FRP-3					
GPC OPS	1 G3	2 G3	3 G3	4 G3	5 -
POWER OUTPUT MODE	ON NORM RUN	ON NORM RUN	ON NORM RUN	ON NORM RUN	ON NORM HALT
CONFIG GPC	3 12340				
STR 1	1				
2	2				
3	3				
4	4				
PL 1/2	1				
CRT 1	1				
2	2				
3	3				
4	0				
L 1	0				
2	0				
MM 1	1				
2	2				

- a. Remove GPC2 from MC3

GNC 0 GPC MEMORY

- Config – ITEM 1 +3 EXEC
- Modify MC3 per table
- GNC OPS 301 PRO (✓DAP)

- b. Establish new BFS in GPC 2

- Perform GPC IPL – MENU OPTION (PASS/BFS) DPS SSR-5
- GPC OUTPUT – BKUP
- MODE – RUN

GNC 50 HORIZ SIT – ✓PASS R/W sel

CONFIG GPC	3 10340
STR 1	1
2	4
3	3
4	4
PL 1/2	1
CRT 1	1
2	4
3	3
4	0
L 1	0
2	0
MM 1	1
2	3

O6

GPC FRP-3 (Cont)

- c. Attempt recovery of failed GPC
 - Perform GPC IPL-PASS DPS SSR-6
 - If GPC recovered, perform step d

Final Config for GPC 5 Not Recovered					
GPC OPS	1 G3	2 BFS3	3 G3	4 G3	5 -
POWER OUTPUT MODE	ON NORM RUN	ON BKUP RUN	ON NORM RUN	ON NORM RUN	OFF NORM HALT
CONFIG GPC	3 10340				
STR 1	1				
2	4				
3	3				
4	4				
PL 1/2	1				
CRT 1	1				
2	4				
3	3				
4	0				
L 1	0				
2	0				
MM 1	1				
2	3				

- d. GPC recovered, establish a four GPC redundant set

GNC 0 GPC MEMORY

- Config – ITEM 1 +3 EXEC
 - Modify MC3 per table
 - GNC OPS 301 PRO (✓DAP)
 - (BFS) GNC, OPS 000 PRO
 - 301 PRO
- GNC 50 HORIZ SIT – ✓PASS R/W sel

CONFIG GPC	3 10345
STR 1	1
2	4
3	3
4	5
PL 1/2	1
CRT 1	1
2	4
3	3
4	0
L 1	0
2	0
MM 1	1
2	3

Final Config for GPC 5 Recovered					
GPC OPS	1 G3	2 BFS3	3 G3	4 G3	5 G3
POWER OUTPUT MODE	ON NORM RUN	ON BKUP RUN	ON NORM RUN	ON NORM RUN	ON NORM RUN
CONFIG GPC	3 10345				
STR 1	1				
2	4				
3	3				
4	5				
PL 1/2	1				
CRT 1	1				
2	4				
3	3				
4	0				
L 1	0				
2	0				
MM 1	1				
2	3				

GPC FRP-4 PASS RECOVERY AFTER BFS ENGAGE (ASCENT/ORBIT/ENTRY)

NOTE

Procedure can be entered from direct Ascent/Entry engagement or from BFS ENGAGE (ORB PKT, DPS). Do not hardware dump or IPL freeze-dry GPC if activation was not attempted. The following uplinks will be necessary during or after completion of the FRP:

- State Vector
- IMU desired REFSMMATs
- IMU gyro bias (if reqd)
- IMU accel bias (if reqd)
- ADI quaternion (orbit inertial)
- If immediate deorbit planned:
 - Guidance targets
 - Landing sites (if reqd)
 - TACAN table (if reqd)

1. Config GPCs:
 - O6 a. PASS GNC GPCs MODE – HALT
 - b. BFS GPC MODE – RUN
 - C2 c. If BFS not in 301: (BFS) GNC, OPS 301 PRO
2. If SM GPC currently active:
 - O6 a. If SM GPC OUTPUT – TERM:
SM GPC OUTPUT – NORM
BFS ENGAGE pb – push (reset engage discrettes)
 - O1 b. If SM GPC self-fail CAM It on:
Perform PL/DPS RECONFIG (PL SYS):
SM 1 DPS UTILITY
CHECKPOINT RETRIEVE DISABLE:
CKPT RETRV ENA – ITEM 12 EXEC (no *)
O6 SM GPC MODE – STBY, then RUN
C2 SM, OPS 201 PRO
 - c. Go to step 6
3. Attempt recovery of one GPC (begin with GPC 4 and proceed in descending order until a GPC is successfully IPL'd):
Perform GPC IPL – PASS DPS SSR-6
4. For first successfully IPL'd GPC, establish SM GPC:
Perform SM REASSIGNMENT DPS SSR-4 →
5. Select MET as MISSION TIME:
SM 2 TIME
MISSION TIME MET – ITEM 2 EXEC
6. Hardware dump the remaining failed GPCs (if step 3 performed, do not dump IPL'd GPCs):
 - a. Perform GPC HDW INITIATED MEM DUMP DPS SSR-1
 - b. Repeat last step for each GPC DPS SSR-1
 - c. BFS ENGAGE pb – push (reset engage discrettes)
7. Attempt recovery of each dumped GPC:
 - a. Perform IPL:
Perform GPC IPL-PASS DPS SSR-6
Repeat for each dumped GPC DPS SSR-6
 - b. Configure GPCs:
If 1 PASS GPC, go to step 8
If 2 PASS GPCs, go to steps 9–11
If 3 PASS GPCs, go to steps 12–14
If 4 PASS GPCs, go to steps 15–18
8. One PASS GPC, config for ENTRY:
 - a. Perform LOAD PCMMU FORMAT (ENTRY) (ORB OPS FS, COMM/INST)
 - b. Perform GNC REASSIGNMENT (G3) DPS SSR-3 →
 - c. Go to step 19; PASS IMU attitude reference recovery

CONFIG GPC	GPC IPL'd			
	1	2	3	4
4(5) 10000	4(5) 02000	4(5) 00300	4(5) 00040	
STR 1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
PL 1/2	1	2	3	4
CRT 1	1	2	3	4
2	1	2	3	4
3	1	2	3	4
4	0	0	0	0
L 1	1	2	3	4
2	0	0	0	0
MM 1	1	2	3	4
2	1	2	3	4

CONFIG GPC	PASS GPC			
	1	2	3	4
3 10000	3 02000	3 00300	3 00040	
STR 1	1	2	3	4
2	1	2	3	4
3	1	2	3	4
4	1	2	3	4
PL 1/2	1	2	3	4
CRT 1	1	2	3	4
2	1	2	3	4
3	1	2	3	4
4	0	0	0	0
L 1	0	0	0	0
2	0	0	0	0
MM 1	1	2	3	4
2	1	2	3	4

MEDS

GPC FRP-4 (Cont)

8. (Cont)

Final Config for GPC 1					
GPC OPS	1	2	3	4	5
	G3	-	-	-	BFS3
POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	OFF NORM HALT	OFF NORM HALT	ON BKUP RUN
CONFIG GPC	3 10000				
STR 1	1				
2	1				
3	1				
4	1				
PL 1/2	1				
CRT 1	1				
2	1				
3	1				
4	0				
L 1	0				
2	0				
MM 1	1				
2	1				

Final Config for GPC 2					
GPC OPS	1	2	3	4	5
	-	G3	-	-	BFS3
POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	OFF NORM HALT	OFF NORM HALT	ON BKUP RUN
CONFIG GPC	3 02000				
STR 1	2				
2	2				
3	2				
4	2				
PL 1/2	2				
CRT 1	2				
2	2				
3	2				
4	0				
L 1	0				
2	0				
MM 1	2				
2	2				

Final Config for GPC 3					
GPC OPS	1	2	3	4	5
	-	-	G3	-	BFS3
POWER OUTPUT MODE	OFF NORM HALT	OFF NORM HALT	ON NORM RUN	OFF NORM HALT	ON BKUP RUN
CONFIG GPC	3 00300				
STR 1	3				
2	3				
3	3				
4	3				
PL 1/2	3				
CRT 1	3				
2	3				
3	3				
4	0				
L 1	0				
2	0				
MM 1	3				
2	3				

Final Config for GPC 4					
GPC OPS	1	2	3	4	5
	-	-	-	G3	BFS3
POWER OUTPUT MODE	OFF NORM HALT	OFF NORM HALT	OFF NORM HALT	ON NORM RUN	ON BKUP RUN
CONFIG GPC	3 00040				
STR 1	4				
2	4				
3	4				
4	4				
PL 1/2	4				
CRT 1	4				
2	4				
3	4				
4	0				
L 1	0				
2	0				
MM 1	4				
2	4				

GPC FRP-4 (Cont)

C3

9. Two PASS GPCs:

- a. OI PCMMU FORMAT – FXD
- b. Establish single G3 config in lowest number GPC:
Perform GNC REASSIGNMENT(G3) DPS SSR-3 →
- c. Perform step 19: PASS IMU attitude reference recovery, then:
- d. If ORBIT config desired, go to step 11

PASS GPCs

1,2
1,3 2,3
1,4 2,4 3,4

CONFIG GPC	3 10000	3 02000	3 00300
STR 1	1	2	3
2	1	2	3
3	1	2	3
4	1	2	3
PL 1/2	0	0	0
CRT 1	1	2	3
2	1	2	3
3	1	2	3
4	0	0	0
L 1	0	0	0
2	0	0	0
MM 1	1	2	3
2	1	2	3

10. Entry config desired, establish dual G3 config:

- a. Perform SM CHECKPOINT INITIATE (ORB OPS, DPS)
- b. Perform LOAD PCMMU FORMAT (ENTRY) (ORB OPS FS, COMM/INST)
- c. Perform GNC REASSIGNMENT (G3) DPS SSR-3 →

PASS GPCs

1,2 1,3 1,4 2,3 2,4 3,4

CONFIG GPC	3 12000	3 10300	3 10040	3 02300	3 02040	3 00340
STR 1	1	3	1	3	2	3
2	2	1	4	2	4	4
3	1	3	1	3	2	3
4	2	1	4	2	4	4
PL 1/2	1	1	1	2	2	3
CRT 1	1	1	1	2	2	3
2	2	3	4	3	4	4
3	1	1	1	2	2	3
4	0	0	0	0	0	0
L 1	0	0	0	0	0	0
2	0	0	0	0	0	0
MM 1	1	1	1	2	2	3
2	2	3	4	3	4	4

GPC FRP-4 (Cont)

10. (Cont)

Final Config for Two PASS GPCs and Entry Desired											
GPCs 1,2						GPCs 1,3					
GPC OPS	1 G3	2 G3	3 -	4 -	5 BFS3	GPC OPS	1 G3	2 -	3 G3	4 -	5 BFS3
POWER OUTPUT MODE	ON NORM RUN	ON NORM RUN	OFF NORM HALT	OFF NORM HALT	ON BKUP RUN	POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	ON NORM RUN	OFF NORM HALT	ON BKUP RUN
CONFIG GPC	3 12000					CONFIG GPC	3 10300				
STR 1	1					STR 1	3				
2	2					2	1				
3	1					3	3				
4	2					4	1				
PL 1/2	1					PL 1/2	1				
CRT 1	1					CRT 1	1				
2	2					2	3				
3	1					3	1				
4	0					4	0				
L 1	0					L 1	0				
2	0					2	0				
MM 1	1					MM 1	1				
2	2					2	3				
GPCs 1,4						GPCs 2,3					
GPC OPS	1 G3	2 -	3 -	4 G3	5 BFS3	GPC OPS	1 -	2 G3	3 G3	4 -	5 BFS3
POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	OFF NORM HALT	ON NORM RUN	ON BKUP RUN	POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	ON NORM RUN	OFF NORM HALT	ON BKUP RUN
CONFIG GPC	3 10040					CONFIG GPC	3 02300				
STR 1	1					STR 1	3				
2	4					2	2				
3	1					3	3				
4	4					4	2				
PL 1/2	1					PL 1/2	2				
CRT 1	1					CRT 1	2				
2	4					2	3				
3	1					3	2				
4	0					4	0				
L 1	0					L 1	0				
2	0					2	0				
MM 1	1					MM 1	2				
2	4					2	3				

GPC FRP-4 (Cont)

10. (Cont)

Final Config for Two PASS GPCs and Entry Desired											
GPCs 2,4						GPCs 3,4					
GPC OPS	1	2	3	4	5	GPC OPS	1	2	3	4	5
	-	G3	-	G3	BFS3		-	-	G3	G3	BFS3
POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	OFF NORM HALT	ON NORM RUN	ON BKUP RUN	POWER OUTPUT MODE	OFF NORM HALT	OFF NORM HALT	ON NORM RUN	ON NORM RUN	ON BKUP RUN
CONFIG GPC	3					CONFIG GPC	3				
	02040						00340				
STR 1	2					STR 1	3				
2	4					2	4				
3	2					3	3				
4	4					4	4				
PL 1/2	2					PL 1/2	3				
CRT 1	2					CRT 1	3				
2	4					2	4				
3	2					3	3				
4	0					4	0				
L 1	0					L 1	0				
2	0					2	0				
MM 1	2					MM 1	3				
2	4					2	4				

11. Orbit config desired, establish single G2:

- a. Secure BFS:
 - (BFS) GNC, OPS 000 PRO
 - BFC CRT DISP - OFF
 - SEL - 3+1
 - ✓ All CRTs deassigned from BFS
 - BFS GPC MODE - STBY, HALT (tb-bp)
 - OUTPUT - NORM
 - b. Perform GNC REASSIGNMENT (G3 to G2) DPS SSR-3 →
 - c. Perform LOAD PCMMU FORMAT (ORBIT) (ORB OPS FS, COMM/INST)
 - d. If applicable, perform LOAD PDI DECOM FORMAT (ORB OPS FS, COMM/INST)
 - e. Configure IDPs:
 - GPC/CRT 03 EXEC
 - GPC/CRT DESIRED GPC/4 EXEC
 - f. SM GPC OUTPUT - TERM
 - g. Reselect MTU accumulator:
 - SM(GNC) 2 TIME
- MTU ACCUM 1(2,3) TRY - ITEM 34(35,36)

PASS GPCs
1,2
1,3 2,3
1,4 2,4 3,4

CONFIG GPC	2	2	2
	10000	02000	00300
STR 1	1	2	3
2	1	2	3
3	1	2	3
4	1	2	3
PL 1/2	0	0	0
CRT 1	1	2	3
2	1	2	3
3	0	0	0
4	1	2	3
L 1	0	0	0
2	0	0	0
MM 1	1	2	3
2	1	2	3

NOTE

Down arrows will remain for accumulators not selected by GPC driving SPEC. If TRY is not successful, do not perform TIME SYNC. Continue with procedures, ✓MCC

GPC FRP-4 (Cont)

11. (Cont)

Final Config for Two PASS GPCs and Orbit Desired											
GPCs 1,2						GPCs 1,3					
GPC OPS	1 G2	2 SM	3 -	4 -	5 BFS	GPC OPS	1 G2	2 -	3 SM	4 -	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON TERM RUN	OFF NORM HALT	OFF NORM HALT	ON NORM HALT	POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	ON TERM RUN	OFF NORM HALT	ON NORM HALT
CONFIG GPC	2 10000	4(5) 02000				CONFIG GPC	2 10000	4(5) 00300			
STR 1	1	0				STR 1	1	0			
2	1	0				2	1	0			
3	1	0				3	1	0			
4	1	0				4	1	0			
PL 1/2	0	2				PL 1/2	1	3			
CRT 1	1	2				CRT 1	1	3			
2	1	2				2	1	3			
3	0	0				3	0	0			
4	1	2				4	1	3			
L 1	0	2				L 1	0	3			
2	0	0				2	0	0			
MM 1	1	2				MM 1	1	3			
2	1	2				2	1	3			
GPCs 1,4						GPCs 2,3					
GPC OPS	1 G2	2 -	3 -	4 SM	5 BFS	GPC OPS	1 -	2 G2	3 SM	4 -	5 BFS
POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	OFF NORM HALT	ON TERM RUN	ON NORM HALT	POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	ON TERM RUN	OFF NORM HALT	ON NORM HALT
CONFIG GPC	2 10000	4(5) 00040				CONFIG GPC	2 02000	4(5) 00300			
STR 1	1	0				STR 1	2	0			
2	1	0				2	2	0			
3	1	0				3	2	0			
4	1	0				4	2	0			
PL 1/2	0	4				PL 1/2	0	3			
CRT 1	1	4				CRT 1	2	3			
2	1	4				2	2	3			
3	0	0				3	0	0			
4	1	4				4	2	3			
L 1	0	4				L 1	0	3			
2	0	0				2	0	0			
MM 1	1	4				MM 1	2	3			
2	1	4				2	2	3			

GPC FRP-4 (Cont)

11. (Cont)

Final Config for Two PASS GPCs and Orbit Desired											
GPCs 2,4					GPCs 3,4						
GPC OPS	1	2	3	4	5	GPC OPS	1	2	3	4	5
	-	G2	-	SM	BFS		-	-	G2	SM	BFS
POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	OFF NORM HALT	ON TERM RUN	ON NORM HALT	POWER OUTPUT MODE	OFF NORM HALT	OFF NORM HALT	ON NORM RUN	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 02000	4(5) 00040				CONFIG GPC	2 00300	4(5) 00040			
STR 1	2	0				STR 1	3	0			
2	2	0				2	3	0			
3	2	0				3	3	0			
4	2	0				4	3	0			
PL 1/2	0	4				PL 1/2	0	4			
CRT 1	2	4				CRT 1	3	4			
2	2	4				2	3	4			
3	0	0				3	0	0			
4	2	4				4	3	4			
L 1	0	4				L 1	0	4			
2	0	0				2	0	0			
MM 1	2	4				MM 1	3	4			
2	2	4				2	3	4			

C3

12. Three PASS GPCs:

- OI PCMMU FORMAT - FXD
- Establish G3 redundant set:
Perform GNC REASSIGNMENT (G3) DPS_SSR-3 →
- Perform step 19: PASS IMU attitude reference recovery, then:

CONFIG GPC	PASS GPCs			
	1,2,3	1,2,4	1,3,4	2,3,4
	3 12000	3 10300	3 02300	
STR 1	1	3	3	
2	2	1	2	
3	1	3	3	
4	2	1	2	
PL 1/2	0	0	0	
CRT 1	1	1	2	
2	2	3	3	
3	1	1	2	
4	0	0	0	
L 1	0	0	0	
2	0	0	0	
MM 1	1	1	2	
2	2	3	3	

GPC FRP-4 (Cont)

13. Config for ORBIT:

- a. Secure BFS:
 - (BFS) GNC, OPS 000 PRO
 - BFC CRT DISP – OFF
 - SEL – 3+1
 - ✓ All IDPs deassigned from BFS
- b. Perform GNC REASSIGNMENT (G3 to G2) DPS SSR-3 →
- c. Perform LOAD PCMMU FORMAT (ORBIT) (ORB OPS FS, COMM/INST)
- d. If applicable, perform LOAD PDI DECOM FORMAT (ORB OPS FS, COMM/INST)
- e. Configure IDPs:
 - GPC/CRT 03 EXEC
 - DESIRED GPC/4 EXEC
- f. SM GPC OUTPUT – TERM
- g. Reselect MTU accumulator:

SM(GNC) 2 TIME
- MTU ACCUM 1(2,3) TRY – ITEM 34(35,36)

PASS GPCs
1,2,3
1,2,4 1,3,4 2,3,4

CONFIG GPC	2	2	2
	12000	10300	02300
STR 1	1	1	2
2	2	3	3
3	1	1	2
4	2	3	3
PL 1/2	0	0	0
CRT 1	1	1	2
2	2	3	3
3	0	0	0
4	2	3	3
L 1	0	0	0
2	0	0	0
MM 1	1	1	2
2	2	3	3

NOTE

Down arrows will remain for accumulators not selected by GPC driving SPEC. If try is not successful, do not perform TIME SYNC. Continue with procedures, ✓MCC

- h. If single GNC GPC config desired, go to step 14

14. Establish single GNC GPC config:

- a. Perform GNC REASSIGNMENT (G2) DPS SSR-3 →

PASS GPCs
1,2,3
1,2,4
1,3,4 2,3,4

CONFIG GPC	2	2
	10000	02000
STR 1	1	2
2	1	2
3	1	2
4	1	2
PL 1/2	0	0
CRT 1	1	2
2	1	2
3	0	0
4	1	2
L 1	0	0
2	0	0
MM 1	1	2
2	1	2

- b. Perform FREEZE-DRY REASSIGNMENT (G3) DPS SSR-3 →

PASS GPCs
1,2,3 1,3,4
1,2,4 2,3,4

CONFIG GPC	3(FD) 0200	3(FD) 00300
STR 1	2	3
2	2	3
3	2	3
4	2	3
PL 1/2	0	0
CRT 1	2	3
2	2	3
3	2	3
4	0	0
L 1	0	0
2	0	0
MM 1	2	3
2	2	3

MEDS

MAL/MEDS/GEN E

GPC FRP-4 (Cont)

14. (Cont)

Final Config for GPCs 1,2,3					
GPC OPS	1 G2	2 G3FD	3 SM	4 -	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON TERM RUN	OFF NORM HALT	ON NORM HALT
CONFIG GPC	2 10000	4(5) 00300	3(FD) 02000		
STR 1	1	0	2		
2	1	0	2		
3	1	0	2		
4	1	0	2		
PL 1/2	0	3	0		
CRT 1	1	3	2		
2	1	3	2		
3	0	0	2		
4	1	3	0		
L 1	0	3	0		
2	0	0	0		
MM 1	1	3	2		
2	1	3	2		

Final Config for GPCs 1,2,4					
GPC OPS	1 G2	2 G3FD	3 -	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	OFF NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 10000	4(5) 00040	3(FD) 02000		
STR 1	1	0	2		
2	1	0	2		
3	1	0	2		
4	1	0	2		
PL 1/2	0	4	0		
CRT 1	1	4	2		
2	1	4	2		
3	0	0	2		
4	1	4	0		
L 1	0	4	0		
2	0	0	0		
MM 1	1	4	2		
2	1	4	2		

Final Config for GPCs 1,3,4					
GPC OPS	1 G2	2 -	3 G3FD	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 10000	4(5) 00040	3(FD) 00300		
STR 1	1	0	3		
2	1	0	3		
3	1	0	3		
4	1	0	3		
PL 1/2	0	4	0		
CRT 1	1	4	3		
2	1	4	3		
3	0	0	3		
4	1	4	0		
L 1	0	4	0		
2	0	0	0		
MM 1	1	4	3		
2	1	4	3		

Final Config for GPCs 2,3,4					
GPC OPS	1 -	2 G2	3 G3FD	4 SM	5 BFS
POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 02000	4(5) 00040	3(FD) 00300		
STR 1	2	0	3		
2	2	0	3		
3	2	0	3		
4	2	0	3		
PL 1/2	0	4	0		
CRT 1	2	4	3		
2	2	4	3		
3	0	0	3		
4	2	4	0		
L 1	0	4	0		
2	0	0	0		
MM 1	2	4	3		
2	2	4	3		

GPC FRP-4 (Cont)

C3

15. Four PASS GPCs:

- a. OI PCMMU FORMAT – FXD
- b. Establish G3 redundant set:
 Perform GNC REASSIGNMENT (G3) DPS SSR-3 →
- c. Perform step 19: PASS IMU attitude reference recovery, then:

CONFIG GPC	3	12300
STR 1	1	
2	2	
3	3	
4	3	
PL 1/2	0	
CRT 1	1	
2	2	
3	3	
4	0	
L 1	0	
2	0	
MM 1	1	
2	2	

16. Freeze-dry GPC:

- a. Perform GNC REASSIGNMENT (G3) DPS SSR-3 →

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

- b. Perform FREEZE-DRY REASSIGNMENT (G3) DPS SSR-3 →

CONFIG GPC	3(FD)	00300
STR 1	3	
2	3	
3	3	
4	3	
PL 1/2	0	
CRT 1	3	
2	3	
3	3	
4	0	
L 1	0	
2	0	
MM 1	3	
2	3	

GPC FRP-4 (Cont)

- 17. Config for ORBIT:
 - a. Secure BFS:
 - C2 (BFS) GNC, OPS 000 PRO
 - C3 BFC CRT DISP – OFF
 - SEL – 3+1
 - ✓ All IDPs deassigned from BFS
 - O6 BFS GPC MODE – STBY,HALT (tb-bp)
 - OUTPUT – NORM
 - b. Perform GNC REASSIGNMENT (G3 to G2) DPS SSR-3 →
 - c. Perform LOAD PCMMU FORMAT (ORBIT) (ORB OPS FS, COMM/INST)
 - d. If applicable, perform LOAD PDI DECOM FORMAT (ORB OPS FS, COMM/INST)
 - e. Configure IDPs:
 - C2 GPC/CRT 03 EXEC
 - O6 GPC/CRT DESIRED GPC/4 EXEC
 - f. SM GPC OUTPUT – TERM
 - g. Reselect MTU accumulator:
 - C2 SM(GNC) 2 TIME
 - MTU ACCUM 1(2,3) TRY – ITEM 34(35,36)

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

NOTE

Down arrows will remain for accumulators not selected by GPC driving SPEC. If TRY is not successful, do not perform TIME SYNC. Continue with procedures, ✓MCC

- h. If single GNC GPC config desired, perform step 18

Final Config for GPCs 1,2,3,4 Dual GNC GPCs					
GPC OPS	1 G2	2 G2	3 G3FD	4 SM	5 BFS
POWER	ON	ON	ON	ON	ON
OUTPUT	NORM	NORM	NORM	TERM	NORM
MODE	RUN	RUN	HALT	RUN	HALT
CONFIG GPC	2 12000	4(5) 00040	3(FD) 00300		
STR 1	1	0	3		
2	2	0	3		
3	1	0	3		
4	2	0	3		
PL 1/2	0	4	0		
CRT 1	1	4	3		
2	2	4	3		
3	0	0	3		
4	2	4	0		
L 1	0	4	0		
2	0	0	0		
MM 1	1	4	3		
2	2	4	3		

GPC FRP-4 (Cont)

18. Establish single GNC GPC config:

a. Perform GNC REASSIGNMENT (G2) DPS SSR-3 →

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

b. Perform FREEZE-DRY REASSIGNMENT (G2) DPS SSR-3 →

CONFIG GPC	2(FD) 02000
STR 1	2
2	2
3	2
4	2
PL 1/2	0
CRT 1	2
2	2
3	0
4	2
L 1	0
2	0
MM 1	2
2	2

Final Config for GPCs 1,3,4 Single GNC GPC					
GPC OPS	1 G2	2 G2FD	3 G3FD	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 10000	4(5) 00040	2(FD) 02000	3(FD) 00300	
STR 1	1	0	2	3	
2	1	0	2	3	
3	1	0	2	3	
4	1	0	2	3	
PL 1/2	0	4	0	0	
CRT 1	1	4	2	3	
2	1	4	2	3	
3	0	0	0	3	
4	1	4	2	0	
L 1	0	4	0	0	
2	0	0	0	0	
MM 1	1	4	2	3	
2	1	4	2	3	

GPC FRP-4 (Cont)

19. PASS IMU attitude reference recovery:
- O6 a. ✓ STAR TRKR PWR (two) – ON
GNC 21 IMU ALIGN
- b. Mode IMUs 1,2,3 to OPERATE:
 IMU OPER 1(2,3) – ITEM 4(5,6) EXEC
 (* will not appear until DISENGAGE step)
- If extended loss of comm (ZOE not included) or no uplink CMD capability:
 Recover IMU attitude reference utilizing the HUD and MATRIX alignment:
- c. Deselect two IMUs leaving one IMU selected:
 IMU DES 1(2,3) – ITEM 7(8,9)
- d. Maneuver to attitude for subsequent HUD alignment,
 STAR PAIRS PAD/CUE CARD (ORB OPS FS, PTG)
- NOTE**
- Establish an inertial attitude which will simplify a manual maneuver to second star
- e. Perform BFS disengagement (if comm, wait for MCC GO):
- NOTE**
- BFS DISENGAGE can be verified Big X/POLL FAIL on MDU in DPS mode commanded by IDP 1, BFS GPC OUTPUT tb – bp (pnl O6), and BFC lt flashing (pnl F2/F4)
- C2 ✓ BFC CRT DISP – ON
 SEL – 3+1 (BFS commanding MDUs via IDPs 3 and 1)
 ✓ PASS GNC GPC driving MDUs via IDP 2
- Deassign IDP 1 from PASS:
 Via IDP 2, GPC/CRT 01 EXEC (BFS still commanding MDU via IDP 1)
- On MCC GO, perform BFS disengage:
 BFC – DISENGAGE (repeat, as reqd)
 DAP: INRTL
- F6
 C3
- Verify BFS disengage
- C3
 O6
- | | | |
|---|--|---|
| * | If only PASS disengages: | * |
| * | (BFS commanding MDUs via IDPs 1 and 3, | * |
| * | GNC GPC(s) OUTPUT tb – gray (pnl O6), | * |
| * | SPEC 6, GNC ✓ no ↓ on strings) | * |
| * | | * |
| * | BFS, OPS 000 PRO | * |
| * | GPC 5 OUTPUT – NORM | * |
| * | – BACKUP | * |
| * | Verify BFS disengage | * |
| * | BFS, OPS 301 PRO | * |
- C2 BFS – I/O RESET
- Reassign IDP 1, as desired
- F6/F8 ADI ATT (two) – REF
 ADI REF pb – push
- f. Perform IMU REFERENCE RECOVERY AFTER GNC GPCs IPL'd, GNC FRP-1 (GNC)
- g. Go to step x
- If good comm and uplink CMD capability:
 Recover IMU attitude reference utilizing IMU/IMU alignments:
- h. Deselect two IMUs leaving best IMU selected:
 ✓ MCC for best IMU
 IMU DES 1(2,3) – ITEM 7(8,9)
- NOTE**
- Post BFS DISENGAGE, IMUs will be drifting uncompensated until MMREAD step is complete. Steps between BFS DISENGAGE and MMREAD must be performed without delay to reduce IMU drift

GPC FRP-4 (Cont)

i. Disengagement of BFS:

NOTE

BFS DISENGAGE can be verified by Big X/POLL FAIL (on MDU in DPS mode commanded by IDP 1), BFS GPC OUTPUT tb – bp (pnl O6), and BFC It flashing (pnl F2/F4)

C2

- ✓ BFC CRT DISP – ON
SEL – 3+1 (BFS commanding MDUs via IDPs 3 and 1)
- ✓ PASS GNC GPC commanding MDUs via IDP 2

Deassign IDP 1 from PASS:

Via IDP 2, GPC/CRT 01 EXEC (BFS still commanding MDUs via IDP 1)

On MCC GO, perform BFS disengage:

F6
C3

BFC – DISENGAGE (repeat, as reqd)
DAP: INRTL

Verify BFS disengage

C3
O6

```

* If only PASS disengages: *
* (BFS commanding MDUs via IDPs 1 and 3), *
* GNC GPC(s) OUTPUT tb – gray (pnl O6), *
* SPEC 6, GNC ✓ no ↓ on strings) *
* BFS, OPS 000 PRO *
* GPC 5 OUTPUT – NORM *
* – BACKUP *
* Verify BFS disengage *
* BFS, OPS 301 PRO *
* *

```

C2

BFS – I/O RESET

Reassign IDP 1, as desired

j. Mass Memory Read of IMU calibration data:

GNC 21 IMU ALIGN

Select all IMUs for MASS MEMORY READ:

IMU 1,2,3 – ITEM 10,11,12 EXEC (*)

Initiate MMREAD:

MMREAD – ITEM 19 EXEC (*)

When MMREAD complete:

✓ MMREAD – ITEM 19 (no *)

NOTE

'IMU BITE/T' may be annunciated until MMREAD is performed to restore IMU gyro delta bias terms

Recover Attitude Reference on one IMU:

k. Confirm with MCC that REFSMMAT uplink has been performed. Do not proceed without confirmation

l. Execute a modified IMU/IMU alignment:

CAUTION

IMU/IMU ALIGN MUST BE MANUALLY TERMINATED AS SOON AS DELTA ANGLES ON SPEC 21, FOR THE IMU BEING ALIGNED, ARE LESS THAN 0.05 IN ALL THREE AXES. THIS WILL OCCUR JUST PRIOR TO NOMINAL ALIGNMENT COMPLETION

GNC 21 IMU ALIGN

Utilize as reference the best IMU currently selected by RM:

IMU/IMU – ITEM 14 + ___ EXEC

✓ MCC for IMU to be aligned:

ALIGN IMU 1(2,3) – ITEM 10(11,12) EXEC (*)

EXEC – ITEM 16 EXEC (*)

Manually TERMainte alignment as soon as delta angles on SPEC 21, for IMU being aligned, are less than 0.05 in all three axes:

TERM – ITEM 17 EXEC

GPC FRP-4 (Cont)

- C3
- m. Configure DAP:
 - ✓ DAP: INRTL
 - DAP ROT: PULSE/PULSE/PULSE
 - n. Deselect currently selected IMU (no selected IMUs):
 - IMU DES – ITEM 7(8,9) EXEC (*)
 - o. Reselect IMU aligned in step l:
 - IMU DES – ITEM 7(8,9) EXEC (no *)
- C3
- p. Configure DAP:
 - ✓ DAP: INRTL
 - DAP ROT: DISC/DISC/DISC
- Recover Attitude Reference on remaining two IMUs and desired platform skew on two IMUs:
- q. Execute a nominal IMU/IMU alignment to recover attitude reference on all IMUs:
 - NOTE
 - Manual termination should not be performed. Alignment will require 3–4 min
 - GNC 21 IMU ALIGN**
 - Utilize IMU recovered in step l (currently selected by RM) as reference:
 - IMU/IMU – ITEM 14 + __ EXEC
 - Select other two IMUs for alignment:
 - ALIGN IMU 1(2,3) – ITEM 10(11,12) EXEC (*)
 - EXEC – ITEM 16 EXEC (*)
 - r. When IMU/IMU alignment complete, reselect all IMUs:
 - IMU DES – ITEM 7(8,9) EXEC (no *)
- Reestablish desired platform skew on remaining IMU:
- s. Confirm with MCC that second REFSMMAT uplink has been performed. Do not proceed without confirmation
 - t. Execute a nominal IMU/IMU alignment to reestablish skew on all IMUs:
 - NOTE
 - Manual termination should not be performed. Alignment will require 3–6 min
 - GNC 21 IMU ALIGN**
 - Align IMU previously utilized as reference in step q:
 - ALIGN IMU 1(2,3) – ITEM 10(11,12) EXEC (*)
 - Utilize either of the other two IMUs as current reference:
 - IMU/IMU – ITEM 14 + __ EXEC
 - EXEC – ITEM 16 EXEC (*)
 - u. Mnvr to acquire stars using AUTO DAP for STRK align. Only Stars 11–60 are available in OPS3: choose appropriate star pair from pad STAR PAIRS PAD/CUE CARD (ORB OPS FS, PTG)
 - v. If STAR TRKR powered on in step a, configure STAR TRKR and open doors:
 - GNC I/O RESET
 - GNC 22 S TRK/COAS CNTL**
 - If SHUTTER – CL:
 - ITEM 15(16) EXEC (*)
 - ITEM 15(16) EXEC (no *)
- O6
- S TRK DR CNTL SYS (two) – OP
 - ✓ POS tb (two) – bp (start timer)
- When both tb – OP (8–24 sec), or either tb – bp for > 24 sec:
- CNTL SYS (two) – OFF
 - If tb – bp > 8 sec, notify MCC
- CRT
- STAR TRK – ITEM 3,4 EXEC (*)
- w. If reqd, perform IMU ALIGN – S TRK (ORB OPS, GNC)
 - x. If only one GPC recovered:
 - GNC, OPS 201 PRO
 - GNC, OPS 301 PRO
 - (BFS) GNC, OPS 000 PRO
 - (BFS) GNC, OPS 301 PRO

GPC FRP-7 DPS RECONFIG FOR LOSS OF AV BAY COOLING (ASCENT/ORBIT)

NOTE

Procedure is designed to protect GPCs from overheating by moving G2, SM, BFS functions into cooled Av Bay GPCs (if not already there). G3FD and G2FD functions are placed into uncooled Av Bay GPCs and halted. If BFS is moved, new BFS GPC will be dumped to provide good BFS for Entry.

For Ascent, this FRP assumes LOSS OF AV BAY 1(2,3) COOLING/AV BAY 1(2,3) FIRE procedure (ASC PKT, PWRDN) has been accomplished.

If Orbit Config is G8 (FCS C/O), substitute for G2 where appropriate. If Orbit Config is G3, go to LOSS OF AV BAY 1(2,3) COOLING (ENT PKT, PWRDN) >>

	Perform steps
ASCENT (G1)	a-h
ORBIT (G2,G8/S2)	i-q

ASCENT

Initial ASCENT Config – Av Bay 1						Initial ASCENT Config – Av Bay 2					
GPC OPS	1 -	2 G1	3 G1	4 -	5 BFS	GPC OPS	1 G1	2 -	3 G1	4 G1	5 BFS
POWER OUTPUT MODE	ON NORM HALT	ON NORM RUN	ON NORM RUN	ON NORM HALT	ON BKUP RUN	POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON NORM RUN	ON NORM RUN	ON NORM HALT
CONFIG GPC	1 12340					CONFIG GPC	1 12340				
STR 1	3					STR 1	1				
2	2					2	4				
3	3					3	3				
4	2					4	4				
PL 1/2	2					PL 1/2	1				
CRT 1	2					CRT 1	1				
2	2					2	4				
3	3					3	3				
4	0					4	0				
L 1	1					L 1	1				
2	2					2	2				
MM 1	2					MM 1	1				
2	3					2	3				

Initial ASCENT Config – Av Bay 3					
GPC OPS	1 G1	2 G1	3 -	4 G1	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM RUN	ON NORM HALT	ON NORM RUN	ON BKUP RUN
CONFIG GPC	1 12340				
STR 1	1				
2	2				
3	4				
4	2				
PL 1/2	1				
CRT 1	1				
2	2				
3	4				
4	0				
L 1	1				
2	2				
MM 1	1				
2	2				

MEDS

MAL/MEDS/GEN E

GPC FRP-7 (Cont)

- a. Establish G2 freeze-dry GPC (Av Bay 1 – GPC 1; Av Bay 2 – GPC 2; Av Bay 3 – GPC 3)
 - Perform FREEZE-DRY REASSIGNMENT DPS SSR-3
- b. Secure BFS (Av Bay 1,3 only)
 - BFS GNC,OPS 000 PRO
 - BFC CRT DISP – OFF
 - ✓All IDPs deassigned from BFS
- C2 C3 O6
 - GPC MODE 5 – STBY,HALT (tb-bp)
 - OUTPUT 5 – NORM

- c. Transition to GNC OPS 2

GNC OPS 0 GPC MEMORY

- CONFIG ITEM 1+2 EXEC
- Modify MC 2 per table
- GNC, OPS 201 PRO

GNC UNIV PTG

		Av Bay		
		1	2	3
CONFIG GPC	2	2	2	2
		02000	10000	12000
STR	1	2	1	1
	2	2	1	2
	3	2	1	1
	4	2	1	2
PL	1/2	0	0	0
CRT	1	2	1	1
	2	2	1	2
	3	0	0	0
	4	2	1	2
L	1	0	0	0
	2	0	0	0
MM	1	2	1	1
	2	2	1	2

- d. Transition to OPS 2
 - Perform SM REASSIGNMENT DPS SSR-4
- e. If Av Bay 2, reassign BFS to GPC 3:
 - Perform GPC IPL MENU OPTION (PASS/BFS) DPS SSR-5
 - Dump newly IPL'd BFS:
 - Perform GPC S/W INITIATED MEM DUMP GPC (3) (Target) DPS SSR-2
 - C3
 - BFC CRT DISP – OFF
 - ✓All IDPs deassigned from BFS
 - O6
 - GPC MODE 3 – STBY,HALT (tb-bp)
 - ✓OUTPUT 3 – NORM
 - Re-IPL GPC 5:
 - Perform GPC IPL – PASS DPS SSR-6
 - GPC MODE 5 – STBY (tb-bp),HALT
 - – STBY (tb-RUN)
 - – HALT (tb-bp)
 - O6

		Av Bay	
		1	2,3
CONFIG GPC	4	4	
		00300	00040
STR	1	0	0
	2	0	0
	3	0	0
	4	0	0
PL	1/2	3	4
CRT	1	3	4
	2	3	4
	3	0	0
	4	3	4
L	1	3	4
	2	0	0
MM	1	3	4
	2	3	4

GPC FRP-7 (Cont)

f. Perform LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)

g. Config LRU switches:

	<u>Av Bay 1</u>		<u>Av Bay 2</u>		<u>Av Bay 3</u>
O14:A	BRAKES MNA – OFF	O15:A	BRAKES MNB – OFF	O13:A	cb ESS 1BC C/W A – op
:E	cb MNA ADTA 1 – op	:E	cb MNB ADTA 2 – op	O7	TACAN 3 MODE – OFF
O16:A	BRAKES MNC – OFF	O16:A	BRAKES MNC – OFF		
:E	cb MNC ADTA 3 – op	:E	cb MNC ADTA 4 – op		
O7	TACAN 1 MODE – OFF	O7	TACAN 2 MODE – OFF		
O8	MLS 1 – OFF	O8	MLS 2,3 (two) – OFF		
L4:P	cb AC3 ΦA LG SNSR 1 – op				

h. Config IDPs:

- GPC/CRT 03 EXEC
- GPC/CRT SM GPC/4 EXEC
- IDP/CRT3 PWR – OFF
- MDU PWR – OFF (as desired)

At deorbit prep, perform LOSS OF AV BAY AIR COOLING (DEORBIT PREP, CONTINGENCY DELTA)
Final Config matrices at end of FRP

ORBIT

i. Orbit procedure assumes nominal ORBIT DPS config. If Orbit Config is G3 or less than 2 hr from deorbit burn, go to LOSS OF AV BAY 1(2,3) COOLING (ENT PKT, PWRDN) >>

If Av Bay 3:

- If triple G2, perform FREEZE-DRY REASSIGNMENT (Target GPC 3) DPS SSR-3
- Go to step p

If Av Bay 1 and config is single G2:

- Expand set to include GPC 2 (in cooled Av Bay)
- Perform GNC REASSIGNMENT DPS SSR-3 →

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

j. Single G2 GPC ops

- Perform GNC REASSIGNMENT DPS SSR-3 →

Av Bay 1		Av Bay 2	
CONFIG GPC	2	CONFIG GPC	2
	02000		10000
STR 1	2	STR 1	1
2	2	2	1
3	2	3	1
4	2	4	1
PL 1/2	0	PL 1/2	0
CRT 1	2	CRT 1	1
2	2	2	1
3	0	3	0
4	2	4	1
L 1	0	L 1	0
2	0	2	0
MM 1	2	MM 1	1
2	2	2	1

MEDS

GPC FRP-7 (Cont)

If Av Bay 1, use BFS for systems monitoring:

- Perform SM CHECKPOINT INITIATE (ORB OPS, DPS)
- If reqd, perform PL/DPS RECONFIG, (PL SYS or SODF: ASSY OPS)

If RMS active:

SM 94 PDRS CONTROL

- Note WR range, PL ID, PL INIT ID, EE ID, SPEC 95 overrides
- O6 ● SM GPC MODE – STBY (tb-bp), RUN (tb-RUN)
- GPC OUTPUT 4 – NORM
- C2 ● IDP/CRT3 PWR – ON
- MDU PWR – ON (as desired)
- C3 ● BFC CRT SEL – 3+1
- DISP – ON
- ✓BFS GPC PWR – ON
- MODE – RUN (during LOS for C/W tones)
- – STBY (during AOS for gnd comm mgmt)
- If no comm at next AOS, select best antenna

k. If time insufficient for complete reconfig:

Av Bay 1
 GPC 1,4 MODE – STBY (tb-bp),HALT
 – STBY (tb-RUN)
 – HALT (tb-bp)

Av Bay 2
 GPC 2 MODE – STBY (tb-bp),HALT
 – STBY (tb-RUN)
 – HALT (tb-bp)
 ✓5 MODE – HALT (tb-bp)

- Perform step p, and ✓MCC

l. Establish freeze-dry GPC (Av Bay 1 – GPC 1; Av Bay 2 – GPC 2)

- Perform FREEZE-DRY REASSIGNMENT DPS SSR-3

m. Reassign GPC 3

If Av Bay 1, reassign SM to GPC 3:

- C2 ● Perform SM REASSIGNMENT DPS SSR-4 →
- IDP/CRT3 PWR – OFF
- MDU PWR OFF as desired
- C3 ● BFC CRT DISP – OFF
- ✓All IDPs deassigned from BFS
- O6 ● BFS GPC MODE – STBY,HALT (tb-bp)
- ✓BFS GPC OUTPUT – NORM

If Av Bay 2, reassign BFS to GPC3:

- Perform GPC IPL MENU OPTION (PASS/BFS) DPS SSR-5

CONFIG	4
GPC	00300
STR 1	0
2	0
3	0
4	0
PL 1/2	3
CRT 1	3
2	3
3	0
4	3
L 1	3
2	0
MM 1	3
2	3

GPC FRP-7 (Cont)

n. If time permits or multiple G2FD GPC:

- If Av Bay 2 perform GPC IPL - PASS (target GPC 5) DPS SSR-6

GNC OPS 0 GPC MEMORY

- CONFIG ITEM 1+2 EXEC →
- Modify MC 2 per table
- GNC, OPS 201 PRO

GNC UNIV PTG

- Perform FREEZE-DRY REASSIGNMENT (Av Bay 1 - GPC 4; Av Bay 2 - GPC 5) DPS SSR-3

	Av Bay	
	1	2
CONFIG GPC	2 02040	2 10005
STR 1	2	1
2	2	1
3	2	1
4	2	1
PL 1/2	0	0
CRT 1	2	1
2	2	1
3	0	0
4	2	1
L 1	0	0
2	0	0
MM 1	2	1
2	2	1

o. If single G2FD config desired, halt GPCs in failed Av Bay

- | | | |
|----|---|--|
| | <u>Av Bay 1</u> | <u>Av Bay 2</u> |
| O6 | <ul style="list-style-type: none"> ✓ GPC 1 MODE - HALT 4 MODE - STBY (tb-bp), HALT - STBY (tb-RUN) - HALT (tb-bp) | <ul style="list-style-type: none"> ✓ GPC 2 MODE - HALT 5 MODE - STBY (tb-bp), HALT |

p. Config LRU switches:

- | | | | |
|-------|----------------------------|---------------------------------|-----------------------------|
| | <u>Av Bay 1</u> | <u>Av Bay 2</u> | <u>Av Bay 3</u> |
| O14:A | ✓ BRAKES MNA - OFF | O15:A ✓ BRAKES MNB - OFF | O13:A cb ESS 1BC C/W A - op |
| :E | ✓ cb MNA ADTA 1 - op | :E ✓ cb MNB ADTA 2 - op | O7 ✓ TACAN 3 MODE - OFF |
| O16:A | ✓ BRAKES MNC - OFF | O16:A ✓ BRAKES MNC - OFF | |
| :E | ✓ cb MNC ADTA 3 - op | :E ✓ cb MNC ADTA 4 - op | |
| O7 | ✓ TACAN 1 MODE - OFF | O7 ✓ TACAN 2 MODE - OFF | |
| O8 | ✓ MLS 1 - OFF | O8 ✓ MLS 2,3 (two) - OFF | |
| L4:P | ✓ cb AC3 ΦA LG SNSR 1 - op | L4:P ✓ cb AC2 ΦA LG SNSR 2 - op | |

GPC FRP-7 (Cont)

- q. If Av Bay 2, S/W dump newly IPL'd BFS GPC:
- Perform GPC S/W INITIATED MEM DUMP (Target GPC3) DPS SSR-2
- C3 ● BFC CRT DISP – OFF
- ✓ All IDPs deassigned from BFS
- O6 ● GPC MODE 3 – STBY,HALT (tb-bp)
- ✓ OUTPUT 3 – NORM
- At deorbit prep, go to LOSS OF AV BAY AIR COOLING (DEORB PREP, CONTINGENCY DELTAS)

FINAL CONFIG

(Ascent and Orbit with single G2FD GPC)

Av Bay 1						Av Bay 2					
GPC OPS	1 G2FD	2 G2	3 SM	4 -	5 BFS	GPC OPS	1 G2	2 G2FD	3 BFS	4 SM	5 *
POWER OUTPUT MODE	ON NORM HALT	ON NORM RUN	ON TERM RUN	ON NORM HALT	ON NORM HALT	POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 02000	4 00300				CONFIG GPC	2 10000	4 00040			
STR 1	2	0				STR 1	1	0			
2	2	0				2	1	0			
3	2	0				3	1	0			
4	2	0				4	1	0			
PL 1/2	0	3				PL 1/2	0	4			
CRT 1	2	3				CRT 1	1	4			
2	2	3				2	1	4			
3	0	0				3	0	0			
4	2	3				4	1	4			
L 1	0	3				L 1	0	4			
2	0	0				2	0	0			
MM 1	2	3				MM 1	1	4			
2	2	3				2	1	4			

Av Bay 3					
GPC OPS	1 G2	2 G2	3 G2FD	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM RUN	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 12000	4 00040			
STR 1	1	0			
2	2	0			
3	1	0			
4	2	0			
PL 1/2	0	4			
CRT 1	1	4			
2	2	4			
3	0	0			
4	2	4			
L 1	0	4			
2	0	0			
MM 1	1	4			
2	2	4			

* BFS for orbit;
PASS OPS 0 for Ascent

GPC FRP-7 (Cont)

FINAL CONFIG
(Orbit with multiple G2FD GPCs)

Av Bay 1						Av Bay 2					
GPC OPS	1 G2FD	2 G2	3 SM	4 G2FD	5 BFS	GPC OPS	1 G2	2 G2FD	3 BFS	4 SM	5 G2FD
POWER OUTPUT MODE	ON NORM HALT	ON NORM RUN	ON TERM RUN	ON NORM HALT	ON NORM HALT	POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 02000	4 00300				CONFIG GPC	2 10000	4 00040			
STR 1	2	0				STR 1	1	0			
2	2	0				2	1	0			
3	2	0				3	1	0			
4	2	0				4	1	0			
PL 1/2	0	3				PL 1/2	0	4			
CRT 1	2	3				CRT 1	1	4			
2	2	3				2	1	4			
3	0	0				3	0	0			
4	2	3				4	1	4			
L 1	0	3				L 1	0	4			
2	0	0				2	0	0			
MM 1	2	3				MM 1	1	4			
2	2	3				2	1	4			

Av Bay 3					
GPC OPS	1 G2	2 G2FD	3 G2FD	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 10000	4 00040			
STR 1	1	0			
2	1	0			
3	1	0			
4	1	0			
PL 1/2	0	4			
CRT 1	1	4			
2	1	4			
3	0	0			
4	1	4			
L 1	0	4			
2	0	0			
MM 1	1	4			
2	1	4			

DPS SSR

MEDS

MAL/MEDS/GEN E

DPS SSR-1

GPC HDW INITIATED MEM DUMP

NOTE

Perform during AOS

- O6 1. ✓ GPC MODE 1(2,3,4,5) - HALT
PWR 1(2,3,4,5) - ON
OUTPUT 1(2,3,4,5) - TERM
- MO42F GPC MEM DUMP - 1(2,3,4,5)
Perform next step at noted dump time
2. ✓ MCC to ensure OPS RCDR 1(2) configured for dump
3.
If reqd, load dump TFL: LOAD PCMMU FORMAT (COMM/INST, ORB OPS FS)
4. If PASS:
Select failed GPC X as downlister (avoids downlist contention)

DOWNLIST GPC - ITEM 44 +X EXEC
- O6 5. GPC MODE 1(2,3,4,5) - STBY (starts dump)
Wait: Double dump of PASS GPC complete after 4 min; single dump of BFS complete after 8 min
- O6 GPC MODE 1(2,3,4,5) - HALT (stops dump)
OUTPUT 1(2,3,4,5) - NORM
6. If PASS:
Select lowest ID GNC GPC X as downlister

DOWNLIST GPC - ITEM 44 +X EXEC
- MO42F 7. GPC MEM DUMP - OFF
8.
If reqd, load post dump TFL:
LOAD PCMMU FORMAT (COMM/INST, ORB OPS FS)

DPS SSR

DPS SSR-2 GPC S/W INITIATED MEM DUMP

NOTE
Perform AOS

1. ✓ MCC to ensure OPS RCDR 1(2) configured for dump
2. SM 62 PCMMU/PL COMM
If reqd, load dump TFL: LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)
3. If PASS:
 - a. On display assigned to GPC to be dumped,
SM(GNC) 0 GPC MEMORY
If GNC GPC to be dumped, ✓ DOWNLIST GPC – ITEM 44 = GNC GPC to be dumped
If OPS 0/PL9 GPC to be dumped, OPS 0 ENA – ITEM 49 EXEC (*) (✓TFL 163)
 - b. MEMORY DUMP (setup):
START ID – ITEM 40 +0 0 0 0 EXEC
NUMBER WDS – ITEM 41 +3 2 7 6 7 9 EXEC
WDS/FRAME – ITEM 42 +X X X EXEC
(128 if G1/G3, 112 if G2/G8, 32 if OPS 0/PL9, 48 if SM)
 - c. MEMORY DUMP (start):
GNC(SM,PL) 0 GPC MEMORY
DUMP – ITEM 43 EXEC (ITEM 40,41 entries begin counting)
Dump complete when ITEM 40,41 blank
Dump time (in min):

Rate	GNC	SM	OPS 0/PL9
DUMP TIME	2.2	5.7	9.7

If GNC GPC was dumped:
✓ DOWNLIST GPC – ITEM 44 = lowest id GNC GPC
If OPS 0/PL9 GPC was dumped:
OPS 0 ENA – ITEM 49 EXEC (no *)

 - d. Perform step 5
4. If BFS:
 - a. MEMORY DUMP (setup):
GNC 0 BFS MEMORY
START ID – ITEM 21 +0 0 0 0 EXEC
NUMBER WDS – ITEM 22 +2 6 2 1 4 4 EXEC
WDS/FRAME – ITEM 23 +3 2 EXEC
 - b. MEMORY DUMP (start):
GNC 0 BFS MEMORY
DUMP – ITEM 24 EXEC (ITEM 21,22 entries begin counting)
Dump complete when ITEM 21,22 blank (after 8 min)
5. SM 62 PCMMU/PL COMM
If reqd, load post dump TFL:
LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)

DPS SSR-3 GNC REASSIGNMENT

- L1
O6
1. If target GPC MODE – HALT:
 - ✓ Appropriate AV BAY FAN – ON
 - ✓ Target GPC PWR – ON
 - MODE – STBY (tb–RUN), RUN
 2. ✓ Target GPC OUTPUT – NORM
 3. If SM GPC being deleted:
 - If reqd, perform PL/DPS RECONFIG, Secure (PL SYS or SODF: ASSY OPS), then:
 - Perform SM CHECKPOINT INITIATE (ORB OPS, DPS), then:
 - SM(GNC) 1 DPS UTILITY
 - UL CNTL
 - ENA – ITEM 36 EXEC (*)
 - UPLK – manually config for AOS/LOS
- C3

NOTE

Ku-Band system may be reqd to be taken to Standby to prevent exceeding radiation constraints

- A1U
4. If AOS:
 - ✓ MCC for comm config and radiation constraints
 If no comm:
 - KU PWR – STBY
 - CNTL – PNL,CMD
 - Go to COMM LOST (ORB PKT, COMM) steps 7 and 8
 5. ✓ All GPCs being added to current redundant set in OPS 0.
 - If new GPC is in simplex ops (SM or PL), select OPS 0 via OPS 000 PRO
- C2,R11L
6. IDP/CRT1(2,3,4) MAJ FUNC – GNC
 - GNC 0 GPC MEMORY
 - CONFIG – ITEM 1 +X EXEC
 - X = 1 if G1, 2 if G2, 8 if G8, 3 if G3
 - Assign desired GPC(s), strings, PL 1/2 (if no SM GPC active), CRTs, and MMs
 - If SM GPC active, deassign PL 1/2
- O14,
O15,
O16
O8
7. If G3:
 - RGAs 1,2,3,4 – ON
 - ✓ RJDA/RJDF (all) – ON
 - cb ADTA (four) – cl
 - MLS (three) – ON
- C2,R11L
8. Using display assigned to a current redundant set GNC GPC,
 - IDP/CRT MAJ FUNC – GNC
- C3
9. GNC, OPS X X X PRO (✓DAP)
 - XXX = 106 if G1, 201 if G2, 301 if G3, 801 if G8
 - ✓ GNC (Major Mode Display)
 10. If PASS and BFS in G1(G3) and BFS not engaged, BFS I/O RESET
 11. ✓ Appropriate DAP mode selected
 12. GNC 0 GPC MEMORY
 - DOWNLIST GPC – ITEM 44 +X EXEC
 - X = GNC GPC
 13. Go to PL/DPS RECONFIG, Recovery (PL SYS or SODF: ASSY OPS)

DPS SSR-4 SM REASSIGNMENT

NOTE

Ku-Band system may be reqd to be taken to Standby to prevent exceeding radiation constraints

1. If AOS:
 - ✓MCC for comm config and radiation constraints
 - If no comm:
 - A1U KU PWR – STBY
 - CNTL – PNL,CMD
 - Go to COMM LOST (ORB PKT, COMM) steps 7 and 8
2. If target GPC MODE – HALT:
 - ✓Appropriate AV BAY FAN – ON
 - ✓Target GPC PWR – ON
 - L1 MODE – STBY (tb-RUN), RUN
 - O6
3. ✓Target GPC OUTPUT – NORM
4. If target GPC not in OPS 0:
 - GNC 0 GPC MEMORY
 - CONFIG – ITEM 1 +X EXEC
 - X = 2 if G2, 8 if G8, 3 if G3
 - Reassign target GPC strings, CRTs, MMs
 - If triple G2, do not reconfig target set
 - ✓PL 1/2 deassigned from G2/G3/G8
 - GNC, OPS X X X PRO
 - DOWNLIST GPC – ITEM 44 +X EXEC
 - X = nontargeted GNC GPC
 - O6 GPC MODE (tgt) – STBY (tb-bp)
 - RUN (tb-RUN)
5. If SM GPC currently active:
 - If reqd, perform PL/DPS RECONFIG, Secure (PL SYS or SODF: ASSY OPS), then:
 - If RMS active:
 - SM 94 PDRS CONTROL
 - Note WR range, PL ID, PL INIT ID, EE ID, SPEC 95 Overrides
 - Perform SM CHECKPOINT INITIATE (ORB OPS, DPS), then:
 - O6 SM GPC OUTPUT – NORM
 - MODE – STBY (tb-bp), RUN (tb-RUN)
6. SM(GNC) 1 DPS UTILITY
 - UL CNTL
 - ENA – ITEM 36 EXEC (*)
 - C3 UPLK – manually config for AOS/LOS
 - If checkpoint previously done, CKPT RETRV ENA – ITEM 12 EXEC (*)
7. Desired IDP/CRT MAJ FUNC – SM
 - If desired IDP not currently assigned to target GPC, GPC/CRT target GPC/desired IDP EXEC
 - C2
 - R11L
8. SM 0 GPC MEMORY
 - CONFIG – ITEM 1 +4(5) EXEC
 - Assign desired GPC, PL 1/2, CRTs, LAUNCH 1, MMs
 - C2
9. SM, OPS 201(401) PRO
 - ✓SM ANTENNA
10. If SM-reassign performed to troubleshoot SM GPC/LRU interface:
 - If original error recurs, problem at LRU:
 - Reconfig to prior DPS config
 - ✓MCC for possible IFM
 - If error does not recur, problem at old SM GPC:
 - Perform DPS FRP-1, then:
11. Reload TFLs, LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)
12. If RMS PWR – PRI (MCIU powered):
 - SM 94 PDRS CONTROL (MA, C/W GPC DATA It on)
 - I/O ON – ITEM 5 EXEC (*) (C/W GPC DATA It on)
 - Update as needed:
 - WR range, PL ID, PL INIT ID, EE ID, SPEC 95 Overrides
 - SAFING – CANCEL (tb-bp if arm deselected)

DPS SSR-4 (Cont)

13. If permanent SM GPC being established:
If BFS not engaged:
O6 Target SM GPC OUTPUT – TERM

UL CNTL
AUTO – ITEM 35 EXEC (*)
C3 UPLK – ENA
If reqd, go to PL/DPS RECONFIG, Recovery (PL SYS or SODF: ASSY OPS)
14. Clear software fail votes on MCC GO:

I/O ERR LOG RESET
ITEM 48 EXEC

I/O ERR LOG RESET
ITEM 48 EXEC

DPS SSR-5 FREEZE-DRY REASSIGNMENT

- O6 1. ✓ Target FD GPC PWR – ON, OUTPUT – NORM, and MODE – RUN
2. If target GPC not in OPS 0:
Reassign target GPC strings (if reqd):
GNC 0 GPC MEMORY
CONFIG – ITEM 1 +X EXEC (X = 1 if G1; 2 if G2; 8 if G8)
Reassign strings, CRTS, and MMs
GNC, OPS X X X PRO
(Tgt) GPC MODE – STBY (tb-bp)
– RUN (tb-RUN)
- C2 3. If IDP not assigned to target GPC:
Desired IDP/CRT MAJ FUNC – PL
GPC/CRT target GPC/desired IDP EXEC
4. **PL 0 GPC MEMORY**
DOWNLIST GPC – ITEM 44 +X EXEC (X = active GNC GPC)
STORE MC:
CONFIG – ITEM 45 +2(3) EXEC
GPC – ITEM 46 +X EXEC (X = target GPC)
STORE – ITEM 47 EXEC
Store complete when MC = 2(3)
5. If G3FD, config NBAT for FD GPC:
CONFIG – ITEM 1 +3 EXEC
Assign FD GPC, all strings, CRTs 1,2,3, and MMs
- O6 6. (FD GPC) GPC MODE – STBY (tb-bp), HALT
– STBY (tb-RUN)
– HALT (tb-bp)

DPS SSR-7

GPC IPL MENU OPTION (PASS/BFS)

NOTE

✓MCC for reapplication of GMEMs as reqd

1. **SM 1 DPS UTILITY**
IPL SOURCE SW MASK – ITEM 38 EXEC (no *)
- C2 2. IDP/CRT 3(1,2) PWR – ON
C3 BFC CRT DISP – ON
SEL – 3+1(1+2, 2+3) (Expect big 'X', POLL FAIL on MDU in DPS mode)
- O6 3. IPL SOURCE – MMU 1(2)
GPC MODE 1(2,3,4,5) – HALT (tb–bp)
OUTPUT 1(2,3,4,5) – NORM (tb–bp)
4. GPC PWR 1(2,3,4,5) – OFF,ON
If BFS engaged:
F7 FLT CNTLR PWR – ON
BFS ENGAGE pb – push
If off–diagonal CAM lts on, execute error log reset:
GNC 0 GPC MEMORY
ERR LOG RESET – ITEM 48 EXEC
Repeat for SM, PL, OPS 0 as applicable
5. IPL 1(2,3,4,5) pb – push (tb–IPL, then bp within 2 min)
- O6 6. When tb – bp or 2 min:
IDP LOAD 3(1,2) – LOAD
GPC MODE 1(2,3,4,5) – STBY (tb remains BP, expect CAM diagonal for 1 sec and Master Alarm)
7. If GPC IPL MENU does NOT appear in 2 min:
GPC MODE 1(2,3,4,5) – HALT
If first attempt:
IPL SOURCE – MMU 2(1)
Go to step 4 and proceed (one time only)
8. If **GPC IPL MENU** appears:
✓ID of GPC is correct
Record MSGS STILL IN LIST _____
Record ERROR/MSG CODEs in space provided below, pressing MSG RESET
to cycle through list until MSGS STILL IN LIST = 0
Nominal Codes
1. ERROR/MSG CODE _____ ✓132 (GPCIPL XX.XX.XX.XX LOADED)
2. ERROR/MSG CODE _____ ✓137 (DCP XX.XX.XX.XX LOADED)
3. ERROR/MSG CODE _____
4. ERROR/MSG CODE _____
5. ERROR/MSG CODE _____

NOTE

If ERROR/MSG CODEs 097 (no IDP poll response) and/or 112 (IDP BITE error) are received in addition to the two nominal codes, ignore and continue. For any other codes, STOP. ✓MCC

9. If PASS IPL desired:
 - a. Load desired copy of PASS software from MM ITEM 1(3,5) EXEC (*) (MODE tb–RUN within 2 min) (Expect big 'X,' POLL FAIL on MDU in DPS mode)
 - O6 b. When tb – RUN or 2 min:
GPC MODE 1(2,3,4,5) – RUN
✓OUTPUT 1(2,3,4,5) – NORM (tb–gray)
C2,R11 Desired IDP/CRT MAJ FUNC – PL
BFC CRT DISP – OFF
GPC/CRT IPL'd GPC/desired IDP EXEC
 - c. If **PL 0 GPC MEMORY** does NOT appear in 2 min:
GPC MODE 1(2,3,4,5) – HALT
If first attempt:
C3 BFC CRT DISP – ON
O6 IPL SOURCE – MMU 2(1)
Go to step 4 and proceed (one time only)
If second attempt:
GPC PWR 1(2,3,4,5) – OFF
 - d. IPL SOURCE – OFF
 - e. Go to step 11

MEDS

MAL/MEDS/GEN E

DPS SSR-7 (Cont)

10. If BFS IPL desired:
- a. If orbit config:
 - On MCC GO, select PCMMU format
 - ✓OI PCMMU FORMAT – GPC
 - X: SM 62 PCMMU/PL COMM
 - PCMMU FMT SEL FXD – ITEM 1 EXEC (*)
 - b. IPL SOURCE – OFF
 - c. Load desired copy of BFS software from MM:
 - ITEM 2(4,6) EXEC (*)
 - d. If 'BSL XX.XX.X.XX.XX LOADED' does not appear within 2 min:
 - GPC MODE 1(2,3,4,5) – HALT
 - If first attempt:
 - IPL SOURCE – MMU 2(1)
 - Go to step 4 and proceed (one time only)
 - e. If 'BSL XX.X.XX.XX LOADED' appears (within 2 min),
 - MSG RESET pb – push (repeat until 'MSGs STILL IN LIST' = 0)
 - f. Expect 'KSC XX.XX.X.XX.XX LOADED'
 - If 'KSC X.XX.X.XX.XX LOADED_SET MMU SEL SW TO OFF' appears, continue with procedure and notify MCC when convenient
 - MSG RESET pb – push (repeat until 'MSGs STILL IN LIST' = 0)
 - g. ✓IDP/CRT MAJ FUNC – GNC
 - If GNC 0 BFS MEMORY does not appear within 2 min:
 - GPC MODE 1(2,3,4,5) – HALT
 - If first attempt:
 - IPL SOURCE – MMU 2(1)
 - Go to step 4 and proceed (one time only)
 - If second attempt:
 - GPC PWR 1(2,3,4,5) – OFF
 - h. If entry config:
 - BFS/GNC, OPS 301 PRO
 - i. If orbit config, verify BFS will track PASS strings:
 - When time permits, on MCC GO:
 - All RGAs – ON
 - cb ADTA (four) – cl
 - MLS (three) – ON
 - ✓Primary RJD LOGIC, DRIVER (sixteen) – ON
 - All strings, CRTs, MMs, assigned to current GNC GPCs in MC3
 - PASS, GNC OPS 301 PRO
 - BFS, GNC, OPS 301 PRO
 - BFS, GNC, OPS 000 PRO
 - PASS, GNC, OPS 201 PRO
 - j. Select program PCMMU FORMAT:
 - ✓OI PCMMU FORMAT – GPC
 - X: SM 62 PCMMU/PL COMM
 - PCMMU FMT PGM – ITEM 2 EXEC
 - Power off IDP/CRTs as reqd
11. SM 1 DPS UTILITY
- IPL SOURCE SELECT SW MASK – ITEM 38 EXEC (*)

DPS SSR-8 GPC IPL-PASS

NOTE

✓MCC for reapplication of GMEMs as reqd

1. SM 1 DPS UTILITY
IPL SOURCE SW MASK – ITEM 38 EXEC (no *)
- C3 2. BFC CRT DISP – OFF (BFS will default to IDPs 1,2 if engaged)
- O6 3. IPL SOURCE – MMU 1(2)
GPC OUTPUT 1(2,3,4,5) – NORM (tb-bp)
MODE 1(2,3,4,5) – HALT (tb-bp)
- F7 4. GPC PWR 1(2,3,4,5) – OFF,ON
If BFS engaged:
FLT CNTLR PWR – ON
BFS ENGAGE pb – push
5. If off-diagonal CAM lts on, execute error log reset:
GNC 0 GPC MEMORY
ERR LOG RESET – ITEM 48 EXEC
Repeat for SM, PL, OPS 0 as applicable
6. IPL 1(2,3,4,5) pb – push (tb-IPL, then bp within 2 min)
7. When tb – bp or 2 min:
GPC MODE 1(2,3,4,5) – STBY (tb-RUN within 2 min, expect CAM diagonal for 1 sec and Master Alarm)
7. When tb – RUN or 2 min, determine if IPL'd GPC can command IDP:
If BFS not engaged:
 - O6 a. GPC MODE1(2,3,4,5) – RUN (tb remains RUN)
✓OUTPUT 1(2,3,4,5) – NORM (tb-gray)
 - C2, R11 b. Desired IDP/CRT MAJ FUNC – PL
 - c. GPC/CRT IPL'd GPC/desired IDP EXEC
 - d. ✓ PL 0 GPC MEMORY driven by IPL'd GPC
 If BFS engaged:
 - C3 a. BFC CRT DISP – ON
SEL – 3+1
 - b. If BFS commanding IDP2,
BFS – GPC/CRT 02 EXEC
 - C2 c. IDP/CRT2 MAJ FUNC – PL
 - O6 d. GPC MODE 1(2,3,4,5) – RUN (tb remains RUN)
OUTPUT 1(2,3,4,5) – NORM (tb-bp)
 - e. If another PASS GPC active, using IDP2
GPC/CRT IPL'd GPC/2 EXEC
✓ 2: PL 0 GPC MEMORY driven by IPL'd GPC
8. If GPC CANNOT command IDP:
GPC MODE 1(2,3,4,5) – HALT
If first IPL attempt:
 - O6 IPL SOURCE – MMU 2(1)
 - C3 BFC CRT DISP – OFF
Go to step 4 and proceed (one time only)
 - If second IPL attempt:
GPC PWR 1(2,3,4,5) – OFF
- O6 9. IPL SOURCE – OFF
10. SM 1 DPS UTILITY
IPL SOURCE SW MASK – ITEM 38 EXEC (*)

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GPC FRP-1 SINGLE GPC FAIL

SINGLE GPC FAIL OBJECTIVE

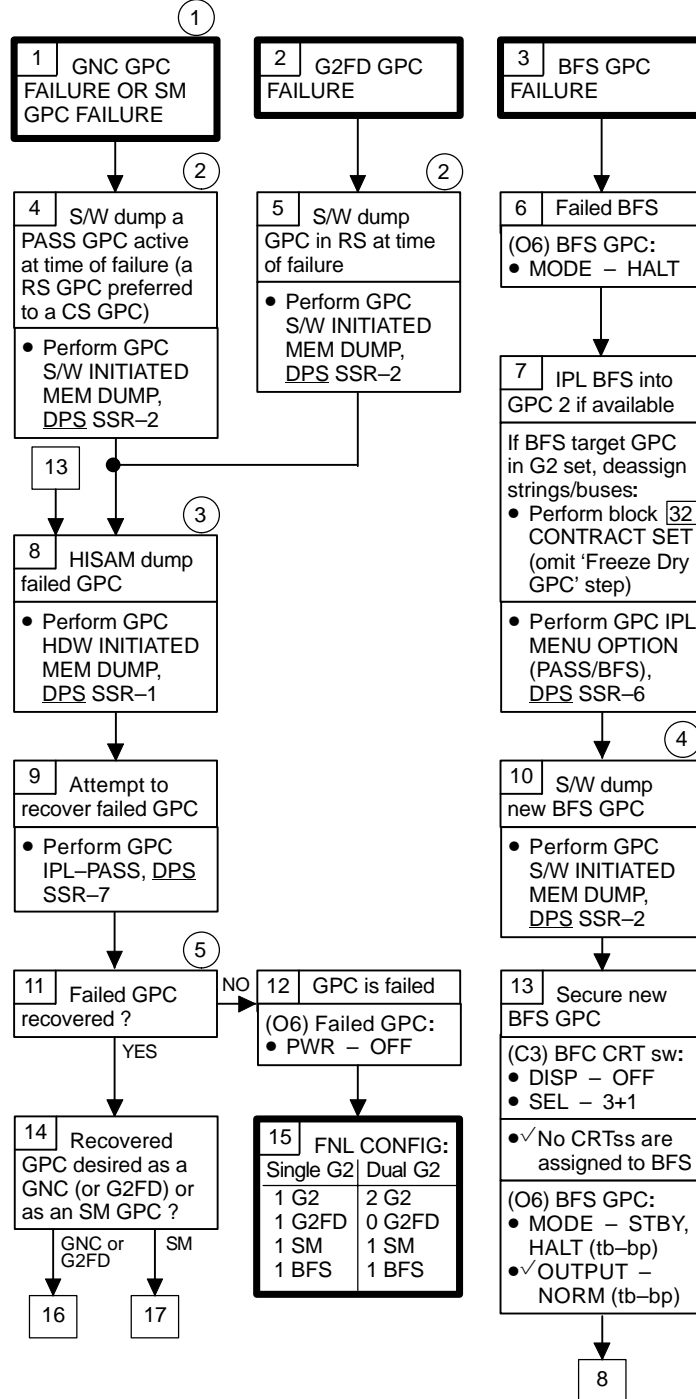
Attempt failed GPC recovery following on-orbit DPS reconfiguration via APCL, OPCL, MAL, or PI procedure. If recovered, target the 'transient' GPC as a redundant G2, G2FD, or SM based upon operational objectives. If RNDZ, EVA, or a critical burn requires a Dual G2 config, recovered GPC will be made a G2FD

SCOPE

Procedure designed to handle any single G2, SM, G2FD, or BFS GPC failure occurring during ascent or on-orbit prior to entry prep

ASSUMPTIONS

If a multiple G2 configuration is reqd shortly following the GPC recovery attempt, such DPS reconfiguration will be performed before or after GPC recovery and is not an embedded part of this FRP



① If GPC FRP-1 following failure of 'GNC RECOVERY VIA G2FD' (OPCL), the following uplinks may be reqd upon a GPC recovery:

- state vector
- ADI quaternions
- IMU gyro bias
- IMU accel bias

② S/W dump to capture GPC Sync Trace Log. MCC analysis of both S/W and H/W dumps may provide insight to the cause of a PASS GPC failure

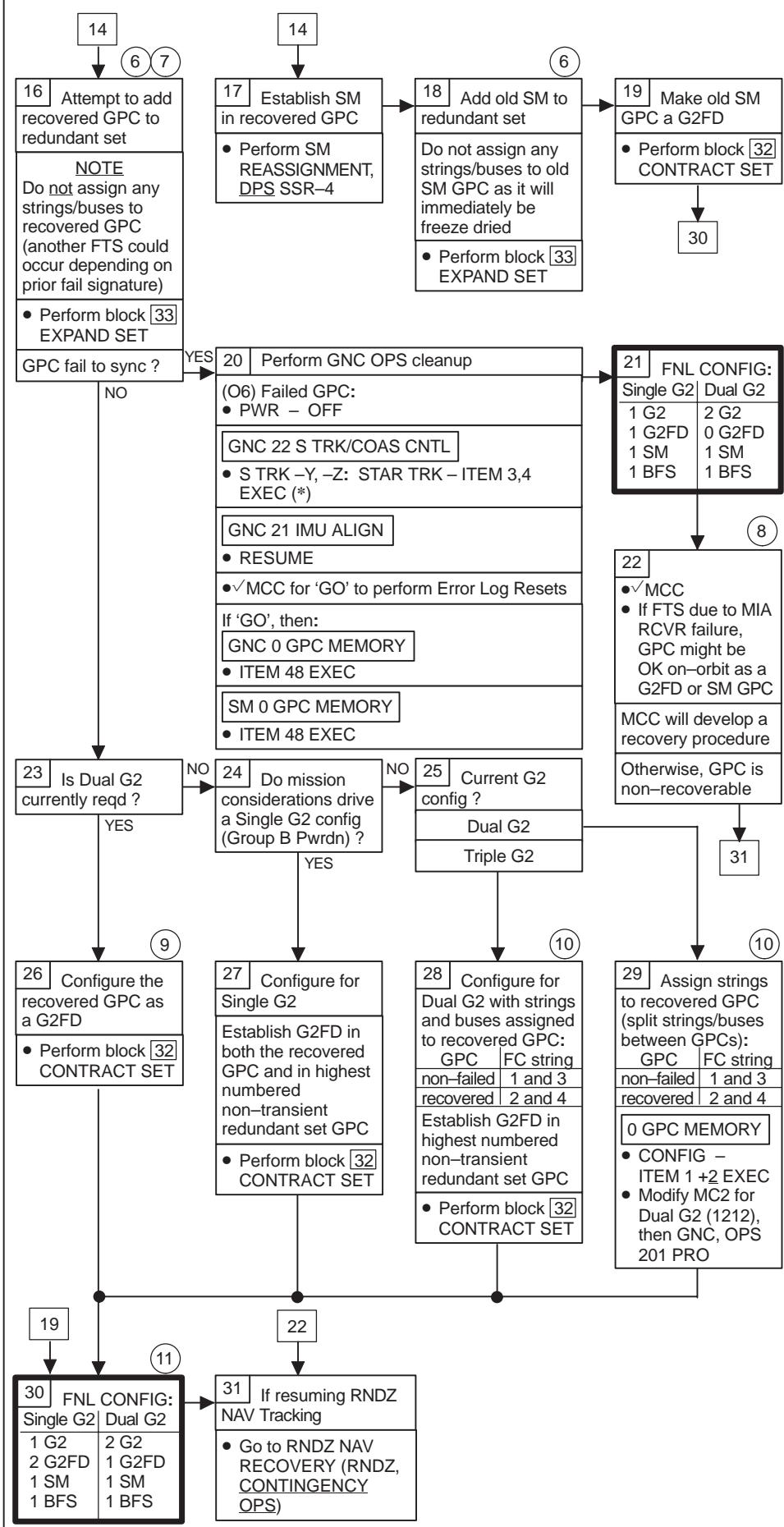
③ Prior to BFS H/W dump, current TFL must be capable of supporting a BFS downlist

④ S/W dump to verify integrity of new BFS software load

⑤ If GPC is recovered, upon completion of FRP, MCC may request certain CRTs be powered on for about 10 sec to ensure MCC uplink interfaces to both GNC and SM

NOM

GPC FRP-1 (Cont)



⑥ This process establishes a GNC Major Function Base in the target G2. For the recovered GPC, the action verifies GPC can maintain redundant set sync

⑦ Action verifies no FC MIA receiver failure exists

⑧ 'Big Picture' recovery overview:

If failed GPC to be used as an SM, uplinked procedure will continue FRP after re-IPLing GPC in block [9]

If failed GPC to be used as a restricted G2FD source, after re-IPLing GPC, uplinked procedure will add recovered GPC to redundant set with the affected string deassigned, collapse set with string deassigned, freeze dry GPC, and finally, reassign string and perform a GNC OPS Mode Recall

If GPC later used as G2FD source, string must be deassigned before set expansion

⑨ After critical mission phase is complete, if OPS considerations will permit continued use of a Dual G2 config, then establish G2FD in a redundant GPC and add recovered GPC to Dual G2 set

⑩ MCC may correct NBAT if IMU config or other considerations drive alternate stringing [1221 or 1122 NBAT]

⑪ Assign string 4 to recovered GPC during Entry phase (a transient GPC)

NOM

GPC FRP-1 (Cont)

ASSUMPTIONS (Block 32):

The crew will need to adjust the GPC Target Set and nominal bus assignment table (NBAT) string/bus assignments in the "Configure For Set Contraction" step below to accommodate the actual DPS configuration (✓MCC if GPC target set or NBAT string/bus assignments unclear)

32 CONTRACT SET

NOTE

Do not perform any keyboard item entries or switch throws
10 sec before and after making an OPS transition request

C3(A6U)
CRT

- If RNDZ NAV enabled:
DAP: LVLH
GNC UNIV PTG
CNCL – ITEM 21 EXEC

- CONFIGURE FOR SET CONTRACTION**

If MM202: GNC, OPS 201 PRO

GNC 0 GPC MEMORY

CONFIG – ITEM 1 +2 EXEC

Assign MC2 per table →

lf:	Single G2	Dual G2
CONFIG GPC	2 10000	2 12000
STR 1	1	1
2	1	2
3	1	1
4	1	2
PL 1/2	0	0
CRT 1	1	1
2	1	2
3	0	0
4	1	2
L 1	0	0
2	0	0
MM 1	1	1
2	1	2

C3(A6U)
CRT

- OPS MODE RECALL** (12)
DAP: FREE
DAP: VERN(ALT)

CRT
C3(A6U)

GNC, OPS 201 PRO
Pause ~30 sec
(DAP settling), then
DAP: as reqd

CRTX

- FREEZE DRY GPC**
MAJ FUNC – PL
GPC/CRT G2FD/X EXEC
X PL GPC MEMORY
CONFIG – ITEM 45 +2 EXEC
GPC – ITEM 46 +2(3) EXEC
STORE – ITEM 47 EXEC
Store complete when MC = 02 (~30 sec)
✓ All CRTs deassigned from FD GPC

O6

GPC MODE G2FD – STBY (tb-bp)
– HALT (tb-bp)
– STBY (tb-RUN)
– HALT (tb-bp)

- CONFIG CLEANUP**
GNC 22 S TRK/COAS CNTL
S TRK –Y, –Z: STAR TRK – ITEM 3,4 EXEC (*)
GNC 21 IMU ALIGN
RESUME

- CLEAR SOFTWARE FAIL VOTES** (13)
GNC 0 GPC MEMORY
ITEM 48 EXEC
SM 0 GPC MEMORY
ITEM 48 EXEC

(12) GNC downlist will default to lowest ID GPC in G2 set. MCC may request downlist change following OPS Mode Recall

(13) Crew "GO" for Error Log resets without prior MCC concurrence

NOM

GPC FRP-1 (Cont)

ASSUMPTIONS (Block 33):

The crew will need to adjust the GPC Target Set in "Configure For Set Expansion" step below to accommodate the actual DPS configuration (✓MCC if GPC target set or NBAT string/bus assignments unclear)

Procedure assumes target GPC (recovered GPC or former SM GPC) is up and in 'RUN', which is normally the case. If target GPC not in common set, perform step 2 "Config G2FD GPC(s) For Set Expansion" of G2 SET EXPANSION procedure (DPS, ORB OPS)

33 EXPAND SET

NOTE

Do not perform any keyboard item entries or switch throws 10 sec before and after making an OPS transition request

- If RNDZ NAV enabled:
 C3(A6U) DAP: LVLH
 CRT GNC UNIV PTG
 CNCL – ITEM 21 EXEC

- CONFIGURE FOR SET EXPANSION
 If MM202: GNC, OPS 201 PRO (14)

GNC 0 GPC MEMORY
 CONFIG – ITEM 1 +2 EXEC
 Assign MC2 per table →

If:	Dual G2	Triple G2
CONFIG GPC	2 12000	2 12300
STR 1	↑	↑
2		
3		
4		
PL 1/2		
CRT 1	↓	↓
2		
3		
4		
L 1		
2		
MM 1		
2		

- OPS MODE RECALL (15)
 C3(A6U) DAP: FREE
 CRT GNC, OPS 201 PRO
 Pause ~30 sec
 (DAP settling), then
 C3(A6U) DAP: as reqd

(14) Whether expanding G2 set to a Dual or Triple G2 config, modify only the GPC target set unless otherwise noted (don't assign strings or buses to target GPC)

(15) GPC downlist will default to lowest ID GPC in G2 set. MCC may request downlist change following OPS Mode Recall

NOM

GPC FRP-3 BFS GPC FAIL RECOVERY (ENTRY)

NOTE

Procedure assumes config shown as established by, BFS GPC FAIL (ENT PKT, DPS). The following BFS uplinks may be necessary after completion of FRP:

- Guidance targets
- ADI quaternions
- IMU gyro bias
- IMU accelerometer bias
- TMBU

Procedure assumes deorbit planned. If deorbit not planned, config for ORBIT and go to SINGLE GPC FAIL, GPC FRP-1 (DPS)

Initial Config FRP-3					
GPC OPS	1 G3	2 G3	3 G3	4 G3	5 -
POWER OUTPUT MODE	ON NORM RUN	ON NORM RUN	ON NORM RUN	ON NORM RUN	ON NORM HALT
CONFIG GPC	3 12340				
STR 1	1				
2	2				
3	3				
4	4				
PL 1/2	1				
CRT 1	1				
2	2				
3	3				
4	0				
L 1	0				
2	0				
MM 1	1				
2	2				

- a. Remove GPC2 from MC3

GNC 0 GPC MEMORY

- Config – ITEM 1 +3 EXEC
- Modify MC3 per table
- GNC OPS 301 PRO (✓DAP)

- b. Establish new BFS in GPC 2

- Perform GPC IPL – MENU OPTION (PASS/BFS) DPS SSR-6
- GPC OUTPUT – BKUP
- MODE – RUN

GNC 50 HORIZ SIT – ✓PASS R/W sel

CONFIG GPC	3 10340
STR 1	1
2	4
3	3
4	4
PL 1/2	1
CRT 1	1
2	4
3	3
4	0
L 1	0
2	0
MM 1	1
2	3

O6

NOM

MAL/NOM/GEN E

GPC FRP-3 (Cont)

- c. Attempt recovery of failed GPC
- Perform GPC IPL-PASS DPS SSR-7
 - If GPC recovered, perform step d

Final Config for GPC 5 Not Recovered					
GPC OPS	1 G3	2 BFS3	3 G3	4 G3	5 -
POWER OUTPUT MODE	ON NORM RUN	ON BKUP RUN	ON NORM RUN	ON NORM RUN	OFF NORM HALT
CONFIG GPC	3 10340				
STR 1	1				
2	4				
3	3				
4	4				
PL 1/2	1				
CRT 1	1				
2	4				
3	3				
4	0				
L 1	0				
2	0				
MM 1	1				
2	3				

- d. GPC recovered, establish a four GPC redundant set

GNC 0 GPC MEMORY

- Config – ITEM 1 +3 EXEC
- Modify MC3 per table
- GNC OPS 301 PRO (✓DAP)
- (BFS) GNC, OPS 000 PRO
- 301 PRO

GNC 50 HORIZ SIT – ✓PASS R/W sel

CONFIG GPC	3 10345
STR 1	1
2	4
3	3
4	5
PL 1/2	1
CRT 1	1
2	4
3	3
4	0
L 1	0
2	0
MM 1	1
2	3

Final Config for GPC 5 Recovered					
GPC OPS	1 G3	2 BFS3	3 G3	4 G3	5 G3
POWER OUTPUT MODE	ON NORM RUN	ON BKUP RUN	ON NORM RUN	ON NORM RUN	ON NORM RUN
CONFIG GPC	3 10345				
STR 1	1				
2	4				
3	3				
4	5				
PL 1/2	1				
CRT 1	1				
2	4				
3	3				
4	0				
L 1	0				
2	0				
MM 1	1				
2	3				

GPC FRP-4 PASS RECOVERY AFTER BFS ENGAGE (ASCENT/ORBIT/ENTRY)

NOTE

Procedure can be entered from direct Ascent/Entry engagement or from BFS ENGAGE (ORB PKT, DPS). Do not hardware dump or IPL freeze-dry GPC if activation was not attempted. The following uplinks will be necessary during or after completion of the FRP:

- State Vector
- IMU desired REFSMMATs
- IMU gyro bias (if reqd)
- IMU accel bias (if reqd)
- ADI quaternion (orbit inertial)
- If immediate deorbit planned:
 - Guidance targets
 - Landing sites (if reqd)
 - TACAN table (if reqd)

1. Config GPCs:
 - O6 a. PASS GNC GPCs MODE – HALT
 - b. BFS GPC MODE – RUN
 - C2 c. If BFS not in 301:
 - BFS CRT – GNC, OPS 301 PRO
2. If SM GPC currently active:
 - O6 a. If SM GPC OUTPUT – TERM:
SM GPC OUTPUT – NORM
BFS ENGAGE pb – push (reset engage discrettes)
 - O1 b. If SM GPC self-fail CAM It on:
Perform PL/DPS RECONFIG (PL SYS):
SM1 DPS UTILITY
CHECKPOINT RETRIEVE DISABLE:
CKPT RETRV ENA – ITEM 12 EXEC (no*)
O6 SM GPC MODE – STBY, then RUN
C2 CRT – SM, OPS X01 PRO
 - c. Go to step 6
3. Attempt recovery of one GPC (begin with GPC 4 and proceed in descending order until a GPC is successfully IPL'd):
Perform GPC IPL – PASS DPS SSR-7
4. For first successfully IPL'd GPC, establish SM GPC:
Perform SM REASSIGNMENT DPS SSR-4 →
5. Select MET as MISSION TIME:
SM 2 TIME
MISSION TIME MET – ITEM 2 EXEC
6. Hardware dump the remaining failed GPCs (if step 3 performed, do not dump IPL'd GPCs):
 - a. Perform GPC HDW INITIATED MEM DUMP DPS SSR-1
 - b. Repeat last step for each GPC DPS SSR-1
 - c. BFS ENGAGE pb – push (reset engage discrettes)
7. Attempt recovery of each dumped GPC:
 - a. Perform IPL:
Perform GPC IPL-PASS DPS SSR-7
Repeat for each dumped GPC DPS SSR-7
 - b. Configure GPCs:
If 1 PASS GPC, go to step 8
If 2 PASS GPCs, go to steps 9–11
If 3 PASS GPCs, go to steps 12–14
If 4 PASS GPCs, go to steps 15–18
8. One PASS GPC, config for ENTRY:
 - a. Perform LOAD PCMMU FORMAT (ENTRY) (ORB OPS FS, COMM/INST)
 - b. Perform GNC REASSIGNMENT (G3) DPS SSR-3 →
 - c. Go to step 19; PASS IMU attitude reference recovery

		GPC IPL'd			
		1	2	3	4
CONFIG GPC		4(5) 10000	4(5) 02000	4(5) 00300	4(5) 00040
STR	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0
PL	1/2	1	2	3	4
CRT	1	1	2	3	4
	2	1	2	3	4
	3	1	2	3	4
	4	0	0	0	0
L	1	1	2	3	4
	2	0	0	0	0
MM	1	1	2	3	4
	2	1	2	3	4

		PASS GPC			
		1	2	3	4
CONFIG GPC		3 10000	3 02000	3 00300	3 00040
STR	1	1	2	3	4
	2	1	2	3	4
	3	1	2	3	4
	4	1	2	3	4
PL	1/2	1	2	3	4
CRT	1	1	2	3	4
	2	1	2	3	4
	3	1	2	3	4
	4	0	0	0	0
L	1	0	0	0	0
	2	0	0	0	0
MM	1	1	2	3	4
	2	1	2	3	4

NOM

GPC FRP-4 (Cont)

8. (Cont)

Final Config for GPC 1					
GPC OPS	1	2	3	4	5
	G3	-	-	-	BFS3
POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	OFF NORM HALT	OFF NORM HALT	ON BKUP RUN
CONFIG GPC	3 10000				
STR 1	1				
2	1				
3	1				
4	1				
PL 1/2	1				
CRT 1	1				
2	1				
3	1				
4	0				
L 1	0				
2	0				
MM 1	1				
2	1				

Final Config for GPC 2					
GPC OPS	1	2	3	4	5
	-	G3	-	-	BFS3
POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	OFF NORM HALT	OFF NORM HALT	ON BKUP RUN
CONFIG GPC	3 02000				
STR 1	2				
2	2				
3	2				
4	2				
PL 1/2	2				
CRT 1	2				
2	2				
3	2				
4	0				
L 1	0				
2	0				
MM 1	2				
2	2				

Final Config for GPC 3					
GPC OPS	1	2	3	4	5
	-	-	G3	-	BFS3
POWER OUTPUT MODE	OFF NORM HALT	OFF NORM HALT	ON NORM RUN	OFF NORM HALT	ON BKUP RUN
CONFIG GPC	3 00300				
STR 1	3				
2	3				
3	3				
4	3				
PL 1/2	3				
CRT 1	3				
2	3				
3	3				
4	0				
L 1	0				
2	0				
MM 1	3				
2	3				

Final Config for GPC 4					
GPC OPS	1	2	3	4	5
	-	-	-	G3	BFS3
POWER OUTPUT MODE	OFF NORM HALT	OFF NORM HALT	OFF NORM HALT	ON NORM RUN	ON BKUP RUN
CONFIG GPC	3 00040				
STR 1	4				
2	4				
3	4				
4	4				
PL 1/2	4				
CRT 1	4				
2	4				
3	4				
4	0				
L 1	0				
2	0				
MM 1	4				
2	4				

NOM

GPC FRP-4 (Cont)

C3

9. Two PASS GPCs:

- a. OI PCMMU FORMAT – FXD
- b. Establish single G3 config in lowest number GPC:
Perform GNC REASSIGNMENT(G3) DPS SSR-3 →
- c. Perform step 19: PASS IMU attitude reference recovery, then:
- d. If ORBIT config desired, go to step 11

PASS GPCs

1,2
1,3 2,3
1,4 2,4 3,4

CONFIG GPC	3 10000	3 02000	3 00300
STR 1	1	2	3
2	1	2	3
3	1	2	3
4	1	2	3
PL 1/2	0	0	0
CRT 1	1	2	3
2	1	2	3
3	1	2	3
4	0	0	0
L 1	0	0	0
2	0	0	0
MM 1	1	2	3
2	1	2	3

10. Entry config desired, establish dual G3 config:

- a. Perform SM CHECKPOINT INITIATE (ORB OPS, DPS)
- b. Perform LOAD PCMMU FORMAT (ENTRY) (ORB OPS FS, COMM/INST)
- c. Perform GNC REASSIGNMENT (G3) DPS SSR-3 →

PASS GPCs

1,2 1,3 1,4 2,3 2,4 3,4

CONFIG GPC	3 12000	3 10300	3 10040	3 02300	3 02040	3 00340
STR 1	1	3	1	3	2	3
2	2	1	4	2	4	4
3	1	3	1	3	2	3
4	2	1	4	2	4	4
PL 1/2	1	1	1	2	2	3
CRT 1	1	1	1	2	2	3
2	2	3	4	3	4	4
3	1	1	1	2	2	3
4	0	0	0	0	0	0
L 1	0	0	0	0	0	0
2	0	0	0	0	0	0
MM 1	1	1	1	2	2	3
2	2	3	4	3	4	4

GPC FRP-4 (Cont)

10. (Cont)

Final Config for Two PASS GPCs and Entry Desired											
GPCs 1,2						GPCs 1,3					
GPC OPS	1 G3	2 G3	3 -	4 -	5 BFS3	GPC OPS	1 G3	2 -	3 G3	4 -	5 BFS3
POWER OUTPUT MODE	ON NORM RUN	ON NORM RUN	OFF NORM HALT	OFF NORM HALT	ON BKUP RUN	POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	ON NORM RUN	OFF NORM HALT	ON BKUP RUN
CONFIG GPC	3 12000					CONFIG GPC	3 10300				
STR 1	1					STR 1	3				
2	2					2	1				
3	1					3	3				
4	2					4	1				
PL 1/2	1					PL 1/2	1				
CRT 1	1					CRT 1	1				
2	2					2	3				
3	1					3	1				
4	0					4	0				
L 1	0					L 1	0				
2	0					2	0				
MM 1	1					MM 1	1				
2	2					2	3				
GPCs 1,4						GPCs 2,3					
GPC OPS	1 G3	2 -	3 -	4 G3	5 BFS3	GPC OPS	1 -	2 G3	3 G3	4 -	5 BFS3
POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	OFF NORM HALT	ON NORM RUN	ON BKUP RUN	POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	ON NORM RUN	OFF NORM HALT	ON BKUP RUN
CONFIG GPC	3 10040					CONFIG GPC	3 02300				
STR 1	1					STR 1	3				
2	4					2	2				
3	1					3	3				
4	4					4	2				
PL 1/2	1					PL 1/2	2				
CRT 1	1					CRT 1	2				
2	4					2	3				
3	1					3	2				
4	0					4	0				
L 1	0					L 1	0				
2	0					2	0				
MM 1	1					MM 1	2				
2	4					2	3				

NOM

GPC FRP-4 (Cont)

10. (Cont)

Final Config for Two PASS GPCs and Entry Desired											
GPCs 2,4						GPCs 3,4					
GPC OPS	1	2	3	4	5	GPC OPS	1	2	3	4	5
	-	G3	-	G3	BFS3		-	-	G3	G3	BFS3
POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	OFF NORM HALT	ON NORM RUN	ON BKUP RUN	POWER OUTPUT MODE	OFF NORM HALT	OFF NORM HALT	ON NORM RUN	ON NORM RUN	ON BKUP RUN
CONFIG GPC	3					CONFIG GPC	3				
	02040						00340				
STR 1	2					STR 1	3				
2	4					2	4				
3	2					3	3				
4	4					4	4				
PL 1/2	2					PL 1/2	3				
CRT 1	2					CRT 1	3				
2	4					2	4				
3	2					3	3				
4	0					4	0				
L 1	0					L 1	0				
2	0					2	0				
MM 1	2					MM 1	3				
2	4					2	4				

11. Orbit config desired, establish single G2:

- a. Secure BFS:
 - C2 BFS CRT - GNC, OPS 000 PRO
 - C3 BFC CRT DISP - OFF
 - SEL - 3+1
 - ✓ All CRTs deassigned from BFS
 - O6 BFS GPC MODE - STBY, HALT (tb-bp)
 - OUTPUT - NORM
- b. Perform GNC REASSIGNMENT (G3 to G2) DPS SSR-3 →
- c. Perform LOAD PCMMU FORMAT (ORBIT)
(ORB OPS FS, COMM/INST)
- d. If applicable, perform LOAD PDI DECOM FORMAT
(ORB OPS FS, COMM/INST)
- e. Configure CRTs:
 - C2 GPC/CRT 03 EXEC
 - O6 GPC/CRT DESIRED GPC/4 EXEC
- f. SM GPC OUTPUT - TERM
- g. Reselect MTU accumulator:
 - C2 SM(GNC) 2 TIME
 - MTU ACCUM 1(2,3) TRY - ITEM 34(35,36)

PASS GPCs

1,2
1,3 2,3
1,4 2,4 3,4

CONFIG GPC	2	2	2
	10000	02000	00300
STR 1	1	2	3
2	1	2	3
3	1	2	3
4	1	2	3
PL 1/2	0	0	0
CRT 1	1	2	3
2	1	2	3
3	0	0	0
4	1	2	3
L 1	0	0	0
2	0	0	0
MM 1	1	2	3
2	1	2	3

NOTE

Down arrows will remain for accumulators not selected by GPC driving SPEC. If TRY is not successful, do not perform TIME SYNC. Continue with procedures, ✓MCC

NOM

MAL/NOM/GEN E

GPC FRP-4 (Cont)

11. (Cont)

Final Config for Two PASS GPCs and Orbit Desired											
GPCs 1,2						GPCs 1,3					
GPC OPS	1 G2	2 SM	3 -	4 -	5 BFS	GPC OPS	1 G2	2 -	3 SM	4 -	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON TERM RUN	OFF NORM HALT	OFF NORM HALT	ON NORM HALT	POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	ON TERM RUN	OFF NORM HALT	ON NORM HALT
CONFIG GPC	2 10000	4(5) 02000				CONFIG GPC	2 10000	4(5) 00300			
STR 1	1	0				STR 1	1	0			
2	1	0				2	1	0			
3	1	0				3	1	0			
4	1	0				4	1	0			
PL 1/2	0	2				PL 1/2	1	3			
CRT 1	1	2				CRT 1	1	3			
2	1	2				2	1	3			
3	0	0				3	0	0			
4	1	2				4	1	3			
L 1	0	2				L 1	0	3			
2	0	0				2	0	0			
MM 1	1	2				MM 1	1	3			
2	1	2				2	1	3			
GPCs 1,4						GPCs 2,3					
GPC OPS	1 G2	2 -	3 -	4 SM	5 BFS	GPC OPS	1 -	2 G2	3 SM	4 -	5 BFS
POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	OFF NORM HALT	ON TERM RUN	ON NORM HALT	POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	ON TERM RUN	OFF NORM HALT	ON NORM HALT
CONFIG GPC	2 10000	4(5) 00040				CONFIG GPC	2 02000	4(5) 00300			
STR 1	1	0				STR 1	2	0			
2	1	0				2	2	0			
3	1	0				3	2	0			
4	1	0				4	2	0			
PL 1/2	0	4				PL 1/2	0	3			
CRT 1	1	4				CRT 1	2	3			
2	1	4				2	2	3			
3	0	0				3	0	0			
4	1	4				4	2	3			
L 1	0	4				L 1	0	3			
2	0	0				2	0	0			
MM 1	1	4				MM 1	2	3			
2	1	4				2	2	3			

GPC FRP-4 (Cont)

11. (Cont)

Final Config for Two PASS GPCs and Orbit Desired											
GPCs 2,4						GPCs 3,4					
GPC OPS	1	2	3	4	5	GPC OPS	1	2	3	4	5
	-	G2	-	SM	BFS		-	-	G2	SM	BFS
POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	OFF NORM HALT	ON TERM RUN	ON NORM HALT	POWER OUTPUT MODE	OFF NORM HALT	OFF NORM HALT	ON NORM RUN	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 02000	4(5) 00040				CONFIG GPC	2 00300	4(5) 00040			
STR 1	2	0				STR 1	3	0			
2	2	0				2	3	0			
3	2	0				3	3	0			
4	2	0				4	3	0			
PL 1/2	0	4				PL 1/2	0	4			
CRT 1	2	4				CRT 1	3	4			
2	2	4				2	3	4			
3	0	0				3	0	0			
4	2	4				4	3	4			
L 1	0	4				L 1	0	4			
2	0	0				2	0	0			
MM 1	2	4				MM 1	3	4			
2	2	4				2	3	4			

C3

12. Three PASS GPCs:

- a. OI PCMMU FORMAT – FXD
- b. Establish G3 redundant set:
Perform GNC REASSIGNMENT (G3) DPS_SSR-3 →
- c. Perform step 19: PASS IMU attitude reference recovery, then:

CONFIG GPC	PASS GPCs			
	1,2,3	1,2,4	1,3,4	2,3,4
	3 12000	3 10300	3 02300	
STR 1	1	3	3	
2	2	1	2	
3	1	3	3	
4	2	1	2	
PL 1/2	0	0	0	
CRT 1	1	1	2	
2	2	3	3	
3	1	1	2	
4	0	0	0	
L 1	0	0	0	
2	0	0	0	
MM 1	1	1	2	
2	2	3	3	

GPC FRP-4 (Cont)

13. Config for ORBIT:

- a. Secure BFS:
 - C2 BFS CRT – GNC, OPS 000 PRO
 - C3 BFC CRT DISP – OFF
 - SEL – 3+1
 - ✓ All CRTs deassigned from BFS
 - O6 BFS GPC MODE – STBY,HALT (tb-bp)
 - OUTPUT – NORM
- b. Perform GNC REASSIGNMENT (G3 to G2) DPS SSR-3 →
- c. Perform LOAD PCMMU FORMAT (ORBIT) (ORB OPS FS, COMM/INST)
- d. If applicable, perform LOAD PDI DECOM FORMAT (ORB OPS FS, COMM/INST)
- e. Configure CRTs:
 - C2 GPC/CRT 03 EXEC
 - DESIRED GPC/4 EXEC
 - O6 SM GPC OUTPUT – TERM
- g. Reselect MTU accumulator:
 - C2 SM(GNC) 2 TIME
 - MTU ACCUM 1(2,3) TRY – ITEM 34(35,36)

PASS GPCs
1,2,3
1,2,4 1,3,4 2,3,4

CONFIG GPC	2	2	2
	12000	10300	02300
STR 1	1	1	2
2	2	3	3
3	1	1	2
4	2	3	3
PL 1/2	0	0	0
CRT 1	1	1	2
2	2	3	3
3	0	0	0
4	2	3	3
L 1	0	0	0
2	0	0	0
MM 1	1	1	2
2	2	3	3

NOTE

Down arrows will remain for accumulators not selected by GPC driving SPEC. If try is not successful, do not perform TIME SYNC. Continue with procedures, ✓MCC

- h. If single GNC GPC config desired, go to step 14

14. Establish single GNC GPC config:

- a. Perform GNC REASSIGNMENT (G2) DPS SSR-3 →

PASS GPCs
1,2,3
1,2,4
1,3,4 2,3,4

CONFIG GPC	2	2
	10000	02000
STR 1	1	2
2	1	2
3	1	2
4	1	2
PL 1/2	0	0
CRT 1	1	2
2	1	2
3	0	0
4	1	2
L 1	0	0
2	0	0
MM 1	1	2
2	1	2

- b. Perform FREEZE-DRY REASSIGNMENT (G3) DPS SSR-4 →

PASS GPCs
1,2,3 1,3,4
1,2,4 2,3,4

CONFIG GPC	3(FD) 0200	3(FD) 00300
STR 1	2	3
2	2	3
3	2	3
4	2	3
PL 1/2	0	0
CRT 1	2	3
2	2	3
3	2	3
4	0	0
L 1	0	0
2	0	0
MM 1	2	3
2	2	3

NOM

GPC FRP-4 (Cont)

14. (Cont)

Final Config for GPCs 1,2,3					
GPC OPS	1 G2	2 G3FD	3 SM	4 -	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON TERM RUN	OFF NORM HALT	ON NORM HALT
CONFIG GPC	2 10000	4(5) 00300	3(FD) 02000		
STR 1	1	0	2		
2	1	0	2		
3	1	0	2		
4	1	0	2		
PL 1/2	0	3	0		
CRT 1	1	3	2		
2	1	3	2		
3	0	0	2		
4	1	3	0		
L 1	0	3	0		
2	0	0	0		
MM 1	1	3	2		
2	1	3	2		

Final Config for GPCs 1,2,4					
GPC OPS	1 G2	2 G3FD	3 -	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	OFF NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 10000	4(5) 00040	3(FD) 02000		
STR 1	1	0	2		
2	1	0	2		
3	1	0	2		
4	1	0	2		
PL 1/2	0	4	0		
CRT 1	1	4	2		
2	1	4	2		
3	0	0	2		
4	1	4	0		
L 1	0	4	0		
2	0	0	0		
MM 1	1	4	2		
2	1	4	2		

Final Config for GPCs 1,3,4					
GPC OPS	1 G2	2 -	3 G3FD	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	OFF NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 10000	4(5) 00040	3(FD) 00300		
STR 1	1	0	3		
2	1	0	3		
3	1	0	3		
4	1	0	3		
PL 1/2	0	4	0		
CRT 1	1	4	3		
2	1	4	3		
3	0	0	3		
4	1	4	0		
L 1	0	4	0		
2	0	0	0		
MM 1	1	4	3		
2	1	4	3		

Final Config for GPCs 2,3,4					
GPC OPS	1 -	2 G2	3 G3FD	4 SM	5 BFS
POWER OUTPUT MODE	OFF NORM HALT	ON NORM RUN	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 02000	4(5) 00040	3(FD) 00300		
STR 1	2	0	3		
2	2	0	3		
3	2	0	3		
4	2	0	3		
PL 1/2	0	4	0		
CRT 1	2	4	3		
2	2	4	3		
3	0	0	3		
4	2	4	0		
L 1	0	4	0		
2	0	0	0		
MM 1	2	4	3		
2	2	4	3		

NOM

GPC FRP-4 (Cont)

C3

15. Four PASS GPCs:

- a. OI PCMMU FORMAT – FXD
- b. Establish G3 redundant set:
 Perform GNC REASSIGNMENT (G3) DPS SSR-3 →
- c. Perform step 19: PASS IMU attitude reference recovery, then:

CONFIG GPC	3	12300
STR 1	1	
2	2	
3	3	
4	3	
PL 1/2	0	
CRT 1	1	
2	2	
3	3	
4	0	
L 1	0	
2	0	
MM 1	1	
2	2	

16. Freeze-dry GPC:

- a. Perform GNC REASSIGNMENT (G3) DPS SSR-3 →

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

- b. Perform FREEZE-DRY REASSIGNMENT (G3) DPS SSR-4 →

CONFIG GPC	3(FD)	00300
STR 1	3	
2	3	
3	3	
4	3	
PL 1/2	0	
CRT 1	3	
2	3	
3	3	
4	0	
L 1	0	
2	0	
MM 1	3	
2	3	

GPC FRP-4 (Cont)

17. Config for ORBIT:
- a. Secure BFS:
 - C2 BFS CRT – GNC, OPS 000 PRO
 - C3 BFC CRT DISP – OFF
 - SEL – 3+1
 - ✓ All CRTs deassigned from BFS
 - O6 BFS GPC MODE – STBY, HALT (tb-bp)
 - OUTPUT – NORM
 - b. Perform GNC REASSIGNMENT (G3 to G2) DPS SSR-3 →
 - c. Perform LOAD PCMMU FORMAT (ORBIT) (ORB OPS FS, COMM/INST)
 - d. If applicable, perform LOAD PDI DECOM FORMAT (ORB OPS FS, COMM/INST)
 - e. Configure CRTs:
 - C2 GPC/CRT 03 EXEC
 - O6 GPC/CRT DESIRED GPC/4 EXEC
 - f. SM GPC OUTPUT – TERM
 - g. Reselect MTU accumulator:
 - C2 SM(GNC) 2 TIME
 - MTU ACCUM 1(2,3) TRY – ITEM 34(35,36)

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

NOTE

Down arrows will remain for accumulators not selected by GPC driving SPEC. If TRY is not successful, do not perform TIME SYNC. Continue with procedures, ✓MCC

- h. If single GNC GPC config desired, perform step 18

Final Config for GPCs 1,2,3,4 Dual GNC GPCs					
GPC OPS	1 G2	2 G2	3 G3FD	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM RUN	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 12000	4(5) 00040	3(FD) 00300		
STR 1	1	0	3		
2	2	0	3		
3	1	0	3		
4	2	0	3		
PL 1/2	0	4	0		
CRT 1	1	4	3		
2	2	4	3		
3	0	0	3		
4	2	4	0		
L 1	0	4	0		
2	0	0	0		
MM 1	1	4	3		
2	2	4	3		

GPC FRP-4 (Cont)

18. Establish single GNC GPC config:

a. Perform GNC REASSIGNMENT (G2) DPS SSR-3 →

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

b. Perform FREEZE-DRY REASSIGNMENT (G2) DPS SSR-4 →

CONFIG GPC	2(FD) 02000
STR 1	2
2	2
3	2
4	2
PL 1/2	0
CRT 1	2
2	2
3	0
4	2
L 1	0
2	0
MM 1	2
2	2

Final Config for GPCs 1,3,4 Single GNC GPC					
GPC OPS	1 G2	2 G2FD	3 G3FD	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 10000	4(5) 00040	2(FD) 02000	3(FD) 00300	
STR 1	1	0	2	3	
2	1	0	2	3	
3	1	0	2	3	
4	1	0	2	3	
PL 1/2	0	4	0	0	
CRT 1	1	4	2	3	
2	1	4	2	3	
3	0	0	0	3	
4	1	4	2	0	
L 1	0	4	0	0	
2	0	0	0	0	
MM 1	1	4	2	3	
2	1	4	2	3	

GPC FRP-4 (Cont)

19. PASS IMU attitude reference recovery:
- O6 a. ✓ STAR TRKR PWR (two) – ON
GNC 21 IMU ALIGN
- b. Mode IMUs 1,2,3 to OPERATE:
 IMU OPER 1(2,3) – ITEM 4(5,6) EXEC
 (* will not appear until DISENGAGE step)
- If extended loss of comm (ZOE not included) or no uplink CMD capability:
 Recover IMU attitude reference utilizing the HUD and MATRIX alignment:
- c. Deselect two IMUs leaving one IMU selected:
 IMU DES 1(2,3) – ITEM 7(8,9)
- d. Maneuver to attitude for subsequent HUD alignment,
 STAR PAIRS PAD/CUE CARD (ORB OPS FS, PTG)
- NOTE
 Establish an inertial attitude which will simplify a manual maneuver to second star
- e. Perform BFS disengagement (if comm, wait for MCC GO):
- NOTE
 BFS DISENGAGE can be verified by CRT 1 Big X/POLL FAIL (pnl C2),
 BFS GPC OUTPUT tb – bp (pnl O6), and BFC It flashing (pnl F2/F4)
- C2 ✓ BFC CRT DISP – ON
 SEL – 3+1 (BFS driving CRTs 3 and 1)
 ✓ PASS GNC GPC driving CRT 2
- Deassign CRT 1 from PASS:
 On CRT 2 GPC/CRT 01 EXEC (BFS still driving CRT 1)
- On MCC GO, perform BFS disengage:
 BFC – DISENGAGE (repeat, as reqd)
 DAP: INRTL
- Verify BFS disengage
- | | | |
|----|--|---|
| | * If only PASS disengages: | * |
| | * (BFS driving both CRTs 1 and 3 (pnl C2), | * |
| C3 | * GNC GPC(s) OUTPUT tb – gray (pnl O6), | * |
| O6 | * SPEC 6, GNC ✓no '↓' on strings) | * |
| | * | * |
| | * BFS, OPS 000 PRO | * |
| | * GPC 5 OUTPUT – NORM | * |
| | * – BACKUP | * |
| | * Verify BFS disengage | * |
| | * BFS, OPS 301 PRO | * |
- C2 BFS CRT – I/O RESET
- Reassign CRT 1, as desired
- F6/F8 ADI ATT (two) – REF
 ADI REF pb – push
- f. Perform IMU REFERENCE RECOVERY AFTER GNC GPCs IPL'd, GNC FRP-1 (GNC), then:
- g. Go to step x
- If good comm and uplink CMD capability:
 Recover IMU attitude reference utilizing IMU/IMU alignments:
- h. Deselect two IMUs leaving best IMU selected:
 ✓ MCC for best IMU
 IMU DES 1(2,3) – ITEM 7(8,9)
- NOTE
 Post BFS DISENGAGE, IMUs will be drifting uncompensated until MMREAD step is complete. Steps between BFS DISENGAGE and MMREAD must be performed without delay to reduce IMU drift

GPC FRP-4 (Cont)

i. Disengagement of BFS:

NOTE

BFS DISENGAGE can be verified by CRT 1 Big X/POLL FAIL (pnl C2),
BFS GPC OUTPUT tb – bp (pnl O6), and BFC It flashing (pnl F2/F4)

C2

- ✓ BFC CRT DISP – ON
 - SEL – 3+1 (BFS driving CRTs 3 and 1)
- ✓ PASS GNC GPC driving CRT 2
- Deassign CRT 1 from PASS:
 - On CRT 2 GPC/CRT 01 EXEC (BFS still driving CRT 1)

F6
C3

- On MCC GO, perform BFS disengage:
 - BFC – DISENGAGE (repeat, as reqd)
 - DAP: INRTL

Verify BFS disengage

C3
O6

- * If only PASS disengages: *
- * (BFS driving both CRTs 1 and 3 (pnl C2), *
- * GNC GPC(s) OUTPUT tb – gray (pnl O6), *
- * SPEC 6, GNC ✓ no ↓ on strings) *
- * BFS, OPS 000 PRO *
- * GPC 5 OUTPUT – NORM *
- * – BACKUP *
- * Verify BFS disengage *
- * BFS, OPS 301 PRO *
- * *

C2

- BFS CRT – I/O RESET
- Reassign CRT 1, as desired

j. Mass Memory Read of IMU calibration data:

GNC 21 IMU ALIGN

Select all IMUs for MASS MEMORY READ:

IMU 1,2,3 – ITEM 10,11,12 EXEC (*)

Initiate MMREAD:

MMREAD – ITEM 19 EXEC (*)

When MMREAD complete:

✓ MMREAD – ITEM 19 (no *)

NOTE

'IMU BITE/T' may be annunciated until MMREAD is
performed to restore IMU gyro delta bias terms

Recover Attitude Reference on one IMU:

- k. Confirm with MCC that REFSMMAT uplink has been
performed. Do not proceed without confirmation
- l. Execute a modified IMU/IMU alignment:

CAUTION

IMU/IMU ALIGN MUST BE MANUALLY TERMINATED AS
SOON AS DELTA ANGLES ON SPEC 21, FOR THE IMU
BEING ALIGNED, ARE LESS THAN 0.05 IN ALL THREE
AXES. THIS WILL OCCUR JUST PRIOR TO NOMINAL
ALIGNMENT COMPLETION

GNC 21 IMU ALIGN

Utilize as reference the best IMU currently selected by RM:

IMU/IMU – ITEM 14 + ___ EXEC

✓ MCC for IMU to be aligned:

ALIGN IMU 1(2,3) – ITEM 10(11,12) EXEC (*)

EXEC – ITEM 16 EXEC (*)

Manually TERMINATE alignment as soon as delta angles on SPEC 21,
for IMU being aligned, are less than 0.05 in all three axes:

TERM – ITEM 17 EXEC

GPC FRP-4 (Cont)

- C3
- m. Configure DAP:
 - ✓ DAP: INRTL
 - DAP ROT: PULSE/PULSE/PULSE
 - n. Deselect currently selected IMU (no selected IMUs):
 - IMU DES – ITEM 7(8,9) EXEC (*)
 - o. Reselect IMU aligned in step l:
 - IMU DES – ITEM 7(8,9) EXEC (no *)
- C3
- p. Configure DAP:
 - ✓ DAP: INRTL
 - DAP ROT: DISC/DISC/DISC
- Recover Attitude Reference on remaining two IMUs and desired platform skew on two IMUs
- q. Execute a nominal IMU/IMU alignment to recover attitude reference on all IMUs:
 - NOTE
 - Manual termination should not be performed. Alignment will require 3–4 min
 - GNC 21 IMU ALIGN**
 - Utilize IMU recovered in step l (currently selected by RM) as reference:
 - IMU/IMU – ITEM 14 + __ EXEC
 - Select other two IMUs for alignment:
 - ALIGN IMU 1(2,3) – ITEM 10(11,12) EXEC (*)
 - EXEC – ITEM 16 EXEC (*)
 - r. When IMU/IMU alignment complete, reselect all IMUs:
 - IMU DES – ITEM 7(8,9) EXEC (no *)
- Reestablish desired platform skew on remaining IMU:
- s. Confirm with MCC that second REFSMMAT uplink has been performed. Do not proceed without confirmation
 - t. Execute a nominal IMU/IMU alignment to reestablish skew on all IMUs
 - NOTE
 - Manual termination should not be performed. Alignment will require 3–6 min
 - GNC 21 IMU ALIGN**
 - Align IMU previously utilized as reference in step q:
 - ALIGN IMU 1(2,3) – ITEM 10(11,12) EXEC (*)
 - Utilize either of the other two IMUs as current reference:
 - IMU/IMU – ITEM 14 + __ EXEC
 - EXEC – ITEM 16 EXEC (*)
 - u. Mnvr to acquire stars using AUTO DAP for STRK align. Only Stars 11–60 are available in OPS3: choose appropriate star pair from pad STAR PAIRS PAD/CUE CARD (ORB OPS FS, PTG)
 - v. If STAR TRKRs powered on in step a, configure STAR TRKRs and open doors:
 - GNC I/O RESET
 - GNC 22 S TRK/COAS CNTL**
 - If SHUTTER – CL:
 - ITEM 15(16) EXEC (*)
 - ITEM 15(16) EXEC (no *)
 - S TRK DR CNTL SYS (two) – OP
 - ✓ POS tb (two) – bp (start timer)
 - When both tb – OP (8–24 sec), or either tb – bp for > 24 sec:
 - CNTL SYS (two) – OFF
 - If tb – bp > 8 sec, notify MCC
 - STAR TRK – ITEM 3,4 EXEC (*)
- O6
- CRT
- w. If reqd, perform IMU ALIGN – S TRK (ORB OPS, GNC)
 - x. If only one GPC recovered:
 - GNC, OPS 201 PRO
 - GNC, OPS 301 PRO
 - (BFS) GNC, OPS 000 PRO
 - (BFS) GNC, OPS 301 PRO

GPC FRP-7 DPS RECONFIG FOR LOSS OF AV BAY COOLING (ASCENT/ORBIT)

NOTE

Procedure is designed to protect GPCs from overheating by moving G2, SM, BFS functions into cooled Av Bay GPCs (if not already there). G3FD and G2FD functions are placed into uncooled Av Bay GPCs and halted. If BFS is moved, new BFS GPC will be dumped to provide good BFS for Entry.

For Ascent, this FRP assumes LOSS OF AV BAY 1(2,3) COOLING/AV BAY 1(2,3) FIRE procedure (ASC PKT, PWRDN) has been accomplished.

If Orbit Config is G8 (FCS C/O), substitute for G2 where appropriate. If Orbit Config is G3, go to LOSS OF AV BAY 1(2,3) COOLING (ENT PKT, PWRDN) >>

	Perform steps
ASCENT (G1)	a-h
ORBIT (G2,G8/S2)	i-q

ASCENT

Initial ASCENT Config – Av Bay 1						Initial ASCENT Config – Av Bay 2					
GPC OPS	1 -	2 G1	3 G1	4 -	5 BFS	GPC OPS	1 G1	2 -	3 G1	4 G1	5 BFS
POWER OUTPUT MODE	ON NORM HALT	ON NORM RUN	ON NORM RUN	ON NORM HALT	ON BKUP RUN	POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON NORM RUN	ON NORM RUN	ON NORM HALT
CONFIG GPC	1 12340					CONFIG GPC	1 12340				
STR 1	3					STR 1	1				
2	2					2	4				
3	3					3	3				
4	2					4	4				
PL 1/2	2					PL 1/2	1				
CRT 1	2					CRT 1	1				
2	2					2	4				
3	3					3	3				
4	0					4	0				
L 1	1					L 1	1				
2	2					2	2				
MM 1	2					MM 1	1				
2	3					2	3				

Initial ASCENT Config – Av Bay 3					
GPC OPS	1 G1	2 G1	3 -	4 G1	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM RUN	ON NORM HALT	ON NORM RUN	ON BKUP RUN
CONFIG GPC	1 12340				
STR 1	1				
2	2				
3	4				
4	2				
PL 1/2	1				
CRT 1	1				
2	2				
3	4				
4	0				
L 1	1				
2	2				
MM 1	1				
2	2				

NOM

MAL/NOM/GEN E

GPC FRP-7 (Cont)

- a. Establish G2 freeze-dry GPC (Av Bay 1 – GPC 1; Av Bay 2 – GPC 2; Av Bay 3 – GPC 3)
 - Perform FREEZE-DRY REASSIGNMENT DPS SSR-4
- b. Secure BFS (Av Bay 1,3 only)
 - BFS GNC,OPS 000 PRO
 - BFC CRT DISP – OFF
 - ✓ All CRTs deassigned from BFS
- c. Transition to GNC OPS 2
 - GNC, OPS 201 PRO
 - GPC MODE 5 – STBY,HALT (tb-bp)
 - OUTPUT 5 – NORM

- C2 GNC OPS 0 GPC MEMORY
- C3
- O6

	Av Bay		
	1	2	3
CONFIG GPC	2 02000	2 10000	2 12000
STR 1	2	1	1
2	2	1	2
3	2	1	1
4	2	1	2
PL 1/2	0	0	0
CRT 1	2	1	1
2	2	1	2
3	0	0	0
4	2	1	2
L 1	0	0	0
2	0	0	0
MM 1	2	1	1
2	2	1	2

- C2
- C3
- O6

- d. Transition to OPS 2
 - Perform SM REASSIGNMENT DPS SSR-4
- e. If Av Bay 2, reassign BFS to GPC 3:
 - Perform GPC IPL MENU OPTION (PASS/BFS) DPS SSR-6
 - Dump newly IPL'd BFS:
 - Perform GPC S/W INITIATED MEM DUMP GPC (3) (Target) DPS SSR-2
 - BFC CRT DISP – OFF
 - ✓ All CRTs deassigned from BFS
 - GPC MODE 3 – STBY,HALT (tb-bp)
 - ✓ OUTPUT 3 – NORM
 - Re-IPL GPC 5:
 - Perform GPC IPL – PASS DPS SSR-7
 - GPC MODE 5 – STBY (tb-bp),HALT
 - – STBY (tb-RUN)
 - – HALT (tb-bp)

- C3
- O6
- O6

	Av Bay	
	1	2,3
CONFIG GPC	4 00300	4 00040
STR 1	0	0
2	0	0
3	0	0
4	0	0
PL 1/2	3	4
CRT 1	3	4
2	3	4
3	0	0
4	3	4
L 1	3	4
2	0	0
MM 1	3	4
2	3	4

GPC FRP-7 (Cont)

f. Perform LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)

g. Config LRU switches:

	<u>Av Bay 1</u>		<u>Av Bay 2</u>		<u>Av Bay 3</u>
O14:A	BRAKES MNA – OFF	O15:A	BRAKES MNB – OFF	O13:A	cb ESS 1BC C/W A – op
:E	cb MNA ADTA 1 – op	:E	cb MNB ADTA 2 – op	O7	TACAN 3 MODE – OFF
O16:A	BRAKES MNC – OFF	O16:A	BRAKES MNC – OFF		
:E	cb MNC ADTA 3 – op	:E	cb MNC ADTA 4 – op		
O7	TACAN 1 MODE – OFF	O7	TACAN 2 MODE – OFF		
O8	MLS 1 – OFF	O8	MLS 2,3 (two) – OFF		
L4:P	cb AC3 ΦA LG SNSR 1 – op				

h. Config CRTs:

- GPC/CRT 03 EXEC
- GPC/CRT SM GPC/4 EXEC
- CRT3 PWR – OFF

C2

At deorbit prep, perform LOSS OF AV BAY AIR COOLING, (DEORBIT PREP, CONTINGENCY DELTA)
Final Config matrices at end of FRP

ORBIT

i. Orbit procedure assumes nominal ORBIT DPS config. If Orbit Config is G3 of less than 2 hr from deorbit burn, go to LOSS OF AV BAY 1(2,3) COOLING (ENT PKT, PWRDN) >>

If Av Bay 3:

- If triple G2, perform FREEZE-DRY REASSIGNMENT (Target GPC 3) DPS SSR-4
- Go to step p

If Av Bay 1 and config is single G2:

- Expand set to include GPC 2 (in cooled Av Bay)
- Perform GNC REASSIGNMENT DPS SSR-3 →

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

j. Single G2 GPC ops

- Perform GNC REASSIGNMENT DPS SSR-3 →

Av Bay 1		Av Bay 2			
CONFIG GPC	2	02000	CONFIG GPC	2	10000
STR 1	2		STR 1	1	
2	2		2	1	
3	2		3	1	
4	2		4	1	
PL 1/2	0		PL 1/2	0	
CRT 1	2		CRT 1	1	
2	2		2	1	
3	0		3	0	
4	2		4	1	
L 1	0		L 1	0	
2	0		2	0	
MM 1	2		MM 1	1	
2	2		2	1	

NOM

GPC FRP-7 (Cont)

If Av Bay 1, use BFS for systems monitoring:

- Perform SM CHECKPOINT INITIATE (ORB OPS, DPS)
- If reqd, perform PL/DPS RECONFIG (PL SYS: or SODF: ASSY OPS), Secure (PL SYS)

If RMS active:

SM 94 PDRS CONTROL

- Note WR range, PL ID, PL INIT ID, EE ID, SPEC 95 overrides
- SM GPC MODE – STBY (tb-bp), RUN (tb-RUN)
- GPC OUTPUT 4 – NORM
- CRT3 PWR – ON
- BFC CRT SEL – 3+1
- DISP – ON
- ✓ BFC GPC PWR – ON
- MODE – RUN (during LOS for C/W tones)
- – STBY (during AOS for gnd comm mgmt)
- If no comm at next AOS, select best antenna

k. If time insufficient for complete reconfig:

- | | |
|----------------------------------|--------------------------------|
| <u>Av Bay 1</u> | <u>Av Bay 2</u> |
| GPC 1,4 MODE – STBY (tb-bp),HALT | GPC 2 MODE – STBY (tb-bp),HALT |
| – STBY (tb-RUN) | – STBY (tb-RUN) |
| – HALT (tb-bp) | – HALT (tb-bp) |
| | ✓5 MODE – HALT (tb-bp) |

- Perform step p, and ✓MCC

l. Establish freeze-dry GPC (Av Bay 1 – GPC 1; Av Bay 2 – GPC 2)

- Perform FREEZE-DRY REASSIGNMENT DPS SSR-4

m. Reassign GPC 3

If Av Bay 1, reassign SM to GPC 3:

- Perform SM REASSIGNMENT DPS SSR-4 →
 - CRT3 PWR – OFF
 - BFC CRT DISP – OFF
 - ✓All CRTs deassigned from BFS
 - BFS GPC MODE – STBY,HALT (tb-bp)
 - ✓BFS GPC OUTPUT – NORM
- If Av Bay 2, reassign BFS to GPC3:
- Perform GPC IPL MENU OPTION (PASS/BFS) DPS SSR-6

CONFIG GPC	4 00300
STR 1	0
2	0
3	0
4	0
PL 1/2	3
CRT 1	3
2	3
3	0
4	3
L	1 3
2	0
MM	1 3
2	3

GPC FRP-7 (Cont)

n. If time permits or multiple G2FD GPC:

- If Av Bay 2 perform GPC IPL - PASS (target GPC 5) DPS SSR-7

GNC OPS 0 GPC MEMORY

- CONFIG ITEM 1+2 EXEC
- Modify MC 2 per table →
- GNC, OPS 201 PRO

GNC UNIV PTG

- Perform FREEZE-DRY REASSIGNMENT (Av Bay 1 - GPC 4, Av Bay 2 - GPC 5) DPS SSR-4

CONFIG GPC	Av Bay	
	1	2
	2	2
	02040	10005
STR 1	2	1
2	2	1
3	2	1
4	2	1
PL 1/2	0	0
CRT 1	2	1
2	2	1
3	0	0
4	2	1
L 1	0	0
2	0	0
MM 1	2	1
2	2	1

o. If single G2FD config desired, halt GPCs in failed Av Bay

- | | | |
|----|---|--|
| | <u>Av Bay 1</u> | <u>Av Bay 2</u> |
| O6 | <ul style="list-style-type: none"> ✓ GPC 1 MODE - HALT 4 MODE - STBY (tb-bp), HALT - STBY (tb-RUN) - HALT (tb-bp) | <ul style="list-style-type: none"> ✓ GPC 2 MODE - HALT 5 MODE - STBY (tb-bp), HALT |

p. Config LRU switches:

- | | <u>Av Bay 1</u> | <u>Av Bay 2</u> | <u>Av Bay 3</u> |
|-------|----------------------------|---------------------------------|-----------------------------|
| O14:A | ✓ BRAKES MNA - OFF | O15:A ✓ BRAKES MNB - OFF | O13:A cb ESS 1BC C/W A - op |
| :E | ✓ cb MNA ADTA 1 - op | :E ✓ cb MNB ADTA 2 - op | O7 ✓ TACAN 3 MODE - OFF |
| O16:A | ✓ BRAKES MNC - OFF | O16:A ✓ BRAKES MNC - OFF | |
| :E | ✓ cb MNC ADTA 3 - op | :E ✓ cb MNC ADTA 4 - op | |
| O7 | ✓ TACAN 1 MODE - OFF | O7 ✓ TACAN 2 MODE - OFF | |
| O8 | ✓ MLS 1 - OFF | O8 ✓ MLS 2,3 (two) - OFF | |
| L4:P | ✓ cb AC3 ΦA LG SNSR 1 - op | L4:P ✓ cb AC2 ΦA LG SNSR 2 - op | |

GPC FRP-7 (Cont)

- q. If Av Bay 2, S/W dump newly IPL'd BFS GPC:
- Perform GPC S/W INITIATED MEM DUMP (Target GPC3) DPS SSR-2
- C3 ● BFC CRT DISP – OFF
- ✓ All CRTs deassigned from BFS
- O6 ● GPC MODE 3 – STBY,HALT (tb-bp)
- ✓ OUTPUT 3 – NORM
- At deorbit prep, go to LOSS OF AV BAY AIR COOLING (DEORB PREP, CONTINGENCY DELTAS)

FINAL CONFIG

(Ascent and Orbit with single G2FD GPC)

Av Bay 1						Av Bay 2					
GPC OPS	1 G2FD	2 G2	3 SM	4 -	5 BFS	GPC OPS	1 G2	2 G2FD	3 BFS	4 SM	5 *
POWER OUTPUT MODE	ON NORM HALT	ON NORM RUN	ON TERM RUN	ON NORM HALT	ON NORM HALT	POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 02000	4 00300				CONFIG GPC	2 10000	4 00040			
STR 1	2	0				STR 1	1	0			
2	2	0				2	1	0			
3	2	0				3	1	0			
4	2	0				4	1	0			
PL 1/2	0	3				PL 1/2	0	4			
CRT 1	2	3				CRT 1	1	4			
2	2	3				2	1	4			
3	0	0				3	0	0			
4	2	3				4	1	4			
L 1	0	3				L 1	0	4			
2	0	0				2	0	0			
MM 1	2	3				MM 1	1	4			
2	2	3				2	1	4			

Av Bay 3					
GPC OPS	1 G2	2 G2	3 G2FD	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM RUN	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 12000	4 00040			
STR 1	1	0			
2	2	0			
3	1	0			
4	2	0			
PL 1/2	0	4			
CRT 1	1	4			
2	2	4			
3	0	0			
4	2	4			
L 1	0	4			
2	0	0			
MM 1	1	4			
2	2	4			

* BFS for orbit;
PASS OPS 0 for Ascent

NOM

GPC FRP-7 (Cont)

FINAL CONFIG
(Orbit with multiple G2FD GPCs)

Av Bay 1						Av Bay 2					
GPC OPS	1 G2FD	2 G2	3 SM	4 G2FD	5 BFS	GPC OPS	1 G2	2 G2FD	3 BFS	4 SM	5 G2FD
POWER OUTPUT MODE	ON NORM HALT	ON NORM RUN	ON TERM RUN	ON NORM HALT	ON NORM HALT	POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 02000	4 00300				CONFIG GPC	2 10000	4 00040			
STR 1	2	0				STR 1	1	0			
2	2	0				2	1	0			
3	2	0				3	1	0			
4	2	0				4	1	0			
PL 1/2	0	3				PL 1/2	0	4			
CRT 1	2	3				CRT 1	1	4			
2	2	3				2	1	4			
3	0	0				3	0	0			
4	2	3				4	1	4			
L 1	0	3				L 1	0	4			
2	0	0				2	0	0			
MM 1	2	3				MM 1	1	4			
2	2	3				2	1	4			

Av Bay 3					
GPC OPS	1 G2	2 G2FD	3 G2FD	4 SM	5 BFS
POWER OUTPUT MODE	ON NORM RUN	ON NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
CONFIG GPC	2 10000	4 00040			
STR 1	1	0			
2	1	0			
3	1	0			
4	1	0			
PL 1/2	0	4			
CRT 1	1	4			
2	1	4			
3	0	0			
4	1	4			
L 1	0	4			
2	0	0			
MM 1	1	4			
2	1	4			

DPS SSR

NOM

MAL/NOM/GEN E

DPS SSR-1

GPC HDW INITIATED MEM DUMP

NOTE

Perform during AOS

- O6 1. ✓ GPC MODE 1(2,3,4,5) - HALT
PWR 1(2,3,4,5) - ON
OUTPUT 1(2,3,4,5) - TERM
- MO42F GPC MEM DUMP - 1(2,3,4,5)
Perform next step at noted dump time
2. ✓ MCC to ensure OPS RCDR 1(2) configured for dump
3.
If reqd, load dump TFL: LOAD PCMMU FORMAT (COMM/INST, ORB OPS FS)
4. If PASS:
Select failed GPC X as downlister (avoids downlist contention)

DOWNLIST GPC - ITEM 44 +X EXEC
- O6 5. GPC MODE 1(2,3,4,5) - STBY (starts dump)
Wait: Double dump of PASS GPC complete after 4 min; single dump of BFS complete after 8 min
- O6 GPC MODE 1(2,3,4,5) - HALT (stops dump)
OUTPUT 1(2,3,4,5) - NORM
6. If PASS:
Select lowest ID GNC GPC X as downlister

DOWNLIST GPC - ITEM 44 +X EXEC
- MO42F 7. GPC MEM DUMP - OFF
8.
If reqd, load post dump TFL:
LOAD PCMMU FORMAT (COMM/INST, ORB OPS FS)

DPS SSR

NOM

MAL/NOM/GEN E

DPS SSR-2 GPC S/W INITIATED MEM DUMP

NOTE
Perform AOS

1. ✓ MCC to ensure OPS RCDR 1(2) configured for dump
2. SM 62 PCMMU/PL COMM
If reqd, load dump TFL: LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)
3. If PASS:
 - a. On display assigned to GPC to be dumped,
SM(GNC) 0 GPC MEMORY
If GNC GPC to be dumped, ✓ DOWNLIST GPC – ITEM 44 = GNC GPC to be dumped
If OPS 0/PL9 GPC to be dumped, OPS 0 ENA – ITEM 49 EXEC (*) (✓TFL 163)
 - b. MEMORY DUMP (setup):
START ID – ITEM 40 +0 0 0 0 EXEC
NUMBER WDS – ITEM 41 +3 2 7 6 7 9 EXEC
WDS/FRAME – ITEM 42 +X X X EXEC
(128 if G1/G3, 112 if G2/G8, 32 if OPS 0/PL9, 48 if SM)
 - c. MEMORY DUMP (start):
GNC(SM,PL) 0 GPC MEMORY
DUMP – ITEM 43 EXEC (ITEM 40,41 entries begin counting)
Dump complete when ITEM 40,41 blank
Dump time (in min):

Rate	GNC	SM	OPS 0/PL9
DUMP TIME	2.2	5.7	9.7

If GNC GPC was dumped:
✓ DOWNLIST GPC – ITEM 44 = lowest id GNC GPC
If OPS 0/PL9 GPC was dumped:
OPS 0 ENA – ITEM 49 EXEC (no *)

 - d. Perform step 5
4. If BFS:
 - a. MEMORY DUMP (setup):
GNC 0 BFS MEMORY
START ID – ITEM 21 +0 0 0 0 EXEC
NUMBER WDS – ITEM 22 +2 6 2 1 4 4 EXEC
WDS/FRAME – ITEM 23 +3 2 EXEC
 - b. MEMORY DUMP (start):
GNC 0 BFS MEMORY
DUMP – ITEM 24 EXEC (ITEM 21,22 entries begin counting)
Dump complete when ITEM 21,22 blank (after 8 min)
5. SM 62 PCMMU/PL COMM
If reqd, load post dump TFL:
LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)

DPS SSR-3 GNC REASSIGNMENT

- L1
O6
1. If target GPC MODE – HALT:
 - ✓ Appropriate AV BAY FAN – ON
 - ✓ Target GPC PWR – ON
 MODE – STBY (tb–RUN), RUN
 2. ✓ Target GPC OUTPUT – NORM
 3. If SM GPC being deleted:
 - If reqd, perform PL/DPS RECONFIG, Secure (PL SYS or SODF: ASSY OPS), then:
 - Perform SM CHECKPOINT INITIATE (ORB OPS, DPS), then:
 - SM(GNC) 1 DPS UTILITY
 - UL CNTL
 - ENA – ITEM 36 EXEC (*)
 - UPLK – manually config for AOS/LOS
- C3
- NOTE
- Ku–Band system may be reqd to be taken to Standby to prevent exceeding radiation constraints
- A1U
4. If AOS:
 - ✓ MCC for comm config and radiation constraints
 If no comm:
 - KU PWR – STBY
 - CNTL – PNL,CMD
 - Go to COMM LOST (ORB PKT, COMM) steps 7 and 8
 5. ✓ All GPCs being added to current redundant set in OPS 0
 - If new GPC is in simplex ops (SM or PL), select OPS 0 via OPS 000 PRO
- C2,R11L
6. CRT1(2,3,4) MAJ FUNC – GNC
 - GNC 0 GPC MEMORY
 - CONFIG – ITEM 1 +X EXEC
 - X = 1 if G1, 2 if G2, 8 if G8, 3 if G3
 - Assign desired GPC(s), strings, PL 1/2 (if no SM GPC active), CRTs, and MMs
 - If SM GPC active, deassign PL 1/2
- O14,
O15,
O16
O8
7. If G3:
 - RGAs 1,2,3,4 – ON
 - ✓ RJDA/RJDF (all) – ON
 - cb ADTA (four) – cl
 - MLS (three) – ON
- C2,R11L
C3
8. Using CRT commanded by a current redundant set GNC GPC, CRT MAJ FUNC – GNC
 - ✓ BFC CRT DISP – OFF
 9. GNC, OPS X X X PRO (✓DAP)
 - XXX = 106 if G1, 201 if G2, 301 if G3, 801 if G8
 - ✓ GNC (Major Mode Display)
 10. If PASS and BFS in G1(G3) and BFS not engaged, BFS CRT – I/O RESET
 11. ✓ Appropriate DAP mode selected
 12. GNC 0 GPC MEMORY
 - DOWNLIST GPC – ITEM 44 +X EXEC
 - X = GNC GPC
 13. Go to PL/DPS RECONFIG, Recovery (PL SYS or SODF: ASSY OPS)

DPS SSR-4 SM REASSIGNMENT

I

NOTE

Ku-Band system may be reqd to be taken to Standby to prevent exceeding radiation constraints

1. If AOS:
 | ✓MCC for comm config and radiation constraints
 If no comm:
 A1U KU PWR – STBY
 CNTL – PNL CMD
 Go to COMM LOST (ORB PKT, COMM) steps 7 and 8
2. If target GPC MODE – HALT:
 L1 ✓Appropriate AV BAY FAN – ON
 O6 ✓Target GPC PWR – ON
 MODE – STBY (tb-RUN), RUN
3. ✓Target GPC OUTPUT – NORM
4. If target GPC not in OPS 0:
 GNC 0 GPC MEMORY
 CONFIG – ITEM 1 +X EXEC
 X = 2 if G2, 8 if G8, 3 if G3
 Reassign target GPC strings, CRTs, MMs
 If triple G2, do not reconfig target set
 ✓PL 1/2 deassigned from G2/G3/G8
 GNC, OPS X X X PRO
 DOWNLIST GPC – ITEM 44 +X EXEC
 X = nontargeted GNC GPC
 O6 GPC MODE (tgt) – STBY (tb-bp)
 – RUN (tb-RUN)
5. If SM GPC currently active:
 If reqd, perform PL/DPS RECONFIG, Secure (PL SYS or SODF: ASSY OPS), then:
 If RMS active:
 SM 94 PDRS CONTROL
 Note WR range, PL ID, PL INIT ID, EE ID, SPEC 95 Overrides
 Perform SM CHECKPOINT INITIATE (ORB OPS, DPS), then:
 O6 SM GPC OUTPUT – NORM
 MODE – STBY (tb-bp), RUN (tb-RUN)
6. SM(GNC) 1 DPS UTILITY
 UL CNTL
 ENA – ITEM 36 EXEC (*)
 C3 UPLK – manually config for AOS/LOS
 If checkpoint previously done, CKPT RETRV ENA – ITEM 12 EXEC (*)
7. Desired CRT MAJ FUNC – SM
 R11L If desired CRT not currently assigned to target GPC, GPC/CRT target GPC/desired CRT EXEC
8. SM 0 GPC MEMORY
 CONFIG – ITEM 1 +4(5) EXEC
 Assign desired GPC, PL 1/2, CRTs, LAUNCH 1, MMs
9. SM, OPS 201(401) PRO
 C2 ✓SM ANTENNA
10. If SM-reassign performed to troubleshoot SM GPC/LRU interface:
 If original error recurs, problem at LRU:
 Reconfig to prior DPS config
 ✓MCC for possible IFM
 If error does not recur, problem at old SM GPC:
 Perform DPS FRP-1, then:
11. Reload TFLs, LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)

NOM I

DPS SSR-4 (Cont)

12. If RMS PWR – PRI (MCIU powered):
 SM 94 PDRS CONTROL (MA, C/W GPC DATA It on)
 I/O ON – ITEM 5 EXEC (*) (C/W GPC DATA It on)
 Update as needed:
 WR range, PL ID, PL INIT ID, EE ID, SPEC 95 Overrides
 SAFING – CANCEL (tb–bp if arm deselected)
- O6 13. If permanent SM GPC being established:
 If BFS not engaged:
 Target SM GPC OUTPUT – TERM
 SM(GNC) 1 DPS UTILITY
 UL CNTL
 AUTO – ITEM 35 EXEC (*)
 UPLK – ENA
 C3 If reqd, go to PL/DPS RECONFIG, Recovery (PL SYS or SODF: ASSY OPS)
14. Clear software fail votes on MCC GO:
 GNC 0 GPC MEMORY
 I/O ERR LOG RESET
 ITEM 48 EXEC
 SM 0 GPC MEMORY
 I/O ERR LOG RESET
 ITEM 48 EXEC

DPS SSR-5 FREEZE-DRY REASSIGNMENT

- O6 1. ✓ Target FD GPC PWR – ON, OUTPUT – NORM, and MODE – RUN
2. If target GPC not in OPS 0:
Reassign target GPC strings (if reqd):
GNC 0 GPC MEMORY
CONFIG – ITEM 1 +X EXEC (X = 1 if G1; 2 if G2; 8 if G8)
Reassign strings, CRTS, and MMs
GNC, OPS X X X PRO
(Tgt) GPC MODE – STBY (tb-bp)
– RUN (tb-RUN)
- C2 3. If CRT not assigned to target GPC:
Desired CRT MAJ FUNC – PL
GPC/CRT target GPC/desired CRT EXEC
4. **PL 0 GPC MEMORY**
DOWNLIST GPC – ITEM 44 +X EXEC (X = active GNC GPC)
STORE MC:
CONFIG – ITEM 45 +2(3) EXEC
GPC – ITEM 46 +X EXEC (X = target GPC)
STORE – ITEM 47 EXEC
Store complete when MC = 2(3)
5. If G3FD, config NBAT for FD GPC:
CONFIG – ITEM 1 +3 EXEC
Assign FD GPC, all strings, CRTs 1,2,3, and MMs
- O6 6. (FD GPC) GPC MODE – STBY (tb-bp), HALT
– STBY (tb-RUN)
– HALT (tb-bp)

DPS SSR-7

GPC IPL MENU OPTION (PASS/BFS)

NOTE

✓MCC for reapplication of GMEMs as reqd

1. SM 1 DPS UTILITY
IPL SOURCE SW MASK – ITEM 38 EXEC (no *)
- C2
C3 2. CRT 3(1,2) PWR – ON
BFC CRT DISP – ON
SEL – 3+1(1+2, 2+3) (Expect big 'X', POLL FAIL on CRT)
- O6 3. IPL SOURCE – MMU 1(2)
GPC MODE 1(2,3,4,5) – HALT (tb–bp)
OUTPUT 1(2,3,4,5) – NORM (tb–bp)
4. GPC PWR 1(2,3,4,5) – OFF,ON
- F7 If BFS engaged:
FLT CNTLR PWR – ON
BFS ENGAGE pb – push
- If off–diagonal CAM lts on, execute error log reset:
GNC 0 GPC MEMORY
ERR LOG RESET – ITEM 48 EXEC
Repeat for SM, PL, OPS 0 as applicable
5. IPL 1(2,3,4,5) pb – push (tb–IPL, then bp within 2 min)
6. When tb – bp or 2 min:
DEU LOAD 3(1,2) – LOAD
GPC MODE 1(2,3,4,5) – STBY (tb remains BP, expect CAM diagonal for 1 sec and Master Alarm)
7. If GPC IPL MENU does NOT appear in 2 min:
GPC MODE 1(2,3,4,5) – HALT
If first attempt:
IPL SOURCE – MMU 2(1)
Go to step 4 and proceed (one time only)
8. If GPC IPL MENU appears:
✓ID of GPC is correct
Record MSGS STILL IN LIST _____
Record ERROR/MSG CODEs in space provided below, pressing MSG RESET
to cycle through list until MSGS STILL IN LIST = 0
Nominal Codes
1. ERROR/MSG CODE _____ ✓132 (GPCIPL XX.XX.XX.XX LOADED)
2. ERROR/MSG CODE _____ ✓137 (DCP XX.XX.XX.XX LOADED)
3. ERROR/MSG CODE _____
4. ERROR/MSG CODE _____
5. ERROR/MSG CODE _____

NOTE

If ERROR/MSG CODEs 097 (no DEU poll response) and/or 112 (DEU BITE error) are received in addition to the two nominal codes, ignore and continue. For any other codes, STOP. ✓MCC

9. If PASS IPL desired:
 - a. Load desired copy of PASS software from MM ITEM 1(3,5) EXEC (*) (MODE tb–RUN within 2 min) (Expect big 'X,' POLL FAIL on CRT)
 - O6 b. When tb – RUN or 2 min:
GPC MODE 1(2,3,4,5) – RUN
✓OUTPUT 1(2,3,4,5) – NORM (tb–gray)
 - C2,R11 Desired CRT MAJ FUNC – PL
BFC CRT DISP – OFF
GPC/CRT IPL'd GPC/desired CRT EXEC
 - c. If PL 0 GPC MEMORY does NOT appear in 2 min:
GPC MODE 1(2,3,4,5) – HALT
If first attempt:
C3 BFC CRT DISP – ON
O6 IPL SOURCE – MMU 2(1)
Go to step 4 and proceed (one time only)
If second attempt:
GPC PWR 1(2,3,4,5) – OFF
 - d. IPL SOURCE – OFF
 - e. Go to step 11

NOM

MAL/NOM/GEN E

DPS SSR-7 (Cont)

10. If BFS IPL desired:
- a. If orbit config:
 - On MCC GO, select PCMMU format
 - ✓OI PCMMU FORMAT – GPC
 - X: SM 62 PCMMU/PL COMM
 - PCMMU FMT SEL FXD – ITEM 1 EXEC (*)
 - b. IPL SOURCE – OFF
 - c. Load desired copy of BFS software from MM:
 - ITEM 2(4,6) EXEC (*)
 - d. If 'BSL XX.XX.X.XX.XX LOADED' does not appear within 2 min:
 - GPC MODE 1(2,3,4,5) – HALT
 - If first attempt:
 - IPL SOURCE – MMU 2(1)
 - Go to step 4 and proceed (one time only)
 - e. If 'BSL XX.X.XX.XX LOADED' appears (within 2 min),
 - MSG RESET pb – push (repeat until 'MSGs STILL IN LIST' = 0)
 - f. Expect 'KSC XX.XX.X.XX.XX LOADED'
 - If 'KSC X.XX.X.XX.XX LOADED_SET MMU SEL SW TO OFF' appears, continue with procedure and notify MCC when convenient
 - MSG RESET pb – push (repeat until 'MSGs STILL IN LIST' = 0)
 - g. ✓CRT MAJ FUNC – GNC
 - If GNC 0 BFS MEMORY does not appear within 2 min:
 - GPC MODE 1(2,3,4,5) – HALT
 - If first attempt:
 - IPL SOURCE – MMU 2(1)
 - Go to step 4 and proceed (one time only)
 - If second attempt:
 - GPC PWR 1(2,3,4,5) – OFF
 - h. If entry config:
 - BFS/GNC, OPS 301 PRO
 - i. If orbit config, verify BFS will track PASS strings:
 - When time permits, on MCC GO:
 - All RGAs – ON
 - cb ADTA (four) – cl
 - MLS (three) – ON
 - ✓Primary RJD LOGIC, DRIVER (sixteen) – ON
 - All strings, CRTs, MMs, assigned to current GNC GPCs in MC3
 - PASS, GNC OPS 301 PRO
 - BFS, GNC, OPS 301 PRO
 - BFS, GNC, OPS 000 PRO
 - PASS, GNC, OPS 201 PRO
 - j. Select program PCMMU FORMAT:
 - ✓OI PCMMU FORMAT – GPC
 - X: SM 62 PCMMU/PL COMM
 - PCMMU FMT PGM – ITEM 2 EXEC
 - Power off IDP/CRTs as reqd
11. SM 1 DPS UTILITY
- IPL SOURCE SELECT SW MASK – ITEM 38 EXEC (*)

DPS SSR-8 GPC IPL-PASS

NOTE

✓MCC for reapplication of GMEMs as reqd

1. SM 1 DPS UTILITY
IPL SOURCE SW MASK – ITEM 38 EXEC (no *)
- C3 2. BFC CRT DISP – OFF (BFS will default to CRTs 1,2 if engaged)
- O6 3. IPL SOURCE – MMU 1(2)
GPC OUTPUT 1(2,3,4,5) – NORM (tb-bp)
MODE 1(2,3,4,5) – HALT (tb-bp)
- F7 4. GPC PWR 1(2,3,4,5) – OFF,ON
If BFS engaged:
FLT CNTLR PWR – ON
BFS ENGAGE pb – push
5. If off-diagonal CAM lts on, execute error log reset:
GNC 0 GPC MEMORY
ERR LOG RESET – ITEM 48 EXEC
Repeat for SM, PL, OPS 0 as applicable
6. IPL 1(2,3,4,5) pb – push (tb-IPL, then bp within 2 min)
7. When tb – bp or 2 min:
GPC MODE 1(2,3,4,5) – STBY (tb-RUN within 2 min, expect CAM diagonal for 1 sec and Master Alarm)
7. When tb – RUN or 2 min, determine if IPL'd GPC can drive CRT:
If BFS not engaged:
 - O6 a. GPC MODE1(2,3,4,5) – RUN (tb remains RUN)
✓OUTPUT 1(2,3,4,5) – NORM (tb-gray)
 - C2, R11 b. Desired CRT MAJ FUNC – PL
 - c. GPC/CRT IPL'd GPC/desired CRT EXEC
 - d. ✓ PL 0 GPC MEMORY driven by IPL'd GPC
- If BFS engaged:
 - C3 a. BFC CRT DISP – ON
SEL – 3+1
 - b. If BFS commanding CRT2,
BFS CRT – GPC/CRT 02 EXEC
 - C2 c. CRT2 MAJ FUNC – PL
 - O6 d. GPC MODE 1(2,3,4,5) – RUN (tb remains RUN)
OUTPUT 1(2,3,4,5) – NORM (tb-bp)
 - e. If another PASS GPC active, on CRT2
GPC/CRT IPL'd GPC/2 EXEC
✓ 2: PL 0 GPC MEMORY driven by IPL'd GPC
8. If GPC CANNOT drive CRT:
 - O6 GPC MODE 1(2,3,4,5) – HALT
 - If first IPL attempt:
 - C3 IPL SOURCE – MMU 2(1)
 - BFS CRT DISP – OFF
 - Go to step 4 and proceed (one time only)
 - If second IPL attempt:
 - GPC PWR 1(2,3,4,5) – OFF
- O6 9. IPL SOURCE – OFF
10. SM 1 DPS UTILITY
IPL SOURCE SW MASK – ITEM 38 EXEC (*)

NOM

MAL/NOM/GEN E

DPS SSR-9

DEU IPL-PASS/BFS

NOTE

Procedure assumes active PASS kybd available, functional PASS GPC in SM OPS 2/4 POST IPL OPS 0, PL9, or functional BFS GPC. If loading from BFS, note that PASS critical formats are not used by BFS. DEU has full capability and CRT can be assigned to PASS via PASS GPC/CRT kybd entry if desired and used to support all displays except the following:

FAULT	GNC SYS SUMM 1	OVERRIDE
HORIZ SIT	ENTRY TRAJ 1(2,3,4,5)	RCS
VERT SIT 1(2)	GPC MEMORY	
XXXXX MNVR YYYYY	S TRK/COAS CNTL	
XXXXXX TRAJ	IMU ALIGN	

The SM common buffer is utilized during SM 2/4 DEU IPL. Other operations which contend for the buffer are TFL loads, SM checkpoint/restore, orbiter mass memory read/write SPEC operations, and crew text uplinks (TUMMS)

- C2/R11L 1. ✓ CRT1(2,3,4) PWR – ON
 CRT1(2,3,4) MAJ FUNC – SM (use PL if loading from PL9, Post IPL OPS 0, or BFS GPC)
- C3 2. ✓ DEU not assigned to BFS via BFC CRT DISP/SEL switches
 On active PASS kybd,
 C2/R11L GPC/CRT 0/1(2,3,4) EXEC
 O6 DEU 1(2,3,4) LOAD – LOAD (repeat if reqd)
 ✓ DEU LOAD msg appears on CRT
-
IF NO RESPONSE
 CRT1(2,3,4) PWR – OFF, then ON
 DEU 1(2,3,4) LOAD – LOAD (repeat if reqd)
- C2/R11L
 O6
- C2/R11L 3. When DEU LOAD msg appears on CRT, on active PASS/BFS kybd:
 GPC/CRT SM OPS 2/4 (PL9, POST IPL OPS 0, BFS) GPC/1(2,3,4) EXEC
- If 'CM BUF BSY CRT X' msg annunciated, wait for contending operation to complete, then retry DEU IPL:
 Go back to step 2 and proceed
4. ✓ 'IPL COMPLETE' msg followed by active display on CRT (ANTENNA for SM OPS 2/4, GPC MEMORY for POST IPL OPS 0, MASS MEMORY R/W for PL9, or blank display with active time fields for BFS)
-
IF NO RESPONSE OR 'IPL INCOMPLETE' MSG APPEARS ON CRT
 CRT1(2,3,4) PWR – OFF, then ON
 DEU 1(2,3,4) LOAD – LOAD (repeat if reqd)
- C2/R11L
 O6
- C2/R11L 5. When active display appears,
 CRT1(2,3,4) MAJ FUNC – GNC (SM,PL) (as desired)
 If loading from BFS, CRT can be assigned to PASS via PASS GPC/CRT kybd entry if desired. However, displays noted above will not be supported

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6.4i	'S88 EVAP TOP TEMP' - EVAP TOPPING L(R) NOZ ↑↓	6-48
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6.4k	RESERVED	not used
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6.4n	'S88 H2O LOOP 1(2) QTY' - H2O ACCUM QTY 1(2) ↑↓	6-57
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6.4p	'S88 H2O LOOP 1(2) TEMP' - H2O ICH OUT T 1(2) ↓, CAB HX IN T 1(2) ↓, PUMP OUT T 1(2) ↑↓	6-61

NOTE A

The identified MAL represents a support procedure that is entered from other procedures or on MCC call

<u>6.5</u>		<u>SPLY H2O</u>	
		SUPPLY H2O SCHEMATIC	6-64
		SUPPLY H2O STORAGE SCHEMATIC	6-66
6.5a		RESERVED	not used
6.5b		RESERVED	not used
6.5c		'S66 SPLY H2O TEMP'	
		'S66 WASTE H2O PRES'	
		'S66 WASTE H2O TEMP' – WASTE H2O PRESS ↑↓,	
		SUPPLY(WASTE) H2O DMP	
		LN T ↑↓, SUPPLY(WASTE)	
		NOZ T A(B) ↑	6-67
6.5d		'S66 SPLY H2O PRES' – H2O SPLY PRESS ↑	6-69

6.6 RESERVED

6.7 EXT A/L

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6.8 CO2

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6.8b		'S66 CO2 RL SYS PCO2'	
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ECLS SSR

ECLS	SSR-1	RESERVED	not used
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	SSR-14	ECLS COMPUTATION INHIBIT	6-99
	SSR-15	RESERVED	not used
	SSR-16	FREE WATER LEAKING FROM HUM SEP	6-100
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	SSR-18	SMALL SUPPLY H2O LEAK ISOL	6-102
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ECLS FRP

ECLS	FRP-1	MANUAL CABIN ATMOSPHERE MANAGEMENT	6-106
	FRP-2	POST-FIRE CABIN CLEANUP CONTINUATION	6-107
	FRP-3	CONTINGENCY CABIN O2 CONTROL	6-108

The following Fault Msgs have no corresponding MAL procedures in this book:

- | | |
|-----------------------------|------------------------|
| 'S66 CAB HX OUT TEMP' | 'S66 CAB AIRLK PRESS' |
| 'S78 CABIN O2 CONC' | '177 EXT A/L PRESS' |
| 'SM1 SMOKE CAB L FD' | '177 A/L VEST DP' |
| 'SM1 SMOKE CAB R FD' | '177 AL H2O LCG P1(2)' |
| 'SM1 SMOKE CAB HX' | '177 AL H2O XFER P' |
| 'SM1 SMOKE BAY 1(2,3) A(B)' | |
| 'S66 VAC VNT N2 TEMP' | |

BFS FSM INDEX

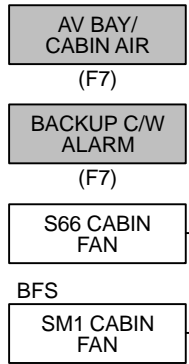
<u>6.1</u>		<u>AV BAY/CABIN AIR</u>		
6.1a	'S66 CABIN FAN'	- CABIN FAN ΔP	6-4
6.1a	'SM1 CABIN FAN'	- CABIN FAN ΔP	6-4
6.1b	'SM2 AV BAY TEMP'	- AV BAY TEMP	6-5
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6.1d	'SM1 CABIN IMU'	- CABIN IMU	6-8
<u>6.2</u>		<u>CABIN ATM</u>		
6.2c	'SM1 CABIN PPO2'	- PPO2 ↑↓	6-21
<u>6.4</u>		<u>FREON/H2O LOOP</u>		
6.4f	'SM0 THRM FRN'	- ACCUM QTY ↓	.....	6-45
6.4g	'SM0 THRM EVAP'	- EVAP TEMP HI LOAD INBD (OUTBD) DUCT(NOZ) ↑↓	.....	6-46
6.4h		- EVAP TOPPING DUCT T FWD(AFT), L(R) ↑↓	.....	6-47
6.4i		- EVAP TOPPING L(R) NOZ ↑↓	.....	6-48
6.4j		- EVAP FDLN TEMP FWD(MID,AFT, TOP,HI LOAD,ACCUM) ↑↓	.....	6-49

**AV BAY/
CABIN AIR
6.1**

The following Fault Msgs have no corresponding MAL procedures in this book:
 SM1 CABIN HX T
 SM2 TEMP

AV BAY/
CABIN AIR
6.1

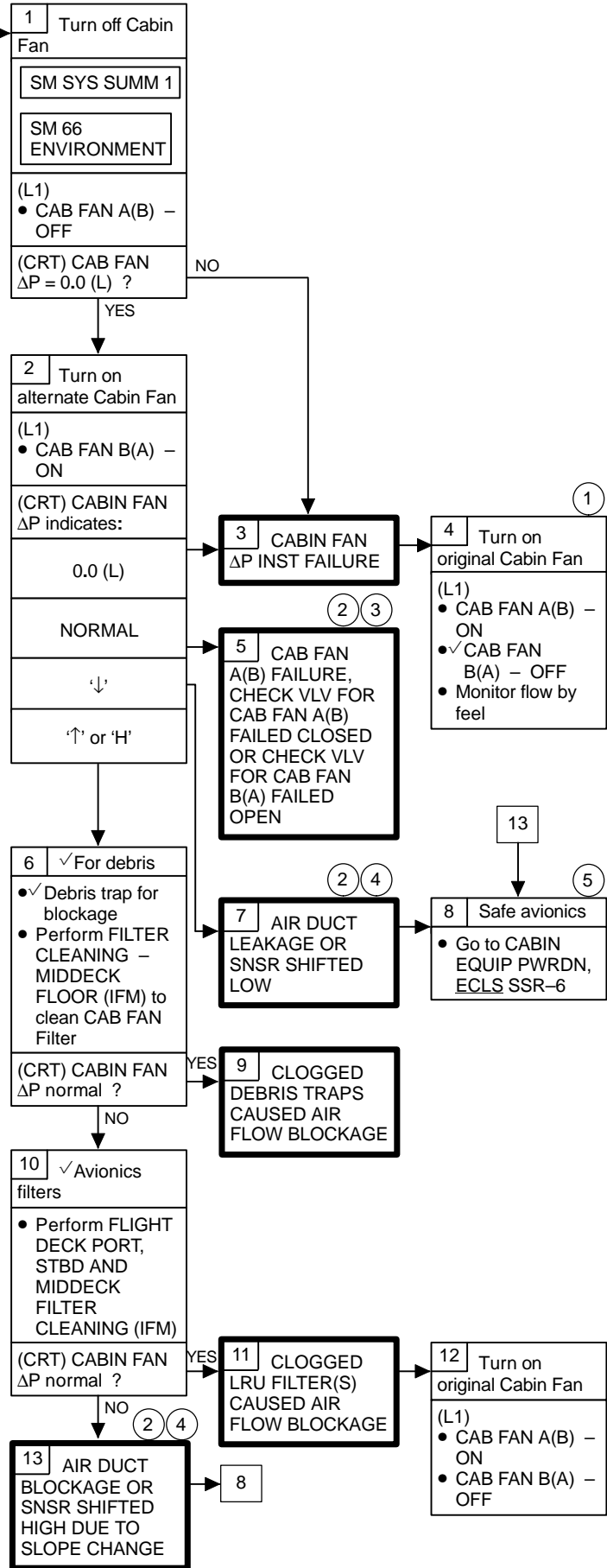
ECLS



If:
CABIN FAN ΔP
< 4.2 or > 6.8
(< 2.8 or > 4.88 if
10.2 ops)

Nominal Config:
(L4:K)
cb AC1 ΦB CAB AIR
S/C – cl
cb AC2 CAB FAN B
(three) – cl
cb AC3 CAB FAN A
(three) – cl
(L4:L)
cb AC1 ΦA CAB T
CNTLR 1 – cl
cb AC2 ΦA CAB T
CNTLR 2 – cl
(L1)
CAB FAN A(B) –
ON
CAB TEMP
CNTLR – 1(2)
CAB TEMP – as
reqd

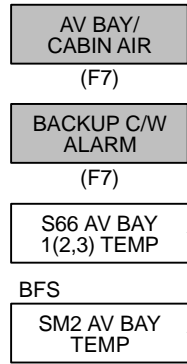
6.1a CABIN FAN ΔP



- ① Turn on both Cabin Fans for sleep
- ② ✓MCC to determine exact failure
- ③ If check vlv is failed open, fan currently selected is the only operational fan available
- ④ May be possible to find duct leakage or blockage by checking airflow at all inlets and outlets
- ⑤ This step prevents overtemping avionics while MCC is evaluating failure

ECLS

6.1b AV BAY TEMP



If: AV BAY 1(2,3) TEMP > 130 degF

Nominal Config:

(L4:G)

- cb AC1 Φ A, Φ B, Φ C AV BAY 1 FAN A (three) - cl
- cb AC2 Φ A, Φ B, Φ C AV BAY 1 FAN B (three) - cl
- cb AC3 Φ A, Φ B, Φ C AV BAY 3 FAN A (three) - cl

(L4:H)

- cb AC1 Φ A, Φ B, Φ C AV BAY 3 FAN B (three) - cl
- cb AC2 Φ A, Φ B, Φ C AV BAY 2 FAN A (three) - cl
- cb AC3 Φ A, Φ B, Φ C AV BAY 2 FAN B (three) - cl

(L4:L)

- cb AC1 Φ B AV BAY 2 S/C - cl
- cb AC2 Φ B AV BAY 3 S/C - cl
- cb AC3 Φ B AV BAY 1 S/C - cl

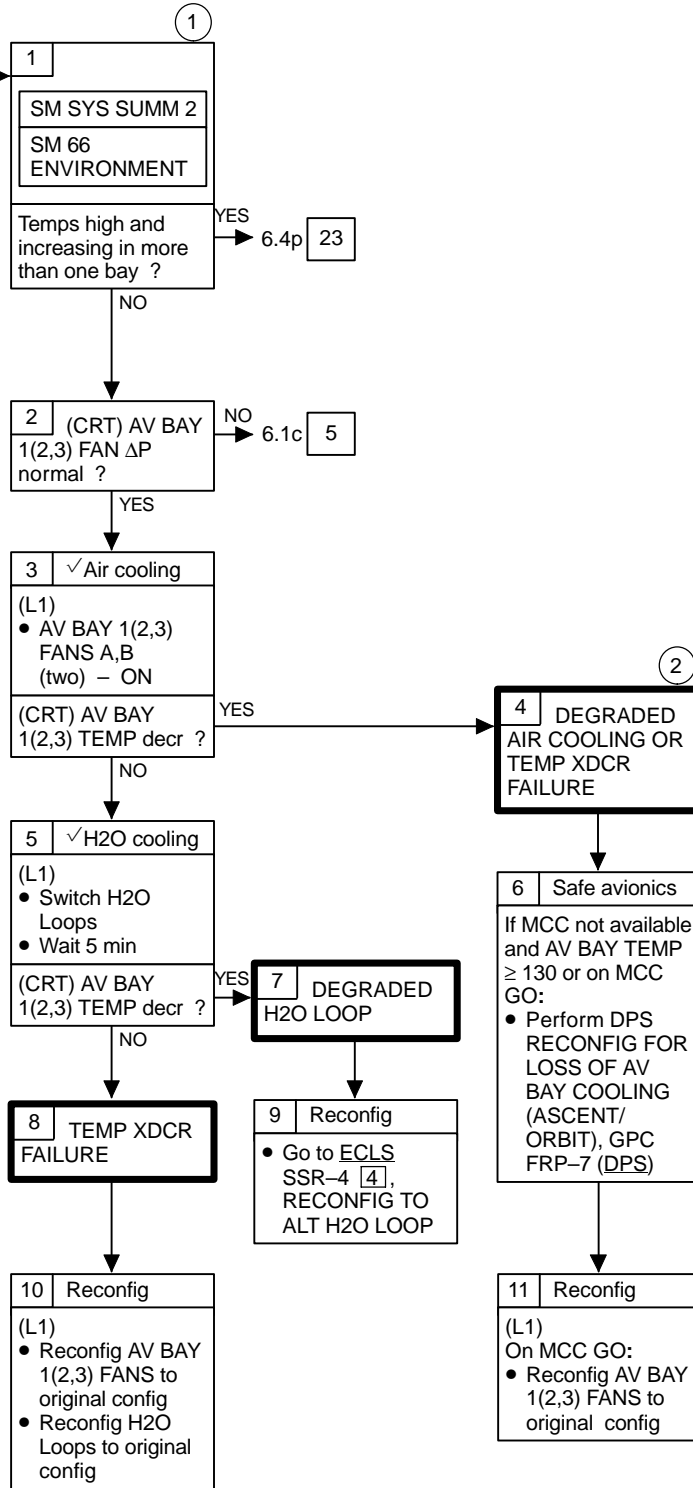
(L1)

- AV BAY
- 1 FAN B(A) - ON
 - 2 FAN A(B) - ON
 - 3 FAN B(A) - ON

H2O LOOP

Nominal Config:

Refer to 6.4!



- ① Temps can be read from meter on pnl O1
- ② \checkmark MCC to determine exact failure

ECLS

6.1c AV BAY FAN ΔP

SM ALERT

S66 AV BAY 1(2,3) FAN

BFS

SM2 AV BAY TEMP

If: AV BAY 1(2,3) FAN ΔP < 2.5 or > 4.3 (3.3 if 10.2 ops)

If Upgraded AV BAY FAN: ΔP < 4.5 or > 7.8 (5.9 if 10.2 ops)

Nominal Config:

(L4:G)

- cb AC1 AV BAY 1 FAN A (three) - cl
- cb AC2 AV BAY 1 FAN B (three) - cl
- cb AC3 AV BAY 3 FAN A (three) - cl

(L4:H)

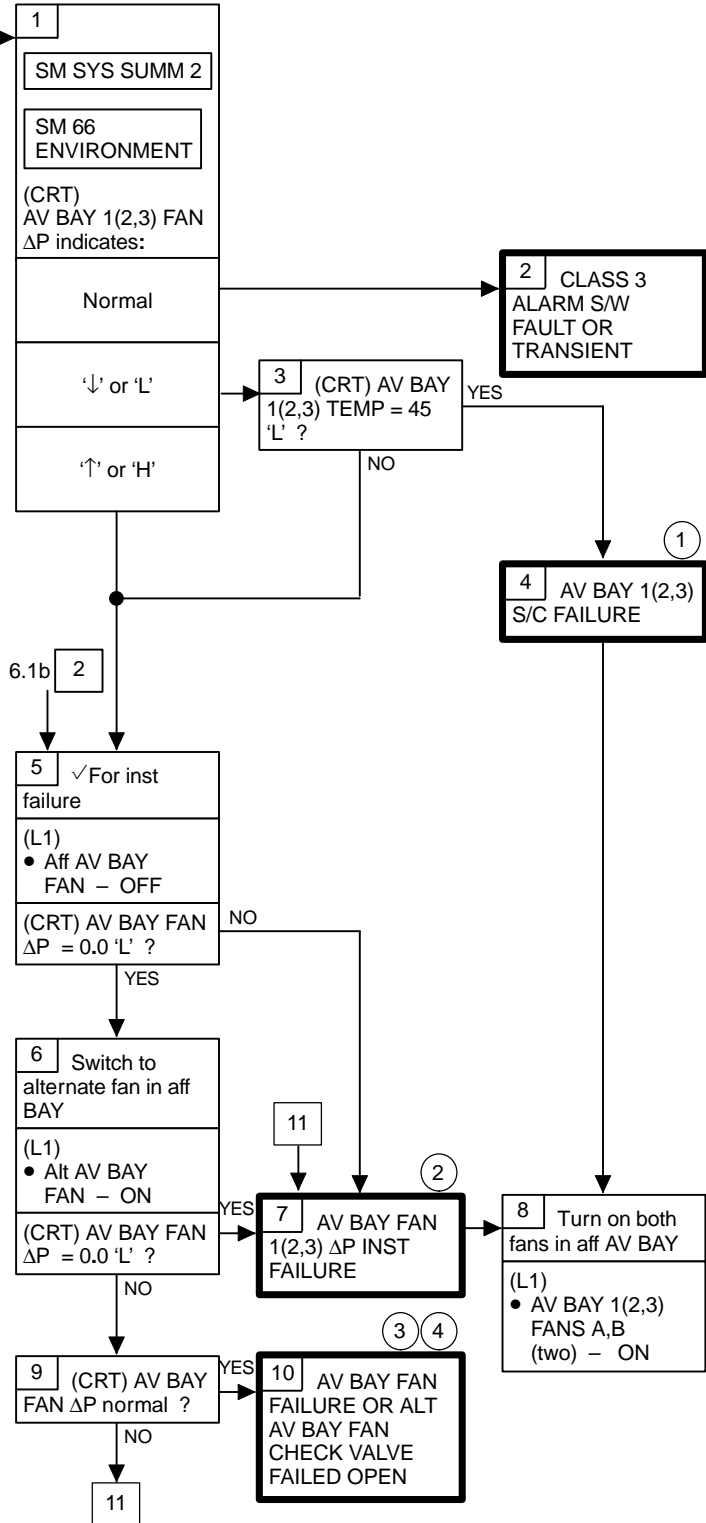
- cb AC1 AV BAY 3 FAN B (three) - cl
- cb AC2 AV BAY 2 FAN A (three) - cl
- cb AC3 AV BAY 2 FAN B (three) - cl

(L4:L)

- cb AC1 ΦB AV BAY 2 S/C - cl
- cb AC2 ΦB AV BAY 3 S/C - cl
- cb AC3 ΦB AV BAY 1 S/C - cl

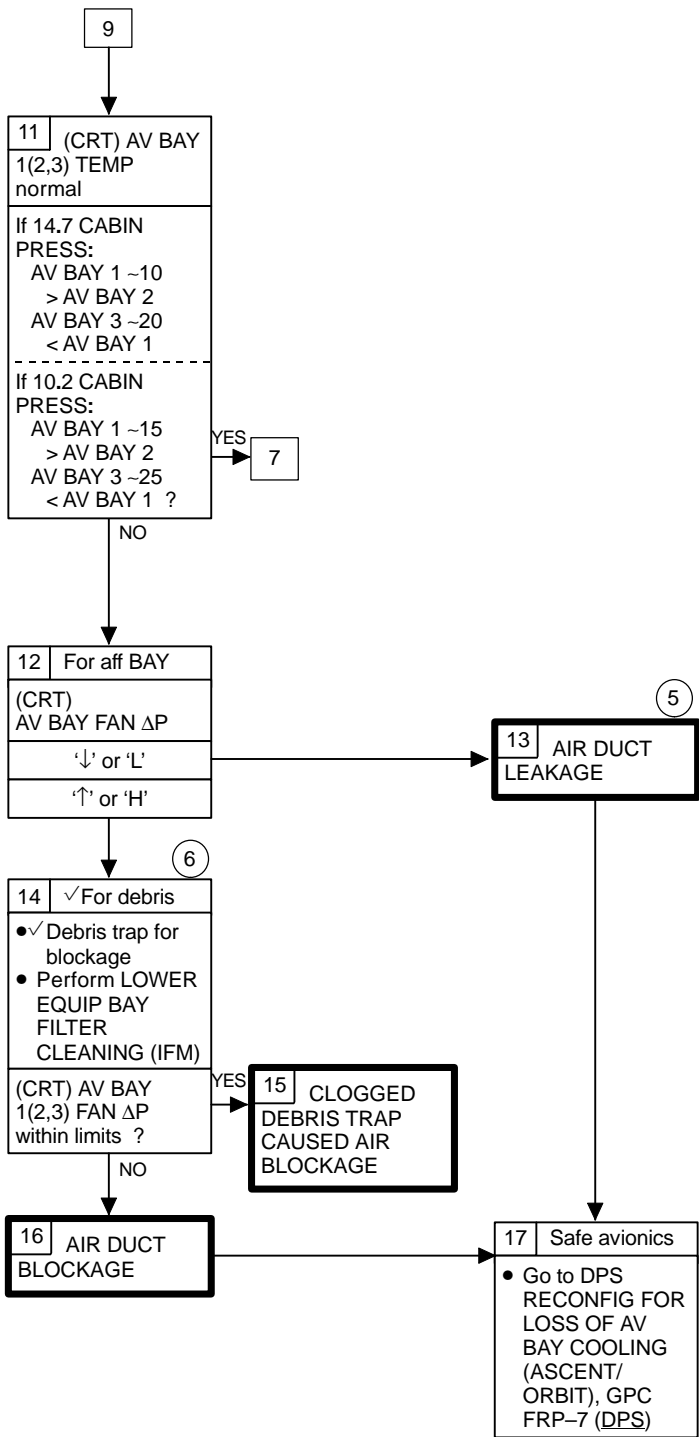
(L1)

- AV BAY 1 FAN B(A) - ON
- AV BAY 2 FAN A(B) - ON
- AV BAY 3 FAN B(A) - ON



- ① If AV BAY 1(2,3) S/C cb is open, √MCC before attempting to reset cb
- ② With loss of ΔP, monitor AV BAY TEMP. If > 130 degF, there is AV BAY cooling problem. If AV BAY TEMP ~H2O LP PUMP OUT T, this is indication of fan failure or duct leakage between fan and HX
- ③ √MCC to determine exact failure
- ④ If check valve failed open, fan currently selected for that AV BAY is the only operational fan available

ECLS 6.1c (Cont)



- ⑤ ✓MCC about checking AV BAY duct integrity after completing next step
- ⑥ ✓MCC about performing pwrn of affected bay before performing AV BAY filter cleaning

ECLS

6.1d CABIN IMU

SM ALERT

S66 IMU FN SPD A(B,C)

IMU FAN Underspeed

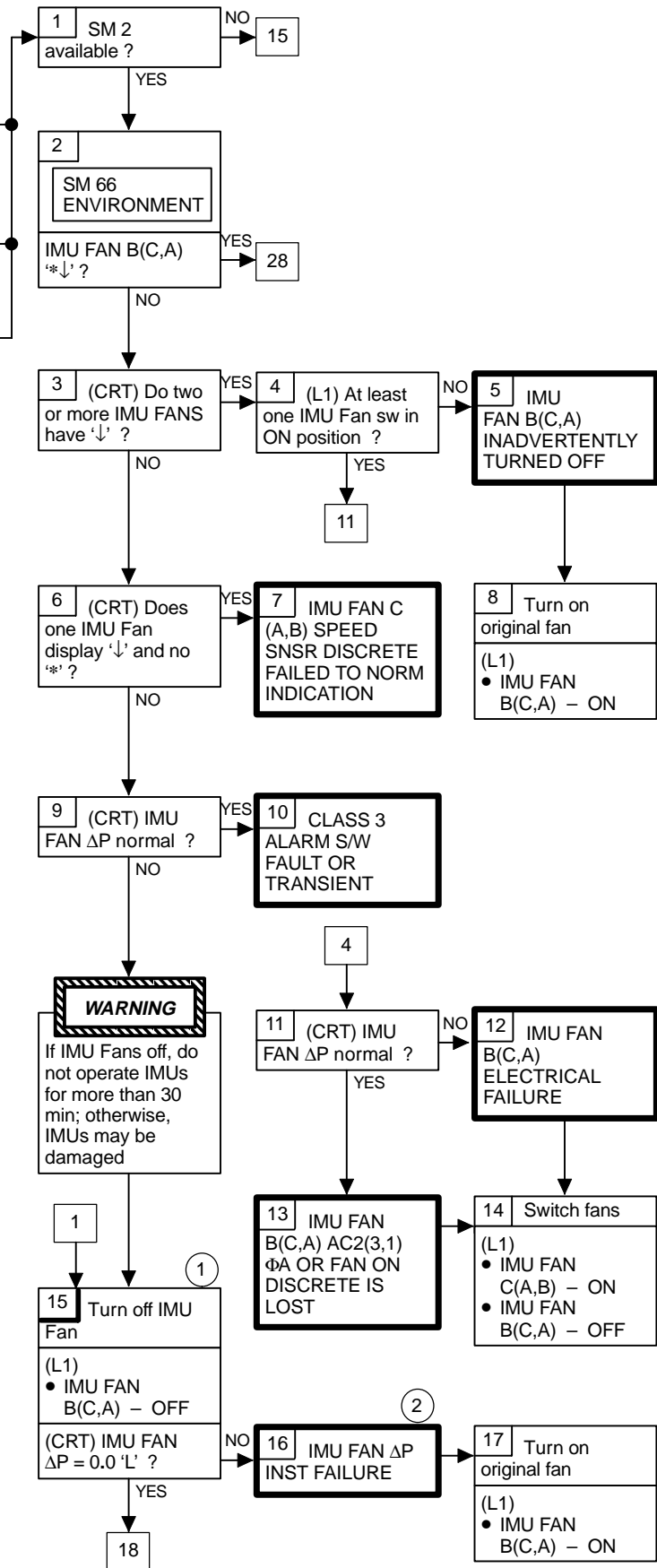
S66 IMU FAN DP

BFS

SM1 CABIN IMU

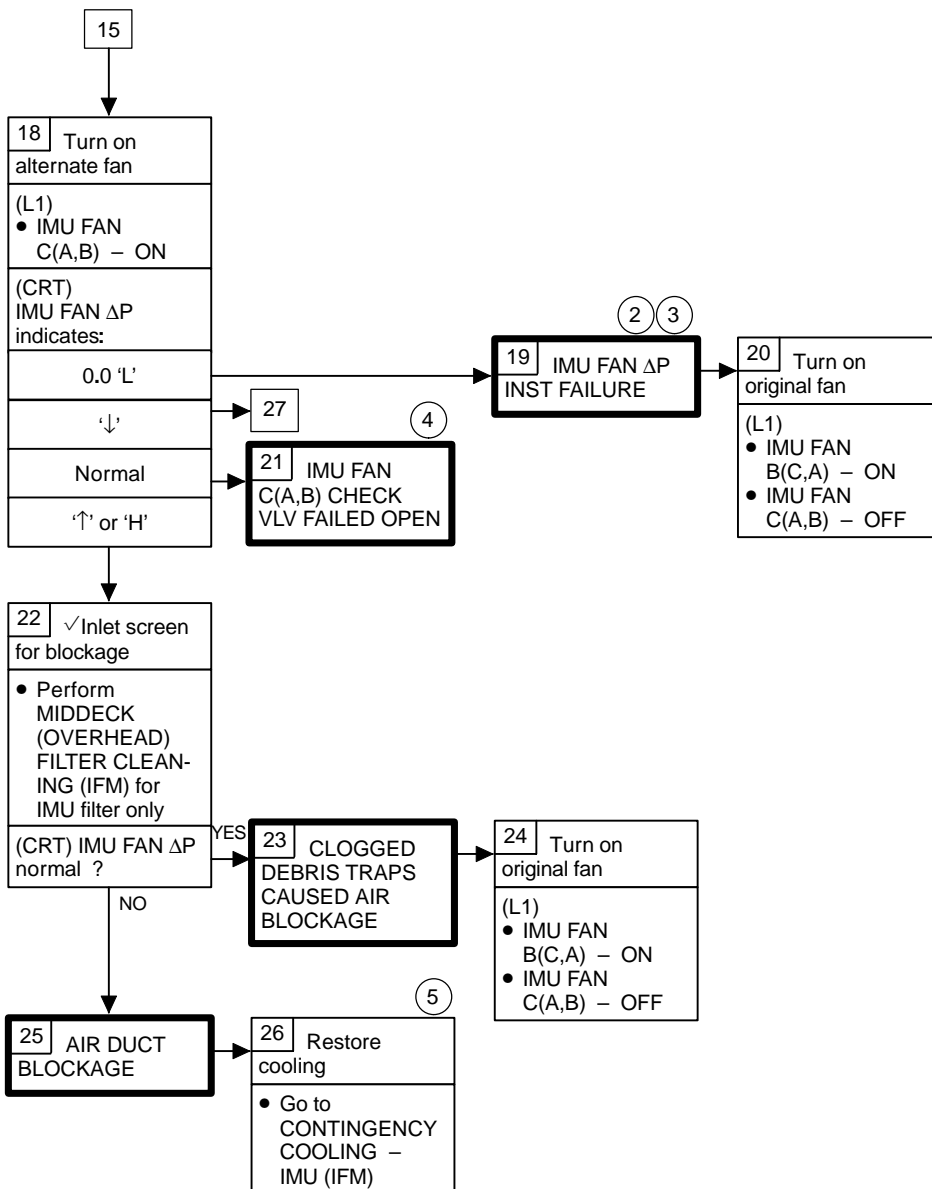
IMU FAN $\Delta P < 3.7$ (3.0 if 10.2 ops) or > 4.95 (3.8 if 10.2 ops)

Nominal Config:
 (O14:B)
 cb MNA OI H2O BYP LOOP 1 SNSR - cl
 (L4:I)
 cb AC1 IMU FAN A (three) - cl
 cb AC2 IMU FAN B (three) - cl
 cb AC3 IMU FAN C (three) - cl
 (L4:J)
 cb AC3 ΦB SIG CONDR IMU FAN - cl
 (L1)
 IMU FAN B(C,A) - ON



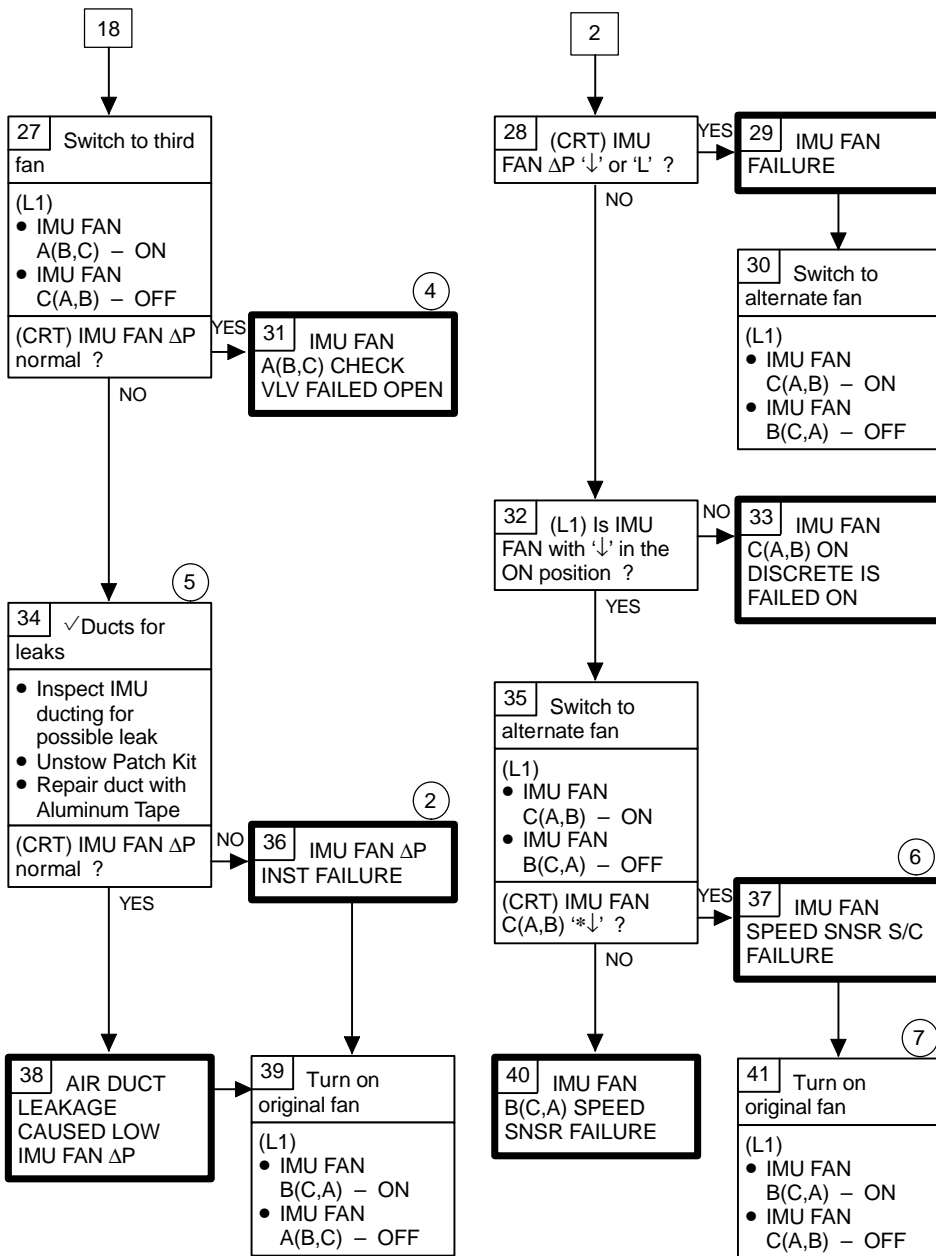
- ① If SM 2 not available, use BFS SYS SUMM 1 to monitor IMU FAN ΔP
- ② Monitor Speed Snsr '↓' for fan failure if IMU ΔP is lost

ECLS 6.1d (Cont)



- ② Monitor Speed Snsr '↓' for fan failure if IMU ΔP is lost
- ③ If cb MNA OI H2O BYP LOOP 1 SNSR – op, ✓MCC before attempting to reset cb
- ④ Fan currently selected is the only operational fan available
- ⑤ ✓MCC for proper IMU config and ops

ECLS 6.1d (Cont)

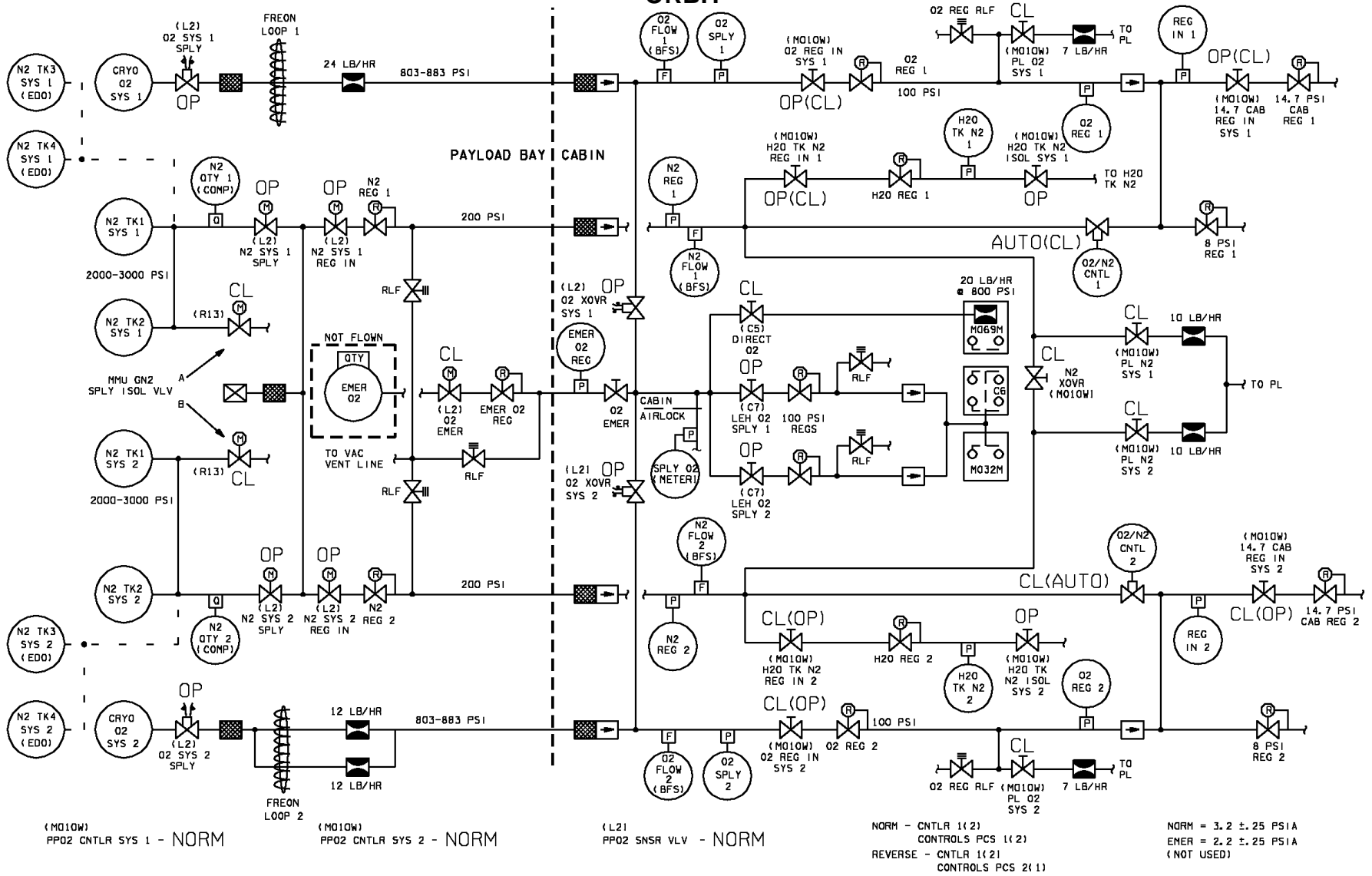


- ② Monitor Speed Snsr '↓' for fan failure if IMU ΔP is lost
- ④ Fan currently selected is the only operational fan available
- ⑤ ✓MCC for proper IMU config and ops
- ⑥ If (pnl L4) cb AC3 ΦB SIG CONDR IMU FAN - op, ✓MCC before attempting to reset
- ⑦ Second 'S66 CABIN IMU' msg will be generated. This is expected as Speed Snsr S/C failure will affect each IMU Fan

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6-12 CABIN ATM

PRESSURE CONTROL SYSTEM ORBIT



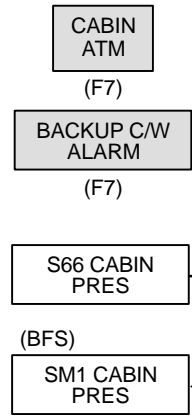
6-12

MAL/ALL/GENE

DATE 01/17/97

480330419, SCH# 2

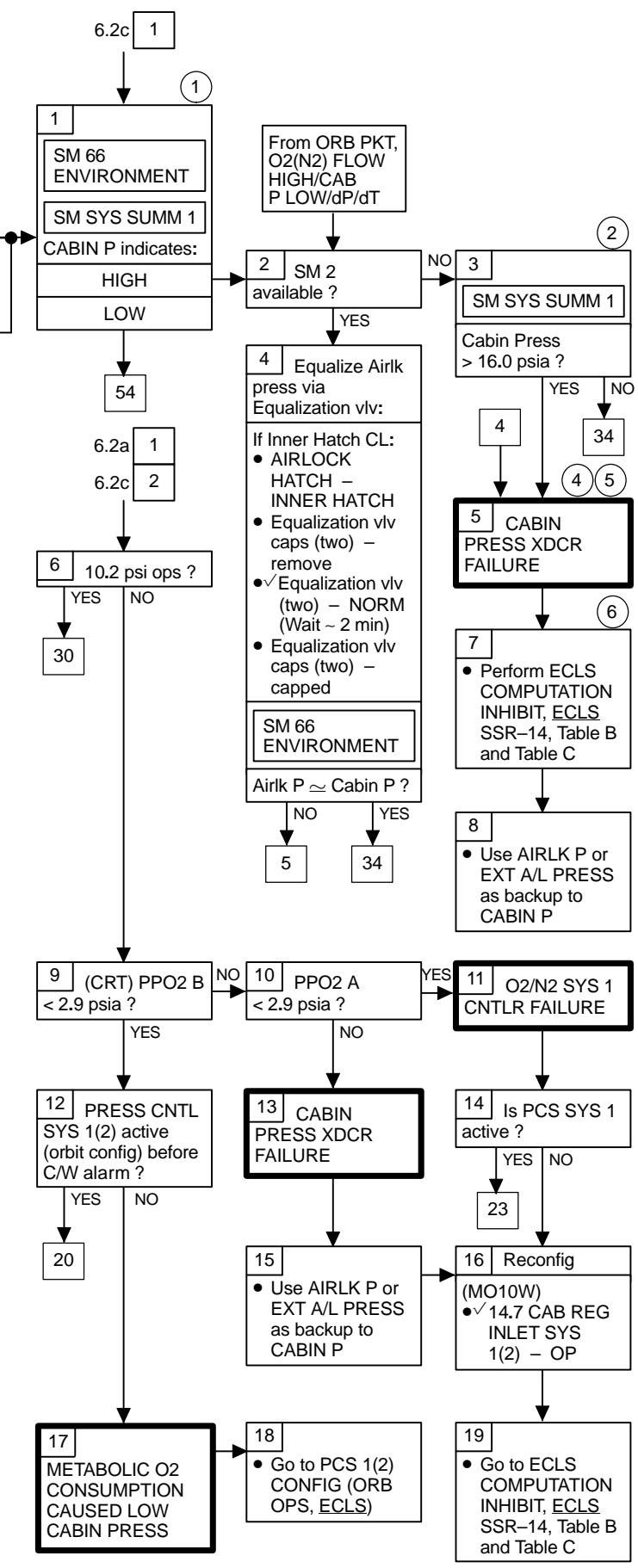
ECLS



CABIN PRES
 < 13.8 (10.0) psia
 > 15.2 (10.6) psia

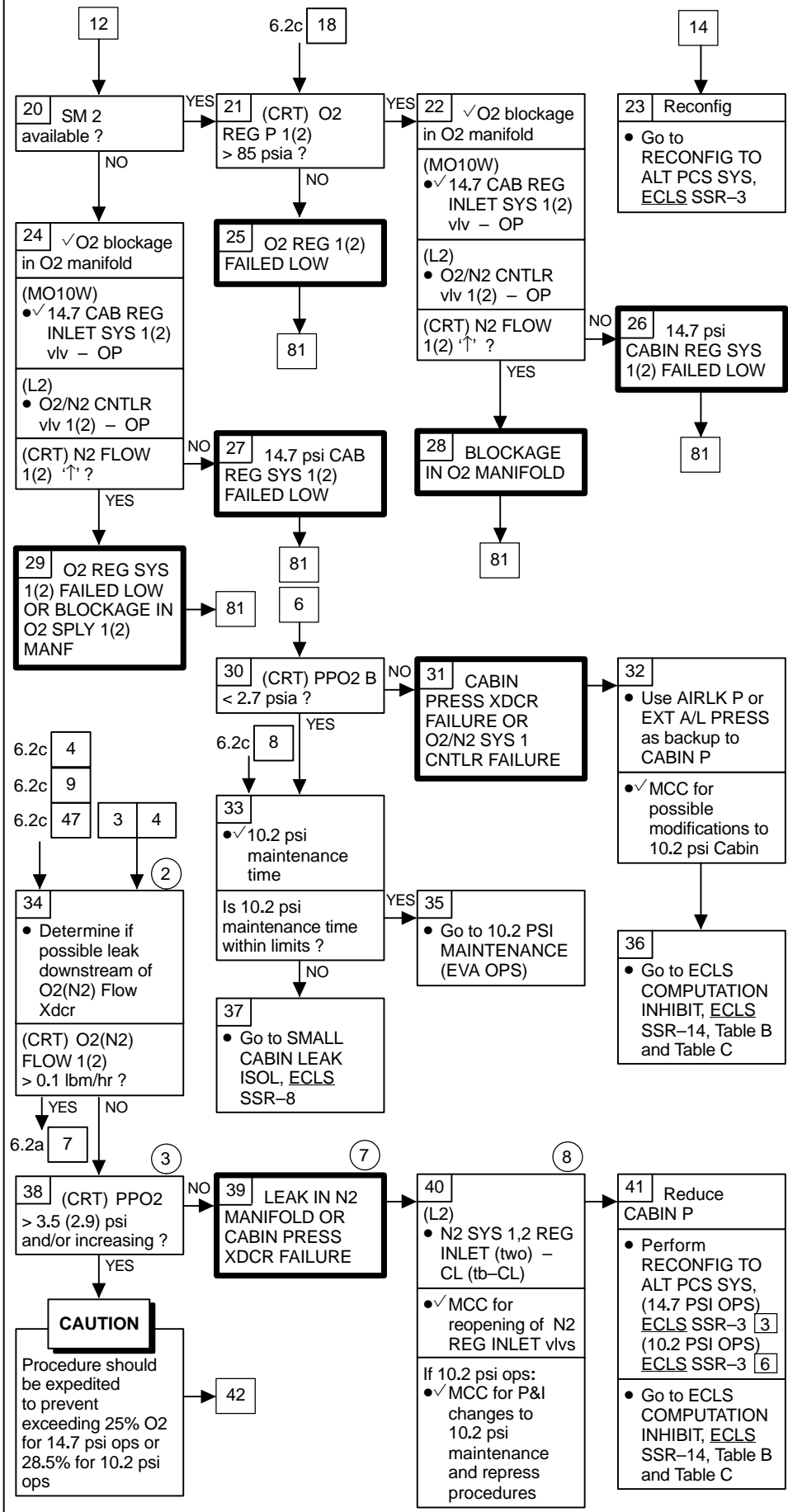
Nominal Config:
 (ORBIT)
 Refer to 6.2a

6.2b CABIN PRES ↑↓



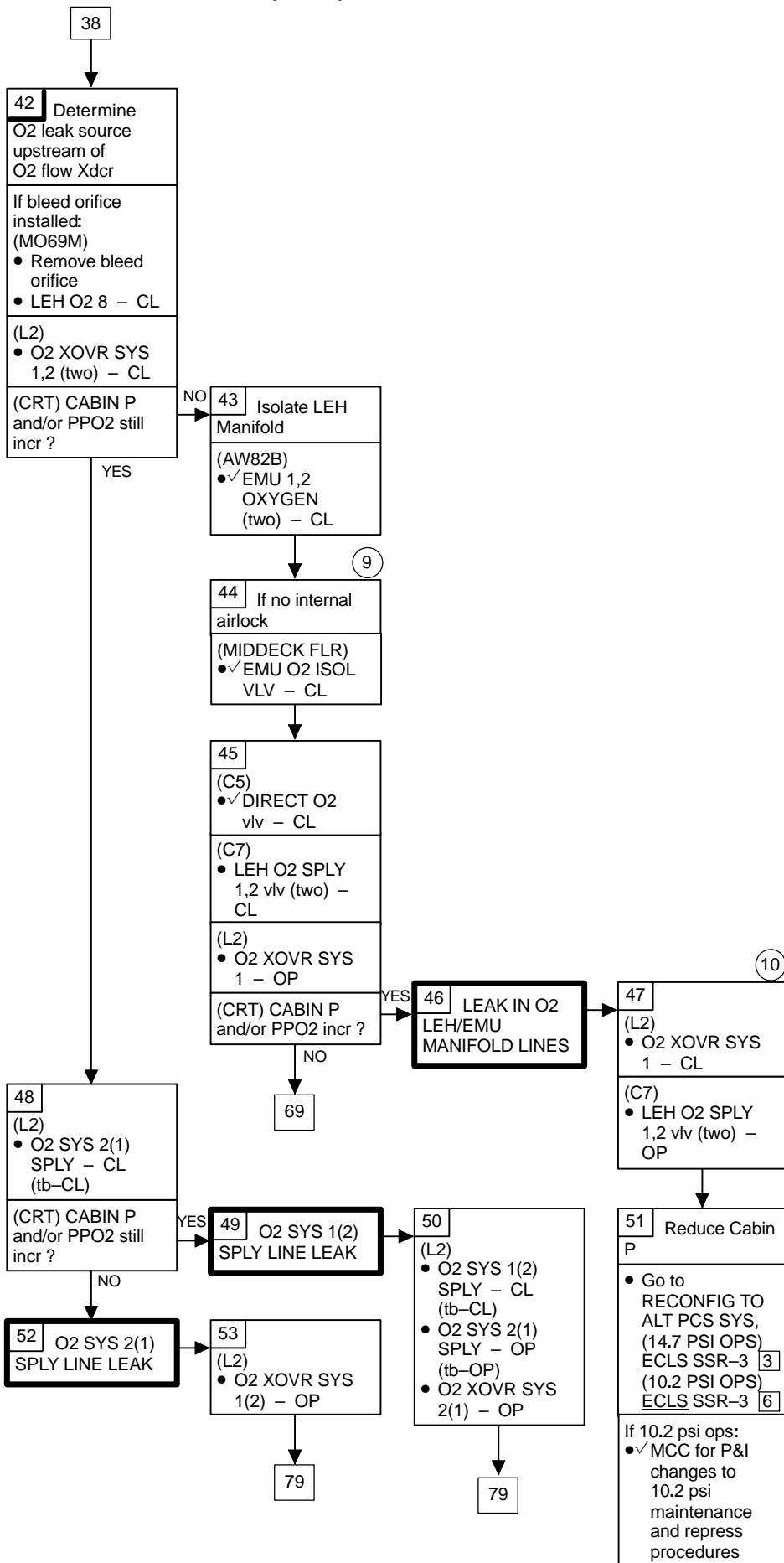
- ① This procedure should only be entered directly for CAB P ↑
- ② Cabin Press Relief vlvs crack at 15.5 psid. Full flow at 16.0 psid
- ③ Use number in parenthesis for 10.2 psia cabin ops
- ④ ✓MCC to determine exact failure. Suspect snr yielding alarm
- ⑤ Unless failure is linear shift of Xdcr reading, loss of cabin pressure Xdcr causes loss of BFS BU dP/dT software computation
- ⑥ This step is accomplished after SM 2 becomes available

ECLS 6.2b (Cont)



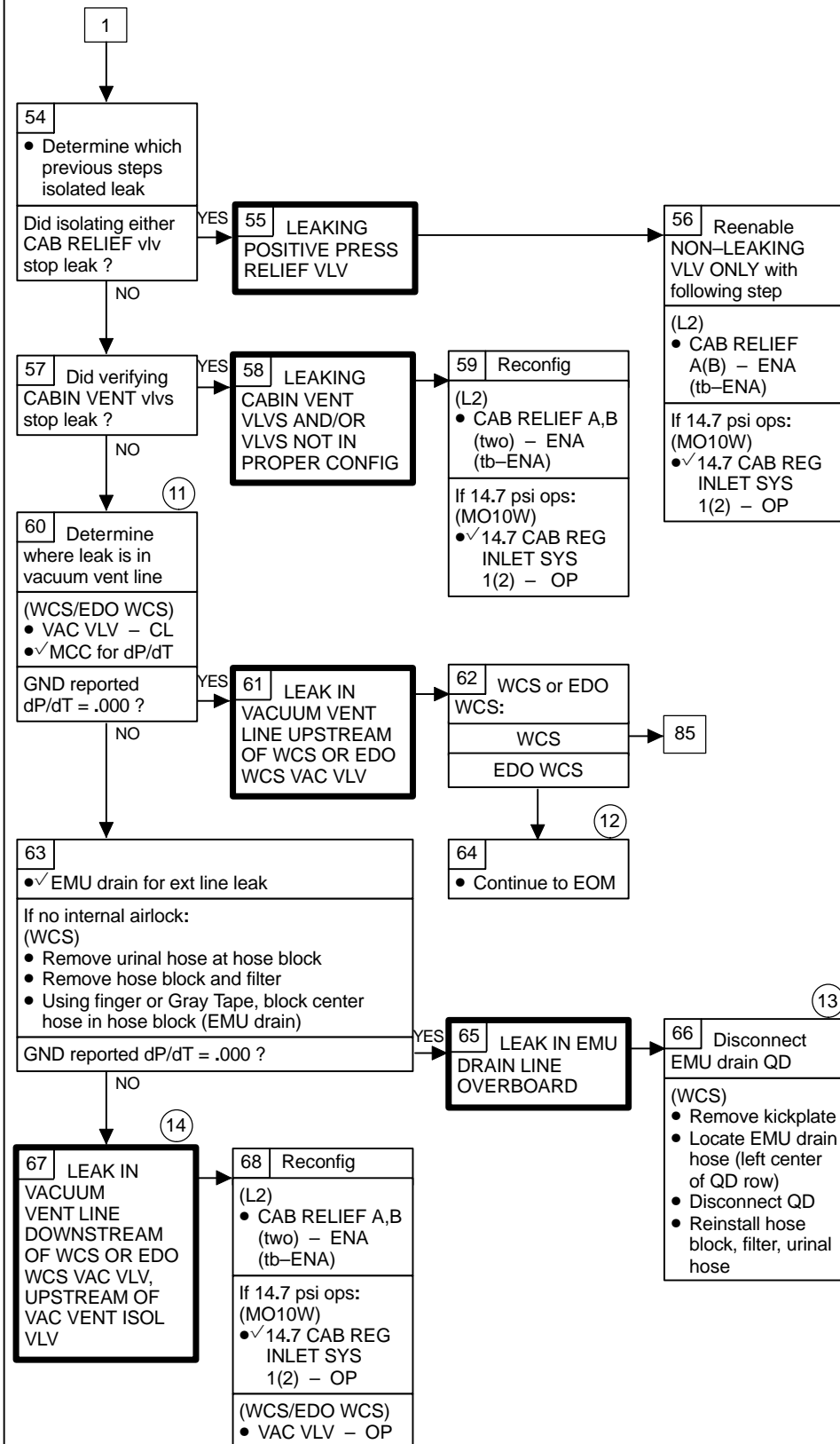
- ② Cabin Press Relief vlv crack at 15.5 psid. Full flow at 16.0 psid
- ③ Use number in parenthesis for 10.2 psia cabin ops
- ⑦ If AirLk P equaled Cabin P in block 4, then failure is leak in N2 Manf. If AirLk P unavailable (no SM 2), N2 Manf leak must be assumed until confirmed by MCC
- ⑧ If N2 needed, opening N2 SYS 1,2 REG INLET could feed possible leak into cabin

ECLS 6.2b (Cont)



- 9 Vlv normally closed except from pre-EVA PREP/ POST-EVA PREP
- 10 O2 XOVR vlvs must be reopened to supply oxygen to LEH O2 vlvs, EMU O2 vlvs, or DIRECT O2 vlv. ✓MCC before taking this action

ECLS 6.2b (Cont)



(11) MCC is reqd to determine if leak is isolated. Leak rate thru VAC Vent Isol vlv ~3 lb/hr (dP/dT = -0.004)

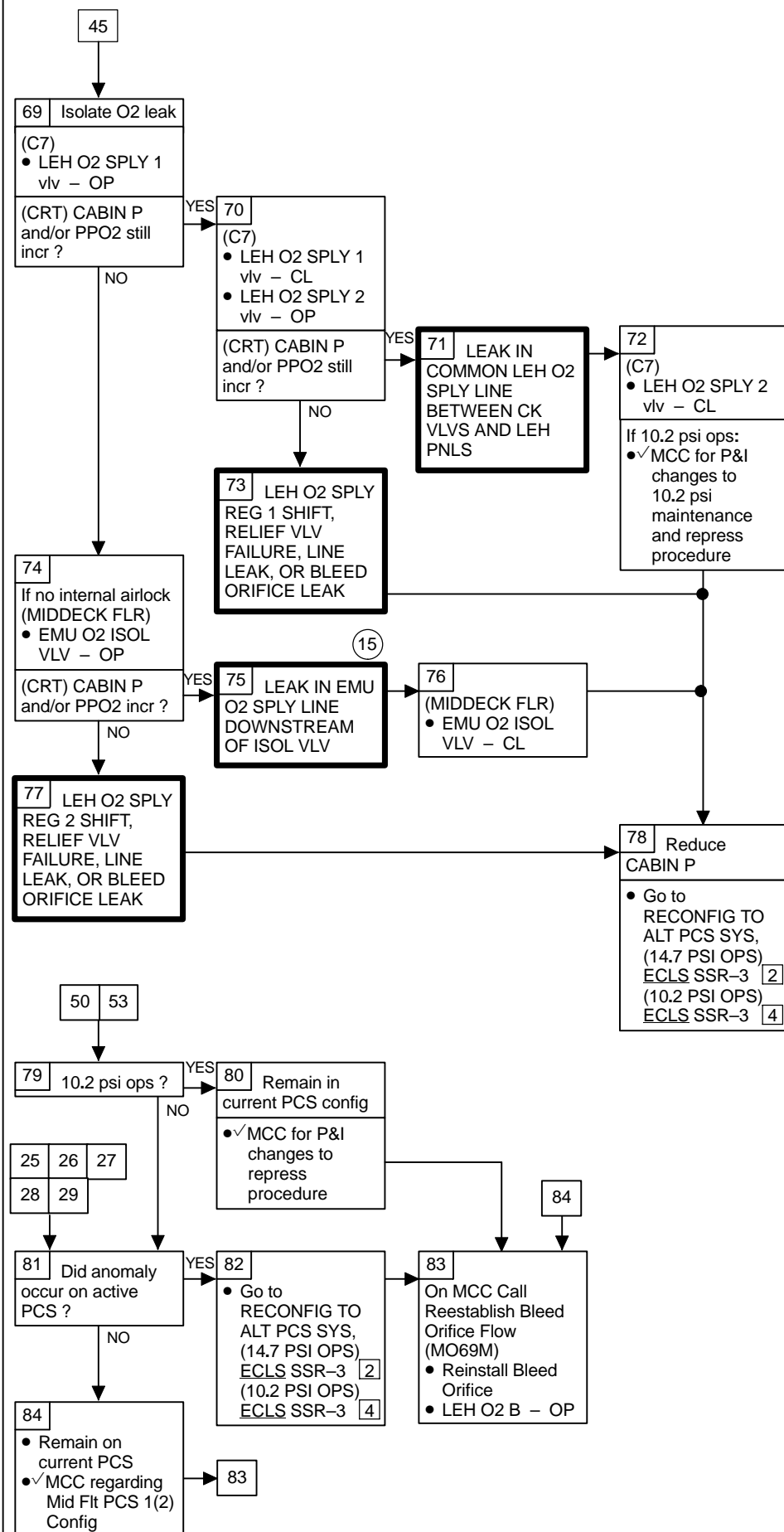
(12) Maintaining VAC VLV - CL to EOM may cause odor buildup due to inability to vent wet trash overboard

(13) EMU drain is lost

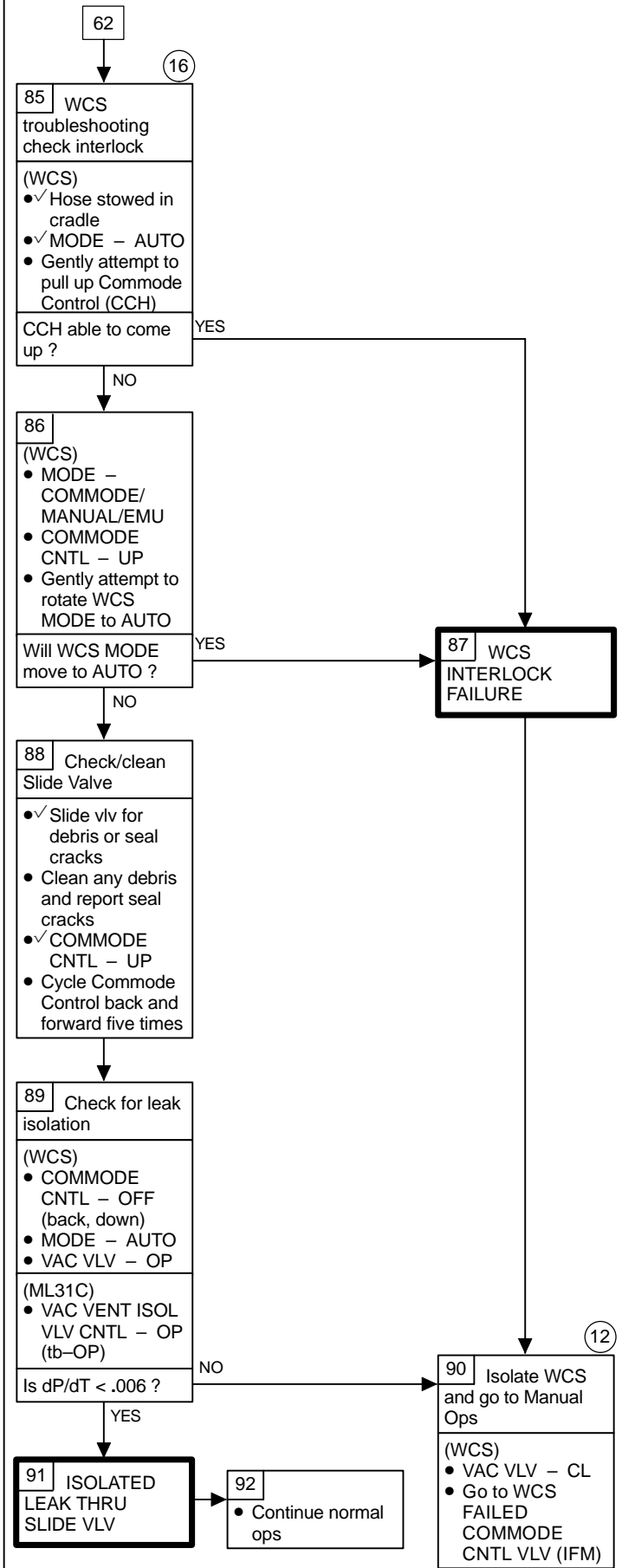
(14) By isolating cabin leak with VAC VENT ISOL VLV CNTL, hydrogen entrapment in vacuum vent line could create hazardous condition. ✓MCC for impacts of leaving this vlv closed

ECLS 6.2b (Cont)

⑮ Possible loss of O2 Supply to EMUs or O2 transfer to ISS



ECLS 6.2b (Cont)



⑫ Maintaining VAC VLV - CL to EOM may cause odor buildup due to inability to vent wet trash overboard

⑬ CCH has range of travel in which path to vacuum and cabin can be open simultaneously. Slow or incomplete extension of CCH may therefore result in cabin leak

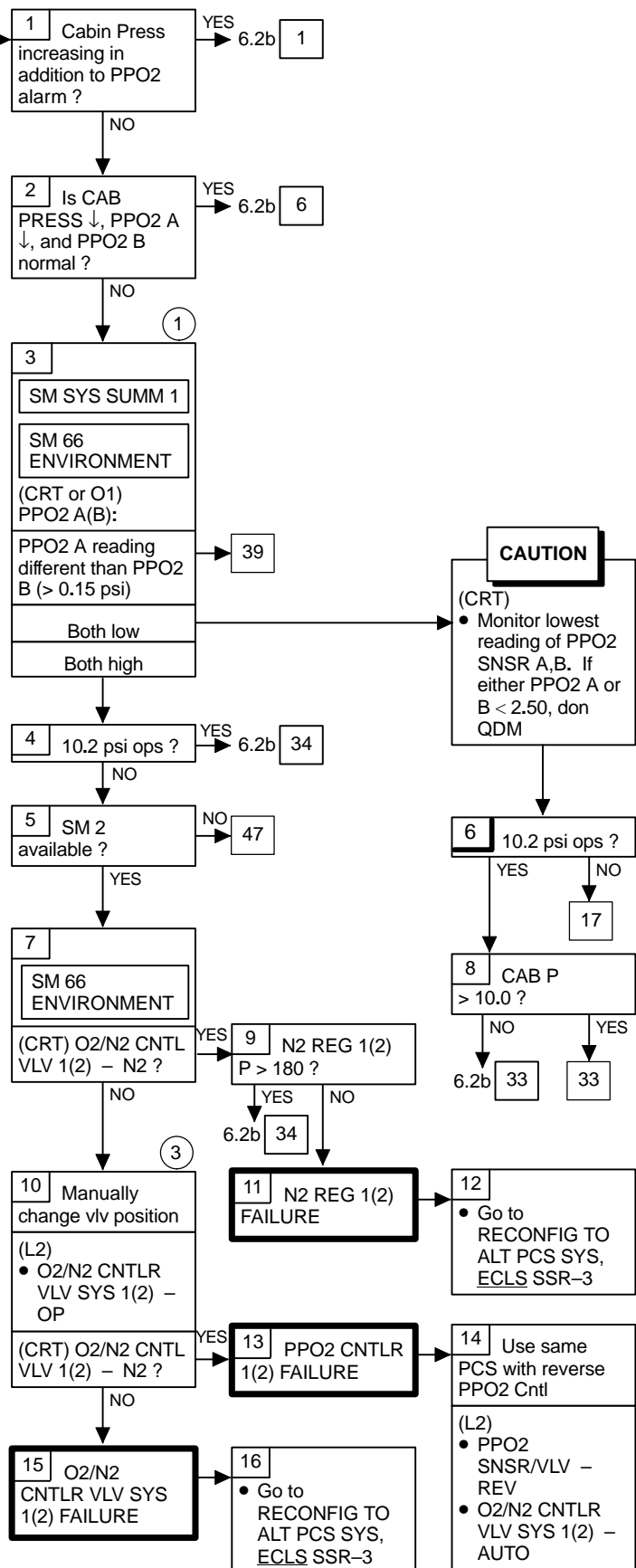
ECLS

- CABIN ATM (F7)
- BACKUP C/W ALARM (F7)
- S66 CABIN PPO2 A(B)
- BFS
- SM1 CABIN PPO2

PPO2 A(B)
 < 2.70 (2.55) psia
 > 3.60 (2.90) psia

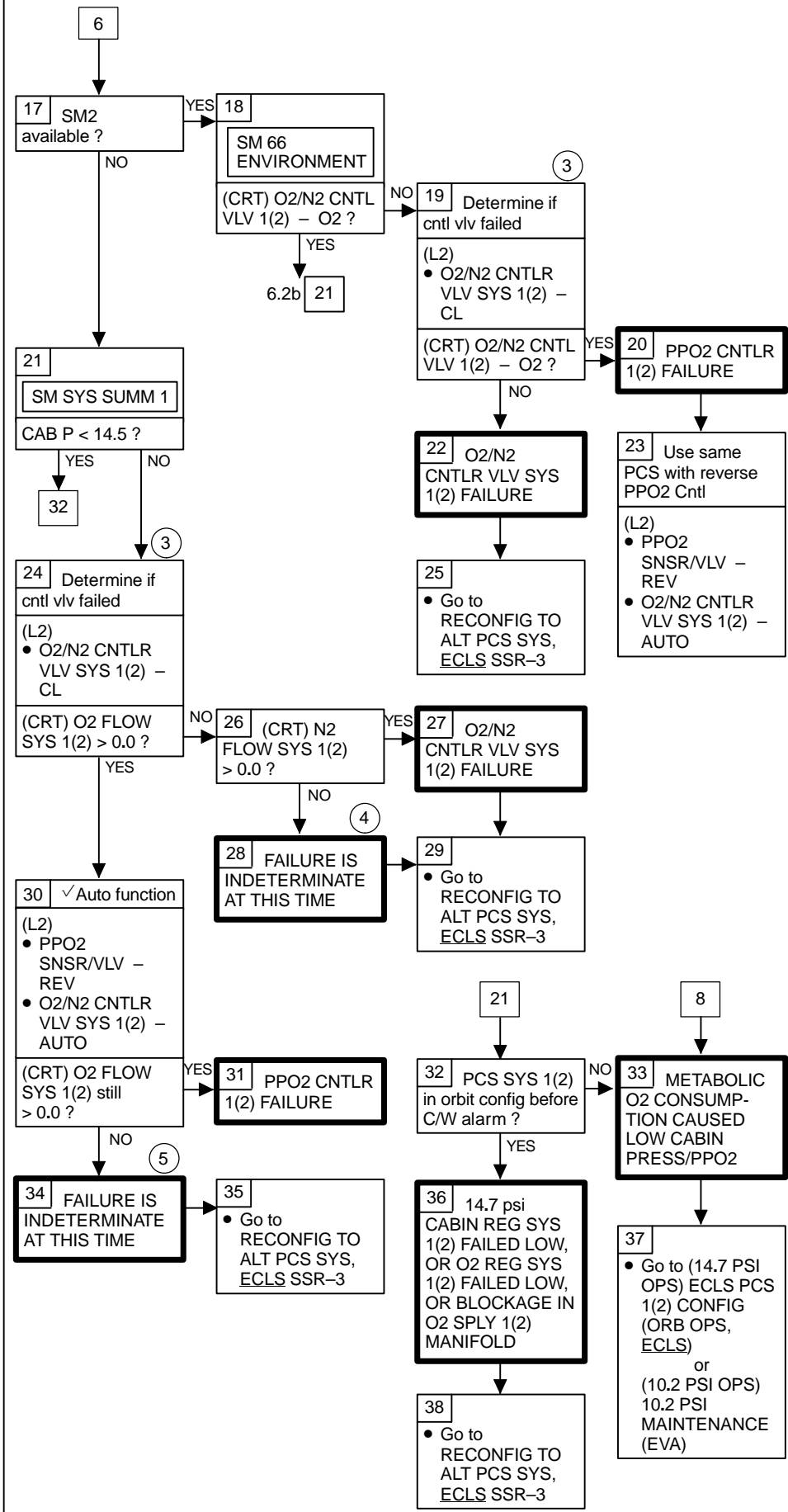
Nominal Config:
 (ORBIT)
 Refer to 6.2a

6.2c PPO2 ↑↓



- ① If prior to performing on-orbit PCS config, low PPO2 could be caused by PCS 14.7 CABIN REGS - CL. After PCS config for Orbit Ops only one system active with PPO2 A tied to PCS 1 and PPO2 B tied to PCS 2. For 10.2 psi ops SYS 1 nominally configured to flow N2 and SYS 2 O2, with both 14.7 CAB REGS - CL
- ② Use number in parenthesis for 10.2 psia cabin ops
- ③ O2/N2 CNTLR VLV flows N2 in OP position, and O2 in CL position

ECLS 6.2c (Cont)

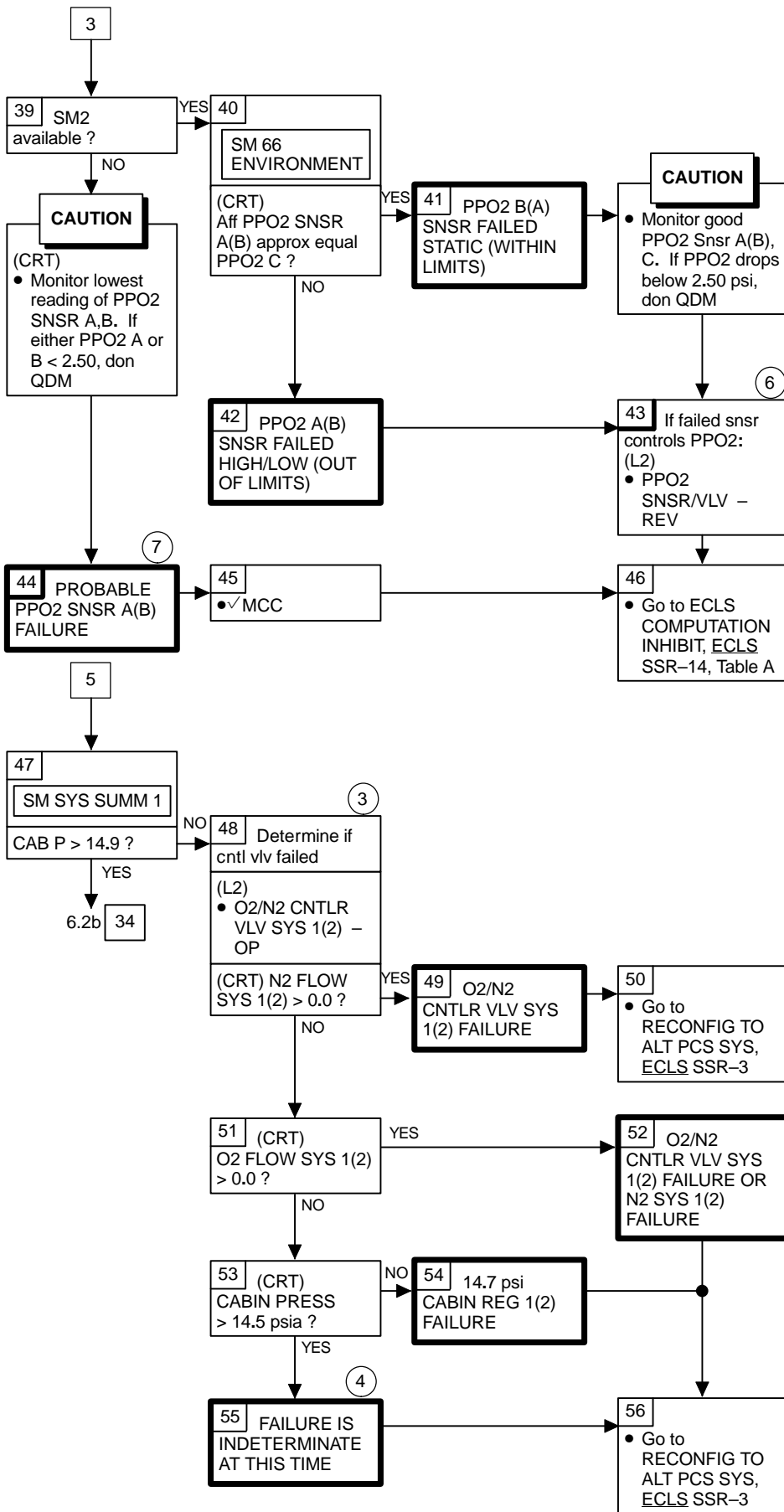


③ O2/N2 CNTLR VLV flows N2 in OP position, and O2 in CL position

④ Cabin P is within no flow region on cabin regulator. ✓MCC for further troubleshooting of that system

⑤ Either Cabin P is within no flow region on cabin regulator or lost AUTO function on O2/N2 CNTLR VLV. ✓MCC for further troubleshooting of that system

ECLS 6.2c (Cont)



- ③ O2/N2 CNTLR VLV flows N2 in OP position, and O2 in CL position
- ④ Cabin P is within no flow region on cabin regulator. ✓MCC for further troubleshooting of that system
- ⑥ Monitor systems performance on Reverse snsr. If 10.2 psi operations, performance of snsr cannot be determined until cabin repressed and initiation of Auto PCS control. If Reverse snsr does not control PPO2 properly, ✓MCC regarding Manual Cabin ATM Management
- ⑦ Only MCC can determine exact failure. Suspect snsr yielding alarm. MCC will determine whether to go to REVERSE on PPO2 SNSR/VLV

ECLS

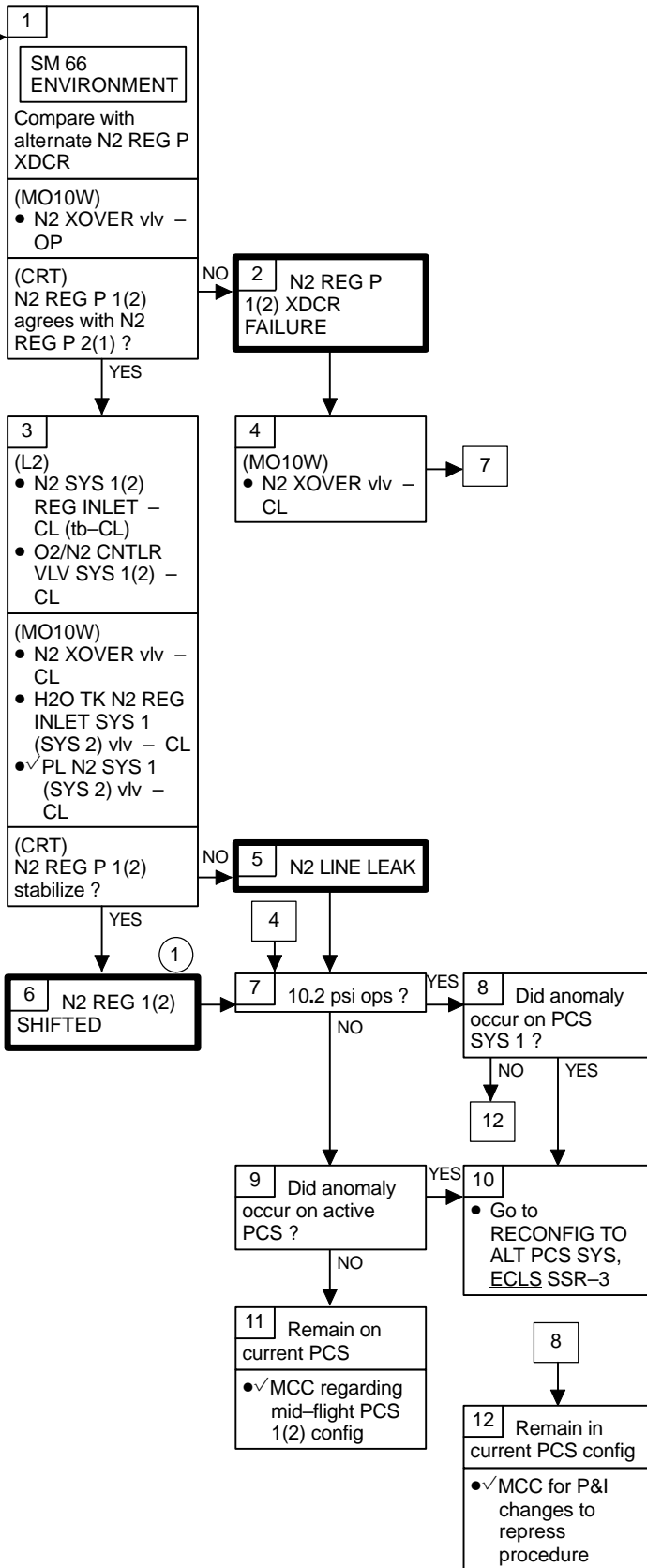
6.2d N2 REG P ↑↓

① If PL N2 line in use, ✓MCC for further isolation

SM ALERT

S66 CAB N2 REG P 1(2)
 N2 REG P 1(2) > 260 psia < 150 psia

Nominal Config:
 (ORBIT)
 Refer to 6.2a



ECLS

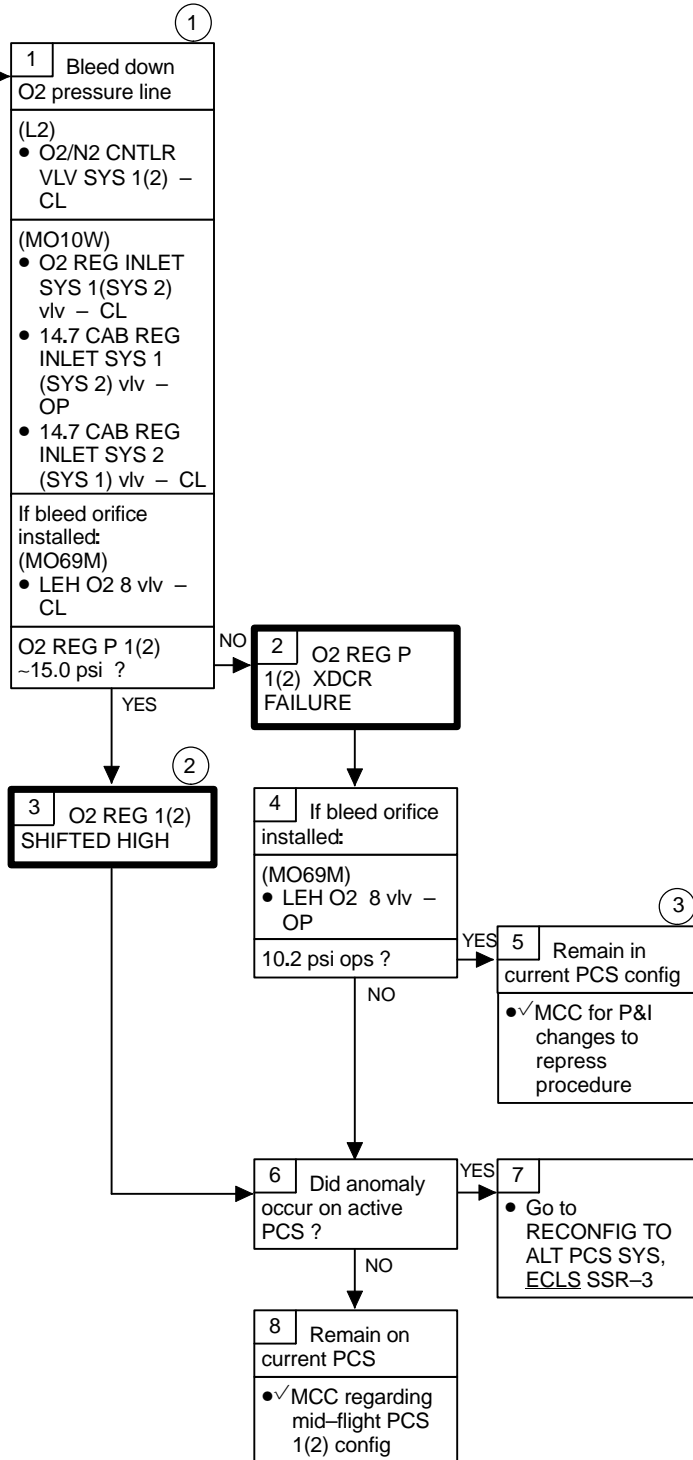
6.2e O2 REG P ↑

SM
ALERT

S66 CAB O2
REG P 1(2)

O2 REG P 1(2)
> 145 psia

Nominal Config:
(ORBIT)
Refer to 6.2a



① Cabin press must drop low enough to open 14.7 psia CABIN REG and bleed O2 Line

② High O2 REG P could possibly be caused by spec leakage through regulator

③ For 10.2 psi ops, O2 will be supplied as reqd, via the direct O2 vlv

ECLS

6.2g N2 QTY ↓

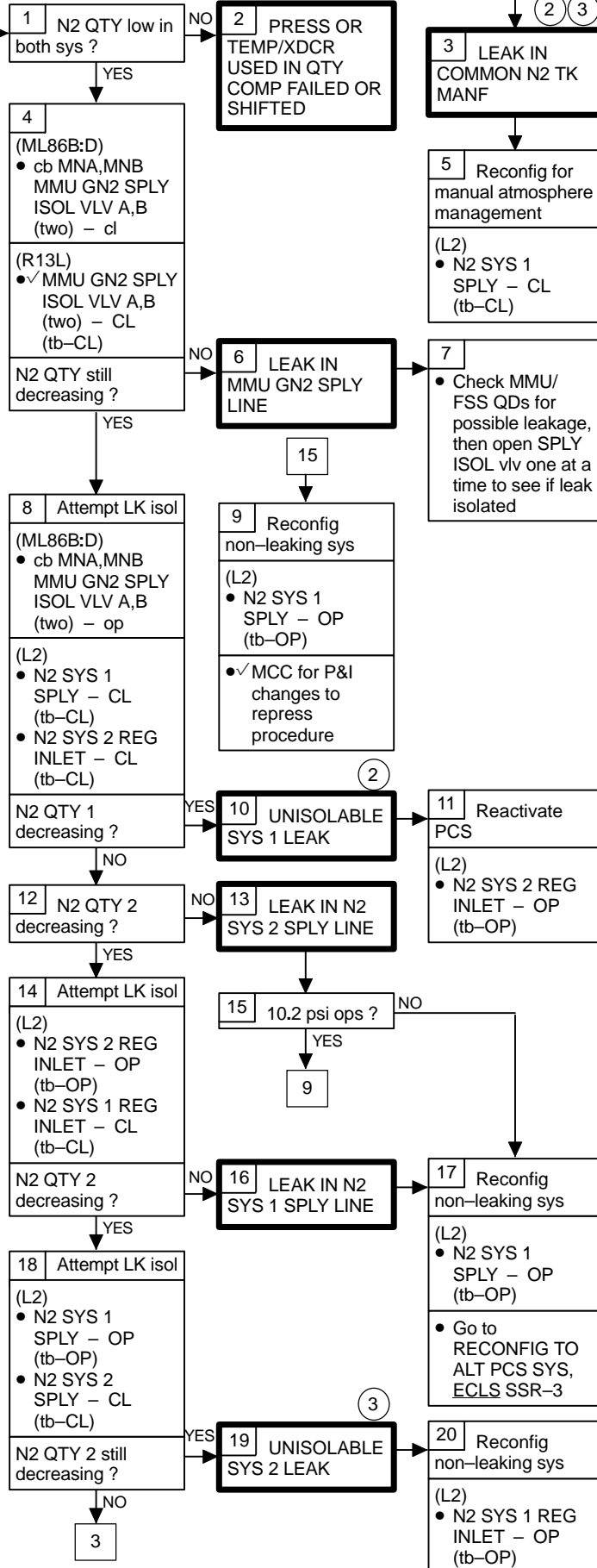
SM ALERT

S66 CAB N2 QTY 1(2)

(4)

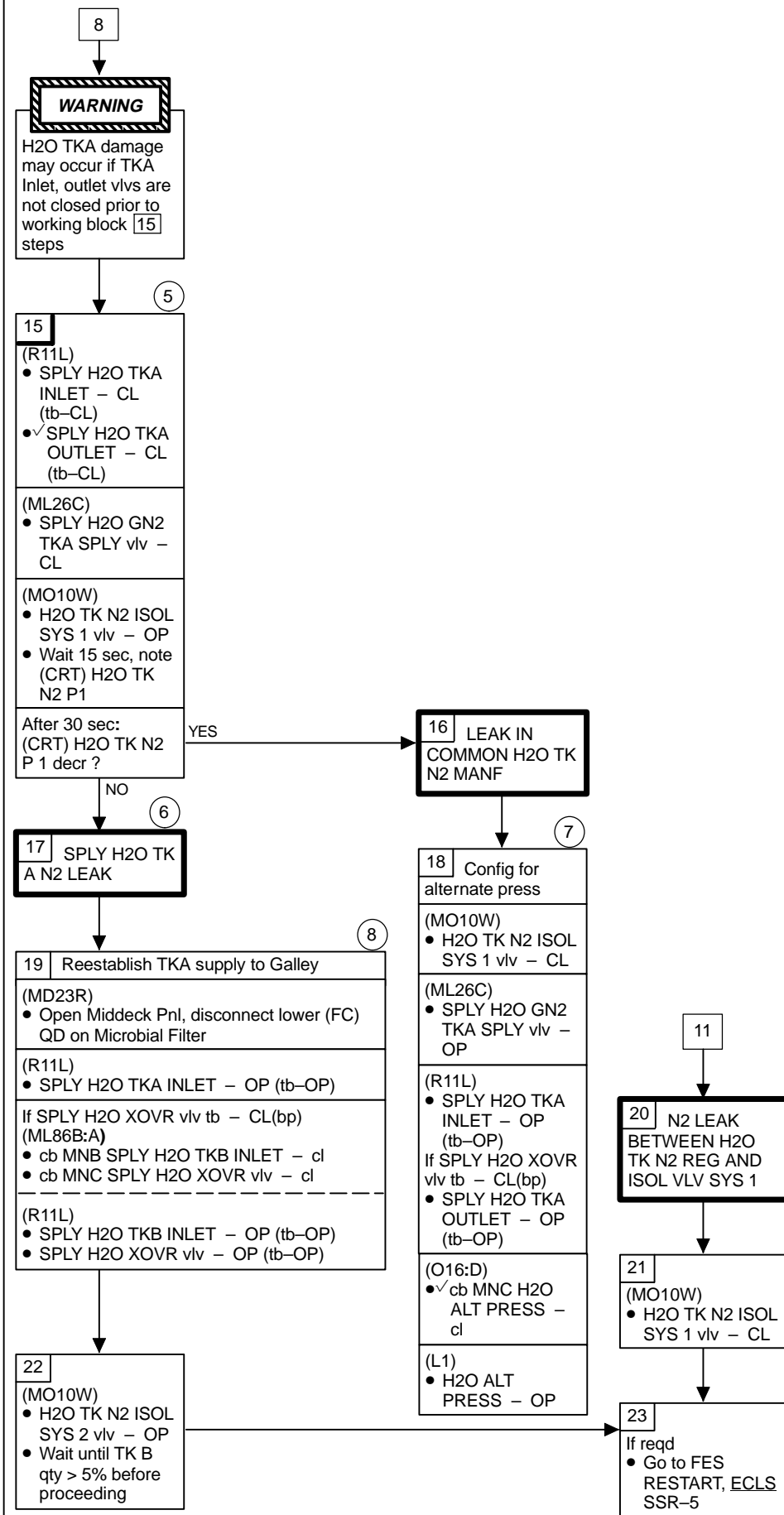
N2 QTY SYS 1(2)
 < 100 (two tk sys)
 < 150 (three tk sys)
 < 200 (four tk sys)

Nominal Config:
 (ORBIT)
 Refer to 6.2a



- ① ✓MCC to determine exact failure
- ② Flight length will depend on remaining quantity
- ③ ✓MCC. If cabin press decreases because of N2 TK isolation, cabin repress may be attempted. Isolate tks after each repress attempt
- ④ Up to four tks per sys are possible. I-load value is 100 but limit is TMBUd at OPS 2 depending on number of tks flown

ECLS 6.2i (Cont)



- ⑤ Repressurization of H2O tanks (except TK A) will cause H2O TK N2 P1 to decrease initially. If no leak in the common manifold is present, the H2O TK N2 P1 will increase until it stabilizes at 15.5 to 17.0 psig
- ⑥ SPLY H2O dumps may need to be scheduled more frequently depending upon FLASH EVAP usage
- ⑦ SPLY H2O pressure to the galley will be affected. This may cause Galley RHS to dispense less than dialed quantity and PHS H2O pressure may be insufficient for use. If SPLY H2O TKA is isolated, SPLY H2O to galley will only be available at FCP rate
- ⑧ Allows utilization of TKA H2O. Only TKs B,C,D will fill FCP H2O. To fill TKA, QD must be remated

ECLS

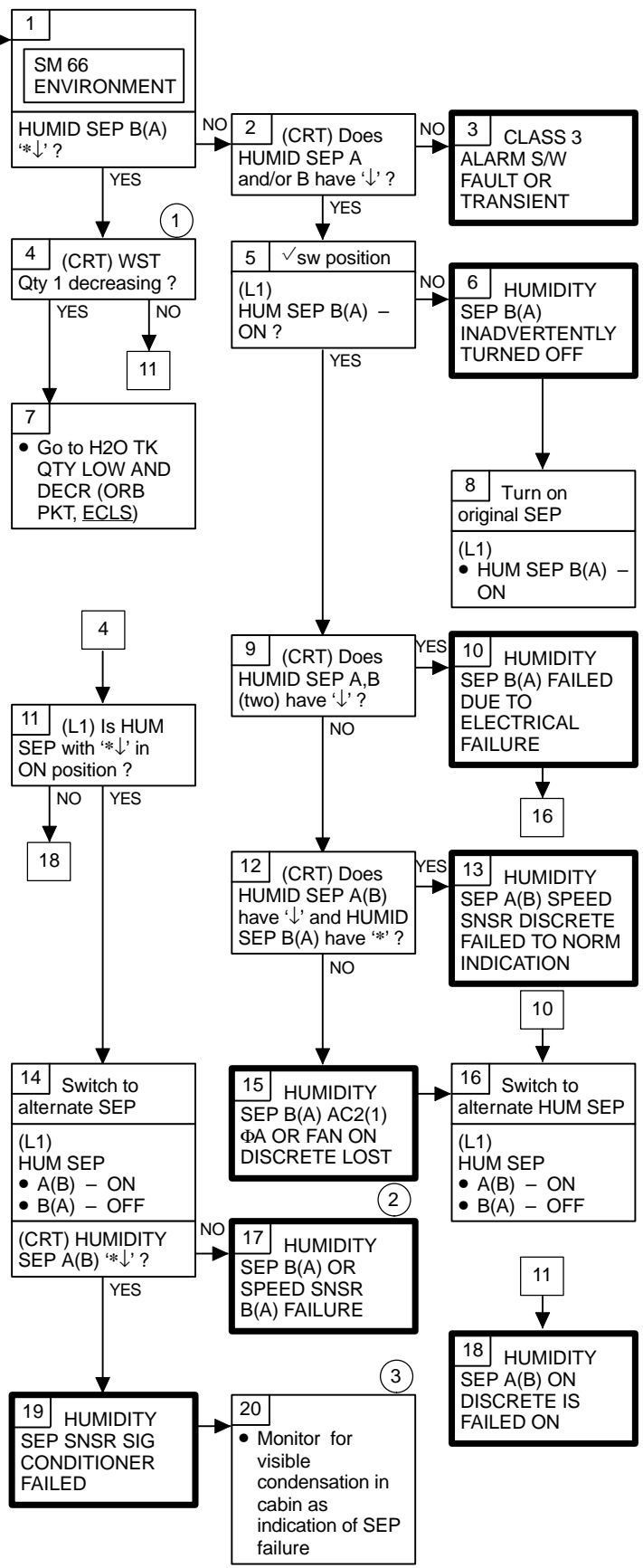
6.2j HUMID SEP ↓

SM ALERT

S66 HUMID SEP A(B)

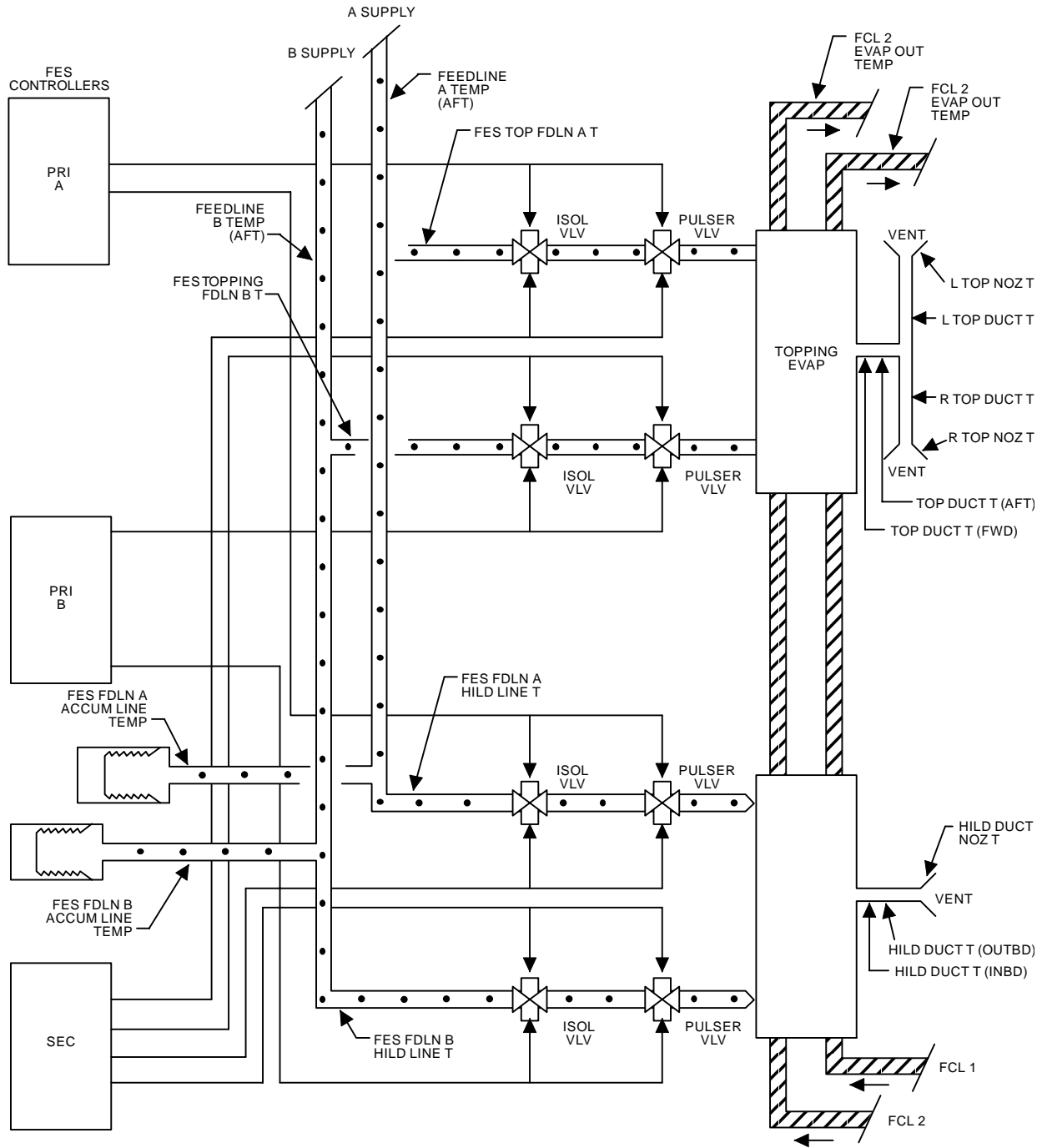
HUMIDITY SEP A(B) underspeed

Nominal Config:
(L4:J)
cb AC1 HUM SEP A (three) - cl
cb AC2 HUM SEP B (three) - cl
cb AC3 ΦA SIG CONDR HUM SEP - cl
(L1)
HUM SEP B(A) - ON



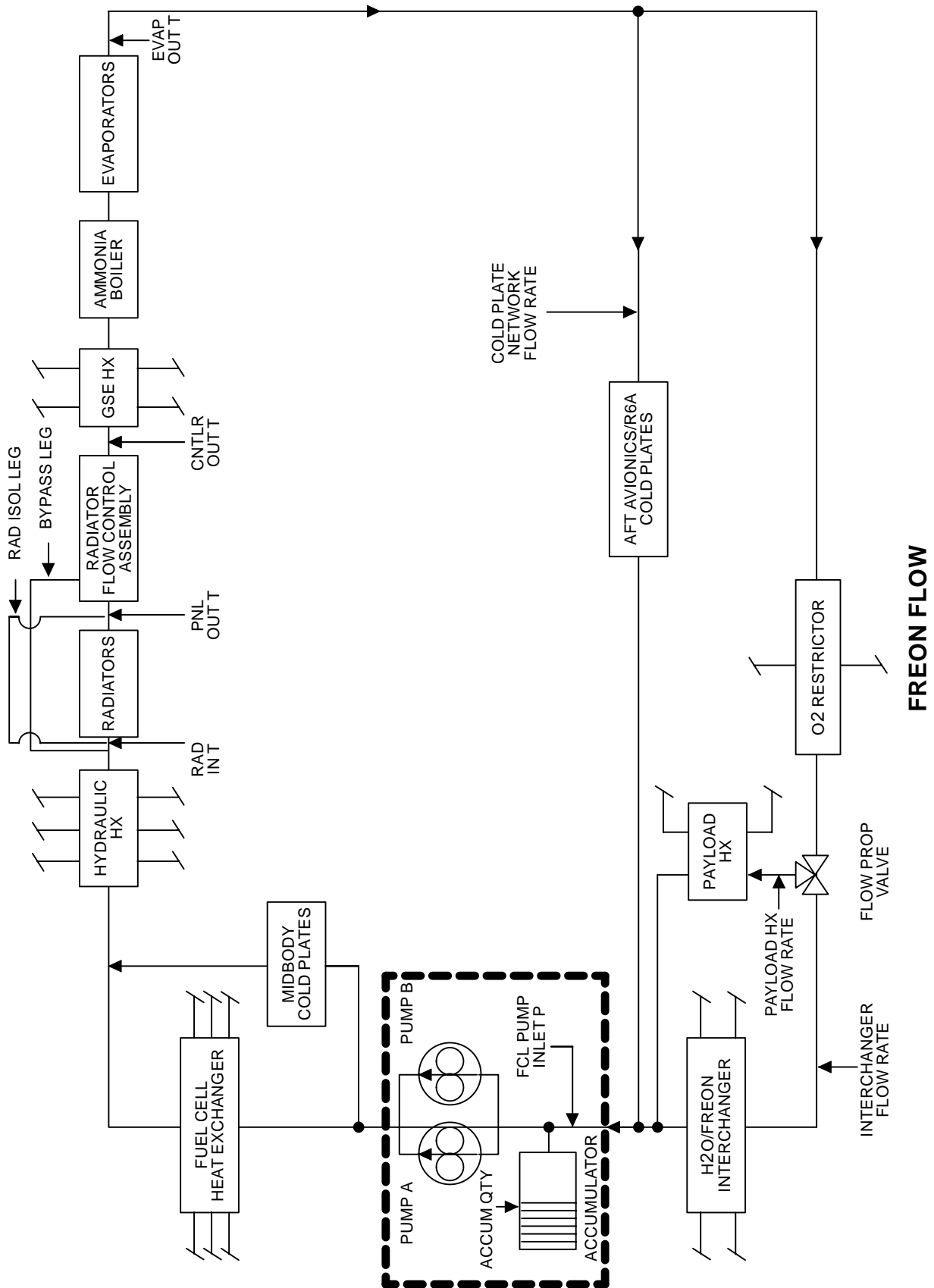
- ① Failed open ck vlvs downstream of each HUM SEP could allow WST TK to flood HUM SEP
- ② ✓MCC to determine exact failure
- ③ MCC has only indication of relative humidity

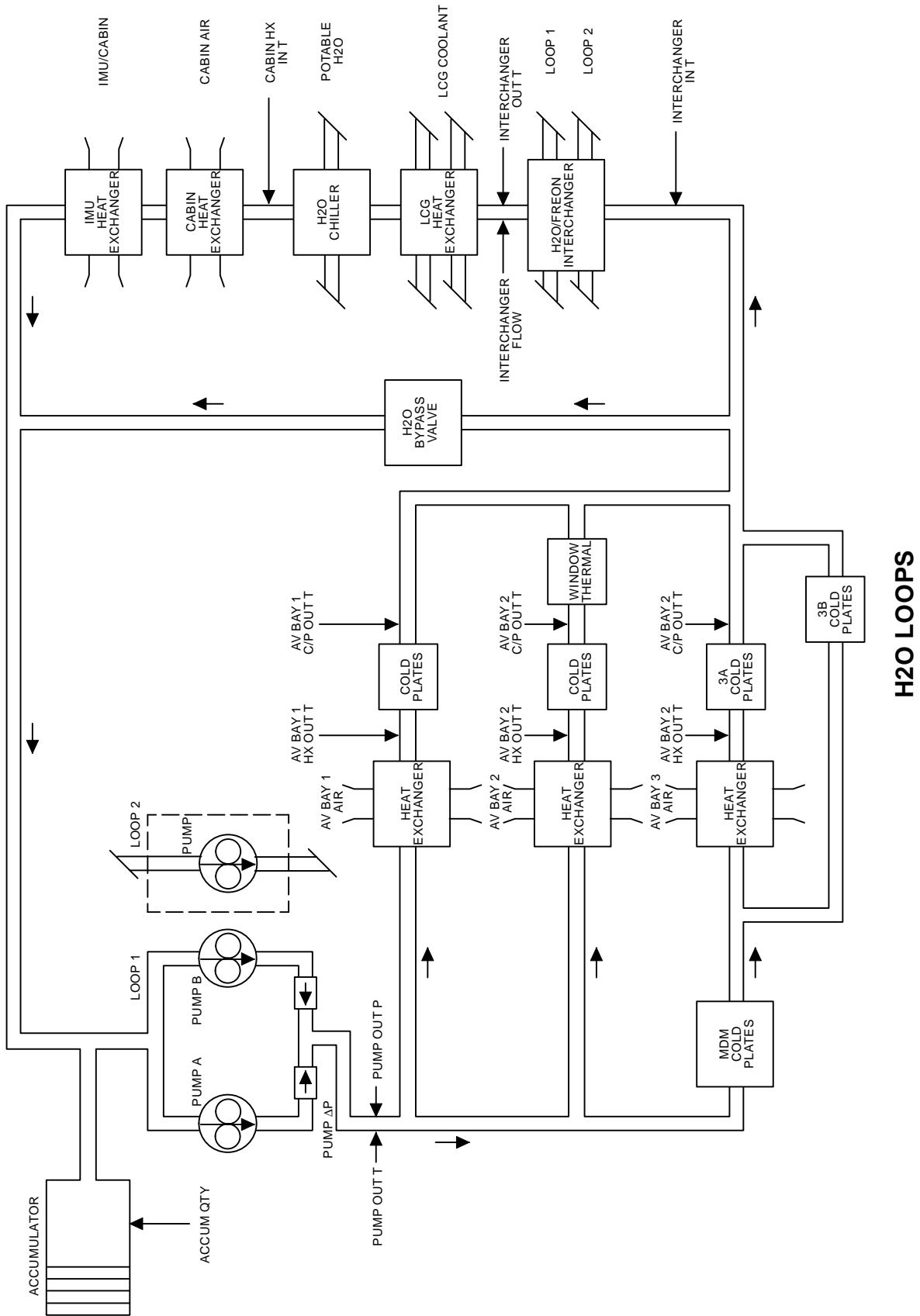
FREON/H2O LOOP



EVAPORATORS

FREON/H2O
LOOP
6.4





ECLS

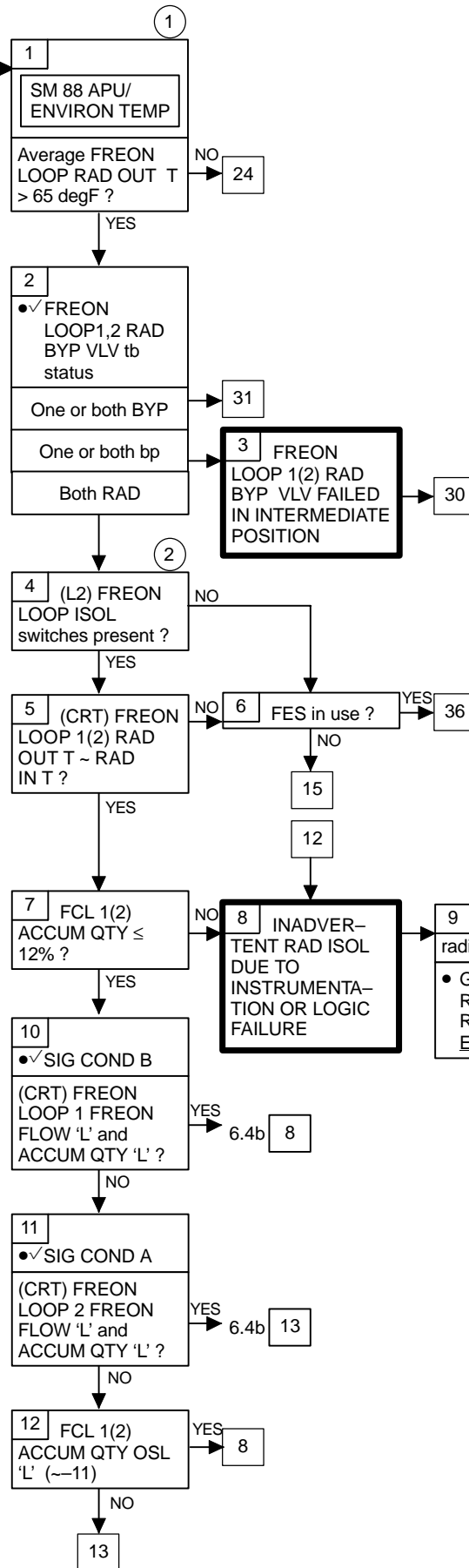
6.4a EVAP OUT T $\uparrow\downarrow$

From ORB PKT,
EVAP OUT T
HIGH

Nominal Config:

- (L4:M,N)
 cb AC1,2,3
 Φ A, Φ B, Φ C FREON
 LOOP 1,2 PUMP
 A,B (twelve) - cl
 cb AC2,3 Φ B FREON
 SIG CONDR
 (two) - cl
 cb AC2,3 Φ A FREON
 FLOW PROP 1,2
 (two) - cl
 (L4:P)
 cb AC1 Φ A RAD
 CNTLR 1B - cl
 cb AC1 Φ B RAD
 CNTLR 2B - cl
 cb AC2 Φ B RAD
 CNTLR 1A - cl
 cb AC3 Φ B RAD
 CNTLR 1A - cl
 (O14:D)
 cb MNA FREON
 RAD CNTL 1,2
 (two) - cl
 (O15:D)
 cb MNB FREON
 RAD CNTL 1,2
 (two) - cl
 (O17:C)
 SIG CONDR
 FREON A - AC2
 B - AC3
 (L1)
 FREON PUMP
 LOOP 1,2 (two) -
 B(A)
 RAD CNTLR
 OUT TEMP -
 NORM
 LOOP 1,2 (two) -
 AUTO A(B)
 BYP VLV
 MAN SEL 1,2
 (two) - ctr
 MODE 1,2 (two) -
 AUTO
 NH3 CNTLR A,B -
 OFF
 FLASH EVAP
 CNTLR
 PRI A(B) - ON
 B(A) - OFF
 SEC - A(B) SPLY
 OFF

(Cont in notes
column)



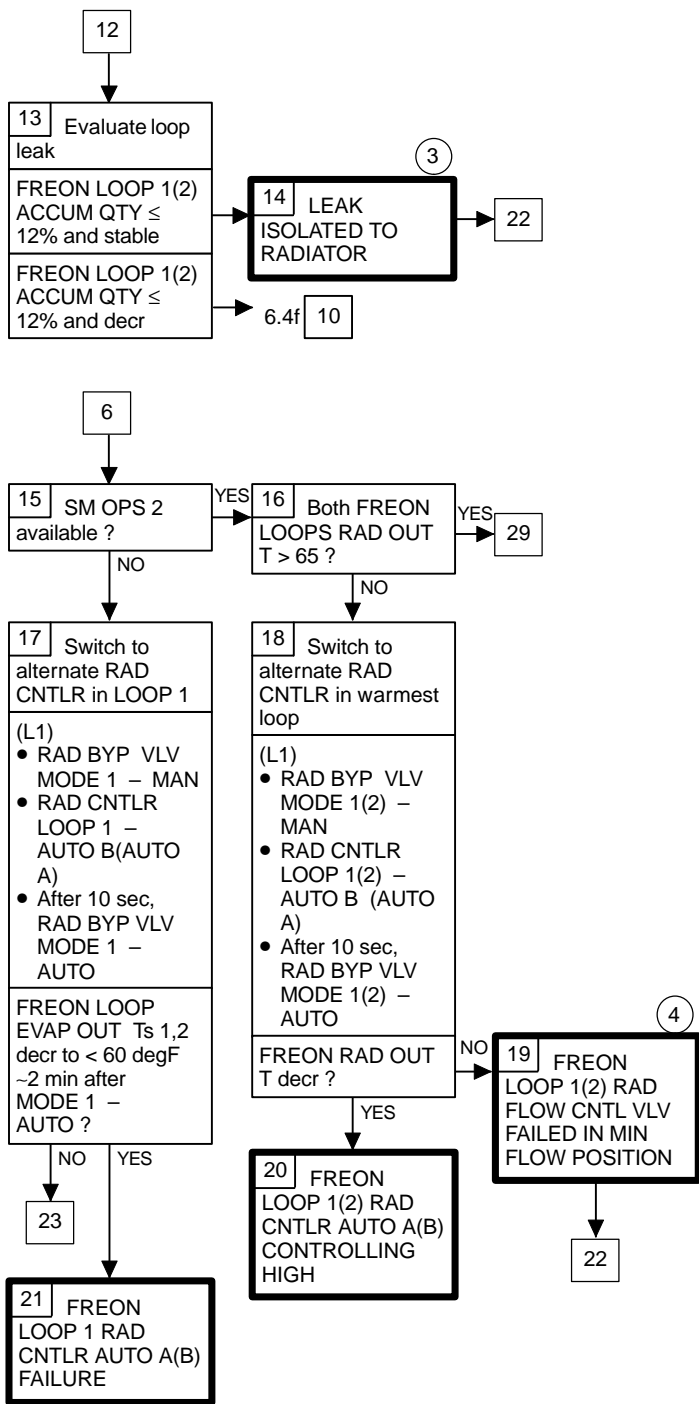
- ① If OPS 2 not available, use EVAP OUT T
- ② Rad isolation capability currently configured on all vehicles except OV103

Nominal Config:

- (Cont):
 (L1)
 HI LOAD
 EVAP - OFF
 DUCT HTR - OFF
 TOP EVAP HTR
 DUCT - A(B)
 NOZ L,R - A(B)
 AUTO
 FLOW PROP VLV
 LOOP 1,2 - ICH
 If payloads in use or crew comfort:
 FLOW PROP VLV
 LOOP 1,2 - PL
 (L2)
 FLASH EVAP FDLN
 HTR A,B SPLY - 1(2)

- If RAD not in use:
 (L1)
 HI LOAD EVAP - ENA
 HI LOAD EVA - DUCT HTR - A(B)
 If vehicle configured with radiator isolation capability
 (O14:C)
 cb MNA RAD ISOL CONTR - cl
 (L4:N)
 cb AC2 Φ C RAD ISOL A - cl
 cb AC3 Φ C RAD ISOL B - cl
 (L2)
 FREON ISOL MODE - AUTO
 LOOP 1 - ctr
 LOOP 2 - ctr

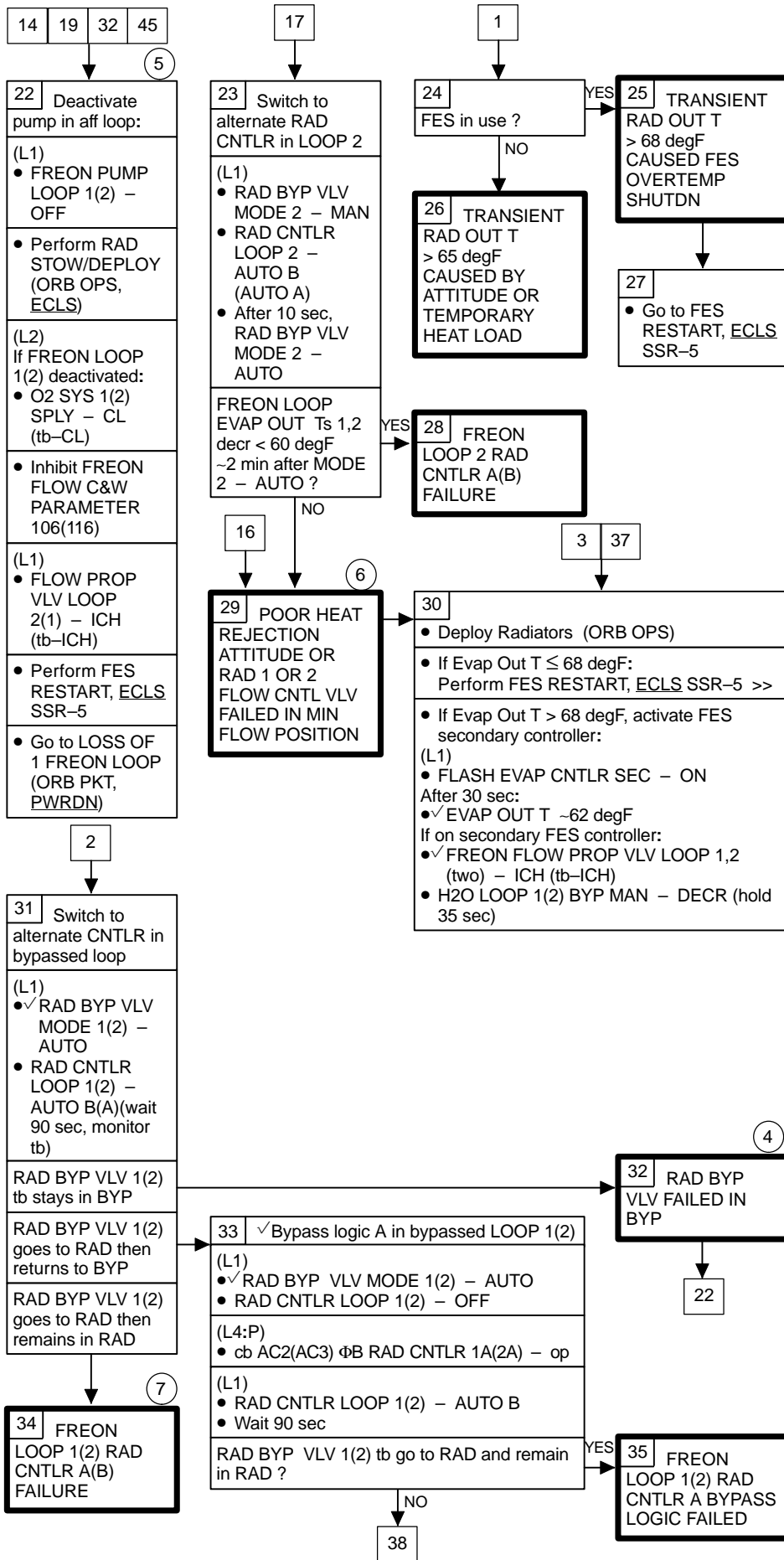
ECLS 6.4a (Cont)



③ Next PLS depending on H2O quantities for leak isolated to radiators. Loss of RAD cooling

④ Loss of RFCA – Next PLS depending on H2O quantities

ECLS 6.4a (Cont)



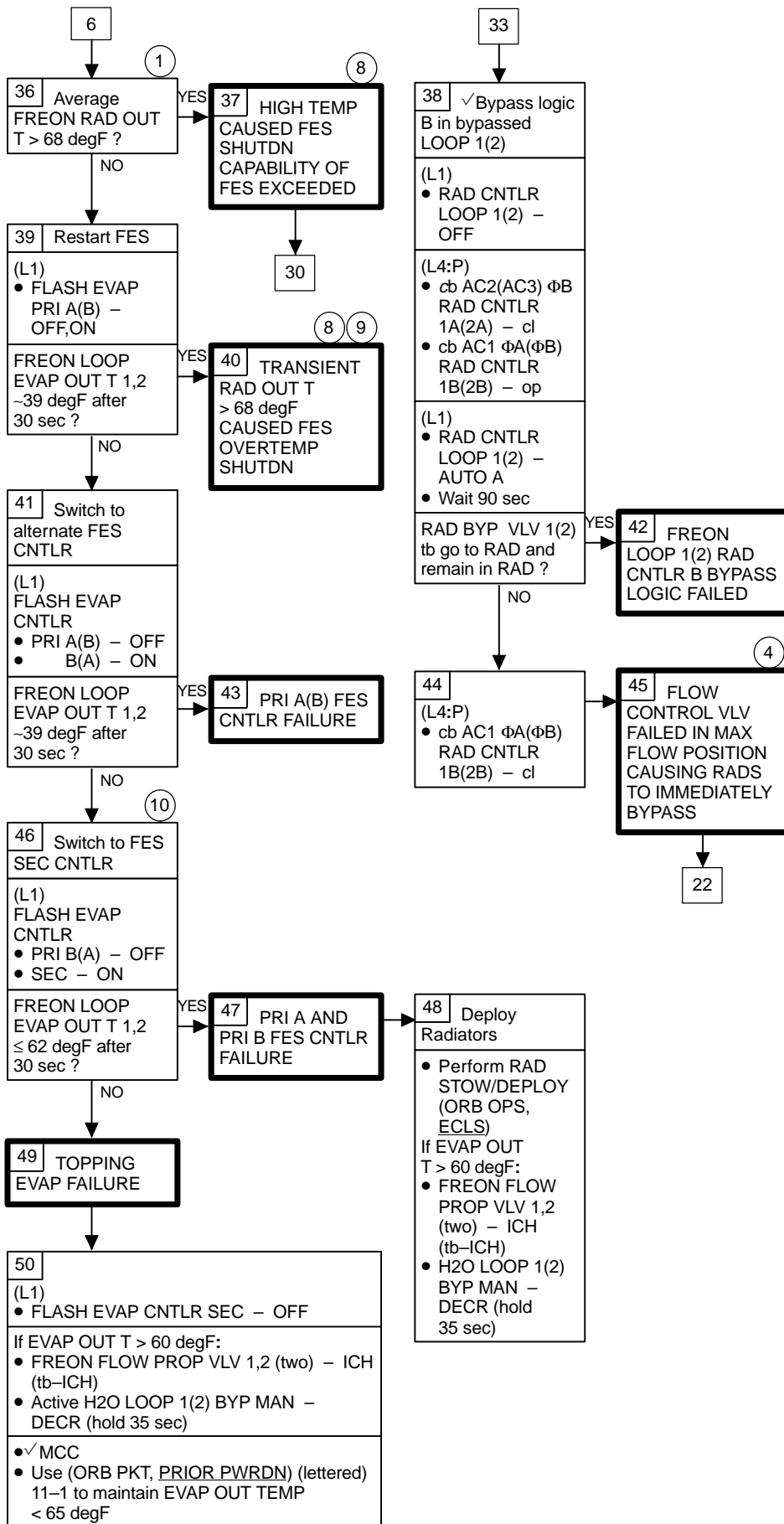
④ Loss of RFCA – Next PLS depending on H2O quantities

⑤ Loop will be reactivated for entry

⑥ ✓ MCC to determine failure

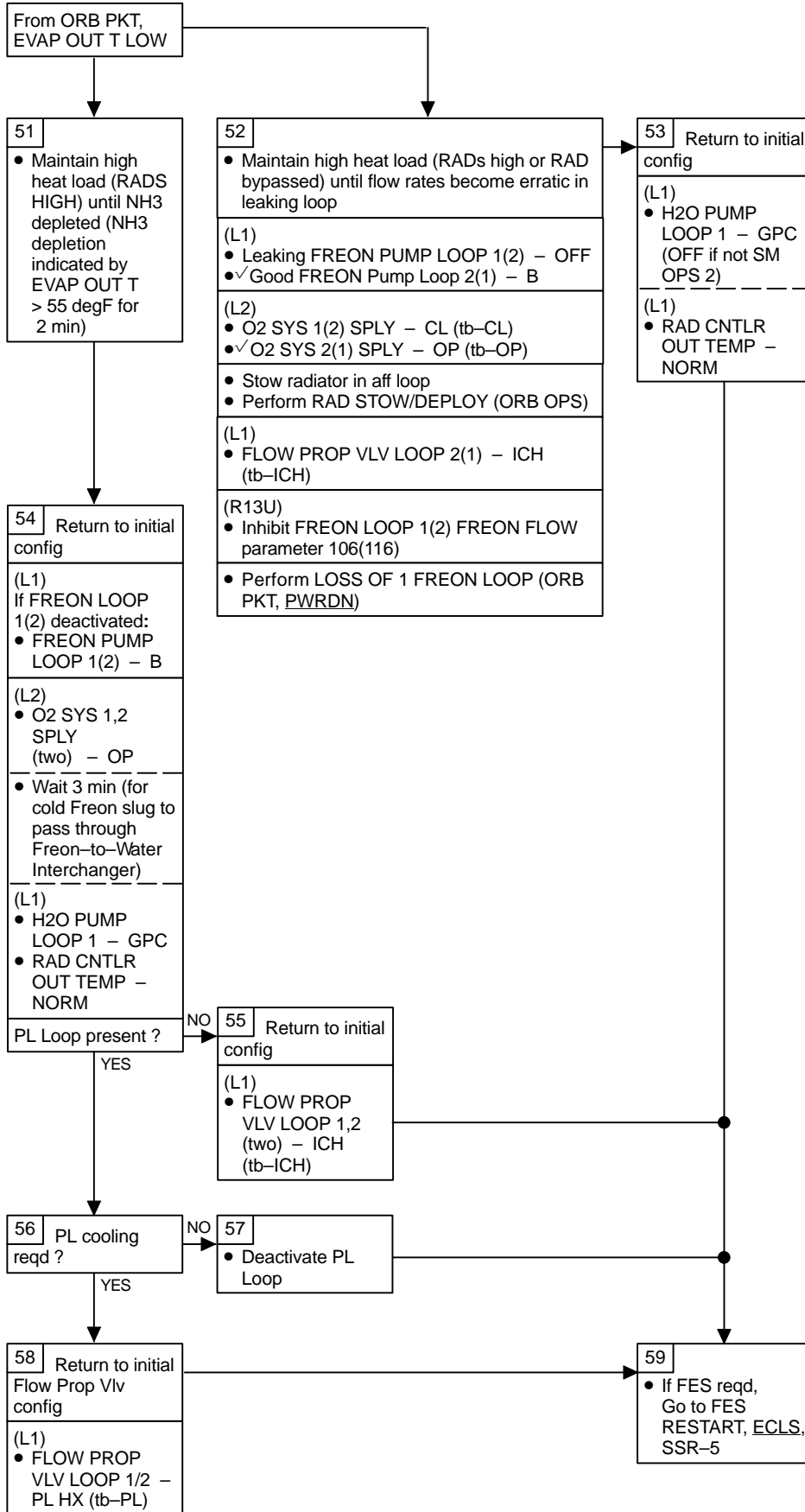
⑦ Continue to monitor RAD BYP VLV tb position. Depending upon failure mode, RAD BYP VLV may not return to BYP immediately. If RAD BYP VLV tb returns to BYP, go to block 33

ECLS 6.4a (Cont)



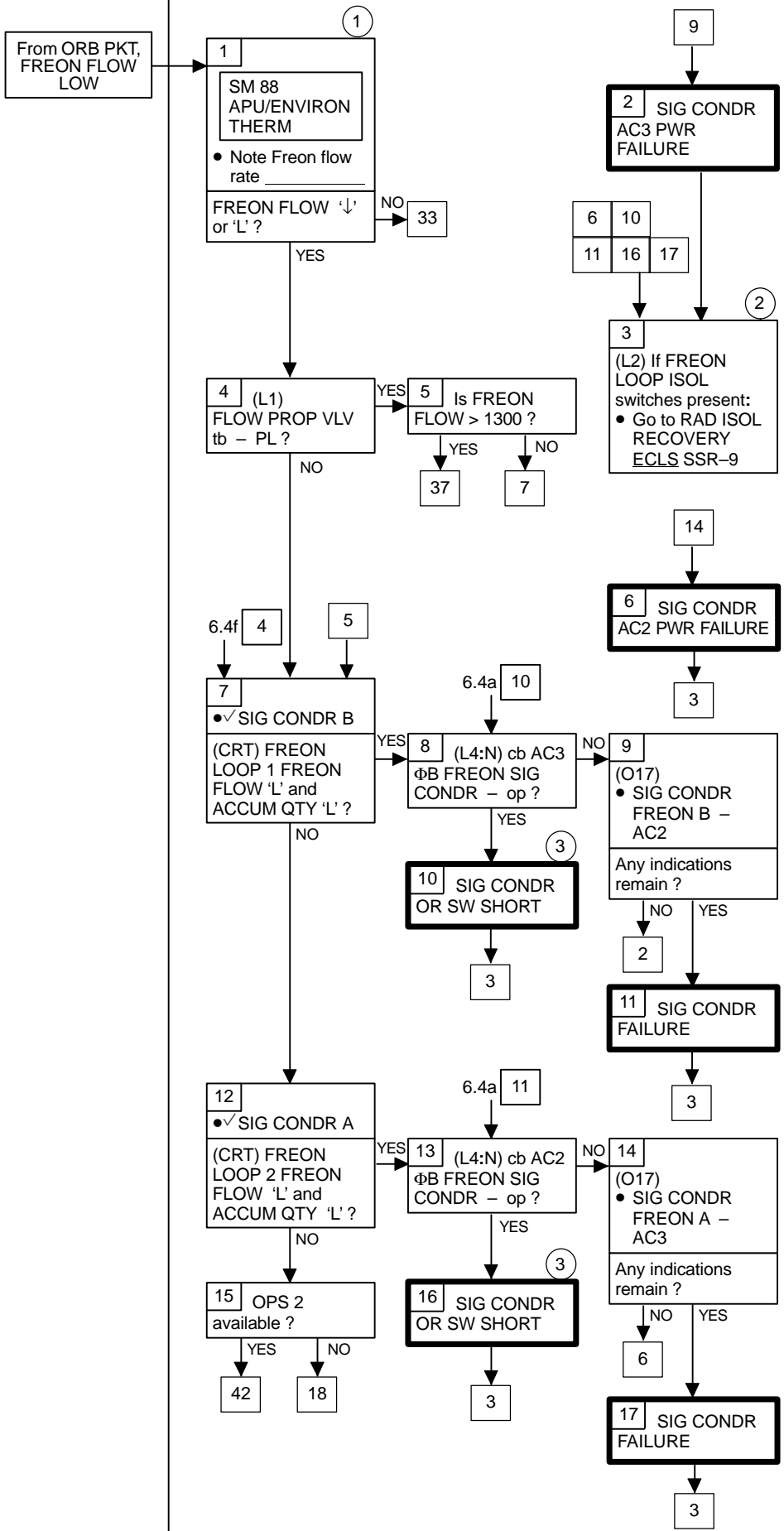
- ① If OPS 2 not available, use EVAP OUT T
- ④ Loss of RFCA – Next PLS depending on H2O quantities
- ⑧ If RAD OUT T > 65 degF not explainable by attitude, troubleshoot radiators. Go to block 18
- ⑨ Expect same transient on next daylight pass if same attitude
- ⑩ SEC CNTLR controls at 62 degF. If EVAP OUT T < 62 degF, SEC CNTLR operation cannot be verified. Further troubleshooting reqd to determine complete failure

ECLS 6.4a (Cont)



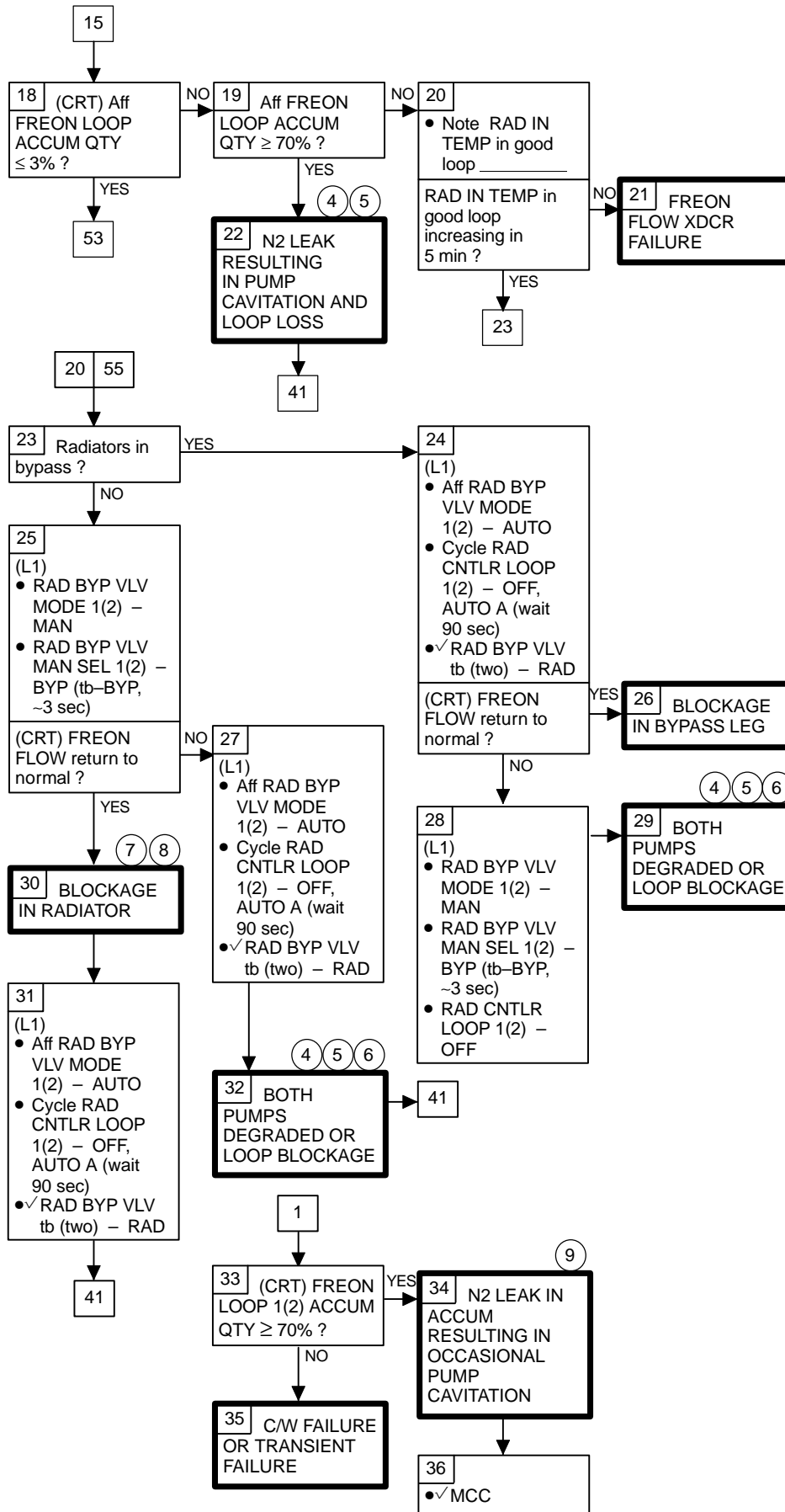
ECLS

6.4b FREON FLOW LOW



- ① FREON FLOW meter on pnl O1 may be used as alternate
- ② Rad isolation capability currently configured on all vehicles except OV103
- ③ Do not operate FREON SIG CONDR sw(s) on pnl O17 before √MCC

ECLS 6.4b (Cont)



- 4** Pwrn of some equipment may be reqd depending on heat load
- 5** Loss of Freon Loop next PLS entry
- 6** ✓ MCC to determine failure
- 7** With blockage in radiator, RADS may be manually bypassed to incr loop's flow in the event of loss of other FCL
- 8** If blockage in radiator deactivates Freon Loop, RADS may be manually bypassed and reactivated for entry
- 9** If cavitation occurs frequently, loop is lost

ECLS 6.4b (Cont)

5

37

- ✓ Correct Freon Flow 1(2) SM ALERT limit set selection by SM preconditioning

SM 60 SM TABLE MAINT

If LOOP 1:

- ITEM 1 +0 6 3 1 1 0 0 EXEC

If LOOP 2:

- ITEM 1 +0 6 3 1 3 0 0 EXEC

Limit set 1 (low: 1950; high: --)

Limit set 2 (low: 1300; high: --)

39 C/W FAILURE OR TRANSIENT FAILURE

38 SELECTED SM ALERT LIMIT SET IS NOT CONSISTENT WITH VALVE STATUS. SM ALERT IN LIMIT SET 1 WHEN FLOW PROP VLV IS IN PL

22	31
32	53
54	56

9 10

41 (CRT) If FREON FLOW < 750 lb/hr (OSL) or MCC call

Deactivate pump in aff loop: (L1)

- FREON PUMP LOOP 1(2) – OFF

Stow radiator in aff loop:

- Perform PORT(STBD) RAD OPS, MECH SSR-1

(L2)

- O2 SYS 1(2) SPLY – CL (tb-CL)

(L1)

- FLOW PROP VLV LOOP 2(1) – ICH (tb-ICH)

(R13U)

- Inhibit FREON LOOP 1(2) FREON FLOW parameter 106 (116)

- Go to LOSS OF 1 FREON LOOP (ORB PKT, PWRDN)

40

- Reset SM ALERT limits on aff loop

SM 60 SM TABLE MAINT

LOOP 1	LOOP 2
FREON FLOW	FREON FLOW
• ITEM 1 +0 6 3 1 1 0 0 EXEC	• ITEM 1 +0 6 3 1 3 0 0 EXEC
• ITEM 2 +1 3 0 0 EXEC	• ITEM 2 +1 3 0 0 EXEC
PL HX FLOW	PL HX FLOW
• ITEM 1 +0 6 3 1 1 0 3 EXEC	• ITEM 1 +0 6 3 1 3 0 3 EXEC
• ITEM 2 +5 0 0 EXEC	• ITEM 2 +5 0 0 EXEC

11

- 9 If cavitation occurs frequently, loop is lost
- 10 FCL1 – PORT
FCL2 – STBD
- 11 Crew may opt to have MCC manage software limits via TMBU

ECLS

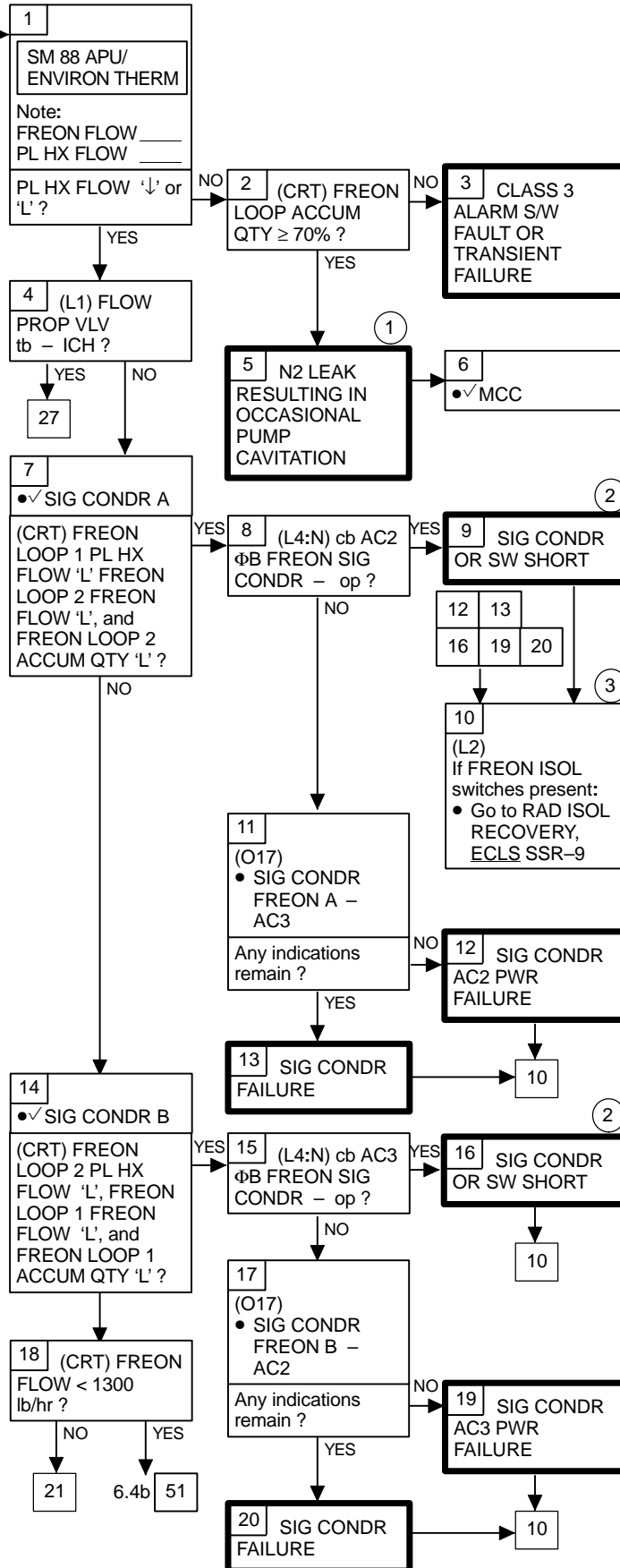
**6.4d FRN FLOW PROP VLV
PL HX FLOW ↓**

SM
ALERT

S88 FRN PL HX
1(2)

If:
(L1)
FLOW PROP VLV
LOOP 1(2) - PL
HX
PL HX FLOW
< 500 lb/hr

With FLOW PROP
VLV - ICH
PL HX FLOW is
TMBU - OSL

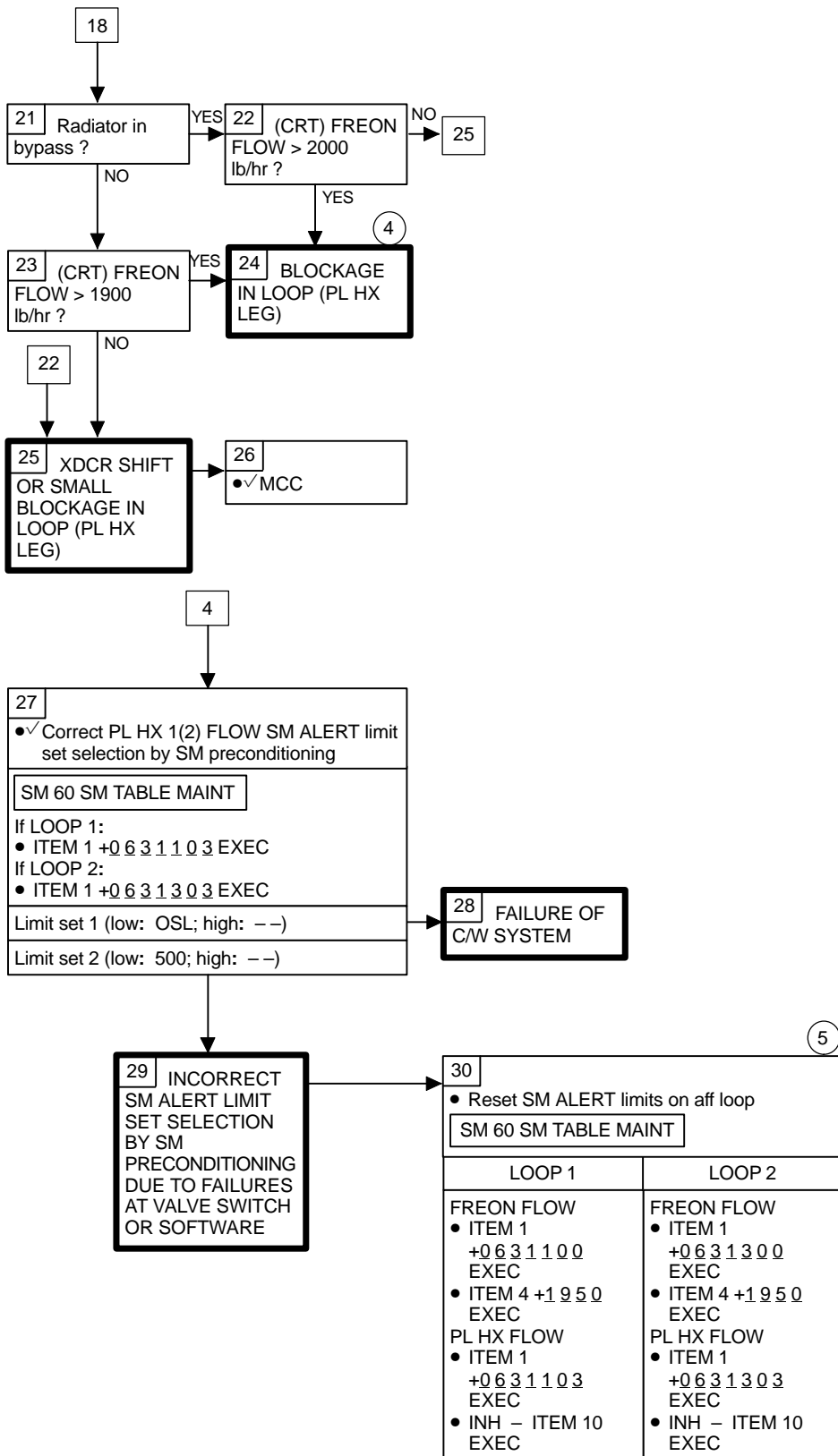


① N2 leak across FCL accum bellows can cause cavitations of pump. Frequent cavitation = loop loss

② ✓MCC. With Sig Condr or sw short, do not operate FREON SIG CONDR sw(s) on pnl O17

③ Rad isolation capability currently configured on all vehicles except OV103

ECLS 6.4d (Cont)



- ④ Pwrn of some equipment may be reqd depending on heat load and amount of blockage
- ⑤ Crew may opt to have MCC manage software limits via TMBU

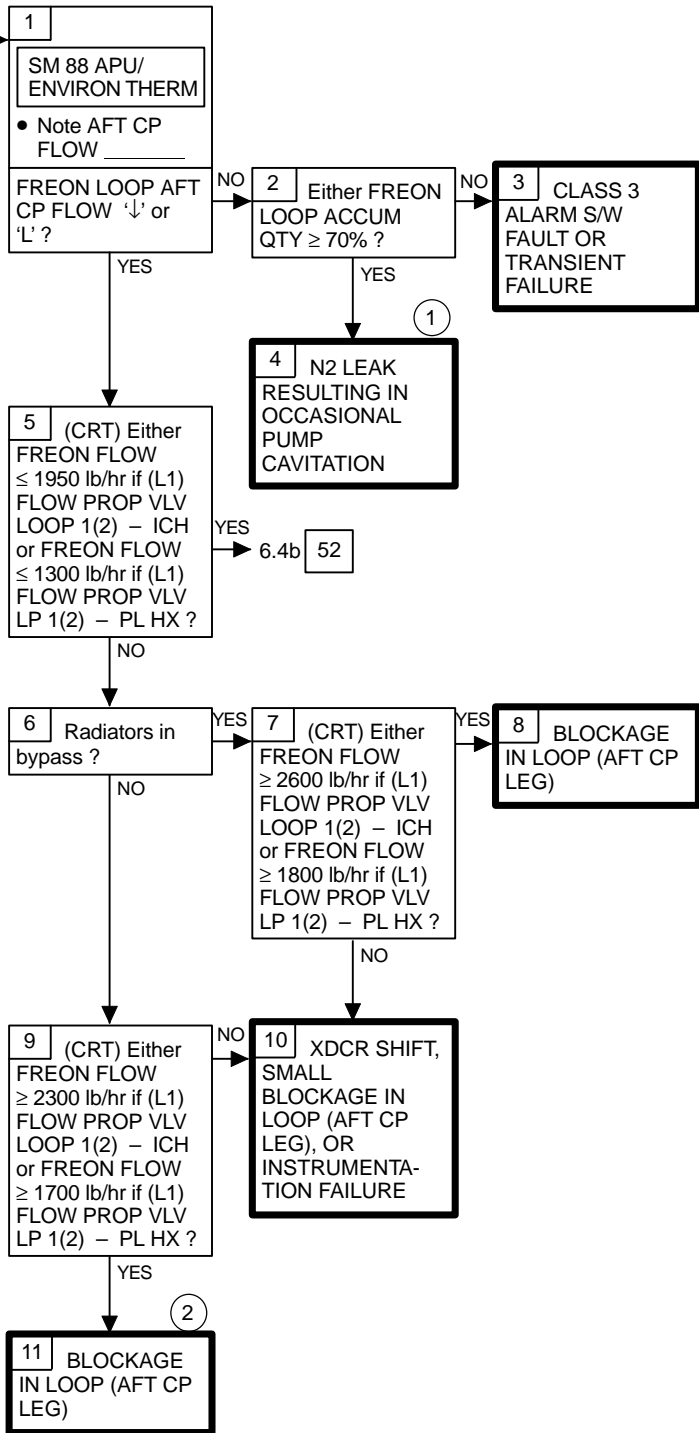
ECLS

6.4e AFT COLDPLATE FLOW ↓

SM ALERT

S88 FRN AFT CP 1(2)

AFT CP FLOW < 200 lb/hr

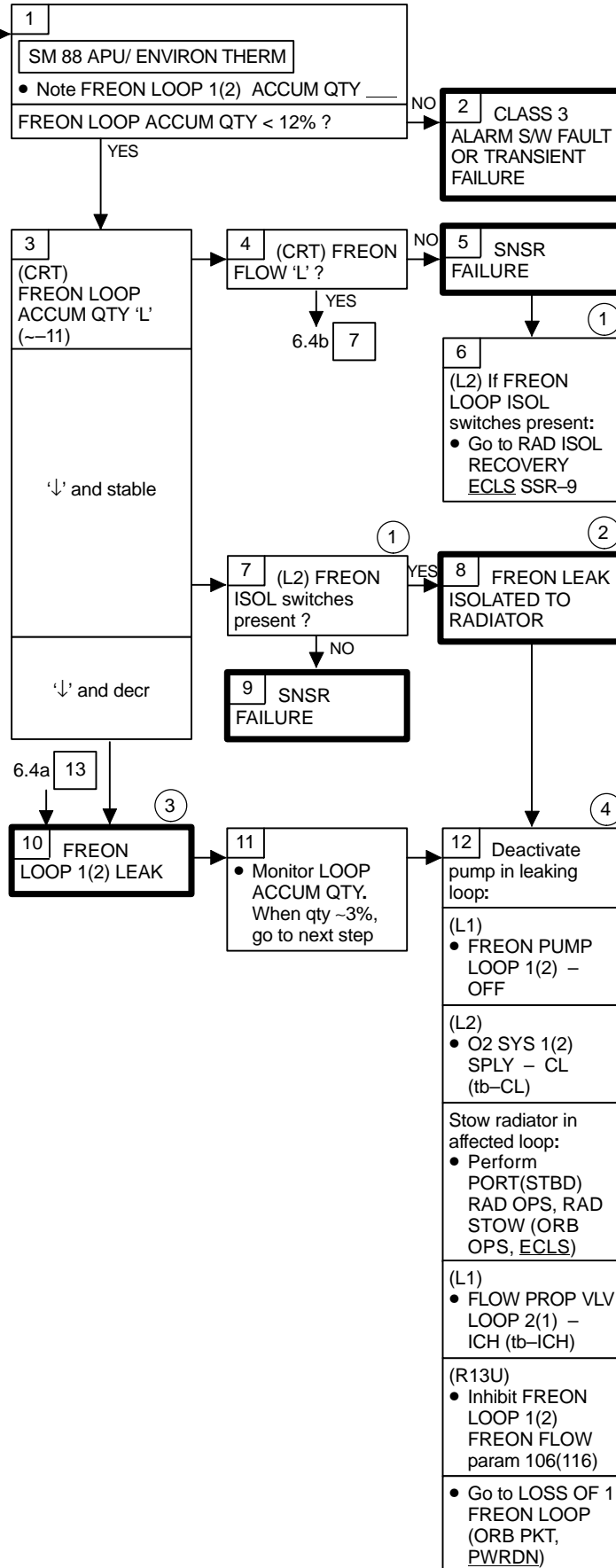


- ① N2 leak across FCL ACCUM bellows. Frequent cavitation = loop lost
- ② Loss of FCL definition next PLS entry

ECLS

6.4f ACCUM QTY ↓

SM ALERT
S88 FREON QTY 1(2)
BFS
SM 0 THRM FRN
ACCUM QTY < 12%



- ① Rad isolation capability currently configured on all vehicles except OV103
- ② Next PLS depending on H2O quantities for leak isolated to Radiators. Loss of RAD cooling
- ③ Loss of one FREON LOOP = next PLS entry
- ④ FCL1 = PORT FCL2 = STBD

ECLS

6.4g EVAP TEMP HI LOAD INBD (OUTBD) DUCT(NOZ) ↑↓

SM ALERT

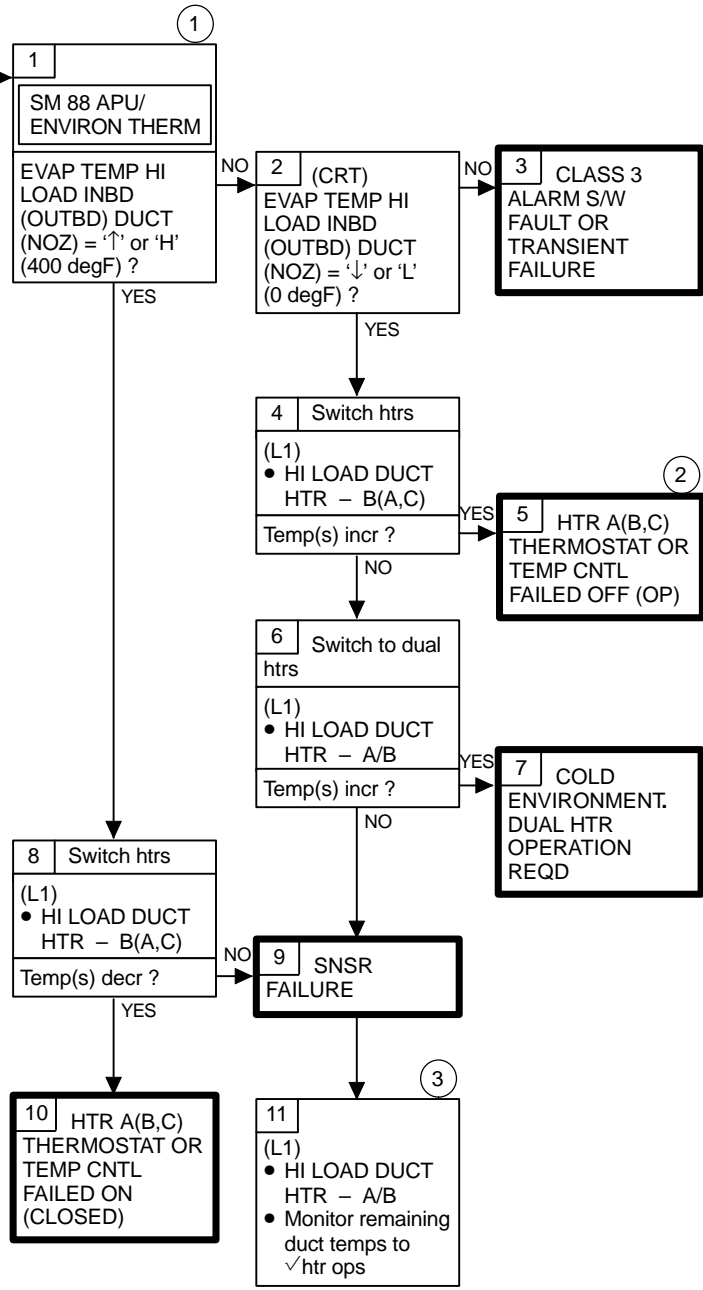
S88 EVAP HI LD TEMP

BFS

SM 0 THRM EVAP

If: HI LOAD

	degF
INBD	> 375
INBD	< 150
OUTBD	> 330
OUTBD	< 150
NOZ	> 350
NOZ	< 100



- ① Upon initial activation of heaters, FDA limits are not enabled until following time has elapsed:
INBD T 25 min
OUTBD T 16 min
NOZ T 40 min
- ② If noz htr failed, HI LOAD EVAP still operational. If inbd/outbd duct htr failed, HI LOAD EVAP lost
- ③ Loss of insight requires dual htr ops when htrs are activated

ECLS

**6.4h EVAP TOPPING DUCT T
FWD(AFT), L(R) ↑↓**

SM ALERT

S88 EVAP TOP TEMP

BFS

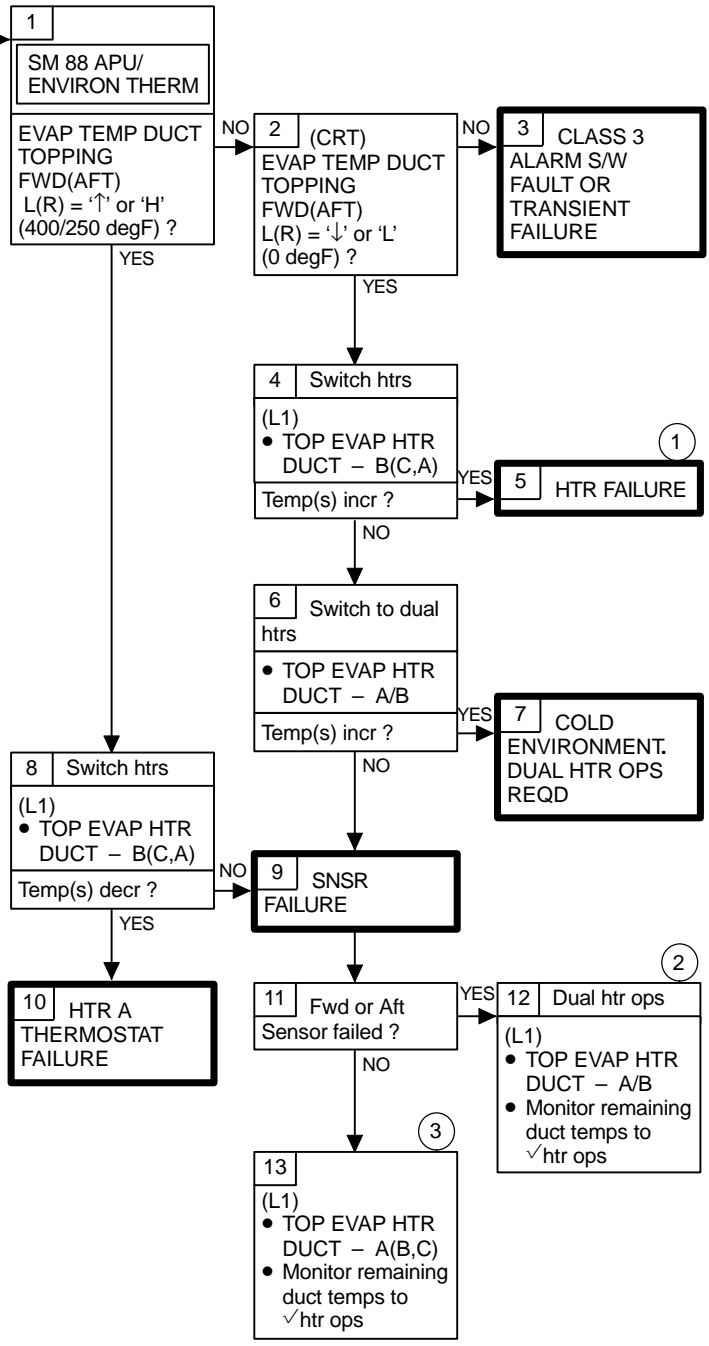
SM 0 THRM EVAP

If: S88/BFS SM 0

	degF
FWD	> 330
FWD	< 100
AFT	> 330
AFT	< 100

S88 ONLY

	degF
L	> 245
L	< 50
R	> 245
R	< 50

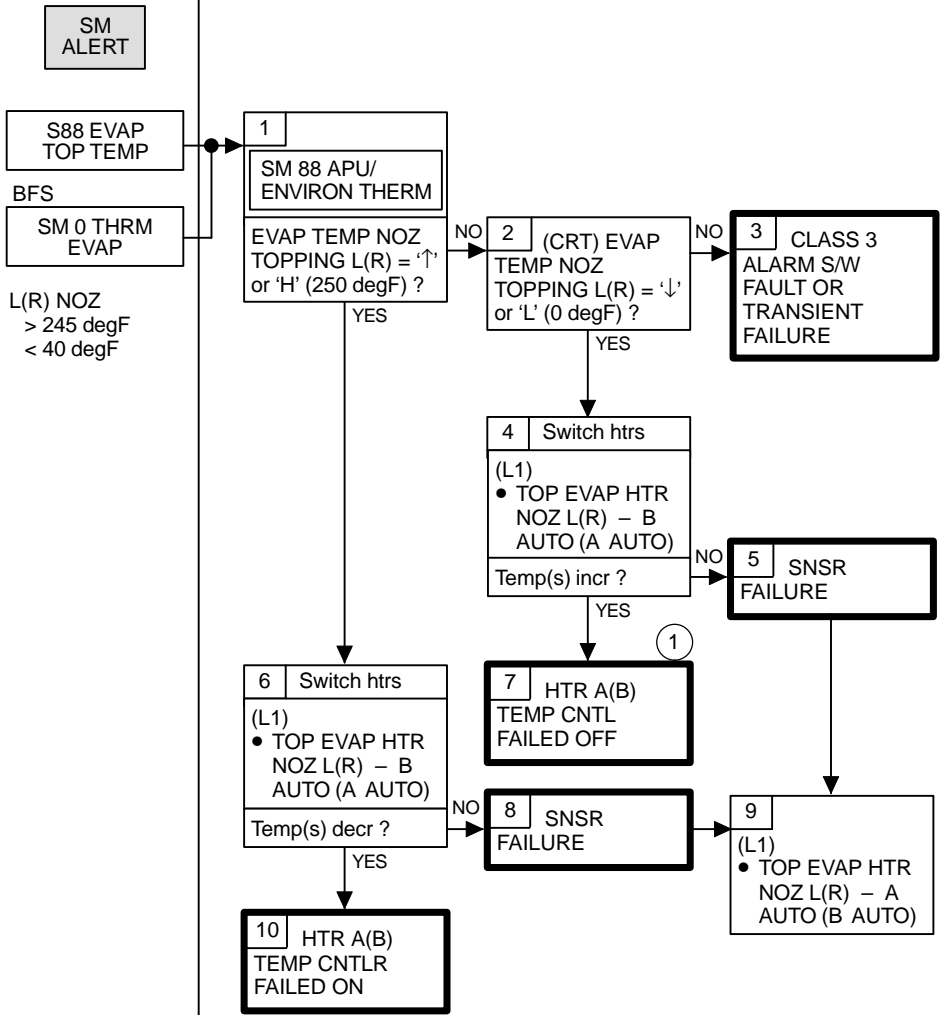


- ① Topping FES still operational if left, right htrs failed. Loss of fwd or aft htr could result in duct freezing and eventual loss of topping FES
- ② If instr loss is on either fwd or aft duct, then dual htr ops is reqd as these htrs are considered mandatory
- ③ If instr loss is on either left or right duct, then only single htr ops is reqd

ECLS

6.4i EVAP TOPPING L(R) NOZ ↑↓

① Topping FES still operational with Noz Htr failed off as long as fwd and aft duct htrs are operational



ECLS

6.4j EVAP FDLN TEMP FWD (MID,AFT, TOP, HI LOAD, ACCUM) ↑↓

SM ALERT

S88 EVAP FDLN T A(B)

BFS

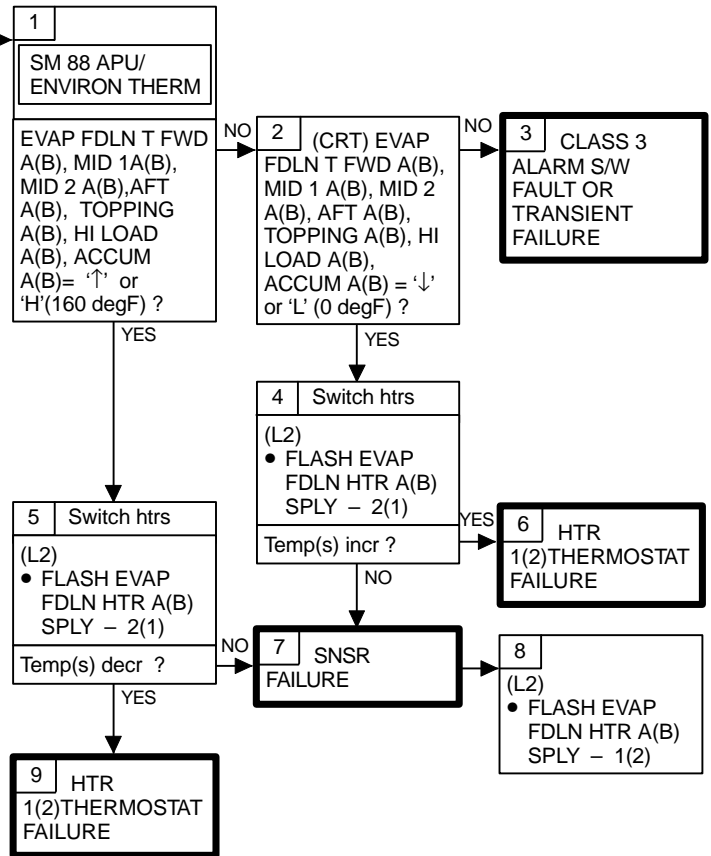
SM 0 THRM EVAP

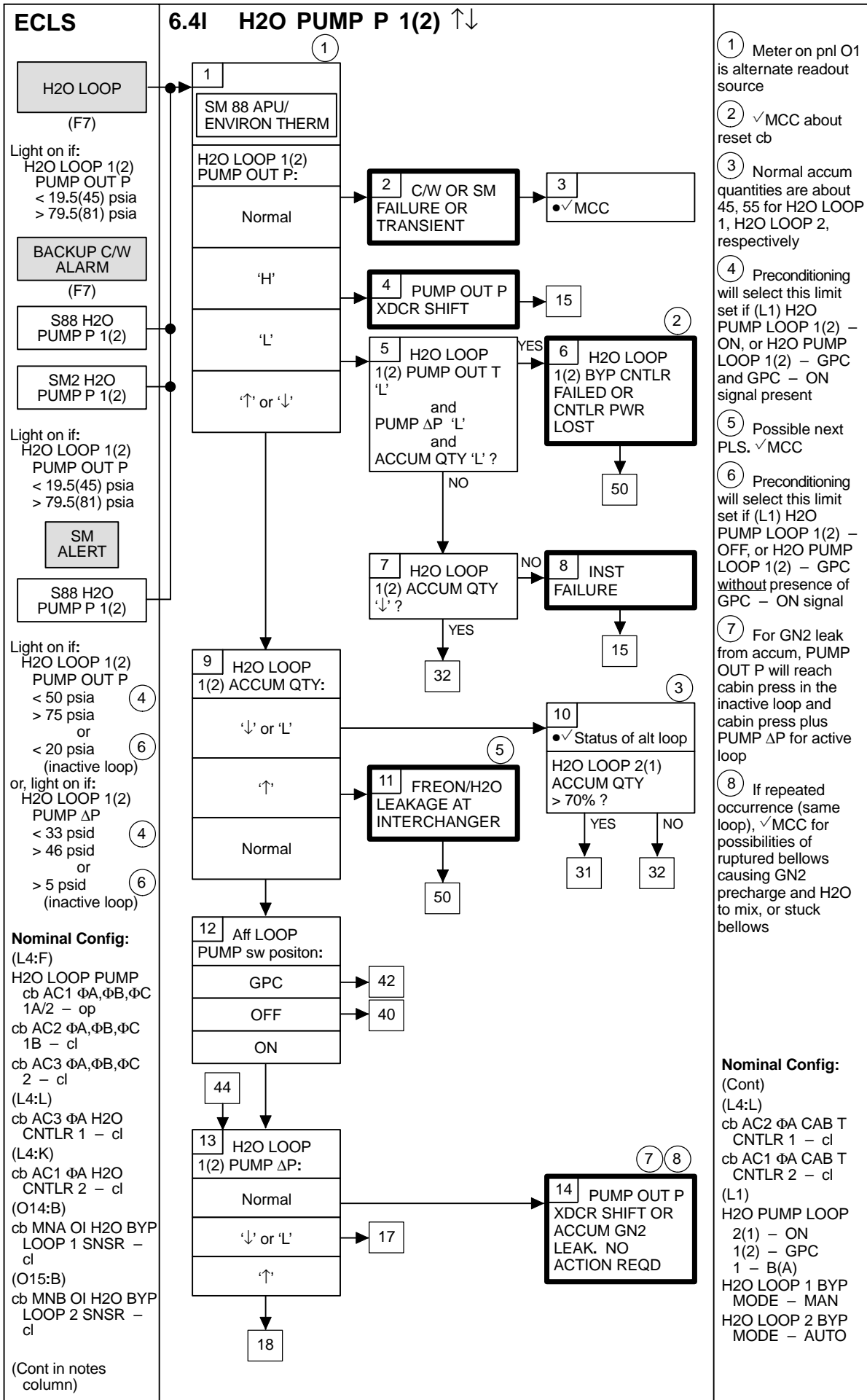
If: S88/BFS SM 0

	degF
FWD A(B)	> 140
FWD A(B)	< 50
MID 1 A(B)	> 140
MID 1 A(B)	< 50
MID 2 A(B)	> 140
MID 2 A(B)	< 50
AFT A(B)	> 140
AFT A(B)	< 50

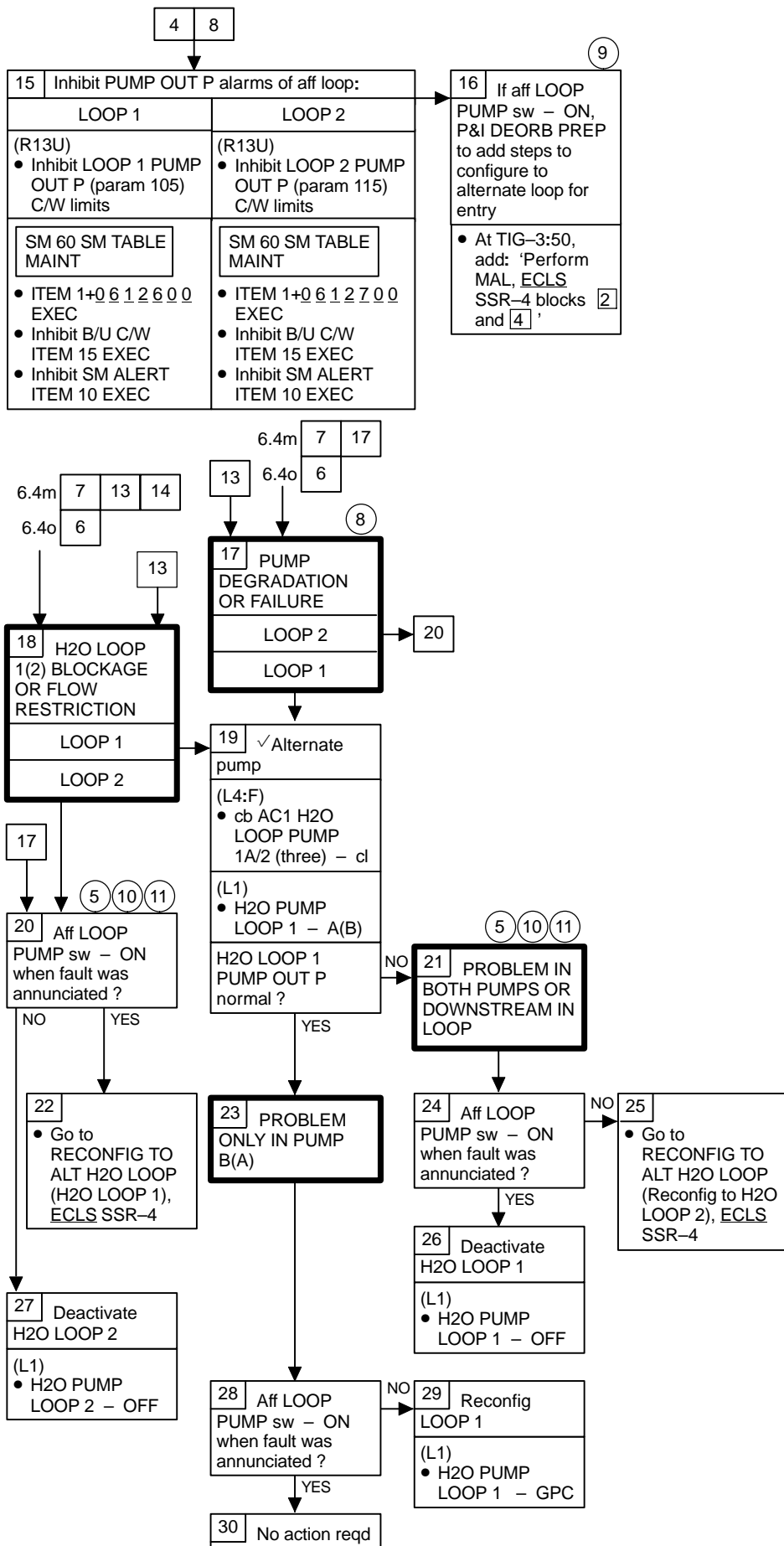
S88 only

	degF
TOPPING A(B)	> 140
TOPPING A(B)	< 50
HI LOAD A(B)	OSH
HI LOAD A(B)	< 50
ACCUM A(B)	> 140
ACCUM A(B)	< 50



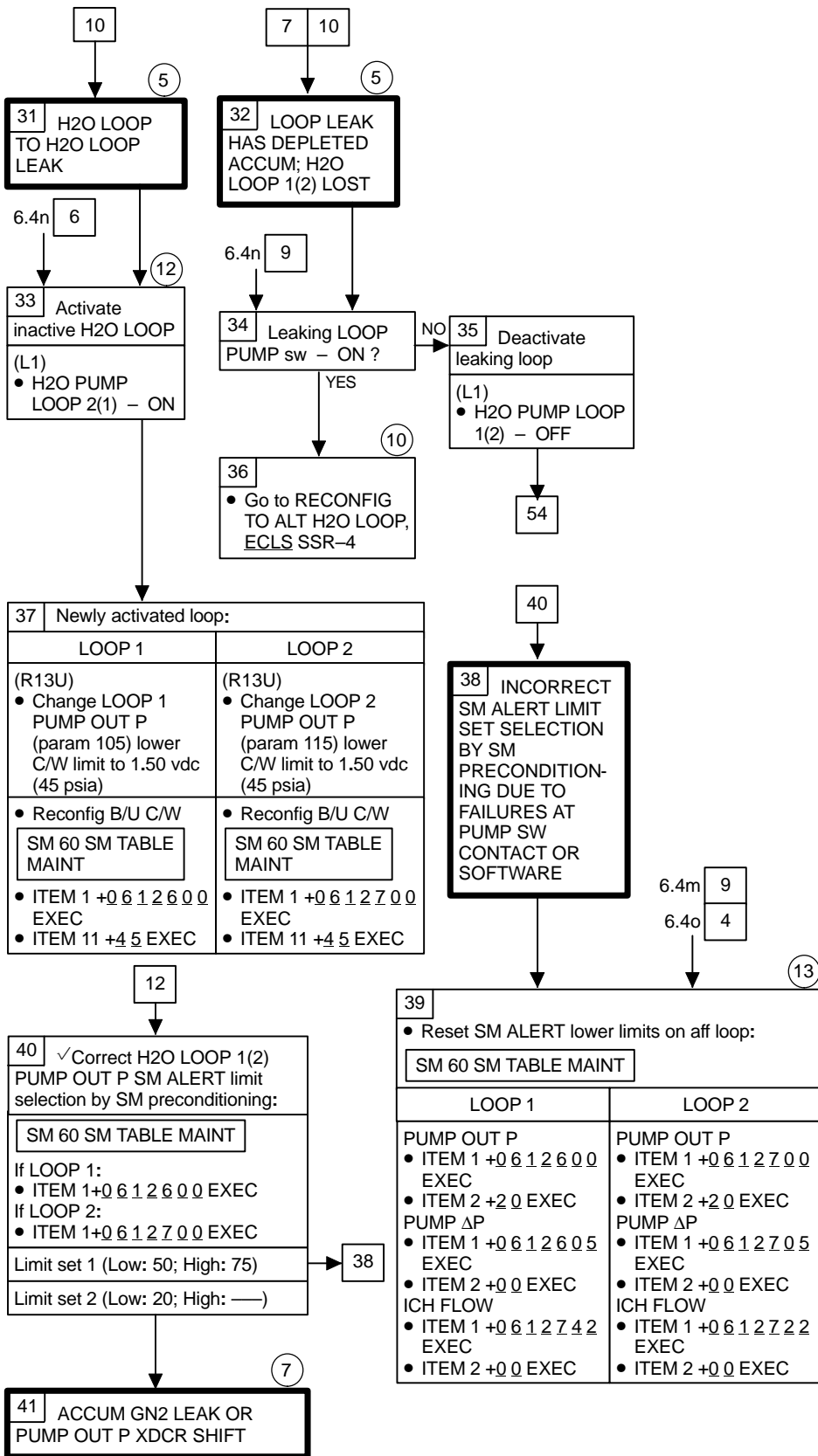


ECLS 6.4I (Cont)



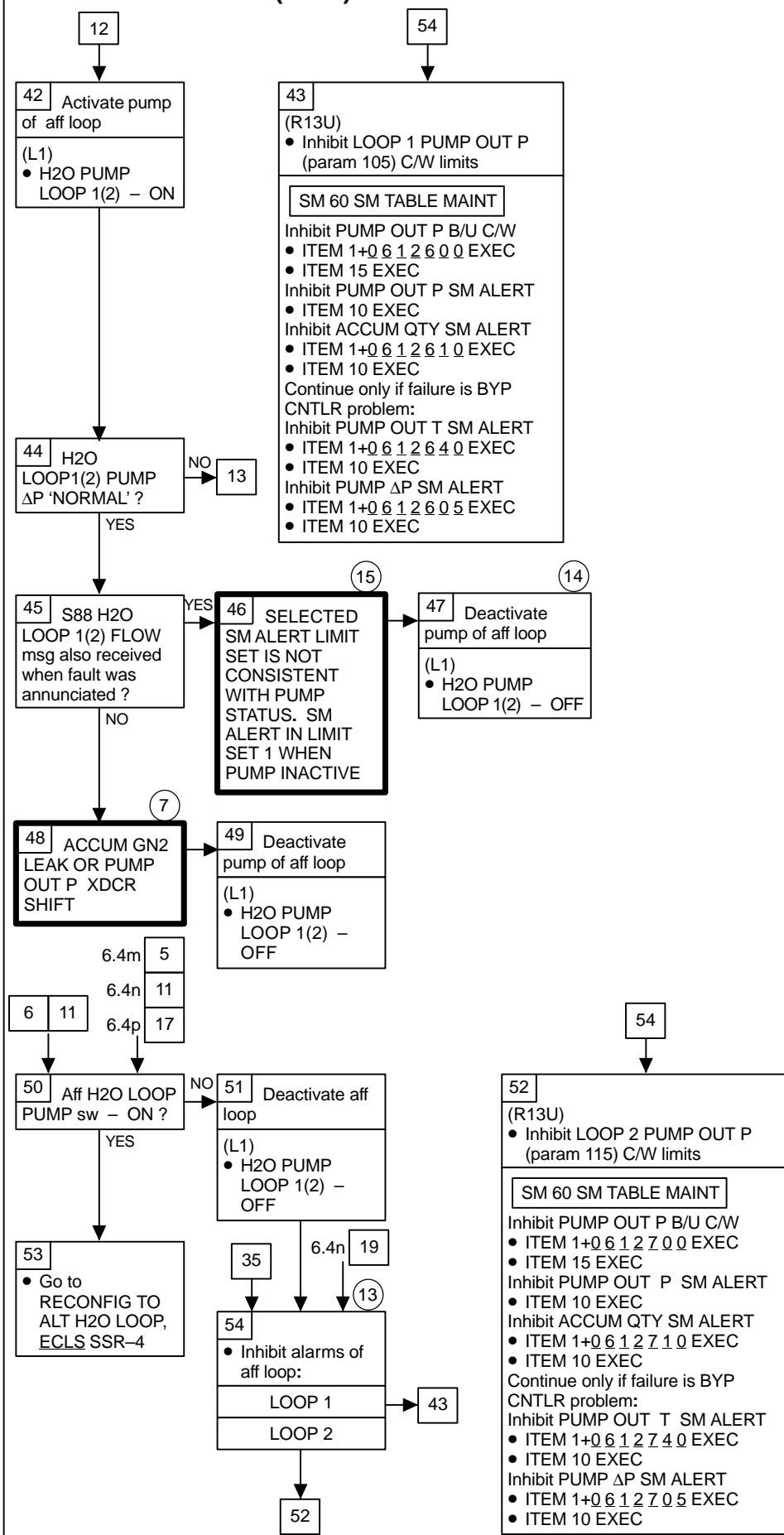
- ⑤ Possible next PLS. ✓ MCC
- ⑧ If repeated occurrence (same loop), ✓ MCC for possibilities of ruptured bellows causing GN2 precharge and H2O to mix, or stuck bellows
- ⑨ Only PUMP OUT P is available on board while in BFS
- ⑩ If both loops are failed: (L1) H2O PUMP LOOP 1,2 – OFF, then go to LOSS OF 2 H2O LOOPS (ORB PKT, PWRDN)
- ⑪ As pumps utilize H2O flow for active cooling, extreme or total blockage will result in overheating and failure of the pump within min

ECLS 6.4I (Cont)



- ⑤ Possible next PLS. ✓ MCC
- ⑦ For GN2 leak from accum, PUMP OUT P will reach cabin press in the inactive loop and cabin press plus PUMP ΔP for active loop
- ⑩ If both loops are failed:
 (L1)
 H2O PUMP LOOP 1,2 – OFF, then go to LOSS OF 2 H2O LOOPS (ORB PKT, PWRDN)
- ⑫ Operation of both H2O loops will prevent loss of H2O to alt loop
- ⑬ Crew may opt to have MCC manage software limits via TMBU

ECLS 6.4I (Cont)



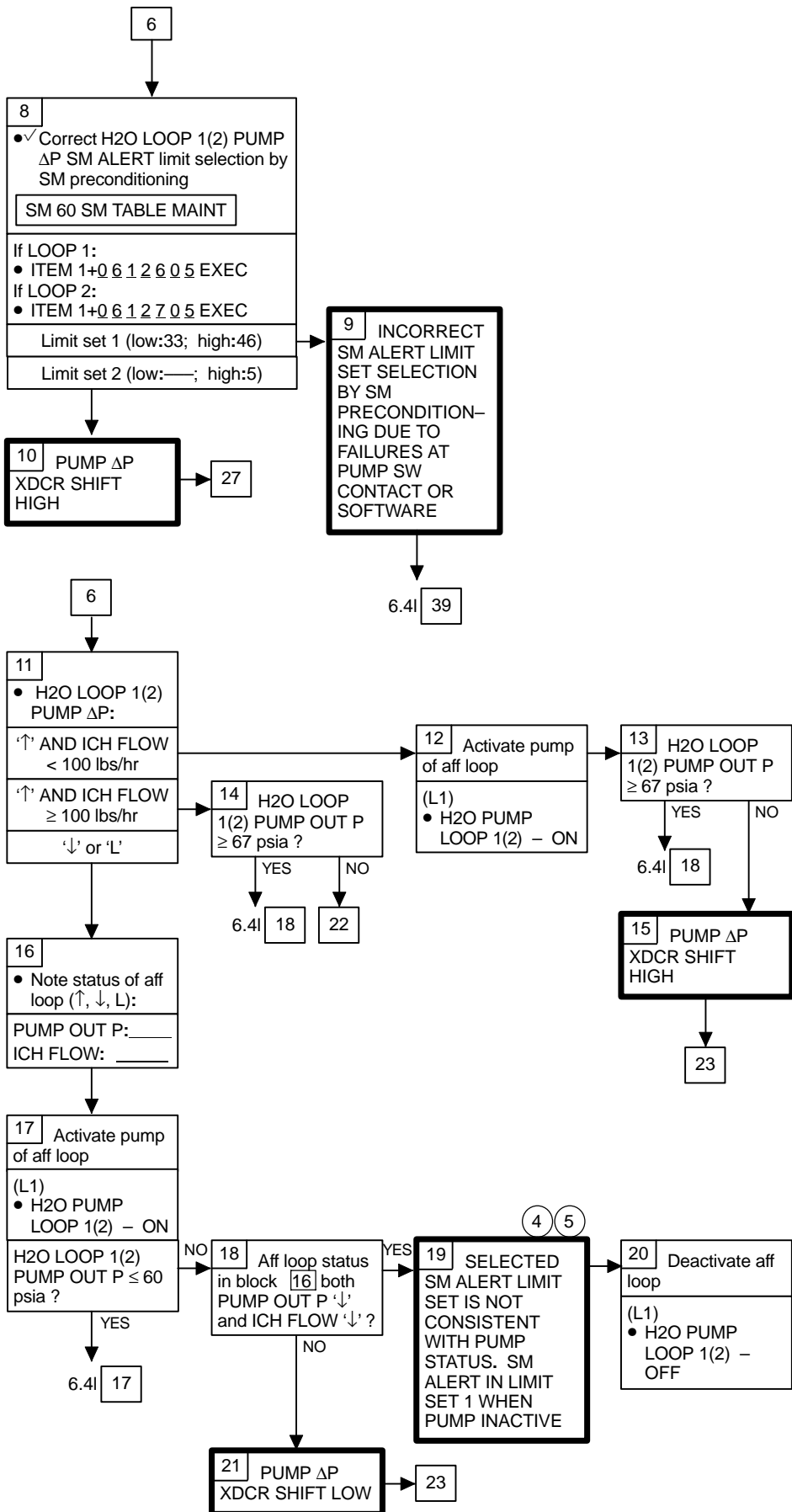
⑦ For GN2 leak from accum, PUMP OUT P will reach cabin press in the inactive loop and cabin press plus PUMP ΔP for active loop

⑬ Crew may opt to have MCC manage software limits via TMBU

⑭ Possible causes:
PL-MDM failure or pump switch GPC position failure resulting in pump not receiving GPC PUMP – ON cmd; or SM preconditioning failure (pump switch contact or software) causing selection of incorrect SM ALERT limits

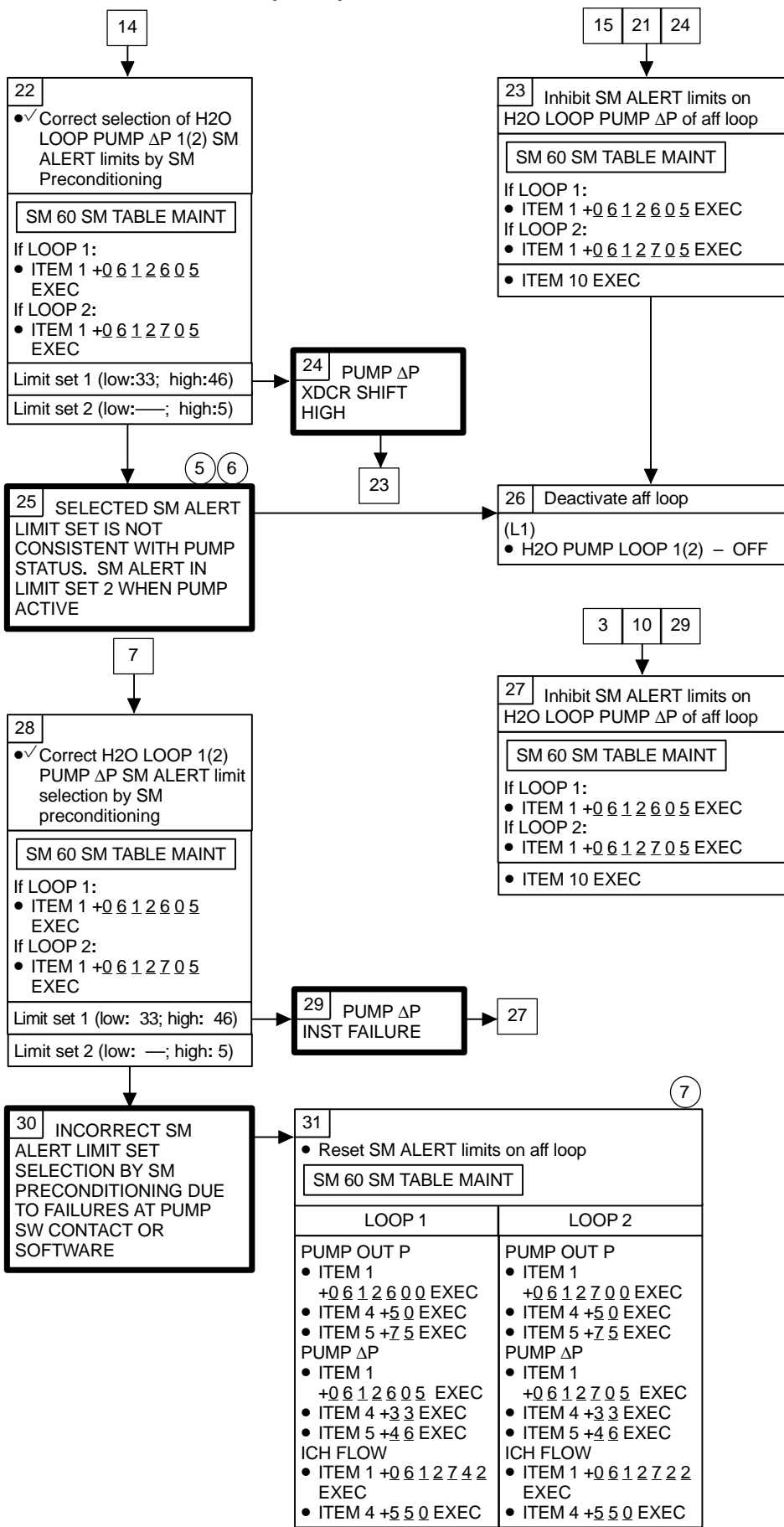
⑮ Pump function sw ON position still available with full cooling capability

ECLS 6.4m (Cont)



- ④ Possible causes: PL-MDM failure or pump switch GPC position failure resulting in pump not receiving GPC PUMP – ON CMD; or SM preconditioning failure (pump switch contact or software) causing selection of incorrect SM ALERT limits
- ⑤ Pump function sw ON position still available with full cooling capability

ECLS 6.4m (Cont)



- (5) Pump function sw ON position still available with full cooling capability
- (6) Possible causes: PL-MDM failure causing pump failed on at GPC PUMP – ON cmd termination; or SM preconditioning failure (pump switch contact or software) causing selection of incorrect SM ALERT limits
- (7) Crew may opt to have MCC manage software limit via TMBU

ECLS

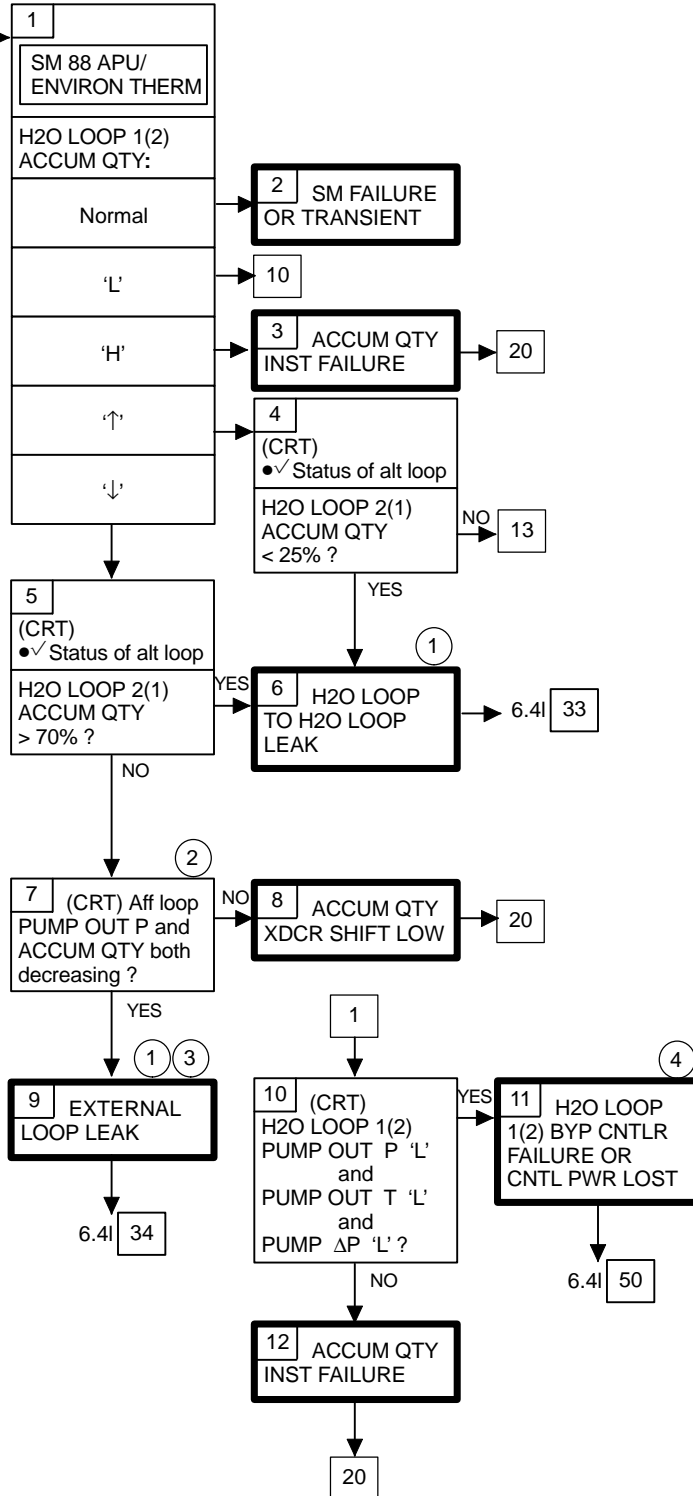
6.4n H2O ACCUM QTY 1(2) ↑↓

SM
ALERT

S88 H2O
LOOP 1(2) QTY

H2O LOOP 1(2)
ACCUM QTY
< 20%
> 80%

Nominal Config:
Refer to 6.4l



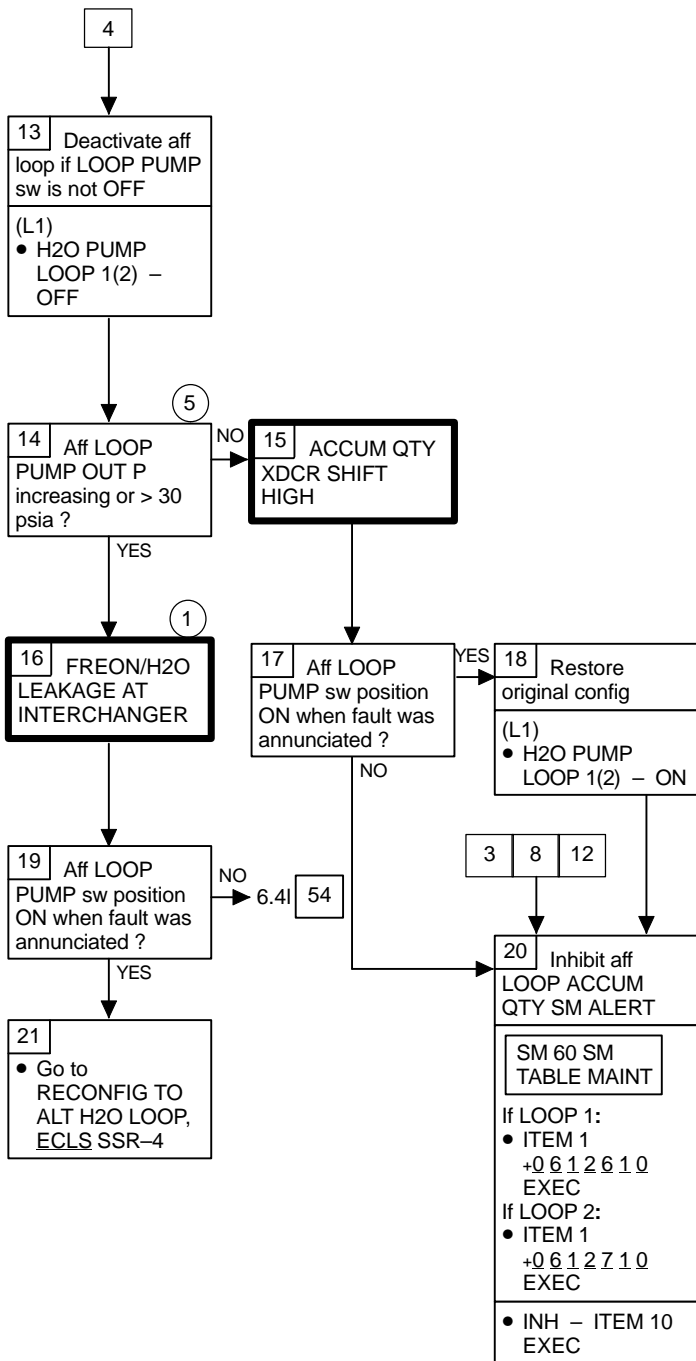
① Possible next PLS. ✓MCC

② For normal water loop charge, – one psia change in PUMP OUT P is observed for every 10 % change in ACCUM QTY

③ If both loops failed:
(L1)
H2O PUMP LOOP1,2 – OFF, then go to LOSS OF 2 H2O LOOPS (ORB PKT, PWRDN)

④ ✓MCC about reset cb
LOOP 1:
(L4) cb AC3 ΦA
H2O CNTLR 1
LOOP 2:
(L4) cb AC1 ΦA
H2O CNTLR 2

ECLS 6.4n (Cont)



- ① Possible next PLS. ✓MCC
- ⑤ For normal water loop charge, PUMP OUT P if inactive loop approaches 30 psia as ACCUM QTY approaches 100 pct in FCL/H2O interloop leakage failure. This PUMP OUT P will eventually reach equilibrium with FCL pressure at interchanger, which is greater than 60 psia normally

ECLS

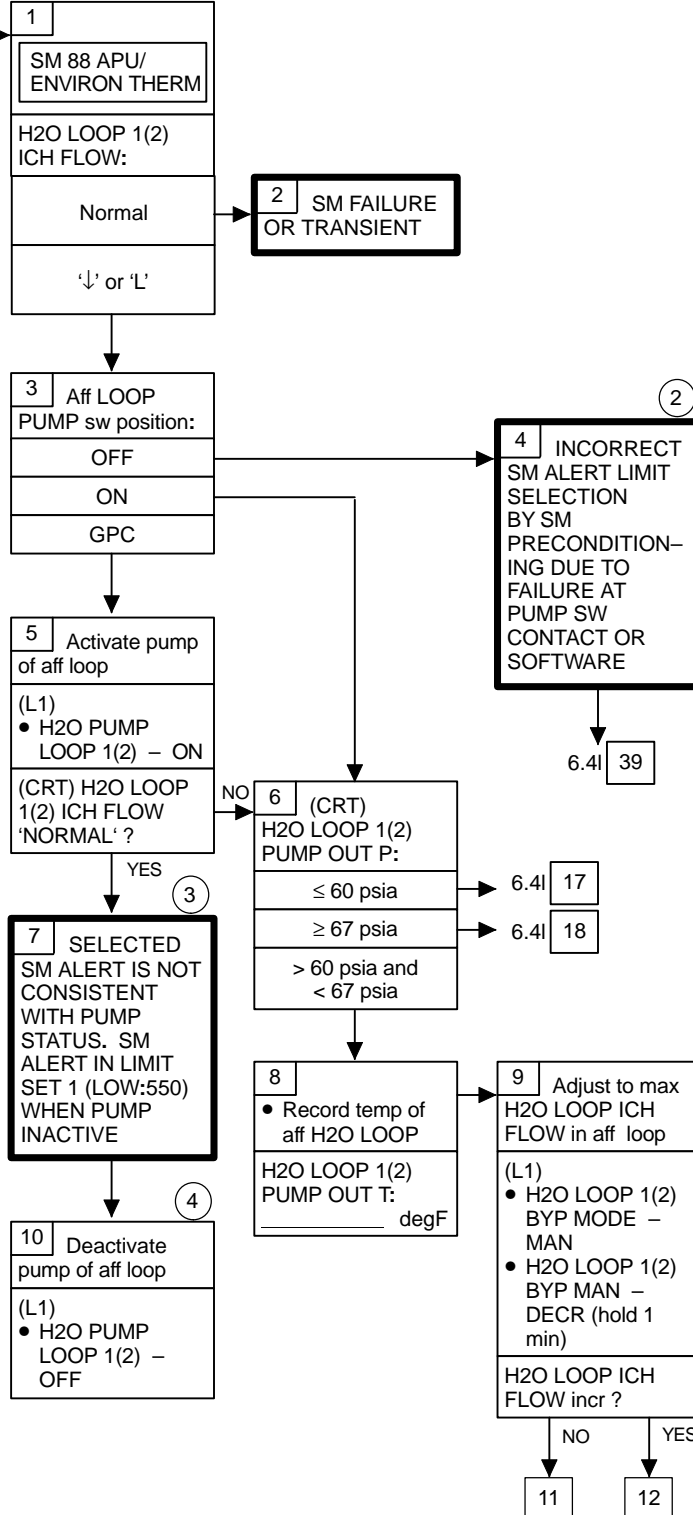
6.4o H2O ICH FLOW 1(2) ↓

SM ALERT

S88 H2O LOOP 1(2) FLOW

H2O LOOP 1(2) ICH FLOW < 550 lb/hr (1)

Nominal Config: Refer to 6.4l



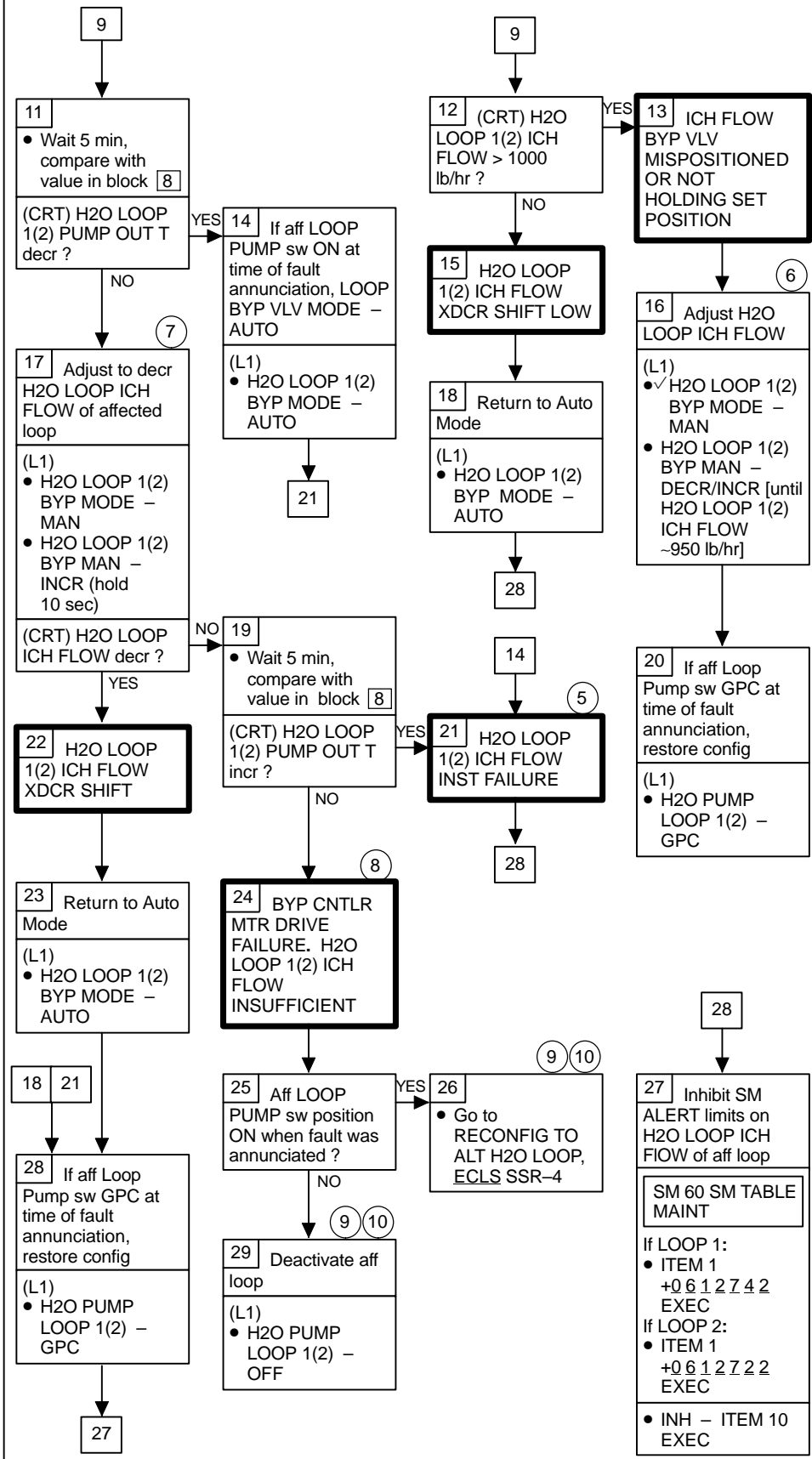
(1) Preconditioning will select this limit set if H2O PUMP LOOP 1(2) - ON; or H2O PUMP LOOP 1(2) - GPC and GPC - ON signal present

(2) Off-scale values are selected for FDA limits by SM preconditioning if H2O PUMP LOOP 1(2) - OFF; or H2O PUMP LOOP 1(2) - GPC without presence of GPC - ON signal

(3) Possible causes: PL-MDM failure or pump switch GPC failure resulting in pump not receiving GPC PUMP - ON cmd; or SM preconditioning failure (pump switch contact or software) causing selection of incorrect SM ALERT limits

(4) Pump function sw ON position still available

ECLS 6.4o (Cont)



- ⑤ H2O LOOP 1:
ECLSS SC11,
MDM OF1
H2O LOOP 2:
ECLSS SC12,
MDM OF2
- ⑥ If problem
recurs, reconfig to
alternate H2O LOOP,
ECLS SSR-4
- ⑦ ICH FLOW BYP
VLV may be at full
ICH flow position
when fault
annunciated
- ⑧ Manual override
adjustment may still
be available. ✓MCC
for possible IFM
- ⑨ Possible next
PL. ✓MCC
- ⑩ If BYP vlv drive
control on both loops
failed, activate both
H2O LOOPS

ECLS

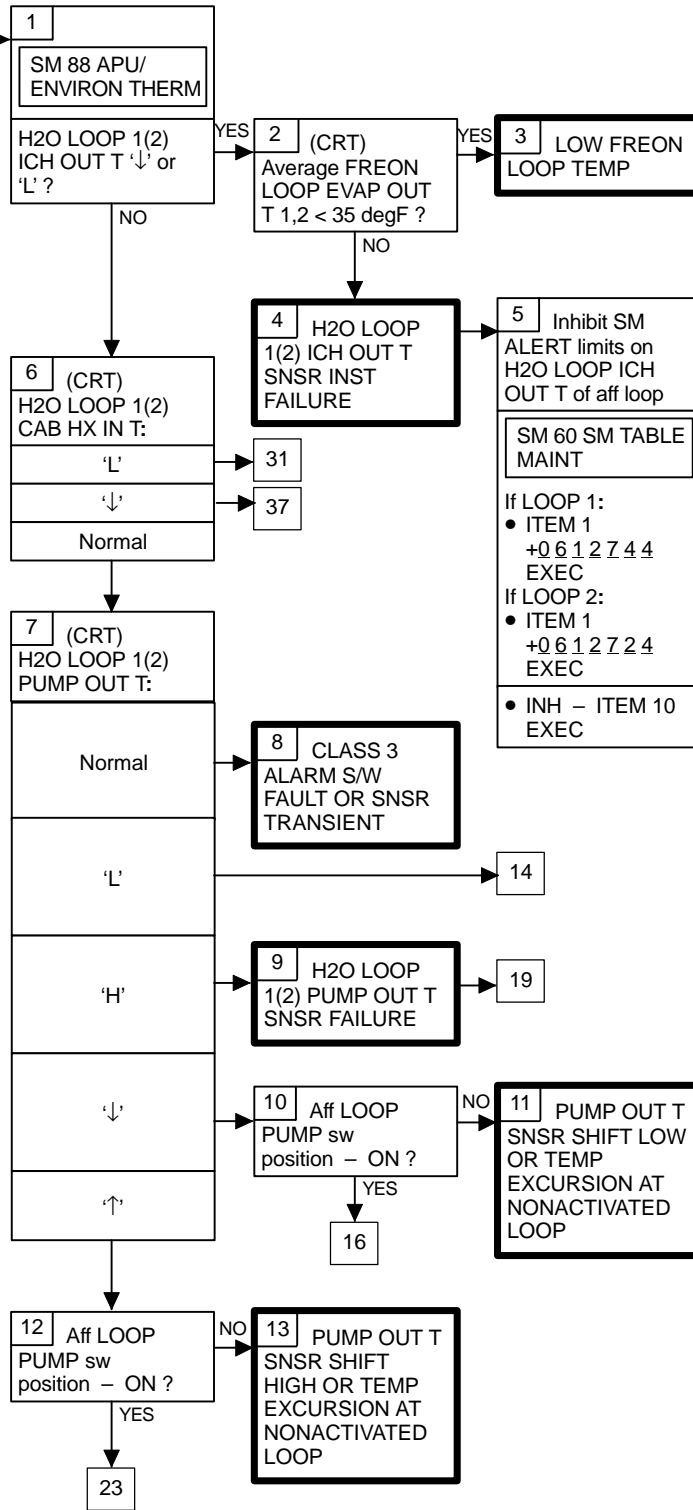
SM
ALERT

S88 H2O
LOOP 1(2)
TEMP

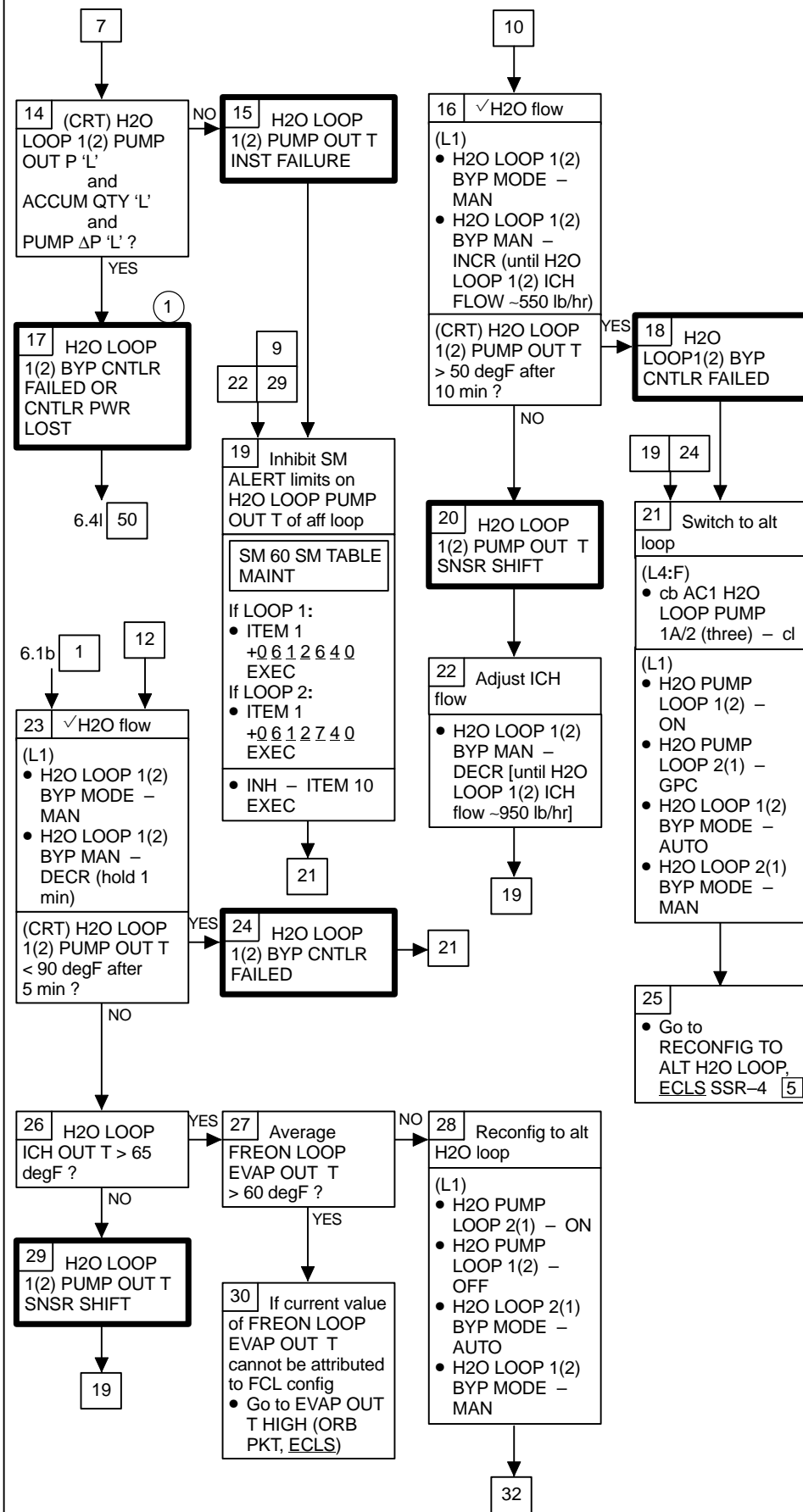
H2O LOOP 1(2) ICH
OUT T < 35 degF
H2O LOOP 1(2) CAB
HX IN T < 34 degF
H2O LOOP 1(2)
PUMP OUT T
< 45 degF
> 90 deg F

Nominal Config:
Refer to 6.4I

**6.4p H2O ICH OUT T 1(2) ↓
CAB HX IN T 1(2) ↓
PUMP OUT T 1(2) ↑↓**

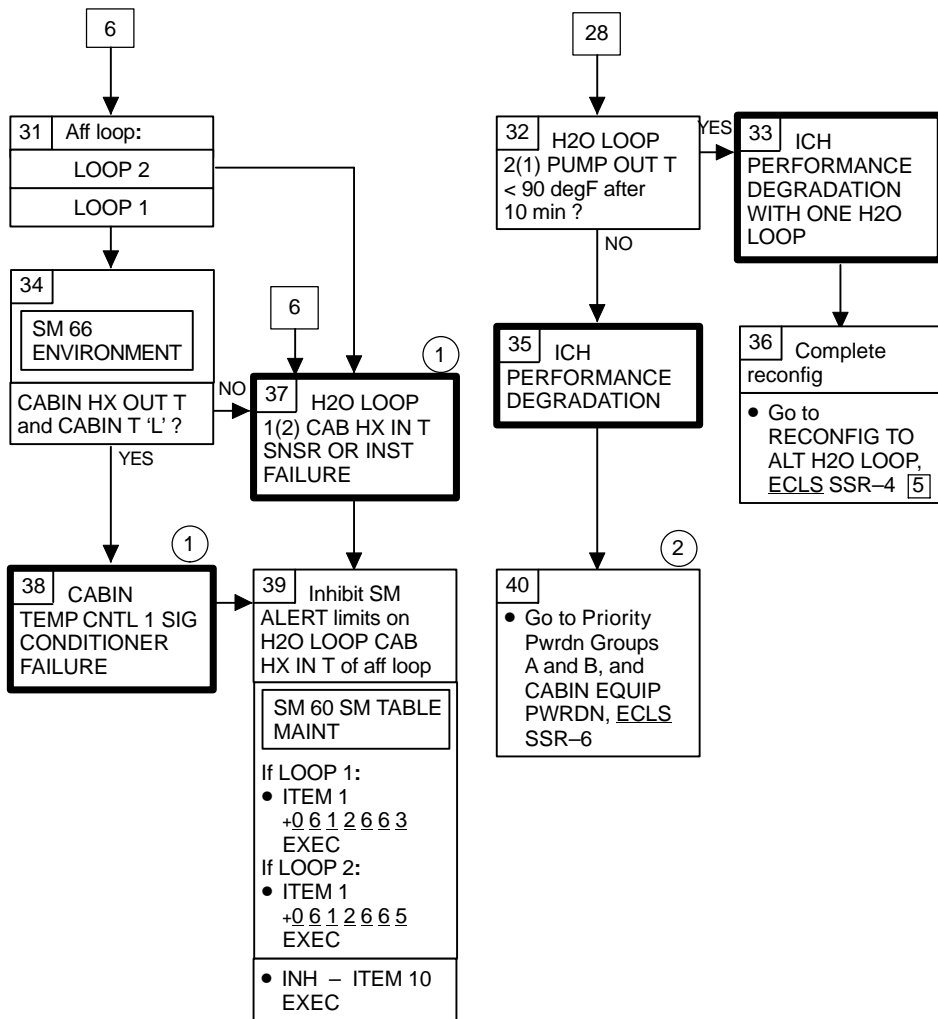


ECLS 6.4p (Cont)



① ✓MCC to reset
cb (pnl L4)
LOOP 1:
cb AC3 ΦA H2O
CNTLR 1
LOOP 2:
cb AC1 ΦA H2O
CNTLR 2

ECLS 6.4p (Cont)

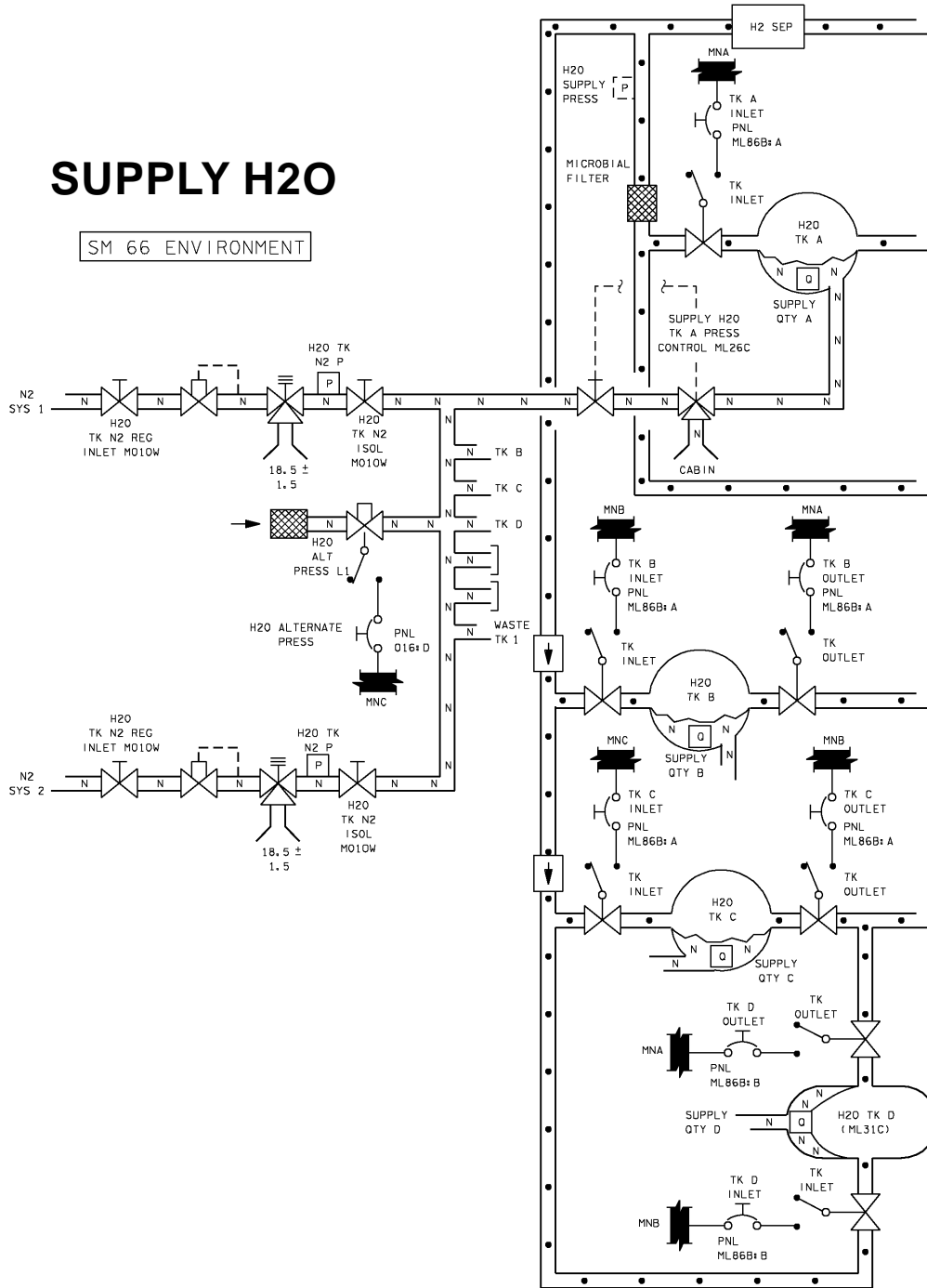


- ① ✓MCC to reset
 LOOP 1:
 (L4:L) cb AC2 ΦA
 CAB T CNTLR 1
 LOOP 2:
 (L4:L) cb AC1 ΦA
 CAB T CNTLR 2
- ② ✓MCC for further pwrn reqd and H2O loop flowrate management

6.5 SPLY H2O

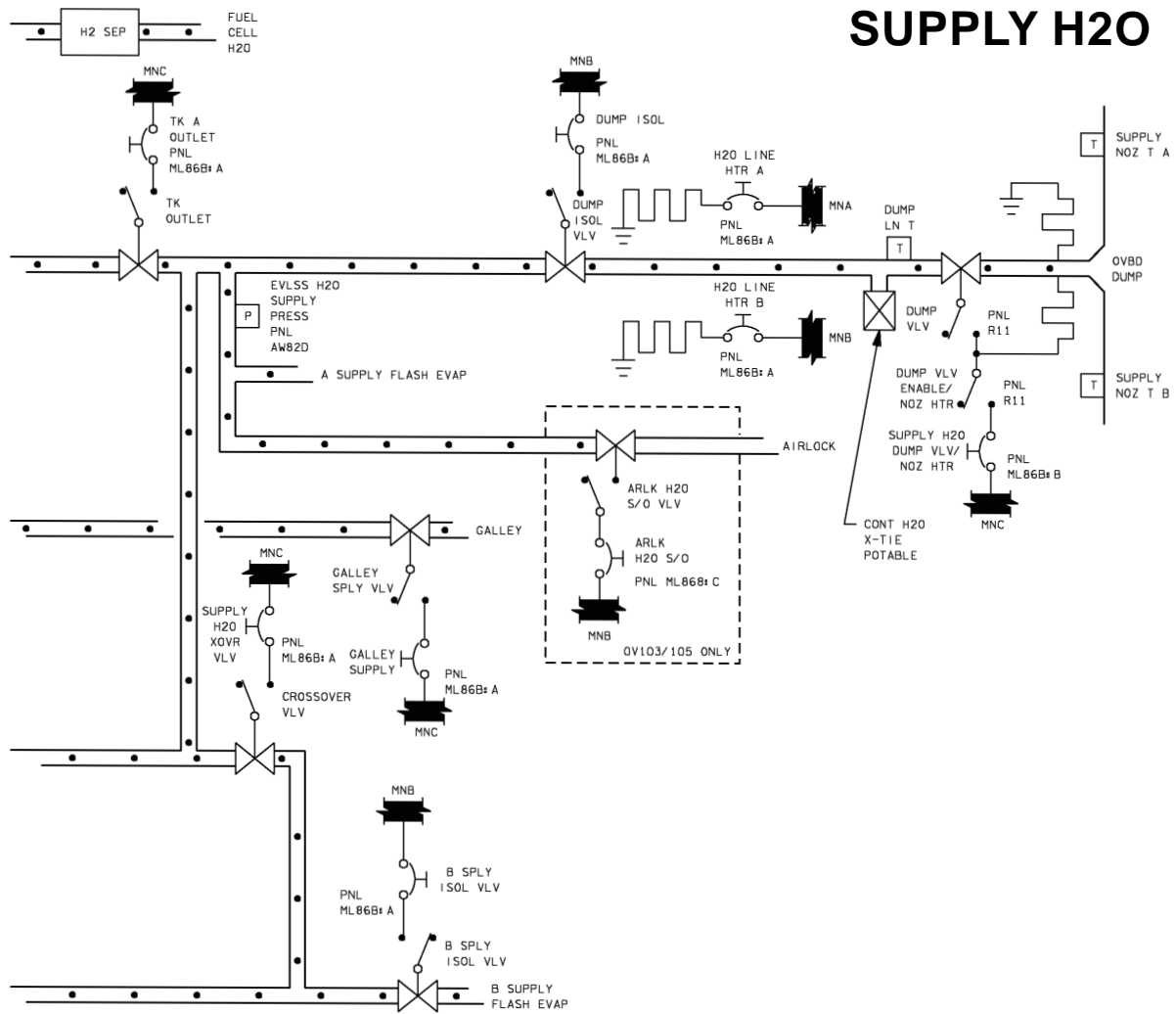
SUPPLY H2O

SM 66 ENVIRONMENT

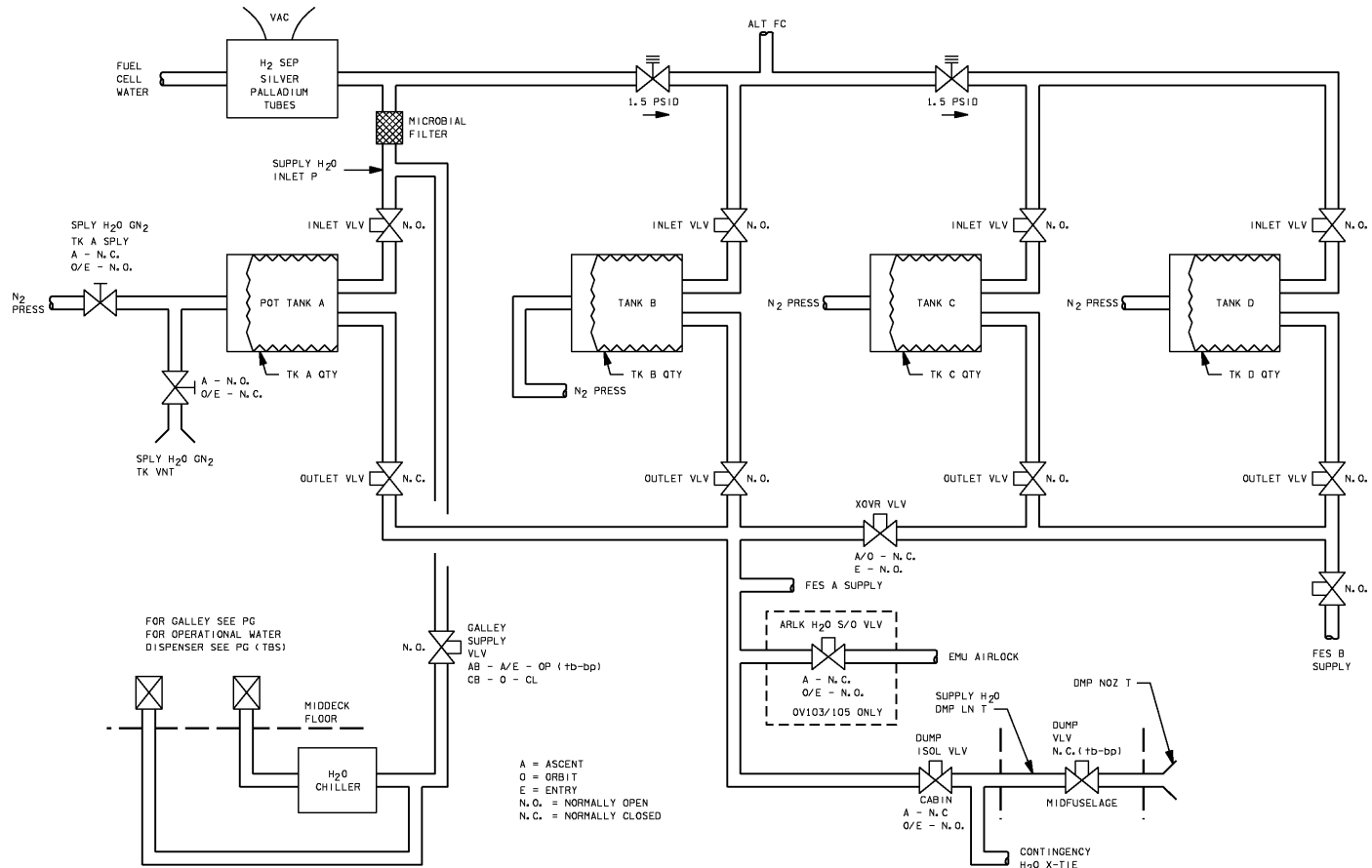


48013011C, SCH# 2

SUPPLY H2O



48013011B, SCH 4



7003, ART 3

SUPPLY H2O STORAGE

ECLS

**6.5c WASTE H2O PRESS ↑↓,
SUPPLY(WASTE) H2O DMP LN T ↑↓,
SUPPLY(WASTE) NOZ T A(B) ↑**

SM ALERT

S66 SPLY H2O TEMP

If:
SUPPLY H2O DMP LN T < 45 or > 125 degF
SUPPLY H2O NOZ T A(B) > 250 degF

S66 WASTE H2O PRESS

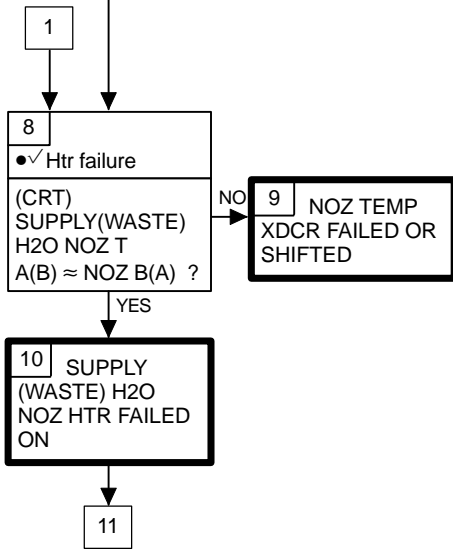
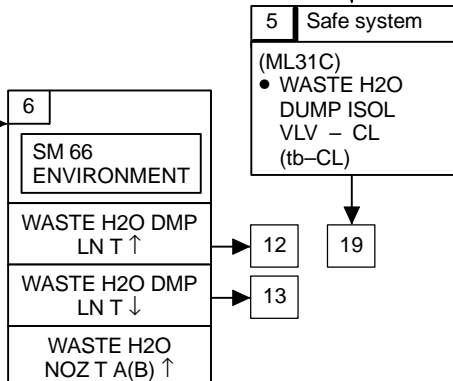
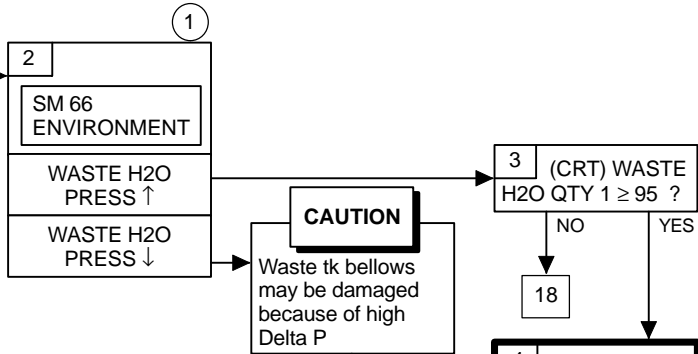
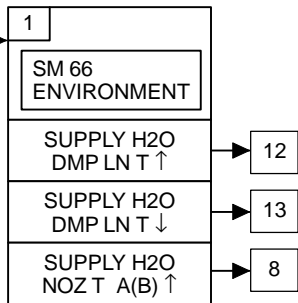
If:
WASTE H2O PRESS < 13 or > 22 psig

S66 WASTE H2O TEMP

If:
WASTE H2O DMP LN T < 45 or > 125 degF
WASTE H2O NOZ T A(B) > 250 degF

Nominal Config:
(ML86B:A)
cb MNA SPLY H2O TKA INLET - cl
TKB OUTLET - cl
cb MNA H2O LINE HTR A - op(cl)
cb MNA WASTE H2O DUMP VLV/NOZ HTR - cl
cb MNB SPLY H2O TKB INLET - cl
TKC OUTLET - cl
DUMP ISOL - cl
B SPLY ISOL VLV - cl
cb MNB H2O LINE HTR B - op(cl)
cb MNC SPLY H2O TKA OUTLET - cl
TKC INLET - cl
DUMP VLV/NOZ HTR - cl
XOVR VLV - cl
GALLEY SPLY - cl

(Cont in notes column)



Nominal Config:
(Cont)
DUMP VLV - CL (tb-bp)*
DUMP VLV ENA/NOZ HTR - OFF
VAC VENT NOZ HTR - ON
ISOL VLV CNTL - OP (tb-OP)
ISOL VLV BUS SEL - MNA
SPLY H2O TKD INLET - OP (tb-OP)
OUTLET - OP (tb-OP)

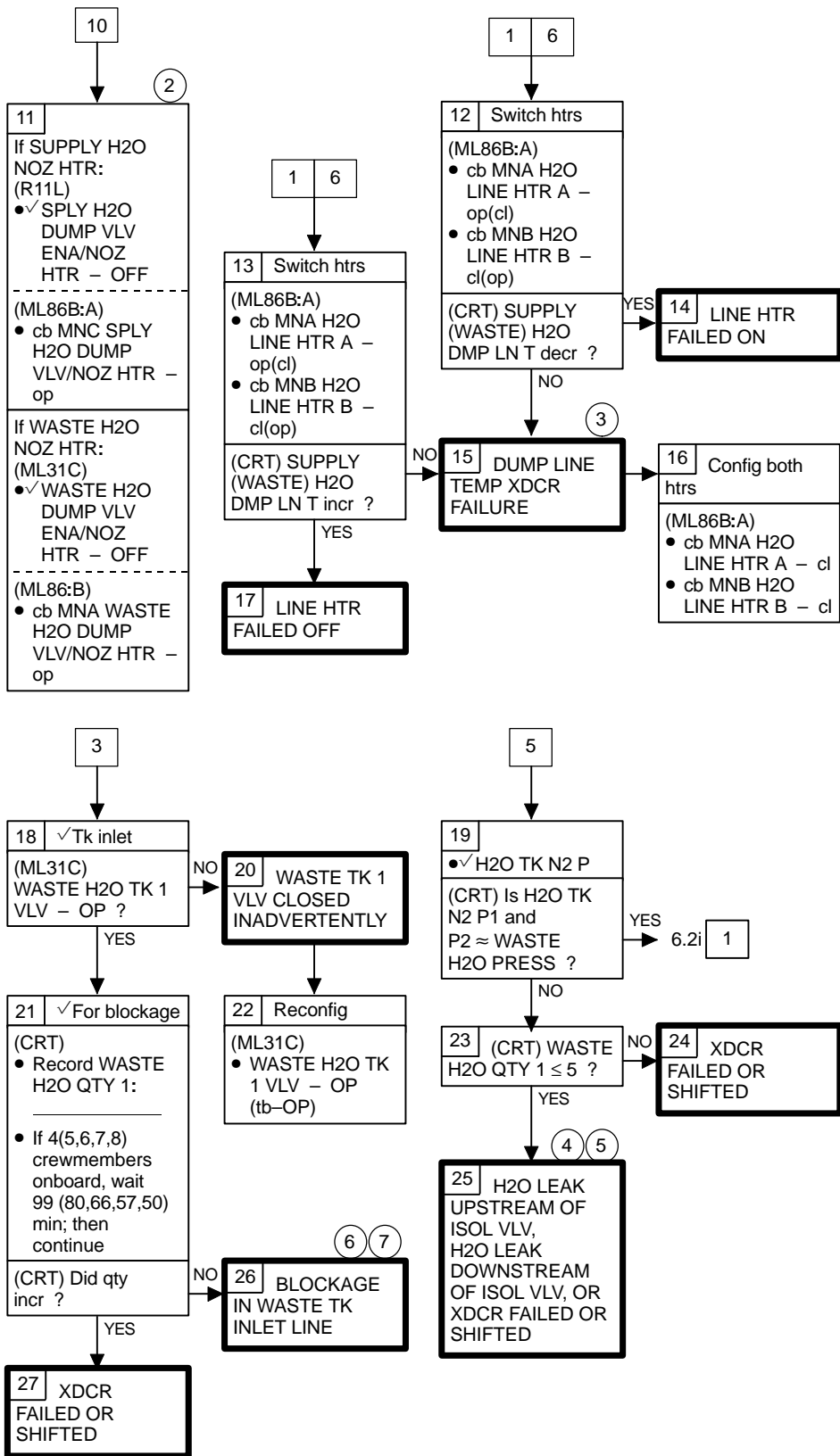
*Talkback will be bp when DUMP VLV ENA/NOZ HTR - OFF

① CRT label 'WASTE H2O PRESS' is same as 'WASTE LIQUID PRESSURE' on SSSH 6.5

Nominal Config:
(Cont)
(ML86B:B)
cb MNA WASTE H2O TK1 VLV - cl
H2O DUMP ISOL - cl
cb MNA VAC VENT ISOL VLV - cl
cb MNB WASTE H2O TK1 DRAIN - op
cb MNB VAC VENT NOZ HTR - cl
cb MNB VAC VENT ISOL VLV - cl
cb MNA SPLY H2O TKD OUTLET - cl
cb MNB SPLY H2O TKD INLET - cl
(O16:D)
cb MNC H2O ALT PRESS - cl
(ML26C)
SPLY H2O GN2 TKA SPLY vlv - OP
SPLY H2O GN2 TK VENT vlv - PRESS
(R11L)
SPLY H2O TKA INLET - OP (tb-OP)
SPLY H2O TKA OUTLET - CL (tb-CL)
TKB,C INLET, OUTLET - OP (tb-OP)
XOVR VLV - CL (tb-CL)
DUMP ISOL VLV - OP (tb-OP)
DUMP VLV - CL (tb-bp)*
DUMP VLV ENA/NOZ HTR - OFF
GALLEY SPLY VLV - OP (tb-OP)
B SPLY ISOL VLV - OP (tb-OP)
(ML31C)
WASTE H2O TK1 DRAIN VLV - CL (tb-bp)
TK1 VLV - OP (tb-OP)
DUMP ISOL VLV - OP (tb-OP)

(Cont in left column)

ECLS 6.5c (Cont)



② Dump system is not lost. MCC will update ORB OPS DUMP procedure

③ If temperature xdcr is OSH, ✓MCC before doing next step

④ ✓MCC about looking for H2O below middeck floor

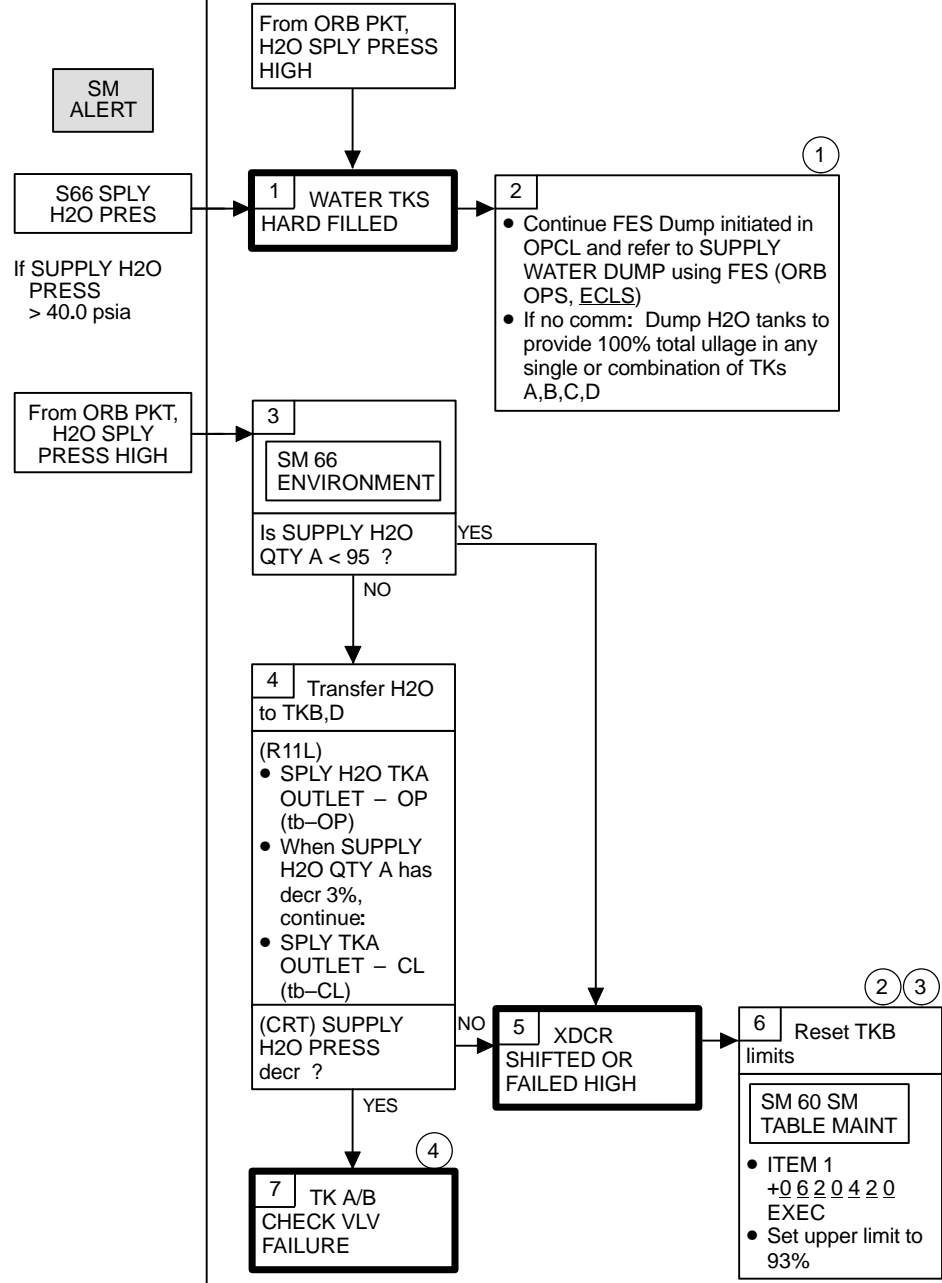
⑤ MCC may be able to determine exact failure

⑥ ✓MCC on how to store condensate from humidity separator

⑦ ✓MCC about attempting waste water dump to remove object blocking waste tank inlet

ECLS

6.5d H2O SPLY PRESS ↑



- ① If Comm, ✓MCC for exact qty to dump
- ② Reset TKC limit to detect next worst case failure (blockage at TKB inlet)
- ③ Crew may opt to have MCC make S/W limit change via TMBU
- ④ Alternate FC relief path will be operating when TKA is ≥ 95

EXT A/L
6.7

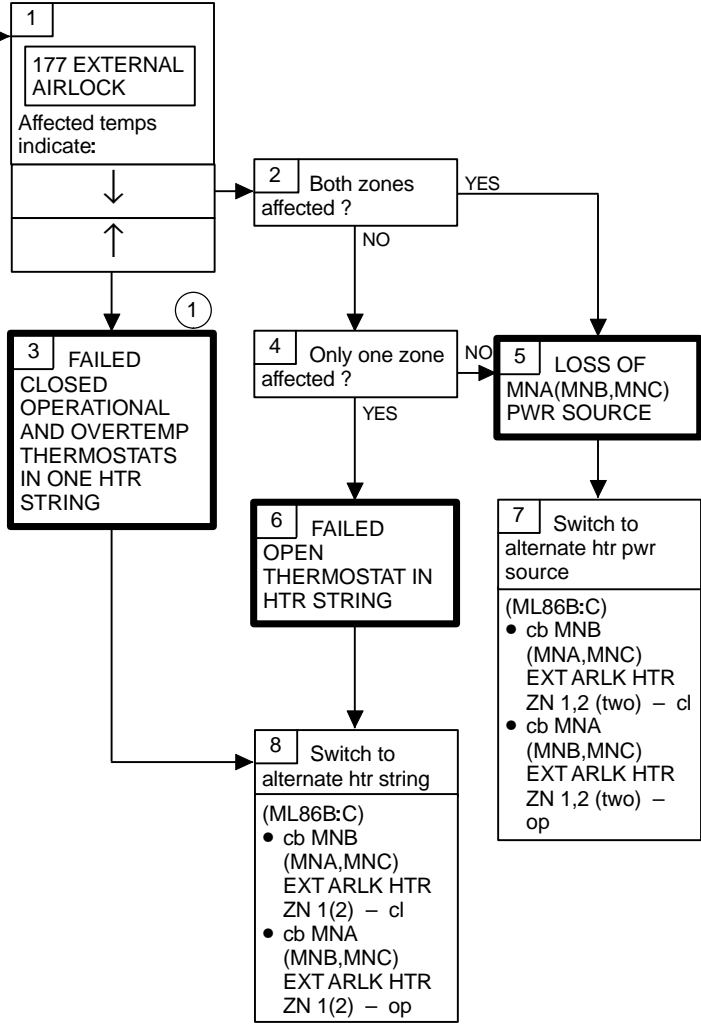
ECLS

6.7a EXT A/L H2O LN T ↑↓

177 A/L H2O LN T1(2)

H2O LINE TEMP:
 H2O SPLY T ZN1 < 42
 H2O SPLY T ZN1 > 130
 LCG2 SPLY T ZN1 < 50
 LCG2 SPLY T ZN1 > 130
 QD PNL T ZN2 < 42
 H2O SPLY T ZN2 < 42
 H2O SPLY T ZN2 > 130

Nominal Config:
 (ML86B:C)
 cb MNA EXT ARLK HTR LNE ZN 1 - cl(op)
 cb MNA EXT ARLK HTR LINE ZN 2 - cl(op)
 cb MNB EXT ARLK HTR LINE ZN 1 - op(cl)
 cb MNB EXT ARLK HTR LINE ZN 2 - op(cl)
 cb MNC EXT ARLK HTR LINE ZN 1 - op(cl)
 cb MNC EXT ARLK HTR LINE ZN 2 - op(cl)



① If both zone temps are indicating high, check MCC. Possible external heat load due to attitude is causing high temps

ECLS

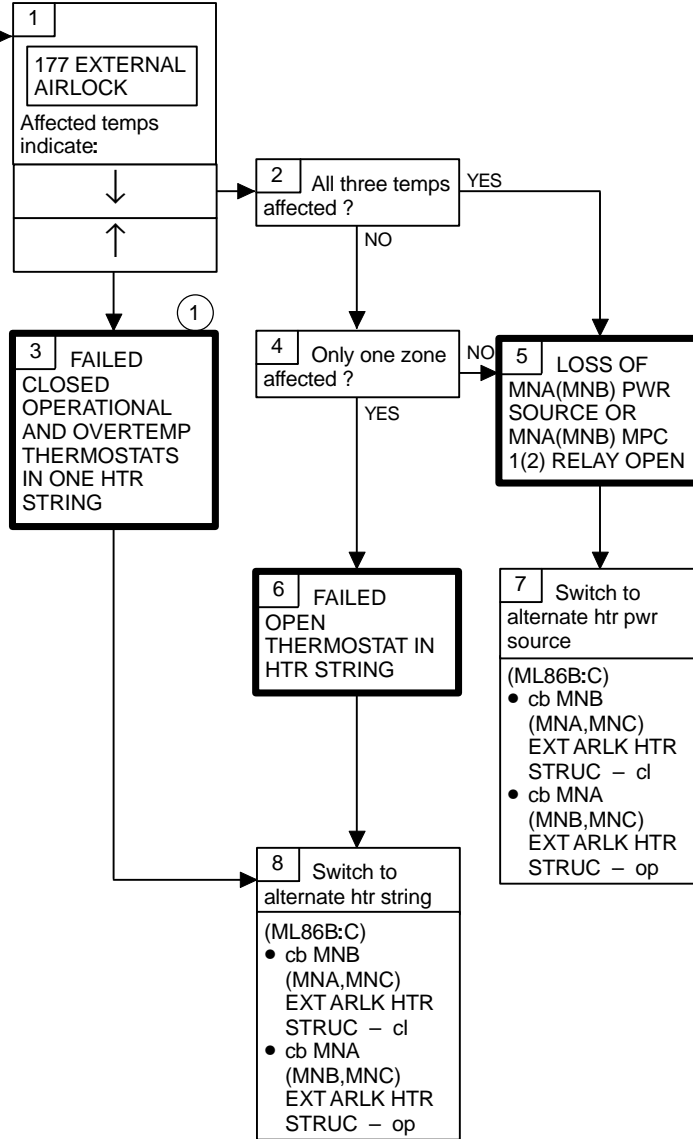
6.7b EXT A/L STRUC T ↑↓

177 A/L STRUC T

INTERNAL TEMP:
UPR (LWR) BKHD
T < 40
UPR (LWR) BKHD
T > 113

EXTERNAL TEMP:
AFT STRUC T < 40
AFT STRUC T
> 113

Nominal Config:
(ML86B:C)
cb MNA EXT ARLK
HTR STRUC -
cl(op)
cb MNB EXT ARLK
HTR STRUC -
op(cl)



① If two or more temps are indicating high, check MCC. Possible external heat load due to attitude is causing high temps

ECLS

6.8a CO2 CNTLR 1(2) ↓

SM
ALERT

S66 CO2 RL
SYS MALF

↓ will only illuminate for 6 sec
CO2 RMVL SYS CNTLR 1(2) FAIL It - on(off)
CO2 RMVL SYS CNTLR 1(2) OPER It - off

Nominal Config:
(ML86B:E)
cb MNA CO2 SYS 1 CNTLR - cl
cb MNB CO2 COM INSTR - cl
cb MNC CO2 SYS 2 CNTLR - cl
(MO51F)
CO2 RMVL SYS CNTLR 1(2) MNA(C) - ON
cb AC1(3) (three) - cl
CNTLR 1(2) FAIL It - off
CNTLR 1(2) OPER It - on
(ML31C)
VAC VENT ISOL VLV BUS SEL - MNA
VAC VENT ISOL VLV CNTL - OP (tb-OP)

6.8b 3
6.8b 9

1

SM 66 ENVIRONMENT

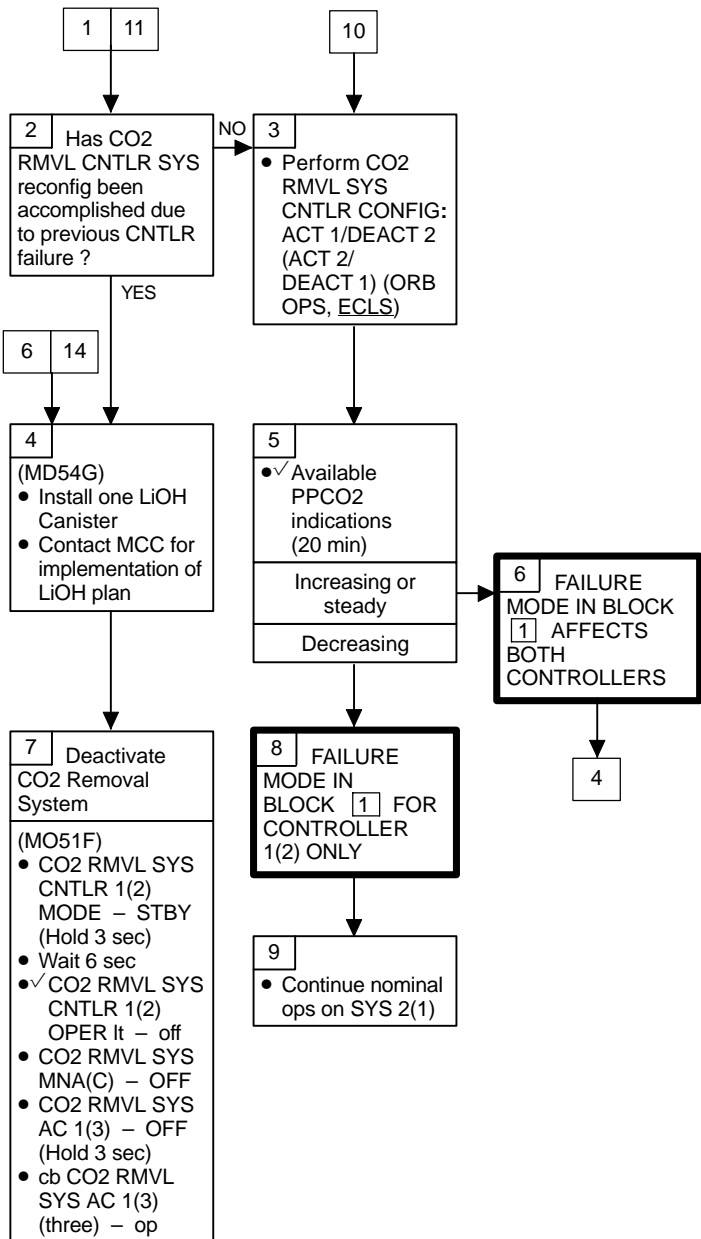
• Match indications in chart to determine failure

FAILURE CASE	(MO51F) CO2 RMVL SYS 1(2) FAIL It	(MO51F) CO2 RMVL SYS 1(2) OPER It	(CRT) CO2 CNTLR 1(2) '*'	(CRT) S66 CO2 RMVL SYS MALF fault msg	FAILURE MODE (Assumes all sw in nominal config)
1	OFF	ON	'*'	NO	DEGRADED CO2 REMOVAL CAPABILITY → 11
2	OFF	OFF	BLANK	YES	LOSS OF MNA(C) PWR → 2
3	ON	OFF	BLANK	NO	LOSS OF AC 1(3) ΦA PWR → 2
4	ON	OFF	'*'	YES	CNTLR 1(2) FAULT SHUTDN → 10
5	ON	OFF	'*'	NO	CNTLR 1(2) COMMON BITE → 10
6	OFF	OFF	BLANK	NO	CNTLR 1(2) TOTAL PWR FAILURE → 2

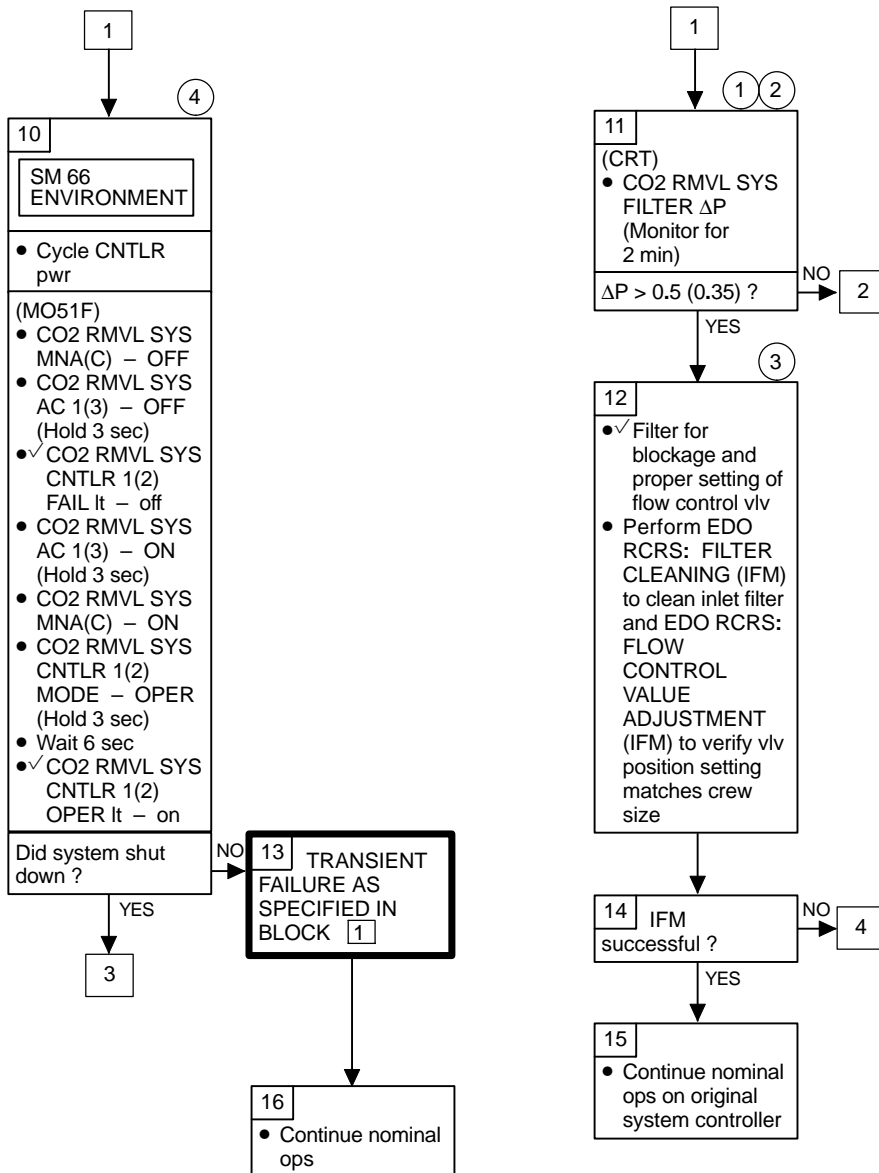
CO2

6.8

ECLS 6.8a (Cont)



ECLS 6.8a (Cont)



- ① System isolates beds for 2 min 6 sec out at every 11 min
- ② ΔP value in parenthesis corresponds to 10.2 psia cabin environment
- ③ ✓MCC before performing IFM
- ④ Allow 26 min for system cycle

ECLS

6.8b PPCO2 ↑

① Only MCC can determine exact failure. Suspect snsr yielding alarm

SM ALERT

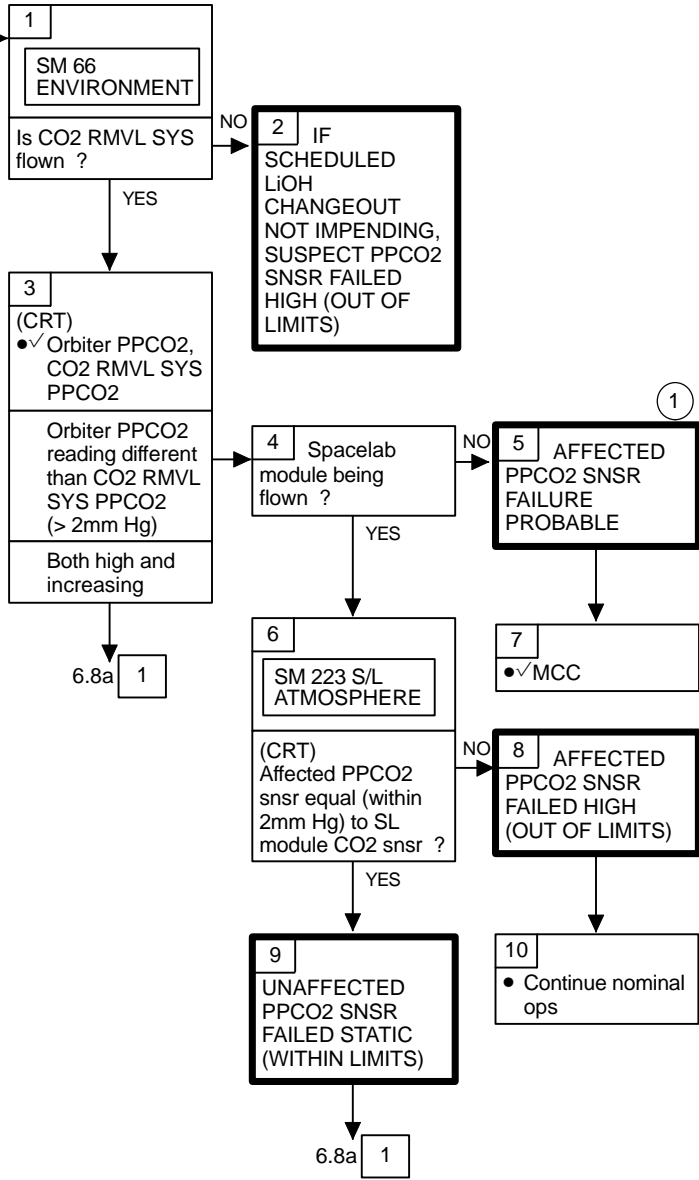
S66 CO2 RL SYS PCO2

If: CO2 RMVL SYS CO2 partial press > 7.6mm Hg

S66 CAB PPCO2

If: Orbiter CO2 partial press > 7.6mm Hg

Nominal Config:
 (ML86B:E)
 cb MNA CO2 SYS 1 CNTLR - cl
 cb MNB CO2 COM INSTR - cl
 cb MNC CO2 SYS 2 CNTLR - cl (MO51F)
 CO2 RMVL SYS:
 CNTLR 1(2) MNA(C) - ON
 cb AC1(3) (three) - cl
 cb AC3(1) (three) - op
 CNTLR 1(2) FAIL lt - off
 CNTLR 1(2) OPER lt - on (ML31C)
 VAC VENT ISOL VLV BUS SEL - MNA
 VAC VENT ISOL VLV CNTL - OP (tb-OP)



ECLS SSR-2 FES CORE FLUSH PROCEDURE

NOTE

This procedure is used to deice or to remove contamination from topping or hi load FES core by flowing warm Freon through core. Bypassed radiators and the Secondary FES Controller are used for the flush. A successful flush will be indicated by EVAP OUT temps stable at -62 degF when FLASH EVAP CNTLR SEC is activated. Secondary cue is a very rapid decrease in duct temps, followed by rapid increase

SM 88 APU/ENVIRON THERM

TOPPING CORE FLUSH (RADS ACTIVATED)

- L1 1. ✓ FLASH EVAP CNTLR (three) – OFF
 2. TOP EVAP HTR DUCT – A/B
 3. ✓ NOZ (two) – A AUTO(B AUTO)
- CRT Proceed when TOP FWD(AFT) temps > 120 degF
 4. RAD BYP VLV MODE (two) – MAN
 5. CNTLR LOOP (two) – OFF, AUTO A
 6. After 80 sec, RAD CNTLR LOOP (two) – OFF
- CRT Proceed when EVAP OUT T > 90 degF for 2 min
 L1 7. FLASH EVAP CNTLR SEC – ON (wait 30 sec)
 8. – OFF (wait 30 sec)
 9. Repeat steps 7 and 8 three times, then:
 FLASH EVAP CNTLR SEC – ON
- CRT 10. Proceed on MCC call, or if no comm, wait minimum 7 min, then proceed when EVAP OUT T -62 degF and TOP FWD(AFT) > 120 degF
- * If TOP FWD(AFT) < 40 degF, then *
 * immediately perform steps 11,12,13,14 *
- L1 11. FLASH EVAP CNTLR SEC – OFF
 12. RAD CNTLR LOOP (two) – AUTO A
 13. After 10 sec, RAD BYP VLV MODE 1,2 (two) – AUTO
 RAD CNTLR OUT TEMP – HI
 14. After 5 min, RAD CNTLR OUT TEMP – NORM
- If successful flush:
 15. After 30 min, TOP EVAP HTR DUCT – A(B)
 If FES reqd, go to FES RESTART, ECLS SSR-5

HI LOAD CORE FLUSH (RADS ACTIVATED)

- L1 1. ✓ FLASH EVAP CNTLR (three) – OFF
 2. HI LOAD DUCT HTR – A/B
- CRT Proceed when HI LOAD INBD(OUTBD) Ts > 170 degF
 L1 3. HI LOAD EVAP – ENA
 4. RAD BYP VLV MODE (two) – MAN
 5. CNTLR LOOP (two) – OFF, AUTO A
 6. After 80 sec, RAD CNTLR LOOP (two) – OFF
- CRT Proceed when EVAP OUT T > 90 degF for 2 min
 L1 7. FLASH EVAP CNTLR SEC – ON (wait 30 sec)
 8. – OFF (wait 30 sec)
 9. Repeat steps 7 and 8 three times, then:
 FLASH EVAP CNTLR SEC – ON
- CRT 10. Proceed on MCC call, or if no comm, wait minimum 7 min, then proceed when EVAP OUT T -62 degF and HI LOAD INBD(OUTBD) > 170 degF
- * If HI LOAD INBD(OUTBD) < 40 degF, then *
 * immediately perform steps 11,12,13,14 *
- L1 11. FLASH EVAP CNTLR SEC – OFF
 12. RAD CNTLR LOOP (two) – AUTO A
 13. After 10 sec, RAD BYP VLV MODE 1,2 (two) – AUTO
 RAD CNTLR OUT TEMP – HI
 14. After 5 min, RAD CNTLR OUT TEMP – NORM
- If successful flush:
 15. HI LOAD EVAP – OFF
 16. After 30 min, HI LOAD EVAP DUCT HTR – OFF
 If FES reqd, go to FES RESTART, ECLS SSR-5

ECLS SSR-2 (Cont)

SM 0 THERMAL

TOPPING CORE FLUSH (RADS NOT ACTIVATED)

- L1 1. TOP EVAP HTR DUCT – A/B
CRT Proceed when TOPPING DUCT temps within limits (no ↓; if PASS SM 88 available, TOP FWD(AFT) > 120 degF)
- L1 2. FLASH EVAP CNTLR SEC – OFF
3. HI LOAD EVAP – OFF
- O1 Proceed when EVAP OUT T > 90 degF for 2 min
- L1 4. FLASH EVAP CNTLR SEC – ON (wait 30 sec)
5. – OFF (wait 30 sec)
6. Repeat steps 4 and 5 three times, then:
FLASH EVAP CNTLR SEC – ON
- CRT 7. Proceed on MCC call, or, if no comm, wait minimum 7 min, then proceed when EVAP OUT T –62 degF and TOP FWD(AFT) > 120 degF
- * If TOP FWD(AFT) < 40 degF, then *
* immediately perform steps 12,13,14,15 *
- L1 8. FLASH EVAP CNTLR SEC – OFF
9. HI LOAD EVAP – ENA
10. FLASH EVAP CNTLR PRI B – ON (wait 2 min)
- O1 If EVAP OUT T ~39 degF (Topper recovered):
- L1 11. TOP EVAP HTR DUCT – A(B) >>
12. FLASH EVAP CNTLR (three) – OFF (Topper not recovered)
13. HI LOAD EVAP – ENA
14. FLASH EVAP CNTLR SEC – ON
15. ✓ TOP EVAP HTR DUCT – A(B)

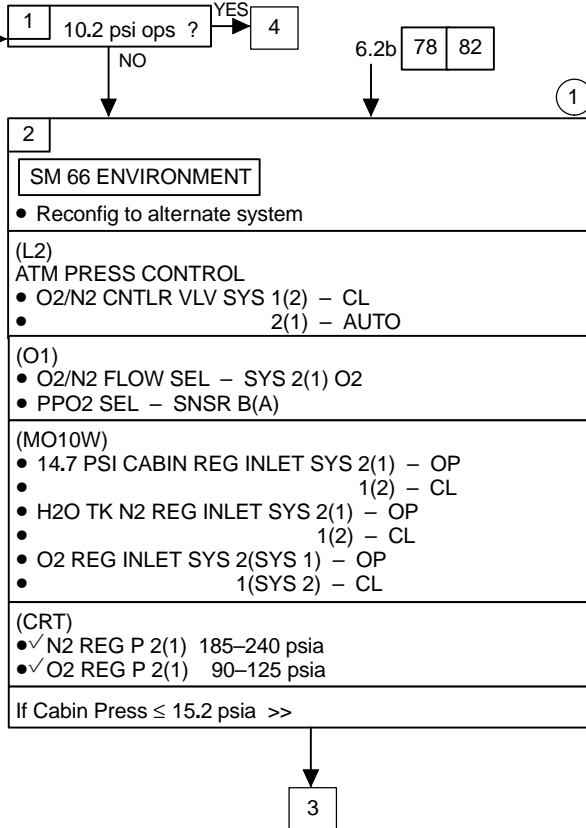
HI LOAD CORE FLUSH (RADS NOT ACTIVATED)

- L1 1. HI LOAD EVAP DUCT HTR – A/B
CRT Proceed when HI LOAD DUCT temps within limits (no ↓; if PASS SM 88 available, when HI LOAD INBD(OUTBD) > 170 degF)
- L1 2. FLASH EVAP CNTLR SEC – OFF
3. HI LOAD EVAP – ON
4. FLASH EVAP CNTLR SEC – ON (wait 30 sec)
5. – OFF (wait 30 sec)
6. Repeat steps 4 and 5 three times, then:
FLASH EVAP CNTLR SEC – ON
- CRT 7. Proceed on MCC call, or, if no comm, wait minimum 7 min, then proceed when EVAP OUT T –62 degF and HI LOAD INBD(OUTBD) > 170 degF
- * If HI LOAD INBD (OUTBD) < 40 degF, then *
* immediately perform steps 12,13,14,15 *
- L1 8. FLASH EVAP CNTLR SEC – OFF
9. HI LOAD EVAP – ENA
10. FLASH EVAP CNTLR PRI B – ON (wait 2 min)
- O1 If EVAP OUT T ~39 degF (HI LOAD recovered):
- L1 11. HI LOAD EVAP DUCT HTR – A >>
12. FLASH EVAP CNTLR (three) – OFF (HI LOAD not recovered)
13. HI LOAD EVAP – OFF
14. FLASH EVAP CNTLR SEC – ON
15. ✓ HI LOAD EVAP DUCT HTR – A(B)

ECLS

**ECLS SSR-3
RECONFIG TO ALT PCS SYS (AUTO OPS)**

Loss of PCS Sys
1(2) O2 or N2



① Use this procedure for complete reconfig of Auto PCS or to depress cabin back to normal pressure after N2 or O2 leak occurred inside cabin. Some sws may be in desired position

ECLS SSR-3 (Cont)

6.2b 41 51 2

3

SM 66 ENVIRONMENT

If Cabin Press > 15.2 psia

(MO13Q)

- MIDDECK FLOODS AIRLK 2 – ON/OFF

(Inner Hatch)

- Equalization vlv caps (two) – remove, stow
- Equalization vlv (two) – OFF
- Open, stow HATCH
- Rotate vent duct into airlock

(O15:D)

- cb MNB PPO2 C CAB dP/dT – op

(AW82B)

- AIRLK DEPRESS vlv cap – vent, remove
- Depress Cabin to ops level

(AW82B)

- AIRLK DEPRESS vlv – 5
 - If 'S66 CABIN PPO2 A(B)' *
 - AIRLK DEPRESS vlv – CL *
 - (C5) *
 - DIRECT O2 vlv – OP *
 - When PPO2 = 3.45, *
 - DIRECT O2 vlv – CL *
 - Continue to depress Cabin and *
 - add O2 as reqd *
- When 'S66 CAB O2(N2) FLO 1(2)'
 - If PPO2 > 3.6, continue depress until PPO2 < 3.6 psia
 - If PPO2 < 2.9, continue depress until CABIN PRESS = 14.5 psi
 - AIRLK DEPRESS vlv – CL
 - Allow CABIN PRESS and PPO2 to incr (~15 min). Repeat depress to CABIN PRESS = 14.5 until PPO2 > 2.9 psia

5 Reconfig from Cabin Depress

(AW82B)

- AIRLK DEPRESS vlv – CL, capped

(O15:D)

- cb MNB PPO2 C CAB dP/dT – cl

(Inner Hatch)

- If reqd, rotate vent duct and stow on AIRLK wall
- If reqd, close HATCH
- EQUAL vlv – norm and capped

(MO13Q)

- MIDDECK FLOODS AIRLK 2 – OFF/ON

6.2b 78 82 1

4 10.2 psi reconfig

(L2)

ATM PRESS CONTROL

- O2/N2 CNTLR VLV SYS 1 – CL (O2)
- 2 – OP (N2)

(MO10W)

- H2O TK N2 REG INLET SYS 1 – CL
- 2 – OP

(CRT)

- ✓ N2 REG P 2(1) 185–240 psia
- ✓ O2 REG P 2(1) 90–110 psia
- P&I change to Cabin Maintenance: Change 'SYS 1' to 'SYS 2'
- ✓ MCC for P&I changes to repress procedure

If Cabin Press ≤ 10.6 psia >>

6

② Swap PCS feeding nitrogen. Oxygen fed via Direct O2

②

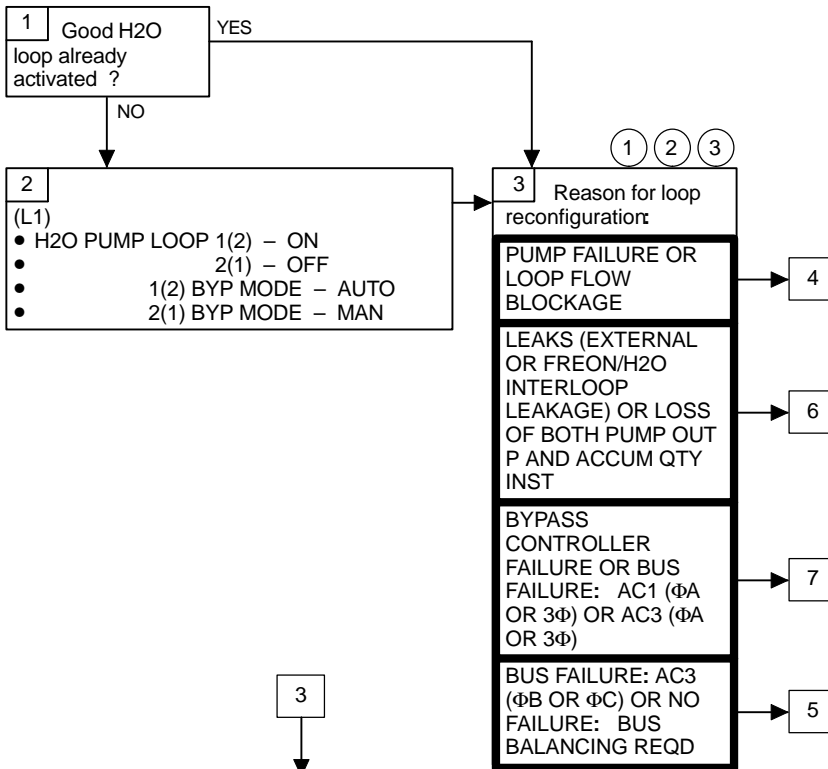
ECLS SSR-3 (Cont)

6.2b 41 51 4

6	
SM 66 ENVIRONMENT	
If Cabin Press > 10.6 psi	
(O15:D)	
<ul style="list-style-type: none"> • cb MNB PPO2 C CAB dP/dT - op 	
(AW82B)	
<ul style="list-style-type: none"> • AIRLK DEPRESS vlv cap - vent, remove 	
<ul style="list-style-type: none"> • Depress Cabin to ops level 	
(AW82B)	
<ul style="list-style-type: none"> • AIRLK DEPRESS VLV - 5 <ul style="list-style-type: none"> * If 'S66 CABIN PPO2' AIRLK * * DEPRESS vlv - CL * * (MO10W) * * 14.7 REG INLET SYS 2 - OP or * * open 14.7 REG INLET configured * * for O2 when PPO2 = 2.8 * * 14.7 REG INLET SYS 2 - CL * * Continue to depress * * Cabin and add O2 as reqd * 	
If PPO2 > 2.8, continue depress until PPO2 ≤ 2.8 and Cabin P = 10.2 < X < 10.4	
If PPO2 < 2.55	
<ul style="list-style-type: none"> • AIRLOCK DEPRESS vlv - CL • Open 14.7 psi CABIN REG INLET which is configured to flow O2 to allow cabin press and PPO2 to incr until PPO2 = 2.8. Repeat depress until Cabin P = 10.2 < X < 10.4 and PPO2 > 2.55 	

7	Reconfig from cabin depress
(AW82B)	
<ul style="list-style-type: none"> • AIRLK DEPRESS vlv - CL 	
(O15:D)	
<ul style="list-style-type: none"> • cb MNB PPO2 C CAB dP/dT - cl 	
<ul style="list-style-type: none"> • Go to 10.2 PSI MAINTENANCE (EVA) for subsequent cabin adjustments 	

ECLS SSR-4 RECONFIG TO ALT H2O LOOP



4 New active loop:	
LOOP 1	LOOP 2
(R13U) <ul style="list-style-type: none"> Inhibit LOOP 2 PUMP OUT P (param 115) Change LOOP 1 PUMP OUT P (param 105) lower C/W to 1.50 vdc (45 psia) 	(R13U) <ul style="list-style-type: none"> Inhibit LOOP 1 PUMP OUT P (param 105) Change LOOP 2 PUMP OUT P (param 115) lower C/W to 1.50 vdc (45 psia)
Reconfig B/U C/W	
SM 60 SM TABLE MAINT	
<ul style="list-style-type: none"> ITEM 1 +0 6 1 2 7 0 0 EXEC ITEM 15 EXEC ITEM 1 +0 6 1 2 6 0 0 EXEC ITEM 11 +4 5 EXEC 	<ul style="list-style-type: none"> ITEM 1 +0 6 1 2 6 0 0 EXEC ITEM 15 EXEC ITEM 1 +0 6 1 2 7 0 0 EXEC ITEM 11 +4 5 EXEC



5 New active loop:	
LOOP 1	LOOP 2
(R13U) <ul style="list-style-type: none"> Change LOOP 1 PUMP OUT P (param 105) lower C/W limit to 1.50 vdc (45 psia) and LOOP 2 (param 115) to 0.70 vdc (19.5 psia) 	(R13U) <ul style="list-style-type: none"> Change LOOP 2 PUMP OUT P (param 115) lower C/W limit to 1.50 vdc (45 psia) and LOOP 1 (param 105) to 0.70 vdc (19.5 psia)
Reconfig B/U C/W	
SM 60 SM TABLE MAINT	
<ul style="list-style-type: none"> ITEM 1 +0 6 1 2 6 0 0 EXEC ITEM 11 +4 5 EXEC ITEM 1 +0 6 1 2 7 0 0 EXEC ITEM 11 +1 9.5 EXEC 	<ul style="list-style-type: none"> ITEM 1 +0 6 1 2 7 0 0 EXEC ITEM 11 +4 5 EXEC ITEM 1 +0 6 1 2 6 0 0 EXEC ITEM 11 +1 9.5 EXEC

- ① Procedure assumes initial C/W and B/U C/W for PUMP OUT P set at 19.5 for inactive loop and 45 for active loop
- ② Loss of bypass controller results in loss of all instrumentation in affected loop except flow and some temperatures
- ③ With loss of PUMP OUT P and ACCUM QTY instrumentation, Freon/H2O interloop leakage is not detectable. Affected loop should not be used unless reqd

ECLS SSR-4 (Cont)

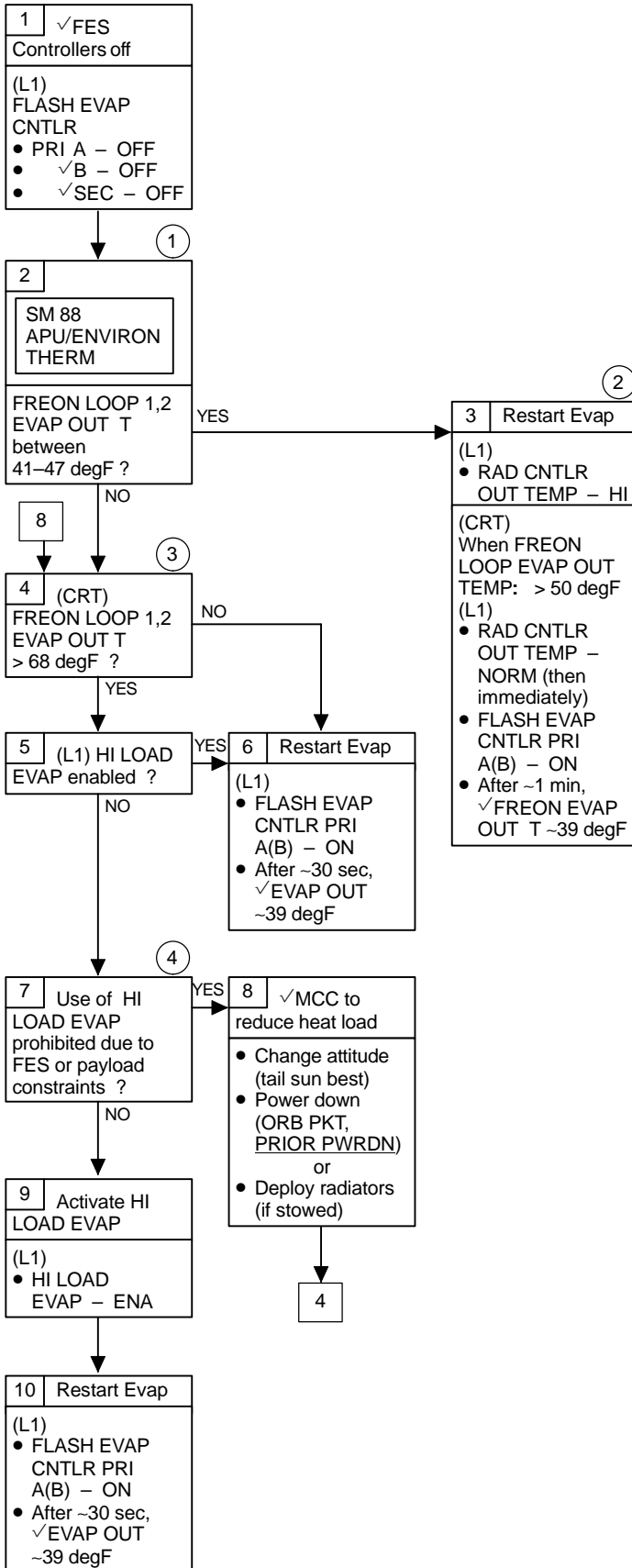
3

6 | New active loop:	
LOOP 1	LOOP 2
(R13U) • Inhibit LOOP 2 PUMP OUT P (param 115) • Change LOOP 1 PUMP OUT P (param 105) lower C/W to 1.50 vdc (45 psia)	(R13U) • Inhibit LOOP 1 PUMP OUT P (param 105) • Change LOOP 2 PUMP OUT P (param 115) lower C/W to 1.50 vdc (45 psia)
Reconfig B/U C/W	Reconfig B/U C/W
SM 60 SM TABLE MAINT	SM 60 SM TABLE MAINT
• ITEM 1 +0 6 1 2 6 0 0 EXEC • ITEM 11 +4 5 EXEC • ITEM 1 +0 6 1 2 7 0 0 EXEC • ITEM 15 EXEC	• ITEM 1 +0 6 1 2 7 0 0 EXEC • ITEM 11 +4 5 EXEC • ITEM 1 +0 6 1 2 6 0 0 EXEC • ITEM 15 EXEC
Inhibit LOOP 2 SM ALERTS	Inhibit LOOP 1 SM ALERTS
• ITEM 10 EXEC • ITEM 1 +0 6 1 2 7 1 0 EXEC • ITEM 10 EXEC	• ITEM 10 EXEC • ITEM 1 +0 6 1 2 6 1 0 EXEC • ITEM 10 EXEC

3

7 | New active loop:	
LOOP 1	LOOP 2
(R13U) • Inhibit LOOP 2 PUMP OUT P (param 115) • Change LOOP 1 PUMP OUT P (param 105) lower C/W to 1.50 vdc (45 psia)	(R13U) • Inhibit LOOP 1 PUMP OUT P (param 105) • Change LOOP 2 PUMP OUT P (param 115) lower C/W to 1.50 vdc (45 psia)
Reconfig B/U C/W	Reconfig B/U C/W
SM 60 SM TABLE MAINT	SM 60 SM TABLE MAINT
• ITEM 1 +0 6 1 2 6 0 0 EXEC • ITEM 11 +4 5 EXEC • ITEM 1 +0 6 1 2 7 0 0 EXEC • ITEM 15 EXEC	• ITEM 1 +0 6 1 2 7 0 0 EXEC • ITEM 11 +4 5 EXEC • ITEM 1 +0 6 1 2 6 0 0 EXEC • ITEM 15 EXEC
Inhibit LOOP 2 SM ALERTS	Inhibit LOOP 1 SM ALERTS
• ITEM 10 EXEC • ITEM 1 +0 6 1 2 7 1 0 EXEC • ITEM 10 EXEC • ITEM 1 +0 6 1 2 7 4 0 EXEC • ITEM 10 EXEC • ITEM 1 +0 6 1 2 7 0 5 EXEC • ITEM 10 EXEC	• ITEM 10 EXEC • ITEM 1 +0 6 1 2 6 1 0 EXEC • ITEM 10 EXEC • ITEM 1 +0 6 1 2 6 4 0 EXEC • ITEM 10 EXEC • ITEM 1 +0 6 1 2 6 0 5 EXEC • ITEM 10 EXEC

ECLS SSR-5 FES RESTART



- ① Prior flight experience has demonstrated that FES shutdms are most likely in this temp range
- ② To ensure positive FES restart, RADs are placed in HIGH to impose a load on FES
- ③ TOPPING EVAP will overtemp shutdn when inlet temp exceeds ~68 degF and HI LOAD not activated
- ④ Heat load beyond capability of topping evap

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ECLS SSR-7 FLASH EVAPORATOR CHECKOUT

NOTE

Procedure used to check all components

PRETEST SETUP

- L1 a. ✓ Rad flow, PLBD opened
- L1 b. FLASH EVAP TOP DUCT HTR – A(B)
NOZ (two) – AUTO A(B)
- If HI LOAD EVAP to be activated:
FLASH EVAP HI LOAD DUCT HTR – A(B)
Wait –45 min before activating HI LOAD
- L2 c. FLASH EVAP FDLN HTR A SPLY – 1(2)
B SPLY – 1(2)
- R11L d. ✓ SPLY H2O TKB OUTLET – OP (tb–OP)
- ML31C ✓ B SPLY ISOL VLV – OP (tb–OP)
✓ TKD OUTLET – OP (tb–OP)

COMPONENT CHECKOUT

SM 88 APU/ENVIRON THERM

- a. PRIMARY CNTLR A,B and TOPPING FES CHECKOUT
Perform FES RESTART, ECLS SSR-5
- b. SECONDARY CNTLR and TOPPING FES CHECKOUT

NOTE

This procedure ✓ SEC CNTLR ops starting from standby mode. To check cntlr startup under load conditions, interchange steps 2 and 3 but pause between steps to allow EVAP OUT T to incr > 62 degF (approx 1 min)

- L1 1. ✓ HI LOAD EVAP – OFF
- 2. FLASH EVAP CNTLR PRI A,B – OFF
SEC – ON
- 3. RAD BYP VLV LOOP 1,2 MODE (two) – MAN
MAN SEL (two) – BYP until tb – BYP
- CRT 4. After 2 min, ✓ EVAP OUT T –62 degF
- L1 5. RAD BYP VLV LOOP 1,2 MODE (two) – AUTO
CNTLR LOOP 1,2 (two) – OFF, AUTO A(AUTO B)
After 90 sec, ✓ tb – RAD (two)
- 6. Perform FES RESTART, ECLS SSR-5
- c. SECONDARY CNTLR, HI LOAD FES, FEEDWATER A CHECKOUT
- L1 1. HI LOAD EVAP – ENA
FLASH EVAP CNTLR SEC – A SPLY
- 2. PRI A,B – OFF
SEC – ON
- 3. RAD BYP VLV LOOP 1,2 MODE (two) – MAN
MAN SEL (two) – BYP until tb – BYP
- CRT 4. After 2 min, ✓ EVAP OUT T –62 degF
- L1 5. RAD BYP VLV LOOP 1,2 MODE (two) – AUTO
CNTLR LOOP 1,2 (two) – OFF, then AUTO A(AUTO B)
After 90 sec, ✓ tb – RAD (two)
- 6. Perform FES RESTART, ECLS SSR-5
- 7. HI LOAD EVAP – OFF
After 30 min,
- 8. FLASH EVAP HI LOAD DUCT HTR – OFF
- d. SECONDARY CONTROLLER, HI LOAD FES, FEEDWATER B CHECKOUT
- L1 1. HI LOAD EVAP – ENA
FLASH EVAP CNTLR SEC – B SPLY
- 2. PRI A,B – OFF
SEC – ON
- 3. RAD BYP VLV LOOP 1,2 MODE (two) – MAN
MAN SEL (two) – BYP until tb – BYP
- CRT 4. After 2 min, ✓ EVAP OUT T –62 degF
- L1 5. RAD BYP VLV LOOP 1,2 MODE (two) – AUTO
CNTLR LOOP 1,2 (two) – OFF, then AUTO A(AUTO B)
After 90 sec, ✓ tb – RAD (two)
- 6. Perform FES RESTART, ECLS SSR-5
- 7. HI LOAD EVAP – OFF
After 30 min,
- 8. FLASH EVAP HI LOAD DUCT HTR – OFF
- 9. CNTLR SEC – A SPLY

MEDS

MAL/ALL/GEN E

ECLS SSR-6 CABIN EQUIP PWRDN

C2	CRT PWR (three) – OFF	
F7/F8/A6U F6/F8	FLT CNTLR PWR (three) – OFF INST PWR (two) – OFF	
O14:E O15:E O16:E	cb MNA DDU L,AFT (two) – op cb MNB DDU L,R (two) – op cb MNC DDU R,AFT (two) – op	
L1	CAB TEMP – COOL(as reqd, WARM) Minimize Itg	
W1-10	Install Window Shades (ten)	
O19 A3 R11	TV PWR – OFF MON 1,2 – OFF VTR PWR – OFF	
MO39M MO42F	MIDDECK COMM CCU PWR – OFF SPKR AUD SPKR PWR – OFF PWR – OFF	
MO58F GALLEY	MIDDECK CCU AUD PWR – OFF DC PWR BUS A – OFF B – OFF	
MA73C:G	cb AC3 GALLEY FAN (three) – op or Food Warmer – OFF, ✓light – off All middeck lts – off	

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ECLS SSR-7 FLASH EVAPORATOR CHECKOUT

NOTE

Procedure used to check all components

PRETEST SETUP

- L1 a. ✓ Rad flow, PLBD opened
- L1 b. FLASH EVAP TOP DUCT HTR – A(B)
NOZ (two) – AUTO A(B)
- If HI LOAD EVAP to be activated:
FLASH EVAP HI LOAD DUCT HTR – A(B)
Wait –45 min before activating HI LOAD
- L2 c. FLASH EVAP FDLN HTR A SPLY – 1(2)
B SPLY – 1(2)
- R11L d. ✓ SPLY H2O TKB OUTLET – OP (tb–OP)
- ML31C ✓ B SPLY ISOL VLV – OP (tb–OP)
✓ TKD OUTLET – OP (tb–OP)

COMPONENT CHECKOUT

SM 88 APU/ENVIRON THERM

- a. PRIMARY CNTLR A,B and TOPPING FES CHECKOUT
Perform FES RESTART, ECLS SSR-5
- b. SECONDARY CNTLR and TOPPING FES CHECKOUT

NOTE

This procedure ✓ SEC CNTLR ops starting from standby mode. To check cntlr startup under load conditions, interchange steps 2 and 3 but pause between steps to allow EVAP OUT T to incr > 62 degF (approx 1 min)

- L1 1. ✓ HI LOAD EVAP – OFF
- 2. FLASH EVAP CNTLR PRI A,B – OFF
SEC – ON
- 3. RAD BYP VLV LOOP 1,2 MODE (two) – MAN
MAN SEL (two) – BYP until tb – BYP
- CRT 4. After 2 min, ✓ EVAP OUT T –62 degF
- L1 5. RAD BYP VLV LOOP 1,2 MODE (two) – AUTO
CNTLR LOOP 1,2 (two) – OFF, AUTO A(AUTO B)
After 90 sec, ✓ tb – RAD (two)
- 6. Perform FES RESTART, ECLS SSR-5
- c. SECONDARY CNTLR, HI LOAD FES, FEEDWATER A CHECKOUT
- L1 1. HI LOAD EVAP – ENA
FLASH EVAP CNTLR SEC – A SPLY
- 2. PRI A,B – OFF
SEC – ON
- 3. RAD BYP VLV LOOP 1,2 MODE (two) – MAN
MAN SEL (two) – BYP until tb – BYP
- CRT 4. After 2 min, ✓ EVAP OUT T –62 degF
- L1 5. RAD BYP VLV LOOP 1,2 MODE (two) – AUTO
CNTLR LOOP 1,2 (two) – OFF, then AUTO A(AUTO B)
After 90 sec, ✓ tb – RAD (two)
- 6. Perform FES RESTART, ECLS SSR-5
- 7. HI LOAD EVAP – OFF
After 30 min,
- 8. FLASH EVAP HI LOAD DUCT HTR – OFF
- d. SECONDARY CONTROLLER, HI LOAD FES, FEEDWATER B CHECKOUT
- L1 1. HI LOAD EVAP – ENA
FLASH EVAP CNTLR SEC – B SPLY
- 2. PRI A,B – OFF
SEC – ON
- 3. RAD BYP VLV LOOP 1,2 MODE (two) – MAN
MAN SEL (two) – BYP until tb – BYP
- CRT 4. After 2 min, ✓ EVAP OUT T –62 degF
- L1 5. RAD BYP VLV LOOP 1,2 MODE (two) – AUTO
CNTLR LOOP 1,2 (two) – OFF, then AUTO A(AUTO B)
After 90 sec, ✓ tb – RAD (two)
- 6. Perform FES RESTART, ECLS SSR-5
- 7. HI LOAD EVAP – OFF
After 30 min,
- 8. FLASH EVAP HI LOAD DUCT HTR – OFF
- 9. CNTLR SEC – A SPLY

NOM

ECLS SSR-7 (Cont)

- a. PRIMARY CNTLR A,B, TOPPING and HI LOAD EVAP, A and B SPLY CHECKOUT
- L1 1. HI LOAD EVAP – ENA
FLASH EVAP CNTLR SEC – A SPLY(B SPLY)
2. PRI A – OFF
B – OFF
SEC – OFF
3. RAD BYP VLV LOOP 1,2 MODE (two) – MAN
MAN SEL (two) – BYP until tb – BYP
- CRT 4. When EVAP OUT T > 47 degF, FLASH EVAP CNTLR PRI A – ON
5. After 60 sec, ✓EVAP OUT T ~-39 degF ± 1 degF
- L1 6. FLASH EVAP CNTLR PRI A – OFF
B – ON
- CRT After 60 sec, ✓EVAP OUT T ~-39 degF ± 1 degF
- L1 7. RAD BYP VLV LOOP 1,2 MODE (two) – AUTO
CNTLR LOOP 1,2 (two) – OFF, AUTO A(AUTO B)
After 90 sec, ✓tb (two) – RAD
8. After 2 min, HI LOAD EVAP – OFF
- b. PRIMARY CNTLR A,B, TOPPING, STARTUP FROM STBY CHECKOUT
1. Perform FES RESTART, ECLS SSR-5, using A CNTLR
- CRT 2. ✓RAD OUT T ~-39 degF (FES to STBY)
Pwrn and/or change attitude if necessary
- L1 3. RAD CNTLR OUT T – HIGH
- CRT 4. After 2 min, ✓EVAP OUT T ~-39 degF ± 1 degF
- L1 5. FLASH EVAP CNTLR PRI A – OFF
B – ON
- CRT 6. After 60 sec, ✓EVAP OUT T ~-39 degF ± 1 degF
- L1 7. RAD CNTLR OUT T – NORM, then immediately
8. FLASH EVAP CNTLR PRI B – OFF, ON
9. ✓RAD OUT T ~-39 degF ± 1 degF
10. CNTLR OUT T – HIGH
11. After 2 min, ✓EVAP OUT T ~-39 degF ± 1 degF
12. RAD CNTLR OUT T – NORM
13. FLASH EVAP CNTLR PRI B – OFF

ECLS SSR-8 (Cont)

WCS/
EDO
WCS

17. VAC VLV – OP

PCS CONFIG (On MCC call)

18. ✓ MCC for PCS config and TIG time (if necessary)

LEAK SEALING (On MCC call)

19. Go to CABIN LEAK SEALING (PROCEDURES A thru F, IFM)

ECLS SSR-9 RAD ISOL RECOVERY

NOTE

Procedure reestablishes radiator flow after an inadvertent isolation due to an instrumentation or Freon isolation logic failure. Expect possible 'S88 EVAP OUT T 1(2)' msg

- L1 1. FLASH EVAP CNTLR PRI A,B,SEC (three) – OFF
- If Freon Loop 1 aff:
 - L2 2. RAD BYP VLV MODE 1 – MAN
 CNTLR LOOP 1 – OFF, then
 AUTO A(AUTO B)
 - L2 3. After 10 sec, RAD BYP VLV MODE 1 – AUTO
 - L2 4. RAD CNTLR OUT TEMP – HI
 - L2 5. FREON ISOL MODE – MAN
 LOOP 1 – RADIATOR (hold 5 sec)
- If Freon Loop 2 aff:
 - L1 6. RAD BYP VLV MODE 2 – MAN
 CNTLR LOOP 2 – OFF, then
 AUTO A(AUTO B)
 - L2 7. After 10 sec, RAD BYP VLV MODE 2 – AUTO
 - L2 8. RAD CNTLR OUT TEMP – HI
 - L2 9. FREON ISOL MODE – MAN
 LOOP 2 – RADIATOR (hold 5 sec)
- L1 10. After 5 min, RAD OUT TEMP – NORM
- If FES reqd, go to FES RESTART, ECLS SSR-5

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ECLS SSR-10 H2O PUMP OPS VIA GPC

NOTE

Provides continuous GPC commanding of the H2O loop pumps

1. Reset pump cycling constants (if comm available. MCC can TMBU if desired)
 - SM 60 SM TABLE MAINT
 - ITEM 16 +9 2 0 6 4 1 EXEC
 - 17 +9 9 9 9 9 EXEC
 - 16 +9 2 0 6 4 0 EXEC
 - 17 +1 EXEC
2. If reqd, perform PL/DPS RECONFIG (PL SYS: or SODF: ASSY OPS), Secure (PL SYS)
3. Perform SM CHECKPOINT INITIATE (ORB OPS, DPS)

If WCL 1 for continuous ops:

- L4:F
L1
- If Pump A reqd:
 - 4. cb AC1 H2O LOOP PUMP 1 A/2 (three) – cl
 - 5. H2O PUMP LOOP 1 – A
 - If Pump B reqd:
 - 6. ✓ H2O PUMP LOOP 1 – B
 - 7. H2O PUMP LOOP 1 – GPC
 - LOOP 1 BYP MODE – AUTO
 - 2 BYP MODE – MAN
 - 8. H2O PUMP LOOP 2 – OFF
- O1
- 9. H2O PUMP OUT PRESS – 1

If WCL 2 for continuous ops:

- L4:F
L1
- 10. cb AC1 H2O LOOP PUMP 1 A/2 (three) – cl
 - 11. H2O PUMP LOOP 2 – GPC
 - ✓ LOOP 2 BYP MODE – AUTO
 - ✓ 1 BYP MODE – MAN
 - 12. H2O PUMP LOOP 1 – OFF
- O1
- 13. ✓ H2O PUMP OUT PRESS – 2

NOTE

Ops transition in steps 14 and 15 causes MCIU to lose I/O with the GPC. Coordinate ops transition with PDRS to avoid impacts to ongoing PDRS operations. Nominal PDRS ops are recovered in step 17, if required

14. SM OPS 000 PRO
15. SM OPS 201 PRO
16. S88 APU/ENVIRON THERM
 - ✓ H2O LOOP PUMP OUT P 1(2): 61–69
17. If reqd:
 - S94 PDRS CONTROL
 - I/O ON – ITEM 5 EXEC(*)
 - SAFING – CANCEL
18. SM(GNC,PL) 1 DPS UTILITY
 - CKPT RETRV ENA – ITEM 12 EXEC (*)
 - UL CNTL AUTO – ITEM 35 EXEC (*)
19. If reqd, perform PL/DPS RECONFIG, (PL SYS: or SODF: ASSY OPS)
20. C/W update (if comm available, MCC can TMBU software limits if desired)

Loop 1 active	Loop 2 active
(R13U) <ul style="list-style-type: none"> ● Change Loop 1 PUMP OUT P (param 105) lower C/W limit to 1.50 vdc (45 psia) and Loop 2 (param 115) to 0.70 vdc (19.5 psia) 	(R13U) <ul style="list-style-type: none"> ● Change Loop 2 PMUP OUT P (param 115) lower C/W limit to 1.50 vdc (45 psia) and Loop 1 (param 105) to 0.70 vdc (19.5 psia)
Reconfig B/U C/W SM 60 SM TABLE MAINT <ul style="list-style-type: none"> ● ITEM 1 +0 6 1 2 6 0 0 EXEC ● ITEM 11 +4 5 EXEC ● ITEM 1 +0 6 1 2 7 0 0 EXEC ● ITEM 11 +1 9 . 5 EXEC 	Reconfig B/U C/W SM 60 SM TABLE MAINT <ul style="list-style-type: none"> ● ITEM 1 +0 6 1 2 7 0 0 EXEC ● ITEM 11 +4 5 EXEC ● ITEM 1 +0 6 1 2 6 0 0 EXEC ● ITEM 11 +1 9 . 5 EXEC

ECLS SSR-11

FES FEEDLINE PURGE

NOTE

Procedure provides evacuation of H2O from FES Feedlines in the event of dual htr failures or htr deactivation during major pwrdn. If purge of both feedlines is to be performed or if SPLY H2O dump reqd, perform dump before performing this procedure to provide ullage

- L1 1. FLASH EVAP CNTLR PRI A – OFF
 - ✓B – OFF
 - ✓SEC – OFF
- R11L 2. SPLY H2O DUMP ISOL VLV – CL (tb-CL)
 - ✓VLV – CL (tb-CL)
- 3. Unstow (top drawer of IFM container):
 - Free Fluid Nozzle
 - Y/R QD Adapter
 - Towel
- WCS 4. Install red-banded side of Y/R QD Adapter to Free Fluid Nozzle

NOTE

Hold Towel around Free Fluid Nozzle in the following step to soak up any H2O that leaks out of Nozzle during installation

- 5. Install yellow-banded side of Y/R QD Adapter to CONT H2O X-TIE POT QD

If only B FDLN requires purging:

NOTE

After evacuation of B FDLN, SPLY H2O can be managed in normal fashion by SPLY H2O dumps or boiling thru FES A SUPPLY WATER DUMP USING FES (ORB OPS, ECLS)

- ML31L 6. SPLY H2O TKD OUTLET – CL (tb-CL)
- R11L 7. TKA,TKB,TKC OUTLET – CL (tb-CL)
 - ✓B SPLY ISOL VLV – OP
 - XOVR VLV – OP (tb-OP)
 - DUMP ISOL VLV – OP (tb-OP)
- L1 8. RAD CNTLR OUT TEMP – HI
- O1 9. When EVAP OUT T > 47 degF,
 - FLASH EVAP CNTLR PRI B – ON
- 10. When FES shuts down and EVAP OUT T again > 47 degF,
 - FLASH EVAP CNTLR PRI B – OFF, ON
- 11. Repeat step 10 until EVAP OUT T remains at -57 degF,
 - then FLASH EVAP CNTLR PRI B – OFF
- R11L 12. SPLY H2O B SPLY ISOL VLV – CL
 - XOVR VLV – CL (tb-CL)
 - DUMP ISOL VLV – CL (tb-CL)
- 13. TKB OUTLET – OP (tb-OP)
- L2 14. TKB OUTLET – OP (tb-OP)
- L1 15. FLASH EVAP FDLN HTR B SPLY – OFF
- 16. ✓CNTLR SEC – A SPLY

If only A FDLN requires purging:

NOTE

After evacuation of A FDLN, SPLY H2O can be managed using FES B and SPLY H2O TKS C and/or D SUPPLY WATER DUMP USING FES (ORB OPS, ECLS)

- R11L 17. SPLY H2O TKA,TKB OUTLET – CL (tb-CL)
 - ✓XOVR VLV – CL (tb-CL)
 - DUMP ISOL VLV – OP (tb-OP)
- L1 18. RAD CNTLR OUT TEMP – HI
- O1 19. When EVAP OUT T > 47 degF,
 - FLASH EVAP CNTLR PRI A – ON
- 20. When FES shuts down and EVAP OUT T again > 47 degF,
 - FLASH EVAP CNTLR PRI A – OFF, ON
- 21. Repeat step 20 until EVAP OUT T remains at -57 degF,
 - then FLASH EVAP CNTLR PRI A – OFF
- R11L 22. SPLY H2O DUMP ISOL VLV – CL (tb-CL)
- L2 23. FLASH EVAP FDLN HTR A SPLY – OFF
- L1 24. CNTLR SEC – B SPLY

ECLS SSR-11 (Cont)

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If both A,B FDLNs require purging:

NOTE

SPLY H2O can be managed by normal means after lines are refilled. Lines should be reevacuated after completion of dump

- L1 25. Perform steps 6 thru 11, then:
FLASH EVAP CNTLR PRI A – ON
- L2 26. Perform steps 20 thru 22, then:
- L1 27. FLASH EVAP FDLN HTR A,B SPLY (two) – OFF
- L1 28. TOP EVAP HTR DUCT – OFF
NOZ L,R (two) – OFF
- 29. RAD CNTLR OUT TEMP – NORM
- WCS 30. Remove Y/R QD Adapter from CONT H2O X-TIE POT QD
- R11L SPLY H2O DUMP ISOL VLV – OP (tb-OP)
- 31. Stow Tools and Towel

NOTE

✓MCC for possible SPLY H2O DUMP after completion of procedure

ECLS SSR-12 AV BAY FIRE RECOVERY/RECONFIG

NOTES

1. This procedure is used to restore a single fault tolerance condition to orbiter after ORB PKT, PWRDN, AV BAY FIRE has been performed. It may be necessary to repower equipment in affected Av Bay to restore Single Fault Tolerance (SFT)
2. The following Reference Table identifies location of equipment to ensure SFT for entry:

Essential Equipment	Av Bay 1	Av Bay 2	Av Bay 3A
ANTISKID	X	X	
AUD CTR	1,2		
BRAKES	X	X	
COMM			X
C/W			X
OI MDM	OF1	OF2	OF3
OI DSC	OF1	OF2	OF3
PL MDM	PL1	PL2	
Minimum Equip reqd for SFT	Av Bay 1	Av Bay 2	Av Bay 3A
3 of 4 FF MDMs	FF1	FF2,FF4	FF3
3 of 4 ADTAs	1,3	2,4	
3 of 4 AAs	1,4	2,3	
2 of 3 MLSs	1	2,3	
2 of 3 TACANs	1	2	3
2 of 3 FMCAs	1	2	3
3 of 5 GPCs	1,4	2,5	3

3. Perform with MCC coverage, if possible
4. Recovery steps A,B, and C are reqd to provide valid smoke concentrations
5. Perform recovery steps D thru M if smoke conc stable or decreasing
6. FRCS dump will be 2 jet dump only

CAUTION

Do NOT close any cb(s) found open at time of fire that is normally closed. Unpower recovered component if smoke concentration increases during recovery

A. OI MDM RECOVERY (IF REQD)

If Av Bay 1 or 2 affected:

- O14:B 1. cb MNA OI MDM OF 1/2 A - cl
If cb not reset then:
- O15:B 2. cb MNB OI MDM OF 1/2 B - cl
- If Av Bay 3A affected:
- O14:B 3. cb MNA OI MDM OF 3/4 A - cl
If cb not reset then:
- O16:B 4. cb MNC OI MDM OF 3/4 B - cl

SM 62 PCMMU/PL COMM

5. PCMMU I/O RESET PCM - ITEM 5 EXEC (*)

B. OI DSC RECOVERY (IF REQD)

If Av Bay 1 affected:

- O14:B 1. cb MNA OI SIG CONDR OF 1/4 A - cl
If cb not reset, then:
- O15:B 2. cb MNB OI SIG CONDR OF 1/4 B - cl
- If Av Bay 2 or 3A affected:
- O15:B 3. cb MNB OI SIG CONDR OF 2/3 A - cl
If cb not reset, then:
- O16:B 4. cb MNC OI SIG CONDR OF 2/3 B - cl

C. AV BAY FAN RECONFIG

CAUTION

With Av Bay Fan activation, a momentary rise in smoke concentration may result. If smoke concentration continues to increase for > 1 min, unpower affected bay

ECLS SSR-12 (Cont)

F. IMU FAN RECONFIG

SM 66 ENVIRONMENT

- If Av Bay 1 affected:
- L1 1. IMU FAN C(B) – OFF
 - CRT If IMU FAN ΔP < 3.7 or > 4.95
 - L1 2. IMU FAN C(B) – ON
 - CRT B(C) – OFF
 - 3. ✓ IMU FAN ΔP OK
- If Av Bay 2 affected:
- L1 4. IMU FAN A(C) – OFF
 - CRT If IMU FAN ΔP < 3.7 or > 4.95
 - L1 5. IMU FAN A(C) – ON
 - CRT C(A) – OFF
 - 6. ✓ IMU FAN ΔP ok
- If Av Bay 3A affected:
- L1 7. IMU FAN A(B) – OFF
 - CRT If IMU FAN ΔP < 3.7 or > 4.95
 - L1 8. IMU FAN A(B) – ON
 - CRT B(A) – OFF
 - 9. ✓ IMU FAN ΔP OK

G. CAUTION AND WARNING RECOVERY (For AV BAY 3A only)

- O13:C 1. cb ESS 2CA C/W B – cl (MA)
- F2(F4,A7) 2. MSTR ALARM pb – off
- O13:A 3. cb ESS 1BC C/W A – cl (MA)
- F2(F4,A7) 4. MSTR ALARM pb – off

NOTE

C/W parameters must be reset to nominal on-orbit config since temporary loss of pwr has set hardware C/W parameters to their default values

- R13U 5. Inhibit parameters specified for on-orbit ops on PRIMARY C/W PARAMETER MATRIX Cue Card
6. Use C/W & FDA TABLE (REF DATA) to reset limits for:
- | CH | Param |
|-----|-----------------|
| 004 | CAB PRESS |
| 007 | OMS TK P OX – L |
| 017 | OMS TK P FU – L |
| 037 | OMS TK P OX – R |
| 047 | OMS TK P FU – R |
| 074 | CAB FAN Delta P |
7. C/W MEM – CLEAR
8. C/W PARAM SEL tw (three) – >119

H. AC BUS RECOVERY

- If AC Bus is suspect, go to step 13
1. Isolate 3Φ bus per table

NOTE

3Φ AC UTIL PWR cbs are located on pnl L4:B

SM 67 ELECTRIC

- O13:A(C,E) 2. cb ESS 1BC (2CA,3AB) AC1(AC2,AC3) SNSR – cl
- R1 3. Aff AC BUS SNSR – OFF

			(L4,MA73C) cb – open all (3Φ,ΦA, ΦB,ΦC) on aff AC bus	
			Number of cb to open:	
	BUS		L4	MA73C
AC1	3Φ		1	4
	ΦA		15	5
	ΦB		15	4
AC2	3Φ		0	9
	ΦA		15	5
	ΦB		16	4
AC3	3Φ		13	5
	ΦA		1	7
	ΦB		15	3
	ΦC		16	3
	ΦC		12	3

ECLS SSR-12 (Cont)

CAUTION

Following steps should be reviewed carefully prior to their execution since affected AC system may be tied into a short

Repower Φ A:

4. cb aff AC CONTR Φ A – cl
 Aff INV PWR – ON
 INV/AC BUS – ON
- CRT ✓ Aff AC VOLTS > 110 and < 120
 ✓ Aff AC AMPS < 1
- If AC VOLTS, AMPS limits exceeded:
5. Aff INV/AC BUS – OFF (tb-OFF)
 INV PWR – OFF (tb-OFF)
6. cb aff AC CONTR Φ A – op
7. Repeat steps 4 thru 6 for Φ B, then Φ C
- If no phases recovered:
- O13:A(C,E) 8. cb ESS 1BC(2CA,3AB) AC1(AC2,AC3) SNSR – op
- If any phase recovered:
9. Aff AC BUS SNSR – AUTO
10. For recovered phases, all single Φ cbs – cl
- If all 3 Φ s recovered:
11. All 3 Φ cbs – cl
- If 2 or 3 Φ s recovered:
12. Perform FC RESTART, EPS SSR-6
13. Perform aff AC Bus Loss Actions (assume shorted Φ), if reqd

I. GPC RECOVERY

NOTE

Three of five GPCs reqd for single fault tolerance

If requirement not met:

Perform GNC REASSIGNMENT, DPS SSR-3
If first GPC recovery fails, then try other GPC, if available

J. FF MDM

NOTE

Three of four FF MDMs reqd for single fault tolerance. MDM
FF2 reqd for FRCS dump

If requirements not met, reactivate MDM(s) in affected bay:

- O6 MDM FF1(FF2,FF3,FF4) – ON
CRT GNC I/O RESET

K. PL MDM RECOVERY

- O6 MDM PL1(PL2) – ON
CRT SM I/O RESET

L. ADTA, AA, MLS, TACAN

NOTE

Three of four ADTAs reqd for single fault tolerance.
Three of four AAs reqd for single fault tolerance.
Two of three MLSs reqd for single fault tolerance.
Two of three TACANs reqd for single fault tolerance

If requirement not met:

Perform FCS CHECKOUT, DISPLAY/DPS CONFIG and ON-ORBIT FCS CHECKOUT,
PART 2 (ORB OPS, GNC) to verify equipment function in the affected Av Bay
for single fault tolerance (as a minimum)

NOTE

Following FCS CHECKOUT, recovered equipment may be unpowered until deorb prep

M. FMCA

NOTE

Two of three FMCAs reqd for single fault tolerance

If requirement not met (confirmed by MCC):

- MA73C:A MCA LOGIC MNA(MNB,MNC) FWD 1(2,3) – ON

ECLS SSR-13

ON-ORBIT RAD CNTLR SWITCH

NOTE

Procedure switches Radiator Controllers in affected Freon Coolant Loop Radiator. 10-sec pause is necessary to prevent movement of bypass vlv, thus eliminating possibility of bypass vlv failing in bypass. Expect possible 'S88 EVAP OUT T 1(2)' msg

- L1 FLASH EVAP CNTLR PRI A,B,SEC (three) – OFF
 - If Freon Loop 1 aff:
 - RAD BYP VLV MODE 1 – MAN
 - CNTLR LOOP 1 – AUTO B(AUTO A)
 - After 10 sec, RAD BYP VLV MODE 1 – AUTO
 - If Freon Loop 2 aff:
 - RAD BYP VLV MODE 2 – MAN
 - CNTLR LOOP 2 – AUTO B(AUTO A)
 - After 10 sec, RAD BYP VLV MODE 2 – AUTO
- O1 If FES reqd, wait 4 min, then:
 - If FREON EVAP OUT TEMP > 41 and ≤ 47 degF:
 - L1 RAD CNTLR OUT TEMP – HI
 - O1 When FREON EVAP OUT TEMP > 50 degF:
 - L1 RAD CNTLR OUT TEMP – NORM, then immediately,
 - FLASH EVAP CNTLR PRI A(B) – ON
 - O1 If FREON EVAP OUT TEMP ≤ 41 or > 47 degF:
 - L1 FLASH EVAP CNTLR PRI A(B) – ON

ECLS SSR-14 ECLS COMPUTATION INHIBIT

TABLE A

REMOVAL OF FAILED/DEGRADED PPO2 SNSR FROM O2 CONCENTRATION COMPUTATION

SM 60 SM TABLE MAINT		
If PPO2 SNSR A failed/degraded	If PPO2 SNSR B failed/degraded	If PPO2 SNSR C failed/degraded
CONSTANT ID – ITEM 16 +9 2 2 1 3 1 EXEC ✓ Update of CONSTANT ID CONSTANT VALUE – ITEM 17 +0 EXEC ✓ Update of CONSTANT VALUE	CONSTANT ID – ITEM 16 +9 2 2 1 3 2 EXEC ✓ Update of CONSTANT ID CONSTANT VALUE – ITEM 17 +0 EXEC ✓ Update of CONSTANT VALUE	CONSTANT ID – ITEM 16 +9 2 2 1 3 3 EXEC ✓ Update of CONSTANT ID CONSTANT VALUE – ITEM 17 +0 EXEC ✓ Update of CONSTANT VALUE
<ul style="list-style-type: none"> • Notify MCC of disabled constant 		

TABLE B

O2 CONCENTRATION COMPUTATION INHIBIT

SM 60 SM TABLE MAINT
PARAM ID – ITEM 1 +9 2 2 1 0 4 EXEC ✓ Update of PARA.03M ID INH – ITEM 10 EXEC
<ul style="list-style-type: none"> • Notify MCC of inhibited parameter

TABLE C

EQUIVALENT dP/dT COMPUTATION INHIBIT

SM 60 SM TABLE MAINT
PARAM ID – ITEM 1 +9 2 4 9 3 5 EXEC ✓ Update of PARAM ID INH – ITEM 10 EXEC
<ul style="list-style-type: none"> • Notify MCC of inhibited parameter

TABLE D

REMOVAL OF FAILED/DEGRADED N2 TANK TEMP/PRESSURE FROM N2 QTY COMPS

Normally all temperature and pressure transducer flags are set to 1. If transducer fails, disable failed transducer's flag. For example, if SYS 1 N2 TANK 1 TEMP has failed, disable its flag, then the comp uses TK 2 TEMP in lieu of TANK 1 TEMP in the quantity computation. ✓MCC for multiple failures

SM 60 SM TABLE MAINT			
Update CONSTANT ID:			
ITEM 16 + _____ EXEC (ID numbers below)			
ITEM 17 + __ EXEC (1 = transducer is OK, 0 = transducer is faulty)			
CONSTANT ID	NAME	CONSTANT ID	NAME
925521	SYS 1 N2 TANK 1 TEMP FLAG	925526	SYS 1 N2 TANK 4 TEMP FLAG
925522	SYS 1 N2 TANK 2 TEMP FLAG	925527	SYS 2 N2 TANK 3 TEMP FLAG
925523	SYS 2 N2 TANK 1 TEMP FLAG	925528	SYS 2 N2 TANK 4 TEMP FLAG
925524	SYS 2 N2 TANK 2 TEMP FLAG	925529	SYS 1 N2 PRESS FLAG
925525	SYS 1 N2 TANK 3 TEMP FLAG	925530	SYS 2 N2 PRESS FLAG

TABLE E

N2 TANK CONFIG

The following table is used to enable/disable N2 tank depending on whether or not it is flown. ✓MCC to verify vehicle config shown below. ** designates flight-specific tanks

SM 60 SM TABLE MAINT		
Update CONSTANT ID:		
ITEM 16 + _____ EXEC (ID numbers below)		
ITEM 17 + __ EXEC (1 = tank active, 0 = tank inactive)		
CONSTANT ID	NAME	VEHICLE CONFIG (ITEM 17)
925531	SYS 1 N2 TANK 1 FLAG	*
925532	SYS 1 N2 TANK 2 FLAG	*
925533	SYS 1 N2 TANK 3 FLAG	1
925534	SYS 1 N2 TANK 4 FLAG	1
925535	SYS 2 N2 TANK 1 FLAG	1
925536	SYS 2 N2 TANK 2 FLAG	1
925537	SYS 2 N2 TANK 3 FLAG	*
925538	SYS 2 N2 TANK 4 FLAG	*

ECLS SSR-16

FREE WATER LEAKING FROM HUM SEP

CAUTION

Leave one Humidity Sep running continuously. Deactivating both Humidity Separators simultaneously could cause further flooding of Humidity Sep and damage Humidity Sep when restarted

- L1
1. HUM SEP A(B) – ON
B(A) – OFF
 2. Perform LiOH STOWAGE VOLUME REMOVAL (IFM)
 3. Clean up free water in Lower Equipment Bay
If practical, contact MCC prior to performing FREE FLUID DISPOSAL (IFM), for possible waste water dump; otherwise, use towels to soak up water. For remainder of flight, check pre/post-sleep daily for free water in Lower Equipment Bay. Report to MCC
 4. If second HUM SEP LEAKS WATER, perform the following steps:
If any step stops water from leaking, >>
 5. HUM SEP A,B (two) – ON
Monitor HUM SEP operation by checking for water around outlet screen. If over 15 min,
Report to MCC
 6. Depress H2O TKs:
 - ✓ Best HUM SEP – ON
 - Other HUM SEP – OFF
 - FLASH EVAP CNTLR PRI A(B) – OFF
 - H2O TK N2 ISOL SYS 1, SYS 2 vlv (two) – CL
 - SPLY H2O GN2 TK VENT vlv – VENT
 - ✓ TKA SPLY vlv – OP
 Expect audible vent and 'S66 WASTE H2O PRES' alert for Waste Press '↓' (See SSR-17 for H2O dumps)
 7. Perform HUM SEP AIR OUTLET H2O ABSORPTION (IFM)
 8. Go to HUM SEP CONTINGENCY H2O REMOVAL (IFM)
- MO10W
ML26C

ECLS SSR-17 WATER TANK REPRESS/DEPRESS

NOTE

This SSR may be reqd for water dumps in the event water tanks are depressed for humidity separator problems. Repressing water tanks for supply or waste water dumps decreases amount of time reqd for dump

1. Start repress ~30 min prior to water dump
- ML26C 2. SPLY H2O GN2 TK VENT vlv – PRESS
 ✓TKA SPLY vlv – OP
- MO10W 3. H2O TK N2 REG INLET SYS 1,SYS 2 vlv (two) – OP
 ISOL SYS 1,SYS 2 vlv (two) – OP
 Expect 'S66 CAB H2O N2 P1,P2' msgs for H2O TK N2 P '↓'
4. Perform SUPPLY(WASTE) WATER DUMP (ORB OPS, ECLS)
 Depress Tanks
- ML26C 5. H2O TK N2 ISOL SYS 1,SYS 2 vlv (two) – CL
6. SPLY H2O GN2 TK VENT vlv – VENT
 ✓TKA SPLY vlv – OP
 Expect audible vent and 'S66 WASTE H2O PRES' alert for Waste Press '↓'
7. Visually inspect Lower Equipment Bay for free water
 Report to MCC

ECLS SSR-18

SMALL SUPPLY H2O LEAK ISOL

NOTE

This procedure assumes that MCC is available for assistance and would inform crew of tank C leak (which is normally isolated) or dump line leak at nozzle. This procedure also assumes that tanks B, D are tied together and that tank C is isolated. Also note that Supply H2O tanks remain pressurized during troubleshooting

SM 66 ENVIRONMENT

- L1 1. FLASH EVAP CNTLR PRI A,B – OFF
R11L SPLY H2O XOVR vlv – CL (tb-CL)
B SPLY ISOL VLV – CL (tb-CL)
MCC,CRT If no TK QTY decr or incr at a reduced rate:
Perform steps 8, 10 >>
R11L SPLY H2O DUMP ISOL VLV – CL (tb-CL)
MCC,CRT If no SPLY H2O TK QTY decr or incr at a reduced rate:
Perform steps 8-11 >>
SPLY H2O DUMP ISOL VLV – OP (tb-OP)
If no internal airlock:
- #### SM 177 EXTERNAL AIRLOCK
- MO13Q ARLK H2O S/O VLV – CL (tb-CL)
If H2O XFER P decr or -0:
Perform steps 8,9,10,12 >>
MO13Q ARLK H2O S/O VLV – OP (tb-OP)
- CRT 2. If SPLY H2O TK QTY D decr:
ML31C SPLY H2O TK D INLET, OUTLET (two) – CL (tb-CL)
CRT If SPLY H2O TK QTY D decr:
Perform step 6
Perform SUPPLY/WASTE WATER DUMP (ORB OPS, ECLS) for TK D on MCC call
ML31C SPLY H2O TK D INLET, OUTLET (two) – CL (tb-CL)
Perform steps 7-11 >>
MCC,CRT If SPLY H2O TK QTY B decr or incr at a reduced rate:
Perform steps 6, 8, 9, 11 >>
MCC,CRT If no SPLY H2O TK QTY decr or incr a reduced rate:
Perform steps 9-11 >>
- CRT 3. If SPLY H2O TK QTY A > 90% (on MCC call):
R11L SPLY H2O TK A OUTLET – OP (tb-OP)
√ B OUTLET – OP (tb-OP)
CRT When SPLY H2O TK QTY A < 80% or MCC call:
R11L SPLY H2O TK A OUTLET – CL (tb-CL)
Go to step 4 or 5 based on H2O tank qty observation
- CRT 4. If SPLY H2O TK QTY B decr:
R11L SPLY H2O TK B INLET,OUTLET (two) – CL (tb-CL)
CRT If SPLY H2O TK QTY B decr:
Perform step 6
Perform SUPPLY/WASTE WATER DUMP (ORB OPS, ECLS) for TK B on MCC call
R11L SPLY H2O TK B INLET,OUTLET (two) – CL (tb-CL)
Perform steps 7-11 >>
AW82B If PRESS H2O decr or -0:
Perform steps 9-11 using FES CNTRL PRI B on MCC call
R11L SPLY H2O TK B INLET – OP (tb-OP) >>
Perform steps 6, 8, 9, 11 (leak at tank B inlet manifold)
SPLY H2O TK B OUTLET – OP (tb-OP) >>
- MCC,CRT 5. If SPLY H2O TK QTY A decr or incr at reduced rate:
R11L SPLY H2O GALLEY SPLY VLV – CL (tb-CL)
MCC,CRT If SPLY H2O TK QTY A decr or incr at reduced rate:
R11L SPLY H2O TK A INLET – CL (tb-CL)
MD23R Open middeck pnl and disconnect lower (FC) QD on microbial filter
CRT If SPLY H2O TK QTY A decr:
Perform step 6
Perform SUPPLY/WASTE WATER DUMP (ORB OPS, ECLS) for TK A on MCC call
SPLY H2O TK A INLET, OUTLET (two) – CL (tb-CL)
Perform steps 7-11 >>
- CRT If SUPPLY H2O PRESS ~15:
Perform steps 8-11
√ MCC to restore Galley ops >>
MD23R Open middeck pnl and reconnect lower (FC) QD on microbial filter
R11L SPLY H2O GALLEY SPLY VLV – OP (tb-OP)
MD80R Open middeck pnl and inspect for free H2O
Perform steps 6, 8, 9, 11 on MCC call
Perform steps 8-11 on MCC call
√ MCC to restore Galley ops >>

ECLS SSR-18 (Cont)

- MO10W 6. H2O TK N2 ISOL SYS 1,SYS 2 vlv – CL
ML26C SPLY H2O GN2 TANK A SPLY – OP
VENT – VENT
Expect audible vent and 'S66 WASTE H2O PRES' alert for Waste Pres '↓'
- ML26C 7. SPLY H2O GN2 TANK A SPLY – OP
VENT – PRESS
MO10W H2O TK N2 ISOL SYS 1,SYS 2 vlv – OP
Expect 'S66 CAB H2O N2 P1, P2' msgs for H2O TK N2 P '↓'
- R11L 8. SPLY H2O XOVR vlv – OP (tb-OP)
9. B SPLY ISOL VLV – OP (tb-OP)
10. Perform TOPPING FES STARTUP (ORB OPS, ECLS)
11. Visually inspect LEB and perform FREE FLUID DISPOSAL (IFM) as reqd
12. Visually inspect Middeck floor (water line close out area) and Ext A/L
Go to FREE FLUID DISPOSAL (IFM) as reqd

ECLS SSR-19

SMALL WASTE H2O LEAK ISOL

This procedure assumes that MCC is available for assistance. This procedure has the Waste Tank pressurized for a portion of troubleshooting

SM 66 ENVIRONMENT

- CREW 1. Report any increase in pungent odor
- ML31C WASTE H2O DUMP ISOL VLV – CL (tb-CL)
- CRT 2. If WASTE H2O QTY 1 decr:
- L1 HUM SEP A,B – OFF
- Terminate WCS use
- ML31C WASTE H2O TK 1 VLV – CL (tb-CL)
- CRT If WASTE H2O QTY 1 decr:
- L1 3. FLASH EVAP CNTLR PRI A,B – OFF
- MO10W H2O TK N2 ISOL SYS 1,2 vlv (two) – CL
- ML26C ✓SPLY H2O GN2 TANK A SPLY – OP
- VENT – VENT
- Expect 'S66 WASTE H2O PRES' msg
- MCC,CRT If WASTE H2O QTY 1 decr AT SAME RATE with no pungent odor (Bellows leak):
- Perform steps 5, 6, 8 >>
- 4. Perform SUPPLY/WASTE WATER DUMP (ORB OPS, ECLS) for WST TANK
- ML31C WST H2O TK 1 VLV – CL (tb-CL)
- Perform steps 5, 6, 8 >>
- Perform steps 7, 8, 9
- ✓MCC for Waste Dump plan >>

CLEAN UP STEPS

- 5. ✓MCC to install CWC at CONT – XTIE/WST H2O QD
- 6. ✓MCC to install WST TK N2 Supply with IFM
- 7. ✓MCC to install CWCs at Humidity Separator outlet and WCS Urine QD
- ML26C 8. ✓SPLY H2O GN2 TANK A SPLY – OP
- VENT – PRESS
- MO10W H2O TK N2 ISOL SYS 1,2 vlv (two) – OP
- Expect 'S66 CAB H2O N2 P1, P2' msgs for H2O TK N2 P '↓'
- L1 HUM SEP B – ON
- Perform TOPPING FES STARTUP (ORB OPS, ECLS)
- Continue WCS ops as reqd
- 9. ✓MCC to perform SUPPY(WASTE) H2O PURGE FROM DUMP LINE(S) (IFM)

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ECLS FRP-2 POST-FIRE CABIN CLEANUP CONTINUATION

NOTE

This procedure is applicable to both avionics bay fires and cabin fires

1. Every 15 min perform the following:
 - a. Record MET and CSA-CP scan location (general)
LOCATION: _____
 - b. Record contaminant levels
 - c. Report contaminant levels to MCC

	Time (MET)	O2%	CO	HCN	HCL
1	: :				
2	: :				
3	: :				
4	: :				
5	: :				
6	: :				
7	: :				
8	: :				

LiOH/ATCO/CHARCOAL CHANGEOUT CRITERIA

If ATCO canister not yet installed:

2. When HCL < 5 ppm, install ATCO (in place of one LiOH canister)

If CO2 Removal Sys flown:

3. Replace charcoal canister after 2 hr
4. When HCN < 0.7 ppm or stable, replace charcoal canister with LiOH canister

If no CO2 Removal Sys flown:

5. Every 15 min replace one LiOH canister
6. When HCN < 0.7 ppm or stable, changeout LiOH canister(s) per preflight schedule
7. When CO < 55 ppm replace ATCO canister with LiOH canister

WARNING

If any crewmember exhibits adverse symptoms when visors are raised, lower all visors. Symptoms could include the following:
Irritation of the eyes, nose, throat
Cough, difficulty breathing
Headache, nausea

8. Raise visors on MCC call
 - * If loss of communications, visors/QDMs down until all the following limits are met: *
 - * No visible indication of smoke in cabin *
 - * Cabin smoke detector readings are < 1.2 *
 - * No symptoms of smoke inhalation *
 - * HCN < 0.7 ppm HCL < 1 ppm CO < 20 ppm *
9. If symptoms experienced prior to donning QDM/LES, QDM/LES may be doffed only if all crewmembers are symptom free for > 10 min
10. If CO2 Removal Sys flown, on MCC call, perform CO2 REMOVAL SYS CNTLR 1(2) CONFIG (ORB OPS, ECLS), then:
11. If QDM/visor flow must continue, initiate O2 control: perform CONTINGENCY CABIN O2 CONTROL, ECLS, FRP-3; otherwise, ✓ MCC for backout steps >>

ECLS FRP-3 CONTINGENCY CABIN O2 CONTROL

SM SYS SUMM 1
SM 66 ENVIRONMENT

NOTE

- This procedure is applicable for:
- Cabin/Av Bay Fire
 - Level 4 Hazardous Spill
 - Unisolatable O2 Leak into cabin

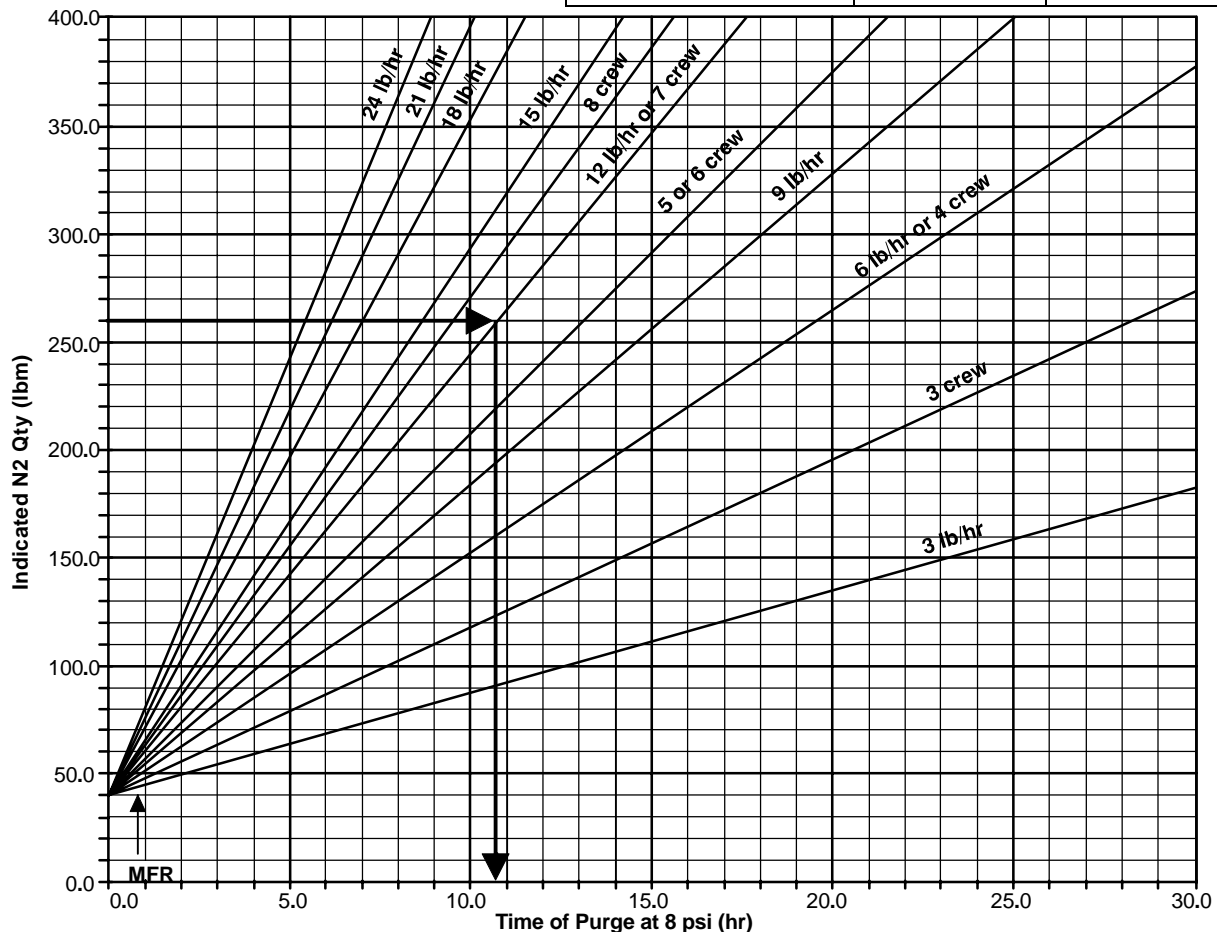
For Av Bay fires: Ensure purge initiated before start of depress

TMAX DETERMINATION

- Determine TMAX from table & graph below:
If ASC, use the following for N2 Qty:
4 N2 tanks: 260 lbs N2
5 N2 tanks: 315 lbs N2
- If TMAX < 3 hr, install ATCO if not already performed

- Time to 8 psi _____ hr
(from chart at right)
- Time of purge + _____ hr
(from graph below)
- Latest TIG: - 1:00 hr
- TMAX = _____ hr

CAUSE	Time to 8 psi in hr	
	From 14.7 psi	From 10.2 psi
Fire (Cab/Av Bay)	1.55	0.67
Haz Spill	1.55	0.67
O2 Leak		
3 lbm/hr	5.83	2.50
6 lbm/hr	2.95	1.28
9 lbm/hr	2.13	0.95
12 lbm/hr	1.55	0.67
15 lbm/hr	1.18	0.52
18 lbm/hr	0.97	0.45
21 lbm/hr	0.80	0.38
24 lbm/hr	0.70	0.33



ECLS FRP-3 (Cont)

DEPRESS & PURGE SETUP

- MO32M, MO69M, C6 L2 3. ✓ LEH 1(2 . . . 8) – OP (as reqd)
- 4. ✓ O2 XOVR SYS 1,2 (two) – OP
- 5. O2/N2 CNTLR VLV SYS 1,2 (two) – OP (N2 flow)
- If LES helmet donned:
 - 6. ✓ TABS/visor – CL
 - 7. ✓ LES O2 – ON
- MO10W 8. 14.7 CAB REG INLET SYS 1,SYS 2 vlv (two) – CL
- 9. O2 REG INLET SYS 1,SYS 2 vlv (two) – CL
- ML86B:A :B 10. ✓ cb MNA(MNB) H2O LINE HTR A(B) – cl
 - ✓ MNA VAC VENT ISOL VLV – cl
 - MNB VAC VENT NOZ HTR – cl
- If internal airlock flown:
 - ML31C 11. ✓ VAC VENT ISOL VLV BUS SEL – MNA
CNTL – CL (tb-CL)
 - 12. Open INNER AIRLOCK HATCH
 - 13. Remove EMUs and all equipment reqd for entry from airlock
 - INNER HATCH 14. Inner hatch EQUAL vlv caps (two) – remove, temp stow
 - 15. EQUAL vlv (one) – OFF
 - 16. ✓ Other EQUAL vlv – NORM
 - 17. EQUAL vlv cap – reinstall on vlv in NORM
- If docked to Mir:
 - 18. Perform TIME CRIT UNDOCKING, EMERGENCY UNDOCKING (MIR OPS)

START DEPRESS TO 8 PSI

- If internal airlock:
 - AW82B 19. AIRLK DEPRESS vlv cap – vent, remove, stow
 - 20. vlv – 0
 - 21. Close INNER AIRLOCK HATCH
 - ML31C 22. VAC VENT ISOL VLV CNTL – OP (tb-OP)
 - ✓ NOZ HTR – ON
 - INNER HATCH 23. Throttle inner hatch EQUAL vlv (one – without cap) until desired EQ dP/dT is established, per table below; tape in place (dP/dT sensor response lags approx 1 min)
- If external airlock only:
 - AW82B 24. AIRLK DEPRESS vlv cap – vent, remove, stow
 - 25. Throttle AIRLK DEPRESS vlv until desired EQ dP/dT is established as follows per table below; tape in place (dP/dT sensor response lags approx 1 min)

CAUSE	EQ dP/dT	INTERNAL AIRLOCK EQUAL VLV CONFIG (two)	EXTERNAL AIRLOCK ONLY AIRLK DEPRESS VLV CONFIG (one)
Fire (Cab/Av Bay)	-0.10	NORM (capped), Throttled	Throttled
Haz Spill	-0.10	NORM (capped), Throttled	Throttled
O2 Leak – 3 (lbm/hr)	—	NORM (capped), OFF	Throttled
6	—	NORM (capped), NORM (capped)	Throttled
9	-0.07	NORM (capped), Throttled	Throttled
12	-0.10	NORM (capped), Throttled	Throttled
15	-0.13	NORM (capped), Throttled	Throttled
18	-0.16	NORM (capped), Throttled	Throttled
21	-0.19	NORM (capped), Throttled	Throttled
24	-0.22	NORM (capped), Throttled	Throttled

NOTE

If SM SYS SUMM not available, EQ dP/dT = dP/dT x 14.7/Cab Press

If prior to OPS 3, when Cab Press < 10.0 psia:

- 26. CM1 perform LOSS OF CAB PRESS PWRDN (ORB PKT, PWRDN)
- CM2 continue with procedure

ECLS FRP-3 (Cont)

O2 MANAGEMENT DURING 8 PSIA PURGE

When Cab Press = 8 psia:

Maintain PPO2 between 2.8 and 3.05 psia for the duration of purge

If internal airlock flown:

- INNER HATCH
- If O2 leak \leq 9 lb/hr or \leq 4 crew on QDM/LESs:
27. EQUAL vlv (one) – OFF
 - ✓ Other EQUAL vlv – NORM, capped
- When PPO2 \geq 3.05:
28. EQUAL vlv (without cap) – NORM, install cap
- When PPO2 \leq 2.8:
29. EQUAL vlv (one) – remove cap, OFF
 30. Continue O2 mgmt per steps 28, 29
- INNER HATCH
31. When ready for entry or LES/QDMs no longer reqd, go to step 46
 32. EQUAL vlv (without cap) – NORM, install cap
- When PPO2 \geq 3.05:
33. EQUAL vlv cap (one) – remove, temp stow
- When PPO2 \leq 2.8:
34. EQUAL vlv cap – reinstall
 - ✓ Other EQUAL vlv – NORM, capped
 35. Continue O2 mgmt per steps 33, 34
 36. When ready for entry or LES/QDMs no longer reqd, go to step 46

If external airlock only flown:

- AW82B
37. AIRLK DEPRESS vlv – CL
 38. vlv cap – reinstall
- MIDDECK FLR
- If Fire or Haz spill:
39. CAB PURGE vlv – dial to number of crew on QDMs
- If O2 leak:
40. CAB PURGE vlv – dial to magnitude O2 leak \div 3
 41. CAB PURGE ISOL VLV – 0
- When PPO2 $<$ 2.8:
42. CAB PURGE ISOL vlv – CL
- When PPO2 \geq 3.05:
43. CAB PURGE ISOL vlv – 0
 44. Continue O2 mgmt per steps 42, 43
 45. When ready for entry or LES/QDMs no longer reqd, continue with step 46

END PURGE AND REPRESS

NOTE

–82 lbm N2 reqd for total repress from 8 psia

46. Prepare for entry or purge termination

If QDM/Visor O2 reqd through entry:

- MO10W
47. Post D/O Burn:
 - 14.7 CAB REG INLET SYS 1, SYS 2 (two) – OP >>

If QDM/Visor O2 no longer reqd:

- If internal airlock flown:
- ML31C INNER HATCH
48. VAC VENT ISOL VLV CNTL – CL (tb–CL)
 49. Inner hatch EQUAL vlv caps (two) – remove, stow
 - ✓ EQUAL vlv (two) – NORM
- AW82B
50. When $\Delta P <$ 0.5, open, stow inner hatch
 51. AIRLK DEPRESS vlv – CL
 52. vlv cap – reinstall
- ML31C
53. VAC VENT ISOL VLV CNTL – OP
- If external airlock only flown:
- MIDDECK FLR
54. CAB PURGE ISOL vlv – CL
 55. vlv – CL
- L2
56. O2/N2 CNTLR SYS 2 – AUTO
- MO10W
57. O2 REG INLET SYS 2 – OP
 58. 14.7 CABIN REG INLET SYS 1, SYS 2 (two) – OP
- If Av Bay fire, terminate AV BAY PURGE:
59. Disconnect, stow IFM hoses and free fluid nozzle
- If Cab Press $>$ 13 psia following repress, backout of LOSS OF CAB PRESS PWRDN may be performed
- If N2 not depleted after repress, reconfig PCS:
60. Go to PCS CONFIG (ORB OPS, ECLS)

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7.6 CRYO

CRYO TABLE A – CRYO HEATER SWITCH PROCEDURAL NOMENCLATURE 7-58

7.6a RESERVED not used

7.6b ‘S68 O2(H2) CNTL P 1(2,3,4,5)’
 ‘168 O2(H2) CNTL P 6(7,8,9)’
 ‘168 O2(H2) TK P 6(7,8,9)’
 ‘S68 O2(H2) TK P 1(2,3,4,5)’ – CRYO O2(H2) PRES, TK P ↓↑ 7-59

7.6c RESERVED not used

7.6d ‘S68 O2(H2) MANF PRESS’ – O2(H2) MANF P ↓ 7-63

7.6e RESERVED not used

7.6f ‘S68 H2 HTR T 1(2,3,4,5)’
 ‘168 H2 HTR T 6(7,8,9)’ – H2 HTR T 7-64

7.6g RESERVED not used

7.6h RESERVED not used

7.6i RESERVED not used

7.6j RESERVED not used

7.6k ‘S68 O2 HTR TRP 1(2,3,4,5)’
 ‘168 O2 HTR TRP 6(7,8,9)’ – O2 HTR CUR SNSR = TRIP 7-65

7.6l ‘S68 O2 HTR T 1(2,3,4,5)’
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SSR-2 RESERVED not used

SSR-3 FC SHUTDN C&W LIMIT CHANGE 7-70

SSR-4 FC STANDBY 7-74

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SSR-7 TWO-PHASE FAN START PROCEDURE 7-84a

SSR-8 BUS LOADING – LRU SELECT 7-85

SSR-9 RESERVED not used

The following msgs have support procedures in the ORB PKT, but not in this book:

- ‘S69 FC REAC 1(2,3)↓’
- ‘S69 FC PUMP 1(2,3)↓’
- ‘S69 FC DELTA V 1(2,3)’
- ‘S69 FC H2O RLF NOZ’
- ‘S67 ESS BUS V 1BC(2CA,3AB)’
- ‘S67 CNTL BUS V’
- ‘S67 CNTL RPC’

The following msgs have no support procedures in this book or in ORB PKT C/L:

- ‘S67 APC/ALC A(B,C)’
- ‘S67 FPC/FLC 1(2,3)’
- ‘S67 MPC 1(2,3)’
- ‘S68 O2(H2) MANF VLV’
- ‘S69 FC READY 1(2,3)’
- ‘FC PURGE 1(2,3)’

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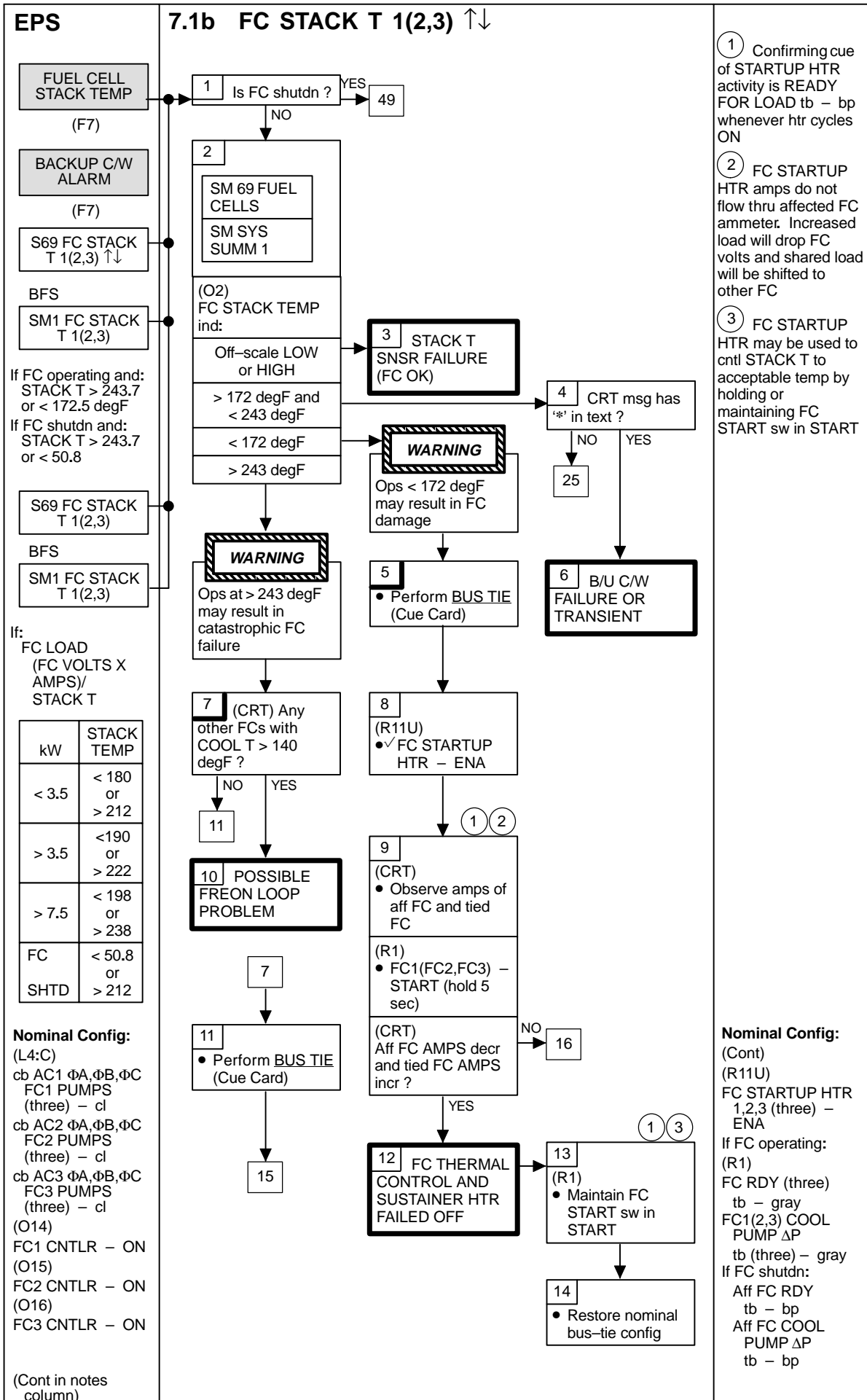
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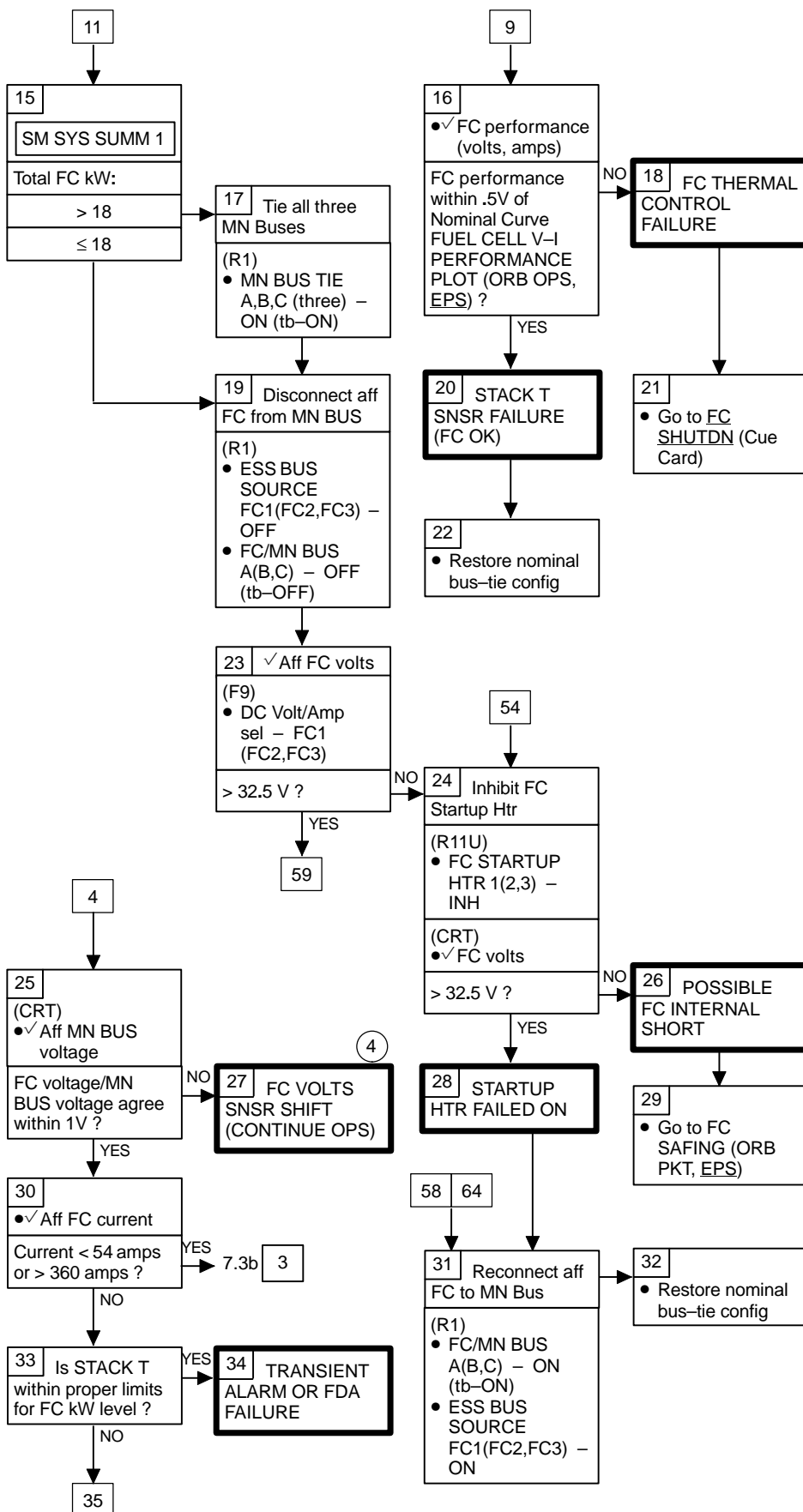
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<u>7.3</u>	<u>FUEL CELL</u>		
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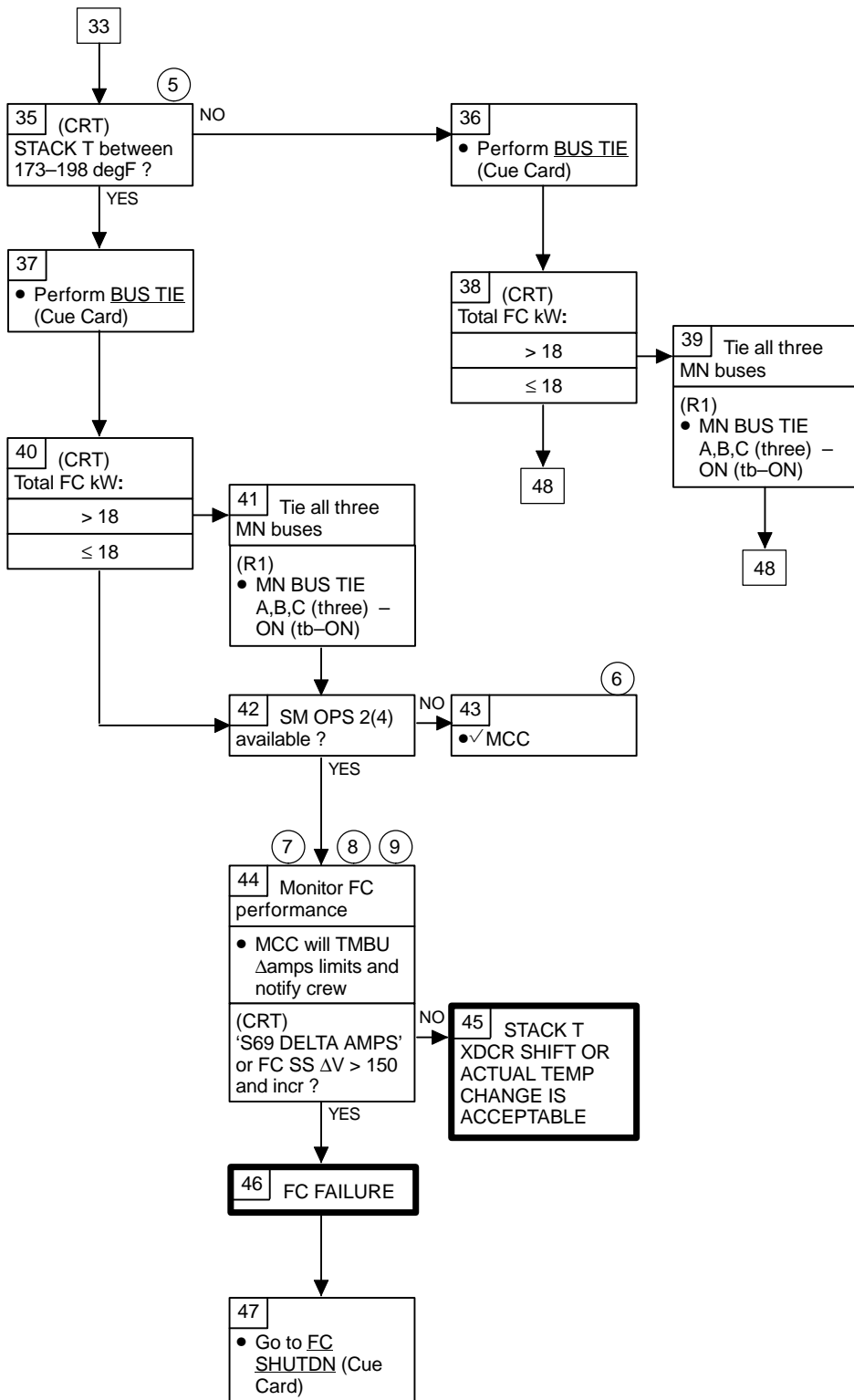
7.1 FC REAC/
PMP/STACK T



EPS 7.1b (Cont)



EPS 7.1b (Cont)



⑤ This is the temp range that could result in low stack temp SM ALERT

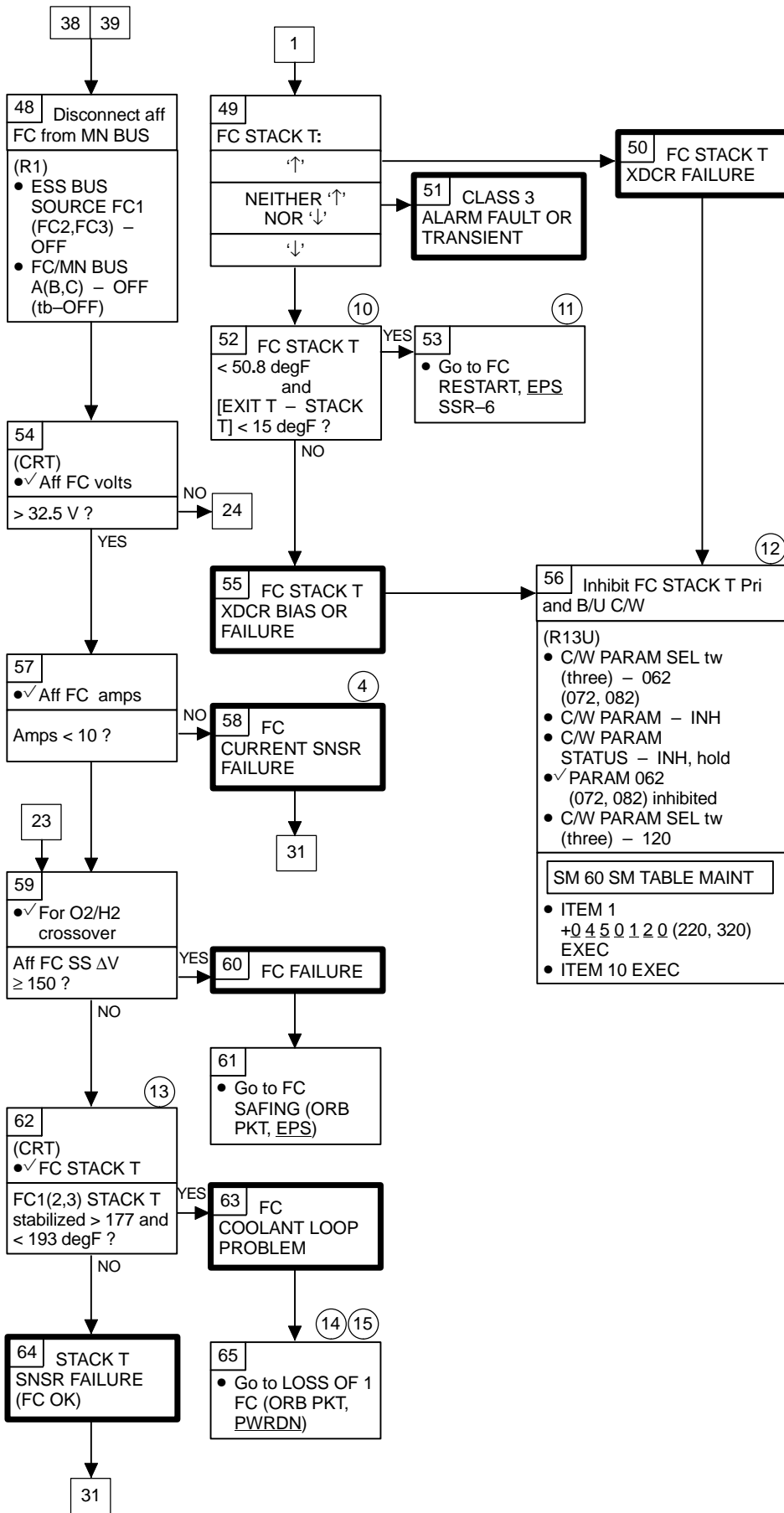
⑥ MCC will monitor FC performance by observing Δamps changes

⑦ If loss of comm, reset Δamps limits to present value ± 40 (± 40 takes into account possible differences in FC V-I curves which would cause a Δamps change with a load change)

⑧ Depending on load, may take several hours for performance change. Do not purge this FC for 5 hr

⑨ With FCs thermally stabilized and at a constant load, a 12-amp change in delta amps would indicate approximately 3% change in KOH concentration. High concentration (indicated by improved performance) > 48% can allow O2/H2 crossover. Low concentration (indicated by degraded performance) < 26% indicates flooding

EPS 7.1b (Cont)



- ④ Loss of correct precondition check for STACK T FDA Class 3 limit set based on kW for this FC
- ⑩ Based upon STS-2, 51, 54, & 57 data, FC STACK T and EXIT T should remain within 15 degF of each other during cooldown
- ⑪ Lower limit on allowable temp for reusable FC is 48 degF (includes Xdcr error). FC must be restarted to maintain temp above 48 degF. 50.8 degF was selected due to being closest value to 48 degF in Primary C/W System
- ⑫ With loss of FC STACK T, FC temp may be obtained only from FC EXIT T
- ⑬ FC sustaining heater maintaining stack temp
- ⑭ After cooldown, FC may be usable on cyclic basis or with extensive vehicle pwrdrn
- ⑮ Leave FC in STBY mode. MCC analysis may determine later need for FC shutdn

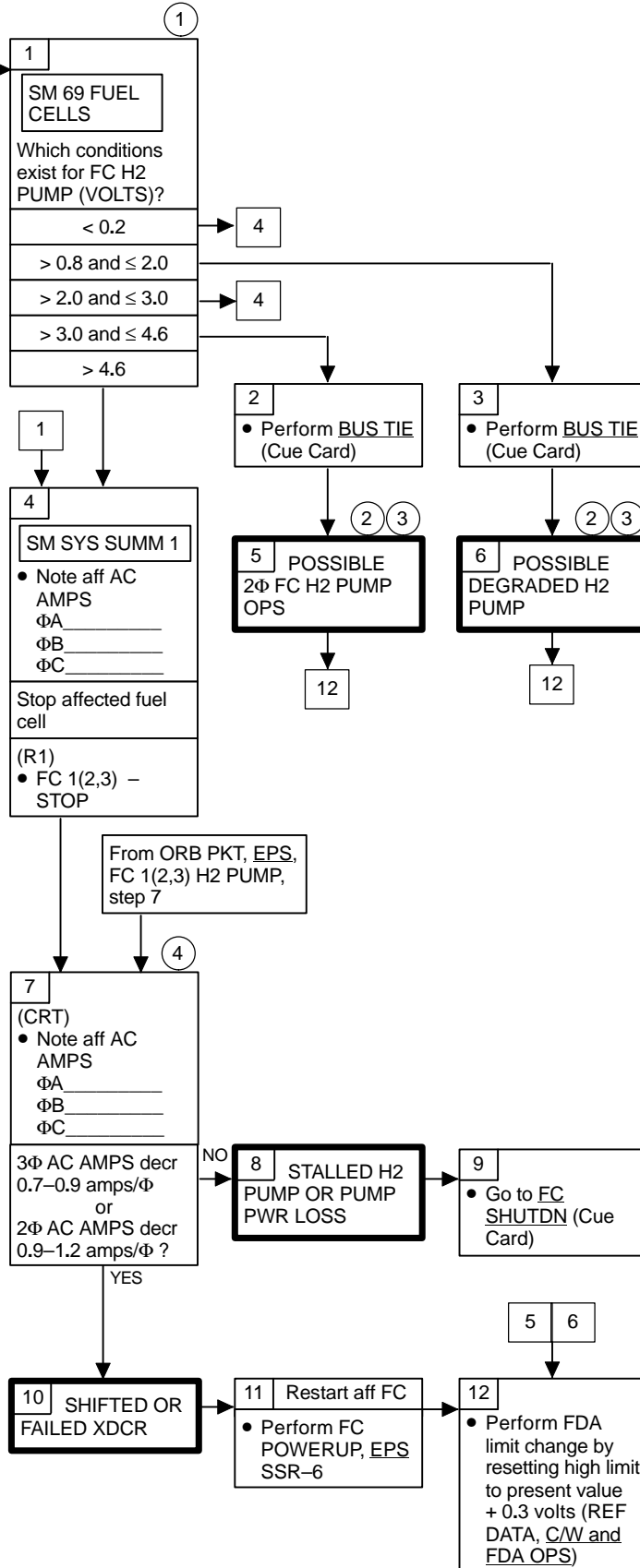
EPS

7.1c H2 PUMP ↑↓

From ORB PKT, EPS, FC 1(2,3) H2 PUMP, step 4

S69 FC H2 PUMP 1(2,3)

Nominal Config:
 (L4:C)
 cb AC1 ΦA,ΦB,ΦC
 FC1 PUMPS (three) – cl
 cb AC2 ΦA,ΦB,ΦC
 FC2 PUMPS (three) – cl
 cb AC3 ΦA,ΦB,ΦC
 FC3 PUMPS (three) – cl
 (O14)
 FC1 CNTLR – ON
 (O15)
 FC2 CNTLR – ON
 (O16)
 FC3 CNTLR – ON
 (R1)
 FC1,FC2, FC3 RDY
 tb (three) – gray
 FC1,FC2, FC3
 COOL PUMP ΔP
 tb (three) – gray



① Normal H2 Pump range 0.28–0.65 volt. See Table A

② If degradation of H2 pump worsens, FC should be shut down so that pump could be used during entry

③ Non-satisfactory H2 pump ops would eventually be reflected in FC amps (low) SSDV (erratic), exit temp, and FC pH (event)

④ H2 PUMP operates at .3A/Φ for 3-phase and .45A/Φ for 2-phase operation. Coolant pump operates at .5A/Φ for 3-phase and .62A/Φ for 2-phase operation

Table A

FC PUMP PACKAGE POWER RANGES

3-PHASE OPERATION

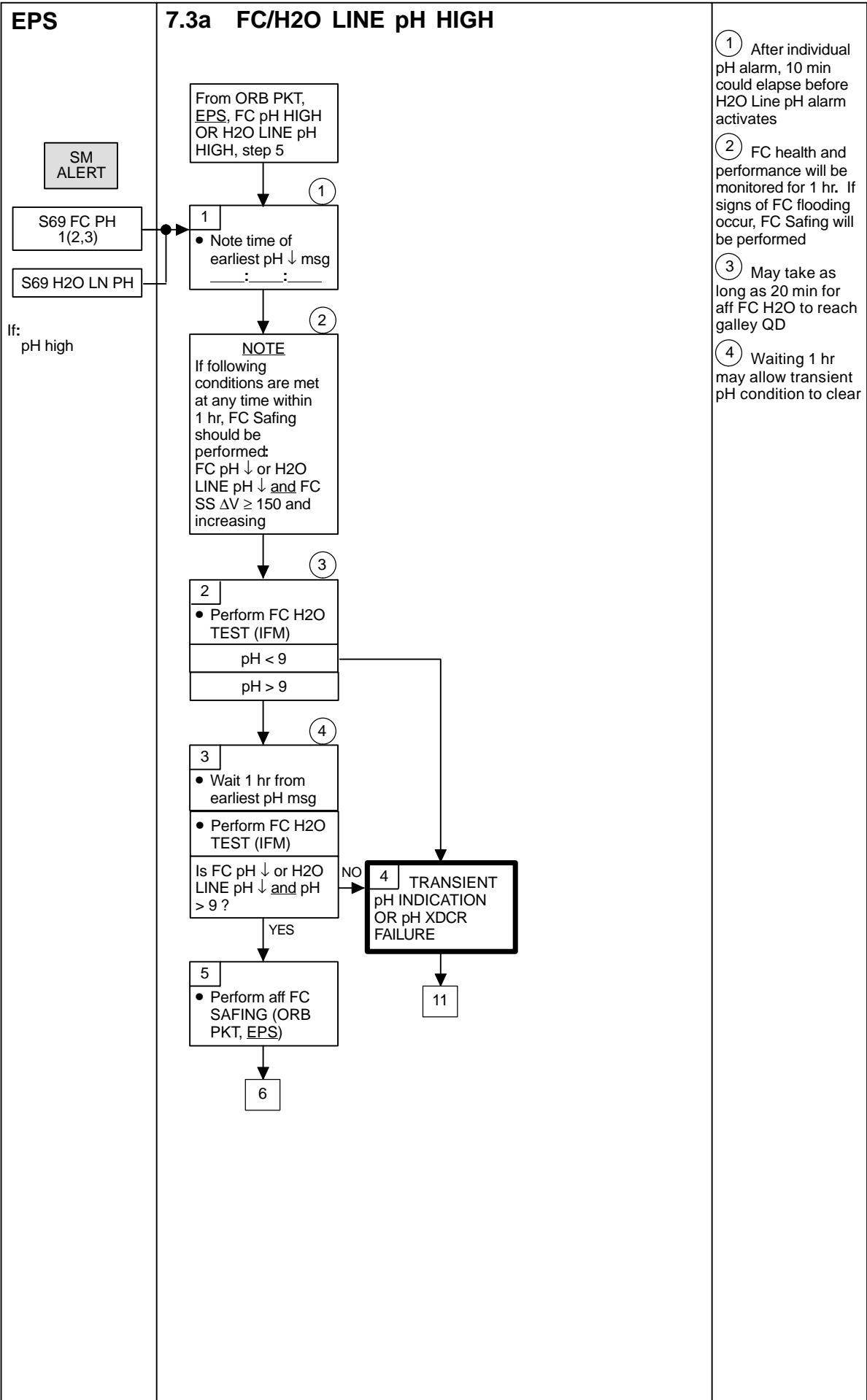
LOAD	COOLANT PUMP	H2 PUMP	
	AMPS/PHASE	AMPS/PHASE	VOLTS
NORMAL	0.51	0.3	0.28-0.65
OVERLOAD		0.5	> 0.8
STALL	1.0	1.2	2.2

2-PHASE OPERATION

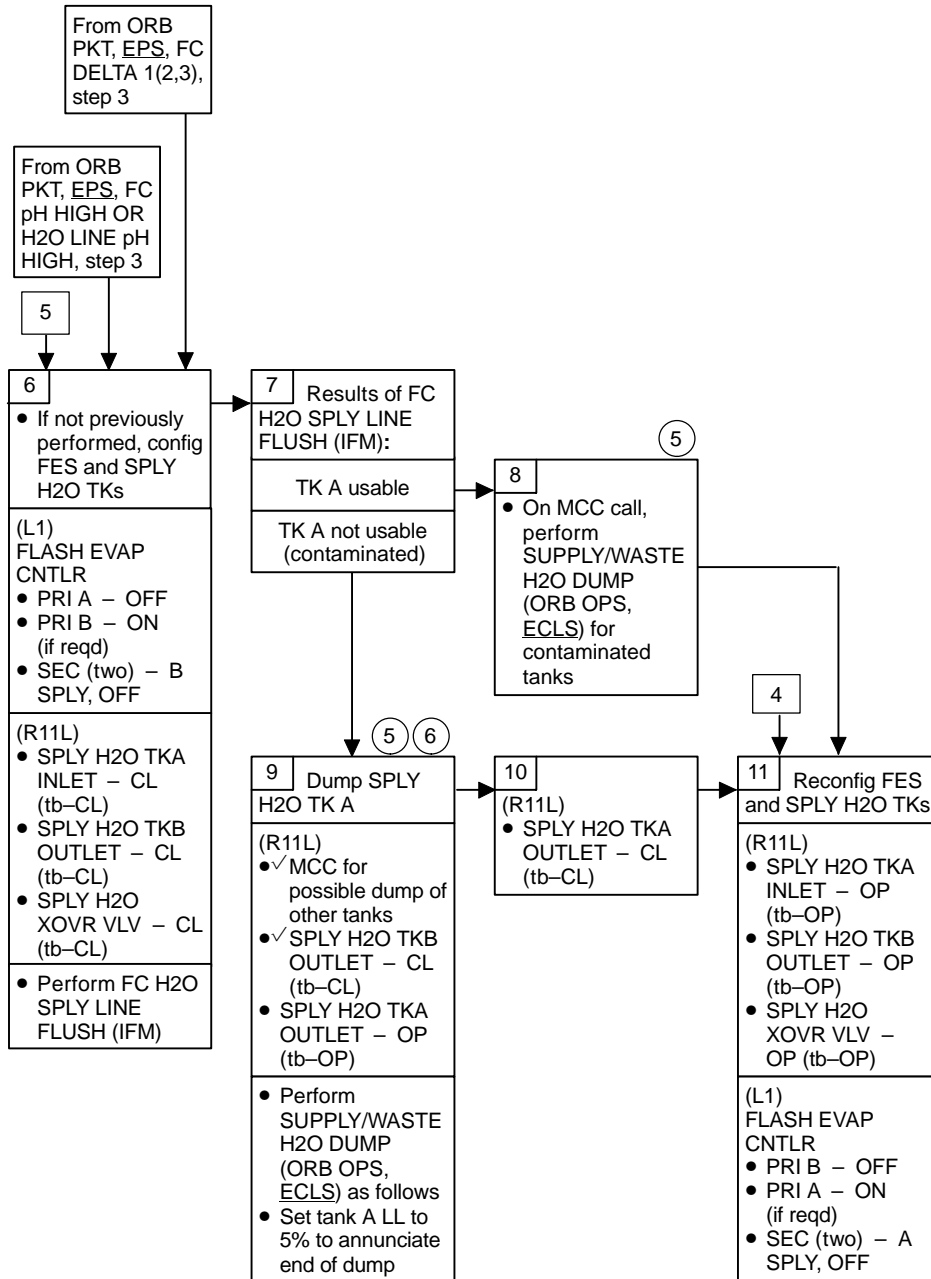
LOAD	COOLANT PUMP	H2 PUMP	
	AMPS/PHASE	AMPS/PHASE	VOLTS
NORMAL (open motor winding)	0.62	0.45	3.15-3.5
NORMAL (1Φ cb open)	0.62	0.45	4.15-4.5
STALL	1.0	1.3	4.8

<p>EPS</p> <p>FC PURGE TEMP</p> <p>If:</p> <p>SM 69 FUEL CELLS</p> <p>FC PURGE LN O2 T < 69 degF or FC PURGE LN H2 T1 < 79 degF or FC PURGE LN H2 T2 < 40 degF After 27 min since AUTO PURGE SEQ started</p>	<p>7.2b FC PURGE TEMP</p>	<p>① GPC will terminate AUTO PURGE SEQ as indicated by (R11U) FC GPC PURGE SEQ tb - bp. (R11U) ON position of FC PURGE HTR sw utilizes redundant htrs</p> <p>② If this alarm occurs: Purge vlv commanded closed. Purge line htrs are commanded OFF. May be verified by (R11U) FC GPC PURGE SEQ tb - bp</p>
<p>FC PURGE SEQ</p> <p>If:</p> <p>S/W detects AUTO PURGE SEQ, purge-line htrs ON-signal has been lost after GPC AUTO PURGE SEQ initiated</p> <p>Nominal Config: (R11U) FC PURGE HTR - GPC</p>	<p>7.2c FC PURGE SEQ</p>	

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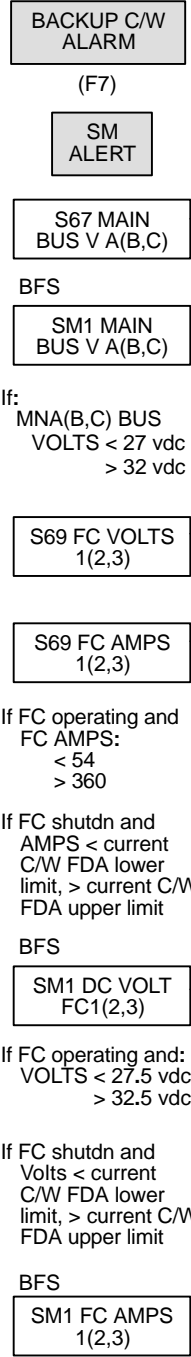
EPS 7.3a (Cont)



⑤ SPLY TKB may be contaminated. TKB will be dumped and then flushed per nominal TKB management

⑥ SPLY TKA will be dumped periodically to flush pH out of system

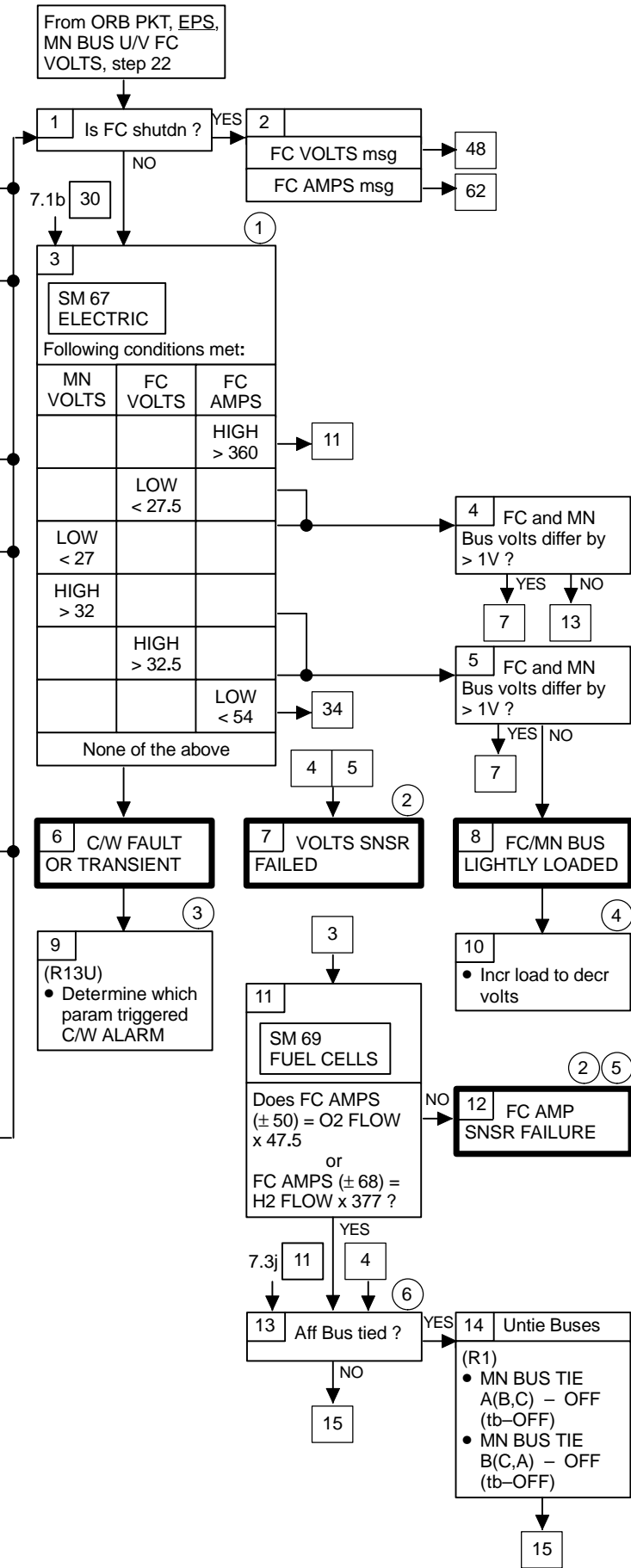
EPS



Nominal Config:
(O13:A)
cb ESS 1BC MNA CONTR - cl
(O13:C)
cb ESS 2CA MNB CONTR - cl
(O13:E)
cb ESS 3AB MNC CONTR - cl

(Cont in notes column)

7.3b FUEL CELL VOLTS ↑↓, FUEL CELL AMPS ↑↓, MAIN BUS V A(B,C) ↑↓

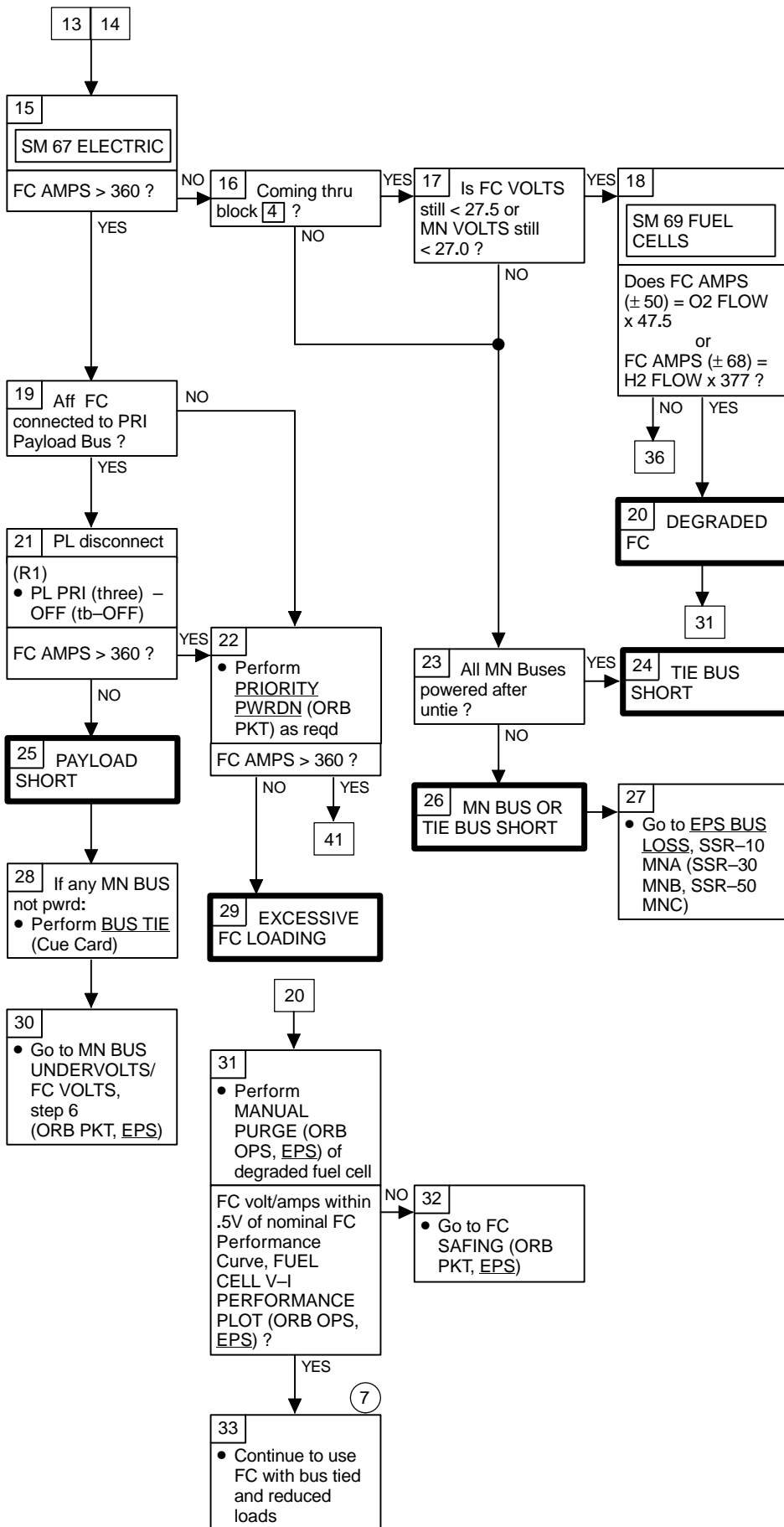


- ① Meters on pnl F9 should be used only if SM is not available, since wiring of TM vs METER results in a different reading in the case of a shunt blowing
- ② FC Stack Temp Class 3 FDA may cause erroneous alarms and is unreliable. MCC will inhibit Class 3 FDA via TMBU. Class 2 FDA still exists
- ③ If hi amps caused transient and short cleared, cockpit check should be made for open cbs or bus loss indications
- ④ Consult MCC for powerup
- ⑤ If SM OPS 2, FC amps may be approximated by utilizing Reac flows in the following equations:
 $AMPS (\pm 50) = O2 \text{ FLOW} \times 47.5$
 $AMPS (\pm 68) = H2 \text{ FLOW} \times 377$
- ⑥ FC AMPS up to 450 may be expected if FC pwr's MN BUS plus PRI PL Bus or FC pwr's two main buses

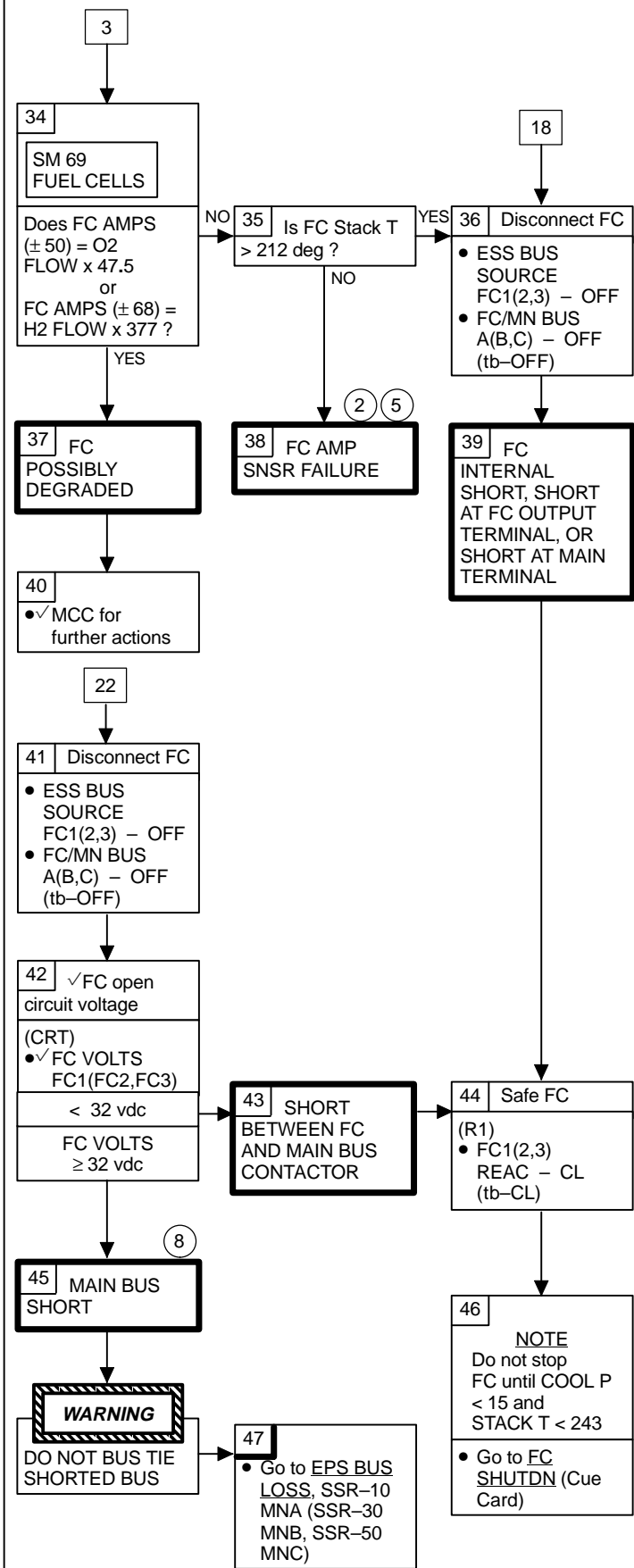
Nominal Config:
(Cont)
(O13:E)
PL PRI FC3 - OFF (tb-OFF)
PL PRI MNB - OFF (tb-OFF)
PL PRI MNC - ON (tb-ON)
If FC operating:
(R1)
FC/MAIN BUS A(B,C) - ON (tb-ON)
FC1(2,3) REAC (six) - OP
If FC shutdn:
Aff FC/MN BUS - OFF (tb-OFF)
Aff FC REAC (two) - CL

EPS 7.3b (Cont)

⑦ MCC analysis reqd before increasing loads on FC



EPS 7.3b (Cont)

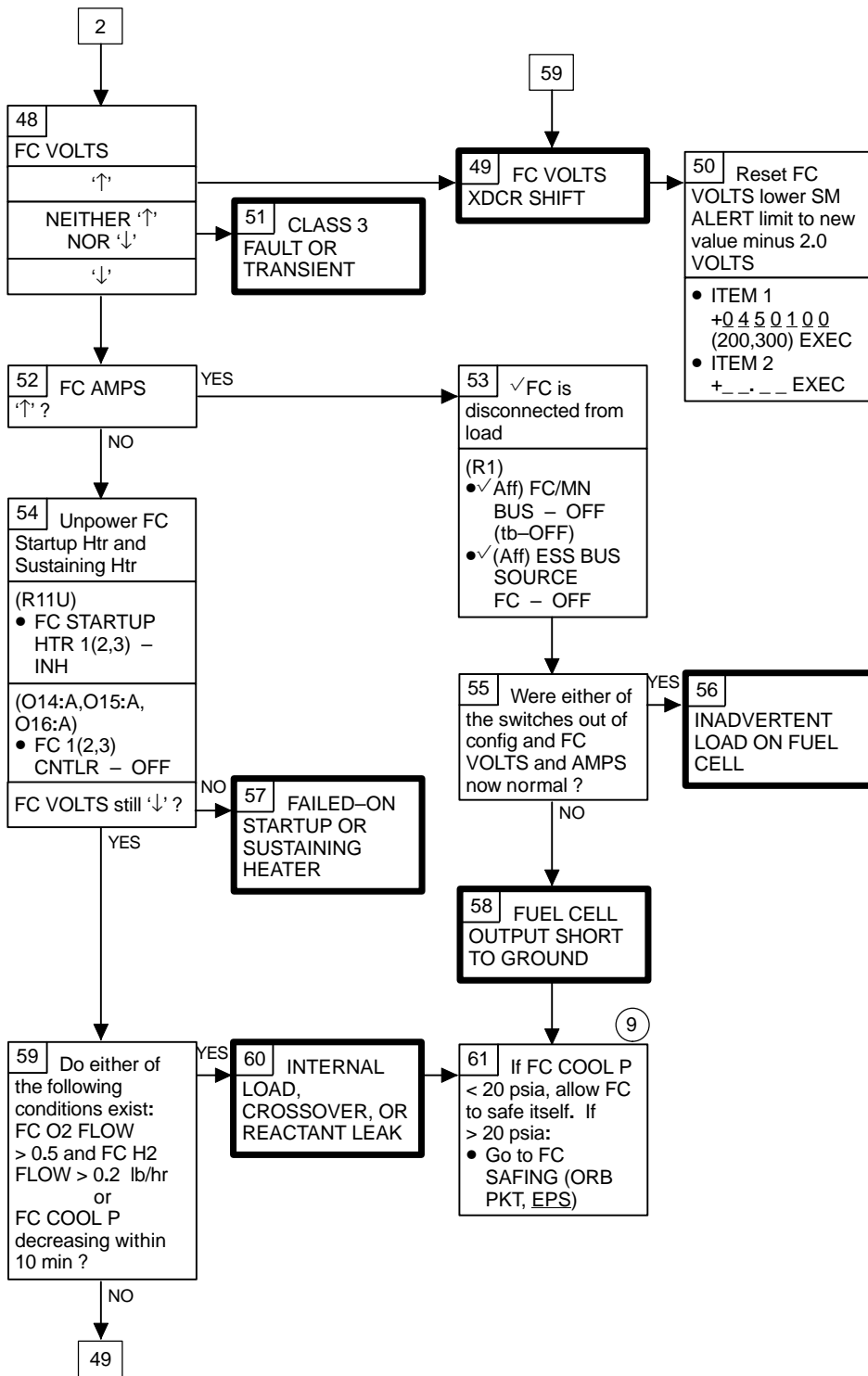


② FC Stack Temp Class 3 FDA may cause erroneous alarms and is unreliable. MCC will inhibit class 3 FDA via TMBU. Class 2 FDA still exists

⑤ If SM OPS 2, FC amps may be approximated by utilizing Reac flows in the following equations:
 AMPS (± 50) = O2 FLOW x 47.5
 AMPS (± 68) = H2 FLOW x 377

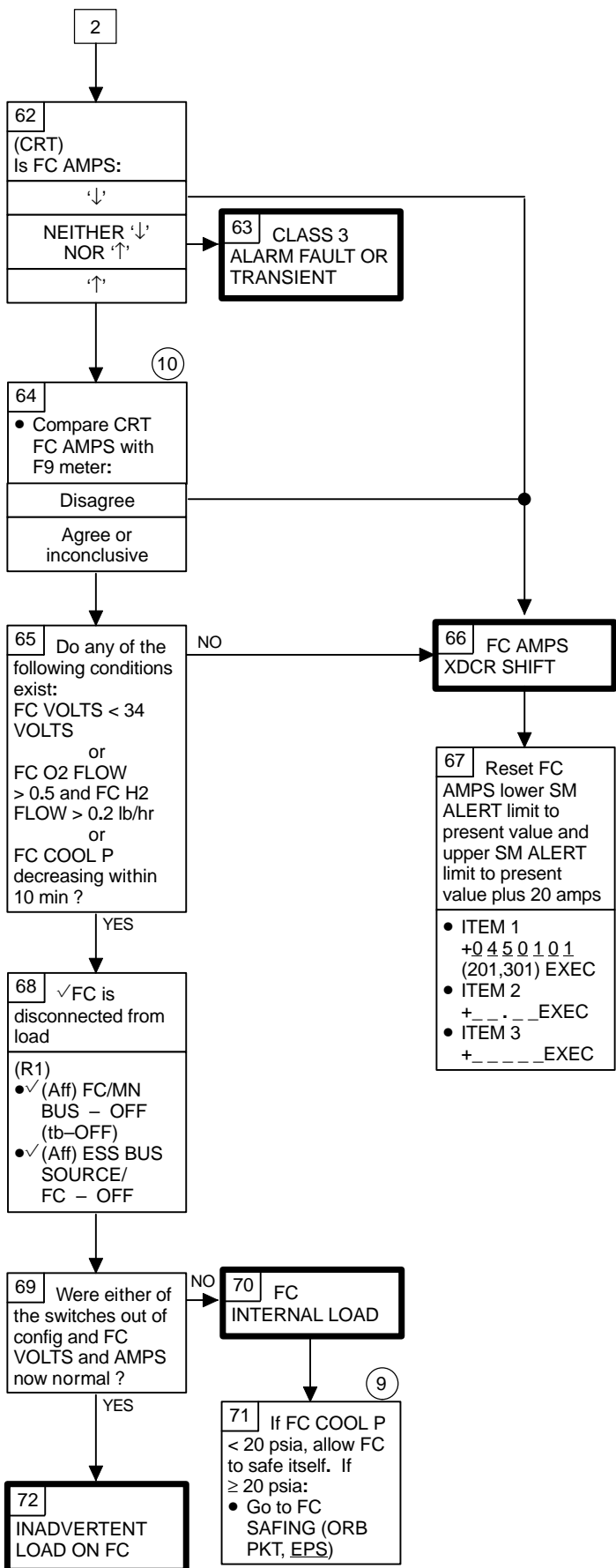
⑧ Short on MN BUS causes FC loss. For loss of MNC, FC3 pumps will be pwr'd with AC Transfer Cable and FC3 pwr will be supplied to MNB through PL pwr contactors

EPS 7.3b (Cont)



⑨ At FC coolant pressure of less than 20 psia, electrolyte boiling may occur (i.e., KOH escaping from cell matrix); in addition, Dual Gas Regulator may not control O2/H2 relative pressures and crossover may result

EPS 7.3b (Cont)



⑨ At FC coolant pressure of less than 20 psia, electrolyte boiling may occur (i.e., KOH escaping from cell matrix); in addition, Dual Gas Regulator may not control O2/H2 relative pressures and crossover may result

⑩ Due to limited resolution of F9 meter, close comparison may be unobtainable

S69 FC EXIT T 1(2,3)

BFS
SM1 FC EXIT T 1(2,3)

If FC operating and Exit T(condenser) < 131 degF > 164 degF

If FC shutdn and Exit T > 164 degF or < 50.8 degF

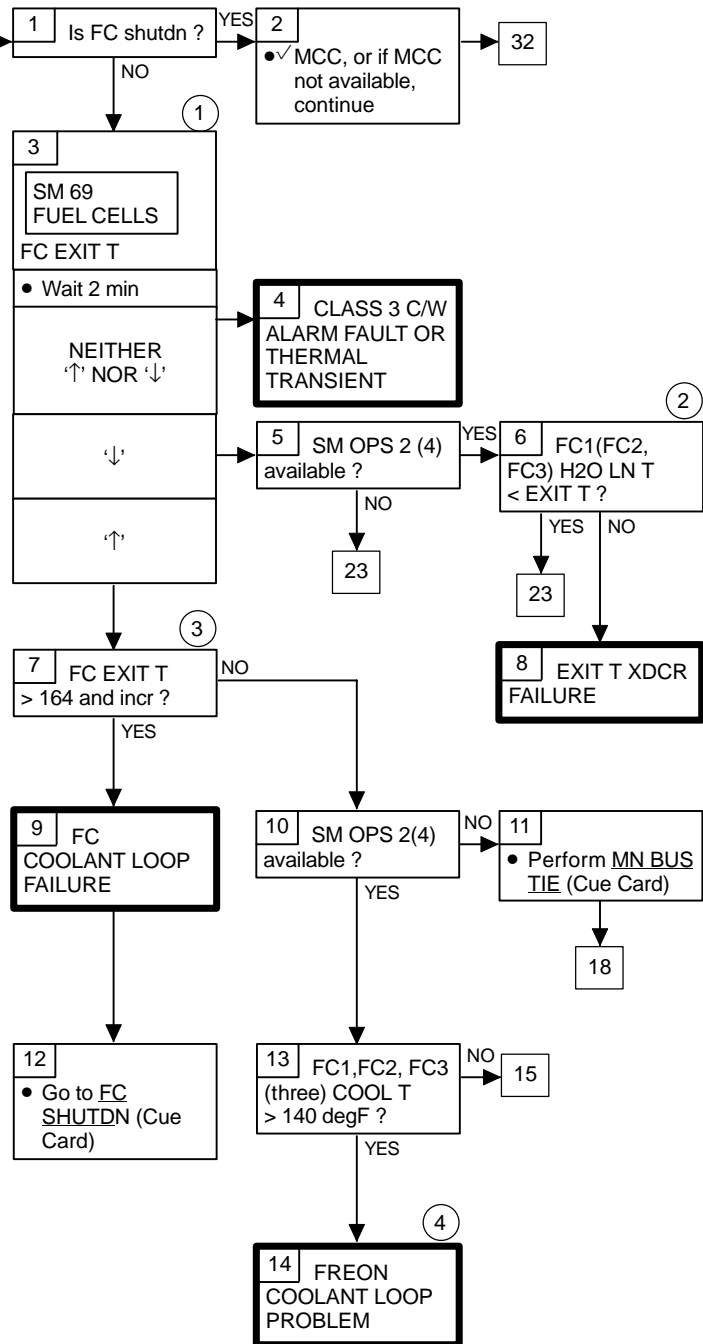
Nominal Config:

(L4:C)

cb AC1 ΦA,ΦB,ΦC
FC1 PUMPS (three) - cl

cb AC2 ΦA,ΦB,ΦC
FC2 PUMPS (three) - cl

cb AC3 ΦA,ΦB,ΦC
FC3 PUMPS (three) - cl



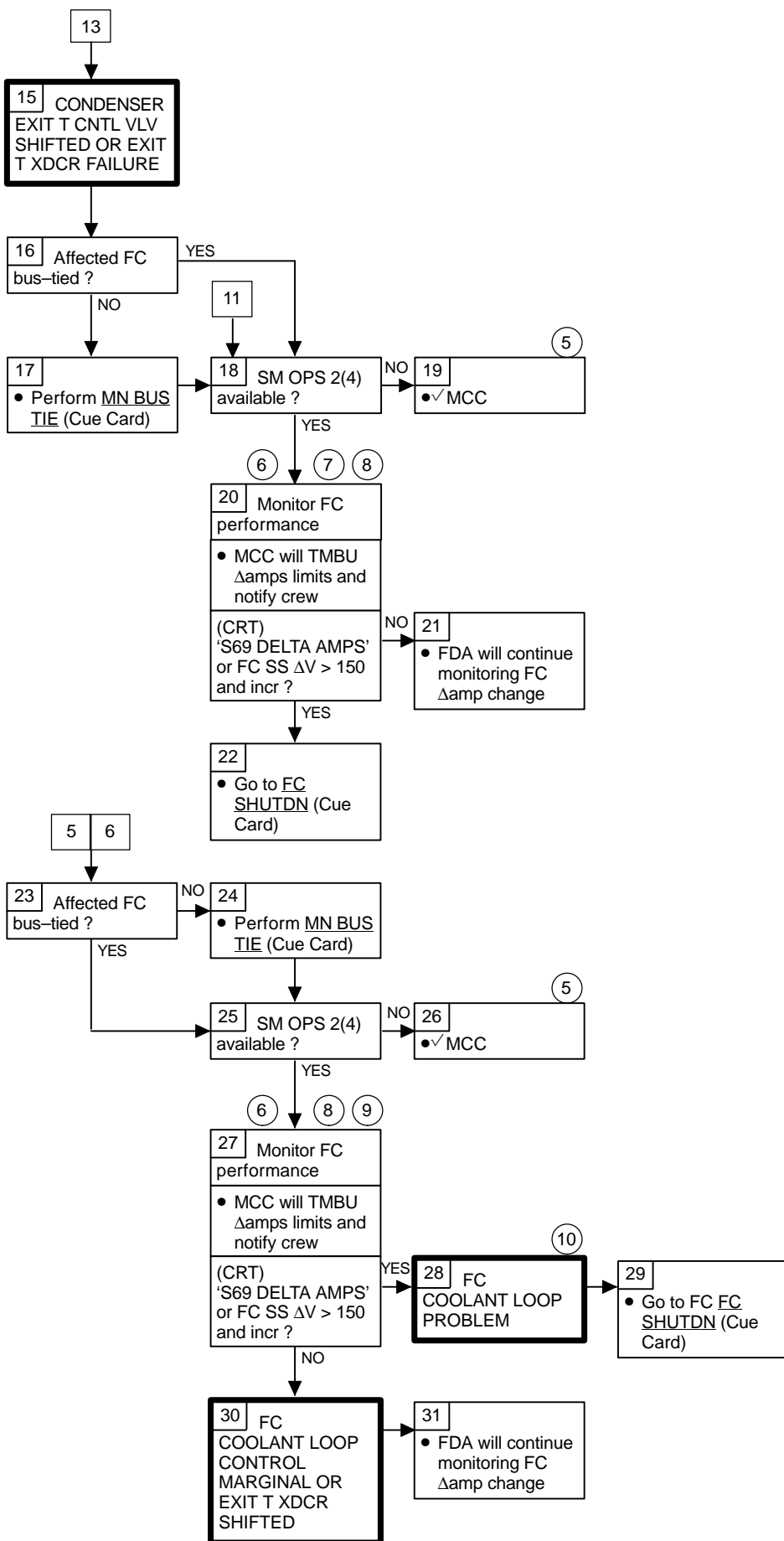
① Transient loads may cause EXIT T < LN T for up to 2 min

② Data indicates H2O LN T < EXIT T by up to 15 degF

③ FC EXIT T will quickly increase to FC STACK T if CONDENSER COOLANT FLOW is stopped while H2 PUMP is operational. FC should be quickly shutdn for possible Coolant Pump failure

④ ✓MCC

EPS 7.3d (Cont)



⑤ MCC will monitor FC performance by observing Δamps change

⑥ If loss of comm, reset Δamps limits to present value ± 40 (± 40 takes into account possible differences in FC V-I curves which would cause a Δamps change with a load change)

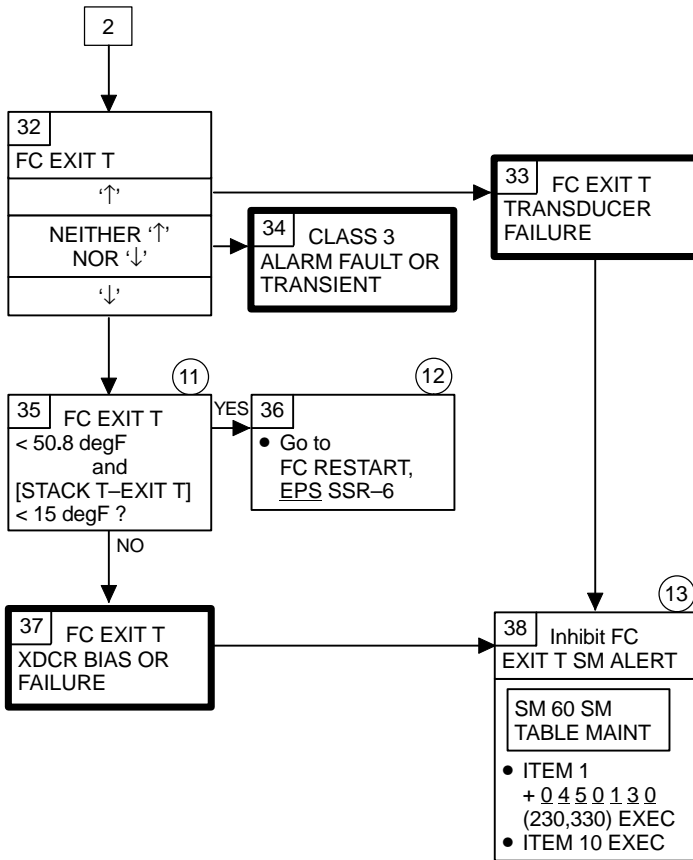
⑦ High FC EXIT T will reduce H2O removal rate and may result in cell flooding. Uniform cell flooding may not be detected by change in FC SS ΔV

⑧ With FCs thermally stabilized and at a constant load, a delta amp change of 12 indicates ~3% change in KOH concentration. Nominal KOH concentration is ~36%. High Concentration (> 48%) would be indicative of FC dryout leading to possible O2/H2 crossover. Low concentration (< 26%) would be indicative of FC flooding

⑨ Low FC EXIT T will increase H2O removal and may result in cell dryout sufficient to allow O2/H2 crossover. Individual cell crossover should be detected by change in FC SS ΔV. Uniform cell dryout would result in increased FC performance

⑩ Depending on extent of failure after cooldown, FC may be usable in cyclic mode

EPS 7.3d (Cont)

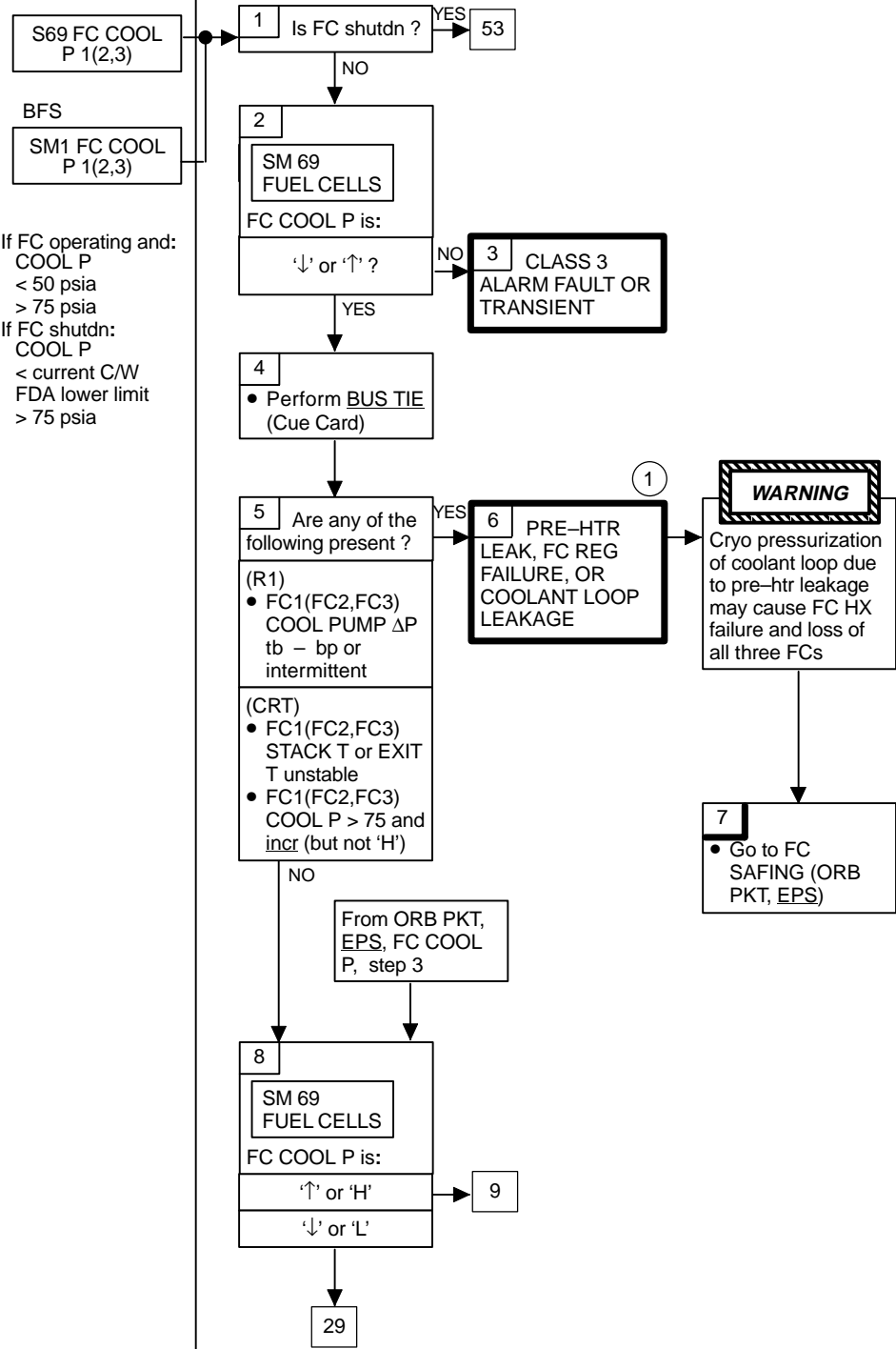


①① Based upon STS-2 data, FC EXIT and STACK T should remain within 15 degF of each other during cooldown

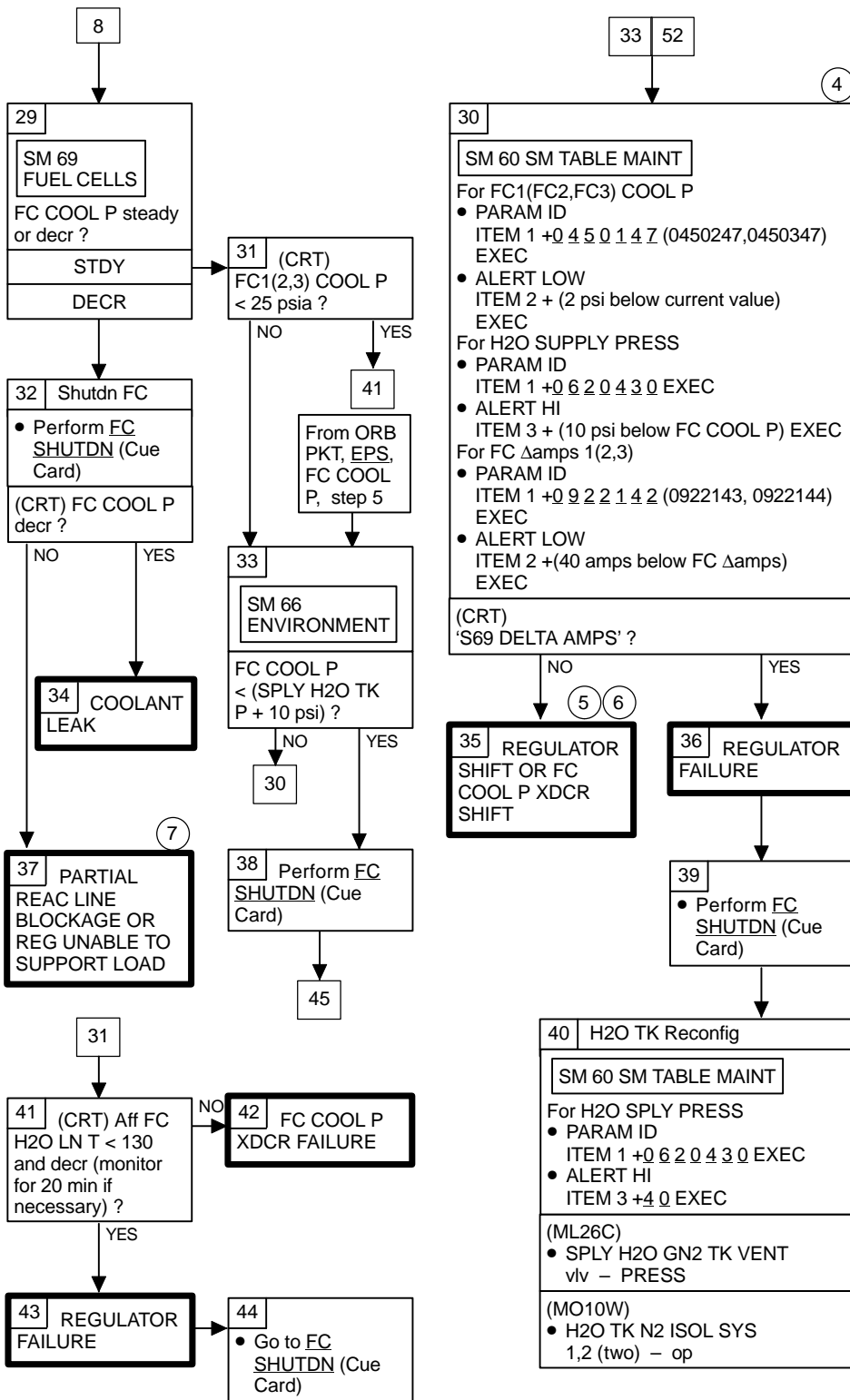
①② Lower limit on allowable temp for reusable FC is 48 degF (includes Xdcr error). FC must be restarted to maintain temp above 48 degF. 50.8 degF was selected due to being the closest value to 48 degF in the Primary C/W System

①③ With loss of FC EXIT T, FC temp may be obtained only from FC STACK T

① Erratic FC COOL T on SM 69 display may also be indicative of pre-htr internal leak

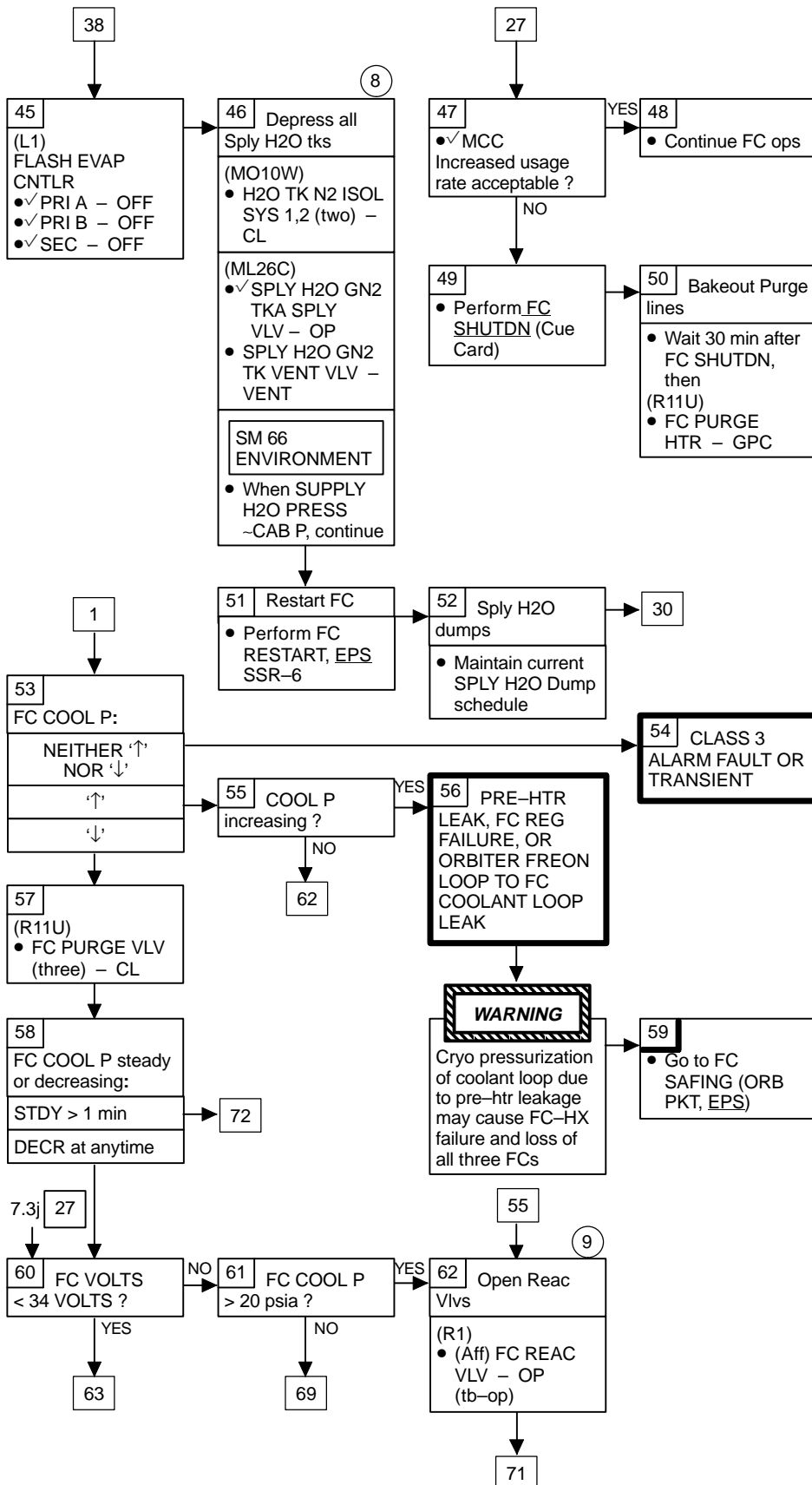


EPS 7.3e (Cont)



- ④ Possible KOH in O2 sys. Do not purge suspect FC until nominal performance at this pressure demonstrated for at least 6 hr
- ⑤ Drop in FC volts vs amps performance that corresponds to new pressure would indicate Regulator shift. If reqd, update FC V-I Curve, FUEL CELL V-I PERFORMANCE PLOT (ORB OPS, EPS), with new nominal data after next purge
- ⑥ For Regulator shift, future FC ops would depend on SPLY H2O TK QTY, FES ops requirement, and FC loads. Suspect FC can be open circuited and saved for entry
- ⑦ FC may be usable if loads reduced to point where reactant demand can be met

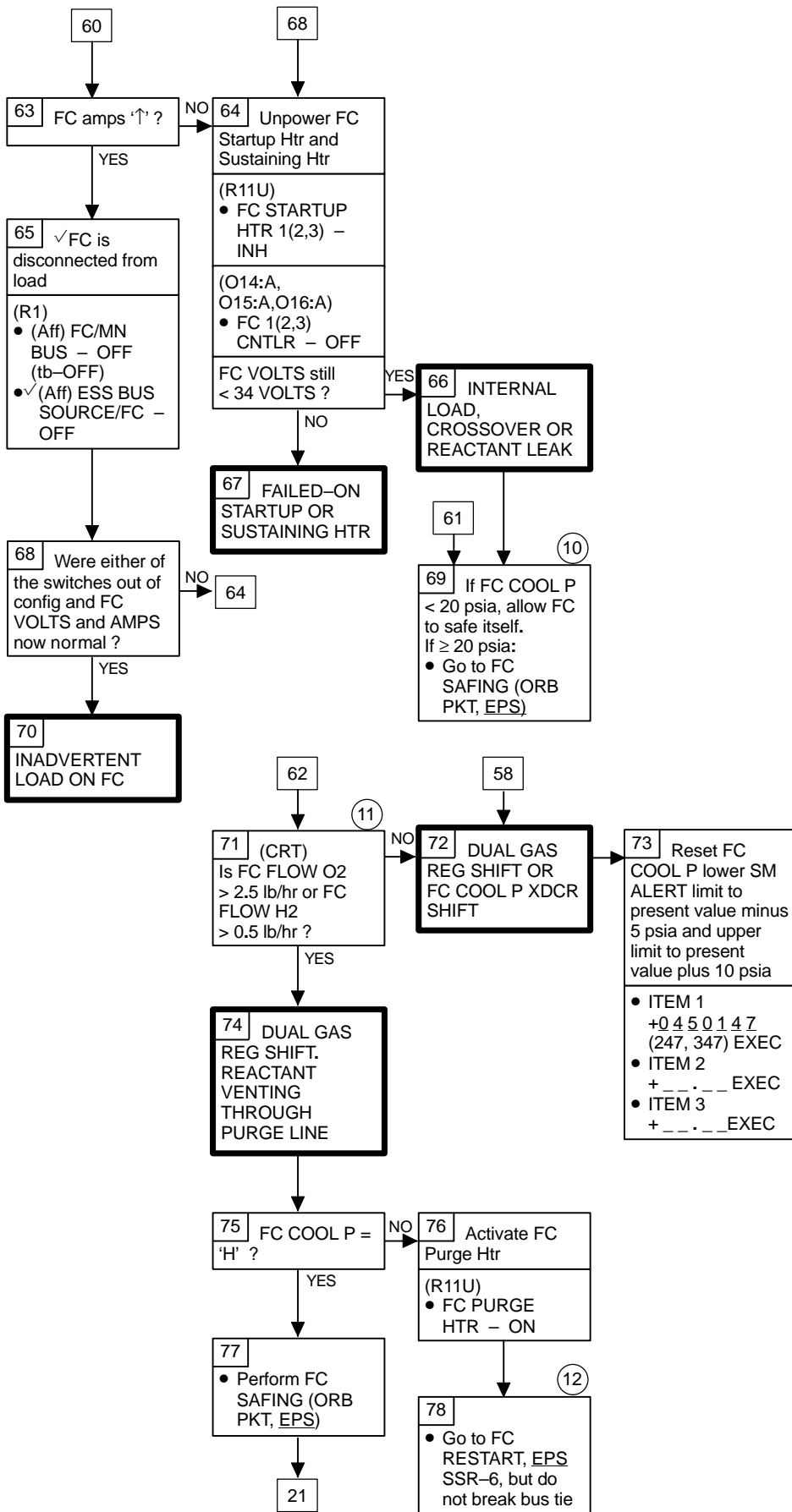
EPS 7.3e (Cont)



8 For FES ops, SPLY H2O TKB, TKC, TKD may need to be repressurized. ✓MCC

9 For Dual Gas Regulator shift high, reactants may be venting through purge line. If Reac Vlvs are not open, FC could evacuate (i.e., safe)

EPS 7.3e (Cont)



⑩ At FC coolant pressure of less than 20 psia, electrolyte boiling may occur (i.e., KOH escaping from cell matrix); in addition, Dual Gas Regulators may not control O2/H2 relative pressures and crossover may result

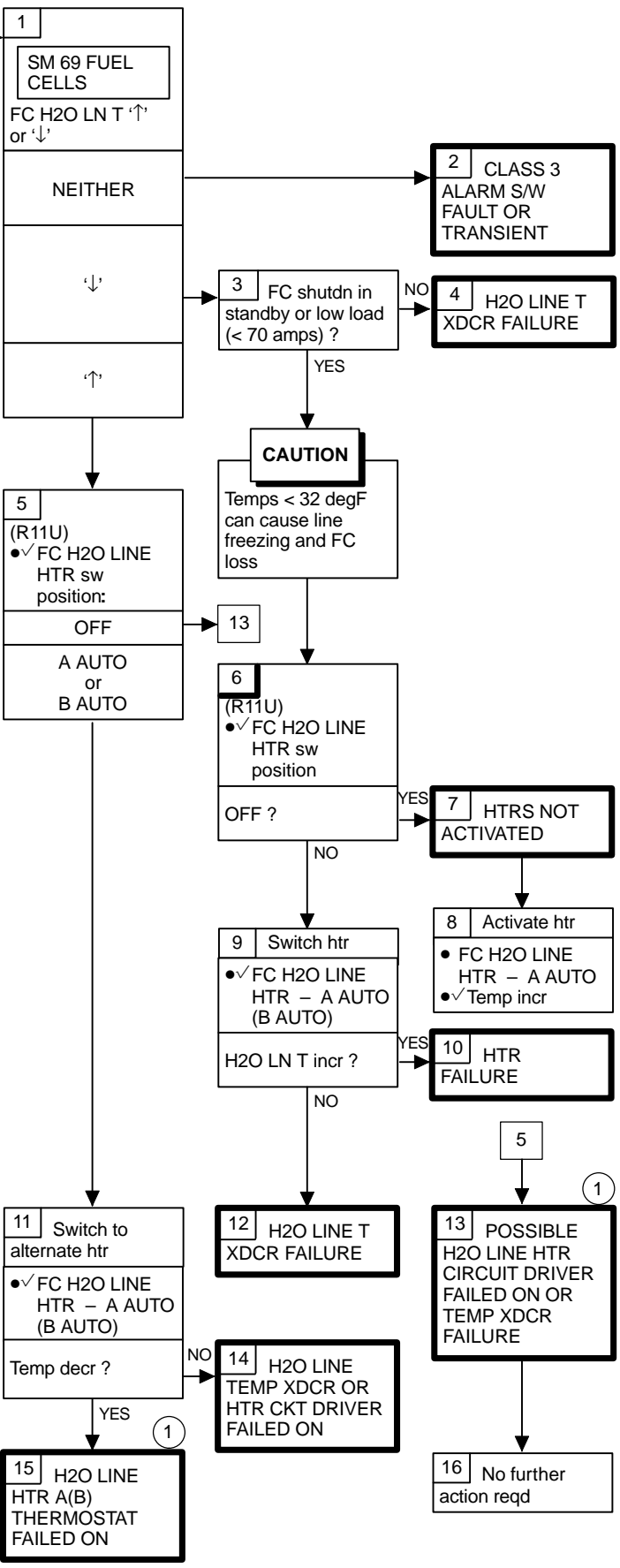
⑪ Typical values for FC purges

⑫ With FC shutdn and no coolant flow, there exists no preheating capability of the incoming reactants. Continuous purge flow may freeze or damage regulator

S69 FC H2O
PRI 1(2,3)

If:
H2O LN T
< 60 degF
> 185 degF

Nominal Config:
(R11U)
FC H2O LINE
HTR – A AUTO
(B AUTO)



① Overtemp
caused by driver or
thermostat failure will
only occur if FC
shutdn in standby, or
lightly loaded. Failure
at normal loads not
detectable

7.3g FUEL CELL H2O RLF VLV T
FUEL CELL H2O RLF LINE T

① Switching htrs isolated failed circuit

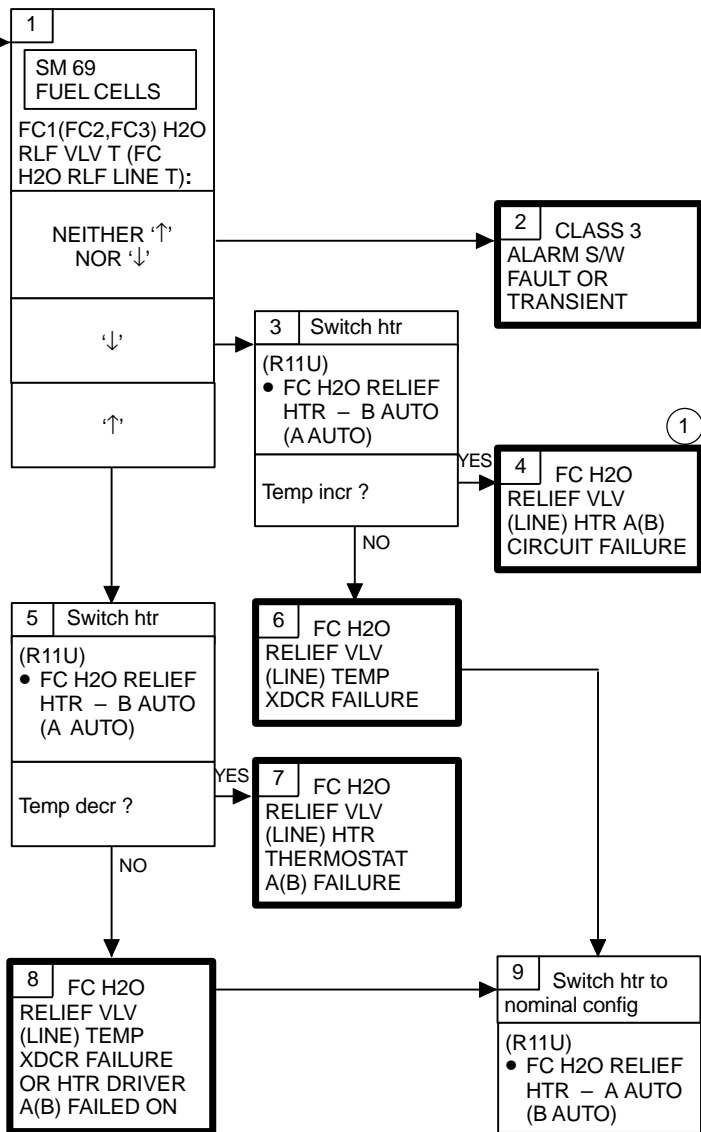
S69 FC H2O RLF 1(2,3)

If:
FC H2O RLF VLV T
< 60 degF
> 185 degF

S69 FC H2O RLF LINE

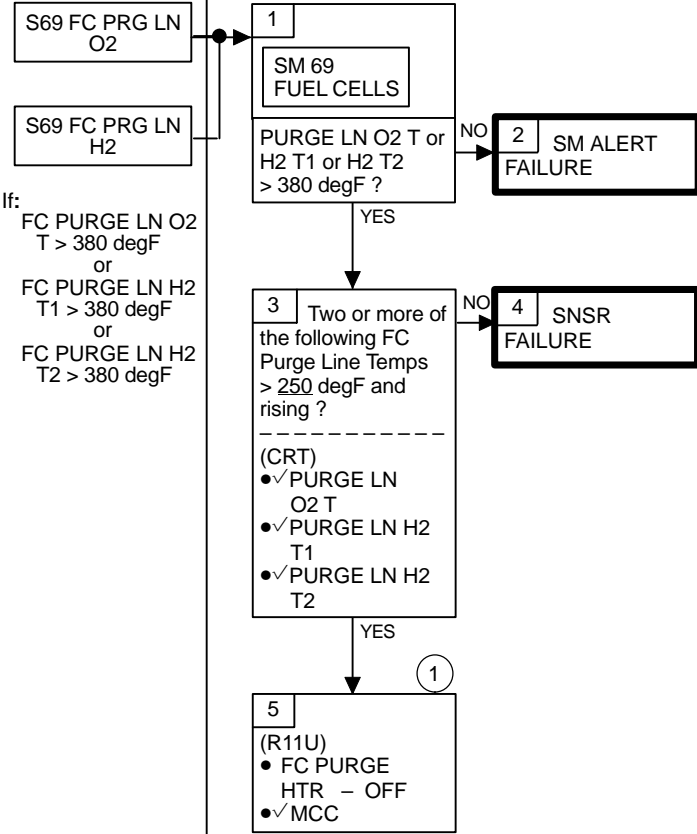
If:
FC H2O RLF LINE T
< 60 degF
> 185 degF

Nominal Config:
(R11U)
FC H2O LINE HTR – A AUTO (B AUTO)



7.3i FUEL CELL O2(H2) PURGE LN T ↑

① If GPC Auto Purge in progress, expect FC PURGE SEQ msg



EPS

7.3j FUEL CELL O2(H2) FLOW ↑

S69 FC O2 FLOW 1(2,3)

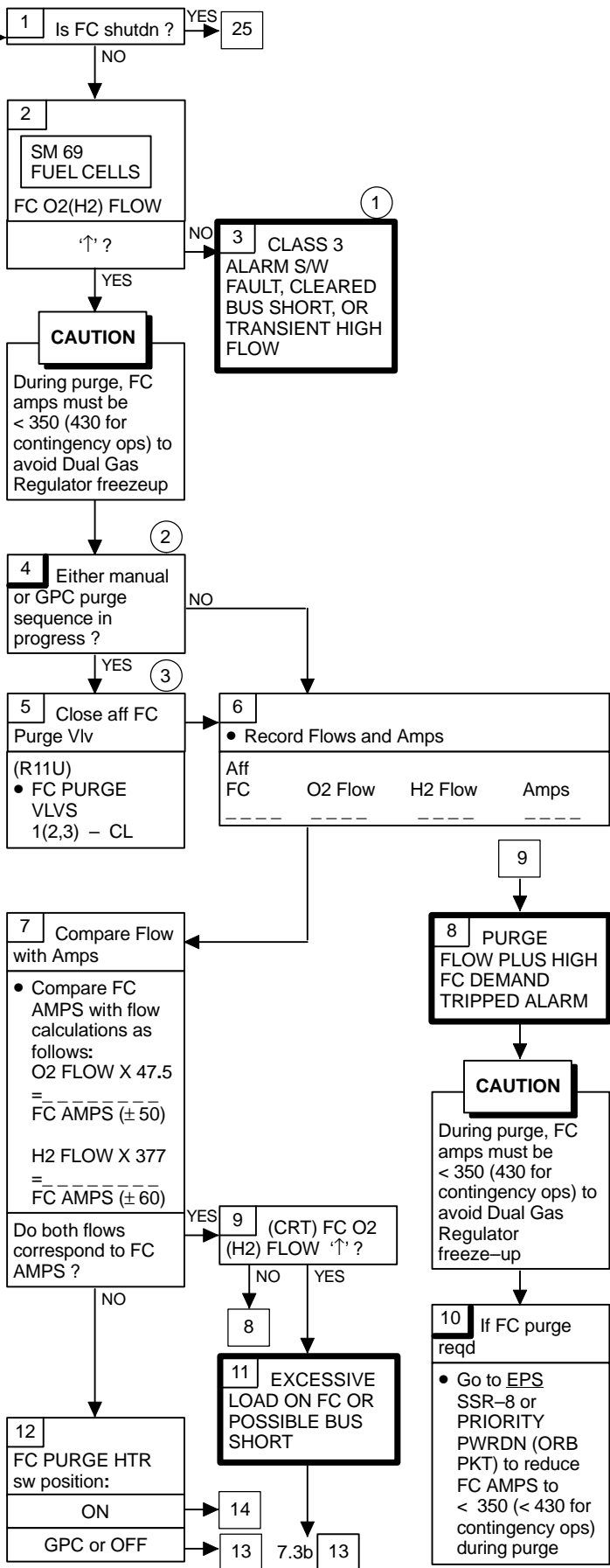
S69 FC H2 FLOW 1(2,3)

If FC operating and:
O2 FLOW > 11.1 pph
H2 FLOW > 1.6 pph

11.1 pph O2 FLOW corresponds to ~370 amps plus 3.3 pph purge flow

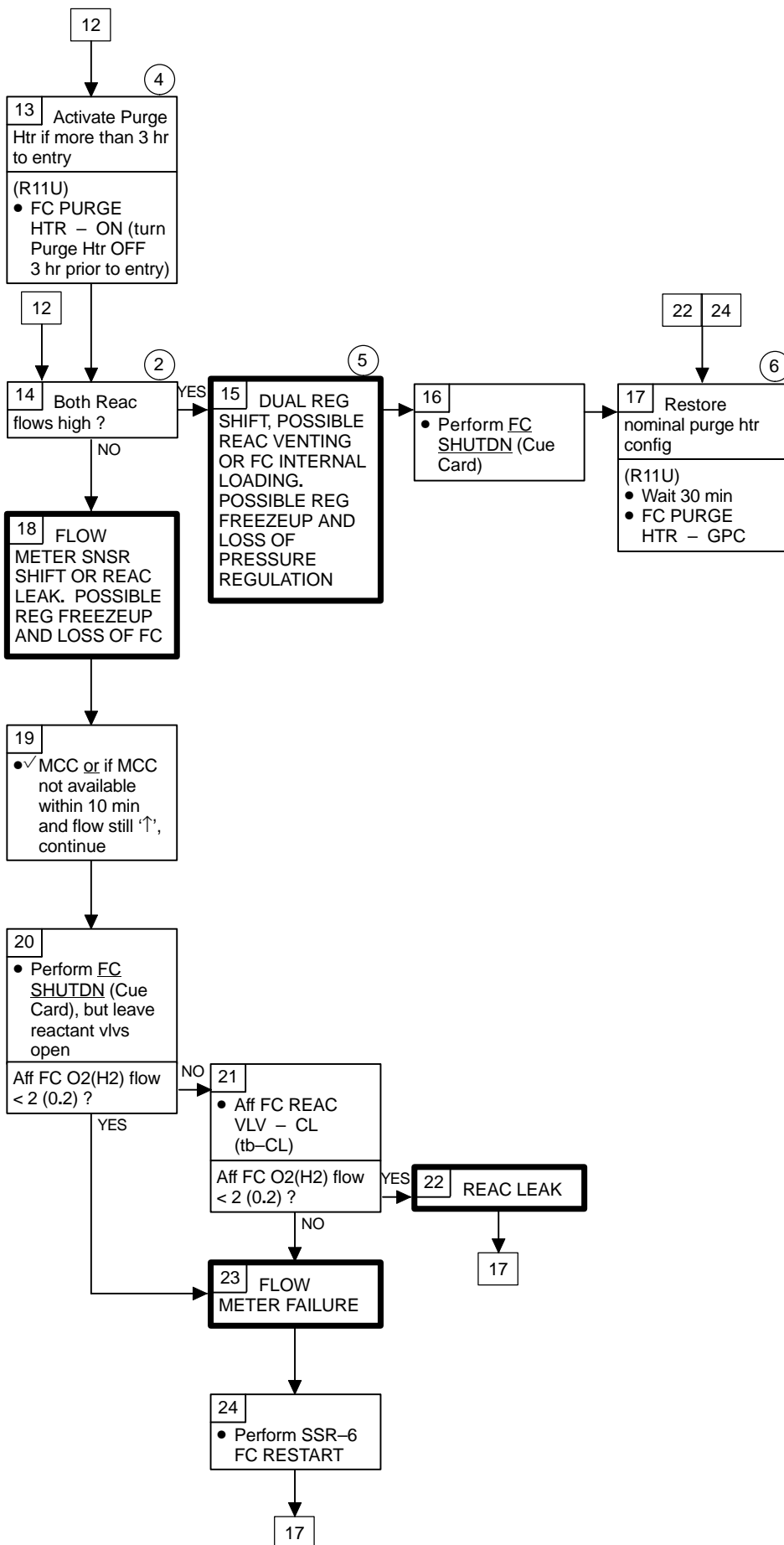
1.6 pph H2 FLOW corresponds to ~370 amps plus 0.6 pph purge flow

If FC shutdn and:
O2 FLOW > current C/W FDA upper limit
H2 FLOW > current C/W FDA upper limit



- ① If bus short caused transient and short cleared, cockpit check should be made for open cbs or bus loss indications
- ② If FC purge in progress, alarm may have tripped because of normal load plus purge flow. If one flowmeter previously failed, assume both flows high
- ③ If GPC PURGE SEQ selected, manually closing Purge Vlv stops purge and GPC will proceed with purging next FC selected for GPC purge. GPC may or may not alert crew. 'S68 FC PURGE 1(2,3)' msg occurs depending on when purge vlvs were manually closed

EPS 7.3j (Cont)



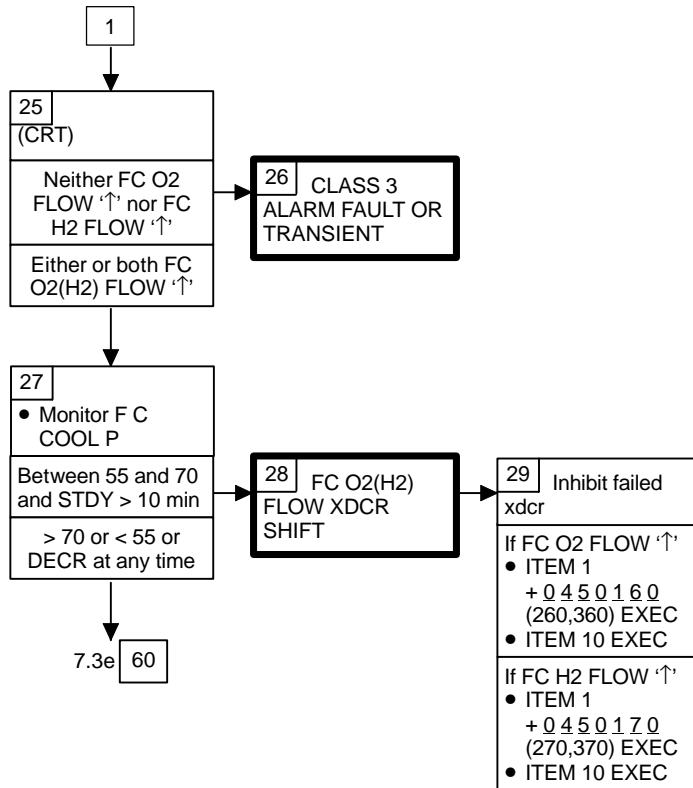
② If FC purge in progress, alarm may have tripped because of normal load plus purge flow. If one flowmeter previously failed, assume both flows high

④ Turning htrs off prevents excessive heat during entry and possible htr element damage

⑤ Reactant venting indication: Cool P ≥ 66 psia

⑥ Htrs must remain on for 30 min to bakeout purge vent lines

EPS 7.3j (Cont)



EPS

7.3k FUEL CELL RELIEF HTR SW FAIL

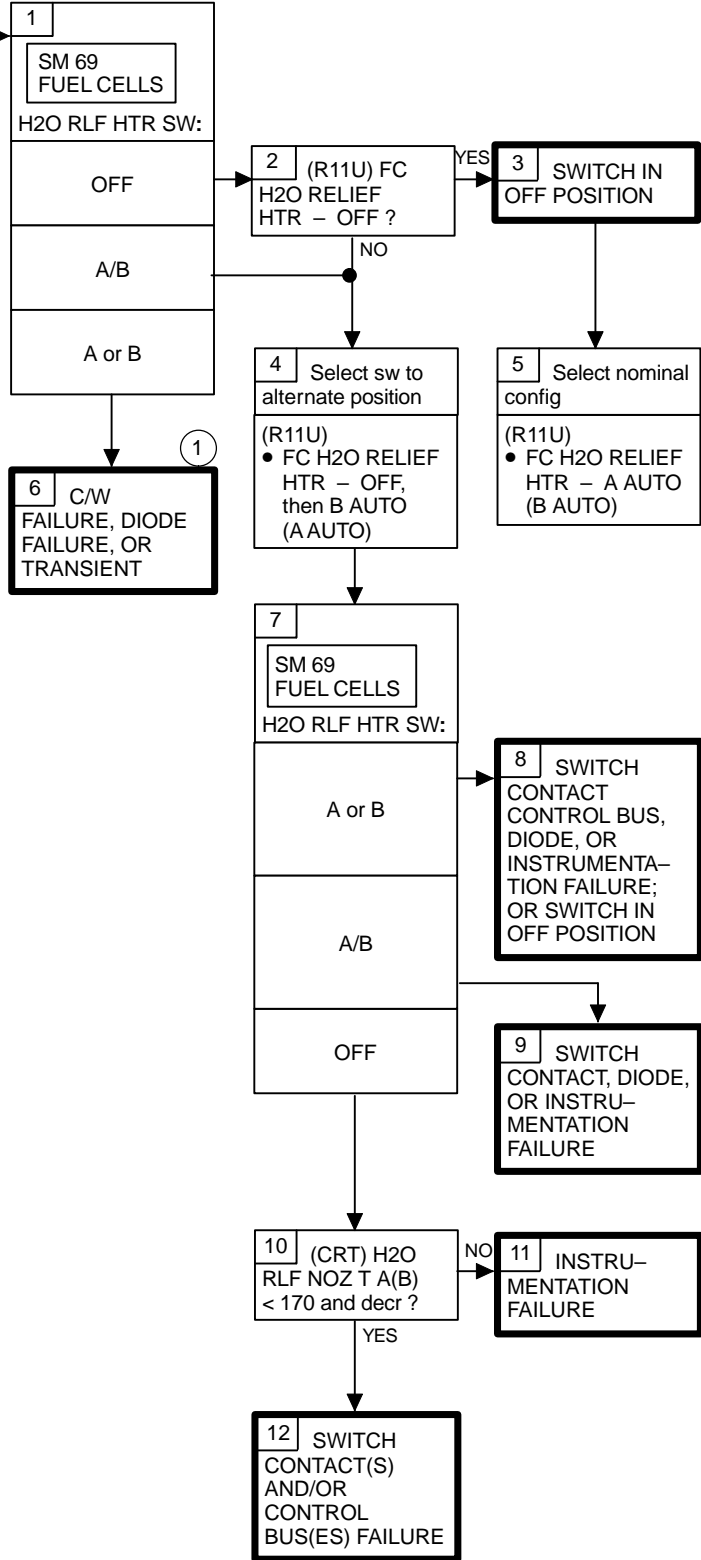
S69 FC H2O RLF HTR

If:
SM 69 FUEL CELLS

H2O RLF HTR SW – OFF
H2O RLF HTR SW – A/B

Nominal Config:
(R11U)
If pre-htr reconfig:
FC H2O RELIEF HTR – A AUTO

If post-htr reconfig:
FC H2O RELIEF HTR – B AUTO



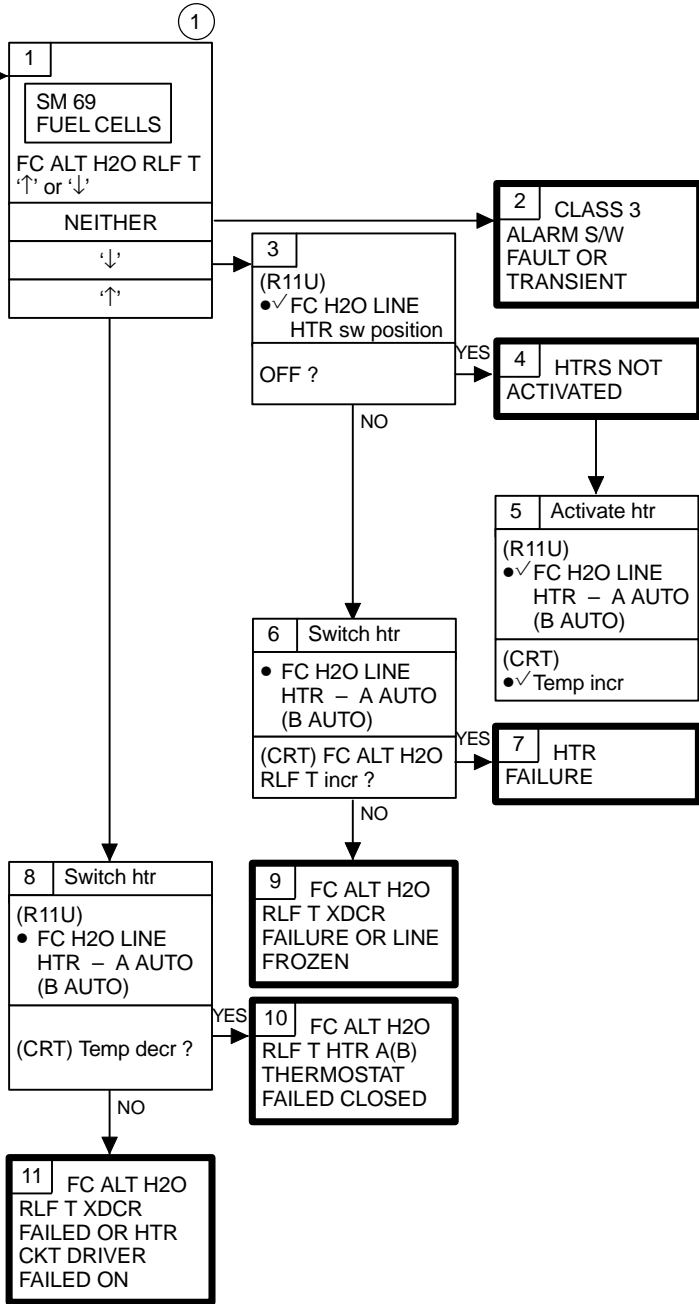
① Diode failure would be indicated if an A/B alarm occurred during nozzle htr ops. Alt htr could be selected to eliminate alarms

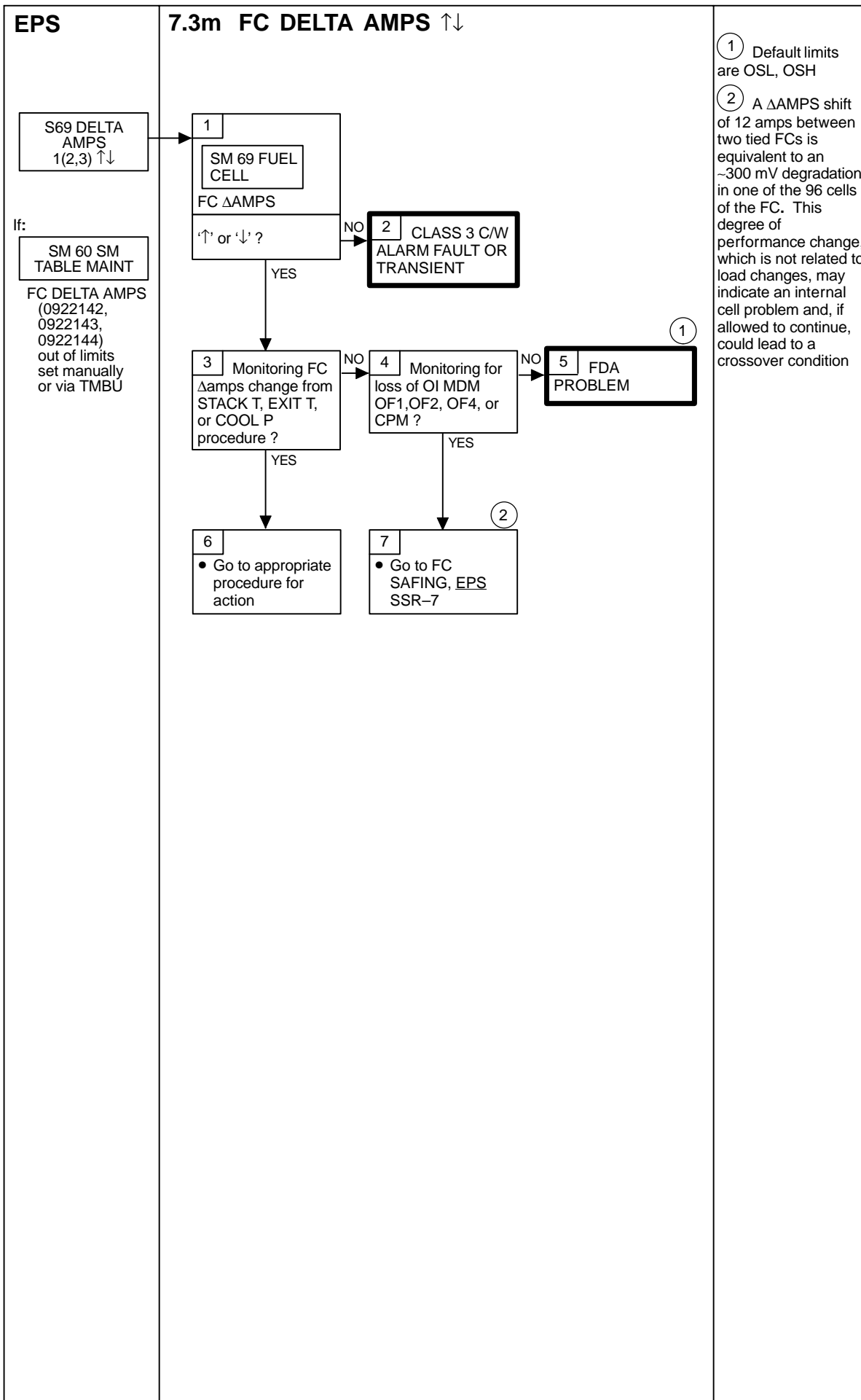
① FC ALT H2O RLF LINE T normally controlled to 70-90 degF

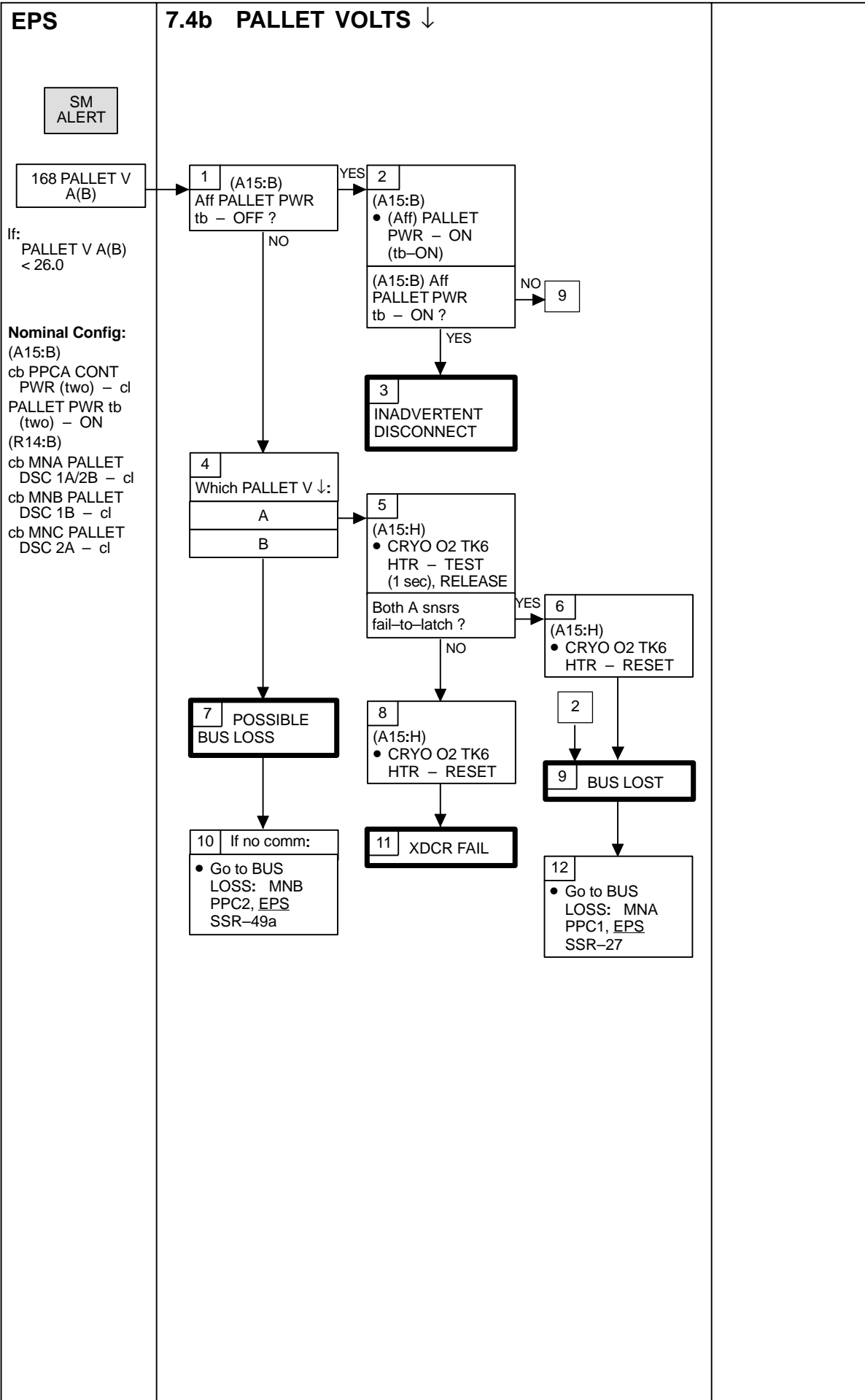
S69 FC H2O ALT

If:
FC ALT H2O RLF T
< 60 degF
> 185 degF

Nominal Config:
(R11U)
FC H2O LINE
HTR - A AUTO
(B AUTO after Htr
reconfig in ORB
OPS)







EPS

7.4c PALLET TEMP ↑↓

① May take several minutes

SM ALERT

168 PALLET T

PALLET T
< -45
> 130

Nominal Config:
(A15:C)
PALLET HTRS
A(B) - AUTO
B(A) - OFF
(R14:B)
cb MNA PALLET
DSC 1A/2B - cl
cb MNB PALLET
DSC 1B - cl
cb MNC PALLET
DSC 2A - cl

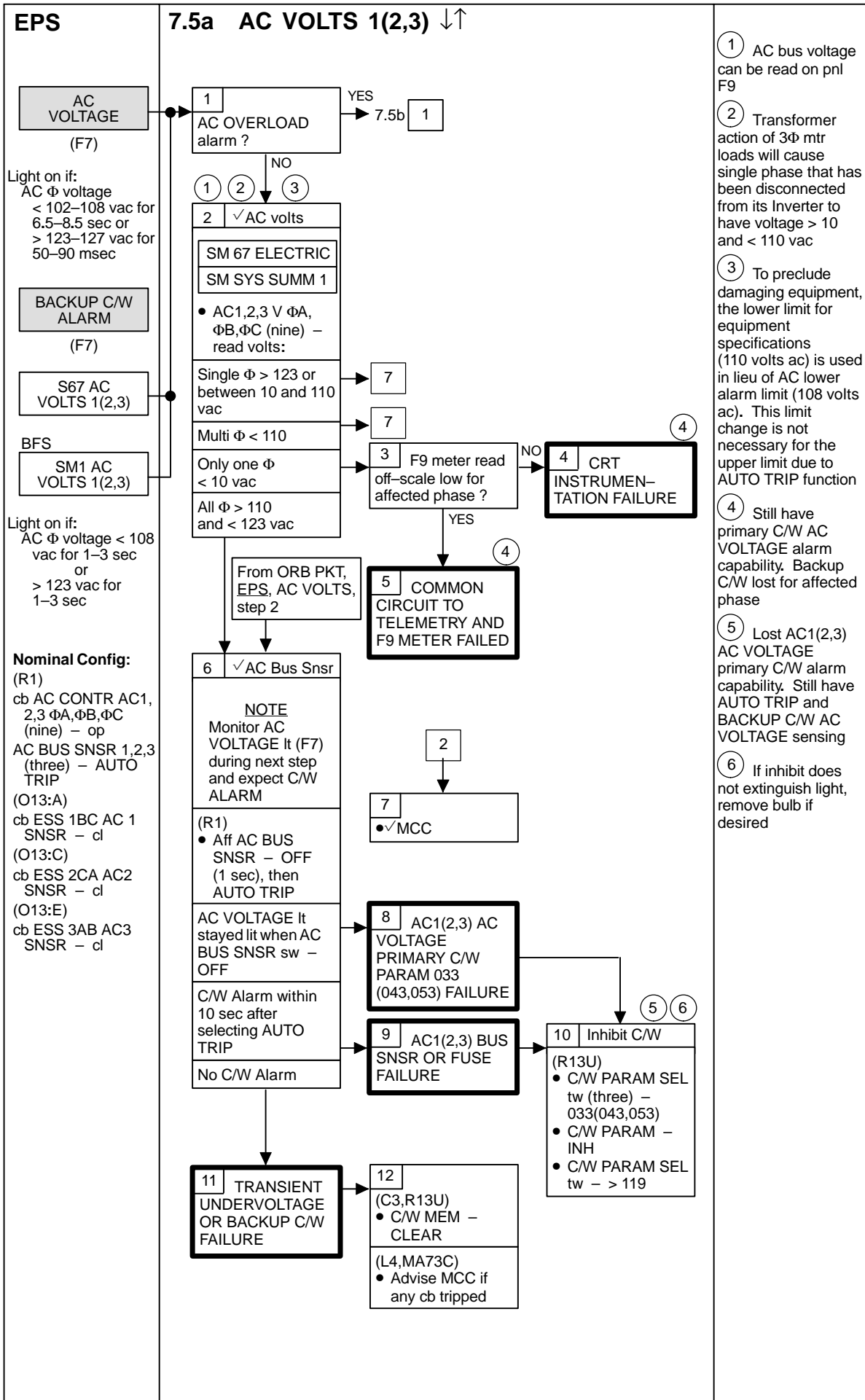
1 Switch heaters
(A15:C)
PALLET HTRS
• A(B) - OFF
• B(A) - AUTO

2
SM 168 CRYO PALLET
Aff Pallet T between -45 and 130 ?

3 HTR FAILURE

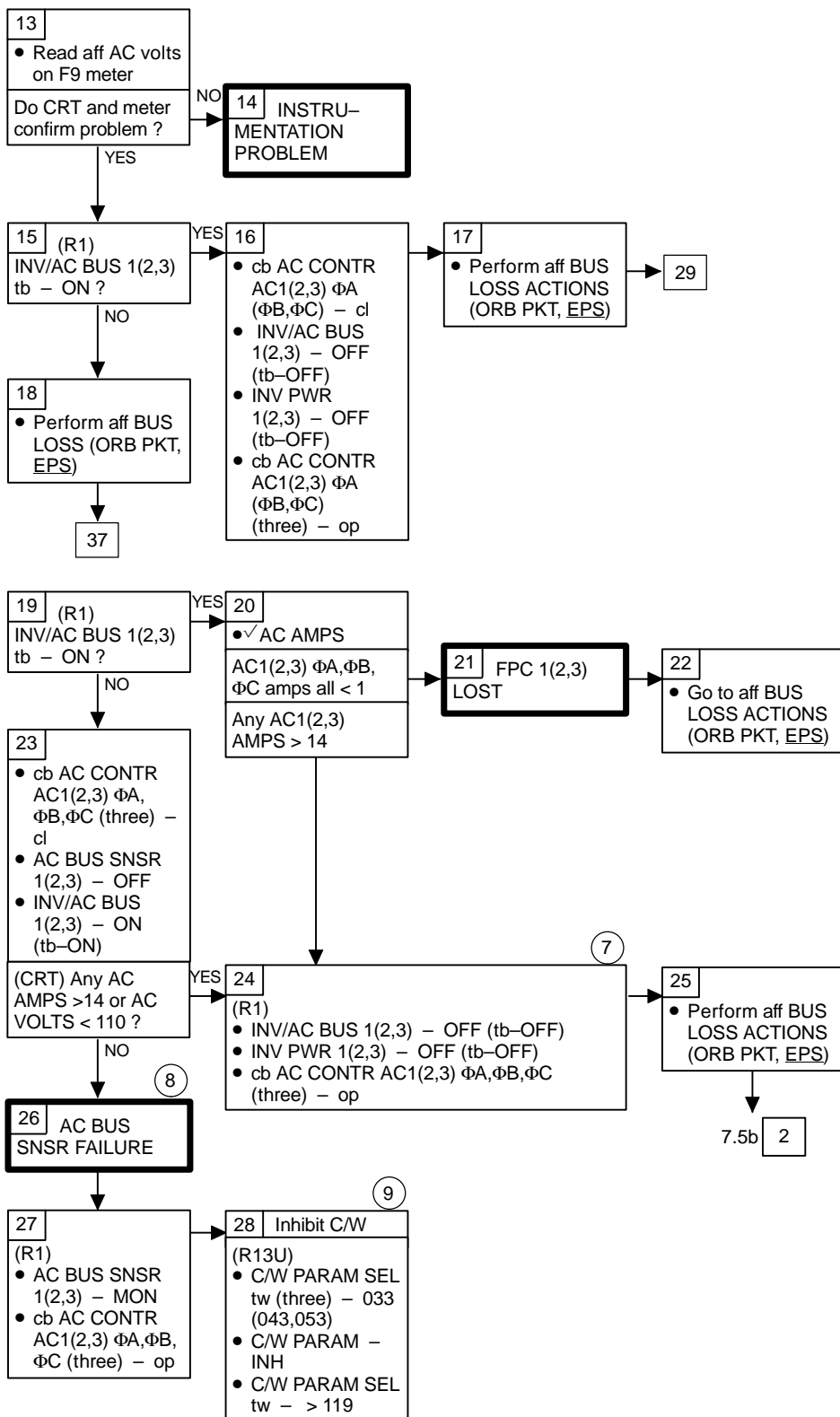
4 XDCR FAIL

7.5 AC VOLTAGE/ OVLD



- ① AC bus voltage can be read on pnl F9
- ② Transformer action of 3 Φ mtr loads will cause single phase that has been disconnected from its Inverter to have voltage > 10 and < 110 vac
- ③ To preclude damaging equipment, the lower limit for equipment specifications (110 volts ac) is used in lieu of AC lower alarm limit (108 volts ac). This limit change is not necessary for the upper limit due to AUTO TRIP function
- ④ Still have primary C/W AC VOLTAGE alarm capability. Backup C/W lost for affected phase
- ⑤ Lost AC1(2,3) AC VOLTAGE primary C/W alarm capability. Still have AUTO TRIP and BACKUP C/W AC VOLTAGE sensing
- ⑥ If inhibit does not extinguish light, remove bulb if desired

EPS 7.5a (Cont)

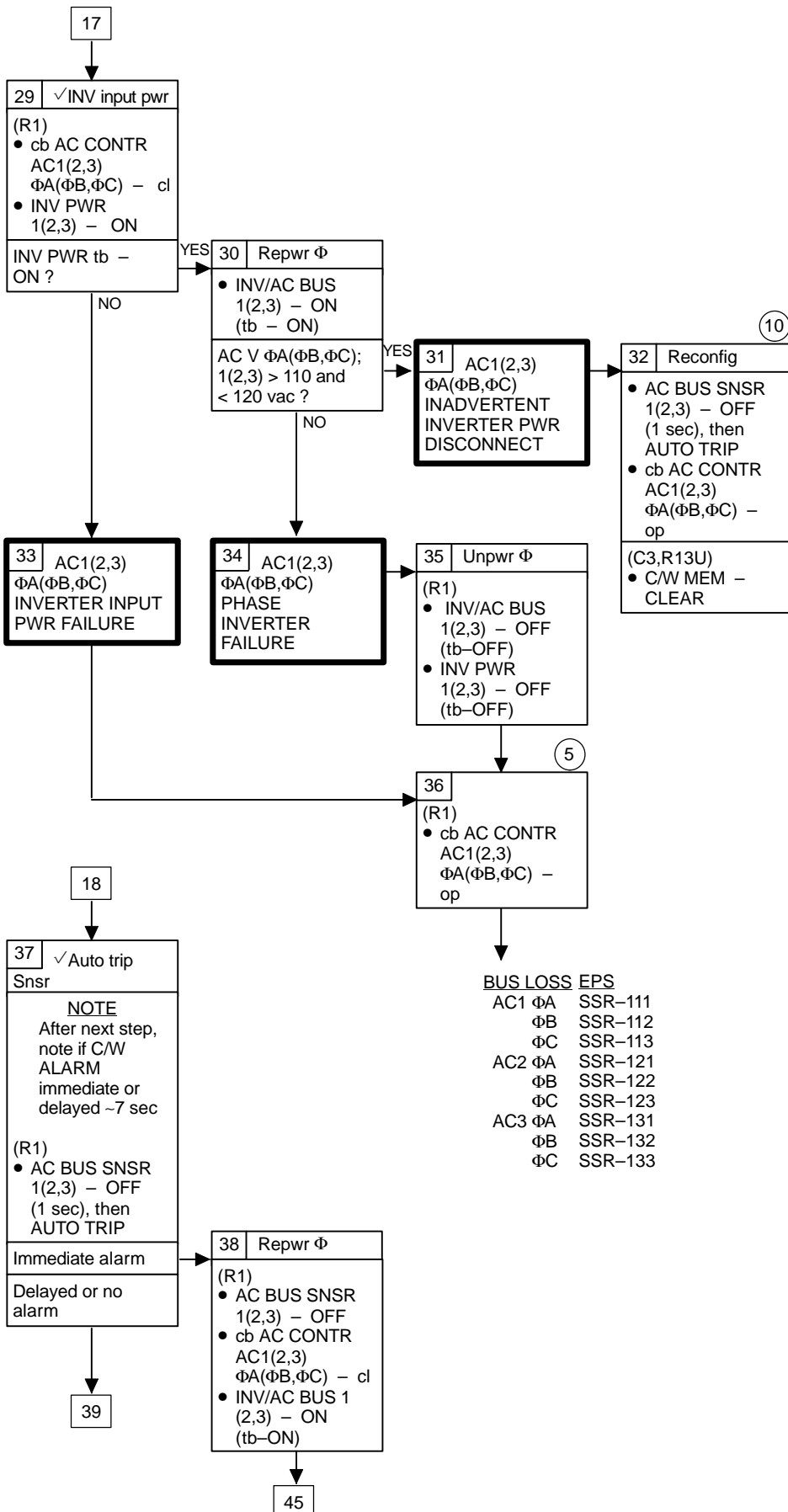


⑦ AC BUS short and AC BUS SNSR OVLD alarm not operational

⑧ AC BUS SNSR 1(2,3) failed causing auto trip on multiple phases

⑨ Lost AC1(2,3) AC VOLTAGE primary C/W alarm and AUTO TRIP capability. Still have BACKUP C/W AC VOLTAGE sensing

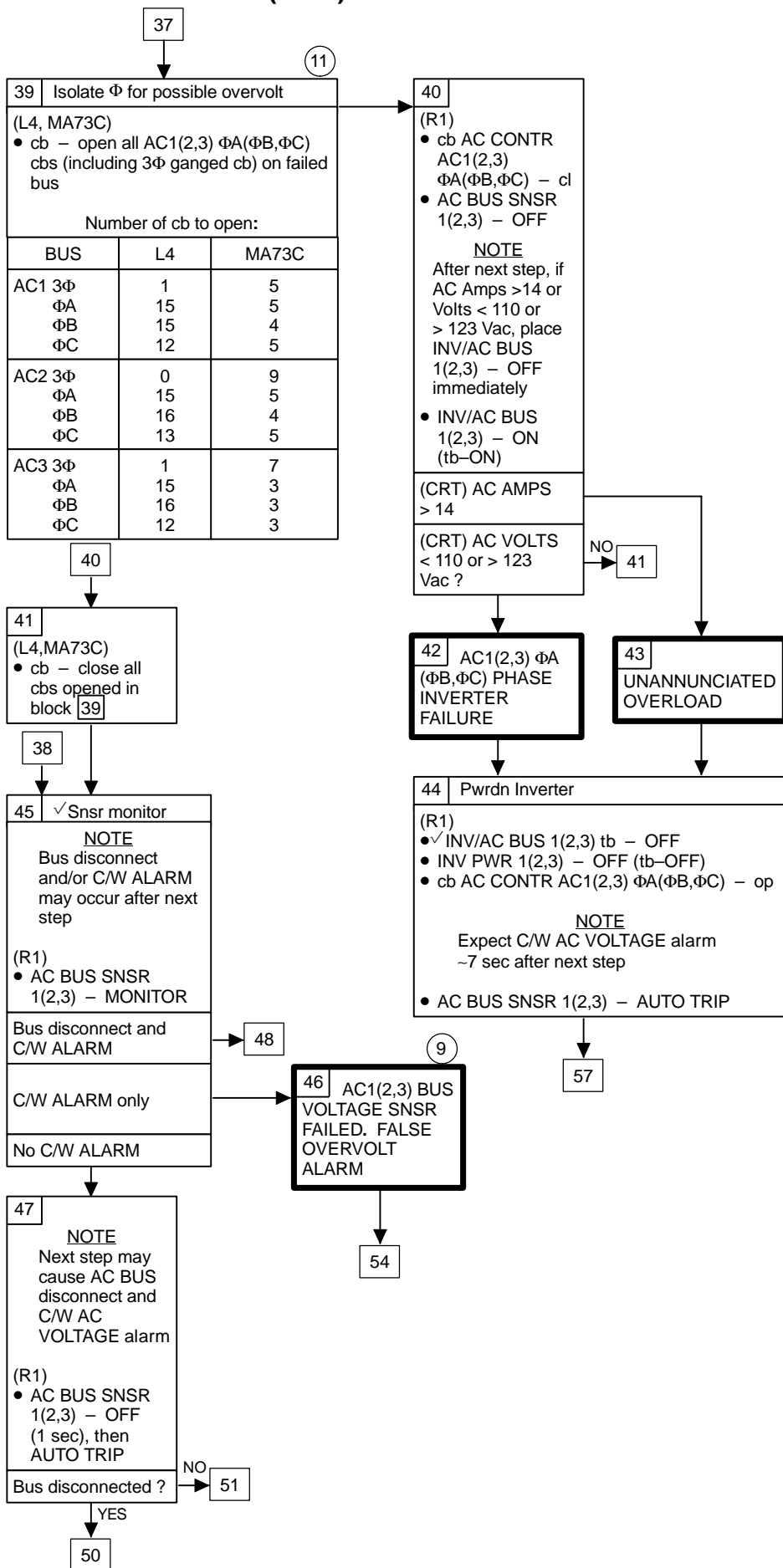
EPS 7.5a (Cont)



⑤ Lost AC1(2,3)AC VOLTAGE primary C/W alarm capability. Still have AUTO TRIP and Backup C/W AC VOLTAGE sensing

⑩ Nominal config may be restored if reqd

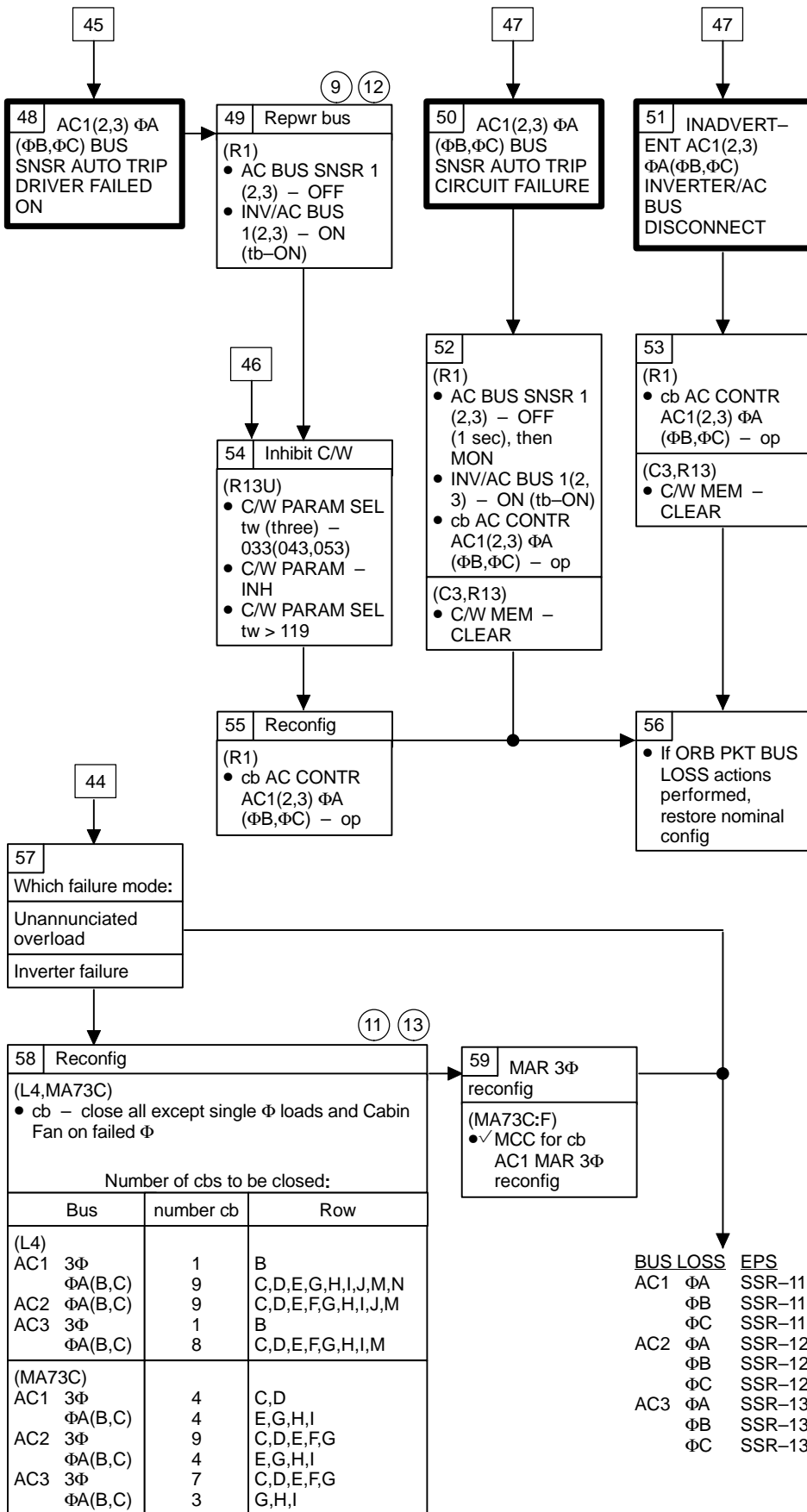
EPS 7.5a (Cont)



⑨ Lost AC1(2,3) AC VOLTAGE primary C/W ALARM and AUTO TRIP capability. Still have BACKUP C/W AC VOLTAGE sensing

⑪ Pnl L4 cb UTILITY PWR is 3Φ

EPS 7.5a (Cont)



- ⑨ Lost AC1(2,3) AC VOLTAGE primary C/W ALARM and AUTO TRIP capability. Still have BACKUP C/W AC VOLTAGE sensing
- ⑩ Pnl L4 cb UTILITY PWR is 3Φ
- ⑪ Lost AC1(2,3) OVLD AUTO TRIP and C/W alarm capability
- ⑫ Removing single Φ loads permits lighter loaded motors to support heavier loaded motors by coupling energy via unpowered Φ. Cabin fan on two Φs cannot support additional single Φ loads. All three cbs must be closed to start cabin fan but unpowered Φ cb should be open while running

58 Reconfig (L4,MA73C)

- cb - close all except single Φ loads and Cabin Fan on failed Φ

Number of cbs to be closed:

Bus	number cb	Row
(L4)		
AC1 3Φ	1	B
ΦA(B,C)	9	C,D,E,G,H,I,J,M,N
AC2 ΦA(B,C)	9	C,D,E,F,G,H,I,J,M
AC3 3Φ	1	B
ΦA(B,C)	8	C,D,E,F,G,H,I,M
(MA73C)		
AC1 3Φ	4	C,D
ΦA(B,C)	4	E,G,H,I
AC2 3Φ	9	C,D,E,F,G
ΦA(B,C)	4	E,G,H,I
AC3 3Φ	7	C,D,E,F,G
ΦA(B,C)	3	G,H,I

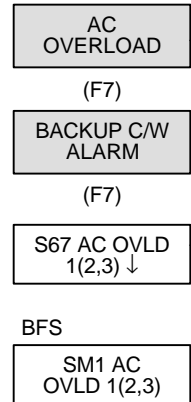
BUS LOSS EPS

AC1 ΦA	SSR-111
ΦB	SSR-112
ΦC	SSR-113
AC2 ΦA	SSR-121
ΦB	SSR-122
ΦC	SSR-123
AC3 ΦA	SSR-131
ΦB	SSR-132
ΦC	SSR-133

EPS

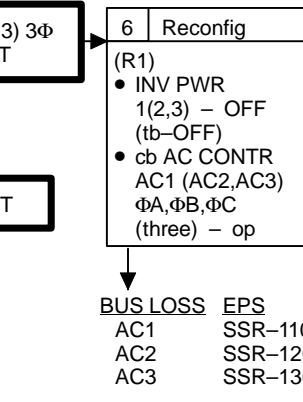
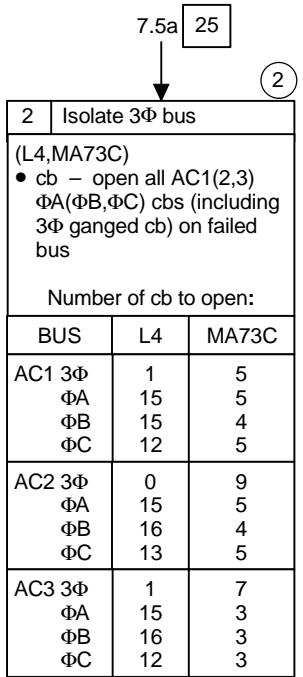
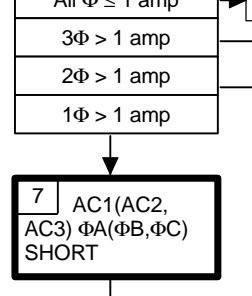
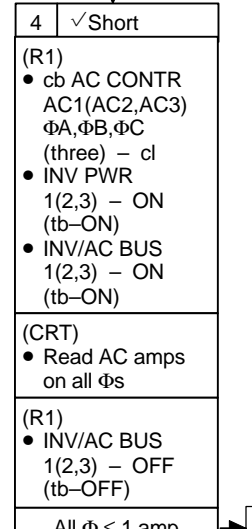
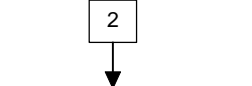
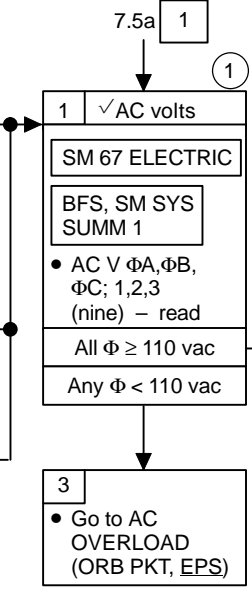
7.5b AC OVLD 1(2,3) ↓

- ① AC volts can be read on pnl F9
- ② Pnl L4 cb UTILITY PWR is 3Φ

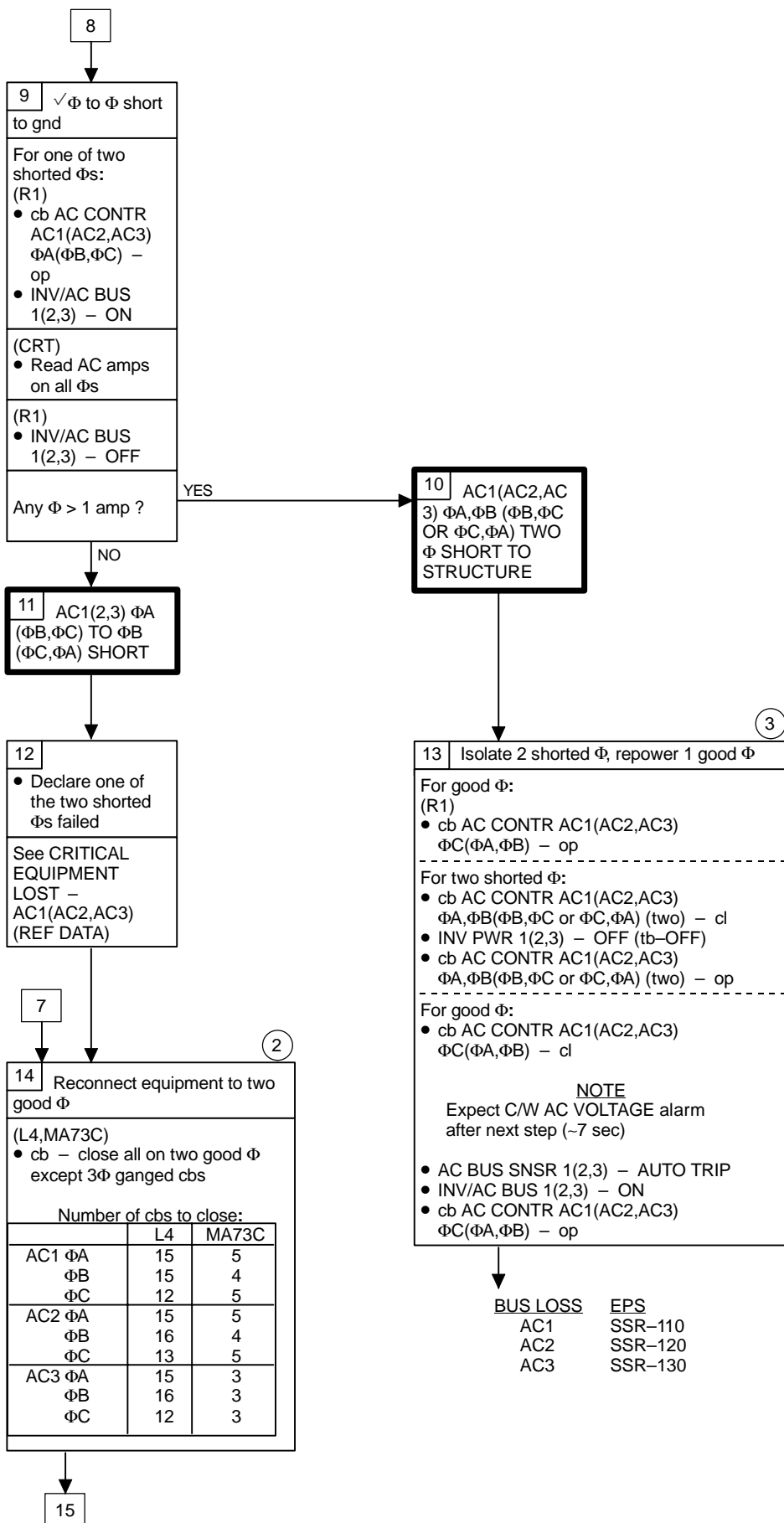


Light on if:
 AC Φ Inverter output current > 14.5 amps for 10–20 sec
 or
 > 17.3–21.1 amps for 4–6 sec

Nominal Config:
 (R1)
 cb AC CONTR AC1, AC2, AC3 ΦA, ΦB, ΦC (nine) – op
 AC BUS SNSR 1,2,3 (three) – AUTO TRIP (O13:A)
 cb ESS 1BC AC1 SNSR – cl (O13:C)
 cb ESS 2CA AC2 SNSR – cl (O13:E)
 cb ESS 3AB AC3 SNSR – cl



EPS 7.5b (Cont)



- ② Pnl L4 cb
UTILITY PWR is 3Φ
- ③ Lost AC1(AC2, AC3) AC VOLTAGE primary C/W alarm capability. Still have AUTO TRIP and B/U C/W AC VOLTAGE alarm capability

EPS 7.5b (Cont)

14

4

15 Repwr 2 good Φ

(R1)
For two good Φ

- cb AC CONTR AC1(AC2,AC3) Φ B, Φ C(Φ C, Φ A or Φ A, Φ B) (two) – op

For shorted Φ :

- \checkmark cb AC CONTR AC1(AC2,AC3) Φ A(Φ B, Φ C) – cl
- INV PWR 1(2,3) – OFF (tb–OFF)
- cb AC CONTR AC1(AC2,AC3) Φ A(Φ B, Φ C) – op

For two good Φ :

- cb AC CONTR AC1(AC2,AC3) Φ B, Φ C (Φ C, Φ A, or Φ A, Φ B) (two) – cl

NOTE
After next step, expect
C/W AC VOLTAGE alarm

- AC BUS SNSR 1(2,3) – AUTO TRIP
- INV/AC BUS 1(2,3) – ON
- cb AC CONTR AC1(AC2,AC3) Φ B, Φ C (Φ C, Φ A or Φ A, Φ B) (two) – op
- \checkmark FC1(2,3) REAC – OP (tb–OP)
- FC1(FC2,FC3) – START (max 10 sec)
- \checkmark FC1(FC2,FC3) COOL PUMP Δ P tb – gray

51

17 Reconnect FC

(R1)
When FC1(FC2,FC3) RDY tb – gray:

- FC/MN BUS A(B,C) – ON (tb–ON)
- FC/MN BUS A(B,C) – ON (tb–ON)
- ESS BUS SOURCE FC1(FC2,FC3) – ON
- MN BUS TIE A(B,C) – OFF (tb–OFF)
- B(C,A) – OFF (tb–OFF)

AC BUS with failed Φ ?

AC1	AC2	AC3
↓	↓	↓
16	20	18

17

5

16 AC1 PKT C/L backout

If Φ A good:
(O6)
• LTG PNL L/CTR – as reqd

(O8)
• LTG PNL R INST – as reqd

If Φ B good:
(O6)
• LTG PNL L OVHD – as reqd

(O8)
• LTG PNL NUMERIC – as reqd

If Φ C good:
(O7)
• TACAN 1 MODE – as reqd

If Φ A, Φ C good:
(L4)
• cb UTILITY PWR AC1 – cl

If ASC PKT C/L AC1(2 or 3 Φ)
FAILED BUS LOSS ACTION
performed:
(L2)
• FLASH EVAP FDLN HTR SPLY
(two) – as reqd

(O7)
• TACAN MODE 2,3 (two) – as reqd

17

BUS LOSS	EPS
AC1 Φ A	SSR–111
Φ B	SSR–112
Φ C	SSR–113

5

18 AC3 PKT C/L backout

If Φ A good:
no reconfig reqd

If Φ B good:
(O6)
• LTG PNL L/CTR – as reqd

(R10)
• MS LTG PNL – as reqd

(O17:C)
• SIG CONDR FREON B –
AC3(AC2)

If Φ C good:
(O7)
• TACAN 3 MODE – as reqd

(A6)
• OS LTG PNL – as reqd

If ASC PKT C/L AC3 (2 or 3 Φ)
FAILED BUS LOSS ACTION
performed:
(L2)
• FLASH EVAP FDLN HTR A,B
SPLY (two) – as reqd

(O7)
• TACAN MODE 1,2 (two) – as reqd

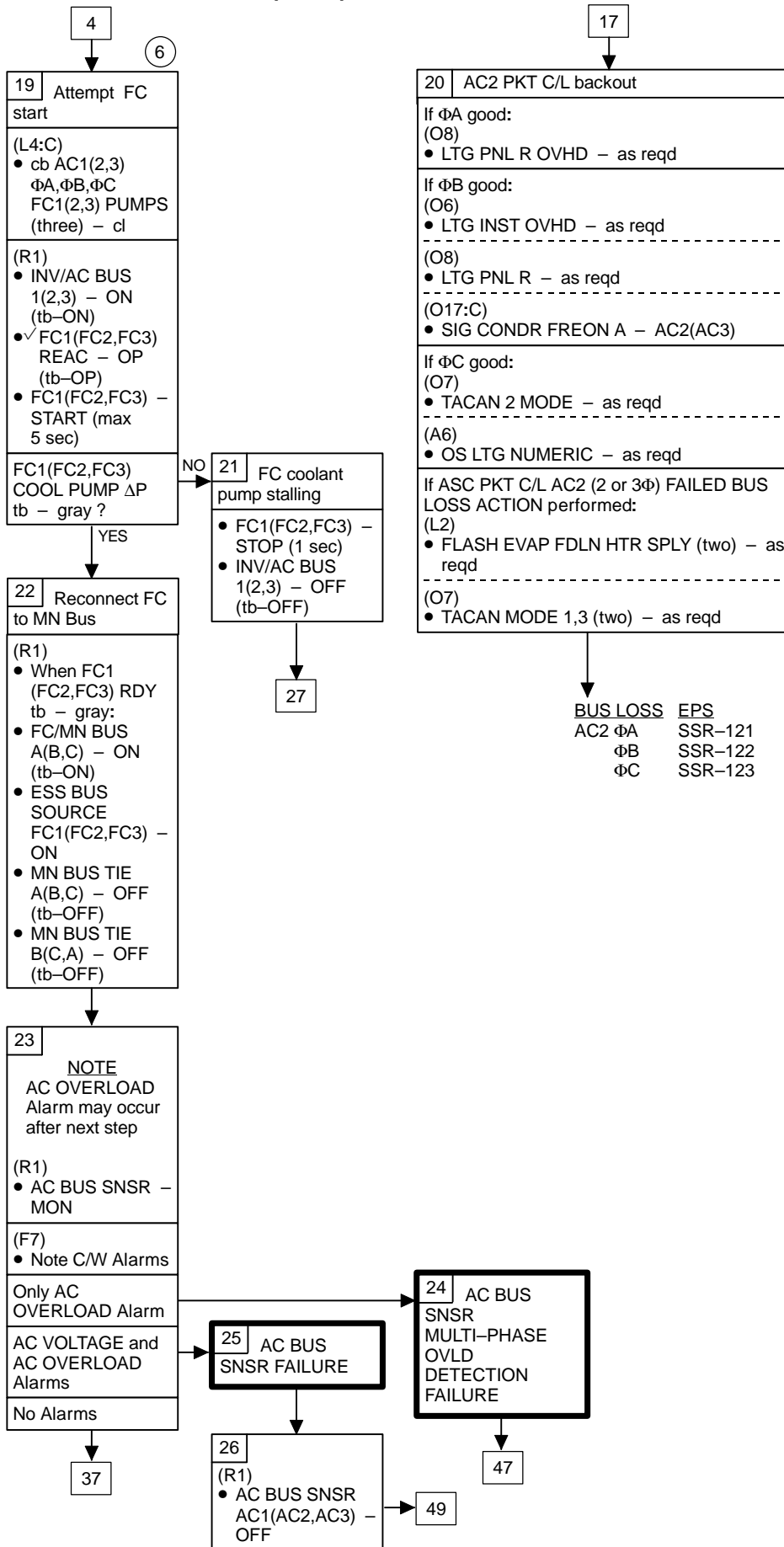
18

BUS LOSS	EPS
AC3 Φ A	SSR–131
Φ B	SSR–132
Φ C	SSR–133

4 If failed bus is AC2(3), CABIN FAN B(A) may not start on remaining two phases

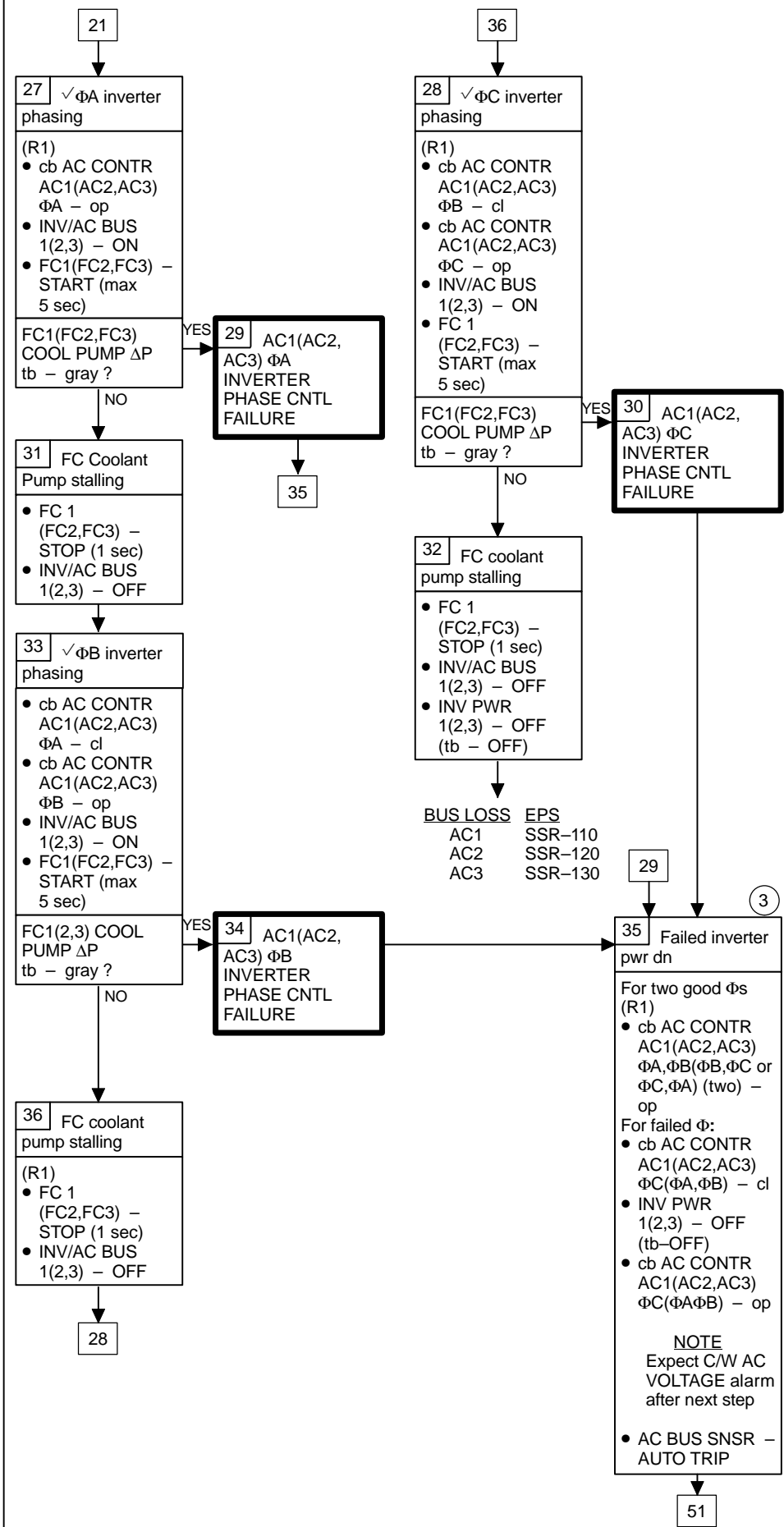
5 Φ A, Φ C reqd to use UTILITY PWR for direct connection to single food warmer

EPS 7.5b (Cont)



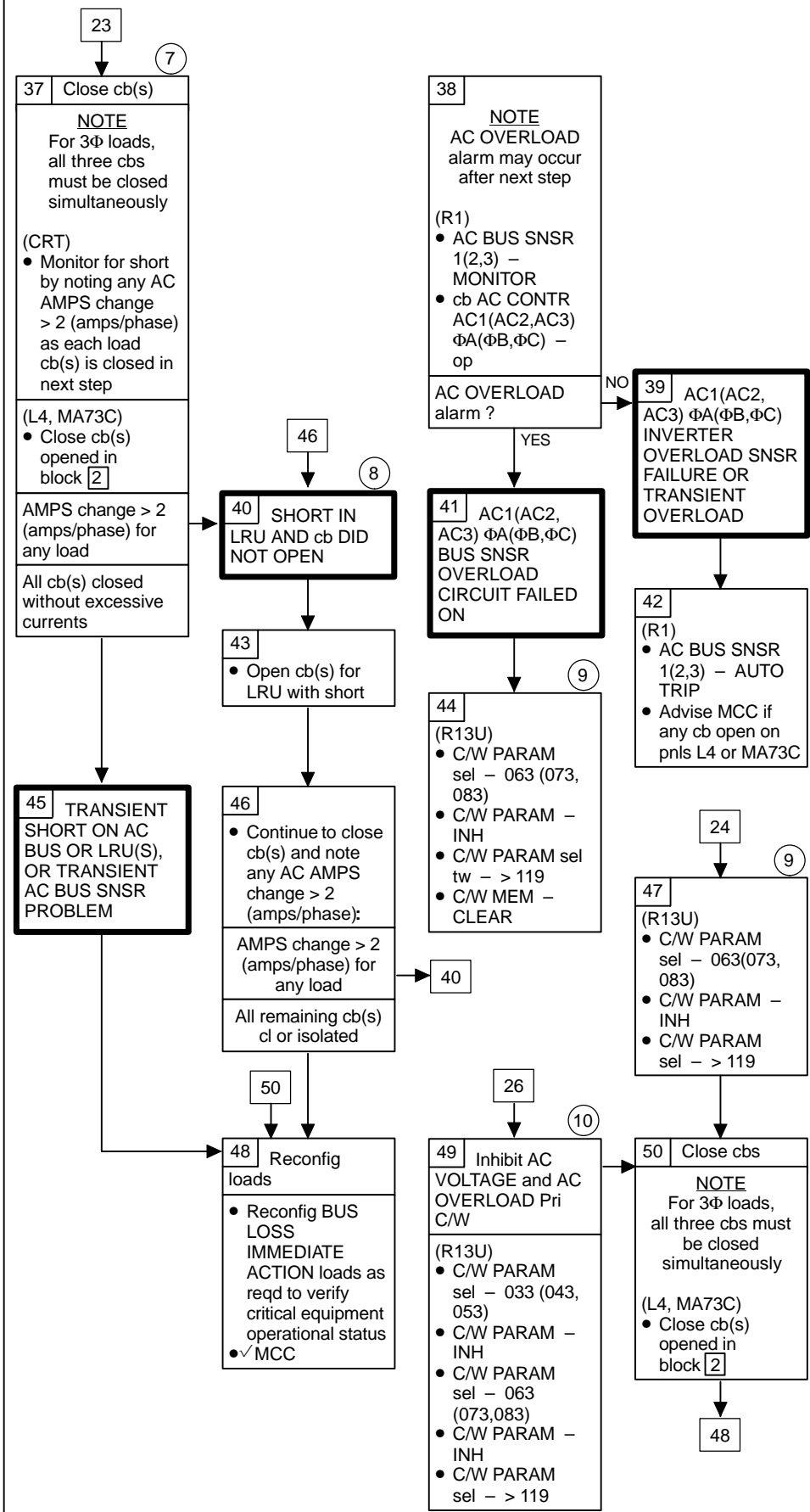
⑥ FC being used to determine if AC problem is due to 3Φ motor stall. FC pumps may be exposed to stall conditions; therefore, do not hold START sw longer than 5 sec

EPS 7.5b (Cont)



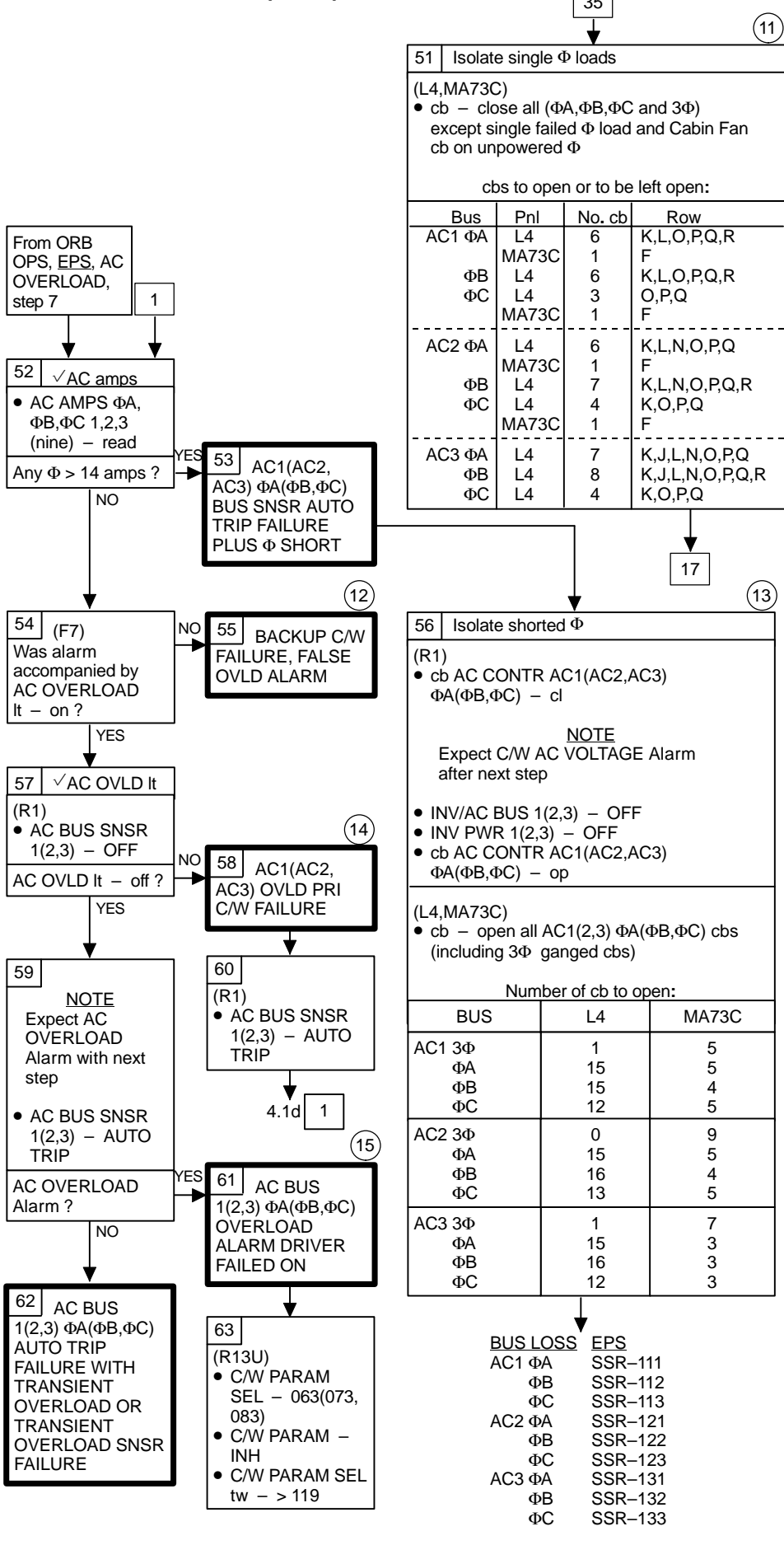
③ Lost AC1 (AC2,AC3) AC VOLTAGE primary C/W alarm capability. Still have AUTO TRIP and B/U C/W AC VOLTAGE alarm capability

EPS 7.5b (Cont)



- 7 Some AC Loads have high starting currents which should stabilize within 5 sec
- 8 Normally cb(s) will open with loads in excess of 3 amps
- 9 Lost AC1(AC2, AC3) overload and over-voltage auto trip protection along with AC OVERLOAD C/W Alarm
- 10 Only B/U C/W AC VOLTAGE Alarm remains. No AUTO TRIP exists for AC1(AC2,AC3)

EPS 7.5b (Cont)



- 11 Removing single phase loads and opening all cbs to Cabin Fan will maximize coupled energy available to heavier loaded mtrs without overstressing lighter loaded mtrs. All three cabin fan cbs must be closed to start fan but unpowered phase cb should be open while fan running
- 12 Lost AC1(AC2, AC3) backup C/W OVLD alarm capability
- 13 If shorted bus is AC2(3), CABIN FAN B(A) will not start on remaining two phases
- 14 OVLD Alarm capability remains via backup C/W
- 15 Lost OVLD Pri C/W alarms only. Auto trip still available

51 Isolate single phase loads (L4, MA73C)

- cb - close all (phase A, phase B, phase C and 3 phase) except single failed phase load and Cabin Fan cb on unpowered phase

cbs to open or to be left open:

Bus	Pnl	No. cb	Row
AC1 phase A	L4	6	K,L,O,P,Q,R
	MA73C	1	F
	phase B	6	K,L,O,P,Q,R
	phase C	3	O,P,Q

AC2 phase A	L4	6	K,L,N,O,P,Q
	MA73C	1	F
	phase B	7	K,L,N,O,P,Q,R
	phase C	4	K,O,P,Q

AC3 phase A	L4	7	K,J,L,N,O,P,Q
	phase B	8	K,J,L,N,O,P,Q,R
	phase C	4	K,O,P,Q
	MA73C	1	F

56 Isolate shorted phase (R1)

- cb AC CONTR AC1(AC2, AC3) phase A(phase B, phase C) - close

NOTE
Expect C/W AC VOLTAGE Alarm after next step

- INV/AC BUS 1(2,3) - OFF
- INV PWR 1(2,3) - OFF
- cb AC CONTR AC1(AC2, AC3) phase A(phase B, phase C) - open

(L4, MA73C)

- cb - open all AC1(2,3) phase A(phase B, phase C) cbs (including 3 phase ganged cbs)

Number of cbs to open:

BUS	L4	MA73C
AC1 3 phase	phase A	5
	phase B	4
	phase C	5
	3 phase	15
AC2 3 phase	phase A	5
	phase B	4
	phase C	5
	3 phase	13
AC3 3 phase	phase A	7
	phase B	3
	phase C	3
	3 phase	12

BUS LOSS EPS

AC1 phase A	SSR-111
phase B	SSR-112
phase C	SSR-113
AC2 phase A	SSR-121
phase B	SSR-122
phase C	SSR-123
AC3 phase A	SSR-131
phase B	SSR-132
phase C	SSR-133

EPS

7.5c AC BUS CURRENT HIGH

SM ALERT

S67 AC AMPS 1(2,3)

If: AC AMPS 1(2,3) > 10 amps

1 ✓ AC amps
SM SYS SUMM 1
More than one ϕ has high amps?

NO
8

2 On aff Bus
(MA73C)
• cb – open all except rows E & F
Any current decr ?

1

YES

3 CNTL LIMIT SW SIGNAL FAILURE CAUSES UNWANTED RUN/STALL MTR CURRENTS

NO

4
(MA73C,L4,R11)
• cb – op and cl ϕ A, ϕ B, ϕ C together on each 3 ϕ load noting AC amps change on aff bus

Normal cb current listed in parentheses

EQUIPMENT	ID (AMPS/ ϕ)		
	AC1	AC2	AC3
(MA73C) :E WCS FAN SEP PAYLOAD	1 (.9)*	2 (.9)* AC2 (0)*	AC3 (< 1.7)
(L4) UTILITY PWR (3 ϕ cb)	(0)		(0)
:C FC PUMPS	1 (.8)	2 (.8)	3 (.8)
:D C,R ENG	C (< 1.6)*	C (< 1.6)*	R (< 1.6)*
:E R,L ENG	R (< 1.6)*	L (< 1.6)*	L (< 1.6)*
:F H2O LOOP PUMP	1A/2 (1.0)*	1B (1.0)*	2 (1.0)
:G AV BAY FAN	1A (.9)*	1B (.9)	3A (.9)*
:H AV BAY FAN	3B (.9)	2A (.9)	2B (.9)*
:I IMU FAN	A (.2)*	B (.2)	C (.2)*
:J HUM SEP	A (.3)*	B (.3)	
:K CAB FAN		B (1.7)*	A (1.7)
:M,N FREON LOOP PUMP	1A (1.7)* 2B (1.7)	1B (1.7)	2A (1.7)*

(CRT) Any AC amps excessive ?

NO

YES

5 EXCESSIVE 3 ϕ LOAD ON AC1(2,3)

18

6 CURRENT LIMITED SHORT OR EXCESSIVE MTR LOAD

12

7
(MA73C)
• cb ϕ A, ϕ B, ϕ C of each load – cl together while watching for AC amps change on aff bus
• cb – cl all except those feeding excess load

1 All (MA73C) 3 ϕ loads are transient loads normally active as response to flight crew/GPC command. All loads are on < 2 min except row E

2 Normally '*' not active

3 Some mtrs have thermal cutoff sw that may remove load unexpectedly. In this event, block 4 will be inconclusive

4 AC Bus Snrs fused at 3 amps/ ϕ . AC volt meter and telemetry signal are fused at .5 amps/ ϕ

EPS 7.5c (Cont)

1

8	✓ Partial short								
(L4,R11,MA73C)									
<ul style="list-style-type: none"> • cb – op and cl single Φ load, one at a time • Monitor amps for proper change on aff Φ 									
Normal cb current (orbit & entry prep)									
Single Φ load AC amps									
Pnl& row	AC1			AC2			AC3		
	Φ A	Φ B	Φ C	Φ A	Φ B	Φ C	Φ A	Φ B	Φ C
(L4) :J	-	-	-	-	-	-	<.1	<.1	-
:K	<.1	<.1	-	-	-	-	-	-	-
:L	⑤	<.1	-	⑤	<.1	-	<.1	<.1	-
:N	-	-	-	⑥	<.1	-	⑥	<.1	-
:O	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
:P	⑦	⑦	⑧	<.1	⑦	⑧	<.1	⑦	⑧
:Q	< 1.9	< 1.8	< .2	< 1.3	< 1.3	< .2	< .2	< .2	< 2.3
:R	< .5	< .2	-	-	< .3	-	-	< .6	-
(MA73C) :F	< 1.3	-	< .1	< .5	-	< .2	-	-	-
(CRT)	Any cb with excessive load ?								

9 SOFT SHORT IN LOAD

10 ✓ Current snsr
(R1)
• cb AC CONTR AC1(2,3) Φ A(Φ B, Φ C) – cl
• INV/AC BUS 1(2,3) – OFF (tb-OFF)
(CRT)
• Read AC1(2,3) Φ A(Φ B, Φ C) amps
• INV/AC BUS 1(2) – ON (tb-ON)
Amps > 1 with INV/AC BUS disconnected ?

13 SOFT SHORT ON AC1(2,3) Φ A(Φ B, Φ C) BUS
14 CURRENT XDCR SHIFTED HIGH

6
12 Which equip shows excessive current:
FC PUMPS
OTHER

11 (L4,MA73C)
• cb – op for load with soft short

15 • Monitor FC for performance change

16 Off-load Bus
(L4:P,Q,R)
• cb AC1(2,3) Φ A(Φ B, Φ C) (three) – op
(CRT) Φ amps < 8 ?

19 • Monitor Bus for performance change

17 • Select alternate system
• cb – op system with high amps

18 • Maintain AC BUS 1(2,3) Φ amps < 8 for continuous loads by transferring following loads:
(L1)
FREON LOOP PUMP
CABIN FAN
AV BAY FAN
H2O LOOP PUMP
IMU FAN
HUM SEP
(MA73C)
PL AC2 3 Φ
PL AC3 3 Φ

- ⑤ < .1 amp steady state.
< .2 amp with mtr vlv operating
- ⑥ Mtr vlv operating load of .3 amp
- ⑦ Mtr vlv operating load of .2 amp
- ⑧ TACAN load of 1.5 amps during entry prep
- ⑨ Depending on subsystem, further short isolation sw ops may be available
- ⑩ Refer to block 4 for normal equipment config and bus loading
- ⑪ Some payload AC equip may be unprwd or configured to alternate pwr source

EPS 7.5c (Cont)

16

12

20 Isolate shorted Φ

(L4,MA73C)

- cb – open all AC1(2,3) Φ A(Φ B, Φ C) cbs (including 3 Φ ganged cbs) on failed bus

Number of cb to open:

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

(R1)

- cb AC CONTR AC1(2,3) Φ A(Φ B, Φ C) – cl

NOTE
Expect C/W AC VOLTAGE alarm after next step

- INV/AC BUS 1(2,3) – OFF (tb-OFF)
- INV PWR 1(2,3) – OFF (tb-OFF)
- cb AC CONTR AC1(2,3) Φ A(Φ B, Φ C) – op

↓

BUS LOSS	EPS
AC1 Φ A	SSR-111
Φ B	SSR-112
Φ C	SSR-113
AC2 Φ A	SSR-121
Φ B	SSR-122
Φ C	SSR-123
AC3 Φ A	SSR-131
Φ B	SSR-132
Φ C	SSR-133

12 If shorted bus is AC2(3), CABIN FAN B(A) will not start on remaining two phases

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CRYO

7.6

12/21/99

EPS 7.6 CRYO

CRYO TABLE A
CRYO HEATER SWITCH PROCEDURAL NOMENCLATURE
OXYGEN

HEATER SET	OV103, OV104	OV102 FOUR-TK SET	OV102 FIVE-TK SET + PALLET	OV105 FIVE-TK SET + PALLET
O2 TK 1 A	(R1) O2 TK1 HTR A	(R1) O2 TK1 HTR A	(R1) O2 TK1 HTR A	(R1) O2 TK1 HTR A
B	O2 TK1 HTR B	O2 TK1 HTR B	O2 TK1 HTR B	O2 TK1 HTR B
O2 TK 2 A	O2 TK2 HTR A	O2 TK2 HTR A	O2 TK2 HTR A	O2 TK2 HTR A
B	O2 TK2 HTR B	O2 TK2 HTR B	O2 TK2 HTR B	O2 TK2 HTR B
O2 TK 3 A	O2 TK3 HTR A	O2 TK3 HTR A	O2 TK3 HTR A	O2 TK3 HTR A
B	O2 TK3 HTR B	O2 TK3 HTR B	O2 TK3 HTR B	O2 TK3 HTR B
O2 TK 4 A	(A11) CRYO TK4 HTR O2 A	(A11) CRYO TK4/5 HTR O2 TK4	(A11) CRYO TK4/5 HTR O2 TK4	(A11) CRYO TK4 HTR O2 A
B	CRYO TK4 HTR O2 B	CRYO TK4/5 HTR O2 TK5	N/A	CRYO TK4 HTR O2 B
O2 TK 5 A	N/A	N/A	CRYO TK4/5 HTR O2 TK5	(A15) CRYO TK5 HTR O2 A
B	N/A	N/A	N/A	CRYO TK5 HTR O2 B
O2 TK 6 A	N/A	N/A	(A15) PALLET O2 TK6 HTR A	PALLET O2 TK6 HTR A
B	N/A	N/A	PALLET O2 TK6 HTR B	PALLET O2 TK6 HTR B
O2 TK 7 A	N/A	N/A	PALLET O2 TK7 HTR A	PALLET O2 TK7 HTR A
B	N/A	N/A	PALLET O2 TK7 HTR B	PALLET O2 TK7 HTR B
O2 TK 8 A	N/A	N/A	PALLET O2 TK8 HTR A	PALLET O2 TK8 HTR A
B	N/A	N/A	PALLET O2 TK8 HTR B	PALLET O2 TK8 HTR B
O2 TK 9 A	N/A	N/A	PALLET O2 TK9 HTR A	PALLET O2 TK9 HTR A
B	N/A	N/A	PALLET O2 TK9 HTR B	PALLET O2 TK9 HTR B

HYDROGEN

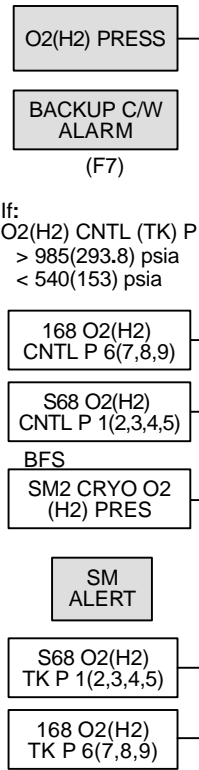
HEATER SET	OV103, OV104	OV102 FOUR-TK SET	OV102 FIVE-TK SET + PALLET	OV105 FIVE-TK SET + PALLET
H2 TK 1 A	(R1) H2 TK1 HTR A	(R1) H2 TK1 HTR A	(R1) H2 TK1 HTR A	(R1) H2 TK1 HTR A
B	H2 TK1 HTR B	H2 TK1 HTR B	H2 TK1 HTR B	H2 TK1 HTR B
H2 TK 2 A	H2 TK2 HTR A	H2 TK2 HTR A	H2 TK2 HTR A	H2 TK2 HTR A
B	H2 TK2 HTR B	H2 TK2 HTR B	H2 TK2 HTR B	H2 TK2 HTR B
H2 TK 3 A	H2 TK3 HTR A	H2 TK3 HTR A	H2 TK3 HTR A	H2 TK3 HTR A
B	H2 TK3 HTR B	H2 TK3 HTR B	H2 TK3 HTR B	H2 TK3 HTR B
H2 TK 4 A	(A11) CRYO TK4 HTR H2 A	(A11) CRYO TK4/5 HTR H2 TK4/5A	(A11) CRYO TK4/5 HTR H2 TK4/5A	(A11) CRYO TK4 HTR H2 A
B	CRYO TK4 HTR H2 B	CRYO TK4/5 HTR H2 TK4/5B	CRYO TK4/5 HTR H2 TK4/5B	CRYO TK4 HTR H2 B
H2 TK 5 A	N/A	N/A	CRYO TK4/5 HTR H2 TK4/5A	(A15) CRYO TK5 HTR H2 A
B	N/A	N/A	CRYO TK4/5 HTR H2 TK4/5B	CRYO TK5 HTR H2 B
H2 TK 6 A	N/A	N/A	(A15) PALLET H2 TK6 HTR A	PALLET H2 TK6 HTR A
B	N/A	N/A	PALLET H2 TK6 HTR B	PALLET H2 TK6 HTR B
H2 TK 7 A	N/A	N/A	PALLET H2 TK7 HTR A	PALLET H2 TK7 HTR A
B	N/A	N/A	PALLET H2 TK7 HTR B	PALLET H2 TK7 HTR B
H2 TK 8 A	N/A	N/A	PALLET H2 TK8 HTR A	PALLET H2 TK8 HTR A
B	N/A	N/A	PALLET H2 TK8 HTR B	PALLET H2 TK8 HTR B
H2 TK 9 A	N/A	N/A	PALLET H2 TK9 HTR A	PALLET H2 TK9 HTR A
B	N/A	N/A	PALLET H2 TK9 HTR B	PALLET H2 TK9 HTR B

7-58

MAL/ALL/GEN E

EPS

7.6b CRYO O2(H2) PRES, TK P ↓↑

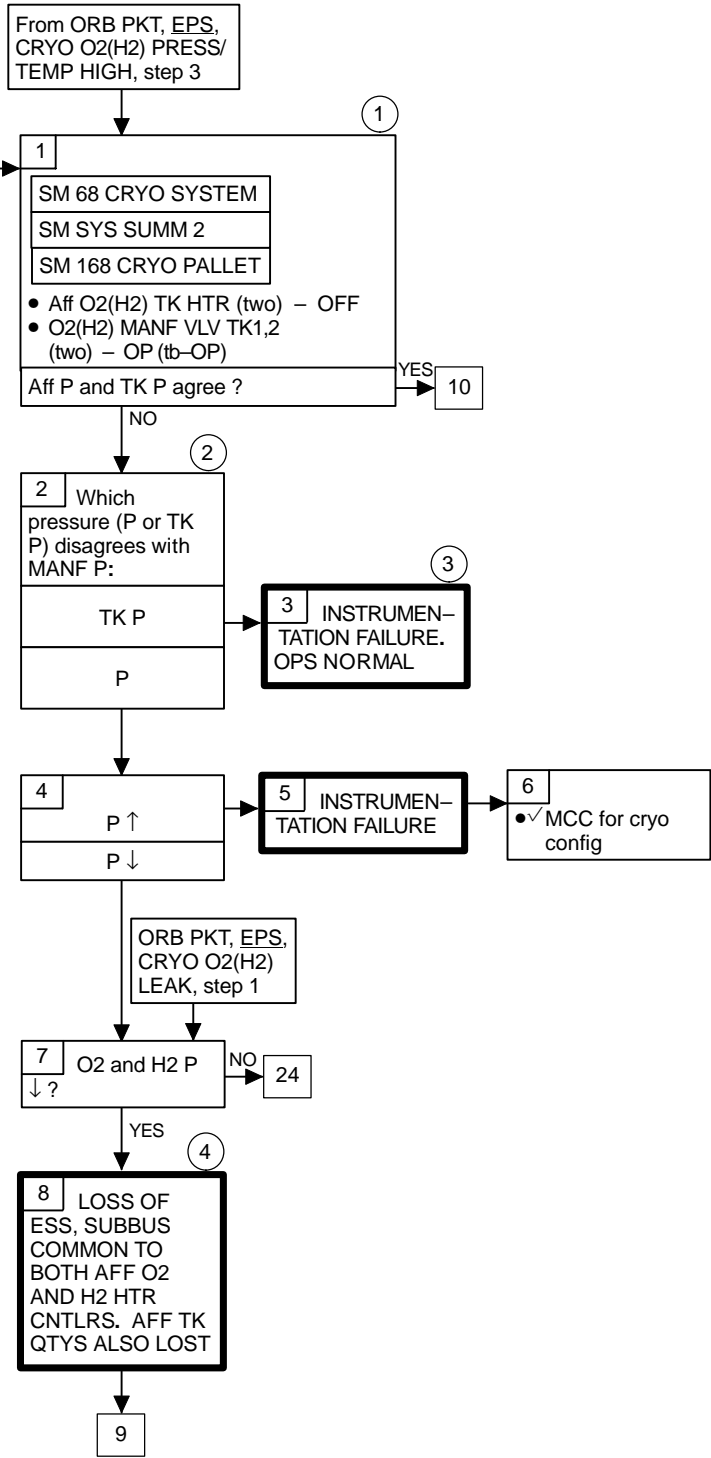


If:
O2(H2) CNTL (TK) P
> 985(293.8) psia
< 540(153) psia

If:
O2(H2) TK P:
> 960(283)
< 740(189.3) with
AUTO htrs
< 575(165) with htr
not in AUTO
BFS
168 PALLET H2
TKP (PRESS)

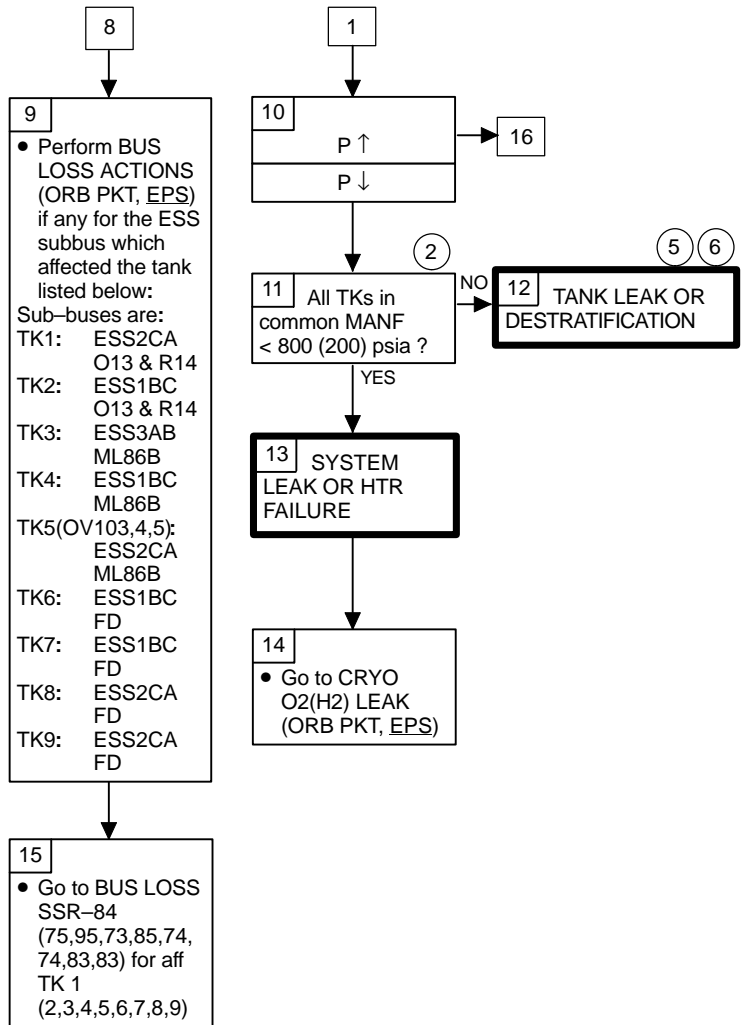
If:
H2 TK P (CNTL P)
< 165.6 (153)

Nominal Config:
(O13)
cb ESS 2CA,1BC
CRYO CNTLR
O2,H2 TK1,2
(four) - cl
cb ESS 2CA,1BC
CRYO QTY O2,H2
TK1,2 (four) - cl
(ML86B:G)
cb ESS 3AB,1BC,
2CA CRYO
CNTLR O2,H2 TK3
(two) - cl
cb ESS 3AB,1BC,
2CA CRYO QTY
O2,H2 TK3
(two) - cl
(O14:C)
cb MNA CRYO O2
HTR TK1 SNSR
1 - cl
(Cont in notes
column)



- ① Use pnl O2 meter or 168 CRYO PALLET (BFS) for TK P if SM2 not available
- ② O2(H2) TK AUTO Control pressure ranges:
TK 1/2: 803-854 (200-226)
TK 3-9: 832-882 (217-243)
- ③ AUTO htr ops still available with failure of this Xdcr
- ④ Loss of ESS bus, cb failed open, or loss of htr cntlr results in P Xdcr reading off-scale low (O2: 515 psia, H2: 145 psia) and loss of AUTO capability

Nominal Config:
(Cont):
(O15:C)
cb MNB CRYO O2
HTR TK2 SNSR
2 - cl
(O16:C)
cb MNC CRYO
O2 HTR
TK1 SNSR 2 - cl
TK2 SNSR 1 - cl
(ML86B:F)
cb MNA,MNB,MNC
CRYO O2 HTR
TK3,4,5 SNSR 1,2
(six) - cl
(A15)
cb PALLET ESS
1BC,2CA TK7,8,9
CNTLR O2,H2
(eight) - cl
cb PALLET ESS
1BC,2CA TK7,8,9
QTY O2,H2
(eight) - cl
cb PALLET MNA
TK6-9
O2 SNSR 1
(four) - cl
cb PALLET MNB
TK6-9
O2 SNSR 2
(four) - cl
(R15:B)
cb MNA,MNB,MNC
PALLET DSC
1A/2B,1B,2C
(three) - cl

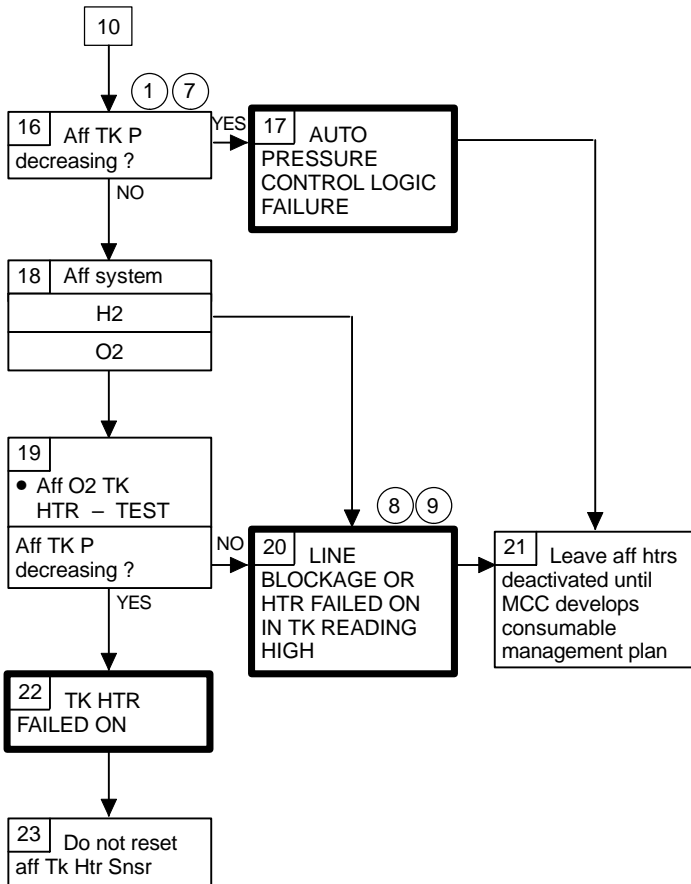


② O2(H2) TK AUTO Control pressure ranges:TK1/2: 803-854 (200-226) TK 3-9: 832-882 (217-243)

⑤ For destratified tk, natural heat leak into tk will eventually build pressure back up

⑥ Operating hrs below critical pressure could be hazardous in presence of two-phase fluid. Therefore, hrs are left deactivated

EPS 7.6b (Cont)



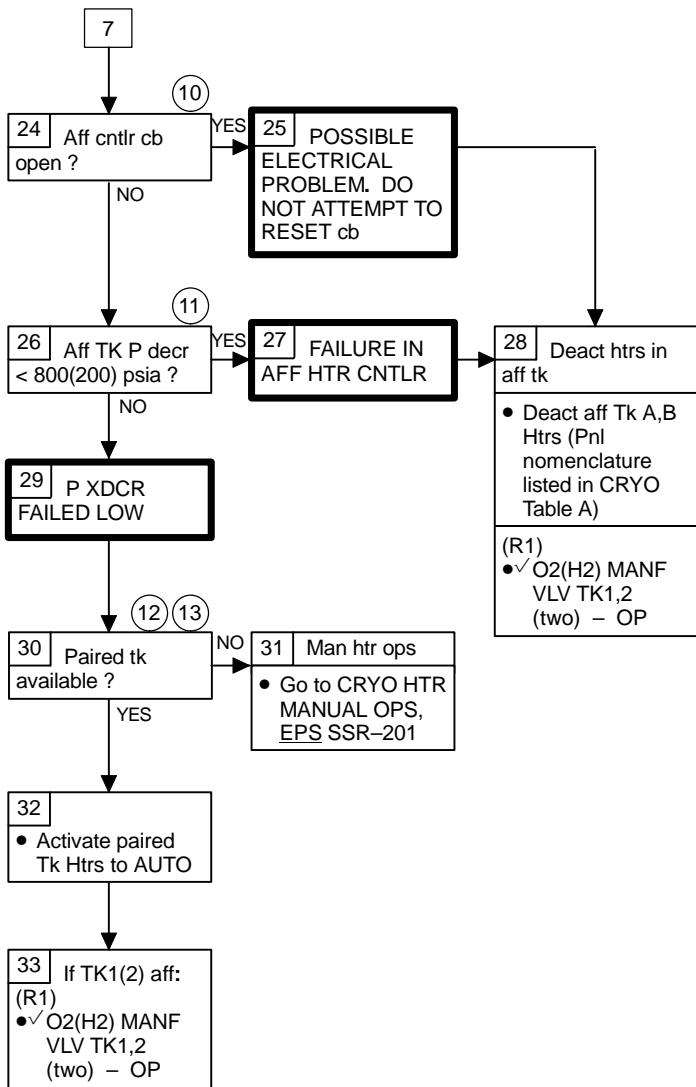
① Use pnl O2 meter or 168 CRYO PALLET (BFS) for TK P if SM2 not available

⑦ Once htrs are deactivated in tk with high P, the P should decrease to normal value

⑧ Even with htrs OFF, environmental heat leak will eventually cause tk relief vlv to crack

⑨ Failed-on htr may require temporarily dropping a main bus until IFM 'CRYO TANK HEATER FUSE REMOVAL' can be performed. If pressure exceeds 1,000(300) psi, overboard relief vlv may open

EPS 7.6b (Cont)

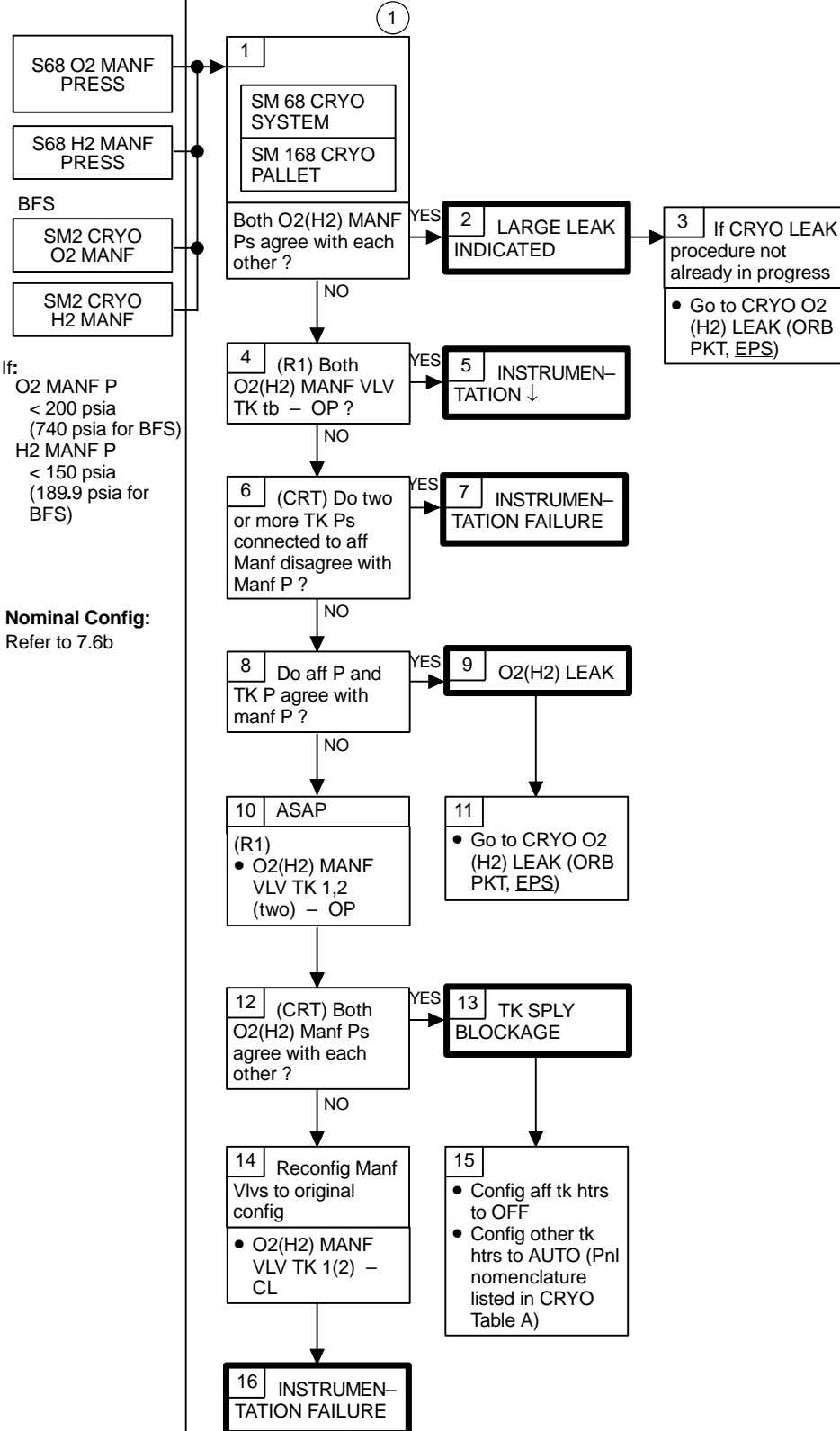


- ⑩ Check nominal config column for cb location
- ⑪ Could take 3 hr to bleed pressures down
- ⑫ For P xdcr failed low, tk can be operated in AUTO only if tk can run simultaneously with a tk paired within its logic. Logic pairings for P controllers are:
1,2
3,4
3,4/5 OV102 only
6,7
8,9
TK5 not paired on OV103,104, or 105
- ⑬ TKs 1,2 cannot be operated simultaneously if a manifold vlv is closed

EPS

7.6d O2(H2) MANF P ↓

① Assumes both Manf vlvs are open. If indicative of continuing system problem, there would have been previous alarms for P and TK P low



If:
O2 MANF P < 200 psia (740 psia for BFS)
H2 MANF P < 150 psia (189.9 psia for BFS)

Nominal Config:
Refer to 7.6b

From ORB PKT,
EPS, CRYO
O2(H2) PRESS/
TEMP HIGH,
step 5

S68 H2 HTR T
1(2,3,4,5)

168 H2 HTR T
6(7,8,9)

If:
H2 HTR T
> 210 degF

1

SM 68 CRYO SYSTEM
SM 168 CRYO PALLET

- Deact all htrs in aff tk(s)
- Config aff HTRS – OFF per CRYO TABLE A

Do either of the following conditions exist?
QTY < 5%
H2 T > 130 degF

YES

2 TANK AT RESIDUAL QTY

NO

3 Aff P increasing?

YES

4 FAILED-ON HTR

1

5

- ✓ MCC

NO

6

TRANSDUCER FAILURE OR POSSIBLE TANK STRATIFICATION

2

7 Reconfig to htrs in alternate tank

- ✓ Any unaffected H2 TK HTR in AUTO
- ✓ H2 MANF VLV TK 1,2 (two) – op (tb-op)

3

- ① Failed-on htr may require temporarily dropping a main bus until IFM 'CRYO TANK HEATER FUSE REMOVAL' can be performed. If pressure exceeds 300 psi, overboard relief valve may open
- ② Stratification normally occurs when htrs are operating for long periods of time and during periods of attitude holds
- ③ MCC will determine cryo management plan

EPS

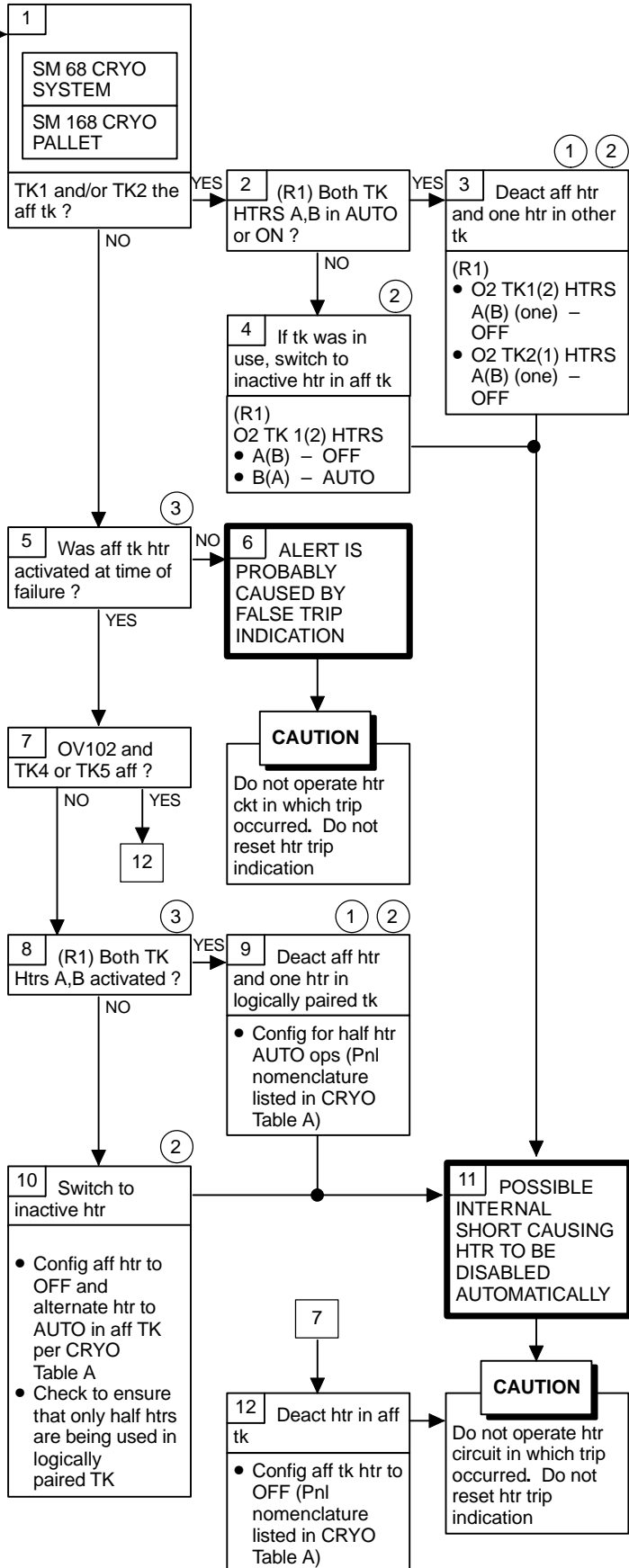
7.6k O2 HTR CUR SNSR = TRIP

SM ALERT

S68 O2 HTR TRP 1(2,3,4,5)

168 O2 HTR TRIP 6(7,8,9)

If: HTR CUR SNSR = '↓' (tripped)



- ① If all Sntrs in tk (or one A and one B Sntr) indicate tripped, deactivate all htrs in affected tk and open manf vlvs. Do not reconfig htrs in other tk
- ② Unless htr pwr in both tks is approx equal, pressurization rates will not be equal and quantity imbalance will eventually result
- ③ Use CRYO Table A to determine which htr sets were active

From ORB OPS, EPS, CRYO O2(H2) PRESS/TEMP HIGH, step 4

O2 HEATER TEMP (F7)

BACKUP C/W ALARM (F7)

If: O2 HTR T > 349 degF

S68 O2 HTR T 1(2,3,4,5)

168 O2 HTR T 6(7,8,9)

BFS SM2 CRYO O2 HTR

168 PALLET O2 HTR

Nominal Config: Refer to 7.6b

1
SM 68 CRYO SYSTEM
SM 168 CRYO PALLET

Deact all htrs in aff tk(s)

- Config aff HTRS – OFF per CRYO TABLE A

Do either of the following conditions exist?
QTY < 10%
O2 T > 130 degF

2 TANK AT RESIDUAL QTY → 10

3 Is QTY in aff tk < 55% and both A,B Htrs in AUTO?

4 INSUFFICIENT QTY FOR DUAL HTR OPS → 5

5 Config for half htrs
• Aff O2 TK HTR A – AUTO

6 Are both HTR T > 349 degF?

7 SINGLE HIGH TEMP IS PROBABLY INSTRUMENTATION FAILURE → 15

8 Aff P increasing?

9 PROBABLE TANK STRATIFICATION → 10

10 Reconfig to htrs in alternate tank
• ✓ Any unaffected O2 TK HTR A in AUTO
• ✓ O2 MANF VLV TK 1,2 (two) – op (tb-op)

11 (R1)
• Aff O2 TK HTRS – TEST

Aff TK P still increasing?

12 FAILED-ON HTR → 13

13 • ✓ MCC

14 FAILED ON HTR NOW DEACTIVATED. DO NOT RESET TK HTR SNSR

15 Inhibit Aff TK HTR T HARDWARE C/W

HTR 1		HTR 2	
TANK 1	CH 001	TANK 1	CH 011
TANK 2	CH 021	TANK 2	CH 031
TANK 3	CH 041	TANK 3	CH 051
TANK 4	CH 061	TANK 4	CH 071
TANK 5	CH 081	TANK 5	N/A

① Stratification normally occurs when htrs are operating for long periods of time or during periods of attitude holds

② MCC will determine cryo management plan

③ Failed-on htr may require temporarily dropping a main bus until IFM 'CRYO TANK HEATER FUSE REMOVAL' can be performed. If pressure exceeds 1,000 psi, overboard relief valve may open

④ Tank 5 Htr 2 and all Cryo Pallet tank htrs have no associated hardware C/W. OV102 has no hardware C/W for Tank 5 Htr 1

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EPS SSR

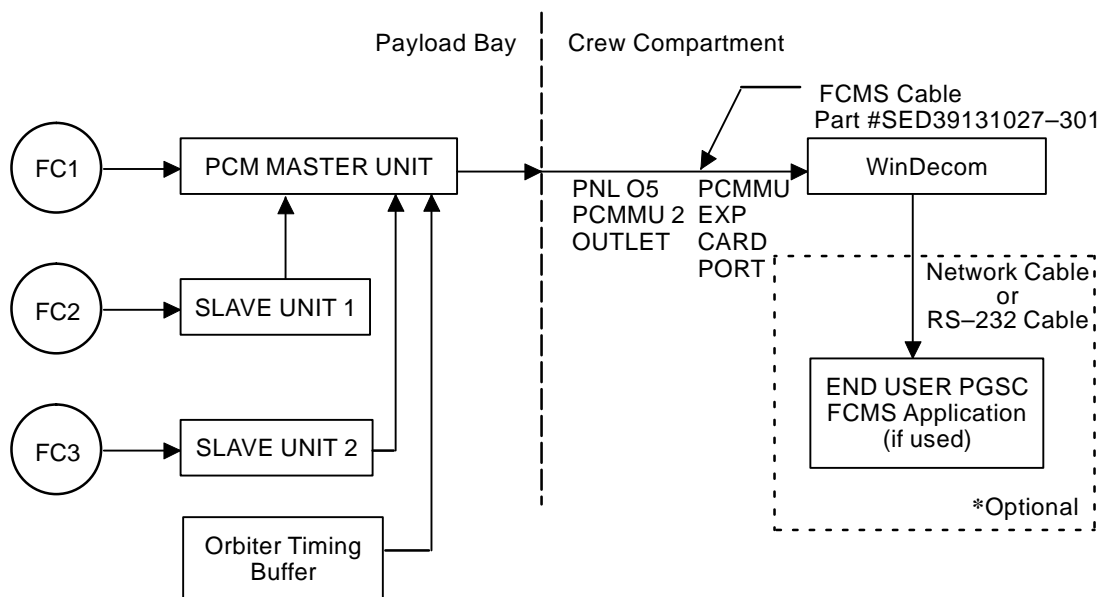
EPS SSR-1 FC MONITORING SYS (FCMS) OPS

NOTE

The FCMS application has capability to display FC single cell voltages and also to record those cell voltages in ASCII data file. Primary mode of operation will be to connect WinDecom using the FCMS data cable, bring up the WinDecom-FCMS application. Start the FCMS application to record data, then downlink the data file to MCC via OCA for analysis.

The recorded data file names will have the format fcXXXXXX.fcv or fcXXXXXX.ZIP where 'XXXXXX' references the GMT of the first data point of the file dropping the hundreds place for the day. Every recorded data file will contain the single cell voltages from all three fuel cells. If recording a full rate data file, temporarily terminate all other applications on the same PGSC

FCMS DATA DIAGRAM



- *The FCMS Application can be run on any one of the following PGSCs
- WinDecom PGSC
 - Any End User Networked PGSC using a network cable
 - Any End User PGSC connected to WinDecom serial port (com 1) using RS232Y Cable

If WinDecom currently running
Double-click 'Shuttle Apps' > 'WinDecom' > 'WinDecom shutdown'
Sel 'OK' to shutdown Telemetry System

ACTIVATION

- WinDecom PGSC – on
End user PGSC pwr – on (if used)
- Disconnect PCMMU cable from PCMMU expansion port on WinDecom PGSC
O5 If reqd, disconnect PCMMU cable from pnl O5 PCMMU 2 outlet

NOTE

FCMS cable pin out is different than standard PCMMU data cable

- Connect FCMS cable from pnl O5 PCMMU 2 outlet to PCMMU expansion card port on WinDecom PGSC

EPS SSR–1 (Cont)

ML86B:D 4. cb MNA FC PCM – cl

WinDecom PGSC

5. At Startup Menu, sel PCMMU Expansion Unit config
6. Double–click ‘Shuttle Apps’ > ‘Fuel Cell Monitoring’ > ‘WinDecom–FCMS’

NOTE

Minimizing FCMS App will reduce PGSC resources being used

FCMS Application

7. If reqd for End User PGSC, sel appropriate Expansion unit config at startup menu
8. Double–click ‘Shuttle Apps’ > ‘Fuel Cell Monitoring’ > Fuel Cell Monitoring System’
9. Verify data being received on crew FCMS display
10. Record full rate data file using record option unless otherwise specified by MCC (Either full rate or one sample every X seconds for X hours)
11. When recording is complete, transfer data file (fcXXXXX.ZIP) from C:\SPOCAPPS\FCMS directory to C:\oca_down directory on Proshare PGSC, notify MCC

If fuel cell open circuit voltage recording requested, following steps will be coordinated with MCC:

12. BUS TIE ____,____(two) – ON (tb–ON)
13. ESS BUS SOURCE FC ____ – OFF
14. FC/MN BUS ____ – OFF
15. Record data file using record option specified by MCC (Either full rate or one sample every X seconds for X hours)

When open circuit recording complete, notify MCC

16. FC/MN BUS ____ – ON
17. ESS BUS SOURCE FC ____ – ON
18. Bus Tie config per MCC

DEACTIVATION

ML86B:D 1. cb MNA FC PCM – op

FCMS Application

2. Close FCMS application
If End User PGSC used
Disconnect and stow RS232Y cable
Shutdown Windows – as reqd

WinDecom PGSC

3. To exit:
Double–click ‘Shuttle Apps’ > ‘Fuel Cell Monitoring’ > ‘WinDecom Shutdown’
4. Perform as reqd
Disconnect FCMS cable
Shutdown Windows
Disconnect pwr cable

O5 5. Connect PCMMU cable between WinDecom’s PCMMU expansion card port and pnl O5 PCMMU 1 outlet

EPS SSR-3 FC SHUTDN C&W LIMIT CHANGE

1 ✓FC H2O LN
HTR and close aff
FC PURGE VLV

(R11U)

- FC H2O LINE HTR – A AUTO (B AUTO)
- Aff FC PURGE VLV – CL
- Install guard on purge valve switch

2

Which FC is being shut down?

FC1	FC2	FC3
-----	-----	-----

3 Change FC1
STACK T PRI C&W
lower limit to 50.8
degF and inhibit
FC1 O2,H2 REAC
VLV and FC1
PUMP PRI C&W

(R13U)

- C/W PARAM SEL tw (three) – 062
- C/W LIMIT SET VALUE tw (three) – 1.70
- C/W LIMIT SET LIMIT – LOWER
- C/W LIMIT SET FUNC – SET, then READ, hold
- ✓STATUS lts – 1.70
- C/W PARAM SEL tw (three) – 002
- C/W PARAM – INH
- C/W PARAM SEL tw (three) – 012
- C/W PARAM – INH
- C/W PARAM SEL tw (three) – 092
- C/W PARAM – INH
- C/W PARAM STATUS – INH, hold
- ✓PARAM 002,012,092 inhibited
- C/W PARAM SEL tw (three) – 120

4 Change FC2
STACK T PRI C&W
lower limit to 50.8
degF and inhibit
FC2 O2,H2 REAC
VLV and FC2
PUMP PRI C&W

(R13U)

- C/W PARAM SEL tw (three) – 072
- C/W LIMIT SET VALUE tw (three) – 1.70
- C/W LIMIT SET LIMIT – LOWER
- C/W LIMIT SET FUNC – SET, then READ, hold
- ✓STATUS lts – 1.70
- C/W PARAM SEL tw (three) – 022
- C/W PARAM – INH
- C/W PARAM SEL tw (three) – 032
- C/W PARAM – INH
- C/W PARAM SEL tw (three) – 102
- C/W PARAM – INH
- C/W PARAM STATUS – INH, hold
- ✓PARAM 022,032,102 inhibited
- C/W PARAM SEL tw (three) – 120

5 Change FC3
STACK T PRI C&W
lower limit to 50.8
degF and inhibit
FC3 O2,H2 REAC
VLV and FC3
PUMP PRI C&W

(R13U)

- C/W PARAM SEL tw (three) – 082
- C/W LIMIT SET VALUE tw (three) – 1.70
- C/W LIMIT SET LIMIT – LOWER
- C/W LIMIT SET FUNC – SET, then READ, hold
- ✓STATUS lts – 1.70
- C/W PARAM SEL tw (three) – 042
- C/W PARAM – INH
- C/W PARAM SEL tw (three) – 052
- C/W PARAM – INH
- C/W PARAM SEL tw (three) – 112
- C/W PARAM – INH
- C/W PARAM STATUS – INH, hold
- ✓PARAM 042,052,112 inhibited
- C/W PARAM SEL tw (three) – 120

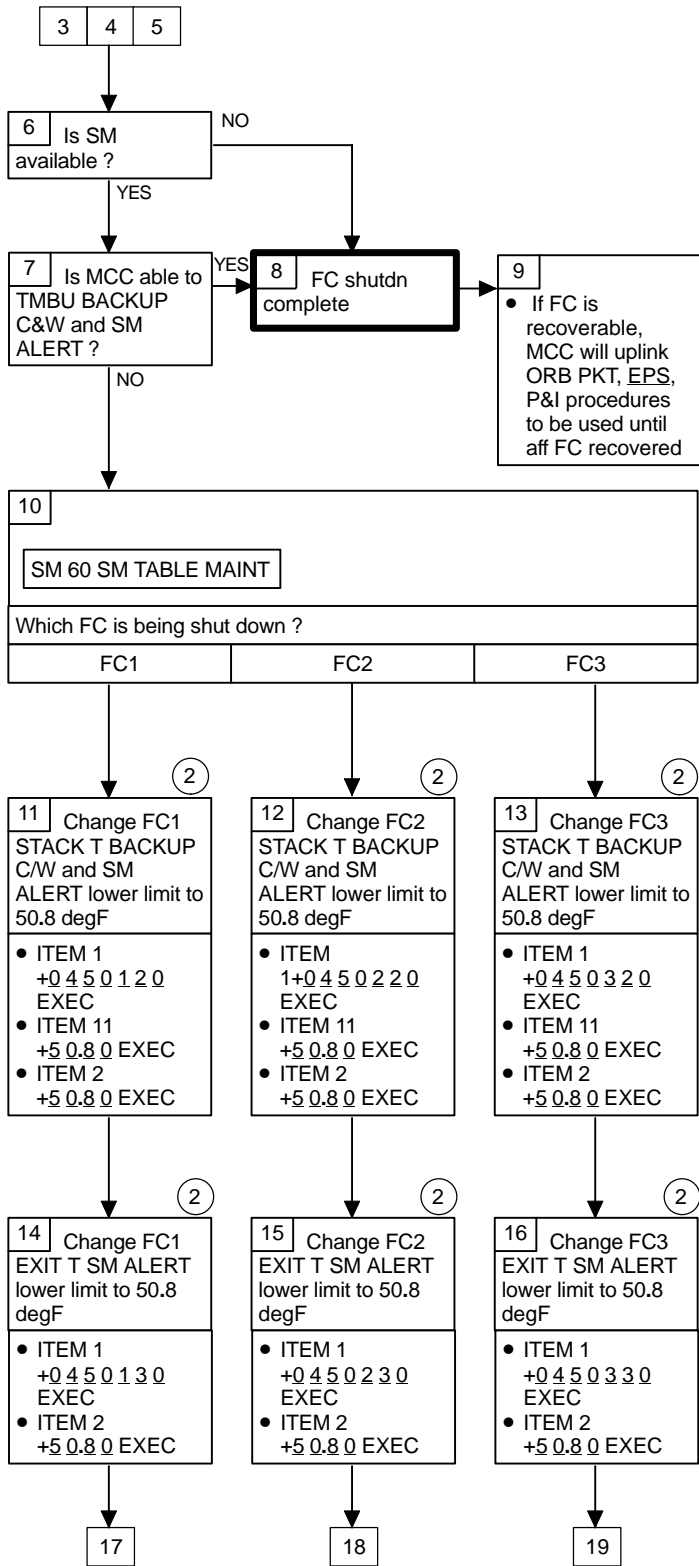
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6

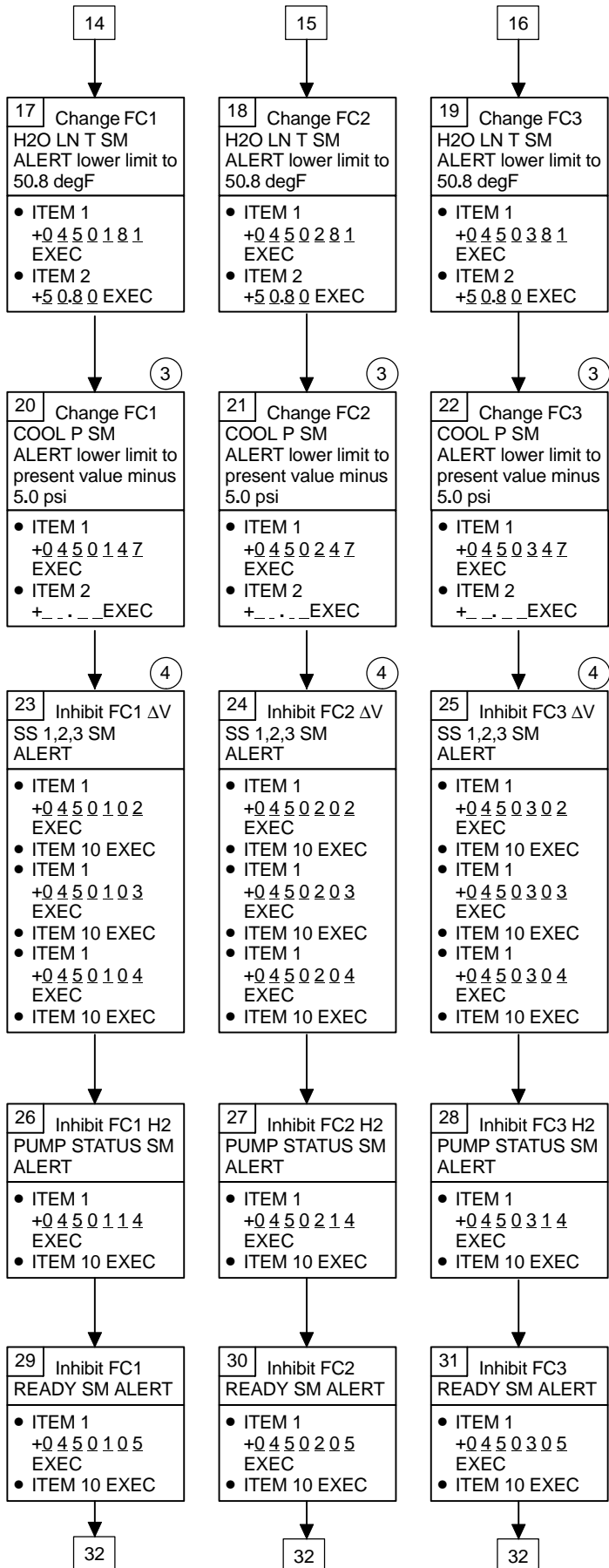
① Lower limit on FC temp during cooldown is 48 degF to protect from ice formation. Closest value > 48 degF that PRI C&W system can be set is 50.8 degF

EPS SSR-3 (Cont)



② Equal to value set in PRIMARY C&W SYSTEM. Lower limit on FC temp during cooldown is 48 degF to protect from ice formation. Closest value > 48 degF that PRI C&W system can be set is 50.8 degF

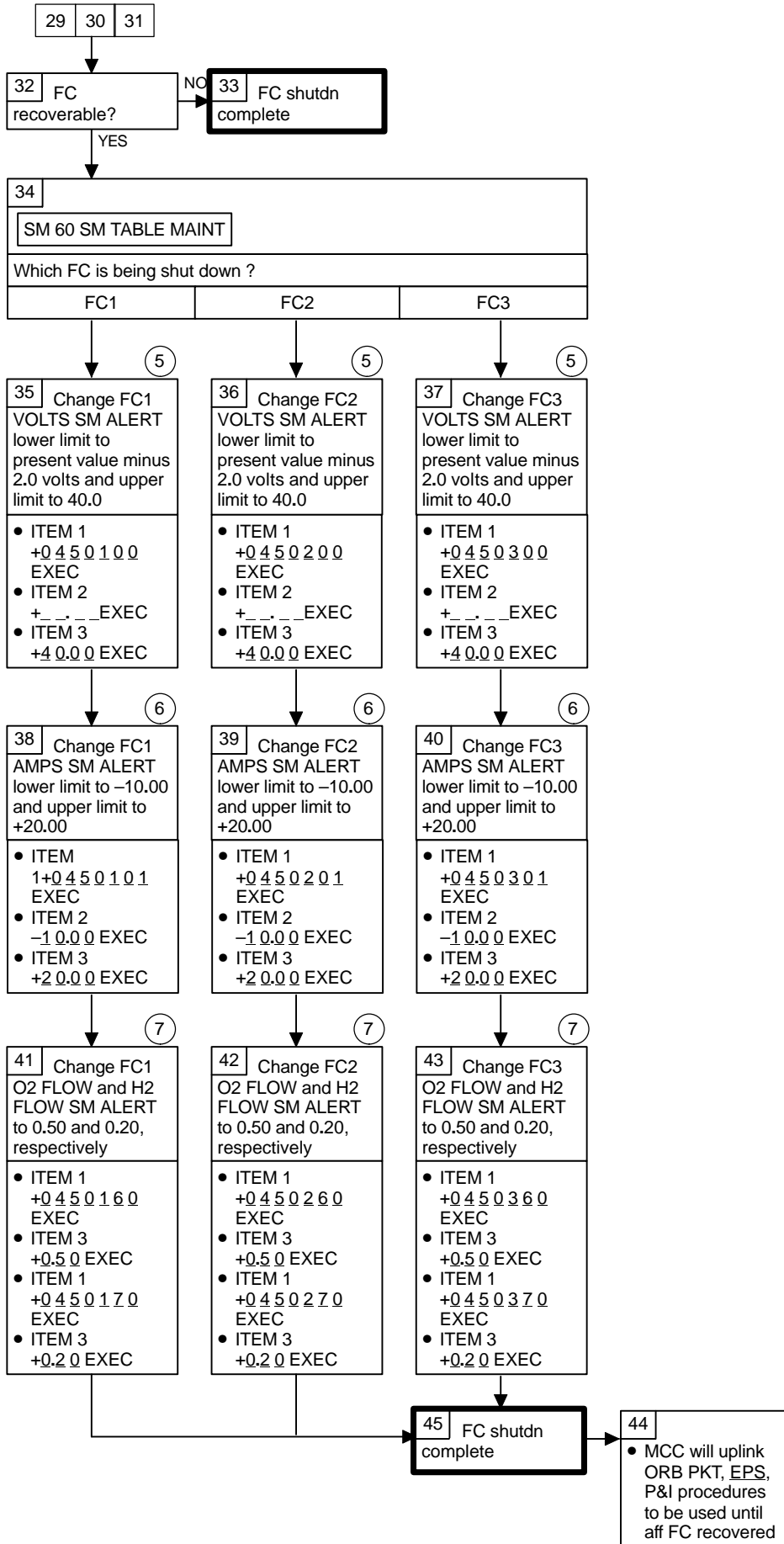
EPS SSR-3 (Cont)



③ Decrease in FC COOL P with fuel cell shutdn and REAC vlvs closed may indicate internal leak, crossover, or reactant leak

④ FC SUBSTACK ΔVOLTS are not usable when fuel cell is shut down

EPS SSR-3 (Cont)



- ⑤ Decrease in FC VOLTS while fuel cell is shut down may indicate internal load, crossover, or reactant leak
- ⑥ Increase in FC O2,H2 FLOWS while fuel cell is shut down may indicate internal load or reactant leak
- ⑦ Increase in FC O2,H2 FLOWS while fuel cell is shut down may indicate internal load or reactant leak

EPS SSR-4 FC STANDBY

1

- If not tied, perform BUS TIE (Cue Card), then: (R1)
- ESS BUS SOURCE FC1(2,3) – OFF
- FC/MN BUS A(B,C) – OFF (tb-OFF)
- ✓FC1(2,3) COOL Pump ΔP (tb-gray)
- ✓Ready for load (tb-gray)
- ✓REAC O2, H2 – OP (tb – Op)
- Expect SM Alerts

Is MCC able to TMBU Backup C&W and SM ALERT ?

YES → 15

NO

2

SM 60 SM TABLE MAINT

Which FC to STANDBY ?

FC1	FC2	FC3
-----	-----	-----

3 Change FC1
H2O LN T SM
ALERT lower limit to 50.8 degF

- ITEM 1
+0 4 5 0 1 8 1
EXEC
- ITEM 2
+5 0.8 0 EXEC

4 Change FC2
H2O LN T SM
ALERT lower limit to 50.8 degF

- ITEM 1
+0 4 5 0 2 8 1
EXEC
- ITEM 2
+5 0.8 0 EXEC

5 Change FC3
H2O LN T SM
ALERT lower limit to 50.8 degF

- ITEM 1
+0 4 5 0 3 8 1
EXEC
- ITEM 2
+5 0.8 0 EXEC

6 Change FC1
VOLTS SM ALERT
lower limit to 31.0
volts and upper limit
to +37.5

- ITEM 1
+0 4 5 0 1 0 0
EXEC
- ITEM 2
+3 1.0 EXEC
- ITEM 3
3 7.5 0 EXEC

7 Change FC2
VOLTS SM ALERT
lower limit to 31.0
volts and upper limit
to +37.5

- ITEM 1
+0 4 5 0 2 0 0
EXEC
- ITEM 2
+3 1.0 EXEC
- ITEM 3
3 7.5 0 EXEC

8 Change FC3
VOLTS SM ALERT
lower limit to 31.0
volts and upper limit
to +37.5

- ITEM 1
+0 4 5 0 3 0 0
EXEC
- ITEM 2
+3 1.0 EXEC
- ITEM 3
3 7.5 0 EXEC

9 Inhibit FC1 ΔV
SS 1,2,3 SM
ALERT

- ITEM 1
+0 4 5 0 1 0 2
EXEC
- ITEM 10 EXEC
- ITEM 1
+0 4 5 0 1 0 3
EXEC
- ITEM 10 EXEC
- ITEM 1
+0 4 5 0 1 0 4
EXEC
- ITEM 10 EXEC

10 Inhibit FC2 ΔV
SS 1,2,3 SM
ALERT

- ITEM 1
+0 4 5 0 2 0 2
EXEC
- ITEM 10 EXEC
- ITEM 1
+0 4 5 0 2 0 3
EXEC
- ITEM 10 EXEC
- ITEM 1
+0 4 5 0 2 0 4
EXEC
- ITEM 10 EXEC

11 Inhibit FC3 ΔV
SS 1,2,3 SM
ALERT

- ITEM 1
+0 4 5 0 3 0 2
EXEC
- ITEM 10 EXEC
- ITEM 1
+0 4 5 0 3 0 3
EXEC
- ITEM 10 EXEC
- ITEM 1
+0 4 5 0 3 0 4
EXEC
- ITEM 10 EXEC

12

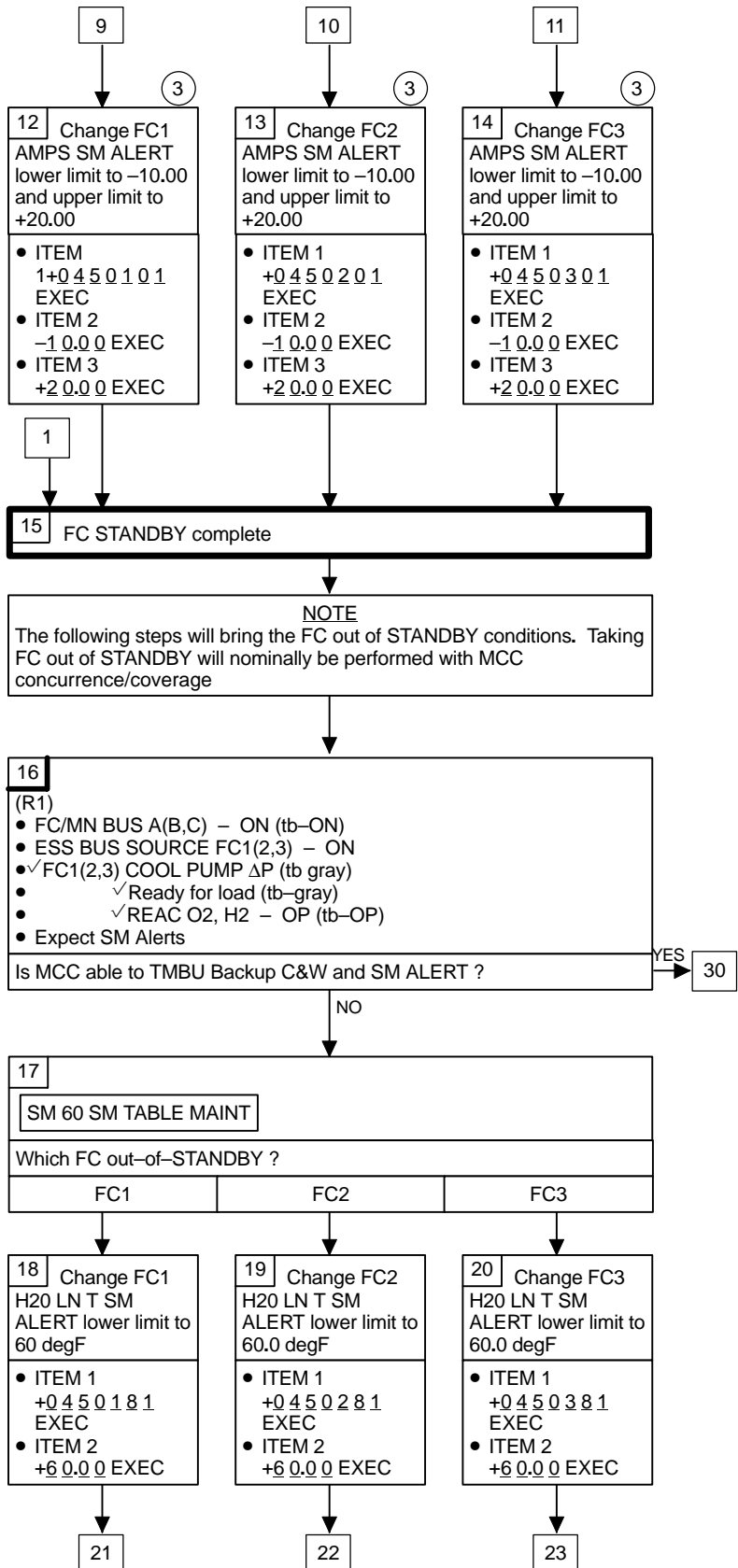
13

14

① Decrease in FC VOLTS beyond FDA limit while fuel cell is in STANDBY may indicate internal load, crossover, or reactant leak

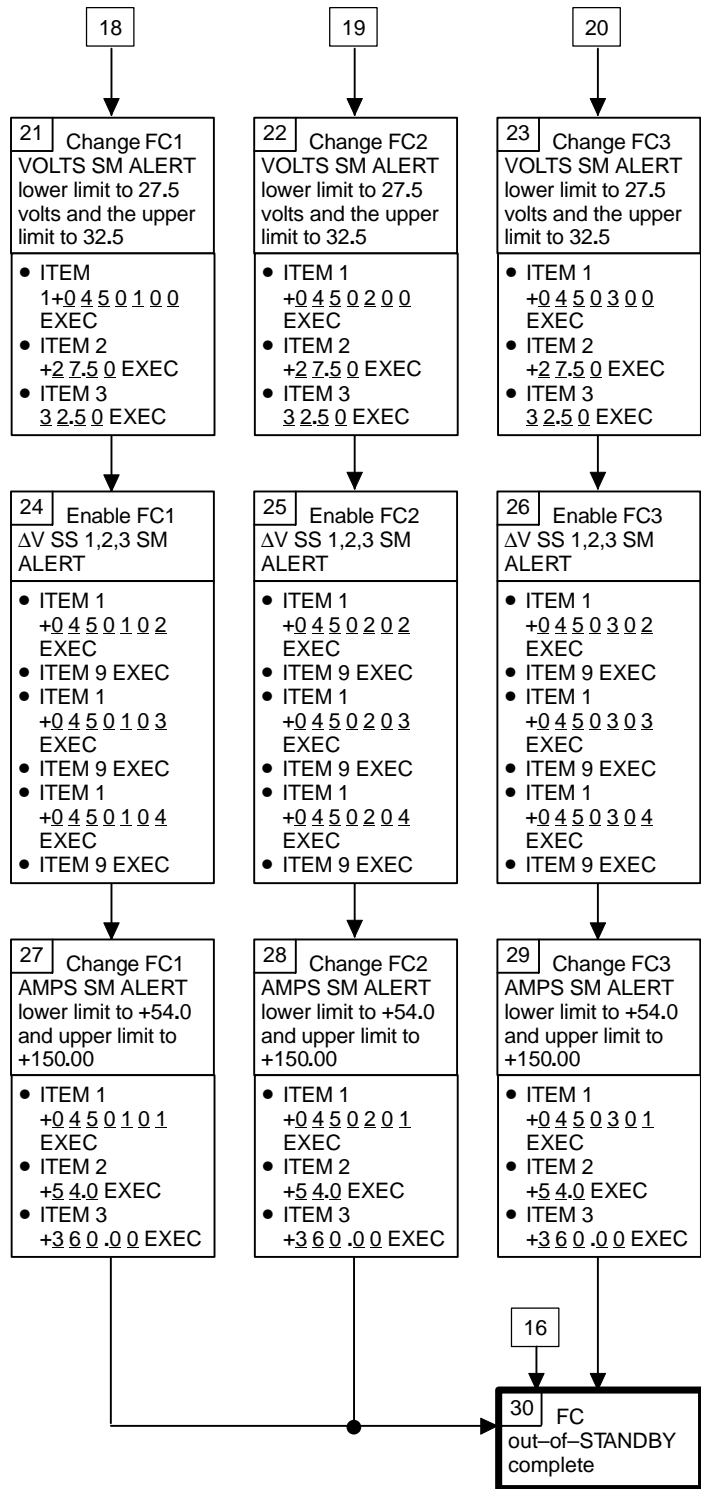
② FC SUBSTACK ΔVOLTS are not usable when fuel cell is in STANDBY

EPS SSR-4 (Cont)



③ Increase in FC Amps beyond the FDA limit while fuel cell is in STANDBY may indicate external load on the fuel cell

EPS SSR-4 (Cont)

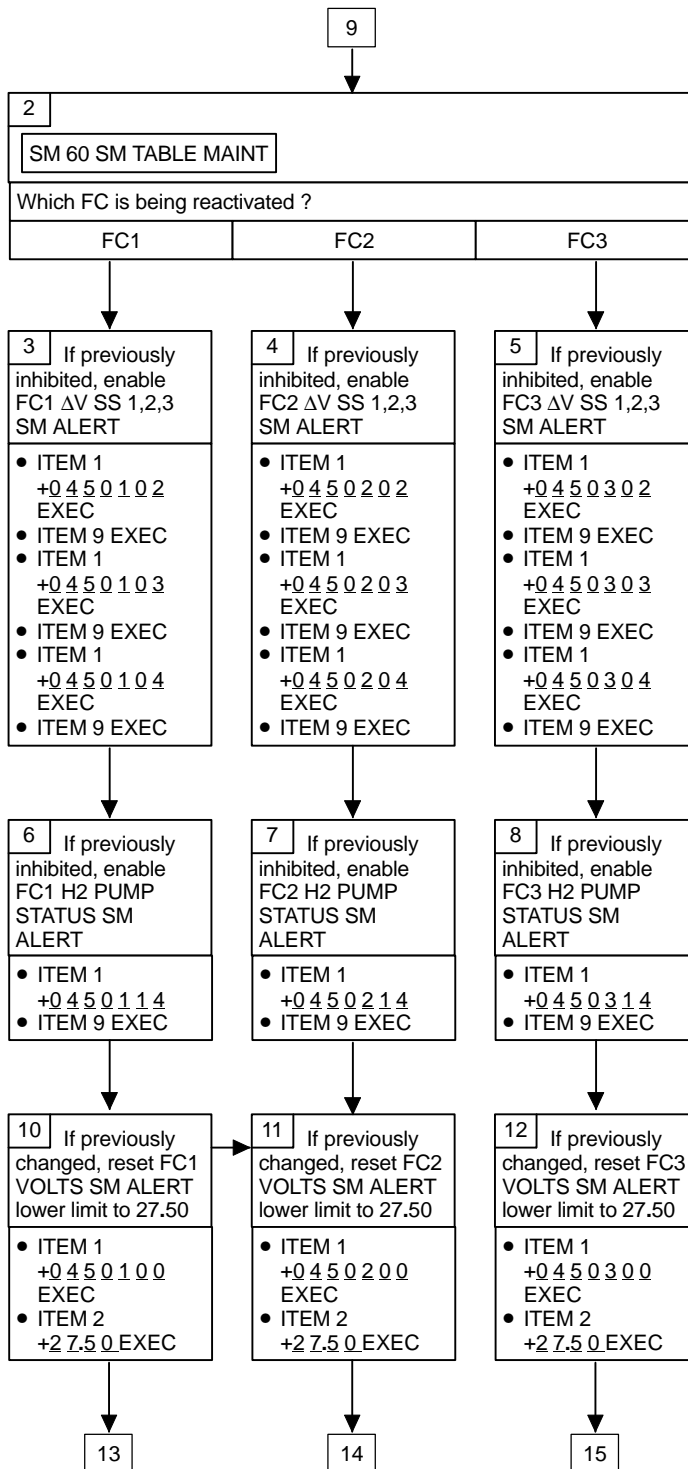


EPS SSR-6 FC RESTART

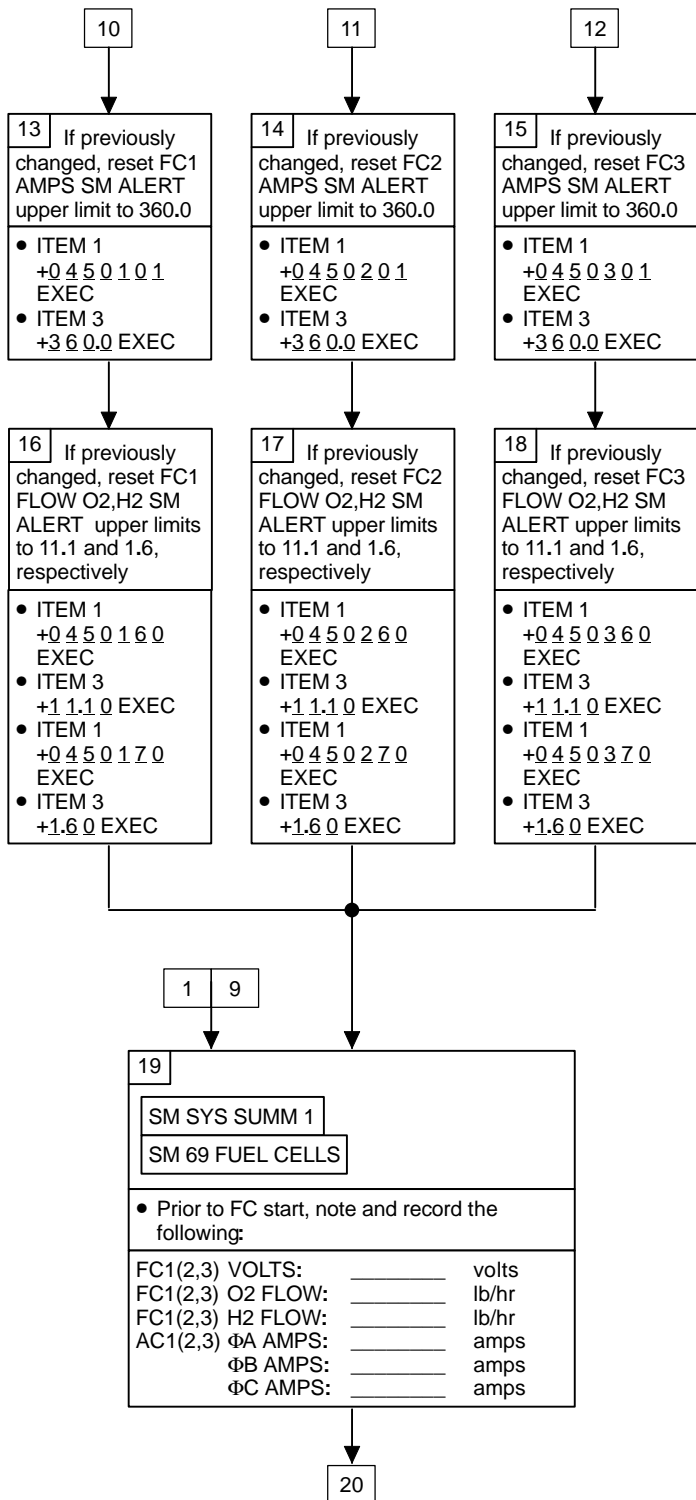
① FC may be restarted on two Φs. Loss of AC1(2,3) ΦA cb causes loss of FC1(2,3) pH sensing. Loss of AC2 ΦB cb causes loss of common pH sensing

①

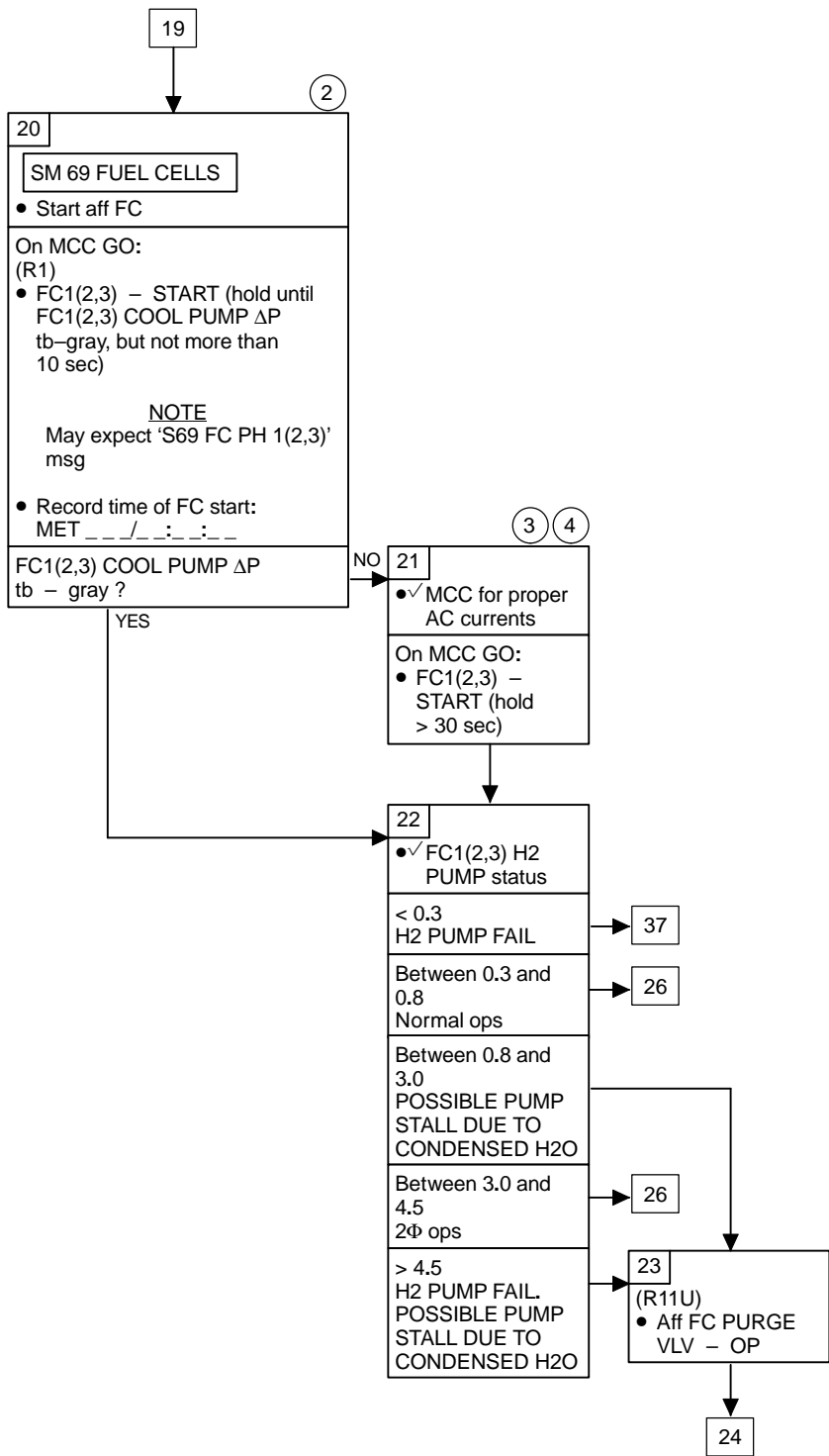
1	Fuel Cell prep
(L4:C)	<ul style="list-style-type: none"> • ✓ cb AC1 (AC2,AC3) ΦA,ΦB,ΦC FC1(FC2,FC3) PUMPS – cl
(O14,O15,O16)	<ul style="list-style-type: none"> • ✓ FC1(FC2,FC3) CNTRLR – ON
(R11U)	<ul style="list-style-type: none"> • ✓ FC STARTUP HTR 1(2,3) – ENA • Aff FC PURGE VLV 1(2,3) – GPC • FC PURGE HTR – ON
(R1)	<ul style="list-style-type: none"> • ✓ FC/MN BUS A(B,C) tb – OFF • ✓ ESS BUS SOURCE FC1 (FC2,FC3) – OFF • FC1(2,3) REAC O2,H2 – OP (tb-OP)
Is SM available ?	
YES	NO
↓	↓
9	19
Is MCC able to TMBU BACKUP C&W and SM ALERT ?	
YES	NO
↓	↓
19	2



EPS SSR-6 (Cont)



EPS SSR-6 (Cont)

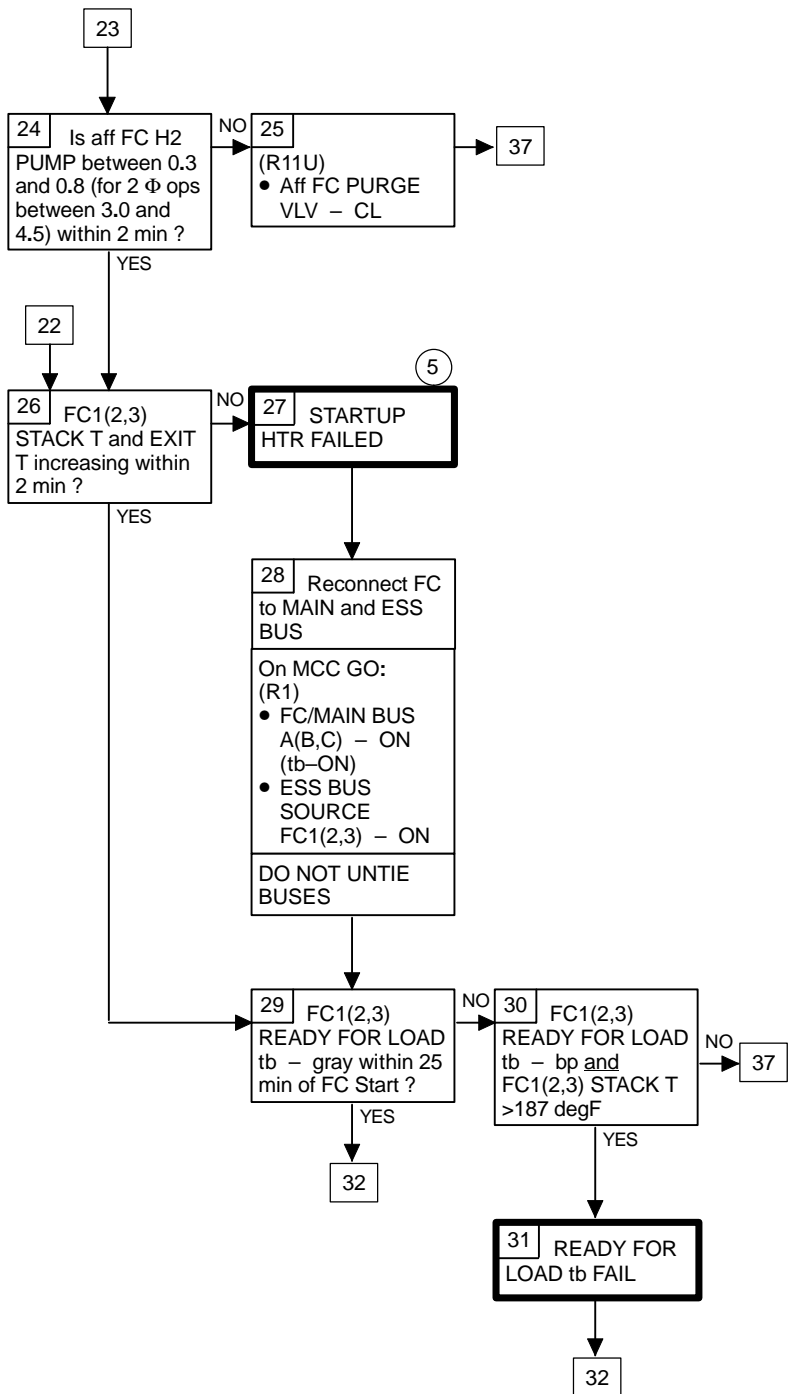


② May expect FC pH FSM when FC is started on some fuel cells due to addition of pH self-test capability

③ Expected AC currents are an increase of ~0.8 amps/Φ (0.55 amps/Φ for COOL PUMPS and 0.25 amps/Φ for H2 mtr)

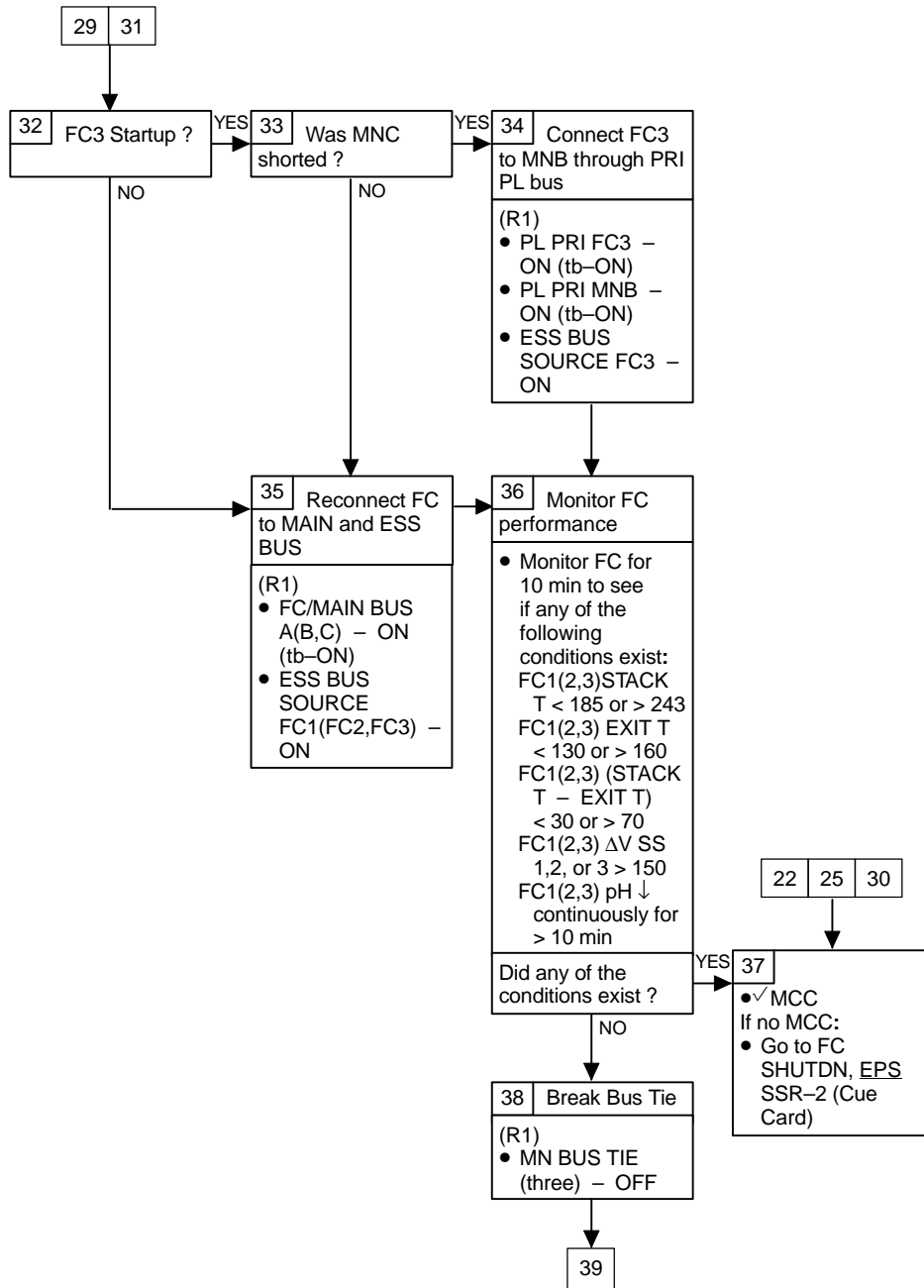
④ Failure of COOL PUMP ΔP tb will inhibit FC startup. Holding sw in START for > 30 sec will bypass Logic Timer and allow COOL PUMP and H2 mtr to run

EPS SSR-6 (Cont)



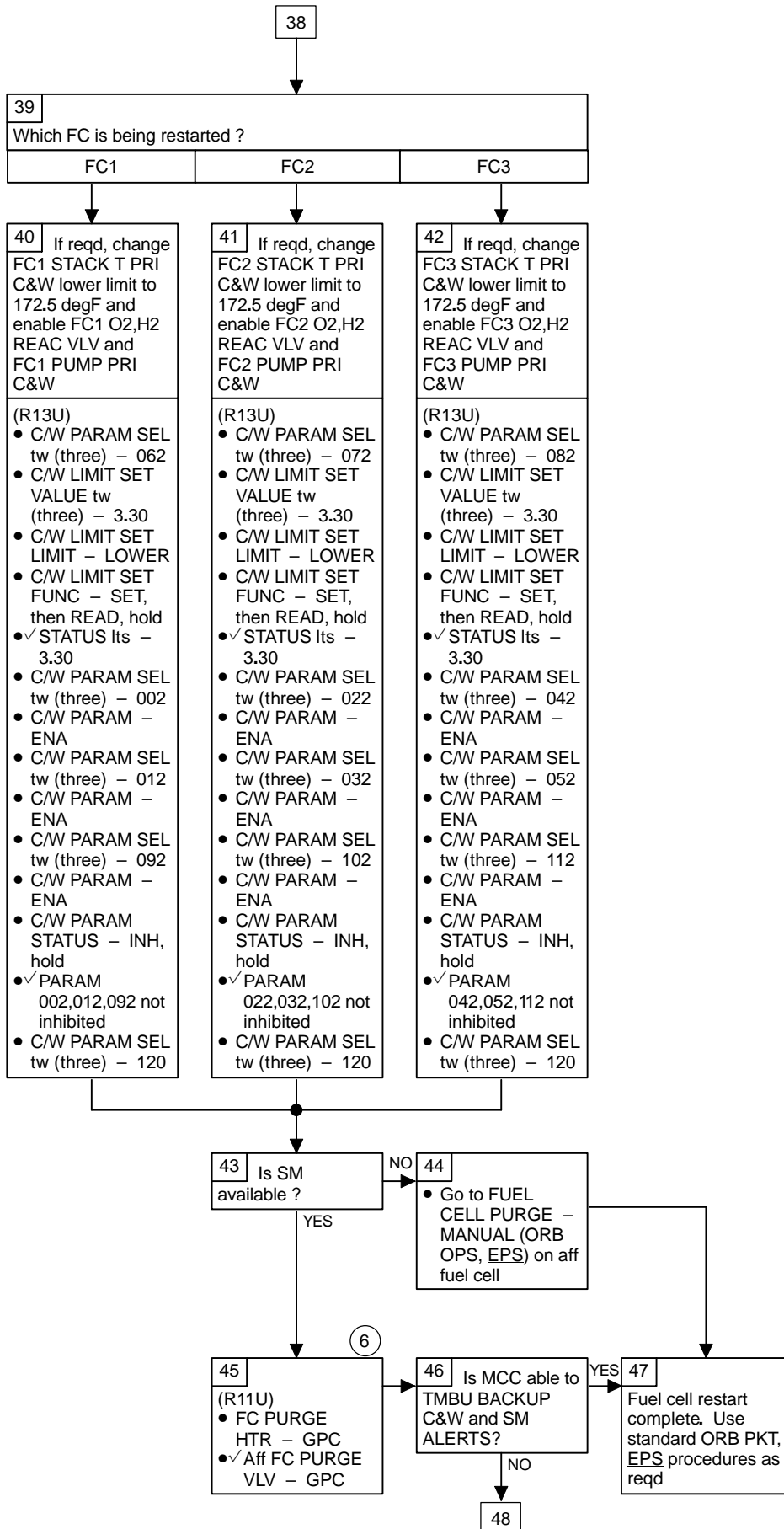
⑤ Expected indications of operating STARTUP HTR are:
FC VOLTS ~32V
FC O2 Flow ~1.4 lb/hr
FC H2 FLOW ~0.2 lb/hr
Placing FC on MAIN BUS will generate sufficient heat to raise FC temp to operating levels

EPS SSR-6 (Cont)

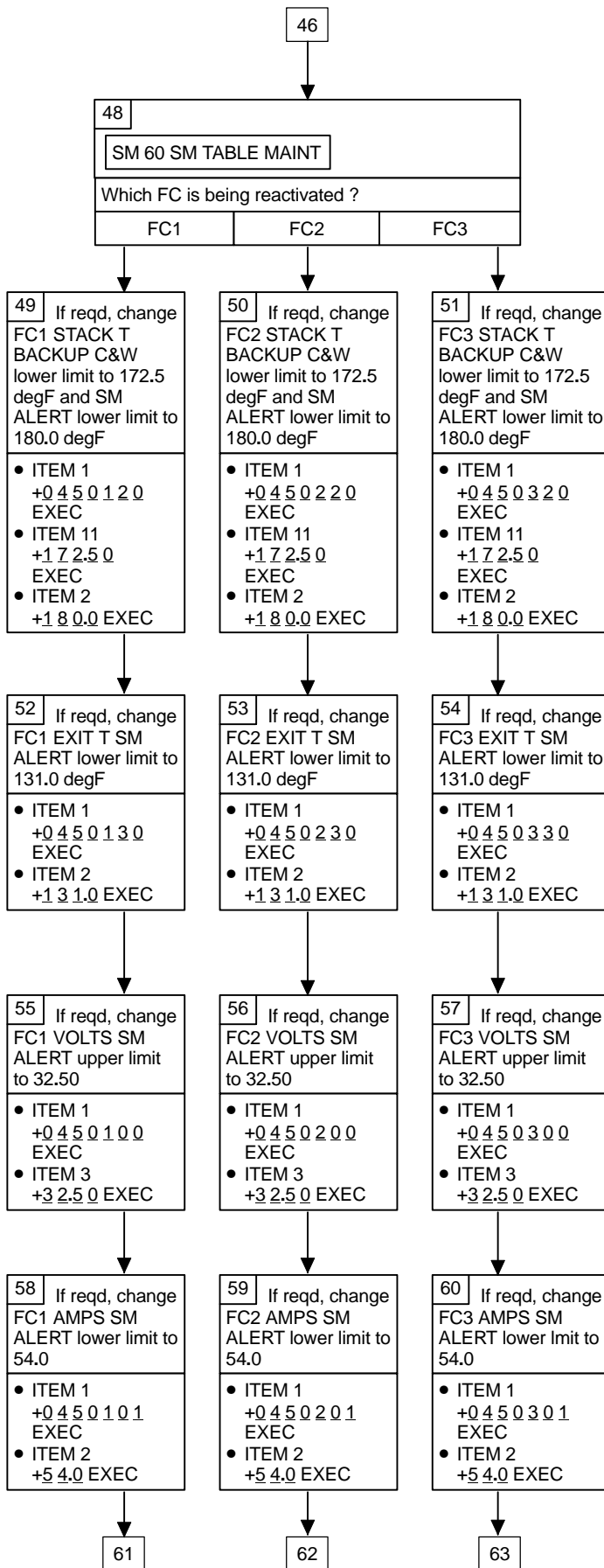


EPS SSR-6 (Cont)

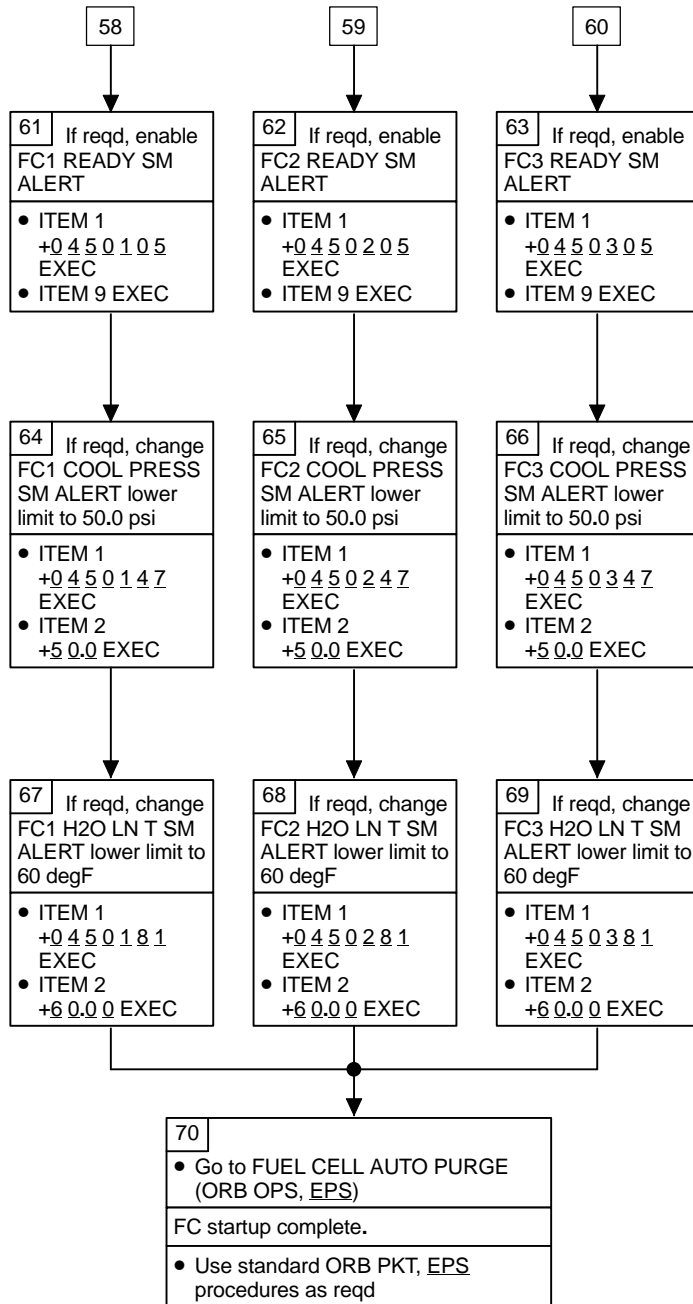
⑥ MCC will TMBU uplink post-restart FC purge



EPS SSR-6 (Cont)



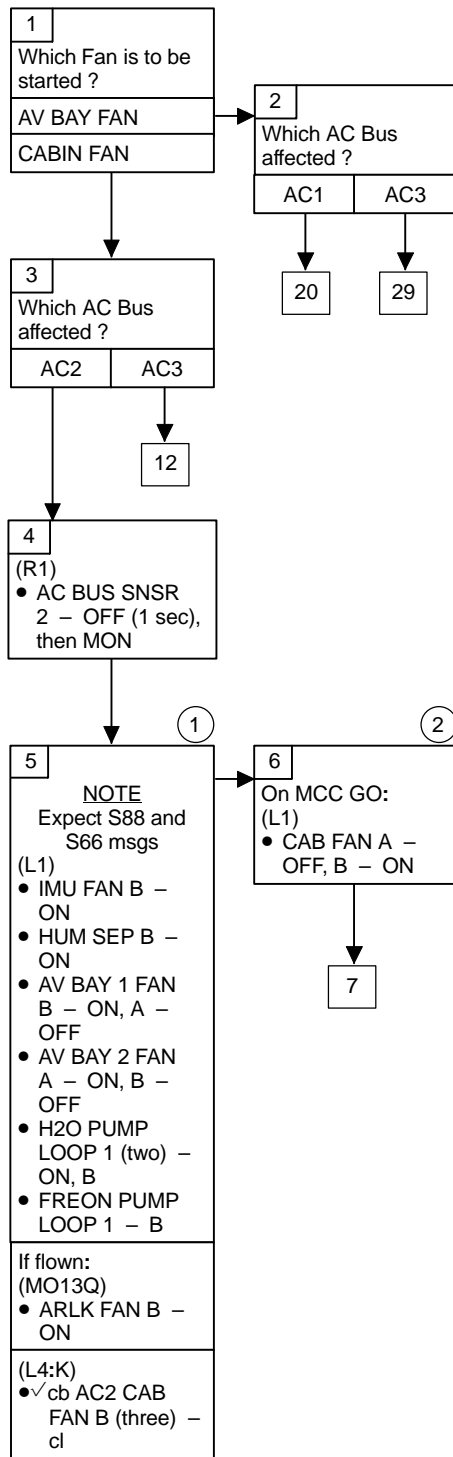
EPS SSR-6 (Cont)



EPS SSR-7 TWO-PHASE FAN START PROCEDURE

NOTE

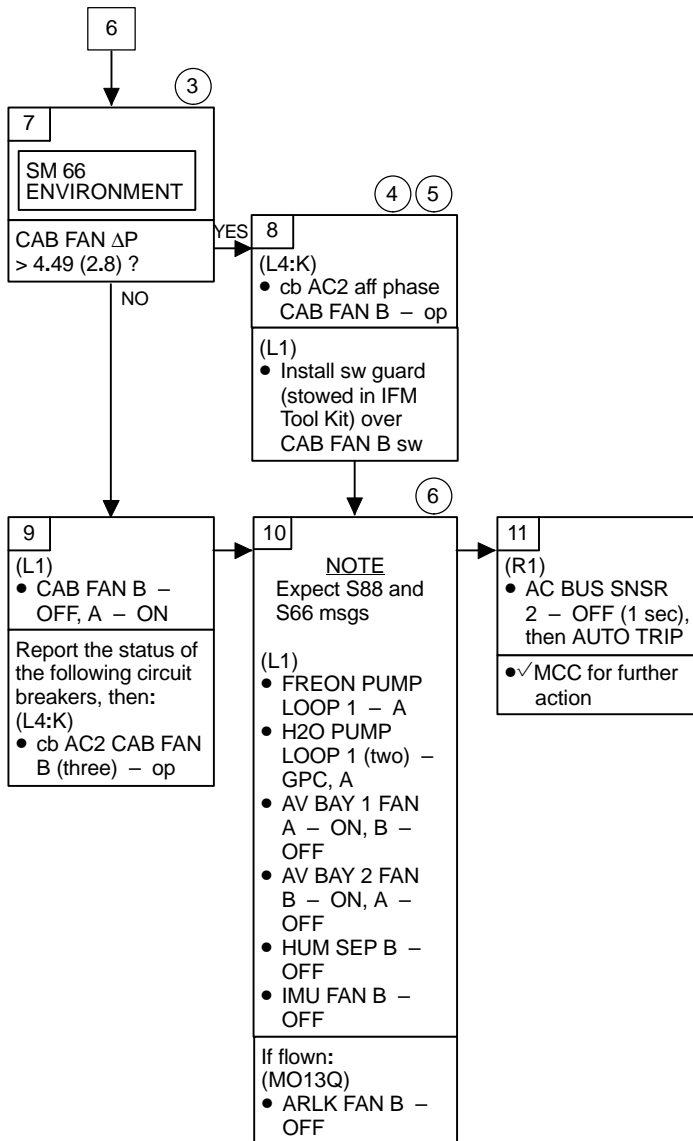
This procedure assumes the EPS MAL BUS LOSS SSR for the affected phase (not shorted) has already been completed. This procedure will be performed during MCC coverage



① Reconfig 3Φ AC equipment to bus with lost phase to create an induced voltage reqd to start large fan

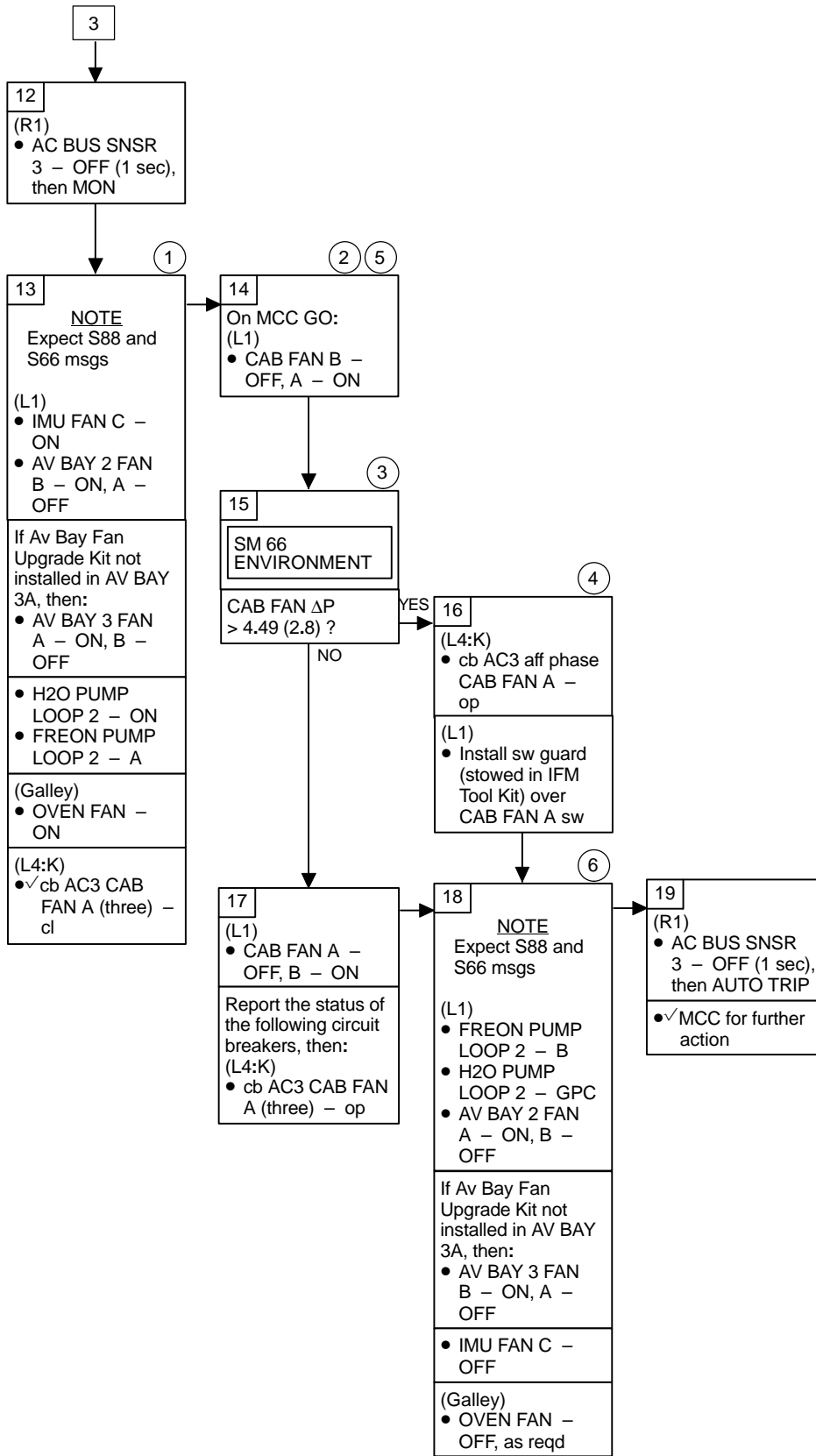
② Off time not to exceed 20 min due to DDU cooling constraints

EPS SSR-7 (Cont)



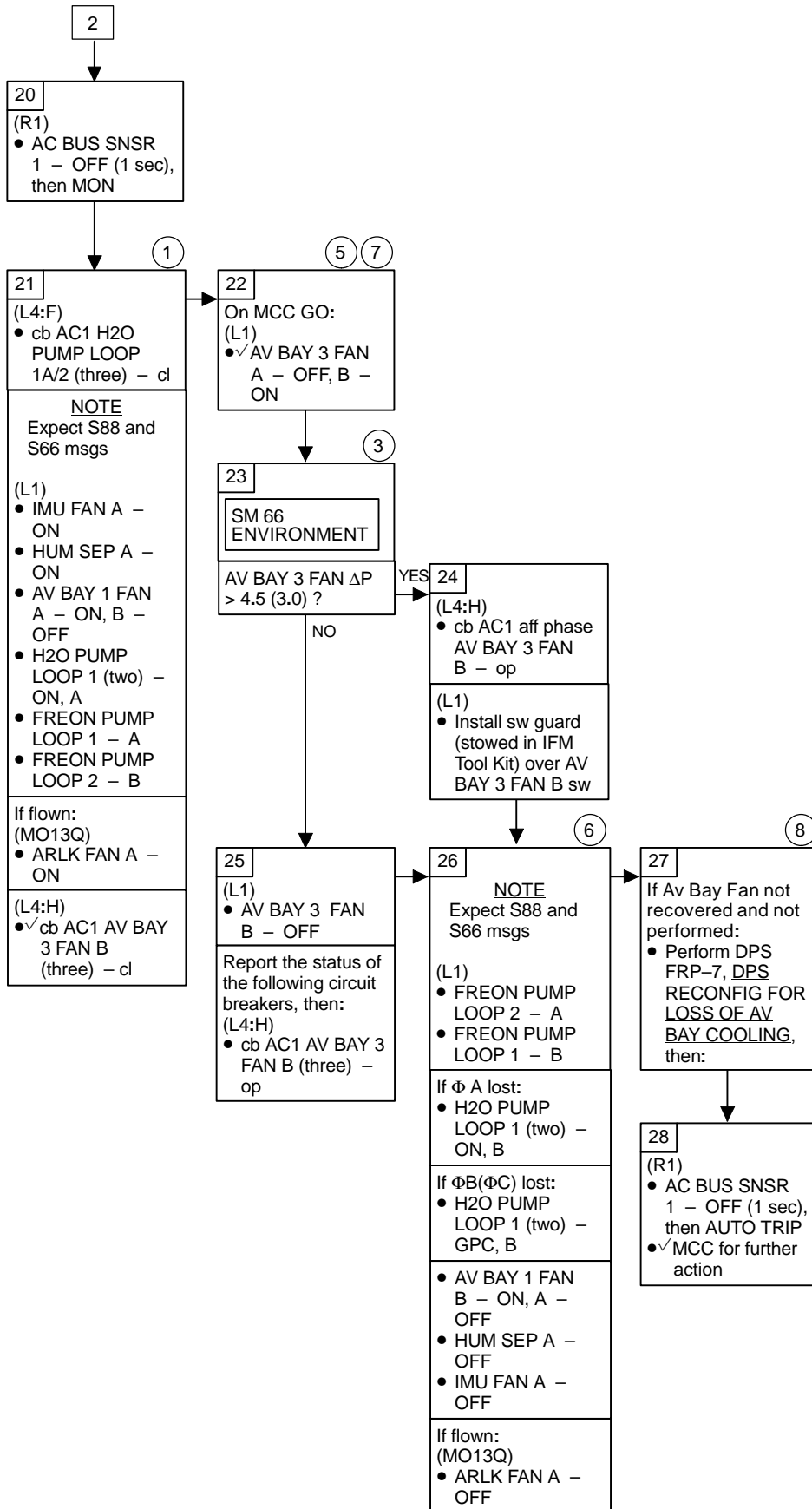
- ③ Value in () is the ΔP when the Cabin Press is at 10.2 psi
- ④ Switch guard installed to prevent CAB Fan from being turned off during LiOH can changeout and cabin fan filter cleaning
- ⑤ May receive 'S67 AC AMPS' msg
- ⑥ Reconfig back to alternate equipment

EPS SSR-7 (Cont)



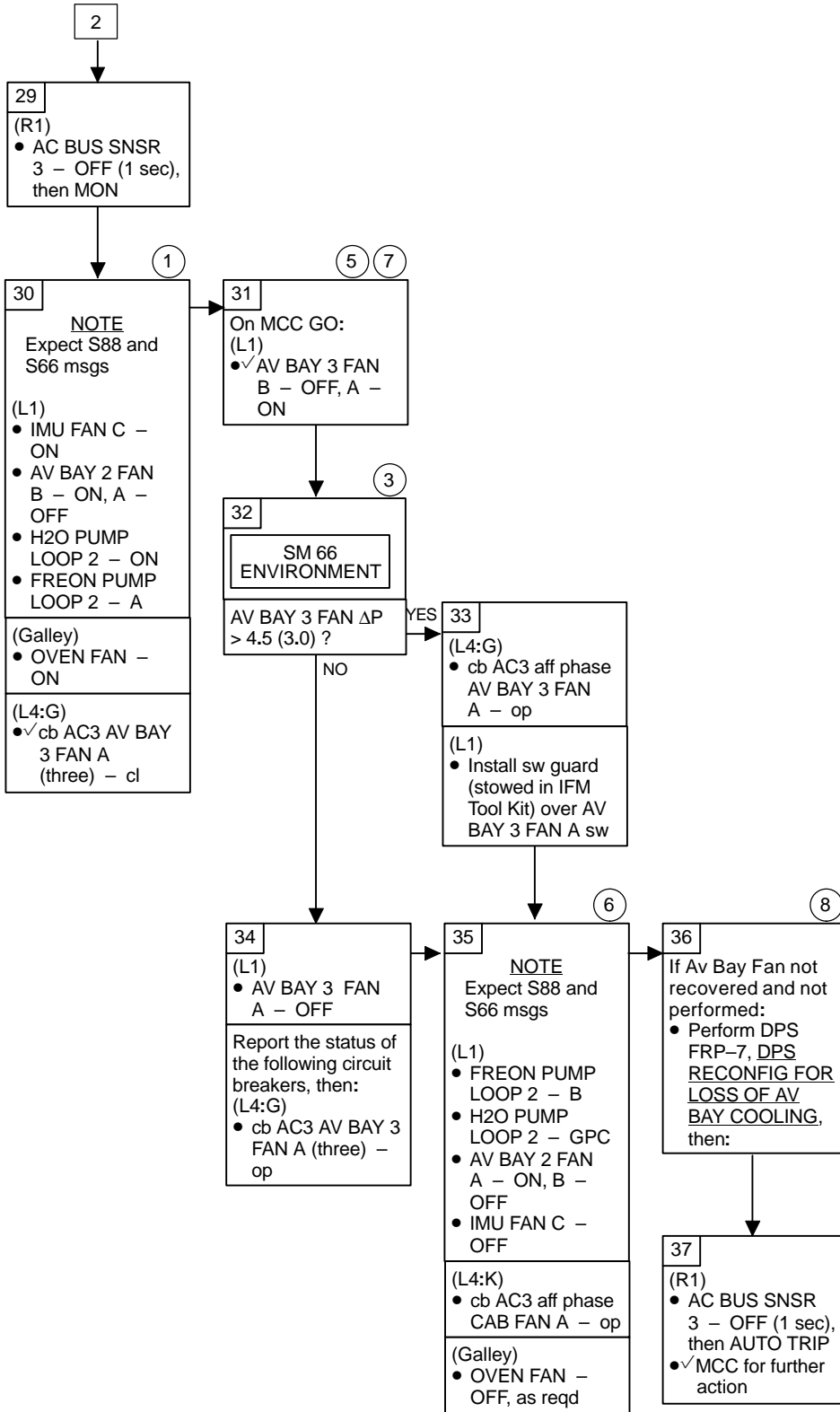
- ① Reconfig 3Φ AC equipment to bus with lost phase to create an induced voltage reqd to start large fan
- ② Off time not to exceed 20 min due to DDU cooling constraints
- ③ Value in () is the ΔP when the Cabin Press is at 10.2 psi
- ④ Switch guard installed to prevent CAB Fan from being turned off during LiOH can changeout and cabin fan filter cleaning
- ⑤ May receive 'S67 AC AMPS' msg
- ⑥ Reconfig back to alternate equipment

EPS SSR-7 (Cont)



- ① Reconfig 3Φ AC equipment to bus with lost phase to create an induced voltage reqd to start large fan
- ③ Value in () is the ΔP when the Cabin Press is at 10.2 psi
- ⑤ May receive 'S67 AC AMPS' msg
- ⑥ Reconfig back to alternate equipment
- ⑦ Off time not to exceed 26 min due to GPC cooling constraints. If GPC 3 Off, time not to exceed 1 hr due to Caution & Warning cooling constraints
- ⑧ The Av Bay air cooled equipment must be powered down due to loss of Av Bay Air Cooling

EPS SSR-7 (Cont)



- ① Reconfig 3Φ AC equipment to bus with lost phase to create an induced voltage reqd to start large fan
- ③ Value in () is the ΔP when the Cabin Press is at 10.2 psi
- ⑤ May receive 'S67 AC AMPS' msg
- ⑥ Reconfig back to alternate equipment
- ⑦ Off time not to exceed 26 min due to GPC cooling constraints. If GPC 3 Off, time not to exceed 1 hr due to Caution & Warning cooling constraints
- ⑧ The Av Bay air cooled equipment must be powered down due to loss of Av Bay Air Cooling

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EPS SSR-8 BUS LOADING – LRU SELECT

1	To load MAIN A, select:
	<u>NOTE</u> Do not change LRU config on LRU(s) configured for Cryo O2/H2 conservation, thermal control, or failure. Only LRUs with > 100 watts load and powered from single bus are listed
	(L1)
1.	• TOP EVAP HTR DUCT – A
2.	• AV BAY 1 FAN A – ON • B – OFF
3.	• 3 FAN B – ON • A – OFF
4.	• FREON PUMP LOOP 1 – A
5.	• 2 – B
	(L2)
6.	• FES FEEDLINE HTR A SUP – 1
7.	• FES FEEDLINE HTR B SUP – 2
	(R1/A11/A15)
8.	• CRYO O2,H2 TK 1,3,5 HTR A (six) – AUTO (as reqd) • CRYO O2,H2 TK 1,2,3,4,5 HTR B (ten) – OFF • CRYO O2,H2 TK 2,4 HTR A (four) – OFF
	(A12)
	APU HTR
9.	• GG/FP 1 – A AUTO
10.	• 3 – B AUTO
11.	• LUBE OIL LINE 1 – A AUTO
12.	• 3 – B AUTO
13.	• TK/FU LN/H2O 1A,3B (two) – AUTO • TK/FU LN/H2O 1B,3A (two) – OFF
	HYD HTR
14.	• SPD BK A – AUTO • B – OFF
15.	• BDY FLP A – AUTO • B – OFF
16.	• ELEV A – AUTO • B – OFF
	HYD
17.	• CIRC PUMP 3 – MNA
	(A14)
	RCS/OMS HTR
18.	• FWD RCS – A AUTO
19.	• L POD A – A AUTO • B – OFF
20.	• R POD B – B AUTO • A – OFF
21.	• OMS CRSFD LINES – A AUTO

2	To load MAIN B, select:
	<u>NOTE</u> Do not change LRU config on LRU(s) configured for Cryo O2/H2 conservation, thermal control, or failure. Only LRUs with > 100 watts load and powered from single bus are listed
	(L1)
31.	• TOP EVAP HTR DUCT – B
32.	• AV BAY 1 FAN B – ON • A – OFF
33.	• 2 FAN A – ON • B – OFF
34.	• FREON PUMP LOOP 1 – B
35.	• CABIN FAN B – ON • A – OFF
	(L2)
36.	• FES FEEDLINE HTR A SUP – 2
	(R1/A11/A15)
37.	• CRYO O2,H2 TK 2,3,4 HTR B (six) – AUTO (as reqd) • CRYO O2,H2 TK 1,2,3,4,5 HTR A (ten) – OFF • CRYO O2,H2 TK 1,5 HTR B (four) – OFF
38.	• PL PRI MNB – ON (tb-ON) • MNC – OFF (tb-OFF) • FC3 – OFF (tb-OFF)
	(A12)
	APU HTR
39.	• GG/FP 1 – B AUTO
40.	• 2 – A AUTO
41.	• LUBE OIL LINE 1 – B AUTO
42.	• 2 – A AUTO
43.	• TK/FU LN/H2O 1B,2A (two) – AUTO • TK/FU LN/H2O 1A,2B (two) – OFF
	HYD HTR
44.	• SPD BK B – AUTO • A – OFF
45.	• BDY FLP B – AUTO • A – OFF
46.	• ELEV B – AUTO • A – OFF
	HYD
47.	• CIRC PUMP 1 – MNB
	(A14)
	RCS/OMS HTR
48.	• FWD RCS – B AUTO
49.	• L POD B – B AUTO • A – OFF
50.	• R POD A – A AUTO • B – OFF
51.	• OMS CRSFD LINES – B AUTO

3	To load MAIN C, select:
	<u>NOTE</u> Do not change LRU config on LRU(s) configured for Cryo O2/H2 conservation, thermal control, or failure. Only LRUs with > 100 watts load and powered from single bus are listed
	(L1)
61.	• TOP EVAP HTR DUCT – C
62.	• AV BAY 2 FAN B – ON • A – OFF
63.	• 3 FAN A – ON • B – OFF
64.	• FREON PUMP LOOP 2 – A
65.	• CABIN FAN A – ON • B – OFF
	(L2)
66.	• FES FEEDLINE HTR B SUP – 1
	(R1/A11/A15)
67.	• CRYO O2,H2 TK 1 HTR B (two) – AUTO • CRYO O2,H2 TK 1 HTR A (two) – OFF • CRYO O2,H2 TK 2 HTR A (two) – AUTO • CRYO O2,H2 TK 2 HTR B (two) – OFF • CRYO O2,H2 TK 4 HTR A (two) – AUTO • CRYO O2,H2 TK 4 HTR B (two) – OFF • CRYO O2,H2 TK 5 HTR B (two) – AUTO • CRYO O2,H2 TK 5 HTR A (two) – OFF
	(A12)
	APU HTR
68.	• GG/FP 2 – B AUTO
69.	• 3 – A AUTO
70.	• LUBE OIL LINE 2 – B AUTO
71.	• 3 – A AUTO
72.	• TK/FU LN/H2O 2B,3A (two) – AUTO • TK/FU LN/H2O 2A,3B (two) – OFF
	HYD
73.	• CIRC PUMP 2 – MNC
	(A14)
	RCS/OMS HTR
74.	• L POD B – B AUTO • A – OFF
75.	• R POD B – B AUTO • A – OFF

EXPLANATORY NOTES FOR BUS LOSS SSRs

Bus Loss SSRs contain all the orbiter reconfig steps necessary following a bus loss for > 100 electrical power buses. SSRs also list all orbiter equipment lost and resultant onboard crew indications for each bus loss. If a bus powers one or more sub-buses, the sub-bus SSRs do not need to be utilized unless referenced in the SSR (i.e., each stands alone).

The ORB PKT BUS LOSS ACTIONS lists all the reconfig steps that need to be accomplished immediately following recognition of a bus loss. Following completion of the ORB PKT BUS LOSS ACTIONS, the action contained in the BUS LOSS SSR should be accomplished as soon as practical. The following buses are not included in the ORB PKT BUS LOSS ACTIONS listings as no loss of equipment requires quick reconfig:

MNA MMC1, MMC3, AMC1, O14&A8, R1A1, A6&A14, ML86B

MNB MMC1, MMC2, MMC3, MMC4, AMC2, R14, O15&A8, R1A1, A6&A14, ML86B

MNC MPC3, APC3, FMC3, MMC2, MMC4, AMC3, O16RJD, R1A1, A6&A14, ML86B

ESS1BC FP&LC1, ML86B

ESS2CA FP&LC2

ESS3AB FP&LC3, O13, ML86B

AC1 FMC1, MMC1, MMC3, AMC1

AC2 FMC2, MMC1, MMC2, MMC3, MMC4, AMC2

AC3 FMC3, MMC2, MMC4, AMC3

Entry into a BUS LOSS SSR may be from a MAL procedure, from the Bus Loss ID Tables in the PKT C/L, from a direct readout of bus power loss by crew or MCC, or from the PKT C/L BUS LOSS ACTION.

The following additional information refers to each column of SSR-10 thru SSR-148:

1. ACTIONS

The ACTIONS column lists, by panel, all the orbiter reconfig steps necessary following a bus loss. Reconfig performed prior to starting the ACTIONS, such as from PKT C/L BUS LOSS ACTIONS, is repeated in the ACTIONS column for completeness. No trouble-shooting steps are listed based on the assumption that the bus loss has been confirmed prior to starting the SSR. ACTIONS are config independent, making many of the switch position listings verification steps. Equipment or function loss that necessitates each reconfig step is listed adjacent to that step in the EQUIP/FUNCTION LOST column.

2. BUS ISOLATION

The BUS ISOLATION steps do not have to be performed following a bus loss since equipment being unpowered is already unpowered if the bus is dead. The BUS ISOLATION column can be used as a shopping list if power must be reduced on a particular bus for any reason. Any equipment loss resulting in each isolation step is listed adjacent to the step in the EQUIP/FUNCTION LOST column if the same equipment is not already listed adjacent to a reconfig ACTION step. Equipment isolation steps listed in the ACTIONS column are not repeated in the BUS ISOLATION column.

3. EQUIP/FUNCTION LOST

This column lists all equipment of the functions that are lost because of a bus loss. If reconfig action is necessary because of equipment loss, the equipment is listed adjacent to the appropriate ACTIONS column step(s). If no reconfig is necessary, but equipment may be isolated from bus, the equipment is listed adjacent to BUS ISOLATION STEP. Equipment lost for which there is no reconfig or isolation is listed separately. Equipment that is used only during ascent, such as the ET door system, is not included.

EXPLANATORY NOTES FOR BUS LOSS SSRs (Cont)

4. CREW INDICATIONS

Onboard crew indications that occur when a bus fails are grouped according to the type of indication. C/W lights are listed together, as are Fault Summary Messages and lights lost. Dedicated displays and tbs are grouped by the panels on which they are located. Indications listed would occur immediately when bus failed; exceptions are explained by a note or preceded by a qualifier. Indications that are config dependent are preceded by a qualifier such as "If H2O Loop 2 Pump Action."

If a Fault Summary Message (FSM) is available in OPS 2 only, without a similar message in BFS or OPS 3, the FSM is followed by '(2)'. If FSM is available in OPS 3 only or BFS only, the FSM is followed by '(3)' or '(B)'. If FSM is available in OPS 3 and BFS, the FSM is followed by '(3,B)'. Nothing is listed for FSMs that are available in all mission phases (available in OPS 2 and OPS 3 or in OPS 2 and BFS). OPS 1 and 8 were not considered.

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EPS MNA
SSR 10-29

EPS SSR-10
BUS LOSS: MNA DA1 (Includes all MNA sub-buses and AC)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<ul style="list-style-type: none"> Perform FC1 SHUTDN (FC SHUTDN Cue Card) 	FC1 PUMPS, pH Snsr Purge Vlv O2,H2 Flow Xdcrs Cell Perf Monitor 1 MNA pwr to AUX PLA Bus 1 ESS2CA 1 ESS3AB 1 CNTLAB1,2,3 1 CNTLCA1,2,3	MASTER ALARM Light/ Tone – on SM ALERT Light/Tone – on (F7) MDU CRT 1 blanks (F1) MDU MFD 2 blanks (F8) MDU PLT 1 blanks (F7) C/W CABIN ATM It – on C/W FREON LOOP It – on C/W AV BAY/CAB AIR It – on C/W MN BUS UNDERVOLT It – on C/W AC VOLT It – on C/W FC PUMP It – on C/W RCS JET It – on C/W H2O LOOP It – on EVENT TIMER ind – blank	① Buses remained pwr'd ② Pwrs PL Timing Buffer and OIU 1 (if flown). OIU 1 redundant pwr MNB MPC2 via CAB PL3 ③ Indications do not appear until jet commanded ④ <div style="border: 1px dashed black; padding: 5px; display: inline-block; text-align: center;"> TIME CRITICAL </div> * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp
<ul style="list-style-type: none"> Perform LOSS OF 1 FC (ORB PKT, PWRDN) 			
(R1) <ul style="list-style-type: none"> PL CAB – MNB cb AC CONTR AC1 ΦA,ΦB,ΦC (three) – cl INV/AC BUS 1 – OFF (tb-OFF) INV PWR 1 – OFF (tb-OFF) cb AC CONTR AC1 ΦA, ΦB,ΦC, (three) – op O2,H2 MANF VLV TK1,2 (four) – OP 	2 MNA pwr to CABPL 1,2,3 buses AC1 ΦA,ΦB,ΦC Inverters	3 (COMM LOST) MS,OS audio lost Xmit to gnd via UHF (LIGHTS LOST) L Console Floodlt Pnl Its L/Ctr (pnls L1,L2,L4, C2,C3,F2,F6,F7) Pnl Its L/OH (pnls O5,O6, O7,O13,O14,O15) Numeric Its (pnls O3, F7) Instr Its R (pnls C2,F8,F9) PS Floodlt Orbit Sta Instr Its (pnls A1,A2) Middeck Floodlts 1,8 WMC Floodlt MO13Q pnl It 2 Airlock Floodlt 1 PLB Floodlts Aft Stbd,Fwd Port, Docking TA Floodlt 2	
(R1) If O2(H2) Tk1 in use: <ul style="list-style-type: none"> O2(H2) TK1 HTR B – AUTO O2(H2) TK1 HTR A – OFF If O2(H2) Tk3 in use: <ul style="list-style-type: none"> O2(H2) TK3 HTR B – AUTO O2(H2) TK1 HTR A – OFF 	Cryo O2,H2 Tk1 Htrs A Cryo O2,H2 Tk3 Htrs A		
(A11) If OV104 or OV105 & Tk5 in use: <ul style="list-style-type: none"> O2(H2) TK5 HTR B – AUTO O2(H2) TK5 HTR A – OFF 	(OV104, OV105) Cryo O2,H2 Tk5 Htrs A		
	Av Bay 3 Agent discharge capability		
If EMU(s) in battery charge mode: (AW18H) <ul style="list-style-type: none"> PWR/BATT CHGR EMU 1(2) BUS SEL – MNB 	EMU 1,2 PWR/BATT Charger MNA pwr	(F9) AC1 ΦA,ΦB,ΦC AC volts ind – < 90 DC VOLTS MNA ind – OSL	
(A12) APU HTR <ul style="list-style-type: none"> GAS GEN/FUEL PUMP 1 – B AUTO GAS GEN/FUEL PUMP 3 – A AUTO LUBE OIL LINE 1 – B AUTO LUBE OIL LINE 3 – A AUTO APU HTR TK/FU LINE/H2O <ul style="list-style-type: none"> SYS 1A – OFF 1B – AUTO 3A – AUTO 3B – OFF HYD HTR <ul style="list-style-type: none"> RUD SPD BK A – OFF B – AUTO BDY FLP A – OFF B – AUTO ELEV A – OFF B – AUTO 	4 APU 1 GG/Fu Pump Htrs A 4 APU 3 GG/Fu Pump Htrs B APU 1 Lube Oil Line Htrs A APU 3 Lube Oil Line Htrs B APU 1 Tk/Fu Ln Htrs A APU 1 Inj H2O Htrs A 3 Tk/Fu Ln Htrs B Rud/Spd Brake Htr A Body Flap Htr A Elevon Actr Htrs A	(FSMs) S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T SM0 THRM HYD (B) S66 AV BAY 3 FAN S66 AV BAY 2 FAN S66 CABIN FAN S66 CABIN PPCO2 S66 IMU FAN DP S66 CABIN PPO2 A S66 CABIN PRESS SM1 CABN DP/DT BU (B) S67 AC VOLTS 1 S69 FC PUMP 1 S69 FC H2 PUMP 1 S88 FREON FLOW 2 S88 FRN AFT CP 2 S88 FRN PL HX 2 S88 H2O LOOP 1 FLOW S88 H2O LOOP 2 QTY S88 H2O LOOP 2 TEMP S88 H2O PUMP P 2 I/O ERROR CRT 1 S67 MAIN BUS V	
(Continued)	(Continued)	(Continued)	

MEDS

EPS MNA
SSR 10-29

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A12) HYD CIRC ● PUMP PWR 1 – MNB ● 3 – MNC	Circ Pump 1 MNA pwr 3 MNA pwr	(FSMs) S88 THERMAL FRN (2) S88 THERMAL H2O (2) S67 FPC/FLC 1 S67 MPC 1 S67 APC/ALC A 168 PALLET V A L RCS D,L JET RM DLMA MANF	③ Indications do not appear until jet commanded ⑤ After MET 3:30, tb already bp ⑥ Vlv holds position. N2 Sys 2 remains ⑦ Crew and ground have lost PPCO2 XDCR if Cabin Air Sig Condr not recovered
If RAD CNTLR LOOP 1,2 – AUTO B: ● Perform ON-ORBIT RAD CNTLR SWITCH, <u>ECLS</u> SSR-13 for Freon Loop 1,2 (L1) ● FLASH EVAP CNTLR PRI A (SEC) – ON (if reqd) ● TOP EVAP HTR NOZ L – B AUTO ● TOP EVAP HTR DUCT – B	Freon Loop 1 Rad Cntrl B 2 Rad Cntrl B FES Pri B Cntrl Top Evap L Noz Htr A Top Evap Duct L,R,Fwd,Aft Htrs A Hi Load Duct Outbd,Inbd Noz Htrs A	If ADTA 1, MLS 1, – STAR TRKR pwr: 'BCE STRG 1 ADTA' (3,B) 'BCE STRG 1 MLS' (3) 'BCE STRG 1 STKR'	⑧ B/U pwr remains for RMS ops ⑨ All brakes ON and safing initiated ⑩ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists
If HI LOAD EVAP enabled: ● HI LOAD DUCT HTR – B(C)		(L2) CAB VENT ISOL tb – bp CAB VENT tb – bp O2 SYS 1 SPLY tb – CL N2 SYS 1 SPLY tb – bp N2 SYS 1 REG INLET tb – bp	
7 ● Maintain LiOH Canister(s) changeout per cue card and FLIGHT PLAN		(O1) AIR TEMP AV BAY 2 ind – 45 degF H2O PUMP OUT PRESS LOOP 2 ind – 0 psia O2/N2 FLOW SYS 1 ind – 0 pph CAB PRESS ind – 0 psia PPO2 SNSR A ind – 0 psia	
(L2) FLASH EVAP FDLN ● HTR A SPLY – 2 ● B SPLY – 1 ----- ● FREON ISOL MODE – OFF	FES H2O Fdln A Htrs 1 (all) B Htrs 2 (all) Auto radiator isolation function	(O3) RCS/OMS Prplt Qty Gage blanks Mission Timer blanks	⑪ Vlv holds position ⑫ Vlv holds position. Man OP capability remains ⑬ Do not reconfig for reg switch or I'CNCT procedures ⑭ Vlv holds position. Man CL and full GPC cntl remains
(A8L) ● PORT RMS HTR A – OFF ● PORT RMS HTR B – AUTO	8 Port RMS: Primary pwr 9 MCIU 10 Mid MRL Mtr 1 10 Aft MRL Mtr 2 Shldr Brace Rel Htr A 8 D&C Primary Itg	HYD/APU HYD QTY 1 ind – 0% APU H2O QTY 3 ind – 0%	
(F6,F8) ● HSI SEL SOURCE – (other than MLS 1) ● RDR ALTM – 2	MLS 1 Radar Altm 1	(R1) FC1 COOL PUMP ΔP tb – bp	
(O6) ● ANNUN BUS SEL ACA 1 – MNB	ACA 1 MNA pwr	(R4) HYD BRAKE ISOL VLV 1 tb – OP LG EXTEND ISOL VLV tb – OP HYD MPS/TVC ISOL VLV SYS 1 tb – CL	
● For attitude control, LOSS OF VERNIER (ORB OPS, RCS)	RCS Manf L5 RJD pwr (L5L,L5D) RCS Manf F1 RJD pwr (F1F,F1L,F1U,F1D)	(O7) AFT L,R RCS He PRESS A (two) tb – bp AFT L,R RCS TK ISOL 3/4/5 A tb – bp (if vlv in CL position)	
Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O7) ● AFT L RCS He PRESS A,B ● R RCS He PRESS A ----- (O8) ● FWD RCS He PRESS A	12 L,R,F RCS He Pr Isol A GPC Cntl and man CL capability 14 Aft L RCS He Pr Isol B man OP capability	(O8) FWD RCS He PRESS A tb – bp FWD RCS TK ISOL 3/4/5 tb – bp FWD RCS MANF ISOL 1 tb – bp	
GNC 23 RCS ● Reprioritize L,R Manf 2 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc ● Set aft pod(s) PRI JET FAIL LIMIT to 6	Aft RCS L,R Jet 2 Htrs	(R11L) SPLY H2O TKA INLET tb – bp SPLY H2O TKB OUTLET tb – bp	
(Continued)	(Continued)	(R13L) RAD CNTL STBD,PORT (two) tb – bp (Continued)	

MEDS

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
	(O8) • If Straight Feed config, Left OMS XFEED B – OP (tb–OP). Otherwise, ✓MCC	15	OMS Eng/Xfeed Vlv Redundancy		SM 168 CRYO PALLET Pallet Volts MNA –0 ↓		9 All brakes ON and safing initiated
	(C2) • L IDP/CRT SEL – 3 • GPC/CRT 01 EXEC	16	IDP 1 MDU CRT 1 MDU MFD 2 MDU PLT 1	11	(R13L) MMU GN2 SPLY ISOL VLV A tb – bp		11 Vlv holds position
	SM 1 DPS UTILITY	17	ADC 1A/2 A		(A4) EVENT TIME ind – blank		15 Maintains deorbit capability for MNB DA2 failure
18	(G2,G8,S2) MMU ASSIGN • GNC ITEM 1 EXEC • SM ITEM 4 EXEC • PL ITEM 6 EXEC		MMU 1	9	(A8U) Port RMS D&C tb – bp except: Brakes tb – OFF RATE MIN tb – OFF RATE HOLD tb – OFF SOFT STOP tb – gray RATE SCALE tb – gray		16 Loss of redundant port to the following: MDU CDR 1 (S) MDU CDR 2 (P)
	(R11U) • FC H2O LINE HTR – B AUTO • FC H2O RELIEF HTR – B AUTO		FC H2O Line Htrs A FC H2O Relief Htrs A		(A8L) Port RMS: DPY/STO tb – bp RETEN LAT tb – bp R–F–L MID tb – bp		17 IDP 1, IDP 2 ADC data lost. MDU port select may be reqd
19	• MS AUD CNTL – PS	20	MS ATU, CCU & FD Spkr		SM 94 PDRS CONTROL Indications lost: Mid MRL Mtr 1 LAT/REL/RDY Aft MRL Mtr 2 LAT/REL/RDY		18 Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION prepositioning
	(L9) • ✓ PS AUD PNL config for use				If cooling by FES B only: 'S88 EVAP OUT T1' 'S88 EVAP OUT T2'		19 Only listen capability restored for MS ATU (CCU only)
	(A14) RCS/OMS HTR • FWD RCS – B AUTO • L POD (two) – A OFF, B AUTO • R POD (two) – B OFF, A AUTO • OMS CRSFD LINES – A OFF, B AUTO	21	Fwd RCS A Htrs (all)		(ML31C) WASTE H2O TK 1 VLV tb – bp		20 Loss of MS ATU causes loss of redundant path for ACCU config control bits, loss of xmit capability from CCU, and loss of FD Spkr
	(ML86B:A) • cb MNB H2O LINE HTR B – cl	21	L Pod A Htrs (all)		11 WASTE H2O DUMP ISOL VLV tb – bp		21 Htr B remains
	(ML86B:D) cb MNB • MMU PORT,STBD HTR B (two) – cl	21	R Pod B Htrs (partial)		11 WASTE H2O DUMP VLV tb – bp		22 Htr A remains
	(A15:D,E,F,G) For any Pallet Cryo Tk Htr A in AUTO: • (Aff) TK HTR A – OFF • B – AUTO	21	OMS Crsfd Ln A Htrs (all)		11 SPLY H2O TKD OUTLET tb – bp		23 Vlv holds position. May have to interface EMU 2 with SCU 1 to provide total H2O servicing/recharge
	(A15:C) • PALLET HTRS A – OFF • B – AUTO	21	H2O Line Htrs A: Waste Dump Line Htr A Sply Dump Line Htr A Vac Vent Line Htr A		(AW82D) EMU 2 H2O SPLY, WASTE tb (two) – CL		24 Lost TM: GNC SYS SUMM 2
	For PLBD ops: • OP/CL Drs in man mode		MMU Port,Stbd Htr A		If OMS Gmbl Cmd Abs value > 2 deg: C/W OMS TVC It – on 'L OMS GMBL' (3,B)		L OMS N2 P VLV: If Eng – ARM/PRESS, assume vlv OP L,R OMS ENG VLV 1: Assume Vlv 1 status same as Vlv 2
	Save L OMS for deorbit (If reqd for on–orbit burn, ✓MCC)	24	Pallet Cryo Tk 6–9 Htrs A		SM (BFS SM 63) PL BAY DOORS		25 Man Cntl remains. Redundant Isol remains
	Prior to using L(R) OMS: (O8)	25	Pallet Structural Htrs A		If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'		26 Maintains He Isol redundancy
24	L(R) OMS He PRESS/VAP • ISOL A – OP • B – GPC	25	PLBD: C/L Lat 1–4, 5–8, 9–12 Mtrs 1 Port,Stbd Fwd Blkhd Mtrs 1 Port Aft Blkhd Mtr Stbd Door Mtr 1 Port Door Mtr 2 CL Limit sw		During MAN PLBD OP/CL, single mtr run time noted on actuators listed at left		
	(Continued)		L OMS GN2 Press Vlv Op TM		During Rad Dpy/Sto ops: (R13L) RAD LAT CNTL tbs (two) indicate single mtr ops		
			L,R OMS He Pr Isol A GPC OP Cntl				
			L,R OMS He Vap Isol 1 GPC OP Cntl				
			(Continued)				

MEDS

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>GNC XXXXX MNV R YYYYY (3,B)</p> <p>Sel L OMS SEC: <ul style="list-style-type: none"> • OMS L GMBL SEL – ITEM 30 EXEC </p> <p>Sel R OMS PRI: <ul style="list-style-type: none"> • OMS R GMBL PRI – ITEM 29 EXEC </p>	<p>L OMS Pri TVC</p> <p>R OMS Sec TVC</p>	<p>If OMS Gmb l Cmd Abs value > 2 deg and Sec TVC selected: C/W OMS TVC It – on ‘R OMS GMBL’ (3,B)</p>	<p>(11) Vlv holds position</p> <p>(27) Vlv fails closed. IFM or real-time flow test will be required. ✓ MCC for additional direction</p>
<p>If Waste H2O Dump reqd: <ul style="list-style-type: none"> • Perform WASTE H2O SYS BACKUP DUMP (IFM) </p>	<p>11 Waste H2O: Dump Vlv Cntl Noz Htr</p>	<p>If Hum Sep A ON: ‘S66 HUMID SEP A’</p>	<p>(28) O2/N2 Cntl Vlv 1 normally closed when unpowered</p>
<p>If on PCS1: <ul style="list-style-type: none"> • Perform RECONFIG TO ALT PCS SYS, ECLS SSR-3 </p>	<p>11 O2/N2 Cntl Sys 1: O2/N2 Sys 1 Flow Xdcrs O2 Sys 1 Sply Vlv Cntl 11 N2 Sply Vlv 1 Cntl 11 N2 Reg Inlet Vlv 1 Cntl 27 O2 Xovr Vlv 1 OP capability 28 O2/N2 Cntl Vlv 1 man Cntl PPO2 Snsr A</p>	<p>If H2O Loop 1 Pump A active: ‘S88 H2O LOOP 1 FLOW’ ‘S88 H2O LOOP 1 TEMP’ ‘S88 H2O PUMP P 1’</p>	<p>(29) PEVs, Actuators, Bed A P, Bed B P, and Bed dP will be recovered after system reconfig</p>
	<p>Cabin Press Snsr Emer dP/dT B/U Comp</p>	<p>(O1) H2O PUMP OUT PRESS LOOP 1 ind – 20–25 psia</p>	<p>(30) Not yet active on all vehicles</p>
<p>(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: <ul style="list-style-type: none"> • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS) </p>	<p>29 CO2 Rmvl Sys Cntrl 1: Fan AC1 pwr Compressor AC1 pwr</p>	<p>(F7) If APUs active, and using BLR CNTLR/HTR 1B or 3A: C/W APU TEMP It – on after ~ 2 min</p>	<p>(31) Sys A Sec Cntrl man on capability remains</p>
	<p>30 FC3 Redundant Reac Vlv Cntl on pnl C3</p>	<p>If first AA failure and S/W Processing Accel data: RM FAIL ACC (3)</p>	<p>(32) Lose Auto Temp Cntl via Cntrl 2 and H2O Loop 2 Cabin Hx In Temp snsr. Hx Byp vlv holds position. May be repwr d after AC Pwr Transfer Cable connected</p>
<p>If reqd during entry (< 120K ft): (L1) <ul style="list-style-type: none"> • NH3 CNTLR B – PRI/GPC </p>	<p>31 NH3 Sys A Pri Cntrl</p>	<p>Impending: ‘S66 CO2 RL SYS PCO2’</p>	<p>CCTV Video and TV Annun Its lost if MNA selected for VCU CCTV Mon 1 lost</p>
<p>(ML31C) <ul style="list-style-type: none"> • VAC VENT ISOL VLV BUS SEL – MNB </p>	<p>Vac Vent Isol Vlv MNA Cntl</p>	<p>STAR TRKR DR POS –Y OP/CL time incr from 8 to 16 sec</p>	<p>(33) Inhibits H2O Loop 2 Pump ΔP, Pump Out Press, Pump Out Temp, Accum Qty, respectively</p>
<p>If AC Pwr Transfer cable to be installed to regain AC: <ul style="list-style-type: none"> • Go to EPS SSR-200; otherwise, continue with Bus Loss Actions </p>		<p>L ADP deploy time incr from 15 to 30 sec</p>	
<p>If Cab Temp Cntrl 2 active: (L1) <ul style="list-style-type: none"> • CAB TEMP CNTLR – OFF (MD44F) <ul style="list-style-type: none"> • Remove pin from SEC Actuator and BYP vlv linkage, connect linkage to PRI Actuator </p>	<p>32 Cabin Temp Cntrl 2 and Hx Byp Vlv Mtr 2</p>		
<p>(L1) <ul style="list-style-type: none"> • CAB TEMP CNTLR – 1 </p>			
<p>(R13U) H2O LOOP 2 OUT P <ul style="list-style-type: none"> • C/W PARAM SEL tw – 115 • PARAM – INH • C/W PARAM SEL tw – > 119 </p>			
<p>33 SM 60 TABLE MAINT</p> <ul style="list-style-type: none"> • Inhibit 0612705, 0612700, 0612740, 0612710 			
<p>(Continued)</p>	<p>(Continued)</p>		

MEDS

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(WCS) ●✓ MODE – AUTO ●✓ CRADLE – AUTO ●✓ Hose stowed in cradle ●✓ WCS ON It – OFF ● FAN SEP SEL sw – OFF ● HOSE BLOCK – SEP 2 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete ● FAN SEP SEL sw – 2	WCS Fan/Sep 1 Sep Fan 1 Mtr Relay		(34) H2O Loop 2 Byp vlv holds position (35) H2O Loop 2 Pump Out Press, Pump ΔP, Accum Qty, Pump Out Temp snrs lost (36) May be repwr'd after AC Pwr Transfer Cable connected
(EDO WCS) ● URINAL SEL – SEP 2 ● WCS PWR SEL – OFF 1, AUTO 2 ● URINE DIVERTER VLV – FAN SEP 2	Urine Fan 1 Urine Sep 1 Commode Fan 1 Controller MNA pwr Compactor MNA Cntl		(37) AV Bay 2 Fan ΔP, Air Out Temp snrs lost
(R2) ● BLR CNTLR/HTR 1 – A ● 3 – B	Hyd H2O Blr Cntrlr 1B 3A		(38) Use streamers (if flown) or monitor by feel during wake period if Cabin Air Sig Condr not recovered
(L1) ● HUM SEP A – OFF ● B – ON ● IMU FAN A – OFF ● B(C) – ON ● H2O PUMP LOOP 1 – ON, B ● H2O PUMP LOOP 2 – OFF ● AV BAY 1 FAN A – OFF ● ✓B – ON ● AV BAY 2 FAN (two) – ON ● AV BAY 3 FAN A – ON ● B – OFF ● FREON PUMP LOOP 1 – B ● 2 – A 38 During sleep periods: ● CAB FAN (two) – ON	Humidity Sep A IMU Fan A 34 H2O Loop 2 Byp Cntrlr, Sig 35 Condr H2O Loop 2 Byp Vlv pwr 2 Pump GPC Cntl 1 Pump A Av Bay 1 Fan A 36 Av Bay 2 Sig Condr, Xdcrs 37 (ECLS SC3) Av Bay 3 Fan B Freon Loop 1 Pump A 2 Pump B Cabin Air Sig Condr (ECLS SC6)		(39) Not applicable for OV102 (40) AC1 Bus Isolation for AC Pwr Transfer Cable installation accomplished in MNA DA1 ACTIONS column. No additional bus isolation steps reqd
(MO13Q) If Arlk/Tnl Fan active: ● ARLK FAN A – OFF ● B – ON	Arlk/Tnl Fan A		
40 BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
● MDU CRT 1 PWR – OFF ● MDU MFD 2 PWR – OFF ● MDU PLT 1 PWR – OFF			
(C2) ● IDP/CRT 1 PWR – OFF			
(O6) ● STAR TRKR PWR –Z – OFF	–Z Star Trkr Dr OP capability Tracker		
(O8) ● RADAR ALTM 1 – OFF ● MLS 1 – OFF			
(Continued)	(Continued)		<div style="text-align: center; font-size: 2em; font-weight: bold;">MEDS</div>

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

BUS ISOLATION		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM				
41	(O14:B) cb MNA ●OI SIG CONDR OF 1/4 A – op			④1 Redundant pwr source remains for equipment
41	●OI SIG CONDR OM 1/2 A – op			④2 H2O Loop 1 Intchgr Flow rate and IMU Fan ΔP snrs lost
41	●OI MDM OF 1/2 A – op			④3 Cabin Smoke Detector remains
41	● 3/4 A – op	42 H2O Byp Loop 1 Snsr (ECLS SC11)		④4 Current Snsr 2 remains
	●OI H2O BYP LOOP 1 SNRSR – op	Fwd Mission Timer		④5 Cntr A remains
	●MNC CONTR – op	Aft Event Timer		④6 NWS 2 is still available
	●MSN TIMER FWD – op			④7 Six vlvs fail to non-isolation position
	●EVENT TIMER AFT – op			
43	(O14:C) cb MNA ●TACAN 1 – op	43 Tacan 1		
	●SMOKE DETN L/R FLT DK – op	L,R Flt Dk Smoke Detectors		
	●SMOKE DETN BAY 2A/3B – op	Av Bay 2 Smoke Detector A		
	●FIRE SUPPR BAY 3 – op	Av Bay 3A Smoke Detector B		
	●UTIL PWR O19/MO52J – op	MNA Utility pwr		
	●FLOOD L CNSL – op	L Console Floodlt		
	●ANNUN FWD ACA 1 – op			
	●cb MNA CRYO O2 HTR TK1 SNRSR 1 – op	44 Cryo O2 Tk1 Htr Current Snsr 1		
	●cb RAD ISOL CONTR – op	Auto radiator isolation function		
45	(O14:D) cb MNA ●FREON RAD CNTLR 1 – op			
45	●FREON RAD CNTLR 2 – op			
	●N2 SPLY 1 – op			
	●O2/N2 CNTLR 1 – op			
	●O2 XOVR 1 – op			
	●N2 REG INLET 1 – op			
	●CAB VENT – op	Cabin Vent Vlv		
	● VENT ISOL – op	Vent Isol		
41	(O14:E) cb MNA ●RDR ALTM 1 – op			
41	●MLS 1 – op	ADTA 1		
46	●ADTA 1 – op	AA 1		
	●S TRK –Z – op			
	●ACCEL 1 – op			
	●DDU L – op			
	● AFT – op	NWS 1		
	●NWS – op			
	(O14:F) ●MMU 1 – OFF			
		47 ATVC 2 Isol ME		
	(R11U) ●FC PURGE VLV 1 – CL			
	●FC STARTUP HTR 1 – ENA	FC1 Startup Htr Inh capability		
	OV102 only (R14:A) cb MNA ●AUD MS/OS – op	OV102 only MS ATU OS SU ATU MIDDECK CCU ATU		
	●AUD AIRLOCK BACKUP – op			
	(Continued)	(Continued)		

MEDS

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			
<u>OV102 only</u> • ADC 1A/2A – op • MDU MFD 2 – op • PLT 1 – op			(41) Redundant pwr source remains for equipment (48) Capability to xmit to gnd from UHF degraded
<u>All except OV102 (R14:A)</u> • cb MNA AUD MS – op • ADC 1A/2A – op • MDU MFD 2 – op • PLT 1 – op	<u>All except OV102</u> MS ATU OS SU		(49) GCIL also pwr'd via MNC cb
<u>All Vehicle (R14:B)</u> cb MNA 41 cb PALLET/DSC • 1A/2B – op (EDO) • 3A – op (EDO) • UHF – op • GCILC – op • CNTL BUS BC1/2/3 – op	<u>All Vehicle</u> 48 UHF Splx Pwr Amp 49 GCIL MNA pwr MNA pwr for Cntl BC1,2,3 Buses		(50) MNB pwr may be selected via TV pwr sw (pnl A7) or GCIL if reqd (51) All docking mechanisms will have single mtr times
<u>(R14:D)</u> cb MNA • TV C AFT BAY CAMR/ PAN-TILT – op • TV C AFT BAY CAMR HTR – op • TV C AFT BAY PAN-TILT HTR – op • TV CONTR UNIT – op • MON 1 – op	TV C Aft Bay Camr and Pan-Tilt TV C Aft Bay Camr Htr TV C Aft Bay Camr Pan-Tilt Htr 50 Video Cntl Unit MNA pwr CTVM 1		(52) Logic buses 1(3) remain pwr'd via MNB(MNC)
<u>(R14:E)</u> cb MNA • PS FLOOD – op • TV D STBD RMS TV CAMR/ PAN-TILT – op • TV D STBD RMS TV CAMR HTR – op • TV D STBD RMS TV PAN-TILT HTR – op	PS Floodlt TV D STBD RMS Camr and PAN-TILT TV D STBD RMS Camr Htr TV D STBD RMS Camr PAN-TILT Htr		
<u>(A7U)</u> PL BAY • FLOOD AFT STBD – OFF • FWD PORT – OFF • DOCKING – OFF • RMS SPOT PORT – OFF	PLB Aft Stbd Floodlt Fwd Port Floodlt Docking Floodlt Port RMS Spot It		
<u>(A7L)</u> IF DOCKING MISSION • cb DEP MNA SYS 1 VENT ISOL – op • cb DEP MNA SYS 1 VENT – op	Vest Dep Vlv Sys 1 Vent Vent Isol		
<u>(A7L)</u> IF DOCKING MISSION cb DOCK LT MNA • TRUSS FWD – op • VEST PORT – op • SYS PWR SYS 1 MNA – OFF • PSU PWR MNA – OFF cb MNA • LOGIC 1 – op • 3 – op • PYRO PWR MNA – OFF LIGHTS • AIRLK 1/4 MNA – OFF	MNA A7 Fwd Truss Docking It Port Vestibule Docking It DSP SYS 1 Pwr 51 PSU MNA Pwr 52 MNA pwr to DSP Logic buses 1,3 MNA Pyro System External Airlock Its 1,4	DSP SYS PWR SYS 1 tb – OFF	
(Continued)	(Continued)		

MEDS

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			① Vlv holds position
(A7L) MADS ● STRAIN GAGE – OFF ● W/B/ACIP PCM – OFF	MADS W/B FDM, WBSC, SGSC, ACIP PCM		② Htr B remains ④ Current Snsr 2 remains
(MA73C:A,B) MCA LOGIC MNA ● FWD 1 – OFF ● AFT 1 – OFF ● MID 1,3 (two) – OF	MNA FMC1 Bus pwr AMC1 Bus pwr MMC1 Bus pwr MMC3 Bus pwr		
(ML86B:A) ● cb MNA H2O LINE HTR A – op ● cb MNA SUPPLY H2O TKA INLET – OP ● cb MNA SUPPLY H2O TKB OUTLET – OP ● cb MNA WASTE H2O DUMP VLV/NOZ HTR – OP	11 Sply H2O TKA Inlet Vlv Cntl 11 Sply H2O TKB Outlet Vlv Cntl		
(ML86B:B) ● cb MNA WASTE H2O TK1 VLV – op ● cb MNA SPLY H2O TKD OUTLET – op ● cb MNA WASTE H2O DUMP ISOL – op ● cb MNA VAC VENT ISOL VLV – op ● cb MNA WCS CNTRLR – op ● cb MNA GALLEY OVEN – op	11 Waste H2O TK1 Inlet Vlv Cntl 11 Sply H2O TKD Outlet Vlv Cntl 11 Waste H2O Dump Isol Cntl		
(ML86B:D) cb MNA MMU ● PORT/STBD HTR A (two) – op ● GN2 SPLY ISOL VLV A – op	21 MMU Port,Stbd Htr A 11 MMU GN2 Sply Isol Vlv A		
(ML86B:E) cb MNA EMU 2 H2O ● SPLY – op ● WASTE – op cb MNA FLOOD ● TNL ADAPT 2 – op	TA Floodlt 2		
(ML86B:F) cb MNA FLOODS ● MIDDECK 1/8 – op ● WMC/MO13Q – op ● AIRLK 1 – op cb MNA CRYO ● O2 HTR TK3 SNSR 1 – op ● O2 HTR TK5 SNSR 1 – op (OV104, OV105)	Middeck floodlts 1,8 WMC Floodlt, MO13Q pnl lt 2 Airlk Floodlt 1 44 Cryo O2 Tk3 Htr Current Snsr 1 (OV104, OV105) Cryo O2 Tk5 Htr Current Snsr 1		
(Continued)	(Continued)		

MEDS

EPS SSR-11

BUS LOSS: MNA FPC1 (Includes MNA FLC1, MNA FMC1, AC1)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1</p> <ul style="list-style-type: none"> Perform FC1 SHUTDN (FC SHUTDN Cue Card), pwrdn not needed, then: <p>(R1)</p> <ul style="list-style-type: none"> cb AC CONTR AC1 (three) - cl INV/AC BUS 1 - OFF (tb-OFF) INV PWR 1 - OFF (tb-OFF) cb AC CONTR AC1 (three) - op 	<p>2</p> <p>FC1 Pumps & pH Snsr</p> <p>AC1 ΦA, ΦB, ΦC Inverters</p>	<p>MASTER ALARM Light/Tone - on CRT 1 blanks</p> <p>(F7) C/W FC PUMP It - on C/W AC VOLT It - on C/W FREON LOOP It - on C/W AV BAY/CAB AIR It - on C/W H2O LOOP It - on SM ALERT Light/Tone - on EVENT TIMER ind - blank</p>	<p>①</p> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> TIME CRITICAL </div> <p>FC1 must be shutdn within 9 min to avoid potentially hazardous condition</p> <p>② Will be repwrdr after AC Pwr Transfer Cable connected</p>
<p>3</p> <ul style="list-style-type: none"> Maintain LiOH canister(s) changeout per cue card and FLIGHT PLAN 		<p>(F9) AC1 ΦA,ΦB,ΦC AC volts < 90</p>	<p>③ Crew and gnd have lost PPO2 Xdcr if Cabin Air Sig Condr not recovered</p>
<p>4</p> <p>Refer to OMS/RCS Slide Rule for vlv loss info</p> <p>Reconfig following vlv(s) only if leak isolation reqd: (O8)</p> <ul style="list-style-type: none"> FWD RCS He PRESS A 	<p>5</p> <p>Fwd RCS He Press Isol A GPC Cntl and man CL capability RCS Manf F1 RJD Driver (F1F,F1L,F1U,F1D)</p>	<p>(LIGHTS LOST) Instr Its R (pnls C2, F8, F9) Pnl Its L/Ctr (pnls L1,L2,L4, C2,C3,F2,F6,F7) Pnl Its L/OH (pnls O5,O6, O7,O13,O14,O15) Numeric Its (pnls O3, F7) Orbit Sta Instr Its (pnls A1,A2)</p>	<p>④ Do not reconfig for reg switch or I'CNCT procedures</p> <p>⑤ Vlv holds position. Man OP capability remains. Isol B remains</p>
<p>(C2)</p> <ul style="list-style-type: none"> L IDP/CRT SEL - 3 GPC/CRT 01 EXEC 	<p>6</p> <p>IDP 1 MDU CRT 1</p>	<p>(FSMs) S67 FPC/FLC 1 S67 AC VOLTS 1 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T SM0 THRM HYD (B) S66 AV BAY 2 FAN S66 AV BAY 3 FAN S66 CABIN FAN S69 FC PUMP 1 S69 FC H2 PUMP 1 S88 FREON FLOW 2 S88 FRN AFT CP 2 S88 FRN PL HX 2 S88 H2O LOOP 2 FLOW S88 H2O LOOP 2 QTY S88 H2O LOOP 2 TEMP S88 H2O PUMP P2 I/O ERROR CRT 1 RM DLMA MANF</p>	<p>⑥ Loss of redundant port to the following: MDU CDR 1 (S) MDU CDR 2 (P) MDU MFD 2(P) MDU PLT 1 (S)</p>
<p>7</p> <div style="border: 1px solid black; padding: 2px; width: fit-content;"> SM 1 DPS UTILITY </div> <p>(G2,G8,S2) MMU ASSIGN</p> <ul style="list-style-type: none"> GNC - ITEM 1 EXEC SM - ITEM 4 EXEC PL - ITEM 6 EXEC 	<p>MMU 1</p>		<p>⑦ Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION prepositioning</p>
<p>(A14)</p> <ul style="list-style-type: none"> RCS/OMS HTR FWD RCS - B AUTO 	<p>Fwd RCS A Htrs (all)</p>		<p>⑧ Temp sensing lost</p>
<p>If EMU(s) in battery charge mode: (AW 18M)</p> <ul style="list-style-type: none"> PWR/BATT CHGR EMU 1(2) BUS SEL - MNB 	<p>EMU 1,2 Pwr/Batt Chgr MNA pwr</p>		<p>⑨ All brakes ON and safing initiated</p>
<p>8</p> <p>(A8L)</p> <ul style="list-style-type: none"> PORT RMS HTR A - AUTO PORT RMS HTR B - AUTO 	<p>9</p> <p>Port RMS: MCIU 10 Mid MRL Mtr 1 10 Aft MRL Mtr 2 11 Shldr Brace Release 11 D&C Primary Ltg</p>	<p>(R1) FC1 COOL PUMP ΔP tb - bp</p>	<p>⑩ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists. May be repwrdr after AC Pwr Transfer Cable connected</p>
<p>Pre-seat ingress:</p> <ul style="list-style-type: none"> Discharge handheld fire ext into AV BAY 3 	<p>Av Bay 3 agent discharge capability</p>	<div style="border: 1px solid black; padding: 2px; width: fit-content;"> HYD/APU </div> <p>HYD QTY 1 ind - 0% APU H2O QTY 3 ind - 0%</p>	<p>⑪ May be repwrdr after AC Pwr Transfer Cable connected</p>
<p>If AC Pwr Transfer Cable to be installed to regain AC:</p> <ul style="list-style-type: none"> Go to EPS SSR-200; otherwise, continue with bus loss actions 		<p>(O1) FREON FLOW LOOP 1 ind - 578 pph AIR TEMP AV BAY 2 ind - 45 degF H2O PUMP OUT PRESS LOOP 2 ind - 0 psia</p>	<p>⑫ Vlv holds position</p>
<p>(Continued)</p>	<p>(Continued)</p>	<p>(O3) RCS/OMS PRPLT QTY Gage and MSN TIMER ind - blank</p> <p>(O8) Fwd RCS 5 He PRESS A tb - bp 12 TK ISOL 3/4/5 tb - bp 12 MANF ISOL 1 tb - bp</p> <p>L ADP deploy time incr from 15 to 30 sec</p> <p>(Continued)</p>	<p>MEDS</p>

EPS SSR-11 (Cont)
BUS LOSS: MNA FPC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
If Cab Temp Cntrl 2 active: (L1) ● CAB TEMP CNTLR – OFF ----- (MD44F) ● Remove pin from SEC Actuator and BYP vlv linkage, connect linkage to PRI Actuator ----- (L1) ● CAB TEMP CNTLR – 1	13 Cabin Temp Cntrl 2, Hx Byp Vlv Mtr 2	STAR TRKR DR POS –Y OP/CL time incr from 8 to 16 sec	⑨ All brakes ON and safing initiated
(R13U) H2O LOOP 2 OUT P ● C/W PARAM SEL tw – 115 ● PARAM – INH ● C/W PARAM SEL tw – > 119		(L1) If H2O PUMP LOOP 1 A active: 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP' 'S88 H2O PUMP P1' If FREON PUMP LOOP 2 B – ON: 'S88 FREON FLOW 2' 'S88 FRN AFT CP 2' 'S88 FRN PL HX 2'	⑬ Lose Auto Temp Cntl via Cntrl 2 and H2O Loop 2 Cabin Hx In Temp snrs. Hx Byp Vlv holds position. May be repwr'd after AC Pwr Transfer Cable connected ⑭ Inhibits H2O Loop 2 Pump ΔP, Pump Out Press, Pump Out Temp, Accum Qty, respectively
14 SM 60 SM TABLE MAINT ● Inhibit 0612705, 0612700, 0612740, 0612710		(O1) H2O PUMP OUT PRESS LOOP 1 ind – 20–25 psia FREON FLOW LOOP 2 ind – 578 pph	⑮ H2O Loop 2 Byp Vlv holds position
(R2) ● BLR CNTLR/HTR 1 – A ● 3 – B	Hyd H2O Blr 1 Cntrl B 3 Cntrl A Rsvr 1 Qty Snsr	If Hum Sep A ON: 'HUMID SEP A'	⑯ H2O Loop 2 Pump Out Press, Pump ΔP, Accum Qty, Pump Out Temp snrs lost
(L1) ● HUM SEP A – OFF ● √B – ON ● IMU FAN A – OFF ● B(C) – ON ● H2O PUMP LOOP 1 – ON, B ● H2O PUMP LOOP 2 – OFF ● AV BAY 1 FAN A – OFF ● √B – ON ● AV BAY 2 FAN A,B (two) – ON ● AV BAY 3 FAN A – ON ● B – OFF ● FREON PUMP LOOP 1 – B ● FREON PUMP LOOP 2 – A	Hum Sep A IMU Fan A 15 H2O Loop 2 Byp Cntrl, Sig Condr 16 H2O Loop 2 Byp Vlv pwr 2 Pump GPC Cntl 1 Pump A Av Bay 1 Fan A Av Bay 2 Sig Condr, Xdcrs (ECLS SC3) Av Bay 3 Fan B 17 Freon Loop 1 Pump A 2 Pump B	(F7) If APUs active and using BLR CNTLR/HTR 1B or 3A: C/W APU TEMP It – on after ~2 min	⑰ Av Bay 2 Fan ΔP, Air Out Temp snrs lost ⑱ Not applicable for OV102 ⑲ Use streamers (if flown) or monitor by feel during wake periods if Cabin Air Sig Condr not recovered
(MO13Q) If Arlk/Tnl Fan active: ● ARLK FAN A – OFF ● B – ON	Arlk/Tnl Fan A	(A8U) Port RMS D&C tb – bp except: BRAKES tb – OFF RATE MIN tb – OFF RATE HOLD tb – OFF SOFT STOP tb – gray RATE SCALE tb – gray	⑳ CO2 partial Press and Cabin Fan ΔP snrs lost
18 During sleep periods: ● CAB FAN (two) – ON	20 Cabin Air Sig Condr (ECLS SC6)	'S66 CO2 RL SYS PCO2' (MO51F) CO2 RMVL SYS CNTLR 1 FAIL It on	
(WCS) ● √MODE – AUTO ● √CRADLE – AUTO ● √Hose stowed in cradle ● √WCS ON It – OFF ● FAN SEP SEL sw – OFF ● HOSE BLOCK – SEP 2 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30–sec run complete ● FAN SEP SEL sw – 2	WCS Fan/Sep 1		
(Continued)	(Continued)		

MEDS

EPS SSR-11 (Cont)
BUS LOSS: MNA FPC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(EDO WCS) • URINAL SEL – SEP 2 • WCS PWR SEL – OFF 1, AUTO 2 • URINE DIVERTER VLV – FAN SEP 2	Urine Sep 1 Urine Fan 1 Commode Fan 1		(21) PEVs, Actuators, Bed A P, Bed B P, and Bed dP will be recovered after system reconfig
• Perform LOSS OF 1 FC (ORB PKT, PWRDN)			(22) AC1 Bus Isolation for AC Pwr Transfer Cable installation accomplished in MNA FPC1 ACTIONS column. No additional bus isolation steps reqd
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	21 CO2 Rmvl Sys Cntrl 1		(23) Mtr 2 remains (24) Htr Cntrl 2 remains
BUS ISOLATION			(25) Loss of Hyd Sys 1 deploy capability for all Ldg Gear. Pyro backup Release Sys will deploy Ldg Gear. NLG can also be deployed by Hyd Sys 2
ONLY ON MCC CALL, PERFORM			(26) Buses remain pwr'd
• MDU CRT 1 PWR – OFF			(27) Redundant mtrs remain
(C2) • IDP/CRT 1 PWR – OFF			(28) Hyd Sys 2 still available for NWS
(O14:C) • cb MNA FIRE SUPPR BAY 3 – op			(29) Bypass vlv holds position and Cntrl A Rad Byp Vlv Mtr remains
(O14:F) • MMU 1 – OFF			
(MA73C:A) • MCA LOGIC MNA FWD 1 – OFF	MNA FMC1 Bus pwr		
22	23 CDR HUD –Y Star Trkr Dr Sys 1 OP/CL capability 24 L ADP Dpy Mtr 1 Htr Cntrl 1		
23	RH Vents 1,2,3,5,6 Mtrs 1 LH Vents 5,6,8,9 Mtrs 1		
24	25 LG Extend Vlv 1		
25	26 MNA pwr to Cntl Buses AB1, AB2, AB3, CA1, CA2, CA3		
26	27 ET Door Mtrs: C/L Lat Actr 1 Mtr 1 Actr 2 Mtr 1 L Dr Closure Mtr 1 Uplock Lat Mtr 1		
27	28 NWS Hyd Sys 1		
28	29 Freon Loop 1,2 Cntrl B Rad Byp Vlv Mtrs		
29	Port, Stbd Rad Lat 1–6, 7–12 Mtrs 1 Port, Stbd Rad Dpy/Sto Mtr 1		
30	PLBD: C/L Lat 1–4, 5–8, 9–12 Mtrs 1 Port, Stbd Fwd Blkhd Mtr 1 Port Aft Blkhd Mtr 1 Stbd Door Mtr 1		
31	PL Reten Sys A Rel/Lat Mtrs		
32			

MEDS

EPS SSR-12

BUS LOSS: MNA MPC1

(Includes MNA MMC1 & MNA MMC3)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 <ul style="list-style-type: none"> Perform MNA BUS TIE (BUS TIE Cue Card) Monitor, record Δamps between FC1 and tied FC 	1 FC1 Purge Vlv O2,H2 Flow Xdcrs SS ΔV Snrs	2 (L2) O2 SYS 1 SPLY tb - CL	① Buses are tied due to: Loss of FC1 Purge capability. As FC1 loses performance, tied FC will pick up load, slowing FC1 degradation. If degradation projection does not allow nominal EOM, FC1 will be shutdn. ✓MCC; and Loss of FC1 SS ΔV Snrs. Change in ΔAmps >12 amps indicates possible cell crossover problem. ΔAmps shift due to loss of FC1 Purge capability is indicated by change in ΔAmps between pre and post purge readings. MCC will aid in this determination ② Vlv holds position. Sys 2 remains ③ Pwrs PL Timing Buffer and OIU 1. OIU 1 redundant pwr MNB MPC2 via CAB PL3 ④ B/U pwr remains for RMS ops. All brakes ON and safing initiated ⑤ Single mtr time. One failure away from loss of two out of three MRLs. EVA or jettison capability exists ⑥ If AC1 MMC1 and MMC3 cbs not opened, Lat Mtrs 1 of actuators for Port and Stbd Rad Lat 1-6, 7-12 continue to run until Sys A Lat Cntl sw placed to OFF ⑦ Mtrs 2 will continue to drive until Sys A,B Cntl sw are taken to OFF ⑧ MNB htrs remain ⑨ FC1 Startup Htr is disconnected
(R1) • PL CAB - MNB	3 MNA pwr to CABPL1,2,3 buses	(R13L) RAD CNTL STBD tb - bp PORT tb - bp	
(A8L) • PORT RMS HTR A - OFF • PORT RMS HTR B - AUTO	Port RMS: Primary pwr Mid MRL Mtr 1 Aft MRL Mtr 2 Htr A	(A8L) PORT RMS: DPY/STO tb - bp RETEN LAT tb - bp R-F-L MID tb - bp	
(L1) • TOP EVAP HTR DUCT - B If Hi Load Evap enabled: • HI LOAD DUCT HTR - B (C)	Top Evap Duct Fwd,Aft Htrs A Hi Load Duct Outbd,Inbd Htrs A	<div style="border: 1px solid black; padding: 2px;">SM 94 PDRS CONTROL</div> Indications lost: Mid MRL Mtr 1 LAT/REL/RDY Aft MRL Mtr 2 LAT/REL/RDY	
(L2) FLASH EVAP FDLN HTR • A SPLY - 2 • B SPLY - 1	FES H2O Fdln A Mid 2 Htr 1 B Mid 2 Htr 2	PLB Floodlts lost: Fwd Port Aft Stbd Docking	
(R11U) FC H2O • LINE HTR - B AUTO • RELIEF HTR - B AUTO	FC H2O Line Htrs A Relief Htrs A	<div style="border: 1px solid black; padding: 2px;">SM (BFS,SM) 63 PL BAY DOORS</div> If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG' ----- During MAN PLBD OP/CL, single mtr run time noted on actuators listed at left	
6 (MA73C:C,D) • cb MCA PWR AC1 3Φ MID 1,3 (two) - op	6 Port,Stbd Rad Lat 1-6,7-12 Mtrs 1 Limit sw 7 Port,Stbd Rad Dpy/Sto Mtrs 2 Limit sw Port,Stbd Rad Dpy/Sto Mtrs 1		
8 (ML86B:C) • cb MNB EXT ARLK HTR STRUC - cl For PLBD ops: • OP/CL Drs in man mode	8 Ext A/L Structural Htrs MNA pwr PLBD: C/L Lat 1-4,5-8,9-12 Mtrs 1 Port,Stbd Fwd Blkhd Lat Mtrs 1 Port Aft Blkhd Lat Mtr 1 Stbd Door Mtr 1 Port Door Mtr 2 CL Limit sw		
(Continued)	(Continued)		
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
9 (R11U) • FC PURGE VLV 1 - CL • FC STARTUP HTR 1 - ENA	9 FC1 Startup Htr Inh capability		
(A7U) PL BAY FLOOD • AFT STBD - OFF • FWD PORT - OFF • DOCKING - OFF • RMS SPOT PORT - OFF	PLB Aft Stbd Floodlt Fwd Port Floodlt Docking Floodlt Port RMS Spottt		
(A7L) IF DOCKING MISSION • cb DEP MNA SYS 1 VENT ISOL - op • cb DEP MNA SYS 1 VENT - op	Vest Dep Vlv Sys 1 Vent Vent Isol		
<div style="text-align: right; font-size: 2em; font-weight: bold;">MEDS</div>			

EPS SSR-12 (Cont)
BUS LOSS: MNA MPC1

(Includes MNA MMC1 & MNA MMC3)

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A7L) IF DOCKING MISSION cb DOCK LT MNA • TRUSS FWD – op • VEST PORT – op • SYS PWR SYS 1 MNA – OFF • PSU PWR MNA – OFF cb MNA • LOGIC 1 – op • 3 – op • PYRO PWR MNA – OFF LIGHTS • AIRLK 1/4 MNA – OFF	MNA A7 Fwd Truss Docking It Port Vestibule Docking It DSP SYS 1 Pwr PSU MNA Pwr	DSP SYS PWR SYS 1 tb – OFF	<p>② Vlv holds position. Sys 2 remains</p> <p>⑧ MNB htrs remain</p> <p>⑩ All docking mechanisms will have single mtr times</p> <p>⑪ Logic buses 1(3) remain pwrd via MNB(MNC)</p> <p>⑫ Buses remain pwrd</p> <p>⑬ Cntrlrs A,B Rad Byp Vlv mtrs auto cntl and Cntrl A Rad Byp Vlv mtr remain</p> <p>⑭ Snr 2 remains</p> <p>⑮ Lost capability to observe and record FC single cell voltages</p>
(A7L) MADS • STRAIN GAGE – OFF • WB/ACIP PCM – OFF	MADS W/B FDM, WBSC, SGSC, ACIP PCM		
(MA73C:A,B) • MCA LOGIC MNA MID 1,3 (two) – OFF	MNA MMC1 and MNA MMC3 Bus pwr		
	12 MNA pwr to ESS2CA and ESS3AB AUXPLA Bus Pwr		
	13 Freon Loop 1,2 Cntrl B Rad Byp Vlv Mtrs Man Cntl 2 ATM Press Cntl O2 Sys 1 Sply Vlv Cntl		
	Port Rad Dpy/Sto Mtr 1 Stbd Rad Dpy/Sto Mtr 1 LH Vents 5,6 Mtrs 1 RH Vents 3,5,6 Mtrs 1		
(A15:H,I,J,K) • cb MNA TK6-TK9 O2 HTR SNSR 1 – op	14 Cryo O2 Tk 6-9 Htr Current Snr 1		
	FC3 Redundant Reac Vlv Close Cntl on pnl C3		
(ML86B:C) 8 • cb MNA EXT ARLK HTR STRUC – op	8 Ext A/L Structural Htrs MNA pwr		
(ML86B:D) • cb MNA FC PCM – op	15 FCMS		

MEDS

**EPS SSR-13
BUS LOSS: MNA APC1**

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
	For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS)	2	RCS Manf L5 RJD pwr (L5L,L5D)	1	MASTER ALARM Light/Tone – on	①	Indications do <u>not</u> appear until jet commanded
	Refer to OMS/ RCS Slide Rule for vlv loss info (use APC 4 Slide for Aft RCS)	3	Aft L,R RCS He Pr Isol A GPC Cntl and Man CL capability	(F7)	C/W RCS JET It – on	②	Manf status <u>not</u> automatically declared closed. Fail-offs will occur when jets commanded
	GNC 23 RCS			(FSM)	L RCS D(L) JET	③	Vlv holds position. Man OP capability remains
4	DES INH on L Manf 3 Jets: • ITEM 2 EXEC • L3L ITEM 12 EXEC (*) • L3D ITEM 28 EXEC (*) • L3A ITEM 30 EXEC (*) Set aft pod(s) PRI JET FAIL LIMIT to 6				If OMS GMBL cmd abs value > 2 deg: C/W OMS TVC It 'L OMS GMBL' (3,B)	④	Maintains control capability for APC6 failure
5	Reconfig following vlv(s) only if leak isolation reqd: (O7) • AFT L RCS He PRESS A,B • R RCS He PRESS A	6	Aft L RCS He Pr Isol B Man OP capability		If OMS GMBL cmd abs value > 2 deg and Sec TVC selected: C/W OMS TVC It 'R OMS GMBL' (3,B)	⑤	Do not reconfig for reg switch or I'CNCT procedures
	(A12) APU HTR TK/FU LINE/H2O • SYS 1A – OFF • 1B – AUTO • 3A – AUTO • 3B – OFF HYD HTR • RUD SPD BK A – OFF • B – AUTO		APU 1 Inj H2O Htrs A APU 3 GG Inj H2O Htrs B Rud/Spd Brake Htr A			⑥	Vlv holds position. Man CL and full GPC cntl remain
	(A14) RCS/OMS HTRS • L POD (two) – A OFF, B AUTO • R POD (two) – B OFF, A AUTO • OMS CRSFD LINES (two) – A OFF, B AUTO	7	L Pod A Htrs (all)			⑦	Htr B remains
		8	R Pod B Htrs (partial)			⑧	Htr A remains
		7	OMS Crsfd Ln A Htrs (all)			⑨	Lost TM: GNC SYS SUMM 2 L,R OMS ENG BALL VLV 1: Assume Vlv 1 status same as Vlv 2
9	Prior to using L(R) OMS: (O8)	10	L,R OMS He Pr A GPC Cntl			⑩	Vlv fails closed. Man cntl remains. Redundant Isols remain
11	L(R) OMS He PRESS/VAP • ISOL A – OP • B – GPC	10	L,R OMS He Vap Isol 1 GPC Cntl			⑪	Maintains He Isol redundancy
	GNC XXXXX MNVR YYYYY (3,B)						
	Sel L OMS SEC TVC: • L OMS GMBL SEC – ITEM 30 EXEC Sel R OMS PRI TVC: • R OMS GMBL PRI – ITEM 29 EXEC		L OMS Pri TVC R OMS Sec TVC				
BUS ISOLATION							
ONLY ON MCC CALL, PERFORM							
NONE							
						MEDS	

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EPS MNA
SSR 10-29

EPS SSR-10

BUS LOSS: MNA DA1

(Includes all MNA sub-buses and AC)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<ul style="list-style-type: none"> Perform FC1 SHUTDN (FC SHUTDN Cue Card) 	FC1 PUMPS, pH Snsr Purge Vlv O2,H2 Flow Xdcrs Cell Perf Monitor 1 MNA pwr to AUX PLA Bus 1 ESS2CA 1 ESS3AB 1 CNTLAB1,2,3 1 CNTLCA1,2,3	MASTER ALARM Light/ Tone – on SM ALERT Light/Tone – on (F7) CRT 1 blanks C/W CABIN ATM It – on C/W FREON LOOP It – on C/W AV BAY/CAB AIR It – on C/W MN BUS UNDERVOLT It – on C/W AC VOLT It – on C/W FC PUMP It – on C/W RCS JET It – on C/W H2O LOOP It – on EVENT TIMER ind – blank MPS PRESS ind (eight) – Red Flag visible	① Buses remained pwr'd ② Pwrs PL Timing Buffer, and OIU 1 (if flown). OIU 1 redundant pwr MNB MPC2 via CAB PL3 ③ Indications do not appear until jet commanded ④
<ul style="list-style-type: none"> Perform LOSS OF 1 FC (ORB PKT, PWRDN) 			* [TIME CRITICAL] * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp
(R1) <ul style="list-style-type: none"> PL CAB – MNB cb AC CONTR AC1 ΦA,ΦB,ΦC (three) – cl INV/AC BUS 1 – OFF (tb-OFF) INV PWR 1 – OFF (tb-OFF) cb AC CONTR AC1 ΦA, ΦB,ΦC, (three) – op O2,H2 MANF VLV TK1,2 (four) – OP 	2 MNA pwr to CABPL 1,2,3 buses AC1 ΦA,ΦB,ΦC Inverters	(COMM LOST) MS,OS audio lost Xmit to gnd via UHF (LIGHTS LOST) L Console Floodlt Pnl Its L/Ctr (pnls L1,L2,L4, C2,C3,F2,F6,F7) Pnl Its L/OH (pnls O5,O6, O7,O13,O14,O15) Numeric Its (pnls O3, F7) Instr Its R (pnls C2,F8,F9) PS Floodlt Orbit Sta Instr Its (pnls A1,A2) Middeck Floodlts 1,8 WMC Floodlt MO13Q pnl It 2 Airlock Floodlt 1 PLB Floodlts Aft Stbd,Fwd Port, Docking TA Floodlt 2	
(R1) If O2(H2) Tk1 in use: <ul style="list-style-type: none"> O2(H2) TK1 HTR B – AUTO O2(H2) TK1 HTR A – OFF If O2(H2) Tk3 in use: <ul style="list-style-type: none"> O2(H2) TK3 HTR B – AUTO O2(H2) TK1 HTR A – OFF 	Cryo O2,H2 Tk1 Htrs A Cryo O2,H2 Tk3 Htrs A		
(A11) If OV104 or OV105 & Tk5 in use: <ul style="list-style-type: none"> O2(H2) TK5 HTR B – AUTO O2(H2) TK5 HTR A – OFF 	(OV104, OV105) Cryo O2,H2 Tk5 Htrs A		
	Av Bay 3 Agent discharge capability		
If EMU(s) in battery charge mode: (AW18H) <ul style="list-style-type: none"> PWR/BATT CHGR EMU 1(2) BUS SEL – MNB 	EMU 1,2 PWR/BATT Charger MNA pwr	(F9) AC1 ΦA,ΦB,ΦC AC volts ind – < 90 DC VOLTS MNA ind – OSL	
(A12) APU HTR 4 • GAS GEN/FUEL PUMP 1 – B AUTO 4 • GAS GEN/FUEL PUMP 3 – A AUTO • LUBE OIL LINE 1 – B AUTO • LUBE OIL LINE 3 – A AUTO APU HTR TK/FU LINE/H2O 4 • SYS 1A – OFF 4 • 1B – AUTO 4 • 3A – AUTO 4 • 3B – OFF HYD HTR • RUD SPD BK A – OFF • B – AUTO • BDY FLP A – OFF • B – AUTO • ELEV A – OFF • B – AUTO	APU 1 GG/Fu Pump Htrs A APU 3 GG/Fu Pump Htrs B APU 1 Lube Oil Line Htrs A APU 3 Lube Oil Line Htrs B APU 1 Tk/Fu Ln Htrs A APU 1 Inj H2O Htrs A 3 Tk/Fu Ln Htrs B Rud/Spd Brake Htr A Body Flap Htr A Elevon Actr Htrs A	(FSMs) S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T SM0 THRM HYD (B) S66 AV BAY 3 FAN S66 AV BAY 2 FAN S66 CABIN FAN S66 CABIN PPO2 S66 IMU FAN DP S66 CABIN PPO2 A S66 CABIN PRESS SM1 CABN DP/DT BU (B) S67 AC VOLTS 1 S69 FC PUMP 1 S69 FC H2 PUMP 1 S88 FREON FLOW 2 S88 FRN AFT CP 2 S88 FRN PL HX 2 S88 H2O LOOP 1 FLOW S88 H2O LOOP 2 QTY S88 H2O LOOP 2 TEMP S88 H2O PUMP P 2 I/O ERROR CRT 1 S67 MAIN BUS V S88 THERMAL FRN (2) S88 THERMAL H2O (2) S67 FPC/FLC 1 S67 MPC 1	
(Continued)	(Continued)	(Continued)	

**EPS MNA
 SSR 10-29**

NOM

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A12) HYD CIRC ● PUMP PWR 1 – MNB ● 3 – MNC	Circ Pump 1 MNA pwr 3 MNA pwr	(FSMs) S67 APC/ALC A 168 PALLET V A L RCS D,L JET RM DLMA MANF	③ Indications do not appear until jet commanded
If RAD CNTLR LOOP 1,2 – AUTO B: ● Perform ON-ORBIT RAD CNTLR SWITCH, ECLS SSR-13 for Freon Loop 1,2 (L1) ● FLASH EVAP CNTLR PRI A (SEC) – ON (if reqd) ● TOP EVAP HTR NOZ L – B AUTO ● TOP EVAP HTR DUCT – B	Freon Loop 1 Rad Cntrl B 2 Rad Cntrl B	If ADTA 1, MLS 1, – STAR TRKR pwrd: 'BCE STRG 1 ADTA' (3,B) 'BCE STRG 1 MLS' (3) 'BCE STRG 1 STKR'	⑤ After MET 3:30, tb already bp ⑥ Vlv holds position. N2 Sys 2 remains
If HI LOAD EVAP enabled: ● HI LOAD DUCT HTR – B(C)	FES Pri B Cntrl	(L2) 5 CAB VENT ISOL tb – bp 5 CAB VENT tb – bp 6 O2 SYS 1 SPLY tb – CL 6 N2 SYS 1 SPLY tb – bp 6 N2 SYS 1 REG INLET tb – bp	⑦ Crew and ground have lost PFCO2 XDCR if Cabin Air Sig Condr not recovered
7 ● Maintain LiOH Canister(s) changeout per cue card and FLIGHT PLAN	Top Evap L Noz Htr A	Top Evap Duct L,R,Fwd,Aft Htrs A	⑧ B/U pwr remains for RMS ops
(L2) FLASH EVAP FDLN ● HTR A SPLY – 2 ● B SPLY – 1	Hi Load Duct Outbd,Inbd Noz Htrs A	(O1) AIR TEMP AV BAY 2 ind – 45 degF H2O PUMP OUT PRESS LOOP 2 ind – 0 psia O2/N2 FLOW SYS 1 ind – 0 pph CAB PRESS ind – 0 psia PPO2 SNSR A ind – 0 psia	⑨ All brakes ON and safing initiated ⑩ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists
● FREON ISOL MODE – OFF	Auto radiator isolation function	(O3) RCS/OMS Prplt Qty Gage blanks Mission Timer blanks	⑪ Vlv holds position
(A8L) ● PORT RMS HTR A – OFF ● PORT RMS HTR B – AUTO	Port RMS: 8 Primary pwr 9 MCIU 10 Mid MRL Mtr 1 10 Aft MRL Mtr 2 8 Shldr Brace Rel Htr A 8 D&C Primary Itg	(F6) HSI,AMI,AVVI,SPI Flags visible	⑫ Vlv holds position. Man OP capability remains
(F8) ● HSI SEL SOURCE – (other than MLS, 1) ● RDR ALTM – 2 ● Use R AMI,AVVI,HSI	MLS 1	(F8) HYD QTY 1 ind – 0% APU H2O QTY 3 ind – 0%	⑬ Do not reconfig for reg switch or I'CNCT procedures
(O6) ● ANNUN BUS SEL ACA 1 – MNB	Radar Altm 1 L INST pwr (MPS Meters, SPI,L HSI,AMI,AVVI)	(R1) FC1 COOL PUMP ΔP tb – bp	⑭ Vlv holds position. Man CL and full GPC cntl remains
● For attitude control, LOSS OF VERNIER (ORB OPS, RCS)	ACA 1 MNA pwr	(R4) HYD BRAKE ISOL VLV 1 tb – OP 11 LG EXTEND ISOL VLV tb – OP 11 HYD MPS/TVC ISOL VLV SYS 1 tb – CL	
Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O7) ● AFT L RCS He PRESS A,B ● R RCS He PRESS A	RCS Manf L5 RJD pwr (L5L,L5D) RCS Manf F1 RJD pwr (F1F,F1L,F1U,F1D)	(O7) 12 AFT L,R RCS He PRESS A (two) tb – bp AFT L,R RCS TK ISOL 3/4/5 A tb – bp (if vlv in CL position)	
13 (O8) ● FWD RCS He PRESS A	12 L,R,F RCS He Pr Isol A GPC Cntl and man CL capability 14 Aft L RCS He Pr Isol B man OP capability	(O8) 12 FWD RCS He PRESS A tb – bp 11 FWD RCS TK ISOL 3/4/5 tb – bp 11 FWD RCS MANF ISOL 1 tb – bp	
GNC 23 RCS	Aft RCS L,R Jet 2 Htrs	(R11L) 11 SPLY H2O TKA INLET tb – bp 11 SPLY H2O TKB OUTLET tb – bp	
● Reprioritize L,R Manf 2 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc ● Set aft pod(s) PRI JET FAIL LIMIT to 6		(R13L) RAD CNTL STBD,PORT (two) tb – bp	
(Continued)	(Continued)	(Continued)	NOM

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	(O8) • If Straight Feed config, Left OMS XFEED B – OP (tb–OP). Otherwise, ✓ MCC	24 OMS Eng/Xfeed Vlv Redundancy	SM 168 CRYO PALLET Pallet Volts MNA –0 ↓	⑨ All brakes ON and safing initiated
	(C2) • L CRT SEL – 3 • GPC/CRT 01 EXEC	DEU/CRT 1	(R13L) MMU GN2 SPLY ISOL VLV A tb – bp	⑪ Vlv holds position
15	SM 1 DPS UTILITY (G2,G8,S2) MMU ASSIGN • GNC ITEM 1 EXEC • SM ITEM 4 EXEC • PL ITEM 6 EXEC	MMU 1	(A4) EVENT TIME ind – blank	⑮ Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION prepositioning
16	(R11U) • FC H2O LINE HTR – B AUTO • FC H2O RELIEF HTR – B AUTO • MS AUD CNTL – PS	FC H2O Line Htrs A FC H2O Relief Htrs A	(A8U) Port RMS D&C tb – bp except: Brakes tb – OFF RATE MIN tb – OFF RATE HOLD tb – OFF SOFT STOP tb – gray RATE SCALE tb – gray	⑯ Only listen capability restored for MS ATU (CCU only)
	(L9) • ✓ PS AUD PNL config for use	17 MS ATU, CCU & FD Spkr	(A8L) Port RMS: DPY/STO tb – bp RETEN LAT tb – bp R–F–L MID tb – bp	⑰ Loss of MS ATU causes loss of redundant path for ACCU config control bits, loss of xmit capability from CCU, and loss of FD Spkr
	(A14) RCS/OMS HTR • FWD RCS – B AUTO • L POD (two) – A OFF, B AUTO • R POD (two) – B OFF, A AUTO • OMS CRSFD LINES – A OFF, B AUTO	18 Fwd RCS A Htrs (all) 18 L Pod A Htrs (all) 19 R Pod B Htrs (partial) 18 OMS Crsfd Ln A Htrs (all)	SM 94 PDRS CONTROL Indications lost: Mid MRL Mtr 1 LAT/REL/RDY Aft MRL Mtr 2 LAT/REL/RDY	⑱ Htr B remains ⑲ Htr A remains
	(ML86B:A) • cb MNB H2O LINE HTR B – cl	H2O Line Htrs A: Waste Dump Line Htr A Sply Dump Line Htr A Vac Vent Line Htr A	If cooling by FES B only: 'S88 EVAP OUT T1' 'S88 EVAP OUT T2'	⑳ Vlv holds position. May have to interface EMU 2 with SCU 1 to provide total H2O servicing/recharge
	(ML86B:D) cb MNB • MMU PORT,STBD HTR B (two) – cl	18 MMU Port,Stbd Htr A	(ML31C) WASTE H2O TK 1 VLV tb – bp WASTE H2O DUMP ISOL VLV tb – bp WASTE H2O DUMP VLV tb – bp SPLY H2O TKD OUTLET tb – bp	㉑ Lost TM: GNC SYS SUMM 2 L OMS N2 P VLV: If Eng – ARM/PRESS, assume vlv OP L,R OMS ENG VLV 1: Assume Vlv 1 status same as Vlv 2
	(A15:D,E,F,G) For any Pallet Cryo Tk Htr A in AUTO: • (Aff) TK HTR A – OFF • B – AUTO	Pallet Cryo Tk 6–9 Htrs A	(AW82D) EMU 2 H2O SPLY, WASTE tb (two) – CL	㉒ Man Cntl remains. Redundant Isol remains
	(A15:C) • PALLET HTRS A – OFF • B – AUTO	Pallet Structural Htrs A	If OMS Gmbl Cmd Abs value > 2 deg: C/W OMS TVC It – on (3,B) 'L OMS GMBL'	㉓ Maintains He Isol redundancy
	For PLBD ops: • OP/CL Drs in man mode	PLBD: C/L Lat 1–4, 5–8, 9–12 Mtrs 1 Port,Stbd Fwd Blkhd Mtrs 1 Port Aft Blkhd Mtr Stbd Door Mtr 1 Port Door Mtr 2 CL Limit sw	SM (BFS SM 63) PL BAY DOORS	㉔ Maintains deorbit capability for MNB DA2 failure
21	Save L OMS for deorbit (If reqd for on–orbit burn, ✓ MCC)	21 L OMS GN2 Press Vlv Op TM	If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'	
21	Prior to using L(R) OMS: (O8)	22 L,R OMS He Pr Isol A GPC OP Cntl	During MAN PLBD OP/CL, single mtr run time noted on actuators listed at left	
23	L(R) OMS He PRESS/VAP • ISOL A – OP • B – GPC	22 L,R OMS He Vap Isol 1 GPC OP Cntl	During Rad Dpy/Sto ops: (R13L) RAD LAT CNTL tbs (two) indicate single mtr ops	
	(Continued)	(Continued)	(Continued)	

NOM

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>GNC XXXXX MNV R YYYYY (3,B)</p> <p>Sel L OMS SEC: <ul style="list-style-type: none"> • OMS L GMBL SEL – ITEM 30 EXEC </p> <p>Sel R OMS PRI: <ul style="list-style-type: none"> • OMS R GMBL PRI – ITEM 29 EXEC </p>	<p>L OMS Pri TVC</p> <p>R OMS Sec TVC</p>	<p>If OMS GmbL Cmd Abs value > 2 deg and Sec TVC selected: C/W OMS TVC It – on ‘R OMS GMBL’ (3,B)</p>	<p>11 Vlv holds position</p> <p>25 Vlv fails closed. IFM or real-time flow test will be required. ✓ MCC for additional direction</p>
<p>If Waste H2O Dump reqd: <ul style="list-style-type: none"> • Perform WASTE H2O SYS BACKUP DUMP (IFM) </p>	<p>11 Waste H2O: Dump Vlv Cntl Noz Htr</p>	<p>If Hum Sep A ON: ‘S66 HUMID SEP A’</p>	<p>26 O2/N2 Cntl Vlv 1 normally closed when unpowered</p>
<p>If on PCS1: <ul style="list-style-type: none"> • Perform RECONFIG TO ALT PCS SYS, ECLS SSR-3 </p>	<p>11 O2/N2 Cntl Sys 1: O2/N2 Sys 1 Flow Xdcrs O2 Sys 1 Sply Vlv Cntl 11 N2 Sply Vlv 1 Cntl 11 N2 Reg Inlet Vlv 1 Cntl 25 O2 Xovr Vlv 1 OP capability 26 O2/N2 Cntl Vlv 1 man Cntl PPO2 Snsr A</p>	<p>If H2O Loop 1 Pump A active: ‘S88 H2O LOOP 1 FLOW’ ‘S88 H2O LOOP 1 TEMP’ ‘S88 H2O PUMP P 1’</p>	<p>27 PEVs, Actuators, Bed A P, Bed B P, and Bed dP will be recovered after system reconfig</p>
<p>(MO51F)</p>	<p>Cabin Press Snsr Emer dP/dT B/U Comp</p>	<p>(O1) H2O PUMP OUT PRESS LOOP 1 ind – 20–25 psia</p>	<p>28 Not yet active on all vehicles</p>
<p>If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: <ul style="list-style-type: none"> • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS) </p>	<p>27 CO2 Rmvl Sys Cntrl 1: Fan AC1 pwr Compressor AC1 pwr</p>	<p>(F7) If APUs active, and using BLR CNTLR/HTR 1B or 3A: C/W APU TEMP It – on after ~ 2 min</p>	<p>29 Sys A Sec Cntrl man on capability remains</p>
<p>If reqd during entry (< 120K ft): (L1) <ul style="list-style-type: none"> • NH3 CNTLR B – PRI/GPC </p>	<p>28 FC3 Redundant Reac Vlv Cntl on pnl C3</p>	<p>If first AA failure and S/W Processing Accel data: RM FAIL ACC (3)</p>	<p>30 Lose Auto Temp Cntl via Cntrl 2 and H2O Loop 2 Cabin Hx In Temp snsr. Hx Byp vlv holds position. May be repwrd after AC Pwr Transfer Cable connected</p>
<p>(ML31C) <ul style="list-style-type: none"> • VAC VENT ISOL VLV BUS SEL – MNB </p>	<p>29 NH3 Sys A Pri Cntrl</p>	<p>Impending: ‘S66 CO2 RL SYS PCO2’</p>	<p>31 Inhibits H2O Loop 2 Pump ΔP, Pump Out Press, Pump Out Temp, Accum Qty, respectively</p>
<p>If AC Pwr Transfer cable to be installed to regain AC: <ul style="list-style-type: none"> • Go to EPS SSR-200; otherwise, continue with Bus Loss Actions </p>	<p>Vac Vent Isol Vlv MNA Cntl</p>	<p>CCTV Video and TV Annun Its lost if MNA selected for VCU CCTV Mon 1 lost</p>	<p>STAR TRKR DR POS –Y OP/CL time incr from 8 to 16 sec</p>
<p>If Cab Temp Cntrl 2 active: (L1) <ul style="list-style-type: none"> • CAB TEMP CNTLR – OFF </p>	<p>30 Cabin Temp Cntrl 2 and Hx Byp Vlv Mtr 2</p>	<p>L ADP deploy time incr from 15 to 30 sec</p>	
<p>(MD44F) <ul style="list-style-type: none"> • Remove pin from SEC Actuator and BYP vlv linkage, connect linkage to PRI Actuator </p>			
<p>(L1) <ul style="list-style-type: none"> • CAB TEMP CNTLR – 1 </p>			
<p>(R13U) H2O LOOP 2 OUT P <ul style="list-style-type: none"> • C/W PARAM SEL tw – 115 • PARAM – INH • C/W PARAM SEL tw – > 119 </p>			
<p>31 SM 60 TABLE MAINT</p> <ul style="list-style-type: none"> • Inhibit 0612705, 0612700, 0612740, 0612710 			
<p>(Continued)</p>	<p>(Continued)</p>		

NOM

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(WCS) ●✓ MODE – AUTO ●✓ CRADLE – AUTO ●✓ Hose stowed in cradle ●✓ WCS ON It – OFF ● FAN SEP SEL sw – OFF ● HOSE BLOCK – SEP 2 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete ● FAN SEP SEL sw – 2	WCS Fan/Sep 1 Sep Fan 1 Mtr Relay		(32) H2O Loop 2 Byp vlv holds position (33) H2O Loop 2 Pump Out Press, Pump ΔP, Accum Qty, Pump Out Temp snrs lost (34) May be repwr'd after AC Pwr Transfer Cable connected
(EDO WCS) ● URINAL SEL – SEP 2 ● WCS PWR SEL – OFF 1, AUTO 2 ● URINE DIVERTER VLV – FAN SEP 2	Urine Fan 1 Urine Sep 1 Commode Fan 1 Controller MNA pwr Compactor MNA Cntl		(35) AV Bay 2 Fan ΔP, Air Out Temp snrs lost
(R2) ● BLR CNTLR/HTR 1 – A ● 3 – B	Hyd H2O Blr Cntrlr 1B 3A		(36) Use streamers (if flown) or monitor by feel during wake period if Cabin Air Sig Condr not recovered
(L1) ● HUM SEP A – OFF ● B – ON ● IMU FAN A – OFF ● B(C) – ON ● H2O PUMP LOOP 1 – ON, B ● H2O PUMP LOOP 2 – OFF ● AV BAY 1 FAN A – OFF ● ✓B – ON ● AV BAY 2 FAN (two) – ON ● AV BAY 3 FAN A – ON ● B – OFF ● FREON PUMP LOOP 1 – B ● 2 – A	Humidity Sep A IMU Fan A 32 H2O Loop 2 Byp Cntrlr, Sig 33 Condr H2O Loop 2 Byp Vlv pwr 2 Pump GPC Cntl 1 Pump A Av Bay 1 Fan A 34 Av Bay 2 Sig Condr, Xdcrs 35 (ECLS SC3) Av Bay 3 Fan B Freon Loop 1 Pump A 2 Pump B		(37) Not applicable for OV102 (38) AC1 Bus Isolation for AC Pwr Transfer Cable installation accomplished in MNA DA1 ACTIONS column. No additional bus isolation steps reqd
36 During sleep periods: ● CAB FAN (two) – ON	Cabin Air Sig Condr (ECLS SC6)		
37 (MO13Q) If Arlk/Tnl Fan active: ● ARLK FAN A – OFF ● B – ON	Arlk/Tnl Fan A		
38 BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(C2) ● CRT 1 PWR – OFF			
(F6) ● INST PWR – OFF			
(O6) ● STAR TRKR PWR –Z – OFF	–Z Star Trkr Dr OP capability Tracker		
(O8) ● RADAR ALTM 1 – OFF ● MLS 1 – OFF			
(Continued)	(Continued)		<div style="text-align: center; font-size: 2em; font-weight: bold;">NOM</div>

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

BUS ISOLATION		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM				
39	(O14:B) cb MNA ●OI SIG CONDR OF 1/4 A – op			③⑨ Redundant pwr source remains for equipment
39	●OI SIG CONDR OM 1/2 A – op			④⑩ H2O Loop 1 Intchgr Flow rate and IMU Fan ΔP snsr lost
39	●OI MDM OF 1/2 A – op			④① Cabin Smoke Detector remains
39	● 3/4 A – op	40 H2O Byp Loop 1 Snsr (ECLS SC11)		④② Current Snsr 2 remains
	●OI H2O BYP LOOP 1 SNSR – op	Fwd Mission Timer		④③ Cntr A remains
	●MNC CONTR – op	Aft Event Timer		④④ NWS 2 is still available
	●MSN TIMER FWD – op			④⑤ Six vlvs fail to non-isolation position
	●EVENT TIMER AFT – op			

41	(O14:C) cb MNA ●TACAN 1 – op	41 Tacan 1		
	●SMOKE DETN L/R FLT DK – op	L,R Flt Dk Smoke Detectors		
	●SMOKE DETN BAY 2A/3B – op	Av Bay 2 Smoke Detector A		
	●FIRE SUPPR BAY 3 – op	Av Bay 3A Smoke Detector B		
	●UTIL PWR O19/MO52J – op	MNA Utility pwr		
	●FLOOD L CNSL – op	L Console Floodt		
	●ANNUN FWD ACA 1 – op			
	●cb MNA CRYO O2 HTR TK1 SNSR 1 – op	42 Cryo O2 Tk1 Htr Current Snsr 1		
	●cb RAD ISOL CONTR – op	Auto radiator isolation function		

43	(O14:D) cb MNA ●FREON RAD CNTLR 1 – op			
43	●FREON RAD CNTLR 2 – op			
	●GPS PRE AMPL UC – op			
	● LC – op			
	●N2 SPLY 1 – op			
	●O2/N2 CNTLR 1 – op			
	●O2 XOVR 1 – op			
	●N2 REG INLET 1 – op			
	●CAB VENT – op	Cabin Vent Vlv		
	● VENT ISOL – op	Vent Isol		

39	(O14:E) cb MNA ●RDR ALTM 1 – op			
39	●MLS 1 – op	ADTA 1		
	●ADTA 1 – op	AA 1		
	●S TRK –Z – op			
	●ACCEL 1 – op			
39	●DDU L – op			
39	● AFT – op			
	●INST L/CTR – op			
44	●NWS – op	NWS 1		

	(O14:F) ●MMU 1 – OFF			
		45 ATVC 2 Isol ME		
	(R11U) ●FC PURGE VLV 1 – CL	FC1 Startup Htr Inh capability		
	●FC STARTUP HTR 1 – ENA			
	OV102 only (R14:A) cb MNA ●AUD MS/OS – op	OV102 only MS ATU OS SU ATU MIDDECK CCU ATU		
	● MIDDECK CCU – op			
	(Continued)	(Continued)		NOM

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			
All except OV102 (R14:A) • cb MNA AUD MS/OS – op	All except OV102 MS ATU OS SU		③9 Redundant pwr source remains for equipment
All Vehicle (R14:B) cb MNA cb PALLET/DSC • 1A/2B – op (EDO) • 3A – op (EDO) • UHF – op • GCILC – op • CNTL BUS BC1/2/3 – op	All Vehicle 46 UHF Spix Pwr Amp 47 GCIL MNA pwr MNA pwr for Cntl BC1,2,3 Buses		④6 Capability to xmit to gnd from UHF degraded ④7 GCIL also pwr'd via MNC cb ④8 MNB pwr may be selected via TV pwr sw (pnl A7) or GCIL if reqd
(R14:D) cb MNA • TV C AFT BAY CAMR/ PAN-TILT – op • TV C AFT BAY CAMR HTR – op • TV C AFT BAY PAN-TILT HTR – op • TV CONTR UNIT – op • MON 1 – op	TV C Aft Bay Camr and Pan-Tilt TV C Aft Bay Camr Htr TV C Aft Bay Camr Pan-Tilt Htr 48 Video Cntl Unit MNA pwr CTVM 1		④9 All docking mechanisms will have single mtr times ⑤0 Logic buses 1(3) remain pwr'd via MNB(MNC)
(R14:E) cb MNA • PS FLOOD – op • TV D STBD RMS TV CAMR/ PAN-TILT – op • TV D STBD RMS TV CAMR HTR – op • TV D STBD RMS TV PAN-TILT HTR – op	PS Floodlt TV D STBD RMS Camr and PAN-TILT TV D STBD RMS Camr Htr TV D STBD RMS Camr PAN-TILT Htr		
(A7U) PL BAY • FLOOD AFT STBD – OFF • FWD PORT – OFF • DOCKING – OFF • RMS SPOT PORT – OFF	PLB Aft Stbd Floodlt Fwd Port Floodlt Docking Floodlt Port RMS Spot It		
(A7L) IF DOCKING MISSION • cb DEP MNA SYS 1 VENT ISOL – op • cb DEP MNA SYS 1 VENT – op	Vest Dep Vlv Sys 1 Vent Vent Isol		
(A7L) IF DOCKING MISSION cb DOCK LT MNA • TRUSS FWD – op • VEST PORT – op • SYS PWR SYS 1 MNA – OFF • PSU PWR MNA – OFF cb MNA • LOGIC 1 – op • 3 – op • PYRO PWR MNA – OFF LIGHTS • AIRLK 1/4 MNA – OFF	MNA A7 Fwd Truss Docking It Port Vestibule Docking It DSP SYS 1 Pwr PSU MNA Pwr 49 50 MNA pwr to DSP Logic buses 1,3 MNA Pyro System External Airlock Its 1,4	DSP SYS PWR SYS 1 tb – OFF	
(A7L) MADS • STRAIN GAGE – OFF • W/B/ACIP PCM – OFF	MADS W/B FDM, WBSC, SGSC, ACIP PCM		
(Continued)	(Continued)		NOM

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			<div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-bottom: 5px;">11</div> Vlv holds position
(MA73C:A,B) MCA LOGIC MNA • FWD 1 – OFF • AFT 1 – OFF • MID 1,3 (two) – OFF	MNA FMC1 Bus pwr AMC1 Bus pwr MMC1 Bus pwr MMC3 Bus pwr		<div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-bottom: 5px;">18</div> Htr B remains <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-bottom: 5px;">42</div> Current Snsr 2 remains <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-bottom: 5px;">51</div> Snsr 2 remains <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-bottom: 5px;">52</div>
(ML86B:A) • cb MNA H2O LINE HTR A – op • cb MNA SUPPLY H2O TKA INLET – OP • cb MNA SUPPLY H2O TKB OUTLET – OP • cb MNA WASTE H2O DUMP VLV/NOZ HTR – OP	11 Sply H2O TKA Inlet Vlv Cntl		
(ML86B:B) • cb MNA WASTE H2O TK1 VLV – op • cb MNA SPLY H2O TKD OUTLET – op • cb MNA WASTE H2O DUMP ISOL – op • cb MNA VAC VENT ISOL VLV – op • cb MNA WCS CNTLR – op • cb MNA GALLEY OVEN – op	11 Sply H2O TKB Outlet Vlv Cntl 11 Waste H2O TK1 Inlet Vlv Cntl 11 Sply H2O TKD Outlet Vlv Cntl 11 Waste H2O Dump Isol Cntl		<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;">CAUTION</div> No purge. Wait 10 min between burns <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-bottom: 5px;">53</div> Unable to confirm redundant coils <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-bottom: 5px;">54</div> Redundant coils remain <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-bottom: 5px;">55</div> ✓MCC for OMS Qtys. Aft Qtys are frozen on
(ML86B:D) cb MNA MMU • PORT/STBD HTR A (two) – op • GN2 SPLY ISOL VLV A – op	18 MMU Port,Stbd Htr A 11 MMU GN2 Sply Isol Vlv A		<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px; text-align: center;">GNC SYS SUMM 2</div>
(ML86B:E) cb MNA EMU 2 H2O • SPLY – op • WASTE – op cb MNA FLOOD • TNL ADAPT 2 – op	TA Floodlt 2		
(ML86B:F) cb MNA FLOODS • MIDDECK 1/8 – op • WMC/MO13Q – op • AIRLK 1 – op cb MNA CRYO • O2 HTR TK3 SNSR 1 – op • O2 HTR TK5 SNSR 1 – op (OV104, OV105)	Middeck floodlts 1,8 WMC Floodlt, MO13Q pnl 2 Airlk Floodlt 1 42 Cryo O2 Tk3 Htr Current Snsr 1 (OV104, OV105) Cryo O2 Tk5 Htr Current Snsr 1		
(A15:H,I,J,K) • cb MNA TK6-TK9 O2 HTR SNSR 1 – op	51 Cryo O2 Tk 6-9 Htr Current Snsr 1		
	CDR HUD Port,Stbd Rad Dpy/Sto Mtr 1 Port,Stbd Rad Lat 1-6, 7-12 Mtrs 1 Fwd RCS Jet 1 Htrs 52 L OMS Purge Vlv 1,2 53 L OMS Eng Pr Vlv Coil 1 54 L OMS Cntl Vlv 1,2 Coils 1 54 R OMS Eng Pr Vlv Coil 2 and Cntl Vlv 1,2 Coils 2 55 OMS Qty Gaging (Continued)		<div style="font-size: 2em; font-weight: bold; margin-top: 20px;">NOM</div>

EPS SSR-10 (Cont)
BUS LOSS: MNA DA1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	56 APU 1 Cntrl Pwr Sply A 57 1 Fu Tk Vlv A 1 GBX GN2 Repress Vlv 58 3 Cntrl Pwr Sply B 57 3 Fu Tk Vlv B	Ctr MPS He reg A < 680 during entry (MM303)	(6) Vlv holds position. N2 Sys 2 remains
	Hyd Rsvr 1 Qty Snsr TVC Hyd Sys 1 Isol Cntl 11 Hyd Brake Isol Vlv 1 Cntl 59 LG Extend Isol Vlv 59 Vlv 1 60 NWS Hyd Sys 1		(11) Vlv holds position (20) Vlv holds position. May have to interface EMU 2 with SCU 1 to provide total H2O servicing/recharge
	-Y Star Trkr Dr Sys 1 OP/CL capability LH Vents 5,6,8,9 Mtrs 1 RH Vents 1,2,3,5,6 Mtrs 1 61 L ADP Deploy Mtr 1 62 Htr Cntrl 1		(56) Pwr Sply B remains. GG Bed T and GBX P ind lost when APU running
	63 Hyd Main Pump 1 Depress Solenoid RPC A 63 Hyd Main Pump 3 Depress Solenoid RPC B		(57) Vlv fails closed. Redundant vlv remains
	6 Atm Press Cntl O2 Sys 1 Sply Vlv Cntl 20 EMU 2 Sply and Waste H2O Vlv Cntl 64 EMU 1,2 Pwr/Batt Chgr MNA pwr		(58) Pwr Sply A remains. Turbine speed ind lost
	PL Reten Sys A Rel/Lat Mtrs		(59) Loss of Hyd Sys 1 deploy capability for all Ldg Gear. Pyro backup release sys will deploy Ldg Gear. NLG can also be deployed by Hyd Sys 2
	MPS: 65 Ctr Eng He Intercon Outlet Vlv 57 Ctr Eng He Isol A 57 Pneu He Isol 1 66 He Sply Blowdn Vlv 1,2 MPS Meters 67 Prplt F/D Inbd LH2 Vlv		(60) Hyd Sys 2 still available for NWS
	68 ET Door Mtrs: C/L Lat Actr 1 Mtr 1 2 Mtr 1 L Dr Closure Mtr 1 Uplock Lat Mtr 1		(61) Mtr 2 remains
	69 Ku-Bd Jettison Sys A		(62) Htr Cntrl 2 remains
	Tacan 1		(63) Redundant RPC remains
	70 Freon Loop 1,2 Cntrl B Rad Byp Vlv Mtrs		(64) MNB pwr select capability remains
	Ops Hyd Actr Instr		(65) Vlv fails closed
			(66) Vlv fails closed. Aft compartment, OMS pods, ET umbilical cavity will not be purged during entry (MM304) (67) Vlv holds position. Loss of manual capability to inert LH2 Manf (68) Redundant mtrs remain (69) Sys B remains (70) Bypass vlv holds position and Cntrl A Rad Byp Vlv Mtr remains

NOM

EPS SSR-11

BUS LOSS: MNA FPC1

(Includes MNA FLC1, MNA FMC1, AC1)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1</p> <ul style="list-style-type: none"> Perform FC1 SHUTDN (FC SHUTDN Cue Card), pwrdn not needed, then: <p>(R1)</p> <ul style="list-style-type: none"> cb AC CONTR AC1 (three) - cl INV/AC BUS 1 - OFF (tb-OFF) INV PWR 1 - OFF (tb-OFF) cb AC CONTR AC1 (three) - op 	<p>2</p> <p>FC1 Pumps & pH Snsr</p> <p>AC1 ΦA, ΦB, ΦC Inverters</p>	<p>MASTER ALARM Light/Tone - on CRT 1 blanks</p> <p>(F7) C/W FC PUMP It - on C/W AC VOLT It - on C/W FREON LOOP It - on C/W AV BAY/CAB AIR It - on C/W H2O LOOP It - on SM ALERT Light/Tone - on EVENT TIMER ind - blank</p>	<p>①</p> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> TIME CRITICAL </div> <p>FC1 must be shutdn within 9 min to avoid potentially hazardous condition</p> <p>② Will be repwr after AC Pwr Transfer Cable connected</p>
<p>3</p> <ul style="list-style-type: none"> Maintain LiOH canister(s) changeout per cue card and FLIGHT PLAN 		<p>(F9) AC1 ΦA,ΦB,ΦC AC volts < 90</p>	<p>③ Crew and gnd have lost PPO2 Xdcr if Cabin Air Sig Condr not recovered</p>
<p>4</p> <p>Refer to OMS/RCS Slide Rule for vlv loss info</p> <p>Reconfig following vlv(s) only if leak isolation reqd: (O8)</p> <ul style="list-style-type: none"> FWD RCS He PRESS A 	<p>5</p> <p>Fwd RCS He Press Isol A GPC Cntl and man CL capability RCS Manf F1 RJD Driver (F1F,F1L,F1U,F1D)</p>	<p>(LIGHTS LOST) Instr Its R (pnls C2, F8, F9) Pnl Its L/Ctr (pnls L1,L2,L4, C2,C3,F2,F6,F7) Pnl Its L/OH (pnls O5,O6, O7,O13,O14,O15) Numeric Its (pnls O3, F7) Orbit Sta Instr Its (pnls A1,A2)</p>	<p>④ Do not reconfig for reg switch or I'CNCT procedures</p> <p>⑤ Vlv holds position. Man OP capability remains. Isol B remains</p>
<p>(C2)</p> <ul style="list-style-type: none"> L CRT SEL - 3 GPC/CRT 01 EXEC 	<p>DEU/CRT 1</p>		
<p>6</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">SM 1 DPS UTILITY</div> <p>(G2,G8,S2) MMU ASSIGN</p> <ul style="list-style-type: none"> GNC - ITEM 1 EXEC SM - ITEM 4 EXEC PL - ITEM 6 EXEC 	<p>MMU 1</p>	<p>(FSMs) S67 FPC/FLC 1 S67 AC VOLTS 1 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T SM0 THRM HYD (B) S66 AV BAY 2 FAN S66 AV BAY 3 FAN S66 CABIN FAN S69 FC PUMP 1 S69 FC H2 PUMP 1 S88 FREON FLOW 2 S88 FRN AFT CP 2 S88 FRN PL HX 2 S88 H2O LOOP 2 FLOW S88 H2O LOOP 2 QTY S88 H2O LOOP 2 TEMP S88 H2O PUMP P2 I/O ERROR CRT 1 RM DLMA MANF</p>	<p>⑥ Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION prepositioning</p>
<p>(A14)</p> <ul style="list-style-type: none"> RCS/OMS HTR FWD RCS - B AUTO 	<p>Fwd RCS A Htrs (all)</p>		<p>⑦ Temp sensing lost</p>
<p>If EMU(s) in battery charge mode: (AW 18M)</p> <ul style="list-style-type: none"> PWR/BATT CHGR EMU 1(2) BUS SEL - MNB 	<p>EMU 1,2 Pwr/Batt Chgr MNA pwr</p>		<p>⑧ All brakes ON and safing initiated</p>
<p>7</p> <p>(A8L)</p> <ul style="list-style-type: none"> PORT RMS HTR A - AUTO PORT RMS HTR B - AUTO 	<p>8 Port RMS: MCIU 9 Mid MRL Mtr 1 9 Aft MRL Mtr 2 10 Shldr Brace Release 10 D&C Primary Ltg</p>	<p>(R1) FC1 COOL PUMP ΔP tb - bp</p>	<p>⑨ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists. May be repwr after AC Pwr Transfer Cable connected</p>
<p>Pre-seat ingress:</p> <ul style="list-style-type: none"> Discharge handheld fire ext into AV BAY 3 	<p>Av Bay 3 agent discharge capability</p>	<p>(F8) HYD QTY 1 ind - 0% APU H2O QTY 3 ind - 0%</p>	<p>⑩ May be repwr after AC Pwr Transfer Cable connected</p>
<p>If AC Pwr Transfer Cable to be installed to regain AC:</p> <ul style="list-style-type: none"> Go to EPS SSR-200; otherwise, continue with bus loss actions 		<p>(O1) FREON FLOW LOOP 1 ind - 578 pph AIR TEMP AV BAY 2 ind - 45 degF H2O PUMP OUT PRESS LOOP 2 ind - 0 psia</p>	<p>⑪ Vlv holds position</p>
		<p>(O3) RCS/OMS PRPLT QTY Gage and MSN TIMER ind - blank</p>	
		<p>(O8) Fwd RCS He PRESS A tb - bp TK ISOL 3/4/5 tb - bp MANF ISOL 1 tb - bp</p>	
<p>(Continued)</p>	<p>(Continued)</p>	<p>L ADP deploy time incr from 15 to 30 sec</p> <p>(Continued)</p>	

NOM

EPS SSR-11 (Cont)
BUS LOSS: MNA FPC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(EDO WCS) • URINAL SEL – SEP 2 • WCS PWR SEL – OFF 1, AUTO 2 • URINE DIVERTER VLV – FAN SEP 2	Urine Sep 1 Urine Fan 1 Commode Fan 1		(20) PEVs, Actuators, Bed A P, Bed B P, and Bed dP will be recovered after system reconfig
• Perform LOSS OF 1 FC (ORB PKT, PWRDN)			(21) AC1 Bus Isolation for AC Pwr Transfer Cable installation accomplished in MNA FPC1 ACTIONS column. No additional bus isolation steps reqd
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	20 CO2 Rmvl Sys Cntrlr 1		(22) Mtr 2 remains (23) Htr Cntrlr 2 remains
BUS ISOLATION			(24) Loss of Hyd Sys 1 deploy capability for all Ldg Gear. Pyro backup Release Sys will deploy Ldg Gear. NLG can also be deployed by Hyd Sys 2
ONLY ON MCC CALL, PERFORM			(25) Buses remain pwr'd
(C2) • CRT 1 PWR – OFF			(26) Redundant mtrs remain
(O14:C) • cb MNA FIRE SUPPR BAY 3 – op			(27) Hyd Sys 2 still available for NWS
(O14:F) • MMU 1 – OFF			(28) Bypass vlv holds position and Cntrlr A Rad Byp Vlv Mtr remains
(MA73C:A) • MCA LOGIC MNA FWD 1 – OFF	MNA FMC1 Bus pwr		
21	CDR HUD –Y Star Trkr Dr Sys 1 OP/CL capability L ADP Dpy Mtr 1 Htr Cntrlr 1	22 23	
24	RH Vents 1,2,3,5,6 Mtrs 1 LH Vents 5,6,8,9 Mtrs 1	24	
25	LG Extend Vlv 1	25	
26	MNA pwr to Cntl Buses AB1, AB2, AB3, CA1, CA2, CA3	26	
27	ET Door Mtrs: C/L Lat Actr 1 Mtr 1 Actr 2 Mtr 1 L Dr Closure Mtr 1 Uplock Lat Mtr 1	27	
28	NWS Hyd Sys 1	28	
29	Freon Loop 1,2 Cntrlr B Rad Byp Vlv Mtrs	29	
30	Port, Stbd Rad Lat 1–6, 7–12 Mtrs 1 Port, Stbd Rad Dpy/Sto Mtr 1	30	
31	PLBD: C/L Lat 1–4, 5–8, 9–12 Mtrs 1 Port, Stbd Fwd Blkhd Mtr 1 Port Aft Blkhd Mtr 1 Stbd Door Mtr 1	31	
32	PL Reten Sys A Rel/Lat Mtrs	32	
33			<p style="text-align: center;">NOM</p>

EPS SSR-12
BUS LOSS: MNA MPC1 (Includes MNA MMC1 & MNA MMC3)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1</p> <ul style="list-style-type: none"> Perform MNA BUS TIE (BUS TIE Cue Card) Monitor, record ΔAmps between FC1 and tied FC <p>(R1)</p> <ul style="list-style-type: none"> PL CAB – MNB <p>(A8L)</p> <ul style="list-style-type: none"> PORT RMS HTR A – OFF PORT RMS HTR B – AUTO <p>(L1)</p> <ul style="list-style-type: none"> TOP EVAP HTR DUCT – B <p>If Hi Load Evap enabled:</p> <ul style="list-style-type: none"> HI LOAD DUCT HTR – B (C) <p>(L2)</p> <p>FLASH EVAP FDLN HTR</p> <ul style="list-style-type: none"> A SPLY – 2 B SPLY – 1 <p>(R11U)</p> <p>FC H2O</p> <ul style="list-style-type: none"> LINE HTR – B AUTO RELIEF HTR – B AUTO <p>(MA73C:C,D)</p> <ul style="list-style-type: none"> cb MCA PWR AC1 3Φ MID 1,3 (two) – op <p>(ML86B:C)</p> <ul style="list-style-type: none"> cb MNB EXT ARLK HTR STRUC – cl <p>For PLBD ops:</p> <ul style="list-style-type: none"> OP/CL Drs in man mode 	<p>1 FC1 Purge Vlv O2,H2 Flow Xdcrs SS ΔV Snrs</p> <p>1</p> <p>3 MNA pwr to CABPL1,2,3 buses</p> <p>4 Port RMS: Primary pwr 5 Mid MRL Mtr 1 5 Aft MRL Mtr 2 Htr A</p> <p>Top Evap Duct Fwd,Aft Htrs A</p> <p>Hi Load Duct Outbd,Inbd Htrs A</p> <p>FES H2O Fdln A Mid 2 Htr 1 B Mid 2 Htr 2</p> <p>FC H2O Line Htrs A Relief Htrs A</p> <p>6 Port,Stbd Rad Lat 1–6,7–12 Mtrs 1 Limit sw</p> <p>7 Port,Stbd Rad Dpy/Sto Mtrs 2 Limit sw Port,Stbd Rad Dpy/Sto Mtrs 1</p> <p>8 Ext A/L Structural Htrs MNA pwr</p> <p>PLBD: C/L Lat 1–4,5–8,9–12 Mtrs 1 Port,Stbd Fwd Blkhd Lat Mtrs 1 Port Aft Blkhd Lat Mtr 1 Stbd Door Mtr 1 Port Door Mtr 2 CL Limit sw</p> <p>9 FC1 Startup Htr Inh capability</p> <p>PLB Aft Stbd Floodlt Fwd Port Floodlt Docking Floodlt Port RMS Spottt</p> <p>Vest Dep Vlv Sys 1 Vent Vent Isol</p> <p>(Continued)</p>	<p>(L2)</p> <p>2 O2 SYS 1 SPLY tb – CL</p> <p>(R13L)</p> <p>RAD CNTL STBD tb – bp PORT tb – bp</p> <p>(A8L)</p> <p>PORT RMS: DPY/STO tb – bp RETEN LAT tb – bp R–F–L MID tb – bp</p> <p>SM 94 PDRS CONTROL</p> <p>Indications lost: Mid MRL Mtr 1 LAT/REL/RDY Aft MRL Mtr 2 LAT/REL/RDY</p> <p>PLB Floodlts lost: Fwd Port Aft Stbd Docking</p> <p>SM (BFS,SM) 63 PL BAY DOORS</p> <p>If in <u>AUTO</u> OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'</p> <p>----- During <u>MAN</u> PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	<p>① Buses are tied due to: <u>Loss of FC1 Purge capability.</u> As FC1 loses performance, tied FC will pick up load, slowing FC1 degradation. If degradation projection does not allow nominal EOM, FC1 will be shutdn. ✓MCC; and <u>Loss of FC1 SS ΔV Snrs.</u> Change in ΔAmps >12 amps indicates possible cell crossover problem. ΔAmps shift due to loss of FC1 Purge capability is indicated by change in ΔAmps between pre and post purge readings. MCC will aid in this determination</p> <p>② Vlv holds position. Sys 2 remains</p> <p>③ Pwrs PL Timing Buffer and OIU 1. OIU 1 redundant pwr MNB MPC2 via CAB PL3</p> <p>④ B/U pwr remains for RMS ops. All brakes ON and safing initiated</p> <p>⑤ Single mtr time. One failure away from loss of two out of three MRLs. EVA or jettison capability exists</p> <p>⑥ If AC1 MMC1 and MMC3 cbs not opened, Lat Mtrs 1 of actuators for Port and Stbd Rad Lat 1–6, 7–12 continue to run until Sys A Lat Cntl sw placed to OFF</p> <p>⑦ Mtrs 2 will continue to drive until Sys A,B Cntl sw are taken to OFF</p> <p>⑧ MNB htrs remain</p> <p>⑨ FC1 Startup Htr is disconnected</p> <p>NOM</p>
<p>BUS ISOLATION</p> <p><u>ONLY ON MCC CALL, PERFORM</u></p> <p>(R11U)</p> <ul style="list-style-type: none"> FC PURGE VLV 1 – CL FC STARTUP HTR 1 – ENA <p>(A7U)</p> <p>PL BAY FLOOD</p> <ul style="list-style-type: none"> AFT STBD – OFF FWD PORT – OFF DOCKING – OFF RMS SPOT PORT – OFF <p>(A7L)</p> <p>IF DOCKING MISSION</p> <ul style="list-style-type: none"> cb DEP MNA SYS 1 VENT ISOL – op cb DEP MNA SYS 1 VENT – op <p>(Continued)</p>	<p>(Continued)</p>		

EPS SSR-12 (Cont)
BUS LOSS: MNA MPC1

(Includes MNA MMC1 & MNA MMC3)

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A7L) IF DOCKING MISSION cb DOCK LT MNA • TRUSS FWD – op • VEST PORT – op • SYS PWR SYS 1 MNA – OFF • PSU PWR MNA – OFF cb MNA • LOGIC 1 – op • 3 – op • PYRO PWR MNA – OFF LIGHTS • AIRLK 1/4 MNA – OFF	MNA A7 Fwd Truss Docking It Port Vestibule Docking It DSP SYS 1 Pwr PSU MNA Pwr	DSP SYS PWR SYS 1 tb – OFF	<p>② Vlv holds position. Sys 2 remains</p> <p>⑧ MNB htrs remain</p> <p>⑩ All docking mechanisms will have single mtr times</p> <p>⑪ Logic buses 1(3) remain pwrd via MNB(MNC)</p> <p>⑫ Buses remain pwrd</p> <p>⑬ Cntrlrs A,B Rad Byp Vlv mtrs auto cntl and Cntrl A Rad Byp Vlv mtr remain</p> <p>⑭ Snr 2 remains</p> <p>⑮ Lost capability to observe and record FC single cell voltages</p>
(A7L) MADS • STRAIN GAGE – OFF • WB/ACIP PCM – OFF	MADS W/B FDM, WBSC, SGSC, ACIP PCM		
(MA73C:A,B) • MCA LOGIC MNA MID 1,3 (two) – OFF	MNA MMC1 and MNA MMC3 Bus pwr		
	12 MNA pwr to ESS2CA and ESS3AB AUXPLA Bus Pwr		
	13 Freon Loop 1,2 Cntrl B Rad Byp Vlv Mtrs Man Cntl 2 ATM Press Cntl O2 Sys 1 Sply Vlv Cntl		
	Port Rad Dpy/Sto Mtr 1 Stbd Rad Dpy/Sto Mtr 1 LH Vents 5,6 Mtrs 1 RH Vents 3,5,6 Mtrs 1		
(A15:H,I,J,K) • cb MNA TK6-TK9 O2 HTR SNSR 1 – op	14 Cryo O2 Tk 6-9 Htr Current Snr 1		
	FC3 Redundant Reac Vlv Close Cntl on pnl C3		
(ML86B:C) 8 • cb MNA EXT ARLK HTR STRUC – op	8 Ext A/L Structural Htrs MNA pwr		
(ML86B:D) • cb MNA FC PCM – op	15 FCMS		

NOM

3EPS SSR-13 BUS LOSS: MNA APC1

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
	For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS)	2	RCS Manf L5 RJD pwr (L5L,L5D)	1	MASTER ALARM Light/Tone – on	①	Indications do <u>not</u> appear until jet commanded
	Refer to OMS/ RCS Slide Rule for vlv loss info (use APC 4 Slide for Aft RCS)	3	Aft L,R RCS He Pr Isol A GPC Cntl and Man CL capability	(F7)	C/W RCS JET It – on	②	Manf status <u>not</u> automatically declared closed. Fail-offs will occur when jets commanded
	GNC 23 RCS			(FSM)	L RCS D(L) JET	③	Vlv holds position. Man OP capability remains
4	DES INH on L Manf 3 Jets: • ITEM 2 EXEC • L3L ITEM 12 EXEC (*) • L3D ITEM 28 EXEC (*) • L3A ITEM 30 EXEC (*) Set aft pod(s) PRI JET FAIL LIMIT to 6				If OMS GMBL cmd abs value > 2 deg: C/W OMS TVC It 'L OMS GMBL' (3,B)	④	Maintains control capability for APC6 failure
5	Reconfig following vlv(s) only if leak isolation reqd: (O7) • AFT L RCS He PRESS A,B • R RCS He PRESS A	6	Aft L RCS He Pr Isol B Man OP capability		If OMS GMBL cmd abs value > 2 deg and Sec TVC selected: C/W OMS TVC It 'R OMS GMBL' (3,B)	⑤	Do not reconfig for reg switch or I'CNCT procedures
	(A12) APU HTR TK/FU LINE/H2O • SYS 1A – OFF • 1B – AUTO • 3A – AUTO • 3B – OFF HYD HTR • RUD SPD BK A – OFF • B – AUTO		APU 1 Inj H2O Htrs A APU 3 GG Inj H2O Htrs B Rud/Spd Brake Htr A			⑥	Vlv holds position. Man CL and full GPC cntl remain
	(A14) RCS/OMS HTRS • L POD (two) – A OFF, B AUTO • R POD (two) – B OFF, A AUTO • OMS CRSFD LINES (two) – A OFF, B AUTO	7	L Pod A Htrs (all)			⑦	Htr B remains
		8	R Pod B Htrs (partial)			⑧	Htr A remains
		7	OMS Crsfd Ln A Htrs (all)			⑨	Lost TM: GNC SYS SUMM 2 L,R OMS ENG BALL VLV 1: Assume Vlv 1 status same as Vlv 2
9	Prior to using L(R) OMS: (O8)	10	L,R OMS He Pr A GPC Cntl			⑩	Vlv fails closed. Man cntl remains. Redundant Isols remain
11	L(R) OMS He PRESS/VAP • ISOL A – OP • B – GPC	10	L,R OMS He Vap Isol 1 GPC Cntl			⑪	Maintains He Isol redundancy
	GNC XXXXX MNVR YYYYY (3,B)						
	Sel L OMS SEC TVC: • L OMS GMBL SEC – ITEM 30 EXEC		L OMS Pri TVC				
	Sel R OMS PRI TVC: • R OMS GMBL PRI – ITEM 29 EXEC		R OMS Sec TVC				
BUS ISOLATION							
ONLY ON MCC CALL, PERFORM							
NONE							
						NOM	

EPS SSR-14
BUS LOSS: MNA APC4 (Includes MNA APC1, MNA ALC1, MNA AMC1)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A12)</p> <p>APU HTR GAS GEN/FUEL</p> <ul style="list-style-type: none"> • PUMP 1 – B AUTO • 3 – A AUTO <p>APU HTR</p> <ul style="list-style-type: none"> • LUBE OIL LINE 1 – B AUTO • LUBE OIL LINE 3 – A AUTO <p>APU HTR TK/FU LINE/H2O</p> <ul style="list-style-type: none"> • SYS 1A – OFF • 1B – AUTO • 3A – AUTO • 3B – OFF <p>HYD HTR</p> <ul style="list-style-type: none"> • RUD SPD BK A – OFF • BK B – AUTO • BDY FLP A – OFF • B – AUTO • ELEVON A – OFF • B – AUTO <p>HYD CIRC PUMP</p> <ul style="list-style-type: none"> • PWR 1 – MNB • 3 – MNC 	<p>APU 1 GG/Fu Pump Htrs A 3 GG/Fu Pump Htrs B</p> <p>APU 1 Lube Oil Line Htr A</p> <p>APU 3 Lube Oil Line Htr B</p> <p>APU 1 Tk/Fu Ln Htrs A</p> <p>APU 1 Inj H2O Htrs A 3 Tk/Fu Ln Htrs B</p> <p>Rud/Spd Brake Htr A</p> <p>Body Flap Htr A</p> <p>Elevon Actr Htrs A</p> <p>Circ Pump 1 MNA pwr 3 MNA pwr</p>	<p>1 MASTER ALARM Light/Tone – on</p> <p>(F7) C/W RCS JET It – on SM ALERT Light/Tone – on</p> <p>(FSMs) L RCS D(L) JET</p> <p>(R4) 3 HYD BRAKE ISOL VLV 1 tb – OP</p> <p>4 LG EXTEND ISOL VLV tb – OP</p> <p>3 HYD MPS/TVC ISOL VLV SYS 1 tb – CL</p> <p>(O7) AFT L RCS He PRESS A tb – bp</p> <p>5 AFT R RCS He PRESS A tb – bp</p> <p>6 AFT L,R RCS TK ISOL 3/4/5A tb – bp (if vlv in CL position)</p> <p>(F7) If APUs active, and using BLR CNTLR/HTR 1B or 3A: C/W APU TEMP It – on after ~2 min</p> <p>If OMS GMBL cmd abs value > 2 deg: C/W OMS TVC It L OMS GMBL (3,B)</p> <p>If OMS GMBL cmd abs value > 2 deg and TVC selected: C/W OMS TVC It R OMS GMBL (3,B)</p> <p>If cooling by FES B only: C/W FREON LOOP It 'S88 EVAP OUT T1' 'S88 EVAP OUT T2'</p>	<p>① Indications do <u>not</u> appear until jet commanded</p> <p>② * TIME CRITICAL *</p> <p>If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p> <p>③ Vlv holds position</p> <p>④ Vlv holds position. Loss of Hyd Sys 1 deploy capability for all Ldg Gear. Pyro backup release sys will deploy Ldg Gear. NLG can also be deployed by Hyd Sys 2</p> <p>⑤ Vlv holds position. Man OP capability remains</p> <p>⑥ Full vlv capability remains. If switch in CL, vlv will continuously drive to CL position</p> <p>⑦ Manf status <u>not</u> automatically declared closed. Fail-offs will occur when jet commanded</p> <p>⑧ Htr B remains</p> <p>⑨ Htr A remains</p> <p>⑩ Do not reconfig for reg switch or I'CNCT procedures</p> <p>⑪ Vlv holds position. Man CL, full GPC Cntl remains</p>
<p>(L1)</p> <ul style="list-style-type: none"> • FLASH EVAP CNTLR PRI A(SEC) – ON (if reqd) • TOP EVAP HTR NOZ L – B AUTO • TOP EVAP HTR DUCT – B <p>If Hi Load Evap enabled:</p> <ul style="list-style-type: none"> • HI LOAD DUCT HTR – B (C) 	<p>FES Pri B Cntlr</p> <p>Top Evap L Noz Htr A</p> <p>Top Evap Duct L,R Htrs A</p> <p>Hi Load Duct Noz Htr A</p>		
<p>(L2)</p> <p>FLASH EVAP FDLN</p> <ul style="list-style-type: none"> • HTR A SPLY – 2 • B SPLY – 1 	<p>FES H2O Fdln A Htrs 1 (all except MID 2)</p> <p>FES H2O Fdln B Htrs 2 (all except MID 2)</p>		
<p>(R2)</p> <ul style="list-style-type: none"> • BLR CNTLR/HTR 1 – A • 3 – B 	<p>Hyd H2O Blr 1 Cntlr B 3 Cntlr A</p>		
<ul style="list-style-type: none"> • For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS) 	<p>7 RCS Manf L5 RJD pwr (L5L,L5D)</p>		
<p>(A14)</p> <p>RCS/OMS HTR</p> <ul style="list-style-type: none"> • L POD (two) – A OFF, B AUTO • R POD (two) – B OFF, A AUTO • OMS CRSFD LINES (two) – A OFF, B AUTO 	<p>8 L Pod A Htrs (all)</p> <p>9 R Pod B Htrs (partial)</p> <p>8 OMS Crsfd Ln A Htrs (all)</p>		
<p>Refer to OMS/RCS Slide Rule for vlv loss info</p> <p>10 Reconfig following vlv(s) only if leak isolation reqd:</p> <p>(O7)</p> <ul style="list-style-type: none"> • AFT L RCS He PRESS A,B • R RCS He PRESS A 	<p>5 Aft L,R RCS He Pr Isol A GPC Cntl and man CL capability</p> <p>11 Aft L RCS He Pr Isol B man OP capability</p>		
<p>If ICNCT config:</p> <p>(O7)</p> <ul style="list-style-type: none"> • AFT L RCS TK ISOL 3/4/5 A – GPC (tb-bp) • AFT R RCS TK ISOL 3/4/5 A – GPC (tb-bp) 	<p>AFT L,R RCS TK ISOL 3/4/5 A CL microswitch feedback</p>		
(Continued)	(Continued)		

EPS SSR-14 (Cont)
BUS LOSS: MNA APC4

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
12	<p>GNC 23 RCS</p> <ul style="list-style-type: none"> Reprioritize L,R Manf 2 Jets to first priority: DES INH twice all other jets, highest priority first, then next highest, etc <p>DES INH on L Manf 3 Jets:</p> <ul style="list-style-type: none"> ITEM 2 EXEC L3L ITEM 12 EXEC (*) L3D ITEM 28 EXEC (*) L3A ITEM 30 EXEC (*) Set aft pod(s) PRI JET FAIL LIMIT to 6 	Aft RCS L,R Jet 2 Htrs		<p>12 Maintains control capability for APC3 failure</p> <p>13 Lost TM:</p> <p>GNC SYS SUMM 2</p> <p>L OMS N2 P VLV: If Eng – ARM/PRESS, assume vlv OP L,R OMS ENG VLV 1: Assume Vlv 1 status same as Vlv 2</p>
13	<ul style="list-style-type: none"> Save L OMS eng for deorbit (If reqd for additional on-orbit burns, ✓MCC) <p>(O8)</p> <ul style="list-style-type: none"> If Straight feed config, L OMS Crossfeed B – OP (tb-OP). Otherwise, ✓MCC 	<p>13 L OMS GN2 Press Vlv OP TM</p> <p>14 Eng Pr Vlv Coil 1</p>		<p>14 Unable to confirm redundant coils</p>
17	<p>Prior to using L(R) OMS: (O8)</p> <p>L(R) OMS He PRESS/VAP</p> <ul style="list-style-type: none"> ISOL A – OP B – GPC 	<p>16 L,R OMS He Pr Isol A GPC Cntl</p> <p>16 L,R OMS He Vap Isol 1 GPC Cntl</p> <p>18 L OMS Eng Cntl Vlv 1,2 Coils 1</p> <p>18 R OMS Eng Pr Vlv Coil 2 and Cntl Vlv 1,2 Coils 2</p> <p>19 L OMS Purge Vlv 1,2</p> <p>20 OMS Qty Gage</p>		<p>15 Maintains deorbit capability for MNB DA2 failure</p> <p>16 Vlv fails closed. Man cntl remains. Redundant Isols remain</p> <p>17 Maintains He Isol redundancy</p> <p>18 Redundant coils remain</p> <p>19</p>
	<p>GNC XXXXX (3,B) MNVR YYYYY</p> <p>Sel L OMS SEC TVC:</p> <ul style="list-style-type: none"> L OMS GMBL SEC – ITEM 30 EXEC <p>Sel R OMS PRI TVC:</p> <ul style="list-style-type: none"> R OMS GMBL PRI – ITEM 29 EXEC 	<p>L OMS Pri TVC</p> <p>R OMS Sec TVC</p>		<p>CAUTION</p> <p>No purge. Wait 10 min between burns</p> <p>20 ✓MCC for OMS Qtys. Disregard qtys on meter and</p> <p>GNC SYS SUMM 2</p>
	<p>If reqd during entry (< 120K ft): (L1)</p> <ul style="list-style-type: none"> NH3 CNTLR B – PRI/GPC <p>If NH3 CNTLR A(B) – SEC/ON reqd, then: (L1)</p> <ul style="list-style-type: none"> H2O PUMP LOOP 1,2 (two) – ON ✓FLOW PROP VLV LOOP 1,2 (two) – ICH Activate PL H2O LOOP(s) (if applicable) 	<p>21 NH3 Sys A Pri Cntrl and Auto Sw over to Sec Cntrl</p>		<p>21 Sys A Sec Cntrl man on capability remains</p> <p>22 Pwr Sply B remains. GG Bed T and GBX P ind lost when APU running</p> <p>23 Vlv B remains</p> <p>24 Pwr Sply A remains. Turbine speed ind lost</p> <p>25 Vlv A remains</p>
<p>BUS ISOLATION</p> <p>ONLY ON MCC CALL, PERFORM</p> <p>(MA73C:B)</p> <ul style="list-style-type: none"> MCA LOGIC MNA AFT 1 – OFF 				
		<p>MNA AMC1 Bus pwr LH Vent 8,9 Mtr 1</p>		
		<p>22 APU 1 Cntrl pwr Sply A</p> <p>23 1 Fu Tk Vlv A</p> <p>24 1 GBX GN2 Repress Vlv</p> <p>25 3 Cntrl pwr Sply B</p> <p>3 Fu Tk Vlv B</p>		
		(Continued)		

**EPS SSR-15
BUS LOSS: MNA FLC1**

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
2	Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O8) ● FWD RCS He PRESS A	1	Fwd RCS He Press Isol GPC CNTL and MAN CL capability		MASTER ALARM Light/Tone – on		① Vlv holds position. Man OP capability remains ② Do not reconfig for reg switch or I'CNCT procedures ③ Indications do not appear until jet commanded ④ Manf status <i>not</i> automatically declared closed. Jet fail-offs may occur ⑤ Htr Cntrl 2 remains
4	GNC 23 RCS		RCS Manf F1 RJD pwr (F1F,F1L,F1U,F1D)	3	(F7) C/W RCS JET lt – on		
	Override F1 Manf status to CL: ● RCS FWD – ITEM 1 EXEC ● MANF VLVS 1 OVRD – ITEM 40 EXEC		Av Bay 3 agent discharge capability	3	(FSM) F RCS D(F,L,U) JET		
	Pre-seat ingress for entry: ● Discharge handheld fire ext into AV BAY 3			1	(O8) FWD RCS He PRESS A tb – bp		
	BUS ISOLATION ONLY ON MCC CALL, PERFORM (O14:C) ● cb MNA FIRE SUPPR BAY 3 – op	5	L ADP Htr Cntrl 1				

**EPS SSR-16
BUS LOSS: MNA ALC1**

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
2	(A12) APU HTR ● GAS GEN/FUEL PUMP 1 – B AUTO	APU 1 GG/Fu Pump Htrs A	1 MASTER ALARM Light/Tone – on	<p>① Indications do <u>not</u> appear until jet commanded</p> <p>②</p> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> * TIME CRITICAL * </div> <p>If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p> <p>③ Vlv holds position</p> <p>④ Vlv holds position. Man OP capability remains</p> <p>⑤ Full vlv capability remains. If switch in CL, vlv will continuously drive to CL position</p> <p>⑥ HYD H2O Blr and Tk Htrs still operative, but GN2 SOV fails open and steam vent htr and spray logic are disabled. Alternate controller must be selected</p> <p>⑦ Manf status <u>not</u> automatically declared closed. Fail-offs will occur when jet commanded</p> <p>⑧ Do not reconfig for reg switch or I'CNCT procedures</p> <p>⑨ Vlv holds position. Man CL and full GPC Cntl remain</p>
2	● GAS GEN/FUEL PUMP 3 – A AUTO	APU 3 GG/FU Pump Htrs B	3 (R4) HYD BRAKE ISOL VLV 1 tb – OP	
2	● LUBE OIL LINE 1 – B AUTO	APU 1 Lube Oil Line Htrs A	3 HYD MPS/TVC ISOL VLV SYS 1 tb – CL	
2	● LUBE OIL LINE 3 – A AUTO	APU 3 Lube Oil Line Htrs B	(O7) 4 AFT L RCS He PRESS A tb – bp	
2	APU HTR TK/FU LINE/H2O	APU 1 Tk/Fu Ln Htrs A 3 Tk/Fu Ln Htrs B	4 AFT R RCS He PRESS A tb – bp	
2	● SYS 1A – OFF		9 AFT L,R RCS TK ISOL 3/4/5A tb (two) – bp (if vlv in CL position)	
2	● 1B – AUTO		If cooling by FES only using PRI B CNTLR: C/W FREON LOOP It – on 'S88 EVAP OUT T1' 'S88 EVAP OUT T2'	
2	● 3A – AUTO		(F7) If APUs active and using BLR CNTLR/HTR 1B or 3A: C/W APU TEMP It – on after ~ 2 min	
2	● 3B – OFF		(F7) C/W RCS JET It	
	HYD HTR	Rud/Spd Brake Htr A	(FSM) 1 L RCS D(L) JET	
	● RUD SPD BK A – OFF			
	● B – AUTO			
	● BDY FLP A – OFF	Body Flap Htr A		
	● B – AUTO			
	● ELEV A – OFF	Elevon Actr Htrs A		
	● B – AUTO			
	HYD CIRC PUMP	Circ Pump 1 MNA pwr 3 MNA pwr		
	● PWR 1 – MNB			
	● 3 – MNC			
	(L1)	FES Pri B Cntrl		
	● FLASH EVAP CNTLR PRI A(SEC) – ON (if reqd)	Top Evap L Noz Htr A		
	● TOP EVAP HTR NOZ L – B AUTO	Top Evap Duct L,R Htrs A		
	● TOP EVAP HTR DUCT – B	Hi Load Duct Noz Htr A		
	If Hi Load Evap enabled			
	● HI LOAD DUCT HTR – B (C)			
	(L2)	FES H2O Fdln A Htrs 1 (all except MID 2)		
	FLASH EVAP FDLN HTR	FES H2O Fdln B Htrs 2 (all except MID 2)		
	● A SPLY – 2			
	● B SPLY – 1			
	(R2)	6 Hyd H2O Blr 1 Cntrl B		
	● BLR CNTLR/HTR 1 – A	6 3 Cntrl A		
	● 3 – B			
	For attitude control:	7 RCS Manf L5 RJD pwr (L5L,L5D)		
	● Perform LOSS OF VERNIERS (ORB OPS, RCS)			
	(A14)	OMS Crsfd Ln A Htrs (partial)		
	RCS/OMS HTR OMS			
	● CRSFD LINES (two) – A OFF, B AUTO			
8	Refer to OMS/RCS Slide Rule for vlv loss info			
	Reconfig following vlv(s) only if leak isolation reqd:	4 Aft L,R RCS He Pr Isol A GPC Cntl and man CL capability		
	(O7)	9 Aft L RCS He Pr Isol B man OP capability		
	● AFT L RCS He PRESS A,B			
	● R RCS He PRESS A			
	GNC 23 RCS	Aft RCS L,R Jet 2 Htrs		
	● Reprioritize L,R Manf 2 Jets to first priority: DES INH twice all other jets, highest priority first, then next highest priority, etc			
	● Set aft pod(s) PRI JET FAIL LIMIT to 6			
	(Continued)	(Continued)		

EPS SSR-16 (Cont)
BUS LOSS: MNA ALC1

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
5	If ICNCT config: (O7) <ul style="list-style-type: none"> • AFT L RCS TK ISOL 3/4/5 A – GPC (tb–bp) • AFT R RCS TK ISOL 3/4/5 A – GPC (tb–bp) 	AFT L,R RCS TK ISOL 3/4/5 A CL microswitch feedback	Ctr MPS He Reg A < 680 during entry (MM303)	⑤ Full vlv capability remains. If switch in CL, vlv will continuously drive to CL position
10	Save L OMS eng for deorbit (If reqd for additional on-orbit burns, ✓MCC)	11 L OMS GN2 Press Vlv OP TM 12 L OMS Eng Pr Vlv Coil 1		⑩ ✓MCC for OMS Qtys. Disregard Qtys on meter and <div style="border: 1px solid black; padding: 2px;">GNC SYS SUMM 2</div>
13	Prior to using OMS: (O8) L(R) OMS He PRESS/VAP <ul style="list-style-type: none"> • ISOL A – OP • B – GPC 	14 L,R OMS He Pr Isol A GPC Cntl		⑪ Lost TM: <div style="border: 1px solid black; padding: 2px;">GNC SYS SUMM 2</div>
	If reqd during entry (< 120K ft): (L1) <ul style="list-style-type: none"> • NH3 CNTLR B – PRI/GPC 	15 NH3 Sys A Pri Cntl & Auto sw over to Sec Cntl		L OMS N2 P VLV: If Eng – ARM/PRESS, assume vlv OP
	If NH3 CNTLR A(B) – SEC/ON reqd, then: (L1) <ul style="list-style-type: none"> • H2O PUMP LOOP 1,2 (two) – ON • ✓FLOW PROP VLV LOOP 1,2 (two) – PL HX If applicable <ul style="list-style-type: none"> • Activate P/L H2O LOOP(s) 			⑫ Unable to confirm redundant coils ⑬ Maintains He Isol redundancy ⑭ Vlv fails closed. Man cntl remains. Isol B remains ⑮ Sys A Sec Cntl man on capability remains ⑯ Redundant coils remains ⑰
BUS ISOLATION				
ONLY ON MCC CALL, PERFORM				
NONE		16 L OMS Cntl Vlv 1,2 Coils 1 16 R OMS Eng Pr Vlv Coil 2 and Cntl Vlv 1,2 Coils 2		⑱ Vlv fails closed
		10 OMS Qty gauging 17 L OMS GN2 Purge Vlv 1,2		⑲ Vlv holds position. Loss of manual capability to inert LH2 Manf
		18 APU 1 Fu Tk Vlv A 18 3 Fu Tk Vlv B		⑳ Vlv fails closed. Redundant vlv remains
		19 Hyd Brake Isol Vlv 1 Cntl 19 TVC Hyd Sys 1 Isol Cntl		㉑ Vlv fails closed. Aft compartment, OMS pods, and ET umbilical cavity will not be purged during entry (MM304)
		MPS: 20 Pneu He Isol 1 20 Ctr Eng He Isol A 18 Ctr Eng He Intercon Outlet Vlv 21 He Sply Blowdn Vlv 1,2 19 Prplt F/D Inbd LH2 Vlv		

CAUTION
No purge. Wait 10 min between burns

**EPS SSR-17
BUS LOSS: MNA FMC1**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L1) ● H2O PUMP LOOP 1 – B	H2O Loop 1 Pump A	MASTER ALARM Light/ Tone – on	(1) Vlv holds position (2) If this action taken, H2O Pump Loop 2 must be pwr'd (3) Mtr 2 remains (4) Htr Cntrl 2 remains
Refer to OMS/RCS Slide Rule for vlv loss info		(F7) SM ALERT Light/Tone – on	
GNC 23 RCS		(FSM) RM DLMA MANF	
Override F1 Manf status to OP: ● RCS FWD ITEM 1 EXEC ● MANF VLVS 1 OVRD ITEM 40 EXEC		(O8) FWD RCS TK ISOL 3/4/5 tb – bp MANF ISOL 1 tb – bp	
		L ADP deploy time incr from 15 to 30 sec	
		STAR TRKR DR POS –Y OP time incr from 8 to 16 sec	
		If H2O PUMP LOOP 1,A active: C/W H2O LOOP It – on 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP' 'S88 H2O PUMP P 1'	
		(O1) H2O PUMP OUT PRESS LOOP 1 ind – 20–25 psia	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(L1) ● H2O PUMP LOOP 1 – OFF			
(MA73C:A) ● MCA LOGIC MNA FWD 1 – OFF	MNA FMC 1 Bus pwr		
	RH Vent 1,2 Mtr 1 3 L ADP Deploy Mtr 1 Disc 1		
	4 Htr Cntrl 1 –Y Star Trkr Dr Sys 1 OP/CL capability		

**EPS SSR-18
BUS LOSS: MNA MMC1**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(MA73C:C) ● cb MCA PWR AC1 3Φ MID 1 – op	1 Port Rad Lat 1–6,7–12 Mtrs 1 Limit sw 2 Port Rad Dpy/Sto Mtr 1	(R13L) RAD CNTL STBD tb – bp If PORT RAD pnl stowed: RAD CNTL PORT tb – bp	(1) If AC1 MMC1 cb not opened, Lat Mtrs 1 of both Port Lat 1–6,7–12 Actuators continue to run until Sys A Lat Cntl sw placed to OFF (2) Mtr 2 will continue to drive until Sys A Cntl sw is taken to OFF (3) Single mtr time
For PLBD ops: ● OP/CL Drs in man mode	2 Stbd Rad Dpy/Sto Mtr 2 Limit sw	SM (BFS SM 63) PL BAY DOORS	
	PLBD: C/L Lat 9–12 Mtr 1 Port,Stbd Fwd Blkhd Lat Mtrs 1 Stbd Door Mtr 1 Port Door Mtr 2 CL Limit sw	If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'	
		During MAN PLBD OP/CL, single mtr run time noted on actuators listed at left	
		(A8L) PORT RMS: RETEN LAT tb – bp R–F–L MID tb – bp	
		SM 94 PDRS CONTROL	
	3 Port RMS Mid MRL Mtr 1	Indications lost: Mid MRL Mtr 1 LAT/REL/RDY	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:A) ● MCA LOGIC MNA MID 1 – OFF	MNA MMC1 Bus pwr RH Vents 3,5,6 Mtrs 1		

EPS SSR-19
BUS LOSS: MNA MMC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1 (MA73C:D)</p> <ul style="list-style-type: none"> • cb MCA LOGIC MCA PWR AC1 3Φ MID 3 – op <p>For PLBD ops:</p> <ul style="list-style-type: none"> • OP/CL Drs in man mode 	<p>1 Stbd Rad Lats 1–6,7–12 Mtrs 1 Limit sw</p> <p>2 Stbd Rad Dpy/Sto Mtr 1</p> <p>Port Rad Dpy/Sto Mtr 2 Limit sw</p> <p>PLBD:</p> <p>C/L Lat 1–4,5–8 Mtr 1</p> <p>Port Aft Blkhd Lats Mtr 1</p>	<p>1 (R13L)</p> <p>RAD CNTL PORT tb – bp</p> <p>If STBD RAD pnl stowed:</p> <p>RAD CNTL STBD tb – bp</p> <p>SM (BFS SM 63)</p> <p>PL BAY DOORS</p> <p>If in <u>AUTO</u> OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'</p>	<p>① If AC1 MM3 cb not opened, Lat Mtrs 1 of both Stbd Lat 1–6,7–12 Actuators continue to run until Sys A Lat Cntl sw placed to OFF</p>
<p>BUS ISOLATION</p>			
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(MA73C:B)</p> <ul style="list-style-type: none"> • MCA LOGIC MNA MID 3 – OFF 	<p>MNA MMC3 Bus pwr</p> <p>LH Vents 5,6 Mtr 1</p>	<p>During <u>MAN</u> PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	<p>② Mtr 2 will continue to drive until Sys B Cntl sw is taken to OFF</p>
	<p>3 Port RMS Aft MRL Mtr 2</p>	<p>PORT RMS:</p> <p>SM 94 PDRS CONTROL</p> <p>Indication lost:</p> <p>Aft MRL Mtr 2</p> <p>LAT/REL/RDY</p>	<p>③ Single mtr time</p>

**EPS SSR-21
BUS LOSS: MNA R14**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (R12L) ● MS AUD CNTL – PS (L9) ● ✓ PS ATU PNL config for use	2 MS ATU, CCU, FD Spkr	PS Floodlt lost MS, OS CCTV Video lost if MNA selected for VCU CCTV Mon 1 lost	① Only listen capability regained for MS ATU (CCU only)
BUS ISOLATION		(F7) MDU MFD 2 blanks	② Causes loss of redundant path for ACCU config control bits, loss of xmit capability via CCU, loss of FD spkr
ONLY ON MCC CALL, PERFORM		(F8) MDU PLT 1 blanks	③ Redundant pwr source remains for equipment
<u>OV102 only</u> (R14:A) cb MNA ● AUD MS/OS – op ● AUD AIRLK 1 B/U – op ● ADC 1A/2A – op ● MDU MFD 2 – op ● MDU PLT 1 – op	<u>OV102 only</u> MS ATU OS SU OS ATU Airlock 1 Backup ATU		④ Possible loss of capability for xmitting to gnd via UHF
<u>All except OV102</u> (R14:A) ● cb MNA AUD MS – op ● ADC 1A/2A – op ● MDU MFD 2 – op ● MDU PLT 1 – op	<u>All except OV102</u> MS ATU OS SU	<u>All Vehicle</u> (R14:B) cb PALLET/DSC ● 1A/2B – op (EDO) ● 3A – op (EDO) cb MNA ● UHF – op ● GCILC – op ● CNTL BUS BC 1/2/3 – op	⑤ GCILC also pwr'd via MNC cb
3 <u>All Vehicle</u> (R14:B) cb PALLET/DSC ● 1A/2B – op (EDO) ● 3A – op (EDO) cb MNA ● UHF – op ● GCILC – op ● CNTL BUS BC 1/2/3 – op	<u>All Vehicle</u> (R14:D) cb MNA ● TV C Aft Bay CAMR and PAN-TILT – op ● TV C Aft Bay CAMR HTR – op ● TV C Aft Bay PAN-TILT HTR – op ● CONTR UNIT – op ● MON 1 – op	4 UHF Spix Pwr Amp 5 GCILC MNA pwr 6 MNA pwr for Cntl BC 1,2,3 Buses	⑥ Buses remain powered
(R14:D) cb MNA ● TV C Aft Bay CAMR and PAN-TILT – op ● TV C Aft Bay CAMR HTR – op ● TV C Aft Bay PAN-TILT HTR – op ● CONTR UNIT – op ● MON 1 – op	TV C Aft Bay Camr and Pan-Tilt TV C Aft Bay Camr Htr TV C Aft Bay Camr Pan-Tilt Htr 7 Video Cntl Unit MNA pwr CCTV Mon 1		⑦ MNB pwr may be selected via TV pwr sw (pnl A7) or GCILC, if reqd
(R14:E) cb MNA ● PS FLOOD – op cb MNA D STBD RMS ● TV D CAMR and PAN-TILT – op ● TV D CAMR HTR – op ● PAN-TILT HTR – op	PS Floodlt TV D STBD RMS: Camr and Pan-Tilt Camr Htr Pan-Tilt Htr		⑧ IDP 1 and IDP 2 ADC data lost. MDU port select may be reqd
● MDU MFD 2 PWR – OFF ● MDU PLT 1 PWR – OFF	8 MDU MFD 2 MDU PLT 1 ADC 1A/2A		

MEDS

EPS SSR-22
BUS LOSS: MNA O14&A8

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A8L) • PORT RMS HTR A – OFF • PORT RMS HTR B – AUTO	1 Port RMS: Primary pwr 2 MCIU Htr A	2 (A8U) Port RMS D&C tb – bp except: BRAKES tb – OFF RATE MIN tb – OFF RATE HOLD tb – OFF SOFT STOP tb – gray RATE SCALE tb – gray	① B/U drive capability remains. All brakes ON and safing initiated ② All brakes ON and safing initiated ③ If driver sw OFF when bus failed, F1 Manf Drivers lost
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE	3 ON control for RCS Manf F1 RJD pwr (F1F,F1L,F1U,F1D)		

MEDS

**EPS SSR-23
BUS LOSS: MNA O14**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (R1) • MN BUS TIE C – ON (tb-ON)		MASTER ALARM Light/Tone – on	① FC3 only one failure away (loss of ESS3AB) from inability to bus tie
(L1) If RAD CNTLR LOOP 1,2 – AUTO B: • Perform ON-ORBIT RAD CNTLR SWITCH, ECLS SSR-13 for Freon Loop 1,2	Freon Loop 1,2 Rad Cntr B	(F7) C/W CAB ATM It – on SM ALERT Light/Tone – on	② H2O Loop 1 Intchgr flowrate and IMU fan ΔP snrsr lost
(L2) • FREON ISOL MODE – OFF	Auto radiator isolation function	(FSMs) 2 S66 IMU FAN DP S66 CABIN PPO2 A S66 CABIN PRES 2 S88 H2O LOOP 1 FLOW SM0 TIRE PRESS S78 CABIN O2 CONC	③ ACA recovered by switching to alternate pwr
(F6,F8) • HSI SEL SOURCE (two) – other than MLS 1 • RDR ALTM – 2	MLS 1 Radar Altm 1	If ADTA 1, MLS 1, –Z STAR TRKR pwrd: 'BCE STRG 1 ADTA' (3,B) 'BCE STRG 1 MLS' (3) 'BCE STRG 1 STKR'	④ After MET 3:30, tb already bp
(O6) • ANNUN BUS SEL ACA 1 – MNB	3 ACA 1 MNA pwr	(L2) 4 CAB VENT ISOL tb – bp 4 tb – bp 5 N2 SYS 1 SPLY tb – bp 5 N2 SYS 1 REG INLET 5 tb – bp	⑤ Vlv holds position ⑥ Vlv fails closed. IFM or real-time flow test will be required. ✓ MCC for additional direction
If on PCS 1: • Perform RECONFIG TO ALT PCS SYS, ECLS SSR-3	5 O2/N2 Cntl Sys 1: 5 O2/N2 Sys 1 Flow Xdcrs 5 N2 Sply Vlv 1 Cntl 6 N2 Reg Inlet Vlv 1 Cntl 6 O2 Xovr Vlv 1 OP capability 7 O2/N2 Cntl Vlv 1 man Cntl PPO2 Snsr A Cabin Press Snsr Emer dP/dT B/U comp	(O1) O2/N2 FLOW SYS 1 ind – 0 pph CAB PRESS ind – 0 psia PPO2 SNSR A ind – 0 psia	⑦ O2/N2 Cntl Vlv 1 normally closed when unpowered
• Pre-seat ingress for entry: discharge hand-held fire ext into AV BAY 3	Av Bay 3 agent discharge capability	(O3) MSN TIME ind – blank	
(Continued)	(Continued)	(A4) EVENT TIME ind – blank	
		If first AA failure and S/W processing accel data: 'RM FAIL ACC' (3)	
		(LIGHTS LOST) L Console Floodlt 3 If ACA 1 – MNA, lights lost: (C3) DAP lights left four columns ALL (F2) PBIs except MA	
		If NWS 1 selected: (F3) NWS FAIL It – on	

MEDS

EPS SSR-23 (Cont)
BUS LOSS: MNA O14

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			② H2O Loop 1 Intchgr flowrate and IMU fan ΔP snsr lost
(O6) ● S TRK PWR -Z - OFF	-Z Star Tracker Dr OP capability -Z Star Tracker		⑧ Redundant pwr source remains for equip
(O8) ● RDR ALTM 1 - OFF ● MLS 1 - OFF			⑨ Redundant measurement remains. FDA Alarm - BFS only; OPS 3,6
(O14:B) cb MNA OI SIG CONDR ● OF 1/4 A - op ● OM 1/2 A - op cb MNA OI MDM OF ● 1/2 A - op ● 3/4 A - op cb MNA OI H2O ● BYP LOOP 1 SNSR - op cb MNA OI ● TIRE PRESS - op cb MNA ● MNC CONTR - op ● MSN TIMER FWD - op ● EVENT TIMER AFT - op	2 H2O Byp Loop 1 Snsr (ECLS SC11) 9 Tire Press Sig Cond A1,A2 Fwd Mission Timer Aft Event Timer		⑩ Cabin Smoke Detector remains ⑪ Current Snsr 2 remains ⑫ Cntr A remains ⑬ NWS 2 still available
(O14:C) cb MNA ● TACAN 1 - op ● SMOKE DETN L/R FLT DK - op ● SMOKE DETN BAY 2A/3B - op ● FIRE SUPPR BAY 3 - op ● UTIL PWR O19/MO52J - op ● FLOOD L CNSL - op ● ANNUN FWD ACA 1 - op ● cb MNA CRYO O2 HTR TK1 SNSR 1 - op	10 Tacan 1 L,R Flt Dk Smoke Detectors Av Bay 2 Smoke Detector A 3A Smoke Detector B Av Bay 3 agent discharge capability MNA Utility pwr L Console Floodt 11 Cryo O2 Tk 1 Htr Current Snsr 1		
● cb RAD ISOL CONTR - op	Auto radiator isolation function		
(O14:D) cb MNA ● FREON RAD CNTLR 1,2 (two) - op ● N2 SPLY 1 - op ● O2/N2 CNTLR 1 - op ● O2 XOVR 1 - op ● N2 REG INLET 1 - op ● CAB VENT - op ● VENT ISOL - op	Cabin Vent Vlv Isol		
(O14:E) cb MNA ● RDR ALTM 1 - op ● MLS 1 - op ● ADTA 1 - op ● S TRK -Z - op ● ACCEL 1 - op ● DDU L,AFT (two) - op	ADTA 1 AA 1 8 L DDU MNA pwr 8 Aft DDU MNA pwr NWS 1		
● NWS - op			

MEDS

**EPS SSR-26
BUS LOSS: MNA ML86B**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(ML86B:A) ● cb MNB H2O LINE HTR B – cl</p> <hr/> <p>(ML86B:D) cb MNB MMU ● PORT,STBD HTR B (two) – cl</p>	<p>1 H2O Line Htrs A: Waste Dump Line Htr A Sply Dump Line Htr A Vac Vent Ln Htr A</p> <hr/> <p>1 MMU Port,Stbd Htr A</p>	<p>(R11L) 2 SPLY H2O TKA INLET tb – bp 2 SPLY H2O TKB OUTLET tb – bp</p>	<p>① Htr B remains ② Vlv holds position ③ Vlv holds position. May have to interface EMU 2 with SCU 1 to provide total H2O servicing/recharge</p>
<p>If Waste H2O Dump reqd: ● Perform WASTE WATER SYS BACKUP DUMP (IFM)</p>	<p>2 Waste H2O: Dump Vlv Cntl Noz Htr</p>	<p>(ML31C) 2 WASTE H2O TK 1 VLV tb – bp</p>	<p>④ Without circulation, H2O will lose heat with time and never reheat to nominal temp</p>
<p>(ML31C) ● VAC VENT ISOL VLV BUS SEL – MNB</p>	<p>Vac Vent Isol MNA Cntl</p>	<p>2 WASTE H2O DUMP ISOL VLV tb – bp 2 WASTE H2O DUMP VLV tb – bp 2 SPLY H2O TKD OUTLET tb – bp</p>	<p>⑤ PEVs, Actuators, Bed A P, Bed B P, and Bed dP will be recovered after system reconfig</p>
<p>(WCS) ● ✓MODE – AUTO ● ✓CRADLE – AUTO ● ✓Hose stowed in cradle ● ✓WCS ON It – OFF ● FAN SEP SEL sw – OFF ● HOSE BLOCK – SEP 2 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete ● FAN SEP SEL sw – 2</p>	<p>WCS Sep Fan 1 Mtr Relay</p>	<p>(AW82D) 3 EMU 2 H2O SPLY, WASTE (two) tb – CL</p>	<p>⑥ MNB and MNC line htrs remain. MNB struc htrs remain</p>
<p>(EDO WCS) ● WCS PWR SEL – OFF 1, AUTO 2</p>	<p>Controller MNA pwr Compactor MNA Cntl</p>	<p>(LIGHTS LOST) Middeck Floodlts 1,8 WMC Floodlt MO13Q pnl It 2 Airlk Floodlt 1 TA Flood 2 (SL only)</p>	
<p>(GALLEY) ● OVEN/RHS – OFF ● ✓OVEN FAN – OFF ● Config for backup H2O dispense per ECLS</p>	<p>Galley Electronics Assy Oven 4 One of six htr strips Galley Hot H2O Tk</p>	<p>'S66 CO2 RL SYS MALF' Impending: 'S66 CO2 RL SYS PCO2' 'S66 CAB PPCO2'</p>	
<p>(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: ● Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)</p>	<p>5 CO2 Rmvl Sys Cntrl 1</p>		
<p>(ML86B:C) ● cb MNB(MNC) EXT ARLK HTR LINE ZN1 – cl ● cb MNB(MNC) EXT ARLK HTR LINE ZN2 – cl ● cb MNB EXT ARLK HTR STRUC – cl</p>	<p>6 Ext A/L H2O and Structural Htrs MNA pwr</p>		
<p>BUS ISOLATION</p>			
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(ML86B:A) cb MNA H2O ● LINE HTR A – op cb MNA SPLY H2O ● TKA INLET – op ● TKB OUTLET – op cb MNA WASTE H2O ● DUMP VLV/NOZ HTR – op</p>	<p>2 Sply H2O TKA Inlet Vlv Cntl 2 Sply H2O TKB,D Outlet Vlv Cntl</p>		
<p>(Continued)</p>	<p>(Continued)</p>		

MEDS

EPS SSR-26 (Cont)
BUS LOSS: MNA ML86B

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>ONLY ON MCC CALL, PERFORM</p>			<p>① Htr B remains</p>
<p>(ML86B:B) cb MNA WASTE H2O ● TK1 VLV – op ● DUMP ISOL – op cb MNA SPLY H2O ● TKD OUTLET – op cb MNA VAC ● VENT ISOL VLV – op cb MNA ● WCS CNTLR – op ● GALLEY OVEN – op</p>	<p>Waste H2O Dump Isol Cntl Tk1 Inlet Vlv Cntl</p> <p>Galley Oven Electronics Assy</p>		<p>② Vlv holds position</p> <p>③ Vlv holds position. May have to interface EMU 2 with SCU 1 to provide total H2O servicing/recharge</p> <p>⑥ MNB and MNC line htrs remain. MNB struc htrs remain</p>
<p>7 (ML86B:F) ● cb MNA CRYO O2 HTR TK3 SNSR 1 – op ● cb MNA CRYO O2 HTR TK5 SNSR 1 – op</p>	<p>7 Cryo O2 Tk 3 Htr Current Snsr 1 Cryo O2 Tk 5 Htr Current Snsr 1 (OV105 only)</p>		<p>⑦ Current Snsr 2 remains</p> <p>⑧ Sys B remains</p>
<p>(ML86B:D) cb MNA MMU ● PORT,STBD HTR A (two) – op ● GN2 SPLY ISOL VLV A – op cb MNA PYRO JETT SYS A ● KU ANT – op ● STBD RMS – op</p>	<p>1 MMU Port,Stbd Htr A</p> <p>2 MMU GN2 Sply Isol Vlv A</p> <p>8 Ku-Bd Jettison Sys A</p>		<p>⑨ Lost capability to observe and record FC single cell voltages</p>
<p>(ML86B:E) cb MNA EMU 2 H2O ● SPLY – op ● WASTE – op cb MNA FLOOD ● TNL ADAPT 2 – op cb MNA ● CO2 SYS 1 CNTLR – op</p>	<p>TA Floodlt 2</p>		
<p>(ML86B:F) cb MNA FLOODS ● MIDDECK 1/8 – op ● WMC/MO13Q – op ● AIRLK 1 – op</p>	<p>Middeck Floodlts 1,8 WMC Floodlt, MO13Q pnl lt 2</p> <p>Airrk Floodlt 1</p>		
	<p>3 EMU 2 Sply H2O Vlv Cntl Waste H2O Vlv Cntl</p>		
<p>6 (ML86B:C) ● cb MNA EXT ARLK HTR LINE ZN1 – op 6 ● cb MNA EXT ARLK HTR LINE ZN2 – op 6 ● cb MNA EXT ARLK HTR STRUC – op</p>	<p>6 Ext A/L H2O and Structural Htrs MNA pwr</p>		
<p>(ML86B:D) ● cb MNA FC PCM – op</p>	<p>9 FCMS</p>		

MEDS

**EPS SSR-27
BUS LOSS: MNA PPC1**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A15:D,E,F,G) For any Pallet Cryo Tk Htr A in Auto: • (Aff) TK HTR A – OFF • B – AUTO ----- (A15:C) • PALLET HTRS A – OFF • B – AUTO	Pallet Cryo Tk 6-9 Htrs A ----- Pallet Structural Htrs A	SM ALERT Light/Tone – on (FSMs) 168 PALLET V A SM 168 CRYO PALLET Pallet Volts MNA -0 ↓	
BUS ISOLATION ONLY ON MCC CALL, PERFORM (A15:B) • PALLET PWR PPCA-1 MNA – OFF			

**EPS SSR-28
BUS LOSS: MNA A15EDO**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE			① Snsr 2 remains
BUS ISOLATION ONLY ON MCC CALL, PERFORM (A15:H,I,J,K) • cb PALLET MNA TK6-9 O2 SNSR 1 – op	1 Cryo O2 Tk 6-9 Htr Current Snsr 1		

**EPS SSR-29
BUS LOSS: MNA A7**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE			
BUS ISOLATION ONLY ON MCC CALL, PERFORM (A7L) IF DOCKING MISSION cb DEP MNA SYS 1 • VENT ISOL – op • VENT – op LIGHTS • AIRLK 1/4 MNA – OFF cb DOCK LT • MNA TRUSS FWD – op	Vestibule Depress Vlv Sys 1 Vent Isol Vestibule Depress Vlv Sys 1 Vent External Airlock Its 1,4 Fwd Truss Docking It	VEST DEP VLV SYS 1 VENT ISOL tb – bp VEST DEP VLV SYS 1 VENT tb – bp 1 DSP SYS PWR SYS 1 tb – OFF	① DSP SYS 1 PWR still available to all users except MNA A7
			MEDS

**EPS SSR-30
BUS LOSS: MNB DA2**

(Includes all MNB sub-buses and AC2)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<ul style="list-style-type: none"> Perform FC2 SHUTDN (FC SHUTDN Cue Card) 	FC2 Pumps and pH Snsr Purge Vlv O2,H2 Flow Xdcrs Cell Perf Monitor 1 MNB pwr to AUX PLB BUS 1 ESS1BC 1 ESS3AB 1 CNTLAB1,2,3 1 CNTLBC1,2,3	MASTER ALARM Light/ Tone – on SM ALERT Light/Tone – on (F6) MDU CDR 2 blanks (F7) MDU CRT 2 blanks MDU MFD 1 blanks C/W CABIN ATM It – on C/W MN BUS UNDERVOLT It – on C/W AC VOLT It – on C/W FC PUMP It – on C/W FREON LOOP It – on C/W RCS JET It – on	① Buses remain pwr'd ② Pwrs PL Timing Buffer, OIU 1, and OIU 2 (if flown). OIU 1 redundant pwr MNA MPC1 via CAB PL3 ③ Indications do not appear until jet commanded ④ If five tk sets flown on OV102, O2 TK4B Htrs are disconnected and associated avionics are connected to TK5A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4A,4B Htrs are wired in parallel to TK5A and TK5B Htrs ⑤ MNA PPC1 will now supply 100% of pwr to A and B Cryo Tk Htrs ⑥ <div style="border: 1px dashed black; padding: 5px; display: inline-block;">TIME CRITICAL</div> If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ⑦ Rad isolation may cause FES shutdown
<ul style="list-style-type: none"> Perform LOSS OF 1 FC (ORB PKT, PWRDN) 			
(R1) <ul style="list-style-type: none"> PL CAB – MNA cb AC CONTR AC2 ϕA,ϕB,ϕC (three) – cl INV/AC BUS 2 – OFF (tb-OFF) INV PWR 2 – OFF (tb-OFF) cb AC CONTR AC2 ϕA,ϕB,ϕC (three) – op 	2 MNB pwr to CABPL 1,2,3 buses AC2 ϕA,ϕB,ϕC Inverters	(COMM LOST) All S-BD A/G voice lost if Sys 1 selected Middeck Spkr audio lost (LIGHTS LOST) R Ovhd pnl (pnls O1,O2,O3,O8,O9,O16,O17) R Pnl (pnls F4,F8,F9,R1,R2,R4) Ovhd Instr (pnls O1,O2,O3) OS Numeric (pnls A2,A4) L Seat/Ctr Cnsl Floodlts R Ovhd Cnsl Floodlt OS Floodlt Middeck Floodlts 2,6 Bunk Floodlts 2/4 PHS Floodlt Airlock Floodlt 3 PLB Fwd Blkhd Floodlt PLB Mid Port Floodlt PLB Fwd Stbd Floodlt TA Floodlt 3	
<ul style="list-style-type: none"> O2,H2 TK1 HTRS A – AUTO O2,H2 MANF vlv TK1,TK2 – OP 	4 Cryo O2(H2) Tk2,3,4 Htrs A if in Auto 4 Cryo O2,H2 Tk2,3,4 Htrs B		
(A15:C) <ul style="list-style-type: none"> PALLET HTRS B – OFF A – AUTO 	Pallet Structural Htrs B		
(A15:D,E,F,G) <ul style="list-style-type: none"> That at least one htr (A or B) per Tk turned off 	5 Redundant pwr to Pallet Cryo Tk 6-9 Htrs B Av Bay 1 Agent discharge capability		
(A12) APU HTR 6 GAS GEN/FUEL PUMP 1 – A AUTO 6 GAS GEN/FUEL PUMP 2 – B AUTO LUBE OIL LINE 1 – A AUTO LUBE OIL LINE 2 – B AUTO APU HTR TK/FU LINE/H2O 6 SYS 1A – AUTO 6 1B – OFF 6 2A – OFF 6 2B – AUTO HYD HTR RUD SPD BK A – AUTO B – OFF BDY FLP A – AUTO B – OFF ELEV A – AUTO B – OFF AFT FUS A – OFF B – AUTO HYD CIRC PUMP PWR 1 – MNA 2 – MNC	APU 1 GG/Fu Pump Htrs B APU 2 GG/Fu Pump Htrs A APU 1 Lube Oil Line Htrs B 2 Lube Oil Line Htrs A 1 Tk/Fu Line Htr B APU 1 GG Inj H2O Htrs B 2 Tk/Fu Line Htr A Rudder/Speed Brake Htr B Body Flap Htr B Elev Act Htr B Aft Fuselage Htrs A Circ Pump 1 MNB pwr 2 MNB pwr	(F9) AC2 ϕA,ϕB,ϕC AC volts ind – < 90 DC VOLTS MNB ind – OSL (FSM) S67 AC VOLTS 2 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T SM0 THRM HYD (B) S66 AV BAY 1,2 FAN S66 AV BAY 3 FAN S78 CABIN DP/DT S66 CABIN PPO2 B,C S66 IMU FAN DP S66 IMU FN SPD B S69 FC PUMP 2 S69 FC H2 PUMP 2 S88 FREON FLOW 1 S88 FRN AFT CP 1 S88 FRN PL HX 1 S88 FREON QTY 2 S88 FREON FLOW 2	
		7 Possible 'S88 EVAP OUT T 1(2)' 3 R RCS D,R JET S67 MAIN BUS V B I/O ERROR CRT 2 S67 FPC/FLC 2	
(Continued)	(Continued)	(Continued)	

MEDS

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A1L) S-BD PM • ANT SW ELEC - 2 • XPNDR - 2 • PWR AMPL OPER - 2 • STBY - 2 • PRE AMP - 2 NSP • PWR - 2	S-BD PM Sys 1: Xpndr 1 PreAmp 1 NSP 1 COM SEC 1 Pwr Amp 1 PM and FM Ant SW 1	(FSM) S67 MPC 2 S67 APC/ALC B 168 PALLET V B RM DLMA MANF If ADTA 2, MLS 2, -Y STAR TRKR pwr: 'BCE STRG 2 ADTA' (3,B) 'BCE STRG 2 MLS' (3) 'BCE STRG 3 STKR'	(3) Indications do not appear until jet commanded (8) Vlv holds position (9) REACQ and PSP reconfig procedures are flight specific. If reqd, procedures are found in payload or ISS specific books
(A1L) If PSP and/or INTRG reqd for PL or ISS ops: • S-BD PL PWR SYS - 2 • CNTL - PNL • - CMD 9 • Reconfig PSP 9 • Perform PL INTRG REACQ (if reqd)	S-BD PL Intrag 1 PSP 1 SW PL Ant capability to 2RH,2LH	SM 168 CRYO PALLET Pallet Volts MNB -0↓	(10) OIU CABLE SWAP (IFM PROCEDURES, IFM) will be reqd to regain OIU cmd via OIU 1 and PSP 2
10 If OIU reqd, ✓MCC	3 OIU 2 OIU 1 MNB Pwr	(L2) 8 CAB RELIEF A tb - bp 8 O2 SYS 2 SPLY tb - CL 8 N2 SYS 2 SPLY tb - bp 8 N2 SYS 2 REG INLET tb - bp	(11) When gear deployed, tb does not indicate DN (12) Vlv holds position. Loss of redundant hyd NLG deploy and NWS redundancy if failed closed
(A1R) • S-BD FM PWR - 2	S-BD FM Sig Proc 1 Xmtr 1	SM 212 OIU OIU 2 TEMP ≥ 140 SM 62 PCMMU/PL COMM If OIU 2, active possible msg 'S62 PDI DECOM FAIL'	(13) Instrumentation loss caused rad isolation (14) May be repwr'd after AC Pwr Transfer Cable connected
If no comm: (C3) • S-BD PM CNTL - PNL • - CMD		(F6/F8) 11 LDG GEAR L, NOSE (two) tb - bp	(15) Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
(L1) • Perform ON-ORBIT RAD CNTLR SWITCH, ECLS SSR-13 for Freon Loop 1,2 • FLASH EVAP CNTLR PRI A(B) - ON (if reqd) • TOP EVAP HTR NOZ L - A AUTO • TOP EVAP HTR NOZ R - B AUTO • TOP EVAP HTR DUCT - A(C) If Hi Load Evap enabled: • HI LOAD DUCT HTR - A(C)	Freon Loop 1,2 Rad Cntrl A FES Sec Cntrl Top Evap L Noz Htr B Top Evap L R Noz Htr A Top Evap Duct R Fwd,Aft Htrs B Hi Load Duct Inbd,Outbd Noz Htrs B	(F7) FWD EVENT TIME ind - blank (R1) FC2 COOL PUMP ΔP tb - bp (R4) 8 HYD MPS/TVC ISOL VLV SYS 2 tb - CL 12 HYD BRAKE ISOL VLV 2 tb - OP	(16) Single mtr time (17) One failure away from loss of jettison capability
(L2) • FLASH EVAP FDLN HTR A SPLY - 1	FES H2O Fdln A Htrs 2 (all)	If Sys 1 pwr: 'S62 BCE BYP PSP 1' Loss of PL TLM and CMD If PDI FDA enabled: 'S62 PDI DECOM FAIL'	
13 • Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 2 (select AUTO B)		(O7) 8 AFT R RCS He PRESS B tb - bp AFT L,R RCS TK ISOL 3/4/5B tb - bp (if vlv in CL position)	
(L4:P) • cb AC3 ΦA LG SNSR 1 - cl	14 Prox Snr Electronics Box 2	(O8) 8 FWD RCS 8 He Press B tb - bp 8 MANF ISOL 2 tb - bp	
(A8L) • PORT RMS HTR B - OFF • PORT RMS HTR A - AUTO	15 Port RMS: B/U Pwr MPM Mtr 2 16 Fwd MRL Mtr 1 16 Mid MRL Mtr 2 16 D&C B/U edge Itg 14 Htr B 17 Jettison Sys A Deadface Relays	(R11L) 8 SPLY H2O 8 DUMP ISOL VLV tb - bp 8 TKB INLET tb - bp 8 TKC OUTLET tb - bp 8 B SPLY ISOL VLV tb - bp	
(F6) • HSI SEL SOURCE - (other than MLS 2)	MLS 2	(R13L) 8 MMU GN2 SPLY ISOL VLV B tb - bp	
(F6,F8) • RDR ALTM - 1	RA 2		
(Continued)	(Continued)	(Continued)	

MEDS

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	(O6) ANNUN BUS • SEL ACA 1 – MNA • 2/3 – MNC	ACA 1 MNB pwr ACA 2/3 MNB pwr	(ML31C) 8 WASTE H2O TK1 DRAIN VLV tb – bp 8 SPLY H2O TKD INLET tb – bp	(8) Vlv holds position (18) Manf status <u>not</u> automatically declared closed. Fail-offs will occur when jet commanded
	• For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS)	18 RCS Manf R5 RJD pwr (R5R,R5D)	(O1) AIR TEMP AV BAY 3 ind – 45 degF FREON FLOW LOOP 2 ind – 443 pph CAB dP/dT ind – .45 O2/N2 FLOW SYS 2 ind – 0 pph PPO2 SNSR B,C ind – 0	(19) Do not reconfig for reg switch or I'CNCT procedures (20) Man CL and GPC cntl remain. Vlv holds position
	Refer to OMS/RCS Slide Rule for vlv loss info	RCS manf F2 RJD pwr (F2F,F2R,R2U,F2D)	(A4) MSN and EVENT TIME ind – blank	(21) Man OP capability remains. Vlv holds position
19	Reconfig following vlvs only if leak isolation reqd: (O7) • AFT L RCS He PRESS A • R RCS He PRESS A,B (O8) • FWD RCS He PRESS A,B	20 F,L,R RCS He Pr Isol A man OP capability 21 F,R RCS He Pr Isol B GPC Cntl, man CL capability	22 If Site AOS and using S-BD Ant Elect 1: 'ANTENNA' (2)	(22) Antenna miscompare causes FSM
	(C2) • R IDP/CRT SEL – 3 • GPC/CRT O2 EXEC	23 IDP 2 MDU CRT 2 MDU CDR 2 MDU MFD 1 24 ADC 1B/2B	If NSP 1 selected: 'BCE STRG 1 NSP'	(23) Loss of redundant port to the following: MDU PLT 1 (P) MDU PLT 2 (S) MDU AFD 1 (S)
	SM 1 DPS UTILITY		If Hum Sep B ON: 'S66 HUMID SEP B'	(24) IDP 3, IDP 4 ADC data lost. MDU port select may be reqd
25	(G2,G8,S2) MMU ASSIGN • GNC – ITEM 2 EXEC • SM – ITEM 3 EXEC • PL – ITEM 5 EXEC	MMU 2	If Cabin Fan B ON: C/W AV BAY/CAB AIR It – on 'S66 CABIN FAN'	(25) Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION repositioning
	(A6U) • ANNUN BUS SEL – MNC	ACA 4/5 MNB pwr	If IMU Fan B ON: 'S66 IMU FAN DP' 'S66 IMU FAN SPD B'	(26) Htr A remains (27) Htr B remains
	(A14) RCS/OMS HTR • FWD RCS – A AUTO • L POD (two) – A AUTO, B OFF • R POD (two) – A OFF, B AUTO • OMS CRSFD LINES – A AUTO, B OFF	26 Fwd RCS Htrs B (all) L Pod B Htrs (partial) 27 R Pod A Htrs (all) 19 OMS Crsfed Ln Htrs B (all)	If Freon Loop 1 Pump B ON: 'S88 FREON FLOW 1' 'S88 FRN AFT CP 1' 'S88 FRN PL HX 1'	(28) O2/N2 Cntl Vlv 2 normally closed when unpowered
	(ML86B:A) • cb MNA H2O LINE HTR A – cl	H2O Line Htrs B: Waste Dump Line Htr Sply Dump Line Htr Vac Vent Line Htr	If H2O Loop 1 Pump B ON: C/W H2O LOOP It 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP' 'S88 H2O PUMP P 1'	(29) Vlv fails closed. IFM or real-time flow test will be required. ✓ MCC for additional direction
	(ML86B:D) cb MNA MMU • PORT HTR A – cl • STBD HTR A – cl	26 MMU Port,Stbd Htr B	(O1) H2O PUMP OUT PRESS LOOP 1 ind – 20–25 psia	
	• If on PCS 2: Perform RECONFIG TO ALT PCS SYS, <u>ECLS</u> SSR-3	8 O2/N2 Cntl Sys 2: 8 O2 Sply Vlv Cntl 8 N2 Sply Vlv 2 Cntl 28 Reg Inlet Vlv 2 Cntl 29 O2/N2 Cntl Vlv 2 Man Cntl O2 Xovr Vlv 2 OP capability O2/N2 Sys 2 Flow Xdcrs PPO2 Snsrs B,C	During Rad Dpy/Sto ops: (R13L) RAD CNTL tbs (four) indicate single mtr ops	
		dP/dT Snsr	(A8L) PORT RMS: DPY/STO tb – bp RETEN LAT tb – bp R-F-L FWD tb – bp	
			SM 94 PDRS CONTROL	
			Indications lost: MPM Mtr 2 STO/DPY FWD MRL Mtr 1 LAT/REL/RDY MID MRL Mtr 2 LAT/REL/RDY	
			If Freon sig condn A(B) on pnl O17:C in AC2 position: 'S88 FREON FLOW 2(1)' 'S88 FRN PL HX 1(2)' 'S88 FREON QTY 2(1)'	
(Continued)		(Continued)	(Continued)	

MEDS

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
For PLBD ops: • OP/CL Drs in man mode	PLBD: C/L Lat 13-16 Mtr 2 Stbd Aft Blkh Mtr 2 Port Door Mtr 2 Stbd Door Mtr 2 Port, Stbd Fwd Blkh Mtrs 2 Port, Stbd Door Mtr 1 CL Limit sws	(O1) FREON FLOW LOOP 2(1) ind - 443 pph	(8) Vlv holds position (30) Lost TM:
30 Prior to using L(R) OMS: (O8) 32 L OMS He PRESS/VAP ISOL • A - GPC • B - OP 34 R OMS He PRESS/VAP ISOL • A(B) - GPC • B(A) - CL	31 L OMS He Pr Isol B and Vap Isol 2 GPC Cntl 33 R OMS He Pr Isol A, B man Cntl and Vap Isol 1,2 man A,B Cntl	CCTV video TV Annun Its lost if MNB selected for VCU CCTV Mon 2 lost (VTR input lost)	<div style="border: 1px solid black; padding: 2px; display: inline-block;">GNC SYS SUMM 2</div> L OMS ENG VLV 2: Assume VLV 2 status same as VLV 1
(O8) • Right OMS TK ISOL A - CL (tb-CL)	35 OMS Eng/Xfeed Redundancy	(F7) If APUs active and using BLR CNTLR/HTR 1A or 2B: C/W APU TEMP It - on after ~2 min	(31) Man cntl remains. Vap Isol closes. Pr Isol normally closed
If Supply H2O Dump reqd and DUMP ISOL VLV failed closed: • Perform SUPPLY WATER DUMP USING FES (ORB OPS, ECLS)	8 Supply H2O Dump Isol Cntl	<div style="border: 1px solid black; padding: 2px; display: inline-block;">SM (BFS, SM) 63 PL BAY DOORS</div> If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'	(32) Maintains He Isol redundancy (33) GPC cntl remains. Vlv fails closed
If EMU(s) in battery charge mode: (AW18H) • PWR/BATT CHGR EMU 1(2) BUS SEL - MNA	EMU 1,2 Pwr/Batt Chgr MNB pwr	During MAN PLBD OP/CL single mtr run time noted on actuators listed at left	(34) Prevents simultaneous opening of parallel reg paths and possibly rupturing burst disk
<div style="border: 1px solid black; padding: 2px; display: inline-block;">GNC 23 RCS</div> • Reprioritize L,R Manf 1, F Manf 3 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc • Set aft pod(s) PRI JET FAIL LIMIT to 3 • Set forward pod PRI JET FAIL LIMIT to 4	Aft RCS L,R Jet 1 Htrs Fwd RCS Jet 3 Htrs	If OMS Gmbl cmd abs value > 2 deg and Sec TVC selected: OMS TVC C/W It 'L OMS GMBL' (3,B)	(35) Maintains deorbit capability for CNTL AB1 failure
If CCTV reqd: (A7U) • TV PWR CONTR UNIT - MNA	Video Cntl Unit MNB pwr	If first AA failure and S/W Processing Accel data: 'RM FAIL ACC' (3)	(36) Not yet active on all vehicles
For SSME Hyd Repress: (R4) • HYD MPS/TVC ISOL VLV SYS 1,3 (two) - OP, wait 10 sec, then CL	36 FC1 Redundant Reac Vlv Cntl on pnl C3	If first RGA failure and rates sensed: 'RM FAIL RGA' (3)	(37) Sys B Pri Cntl, auto switchover to Sec Cntl remain
<div style="border: 1px solid black; padding: 2px; display: inline-block;">GNC XXXXX MNVY YYYYY</div> Sel L OMS PRI GMBL • ITEM 28 EXEC	8 MPS/TVC Hyd Sys 2 Isol Cntl	Star Trkr Dr -Z OP/CL time and -Y CL time incr from 8 to 16 sec	
(ML31C) • VAC VENT ISOL VLV BUS SEC - MNA	L OMS Sec TVC	L,R ADP deploy times incr from 15 to 30 sec	
If reqd during entry (< 120 K ft): (L1) • NH3 CNTLR A(B) - PRI/GPC	Vac Vent Isol MNB Cntl		
(Continued)	37 NH3 Sys B Sec Cntl Man capability		

MEDS

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
If AC Pwr Transfer Cable to be installed to regain AC: • Go to EPS SSR-200; otherwise, continue with Bus Loss Actions			(38) Av Bay 3 Fan ΔP, Air out Temp snsr lost (39) Not applicable for OV102 (40) Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snsr lost (41) Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate, and Accum Qty snsr lost
(WCS) • ✓MODE – AUTO • ✓CRADLE – AUTO • ✓Hose stowed in cradle • ✓WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 1 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete • FAN SEP SEL sw – 1	Urine Sep 2 Fan 2 Commode Fan 2 Controller MNB pwr Compactor MNB Cntl		(42) Lose Auto Temp Cntl via Cntl 1 and Cabin Temp, Cabin Hx Air Out Temp, and H2O Loop 1 Cabin Hx In Temp snsr. Hx Byp Vlv holds position
(EDO WCS) • URINAL SEL – SEP 1 • WCS PWR SEL – AUTO 1, OFF 2 • URINE DIVERTER VLV FAN SEP 1	Hyd H2O Blr 1 Cntl A 2 Cntl B		
(R2) • BLR CNTLR/HTR 1 – B • 2 – A			
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl			
(L1) • HUM SEP B – OFF • A – ON • IMU FAN B – OFF • A(C) – ON • H2O PUMP LOOP 1 – A • CAB FAN B – OFF • ✓A – ON • AV BAY 1 FAN B – OFF • A – ON • 2 FAN A – OFF • B – ON • AV BAY 3 FAN A,B (two) – ON • FREON PUMP LOOP 1 – A	Hum Sep B IMU Fan B H2O Loop 1 Pump B Cabin Fan B AV Bay 1 Fan B AV Bay 2 Fan A AV Bay 3 Sig Condr, Xdcrs (ECLS SC4) 38 Freon Loop 1 Pump B		
(MO13Q) If Arlk/Tnl Fan active: • ARLK FAN B – OFF • ✓A – ON	Arlk/Tnl Fan B		
(O17:C) • SIG CONDR FREON A – AC3 • SIG CONDR FREON B – AC3	40 Freon Sig Condr A AC2 pwr (ECLS SC 1A) 41 Freon Sig Condr B AC2 pwr (ECLS SC 1B)		
(CDR's SEAT) • SEAT PWR – AC3	CDR Seat Adj via AC2 pwr		
(PLT's SEAT) • SEAT PWR – AC3	PLT Seat Adj via AC2 pwr		
• If Cab Temp Cntl 1 active: (L1) • CAB TEMP CNTLR – OFF	42 Cabin Temp Cntl 1, Hx Byp Vlv Mtr 1		
(MD44F) • Remove pin from PRI Actuator BYP vlv linkage, connect linkage to SEC Actuator			
(L1) • CAB TEMP CNTLR – 2 (Continued)	(Continued)		

MEDS

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

BUS ISOLATION		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	ONLY ON MCC CALL, PERFORM			④③ AC2 Bus Isolation for AC Pwr Transfer Cable installation accomplished in MNB DA2 Actions column. No additional bus isolation steps reqd
44	(L1) ● H2O PUMP LOOP 1 – OFF			④④ If this action taken, activate H2O Pump Loop 2
	(L4:N) ● cb AC2 ΦC RAD ISOL A – op	45 Freon Loop 1,2 Rad Isol Motor A		④⑤ Motor B remains
	● MDU CRT 2 PWR – OFF ● MDU CDR 2 PWR – OFF ● MDU MFD 1 PWR – OFF			④⑥ Redundant pwr source remains for equipment
	(C2) ● IDP/CRT 2 PWR – OFF			④⑦ H2O Loop 2 ICH Flow Rate snsr lost
	(C3) ● MSTR MADS PWR – OFF			④⑧ Other detn in Av Bay remains
	(O6) ● STAR TRKR PWR –Y – OFF	–Y Star Tracker		④⑨ Current Snsr 1 remains
	(O8) ● RADAR ALTM 2 – OFF ● MLS 2 – OFF			④⑩ Cntr B remains
	(O15:A) ● RGA 2 – OFF	RGA 2		
46	(O15:B) cb MNB OI SIG CONDR ● OF 1/4 B – op			
46	● OF 2/3 A – op			
	cb MNB			
46	● OM 1/2 B – op			
46	● OI MDM OF 1/2 B – op			
	● OI SIG CONDR OM 3A – op			
46	● OI H2O BYP LOOP 2 SNSR – op	47 H2O Byp Loop 2 Snsr (ECLS SC12)		
	(O15:B) ● cb MNA CONTR – op ● MSN TIMER AFT – op ● EVENT TIMER FWD – op	Aft Mission Timer Fwd Event Timer		
48	(O15:C) cb MNB ● TACAN 2 – op	Tacan 2		
	● SMOKE DETN BAY 1B/3A – op	Av Bay 1 Smoke Det B, Av Bay 3 Smoke Det A		
	● FIRE SUPPR BAY 1 – op	MNB Utility pwr		
	● UTIL PWR F1/MO13Q – op	R Console Floodlt L Seat/Ctr Console Floodlt		
	● FLOOD R CNSL – op			
	● L CTR – op			
	● ANNUN FWD ACA 1 – op			
	● ANNUN FWD ACA 2/3 – op			
	● ANNUN AFT ACA 4/5 – op			
	● CRYO O2 HTR TK2 SNSR 2 – op	49 Cryo O2 Tk2 Htr Current Snsr 2		
	All except OV102 GPS 2 PRE AMPL UPPER – op			
	(A15:H,I,J,K) ● cb MNB TK6–TK9 O2 HTR SNSR 2 – op	49 Cryo O2 Tk6–9 Htr Current Snsr 2		
50	(O15:D) cb MNB ● FREON RAD CNTLR 1 – op			
50	● FREON RAD CNTLR 2 – op			
	(Continued)	(Continued)		

MEDS

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>ONLY ON MCC CALL, PERFORM</p>			<p>⑧ Vlv holds position</p>
<p>• PPO2 C CAB dP/dT – op <u>All except OV102</u> GPS 2 PRE AMPL LOWER – op • N2 SPLY 2 – op • O2/N2 CNTRLR – op • O2 XOVR 2 – op • N2 REG INLET 2 – op • CAB RELIEF A – op • NWS – op</p>	<p>Cabin Relief Vlv A Cntl NWS – 2</p>		<p>④⑥ Redundant pwr source remains for equipment</p> <p>⑤① NWS 1 still available</p> <p>⑤② CDR Arm remains</p>
<p>(O15:E) cb MNB • RDR ALTM 2 – op • MLS 2 – op • ADTA 2 – op • STAR TRKR –Y – op • ACCEL 2 – op • DDU L – op R – op • DRAG CHUTE SYS 2 – op</p> <p>(O15:F) • MMU 2 – OFF</p>	<p>8 ADTA 2 AA2</p> <p>52 Drag Chute, PLT Arm</p>		<p>⑤③ Six vlvs fail to non-isolation position</p> <p>⑤④ KU-BAND ANTENNA: CONTINGENCY STOW – W/EVA ANT GIMBAL ALIGNMENT (IFM) reqd to stow Ku-Bd. Jettison reqd if antenna cannot be positioned within GO FOR PLBD CLOSURE envelope</p>
	53 ASA 4 Isol		
	53 ATVC 3 Isol ME 53 4 Isol ME		
<p>(R1) • PL AFT MNB – OFF</p>	<p>MNB pwr to AUX PLB Bus Aft PL MNB pwr</p>		
<p>(R11U) • FC PURGE VLV 2 – CL • FC STARTUP HTR 2 – ENA</p>	<p>FC2 Startup Htr Inhibit capability</p>		
<p>(R14:A) • cb MNB AUD MIDDECK SPKR – op • ADC 1B/2B – op • MDU MFD 1 – op • MDU CDR 2 – op</p>	<p><u>OV102 only</u> Middeck SU ATU <u>All except OV102</u> Middeck ATU</p>		
<p>(R14:B) • cb MNB CNTL BUS CA 1/2/3 – op 46 cb PALLET/DSC • 1B – op (EDO) • 4B – op (EDO)</p>	<p>MNB pwr for CNTL CA 1,2,3 Buses</p>		
<p>(R14:C) cb MNB KU • ELEC – op • ANT HTR – op • CABLE HTR – op</p>	<p>54 Ku-Bd sys (I/F and cont Unit, RDR) Sig Proc & Dpy Assy Deployed Assy Htrs</p>		
<p>(R14:D) cb MNB • TV A FWD BAY CAMR/PAN-TILT – op • TV A FWD BAY CAMR HTR – op • TV A FWD BAY PAN-TILT HTR – op • TV CONTR UNIT – op • TV MON 2 – op</p>	<p>TV A Fwd Bay Camr/Pan-Tilt TV A Fwd Bay Camr Htr TV A Fwd Bay Camr Pan-Tilt Htr CCTV Mon 2</p>		
<p>(R14:E) cb MNB • OS FLOOD – op • RMS PORT RMS TV CAMR/PAN-TILT – op • RMS PORT RMS TV CAMR HTR – op • RMS PORT RMS TV PAN-TILT HTR – op (Continued)</p>	<p>OS Floodlt Port RMS Camr/Pan-Tilt Port RMS Camr Htr Port RMS Camr Pan-Tilt Htr (Continued)</p>		<p>MEDS</p>

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM		DSP SYS PWR SYS 2 tb – OFF	⑧ Vlv holds position
(A7U) PL BAY FLOOD ● FWD BHD – OFF ● MID PORT – OFF ● FWD STBD – OFF	PLB Fwd Blkhd Floodlt Mid Port Floodlt Fwd Stbd Floodlt		②⑥ Htr A remains ⑤⑤ All docking mechanisms will have single mtr times
(A7L) IF DOCKING MISSION ● cb DEP MNB SYS 2 VENT ISOL – op ● cb DEP MNB SYS 2 VENT – op	Vest Dep Vlv Sys 2 Vent Vent Isol		⑤⑥ Logic buses 1(2) remain pwr'd via MNA(MNC)
(A7L) IF DOCKING MISSION cb DOCK LT MNB ● TRUSS AFT – op ● VEST STBD – op ● SYS PWR SYS 2 MNB – OFF ● PSU PWR MNB – OFF cb MNB ● LOGIC 1 – op ● 2 – op LIGHTS ● AIRLK 2/3 MNB – OFF	MNB A7 Aft Truss Docking It Stbd Vestibule Docking It DSP SYS 2 Pwr PSU MNB Pwr 55 56 MNB pwr to DSP Logic buses 1,2 External Airlock Its 2,3		⑤⑦ No redundancy
(MA73C:A,B) MCA LOGIC MNB ● FWD 2 – OFF ● AFT 2 – OFF ● MID 1,2,3,4 (four) – OFF	MNB FMC2 Bus pwr AMC2 Bus pwr MMC1, MMC2, MMC3, MMC4 Bus pwr		
(ML86B:A) cb MNB ● H2O LINE HTR B – op ● SUPPLY H2O TKB INLET – op ● SUPPLY H2O TKC OUTLET – op ● SUPPLY H2O DUMP ISOL – op ● SUPPLY H2O B SPLY ISOL VLV – op	8 Sply H2O TKB Inlet Vlv Cntl 8 Sply H2O TKC Outlet Vlv Cntl 8 Sply H2O B Sply ISOL Vlv Cntl		
(ML86B:B) cb MNB ● VAC VENT NOZ HTR – op ● WASTE H2O TK1 DRAIN – op ● SUPPLY H2O TKD INLET – op ● VAC VENT ISOL VLV – op ● WCS CNTLR – op ● GALLEY H2O HTR – op	57 Waste H2O Vac Vent Noz Htr 8 Tk1 Drain Vlv Cntl 8 Sply H2O TKD Inlet Vlv Cntl WCS Press Xdcr Galley H2O Htrs		
(ML86B:D) cb MNB MMU ● PORT,STBD HTR B – op ● GN2 SPLY ISOL VLV B – op	26 MMU Port,Stbd Htr B 8 GN2 Sply Isol Vlv B		
(ML86B:E) cb MNB SEAT ● LEFT – op ● RIGHT – op cb MNB FLOOD ● TNL ADAPT 3 – op cb MNB ● CO2 COM INSTR – op	CO2 Rmvl Sys Filter dP CO2 Rmvl Sys Vacuum Press CO2 Rmvl Sys PPCO2 Snsr Inlet Temp TA Floodlt 3		
(ML86B:F) cb MNB FLOODS ● MIDDECK 2/6 – op ● BUNK 2/4 – op	Middeck Floods 2,6 Bunk Floodlts 2/4		
(Continued)	(Continued)		

MEDS

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

BUS ISOLATION		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			L MPS He reg A < 680 during entry (MM 303)	<p>④ If five tk sets flown on OV102, O2 TK4B Htrs are disconnected and associated avionics are connected to TK5A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4A,4B Htrs are wired in parallel to TK5A and TK5B Htrs</p> <p>⑧ Vlv holds position</p> <p>⑫ Vlv holds position. Loss of redundant hyd NLG deploy and NWS redundancy if failed closed</p> <p>④⑨ Current Snsr 1 remains</p> <p>⑤⑧ Current Snsr 2 remains</p> <p>⑤⑨ Mtrs 2 stow capability unaffected</p> <p>⑥⑩ Redundant coils remain</p> <p>⑥① ✓MCC for OMS Qtys</p> <p>⑥② Pwr supply A remains. Turbine speed ind lost</p> <p>⑥③ Vlv fails closed. Redundant vlv remains</p> <p>⑥④ Pwr supply B remains. GG Bed T and GBX P lost when APU running</p> <p>⑥⑤ Cntrs A,B Rad Byp Vlv Mtrs Auto Cntl and Cntrl B Rad Byp Vlv Mtr Man Cntl remain</p> <p>⑥⑥ Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains</p> <p>⑥⑦ Mtr 1 remains</p> <p>⑥⑧ Htr Cntrl 1 remains</p> <p>⑥⑨ ✓MCC for stow reqmts</p> <p>⑦⑩ Vlv fails closed</p>
49 58	<ul style="list-style-type: none"> ● PHS – op ● AIRLK 3 – op cb MNB CRYO O2 ● HTR TK3 SNSR 2 – op ● TK4 SNSR 1 – op 	<p>4 PHS Floodlt</p> <p>4 Airkr Flood 3</p> <p>49 Cryo O2:</p> <p>58 Tk 3 Htr Current Snsr 2</p> <p>4 Htr Current Snsr 1</p> <p>4 MNB pwr to CNTLAB 1,2,3 and CNTLBC 1,2,3</p> <p>59 Port,Stbd Rad Mtrs 2 Dpy capability</p> <p>Port,Stbd Rad Lat 1–6 Mtrs 2</p> <p>60 Fwd RCS Jet 2 Htrs</p> <p>L OMS ENG Press Vlv Coil 2, Cntl Vlv 1,2 Coil 2</p> <p>61 OMS Qty Gauging for all L OMS single engine burns</p> <p>12 Hyd Brake Isol Vlv 2 Cntl</p> <p>62 APU 1 Cntrl Pwr Sply B</p> <p>63 1 Fuel Tk Vlv B</p> <p>64 2 Cntrl Pwr Sply A</p> <p>2 Fuel Tk Vlv A</p> <p>APU 2 GBX GN2 Repress Vlv</p> <p>Hyd Rsvr 2 Qty Snsr</p> <p>65 Freon Loop 2 Cntrl A Rad Byp Vlv Mtr Man Cntl</p> <p>66 Freon Loop 1 Cntrl A Rad Byp Vlv Mtr</p> <p>8 Freon Loop 1 Flow Prop Vlv</p> <p>Freon Loop 1 Cold Plate Flow Xdcr</p> <p>67 L,R ADP Dpy Mtrs 2</p> <p>68 Htr Cntrl 2</p> <p>RH Vents 1,2,6,8,9 Mtrs 2</p> <p>LH Vents 1,2,3,5,8,9 Mtrs 2</p> <p>Tacan 2</p> <p>NLG B/U Rel and Ext Sys 2</p> <p>LMG, RMG B/U Rel Sys 2</p> <p>–Y Star Trkr Dr OP and Sys 2</p> <p>CL capability</p> <p>–Z Star Trkr Dr Sys 1 OP/CL capability</p> <p>69 PL Reten Sys B Rel/Lat Mtrs</p> <p>Ku Ant Sto/Dpy Mtr 2</p> <p>70 MPS:</p> <p>L Eng He Intercon Outlet Vlv</p> <p>65 L Eng He Isol A</p> <p>65 Pneu He Isol 2</p> <p>71 Prplt F/D Inbd LO2 Vlv</p> <p>71 Outbd LH2 Vlv</p> <p>72 Manf Repress LH2 Vlv 1,2</p> <p>73 ET Door Mtrs:</p> <p>C/L Lat Actr 1 Mtr 2</p> <p>L Dr Uplock Lat Mtr 2</p> <p>R Dr Closure Mtr 2</p> <p>Uplock Lat Mtr 2</p> <p>74 NWS Hyd Sys 2</p> <p>12 LG Extend Vlv 2</p> <p>75 Ops Hyd Actr Instr</p> <p>Hyd Main Pump 2 Depress Solenoid RPC A</p> <p>75 Hyd Main Pump 1 Depress Solenoid RPC B</p>	<p>NOTES (Cont)</p> <p>⑦① Vlv holds position. Loss of manual capability to inert LO2 and LH2 Manf</p> <p>⑦② Vlv fails closed. LH2 Manf will not be pressurized with He during entry (MM304)</p> <p>⑦③ Redundant mtrs remain</p> <p>⑦④ Hyd Sys 1 still available for NWS</p> <p>⑦⑤ Redundant RPC remains</p>	

MEDS

EPS SSR-31
BUS LOSS: MNB FPC2 (Includes MNB FLC2, MNB FMC2, AC2)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 <ul style="list-style-type: none"> Perform FC2 SHUTDN (FC SHUTDN Cue Card), pwrdrn not needed, then: 	2 FC2 Pumps and pH Snr	MASTER ALARM Light/Tone – on CRT 2 blanks	<p>① TIME CRITICAL*</p> <p>FC2 must be shutdn within 9 min to avoid potentially hazardous condition</p> <p>② Will be repwrdr after AC Pwr Transfer Cable connected</p> <p>③ Man CL and full GPC cntl remains. Vlv holds position</p> <p>④ Man OP capability remains. Vlv holds position</p> <p>⑤ Do not reconfig for reg switch or I'CNCT procedures</p> <p>⑥ Rad isolation may cause FES shutdown</p> <p>⑦ REACQ and PSP reconfig procedures are flight specific. If reqd, procedures can be found in payload or ISS specific books</p> <p>⑧ When gear deployed, tb will not indicate DN</p> <p>⑨ OIU 2 interfaces with PSP 2 for commanding</p> <p>⑩ Vlv holds position</p> <p>⑪ Loss of redundant port to the following: MDU CDR 2 (S) MDU MFD 1 (P) MDU PLT 1 (P) MDU PLT 2 (S) MDU AFD 1 (S)</p>
(R1) <ul style="list-style-type: none"> cb AC CONTR AC2 (three) – cl INV/AC BUS 2 – OFF (tb-OFF) INV PWR 2 – OFF (tb-OFF) cb AC CONTR AC2 (three) – op 	AC2 ΦA,ΦB,ΦC Inverters	(F7) C/W FC PUMP It – on C/W AC VOLT It – on C/W FREON LOOP It – on C/W AV BAY/CAB AIR SM ALERT Light/Tone – on	
(L4:P) <ul style="list-style-type: none"> cb AC3 ΦA LG SNSR 1 – cl 	2 Prox Snr Electronics Box 2	(F9) AC2 ΦA,ΦB,ΦC AC volts < 90	
Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv only if leak isolation reqd: (O8) <ul style="list-style-type: none"> FWD RCS He PRESS A,B 	3 Fwd RCS He Press Isol A man OP capability 4 Fwd RCS He Press Isol B man CL and full GPC Cntl RCS Manf F2 RJD pwr (F2F,F2R,F2U,F2D)	(COMM LOST) All S-BD A/G voice lost if Sys 1 selected	
(A1L) S-BD PM <ul style="list-style-type: none"> ANT SW ELEC – 2 XPNDR – 2 PWR AMPL OPER – 2 STBY – 2 PRE AMPL – 2 NSP PWR – 2 	S-BD PM Sys 1: Xpndr 1 Pre-Amp 1 Pwr Amp 1 PM, FM Ant Sw 1 NSP 1/COMSEC 1	(LIGHTS LOST) Right Ovhd pnl (pnls O1, O2,O3,O8,O9,O16,O17) Right pnl (pnls F4,F8,F9, R1,R2,R4) Ovhd Instr (pnls O1,O2,O3) Orbit Sta Numeric lts (pnls A2,A4)	
If simo loss of MNA & MNB: <ul style="list-style-type: none"> NSP ENCRYPTION MODE – SEL NSP ENCRYPTION SEL – BYP 		(FSMs) S67 FPC/FLC 2 S67 AC VOLTS 2 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T (B) SM0 THRM HYD (B) S66 AV BAY 1,2 FAN S66 AV BAY 3 FAN S69 FC PUMP 2 S69 FC H2 PUMP 2 S88 FRN AFT CP 1 S88 FREON FLOW 1 S88 FRN PL HX 1	
If PSP and/or INTRG reqd for PL or ISS ops: <ul style="list-style-type: none"> S-BD PL PWR SYS – 2 CNTL – PNL – CMD 	S-BD PL Intrg 1 PSP 1	6 Possible 'S88 EVAP OUT T 1(2)'	
7 7 <ul style="list-style-type: none"> Reconfig PSP Perform PL INTRG REACQ (if reqd) 		RM DLMA MANF S88 I/O ERROR CRT 2 S66 CABIN FAN S66 IMU FAN DP S66 IMU FN SPD B	
(A1R) <ul style="list-style-type: none"> S-BD FM PWR – 2 	S-BD FM Sys 1	8 (F6/F8) LDG GEAR L, NOSE tb – bp	
If no comm: (C3) <ul style="list-style-type: none"> S-BD PM CNTL – PNL – CMD 		HYD/APU TY 1 ind – 0% HYD QTY 2 ind – 0%	
9 <ul style="list-style-type: none"> If OIU reqd: (SSP) <ul style="list-style-type: none"> OIU PWR – OIU 2 ON OIU tb – DN ✓MCC, OIU reconfig 		4 (R1) FC2 COOL PUMP ΔP tb – bp	
(C2) <ul style="list-style-type: none"> R IDP/CRT SEL – 3 GPC/CRT O2 EXEC 	11 IDP 2 MDU CRT 2	10 (O8) FWD RCS He PRESS B tb – bp FWD RCS MANF ISOL 2 tb – bp	
(A14) <ul style="list-style-type: none"> RCS/OMS HTR FWD RCS A AUTO 	Fwd RCS Htrs B (all)	(O1) AIR TEMP AV BAY 3 ind – 45 degF AIR TEMP CAB HX OUT ind – 45 degF FREON FLOW LOOP 1 ind – 578 pph	
(Continued)	(Continued)	(Continued)	MEDS

EPS SSR-31 (Cont)
BUS LOSS: MNB FPC2

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
11	DPS UTILITY (G2,G8,S2)		(A4) MSN and EVENT TIME ind - blank	<p>①① Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION prepositioning</p> <p>①② FSM caused by antenna miscompare</p> <p>①③ Instrumentation loss caused rad isolation</p> <p>①④ AV Bay 3 Fan ΔP Air Out Temp Snsrs lost</p> <p>①⑤ Not applicable for OV102</p> <p>①⑥ Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate and Accum Qty Snsrs lost</p> <p>①⑦ Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate and Accum Qty Snsrs lost</p>
	MMU ASSIGN	MMU 2	L,R ADP deploy times incr from 15 to 30 sec	
	• GNC - ITEM 2 EXEC • SM - ITEM 3 EXEC • PL - ITEM 5 EXEC		12 If site AOS and using S-BD Ant Elec 1: 'ANTENNA' (2)	
	If EMU(s) in battery charge mode: (AW18H)	EMU 1,2 Pwr/Batt Chgr MNB pwr	-Y,-Z Star Trkr Drs OP/CL time incr from 8 to 16 sec	
	• PWR/BATT CHGR EMU 1(2) BUS SEL - MNA		If Sys 1 pwrd: 'S62 BCE BYP PSP1' Loss of PL TLM and CMD	
	Pre-seat ingress for Entry: • Discharge handheld fire ext into AV BAY 1	Av Bay 1 agent discharge capability	If PDI FDA Enabled: 'S62 PDI DECOM FAIL'	
	If AC Pwr Cable to be installed to regain AC: • Go to EPS SSR-200; otherwise, continue with Bus Loss Actions		If NSP 1 selected: 'BCE STRG 1 NSP'	
	(R2)	Hyd H2O Blr 1 Cntrl A 2 Cntrl B RSVR 2 Qty Snsr	If Freon Loop 1 Pump B ON: 'S88 FREON FLOW 1' 'S88 FRN AFT CP 1' 'S88 FRN PL HX 1'	
	• BLR CNTLR/HTR 1 - B • 2 - A		If Freon Sig Condr A(B) (O17:C) in AC2 position: 'S88 FREON FLOW 2(1)' 'S88 FRN PL HX 1(2)' 'S88 FREON QTY 2(1)'	
	13 • Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 2		(O1) FREON FLOW LOOP 2(1) ind - 578 pph	
	(L4:F)		If H2O Loop 1 Pump B ON: C/W H2O LOOP It 'S88 H2O PUMP P 1' 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP'	
• cb AC1 H2O LOOP PUMP 1A/2 (three) - cl		(O1) H2O PUMP OUT PRESS LOOP 1 ind - 20-25 psia		
(L1)	Humidity Sep B	(F7) If APUs active and using H2O Blr Cntrl 2B(3A): C/W APU TEMP It after ~2 min		
• HUM SEP B - OFF • A - ON • CAB FAN B - OFF • A - ON • IMU FAN B - OFF • A(C) - ON • H2O PUMP LOOP 1 - A • AV BAY 1 FAN B - OFF • A - ON • 2 FAN A - OFF • B - ON • AV BAY 3 FAN A,B (two) - ON • FREON PUMP LOOP 1 - A • 2 - A	Cabin Fan B IMU Fan B H2O Loop 1 Pump B Av Bay 1 Fan B Av Bay 2 Fan A	During Rad Dpy/Sto ops: (R13L) RAD LAT CNTL tbs (two) indicate single mtr ops		
14	Av Bay 3 Sig Condr, Xdcrs (ECLS SC4) Freon Loop 1 Pump B			
(MO13Q)	Arkl/Tnl Fan B			
15 If Arkl/Tnl Fan active: • ARLK FAN B - OFF • √A - ON				
(O17:C)	16 Freon Sig Condr A AC2 pwr (ECLS SC1A) 17 Freon Sig Condr B AC2 pwr (ECLS SC1B)			
• SIG COND R FREON A - AC3 • SIG COND R FREON B - AC3				
(WCS)	WCS Fan/Sep 2			
• √MODE - AUTO • √CRADLE - AUTO • √Hose stowed in cradle • √WCS ON It - OFF • FAN SEP SEL sw - OFF • HOSE BLOCK - SEP 1 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete • FAN SEP SEL sw - 1				
(Continued)	(Continued)			

MEDS

EPS SSR-31 (Cont)
BUS LOSS: MNB FPC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(EDO WCS) URINAL SEL – SEP 1 • WCS PWR SEL – AUTO 1, OFF 2 • URINE DIVERTER VLV FAN SEP 1	Urine Sep 2 Fan 2 Commode Fan 2		⑩ Vlv holds position
(CDR's SEAT) • CDR SEAT PWR BUS SEL – AC3 (dn)	CDR Seat Adj via AC2 pwr		⑱ Lost Auto Temp Cntl via Cntrl 1 and Cabin Temp, Cabin Hx Air Out Temp and H2O Loop Cabin Hx In Temp Snsrs Hx Byp Vlv holds position
(PLT's SEAT) • PLT SEAT PWR BUS SEL – AC3 (dn)	PLT Seat Adj via AC2 pwr		⑲ Bypass vlv holds position and Cntrl B Rad Byp vlv mtr remains
If Cab Temp Cntrl 1 active: (L1) • CAB TEMP CNTLR – OFF	18 Cabin Temp Cntrl 1 and Hx Byp vlv Mtr 1		⑳ AC2 Bus isolation for AC Pwr Transfer Cable installation accomplished in MNB FPC2 Actions Column. No additional bus isolation steps reqd
(MD44F) • Remove pin from PRI Actuator and Byp vlv linkage • Connect linkage to SEC Actuator			㉑ Motor B remains
(L1) • CAB TEMP CNTLR – 2			㉒ Buses remain pwr
• Perform LOSS OF 1 FC (ORB PKT, PWRDN)			㉓ Vlv holds position. Loss of redundant hyd NLG deploy and NWS hyd redundancy, if failed closed
	19 Freon Loop 1 Cntrl A Rad Byp Vlv Mtr 10 Freon Loop 1 Flow Prop Vlv		㉔ Hyd Sys 1 still available for NWS
20 BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(L1) • H2O PUMP LOOP 1 – OFF • 2 – ON			
(L4:N) • cb AC2 ΦC RAD ISOL A – op	21 Freon Loop 1,2 Rad Isol Motor A		
• MDU CRT 2 PWR – OFF			
(C2) • IDP/CRT 2 PWR – OFF			
(O15:F) • MMU 2 – OFF			
(A7L) • MADS RCDR PWR – OFF	MADS Rcdr All MADS and ACIP data		
(MA73C:A) • MCA LOGIC MNB FWD 2 – OFF	MNB FMC2 Bus pwr		
(O15:C) • cb MNB FIRE SUPPR BAY 1 – op	22 MNB Pwr to CNTL Buses AB1,AB2,AB3,BC1,BC2,BC3		
	23 NLG B/U Rel and Ext Sys 2 24 LMG,RMG B/U Rel Sys 2 LG Extend Vlv 2 NWS Hyd Sys 2		
	–Y Star Trkr Dr Sys 2 OP/CL capability –Z Star Trkr Dr Sys 1 OP/CL capability		
	(Continued)		

MEDS

EPS SSR-31 (Cont)
BUS LOSS: MNB FPC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	L,R ADP Dpy Mtrs 2 Htr Cntr 2 RH Vents 1,2,6,8,9 Mtrs 2 LH Vents 1,2,3,5,8,9 Mtrs 2		(2) Will be repwr'd after AC Pwr Transfer Cable connected
25	ET Door Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Closure Mtr 2 Uplock Lat Mtr 2		(25) Redundant mtrs remain
	Tacan 2		(26) Single mtr time. One failure away from EVA to stow MPM or from RMS jettison. May be repwr'd after AC Pwr Transfer Cable connected
26	Port RMS: MPM Mtr 2		
27	Fwd MRL Mtr 1		
27	Mid MRL Mtr 2		
2	D&C B/U edge Itg		(27) Single mtr time. May be repwr'd after AC Pwr Transfer Cable connected
28	Ku Ant Sto/Dpy Mtr 2		
	PL Reten Sys B Rel/Lat Mtrs		
	Port,Stbd Rad Lat 1-6 Mtrs 2		(28) ✓MCC for stow reqmts

MEDS

**EPS SSR-21
BUS LOSS: MNA R14**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1 (R12L) ● MS AUD CNTL – PS</p> <p>(L9) ● ✓ PS ATU PNL config for use</p>	<p>2 MS ATU, CCU, FD Spkr</p>	<p>PS Floodlt lost MS, OS CCTV Video lost if MNA selected for VCU CCTV Mon 1 lost</p>	<p>① Only listen capability regained for MS ATU (CCU only)</p>
<p>BUS ISOLATION</p>			
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>OV102 only (R14:A) cb MNA ● AUD MS/OS – op ● AUD MIDDECK AIRLK 1 B/U – op</p>	<p>OV102 only MS ATU OS SU OS ATU Airlock 1 Backup ATU</p>		<p>② Causes loss of redundant path for ACCU config control bits, loss of xmit capability via CCU, loss of FD spkr</p>
<p>All except OV102 (R14:A) ● cb MNA AUD MS – op</p>	<p>All except OV102 MS ATU OS SU</p>		<p>③ Redundant pwr source remains for equipment</p>
<p>All Vehicle (R14:B) cb PALLET/DSC ● 1A/2B – op (EDO) ● 3A – op (EDO) cb MNA ● UHF – op ● GCILC – op ● CNTL BUS BC 1/2/3 – op</p>	<p>All Vehicle 4 UHF Spix Pwr Amp 5 GCILC MNA pwr 6 MNA pwr for Cntl BC 1,2,3 Buses</p>		<p>④ Possible loss of capability for xmitting to gnd via UHF</p>
<p>(R14:D) cb MNA ● TV C AFT BAY CAMR/PAN-TILT – op ● TV C AFT BAY CAMR HTR – op ● TV C AFT BAY PAN-TILT HTR – op ● CONTR UNIT – op ● MON 1 – op</p>	<p>TV C Aft Bay Camr and Pan-Tilt TV C Aft Bay Camr Htr TV C Aft Bay Camr Pan-Tilt Htr 7 Video Cntl Unit MNA pwr CCTV Mon 1</p>		<p>⑤ GCILC also pwr'd via MNC cb</p>
<p>(R14:E) cb MNA ● PS FLOOD – op cb MNA D STBD RMS ● TV D CAMR and PAN-TILT – op ● TV D CAMR HTR – op ● PAN-TILT HTR – op</p>	<p>PS Floodlt TV D STBD RMS: Camr and Pan-Tilt Camr Htr Pan-Tilt Htr</p>		<p>⑥ Buses remain powered</p>
			<p>⑦ MNB pwr may be selected via TV pwr sw (pnl A7) or GCILC, if reqd</p>

NOM

EPS SSR-22
BUS LOSS: MNA 014&A8

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A8L) • PORT RMS HTR A – OFF • PORT RMS HTR B – AUTO	1 Port RMS: Primary pwr 2 MCIU Htr A	2 (A8U) Port RMS D&C tb – bp except: BRAKES tb – OFF RATE MIN tb – OFF RATE HOLD tb – OFF SOFT STOP tb – gray RATE SCALE tb – gray	① B/U drive capability remains. All brakes ON and safing initiated ② All brakes ON and safing initiated ③ If driver sw OFF when bus failed, F1 Manf Drivers lost
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE	3 ON control for RCS Manf F1 RJD pwr (F1F,F1L,F1U,F1D)		
			<p style="text-align: right; font-size: 24pt; font-weight: bold;">NOM</p>

**EPS SSR-23
BUS LOSS: MNA O14**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (R1) • MN BUS TIE C – ON (tb-ON)		MASTER ALARM Light/Tone – on	① FC3 only one failure away (loss of ESS3AB) from inability to bus tie
(L1) If RAD CNTLR LOOP 1,2 – AUTO B: • Perform ON-ORBIT RAD CNTLR SWITCH, ECLS SSR-13 for Freon Loop 1,2	Freon Loop 1,2 Rad Cntr B	(F7) C/W CAB ATM It – on SM ALERT Light/Tone – on Red Flag visible on MPS PRESS meters	② H2O Loop 1 Intchgr flowrate and IMU fan ΔP snsr lost
(L2) • FREON ISOL MODE – OFF	Auto radiator isolation function	(F6) HSI,AMI,AVVI,SPI flags visible	③ ACA recovered by switching to alternate pwr
(F8) • HSI SEL SOURCE (two) – other than MLS 1 • RDR ALTM – 2	MLS 1 Radar Altm 1	2 (FSMs) S66 IMU FAN DP S66 CABIN PPO2 A S66 CABIN PRES 2 S88 H2O LOOP 1 FLOW SM0 TIRE PRESS S78 CABIN O2 CONC	④ Vlv holds position
(O6) • ANNUN BUS SEL ACA 1 – MNB	3 ACA 1 MNA pwr	If ADTA 1, MLS 1, –Z STAR TRKR pwrd: 'BCE STRG 1 ADTA' (3,B) 'BCE STRG 1 MLS' (3) 'BCE STRG 1 STKR'	⑤ Vlv fails closed. IFM or real-time flow test will be required. ✓MCC for additional direction
If on PCS 1: • Perform RECONFIG TO ALT PCS SYS, ECLS SSR-3	4 O2/N2 Cntl Sys 1: O2/N2 Sys 1 Flow Xdcrs 4 N2 Sply Vlv 1 Cntl 4 N2 Reg Inlet Vlv 1 Cntl 5 O2 Xovr Vlv 1 OP capability 7 O2/N2 Cntl Vlv 1 man Cntl PPO2 Snsr A Cabin Press Snsr Emer dP/dT B/U comp	(L2) 6 CAB VENT ISOL tb – bp 6 tb – bp 4 N2 SYS 1 SPLY tb – bp 4 N2 SYS 1 REG INLET tb – bp	⑥ After MET 3:30, tb already bp
• Pre-seat ingress for entry: discharge hand-held fire ext into AV BAY 3	Av Bay 3 agent discharge capability	(O1) O2/N2 FLOW SYS 1 ind – 0 pph CAB PRESS ind – 0 psia PPO2 SNSR A ind – 0 psia	⑦ O2/N2 Cntl Vlv 1 normally closed when unpowered
(Continued)	(Continued)	(O3) MSN TIME ind – blank	
		(A4) EVENT TIME ind – blank	
		If first AA failure and S/W processing accel data: 'RM FAIL ACC' (3)	
		3 (LIGHTS LOST) L Console Floodlt If ACA 1 – MNA, lights lost: (C3) DAP lights left four columns ALL (F2) PBIs except MA	
		If NWS 1 selected: (F3) NWS FAIL It – on	

NOM

EPS SSR-23 (Cont)
BUS LOSS: MNA O14

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			
(F6) ● INST PWR – OFF	L Inst pwr (MPS Meters,SPI, L HSI, AMI, AVVI)		② H2O Loop 1 Intchgr flowrate and IMU fan ΔP snsr lost
(O6) ● S TRK PWR –Z – OFF	–Z Star Tracker Dr OP capability –Z Star Tracker		⑧ Redundant pwr source remains for equip
(O8) ● RDR ALTM 1 – OFF ● MLS 1 – OFF			⑨ Redundant measurement remains. FDA Alarm – BFS only; OPS 3,6
(O14:B) cb MNA OI SIG CONDR 8 ● OF 1/4 A – op 8 ● OM 1/2 A – op cb MNA OI MDM OF 8 ● 1/2 A – op 8 ● 3/4 A – op cb MNA OI H2O ● BYP LOOP 1 SNSR – op cb MNA OI ● TIRE PRESS – op cb MNA ● MNC CONTR – op ● MSN TIMER FWD – op ● EVENT TIMER AFT – op	2 H2O Byp Loop 1 Snsr (ECLS SC11) 9 Tire Press Sig Cond A1,A2 Fwd Mission Timer Aft Event Timer		⑩ Cabin Smoke Detector remains ⑪ Current Snsr 2 remains ⑫ Cntr A remains ⑬ NWS 2 still available
(O14:C) cb MNA 10 ● TACAN 1 – op ● SMOKE DETN L/R FLT DK – op ● SMOKE DETN BAY 2A/3B – op ● FIRE SUPPR BAY 3 – op ● UTIL PWR O19/MO52J – op ● FLOOD L CNSL – op ● ANNUN FWD ACA 1 – op 11 ● cb MNA CRYO O2 HTR TK1 SNSR 1 – op	10 Tacan 1 L,R Flt Dk Smoke Detectors Av Bay 2 Smoke Detector A 3A Smoke Detector B Av Bay 3 agent discharge capability MNA Utility pwr L Console Floodlt 11 Cryo O2 Tk 1 Htr Current Snsr 1		
● cb RAD ISOL CONTR – op	Auto radiator isolation function		
(O14:D) 12 cb MNA ● FREON RAD CNTLR 1,2 (two) – op ● GPS PRE AMPL UC – op ● LC – op ● N2 SPLY 1 – op ● O2/N2 CNTLR 1 – op ● O2 XOVR 1 – op ● N2 REG INLET 1 – op ● CAB VENT – op ● VENT ISOL – op	Cabin Vent Vlv Isol		
(O14:E) cb MNA ● RDR ALTM 1 – op ● MLS 1 – op ● ADTA 1 – op ● S TRK –Z – op ● ACCEL 1 – op 8 ● DDU L,AFT (two) – op 13 ● INST L/CTR – op ● NWS – op	ADTA 1 AA 1 8 L DDU MNA pwr 8 Aft DDU MNA pwr NWS 1		

NOM

**EPS SSR-24
BUS LOSS: MNA R1A1**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 MNA pwr to CNTL buses AB1,AB2,AB3,CA1,CA2, CA3 1 MNA pwr to ESS2CA, ESS3AB	NONE	① Buses remain pwr'd
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE			

**EPS SSR-25
BUS LOSS: MNA A6&A14**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<div style="border: 1px solid black; padding: 2px;">GNC 23 RCS</div> <ul style="list-style-type: none"> • Reprioritize FRCS Manf 1 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc • Set forward pod PRI JET FAIL LIMIT to 4 	Fwd RCS Jet 1 Htrs	(A6U) PL RETEN RDY tb – bp RETEN/LAT tb – bp (A6A1 – pnl overlay) RELAX tb – bp DEMATE tb – bp MATE tb – bp ELEC CONT tb – bp	① Single mtr time
BUS ISOLATION		<div style="border: 1px solid black; padding: 2px;">SM 97 PL RETENTION</div>	
ONLY ON MCC CALL, PERFORM		Indication lost: RELAX DEMATE MATE	
NONE	PL Reten Sys A Rel/Lat Mtrs ROEU Logic Pwr Sys 1 Orbiter arm drive mtr (ODM mtr 1 – mate A, demate A, relax A) 1 ODA mtr 1 latch/release		

NOM

**EPS SSR-26
BUS LOSS: MNA ML86B**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(ML86B:A) ● cb MNB H2O LINE HTR B – cl</p> <hr/> <p>(ML86B:D) cb MNB MMU ● PORT,STBD HTR B (two) – cl</p>	<p>1 H2O Line Htrs A: Waste Dump Line Htr A Sply Dump Line Htr A Vac Vent Ln Htr A</p> <hr/> <p>1 MMU Port,Stbd Htr A</p>	<p>(R11L) 2 SPLY H2O TKA INLET tb – bp 2 SPLY H2O TKB OUTLET tb – bp</p> <p>(R13L) 2 MMU GN2 SPLY ISOL VLV A tb – bp</p>	<p>① Htr B remains</p> <p>② Vlv holds position</p> <p>③ Vlv holds position. May have to interface EMU 2 with SCU 1 to provide total H2O servicing/recharge</p>
<p>If Waste H2O Dump reqd: ● Perform WASTE WATER SYS BACKUP DUMP (IFM)</p>	<p>2 Waste H2O: Dump Vlv Cntl Noz Htr</p>	<p>2 (ML31C) WASTE H2O TK 1 VLV tb – bp</p>	<p>④ Without circulation, H2O will lose heat with time and never reheat to nominal temp</p>
<p>(ML31C) ● VAC VENT ISOL VLV BUS SEL – MNB</p>	<p>Vac Vent Isol MNA Cntl</p>	<p>2 WASTE H2O DUMP ISOL VLV tb – bp 2 WASTE H2O DUMP VLV tb – bp 2 SPLY H2O TKD OUTLET tb – bp</p>	<p>⑤ PEVs, Actuators, Bed A P, Bed B P, and Bed dP will be recovered after system reconfig</p>
<p>(WCS) ● ✓MODE – AUTO ● ✓CRADLE – AUTO ● ✓Hose stowed in cradle ● ✓WCS ON It – OFF ● FAN SEP SEL sw – OFF ● HOSE BLOCK – SEP 2 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30–sec run complete ● FAN SEP SEL sw – 2</p>	<p>WCS Sep Fan 1 Mtr Relay</p>	<p>3 (AW82D) EMU 2 H2O SPLY, WASTE (two) tb – CL</p>	<p>⑥ MNB and MNC line htrs remain. MNB struc htrs remain</p>
<p>(EDO WCS) ● WCS PWR SEL – OFF 1, AUTO 2</p>	<p>Controller MNA pwr Compactor MNA Cntl</p>	<p>(LIGHTS LOST) Middeck Floodlts 1,8 WMC Floodlt MO13Q pnl It 2 Airlk Floodlt 1 TA Flood 2 (SL only)</p>	
<p>(GALLEY) ● OVEN/RHS – OFF ● ✓OVEN FAN – OFF ● Config for backup H2O dispense per ECLS</p>	<p>Galley Electronics Assy Oven 4 One of six htr strips Galley Hot H2O Tk</p>	<p>'S66 CO2 RL SYS MALF' Impending: 'S66 CO2 RL SYS PCO2' 'S66 CAB PPCO2'</p>	
<p>(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: ● Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)</p>	<p>5 CO2 Rmvl Sys Cntrl 1</p>		
<p>(ML86B:C) ● cb MNB(MNC) EXT ARLK HTR LINE ZN1 – cl ● cb MNB(MNC) EXT ARLK HTR LINE ZN2 – cl ● cb MNB EXT ARLK HTR STRUC – cl</p>	<p>6 Ext A/L H2O and Structural Htrs MNA pwr</p>		
<p>BUS ISOLATION</p>			
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(ML86B:A) cb MNA H2O ● LINE HTR A – op cb MNA SPLY H2O ● TKA INLET – op ● TKB OUTLET – op cb MNA WASTE H2O ● DUMP VLV/NOZ HTR – op</p>	<p>2 Sply H2O TKA Inlet Vlv Cntl 2 Sply H2O TKB,D Outlet Vlv Cntl</p>		
<p>(Continued)</p>	<p>(Continued)</p>		<p>NOM</p>

EPS SSR-26 (Cont)
BUS LOSS: MNA ML86B

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			
(ML86B:B) cb MNA WASTE H2O • TK1 VLV – op • DUMP ISOL – op cb MNA SPLY H2O • TKD OUTLET – op cb MNA VAC • VENT ISOL VLV – op cb MNA • WCS CNTLR – op • GALLEY OVEN – op	Waste H2O Dump Isol Cntl Tk1 Inlet Vlv Cntl Galley Oven Electronics Assy		① Htr B remains ② Vlv holds position ③ Vlv holds position. May have to interface EMU 2 with SCU 1 to provide total H2O servicing/recharge ⑥ MNB and MNC line htrs remain. MNB struc htrs remain
7 (ML86B:F) • cb MNA CRYO O2 HTR TK3 SNSR 1 – op • cb MNA CRYO O2 HTR TK5 SNSR 1 – op	7 Cryo O2 Tk 3 Htr Current Snsr 1 Cryo O2 Tk 5 Htr Current Snsr 1 (OV105 only)		⑦ Current Snsr 2 remains ⑧ Sys B remains
(ML86B:D) cb MNA MMU • PORT,STBD HTR A (two) – op • GN2 SPLY ISOL VLV A – op cb MNA PYRO JETT SYS A • KU ANT – op • STBD RMS – op	1 MMU Port,Stbd Htr A 2 MMU GN2 Sply Isol Vlv A 8 Ku-Bd Jettison Sys A		⑨ Lost capability to observe and record FC single cell voltages
(ML86B:E) cb MNA EMU 2 H2O • SPLY – op • WASTE – op cb MNA FLOOD • TNL ADAPT 2 – op cb MNA • CO2 SYS 1 CNTLR – op	TA Floodlt 2		
(ML86B:F) cb MNA FLOODS • MIDDECK 1/8 – op • WMC/MO13Q – op • AIRLK 1 – op	Middeck Floodlts 1,8 WMC Floodlt, MO13Q pnl lt 2 Airlk Floodlt 1		
	3 EMU 2 Sply H2O Vlv Cntl Waste H2O Vlv Cntl		
6 (ML86B:C) • cb MNA EXT ARLK HTR LINE ZN1 – op 6 • cb MNA EXT ARLK HTR LINE ZN2 – op 6 • cb MNA EXT ARLK HTR STRUC – op	6 Ext A/L H2O and Structural Htrs MNA pwr		
(ML86B:D) • cb MNA FC PCM – op	9 FCMS		
			NOM

EPS SSR-27
BUS LOSS: MNA PPC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A15:D,E,F,G) For any Pallet Cryo Tk Htr A in Auto: • (Aff) TK HTR A – OFF • B – AUTO ----- (A15:C) • PALLET HTRS A – OFF • B – AUTO	Pallet Cryo Tk 6-9 Htrs A ----- Pallet Structural Htrs A	SM ALERT Light/Tone – on (FSMs) 168 PALLET V A <div style="border: 1px solid black; padding: 2px; display: inline-block;">SM 168 CRYO PALLET</div> Pallet Volts MNA -0 ↓	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(A15:B) • PALLET PWR PPCA-1 MNA – OFF			

06/04/98

EPS SSR-28
BUS LOSS: MNA A15EDO

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE			① Snsr 2 remains
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(A15:H,I,J,K) • cb PALLET MNA TK6-9 O2 SNSR 1 – op	1 Cryo O2 Tk 6-9 Htr Current Snsr 1		

06/04/98

EPS SSR-29
BUS LOSS: MNA A7

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE			① DSP SYS 1 PWR still available to all users except MNA A7
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(A7L) IF DOCKING MISSION cb DEP MNA SYS 1 • VENT ISOL – op • VENT – op LIGHTS • AIRLK 1/4 MNA – OFF cb DOCK LT • MNA TRUSS FWD – op	Vestibule Depress Vlv Sys 1 Vent Isol Vestibule Depress Vlv Sys 1 Vent External Airlock Its 1,4 Fwd Truss Docking It	1 VEST DEP VLV SYS 1 VENT ISOL tb – bp VEST DEP VLV SYS 1 VENT tb – bp 1 DSP SYS PWR SYS 1 tb – OFF	
			NOM

03/07/00

**EPS SSR-30
BUS LOSS: MNB DA2**

(Includes all MNB sub-buses and AC2)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<ul style="list-style-type: none"> Perform FC2 SHUTDN (FC SHUTDN Cue Card) 	FC2 Pumps and pH Snsr Purge Vlv O2,H2 Flow Xdcrs Cell Perf Monitor 1 MNB pwr to AUX PLB BUS 1 ESS1BC 1 ESS3AB 1 CNTLAB1,2,3 1 CNTLBC1,2,3	MASTER ALARM Light/ Tone – on SM ALERT Light/Tone – on (F7) CRT 2 blanks C/W CABIN ATM It – on C/W MN BUS UNDERVOLT It – on C/W AC VOLT It – on C/W FC PUMP It – on C/W FREON LOOP It – on C/W RCS JET It – on	① Buses remain pwr'd ② Indications do not appear until jet commanded ③ Pwrs PL Timing Buffer, OIU 1 and OIU 2 (if flown). OIU 1 redundant pwr MNA MPC1 via CAB PL3
<ul style="list-style-type: none"> Perform LOSS OF 1 FC (ORB PKT, PWRDN) 		2	④ If five tk sets flown on OV102, O2 TK4B Htrs are disconnected and associated avionics are connected to TK5A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4A,4B Htrs are wired in parallel to TK5A and TK5B Htrs
(R1) <ul style="list-style-type: none"> PL CAB – MNA cb AC CONTR AC2 ϕA,ϕB,ϕC (three) – cl INV/AC BUS 2 – OFF (tb-OFF) INV PWR 2 – OFF (tb-OFF) cb AC CONTR AC2 ϕA,ϕB,ϕC (three) – op 	3 MNB pwr to CABPL 1,2,3 buses AC2 ϕA,ϕB,ϕC Inverters	(COMM LOST) All S-BD A/G voice lost if Sys 1 selected Middeck Spkr audio lost	⑤ MNA PPC1 will now supply 100% of pwr to A and B Cryo Tk Htrs
<ul style="list-style-type: none"> O2,H2 TK1 HTRS A – AUTO O2,H2 MANF vlv TK1,TK2 – OP 	4 Cryo O2(H2) Tk2,3,4 Htrs A if in Auto 4 Cryo O2,H2 Tk2,3,4 Htrs B	(LIGHTS LOST) R Ovhd pnl (pnls O1,O2, O3,O8,O9,O16,O17) R Pnl (pnls F4,F8,F9, R1,R2,R4) Ovhd Instr (pnls O1,O2,O3) OS Numeric (pnls A2,A4) L Seat/Ctr Cnsl Floodlts R Ovhd Cnsl Floodlt OS Floodlt Middeck Floodlts 2,6 Bunk Floodlts 2/4 PHS Floodlt Airlock Floodlt 3 PLB Fwd Blkhd Floodlt PLB Mid Port Floodlt PLB Fwd Stbd Floodlt TA Floodlt 3	⑥
(A15:C) <ul style="list-style-type: none"> PALLET HTRS B – OFF A – AUTO 	Pallet Structural Htrs B		
(A15:D,E,F,G) <ul style="list-style-type: none"> That at least one htr (A or B) per Tk turned off 	5 Redundant pwr to Pallet Cryo Tk 6-9 Htrs B		
	Av Bay 1 Agent discharge capability		
(A12) APU HTR 6 • GAS GEN/FUEL PUMP 1 – A AUTO 6 • GAS GEN/FUEL PUMP 2 – B AUTO • LUBE OIL LINE 1 – A AUTO • LUBE OIL LINE 2 – B AUTO APU HTR TK/FU LINE/H2O 6 • SYS 1A – AUTO 6 • 1B – OFF 6 • 2A – OFF 6 • 2B – AUTO HYD HTR • RUD SPD BK A – AUTO • B – OFF • BDY FLP A – AUTO • B – OFF • ELEV A – AUTO • B – OFF • AFT FUS A – OFF • B – AUTO HYD CIRC • PUMP PWR 1 – MNA • 2 – MNC	APU 1 GG/Fu Pump Htrs B APU 2 GG/Fu Pump Htrs A APU 1 Lube Oil Line Htrs B 2 Lube Oil Line Htrs A 1 Tk/Fu Line Htr B APU 1 GG Inj H2O Htrs B 2 Tk/Fu Line Htr A Rudder/Speed Brake Htr B Body Flap Htr B Elev Act Htr B Aft Fuselage Htrs A Circ Pump 1 MNB pwr 2 MNB pwr	(F9) AC2 ϕA,ϕB,ϕC AC volts ind – < 90 DC VOLTS MNB ind – OSL (FSM) S67 AC VOLTS 2 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T (B) SM0 THRM HYD S66 AV BAY 1,2 FAN S66 AV BAY 3 FAN S78 CABIN DP/DT S66 CABIN PPO2 B,C S66 IMU FAN DP S66 IMU FN SPD B S69 FC PUMP 2 S69 FC H2 PUMP 2 S88 FREON FLOW 1 S88 FRN AFT CP 1 S88 FRN PL HX 1 S88 FREON QTY 2 S88 FREON FLOW 2	* TIME CRITICAL * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ⑦ Rad isolation may cause FES shutdown
		7 Possible 'S88 EVAP OUT T 1(2)'	
		2 R RCS D,R JET S67 MAIN BUS V B I/O ERROR CRT 2 S67 FPC/FLC 2 S67 MPC 2 S67 APC/ALC B 168 PALLET V B RM DLMA MANF	
(Continued)	(Continued)	(Continued)	NOM

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A1L) S-BD PM • ANT SW ELEC - 2 • XPNDR - 2 • PWR AMPL OPER - 2 • STBY - 2 • PRE AMP - 2 NSP • PWR - 2	S-BD PM Sys 1: Xpndr 1 PreAmp 1 NSP 1 COM SEC 1 Pwr Amp 1 PM and FM Ant sw 1	If ADTA 2, MLS 2, -Y STAR TRKR pwrd: 'BCE STRG 2 ADTA' (3,B) 'BCE STRG 2 MLS' (3) 'BCE STRG 3 STKR'	(8) Vlv holds position (9) REACQ and PSP reconfig procedures are flight specific. If reqd, procedures are found in payload specific books
(A1L) If PSP and/or INTRG reqd for PL or ISS ops: • S-BD PL PWR SYS - 2 • CNTL - PNL • - CMD 9 • Reconfig PSP 9 • Perform PL INTRG REACQ (if reqd)	S-BD PL Intrg 1 PSP 1 SW PL Ant capability to 2RH,2LH	(L2) 8 CAB RELIEF A tb - bp 8 O2 SYS 2 SPLY tb - CL 8 N2 SYS 2 SPLY tb - bp 8 N2 SYS 2 REG INLET tb - bp	(10) When gear deployed, tb does not indicate DN (11) OIU CABLE SWAP (IFM PROCEDURES, IFM) will be reqd to regain OIU cmd via OIU 1 and PSP 2
(A1R) • S-BD FM PWR - 2	S-BD FM Sig Proc 1 Xmtr 1	(F6/F8) 10 LDG GEAR L, NOSE (two) tb - bp	(12) Pwrs PL Timing Buffer, OIU 1 and OIU 2 (if flown). OIU 1 redundant pwr MNA MPC1 via CAB PL3
If no comm: (C3) • S-BD PM CNTL - PNL • - CMD		(F7) FWD EVENT TIME ind - blank	(13) Vlv holds position. Loss of redundant hyd NLG deploy and NWS redundancy if failed closed
11 If OIU reqd, ✓MCC	12 OIU 2 OIU 1 MNB Pwr	(F8) HSI,AMI,AVVI Flags visible APU/HYD Meters lost	(14) Instrumentation loss caused rad isolation
(L1) • Perform ON-ORBIT RAD CNTLR SWITCH, ECLS SSR-13 for Freon Loop 1,2 • FLASH EVAP CNTLR PRI A(B) - ON (if reqd) • TOP EVAP HTR NOZ L - AAUTO • TOP EVAP HTR NOZ R - B AUTO • TOP EVAP HTR DUCT - A(C) If Hi Load Evap enabled: • HI LOAD DUCT HTR - A(C)	Freon Loop 1,2 Rad Cntrl A FES Sec Cntrl Top Evap L Noz Htr B Top Evap L R Noz Htr A Top Evap Duct R Fwd,Aft Htrs B Hi Load Duct Inbd,Outbd Noz Htrs B	SM 212 OIU OIU 2 TEMP ≥140 SM 62 PCMMU/PL COMM If OIU 2, active possible msg 'S62 PDI DECOM FAIL'	(15) May be repwr'd after AC Pwr Transfer Cable connected
(L2) • FLASH EVAP FDLN HTR A SPLY - 1	FES H2O Fdln A Htrs 2 (all)	(R1) FC2 COOL PUMP ΔP tb - bp	(16) Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
14 • Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 2 (select AUTO B)		(R4) 8 HYD MPS/TVC ISOL VLV SYS 2 tb - CL 13 HYD BRAKE ISOL VLV 2 tb - OP	(17) Single mtr time
(L4:P) • cb AC3 ΦA LG SNSR 1 - cl	15 Prox Snsr Electronics Box 2	If Sys 1 pwrd: 'S62 BCE BYP PSP 1' Loss of PL TLM and CMD If PDI FDA enabled: 'S62 PDI DECOM FAIL'	(18) One failure away from loss of jettison capability
(A8L) • PORT RMS HTR B - OFF • PORT RMS HTR A - AUTO	16 Port RMS: B/U Pwr MPM Mtr 2 17 Fwd MRL Mtr 1 17 Mid MRL Mtr 2 17 D&C B/U edge Itg 15 Htr B 18 Jettison Sys A Deadface Relays	(O7) 8 AFT R RCS He PRESS B tb - bp AFT L,R RCS TK ISOL 3/4/5B tb - bp (if vlv in CL position)	
(F6) • HSI SEL SOURCE - (other than MLS 2)	MLS 2	(O8) 8 FWD RCS 8 He Press B tb - bp MANF ISOL 2 tb - bp	
(F8) • RDR ALTM - 1	RA 2	(R11L) 8 SPLY H2O 8 DUMP ISOL VLV tb - bp 8 TKB INLET tb - bp 8 TKC OUTLET tb - bp 8 B SPLY ISOL VLV tb - bp	
(Continued)	(Continued)	(R13L) 8 MMU GN2 SPLY ISOL VLV B tb - bp	

NOM

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(O6) ANNUN BUS • SEL ACA 1 – MNA • 2/3 – MNC	ACA 1 MNB pwr ACA 2/3 MNB pwr	(ML31C) 8 WASTE H2O TK1 DRAIN VLV tb – bp 8 SPLY H2O TKD INLET tb – bp	(8) Vlv holds position (19) Manf status <u>not</u> automatically declared closed. Fail-offs will occur when jet commanded
• For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS)	19 RCS Manf R5 RJD pwr (R5R,R5D)	(O1) AIR TEMP AV BAY 3 ind – 45 degF FREON FLOW LOOP 2 ind – 443 pph CAB dP/dT ind – .45 O2/N2 FLOW SYS 2 ind – 0 pph PPO2 SNSR B,C ind – 0	(20) Do not reconfig for reg switch or I'CNCT procedures (21) Man CL and GPC cntl remain. Vlv holds position
Refer to OMS/RCS Slide Rule for vlv loss info	RCS manf F2 RJD pwr (F2F,F2R,R2U,F2D)	(A4) MSN and EVENT TIME ind – blank	(22) Man OP capability remains. Vlv holds position
20 Reconfig following vlvs only if leak isolation reqd: (O7) • AFT L RCS He PRESS A • R RCS He PRESS A,B	21 F,L,R RCS He Pr Isol A man OP capability 22 F,R RCS He Pr Isol B GPC Cntl, man CL capability	23 If Site AOS and using S-BD Ant Elect 1: 'ANTENNA' (2)	(23) Antenna miscompare causes FSM
(O8) • FWD RCS He PRESS A,B	-----	If NSP 1 selected: 'BCE STRG 1 NSP'	(24) Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION prepositioning
(C2) • R CRT SEL – 3 • GPC/CRT O2 EXEC	DEU/CRT 2	If Hum Sep B ON: 'S66 HUMID SEP B'	(25) Htr A remains (26) Htr B remains
SM 1 DPS UTILITY	MMU 2	If Cabin Fan B ON: C/W AV BAY/CAB AIR It – on 'S66 CABIN FAN'	(27) O2/N2 Cntl Vlv 2 normally closed when unpowered (28) Vlv fails closed. IFM or real-time flow test will be required. ✓ MCC for additional direction
24 (G2,G8,S2) MMU ASSIGN • GNC – ITEM 2 EXEC • SM – ITEM 3 EXEC • PL – ITEM 5 EXEC	ACA 4/5 MNB pwr	If IMU Fan B ON: 'S66 IMU FAN DP' 'S66 IMU FAN SPD B'	
(A6U) • ANNUN BUS SEL – MNC	Fwd RCS Htrs B (all) L Pod B Htrs (partial)	If Freon Loop 1 Pump B ON: 'S88 FREON FLOW 1' 'S88 FRN AFT CP 1' 'S88 FRN PL HX 1'	
(A14) RCS/OMS HTR • FWD RCS – A AUTO • L POD (two) – A AUTO, B OFF • R POD (two) – A OFF, B AUTO • OMS CRSFD LINES – A AUTO, B OFF	25 R Pod A Htrs (all) 20 OMS Crsfed Ln Htrs B (all)	If H2O Loop 1 Pump B ON: C/W H2O LOOP It 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP' 'S88 H2O PUMP P 1'	
(ML86B:A) • cb MNA H2O LINE HTR A – cl	H2O Line Htrs B: Waste Dump Line Htr Sply Dump Line Htr Vac Vent Line Htr	(O1) H2O PUMP OUT PRESS LOOP 1 ind – 20–25 psia	
(ML86B:D) cb MNA MMU • PORT HTR A – cl • STBD HTR A – cl	25 MMU Port,Stbd Htr B	During Rad Dpy/Sto ops: (R13L) RAD CNTL tbs (four) indicate single mtr ops	
• If on PCS 2: Perform RECONFIG TO ALT PCS SYS, ECLS SSR-3	8 O2/N2 Cntl Sys 2: 8 O2 Sply Vlv Cntl 8 N2 Sply Vlv 2 Cntl 27 Reg Inlet Vlv 2 Cntl 28 O2/N2 Cntl Vlv 2 Man Cntl O2 Xovr Vlv 2 OP capability O2/N2 Sys 2 Flow Xdcrs PPO2 Snsrs B,C	(A8L) PORT RMS: DPY/STO tb – bp RETEN LAT tb – bp R-F-L FWD tb – bp	
	dP/dT Snsr	SM 94 PDRS CONTROL	
For PLBD ops: • OP/CL Drs in man mode	PLBD: C/L Lat 13–16 Mtr 2 Stbd Aft Blkhd Mtr 2 Port Door Mtr 2 Stbd Door Mtr 2 Port,Stbd Fwd Blkhd Mtrs 2 Port,Stbd Door Mtr 1 CL Limit sws	Indications lost: MPM Mtr 2 STO/DPY FWD MRL Mtr 1 LAT/REL/RDY MID MRL Mtr 2 LAT/REL/RDY	
(Continued)	(Continued)	(Continued)	NOM

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
29	Prior to using L(R) OMS: (O8)	30 L OMS He Pr Isol B and Vap Isol 2 GPC Cntl	If Freon sig condn A(B) on pnl O17:C in AC2 position: 'S88 FREON FLOW 2(1)' 'S88 FRN PL HX 1(2)' 'S88 FREON QTY 2(1)'	(8) Vlv holds position (29) Lost TM: GNC SYS SUMM 2
31	L OMS He PRESS/VAP ISOL • A – GPC • B – OP	32 R OMS He Pr Isol A, B man Cntl and Vap Isol 1,2 man A,B Cntl	(O1) FREON FLOW LOOP 2(1) ind – 443 pph	L OMS ENG VLV 2: Assume VLV 2 status same as VLV 1 (30) Man cntl remains. Vap Isol closes. Pr Isol normally closed
33	R OMS He PRESS/VAP ISOL • A(B) – GPC • B(A) – CL	34 OMS Eng/Xfeed Redundancy	CCTV video TV Annun Its lost if MNB selected for VCU CCTV Mon 2 lost (VTR input lost)	(31) Maintains He Isol redundancy (32) GPC cntl remains. Vlv fails closed
	(O8) • Right OMS TK ISOL A – CL (tb-CL)	8 Supply H2O Dump Isol Cntl	(F7) If APUs active and using BLR CNTLR/HTR 1A or 2B: C/W APU TEMP It – on after ~2 min	(33) Prevents simultaneous opening of parallel reg paths and possibly rupturing burst disk (34) Maintains deorbit capability for CNTL AB1 failure (35) Not yet active on all vehicles (36) Sys B Pri Cntlr, auto switchover to Sec Cntlr remain
	If Supply H2O Dump reqd and DUMP ISOL VLV failed closed: • Perform SUPPLY WATER DUMP USING FES (ORB OPS, ECLS)	EMU 1,2 Pwr/Batt Chgr MNB pwr	SM (BFS,SM) 63 PL BAY DOORS	
	If EMU(s) in battery charge mode: (AW18H) • PWR/BATT CHGR EMU 1(2) BUS SEL – MNA	Aft RCS L,R Jet 1 Htrs Fwd RCS Jet 3 Htrs	If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'	
	GNC 23 RCS • Reprioritize L,R Manf 1, F Manf 3 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc • Set aft pod(s) PRI JET FAIL LIMIT to 3 • Set forward pod PRI JET FAIL LIMIT to 4	Video Cntl Unit MNB pwr	During MAN PLBD OP/CL single mtr run time noted on actuators listed at left	
	If CCTV reqd: (A7U) • TV PWR CONTR UNIT – MNA	35 FC1 Redundant Reac Vlv Cntl on pnl C3	If OMS Gmbl cmd abs value > 2 deg and Sec TVC selected: OMS TVC C/W It 'L OMS GMBL' (3,B)	
	For SSME Hyd Repress: (R4) • HYD MPS/TVC ISOL VLV SYS 1,3 (two) – OP, wait 10 sec, then CL	8 MPS/TVC Hyd Sys 2 Isol Cntl	If first AA failure and S/W Processing Accel data: 'RM FAIL ACC' (3)	
	GNC XXXXX MNVY YYYYY	L OMS Sec TVC	If first RGA failure and rates sensed: 'RM FAIL RGA' (3)	
	Sel L OMS PRI GMBL • ITEM 28 EXEC	Vac Vent Isol MNB Cntl	Star Trkr Dr –Z OP/CL time and –Y CL time incr from 8 to 16 sec	
	(ML31C) • VAC VENT ISOL VLV BUS SEC – MNA	36 NH3 Sys B Sec Cntlr Man capability	L,R ADP deploy times incr from 15 to 30 sec	
	If reqd during entry (< 120 K ft): (L1) • NH3 CNTLR A(B) – PRI/GPC			
	If AC Pwr Transfer Cable to be installed to regain AC: • Go to EPS SSR-200; otherwise, continue with Bus Loss Actions			
	(Continued)	(Continued)		NOM

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(WCS) ● ✓ MODE – AUTO ● ✓ CRADLE – AUTO ● ✓ Hose stowed in cradle ● ✓ WCS ON It – OFF ● FAN SEP SEL sw – OFF ● HOSE BLOCK – SEP 1 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete ● FAN SEP SEL sw – 1			(37) Av Bay 3 Fan ΔP, Air out Temp snrsr lost (38) Not applicable for OV102 (39) Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snrsr lost
(EDO WCS) ● URINAL SEL – SEP 1 ● WCS PWR SEL – AUTO 1, OFF 2 ● URINE DIVERTER VLV FAN SEP 1	Urine Sep 2 Fan 2 Commode Fan 2 Controller MNB pwr Compactor MNB Cntl		(40) Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate, and Accum Qty snrsr lost
(R2) ● BLR CNTLR/HTR 1 – B ● 2 – A	Hyd H2O Blr 1 Cntrl A 2 Cntrl B		(41) Lose Auto Temp Cntl via Cntrl 1 and Cabin Temp, Cabin Hx Air Out Temp, and H2O Loop 1 Cabin Hx In Temp snrsr. Hx Byp Vlv holds position
(L4:F) ● cb AC1 H2O LOOP PUMP 1A/2 (three) – cl			
(L1) ● HUM SEP B – OFF ● A – ON ● IMU FAN B – OFF ● A(C) – ON ● H2O PUMP LOOP 1 – A ● CAB FAN B – OFF ● ✓ A – ON ● AV BAY 1 FAN B – OFF ● A – ON ● 2 FAN A – OFF ● B – ON ● AV BAY 3 FAN A,B (two) – ON ● FREON PUMP LOOP 1 – A	Hum Sep B IMU Fan B H2O Loop 1 Pump B Cabin Fan B AV Bay 1 Fan B AV Bay 2 Fan A AV Bay 3 Sig Condr, Xdcrs (ECLS SC4) Freon Loop 1 Pump B	37	
(MO13Q) If Arlk/Tnl Fan active: ● ARLK FAN B – OFF ● ✓ A – ON	Arlk/Tnl Fan B	38	
(O17:C) ● SIG CONDR FREON A – AC3 ● SIG CONDR FREON B – AC3	Freon Sig Condr A AC2 pwr (ECLS SC 1A) Freon Sig Condr B AC2 pwr (ECLS SC 1B)	39 40	
(CDR's SEAT) ● SEAT PWR – AC3	CDR Seat Adj via AC2 pwr		
(PLT's SEAT) ● SEAT PWR – AC3	PLT Seat Adj via AC2 pwr		
● If Cab Temp Cntrl 1 active: (L1) ● CAB TEMP CNTLR – OFF	Cabin Temp Cntrl 1, Hx Byp Vlv Mtr 1	41	
(MD44F) ● Remove pin from PRI Actuator BYP vlv linkage, connect linkage to SEC Actuator			
(L1) ● CAB TEMP CNTLR – 2			
(Continued)	(Continued)		<div style="text-align: center; font-size: 2em; font-weight: bold;">NOM</div>

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

	BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
42	ONLY ON MCC CALL, PERFORM			<p>④2 AC2 Bus Isolation for AC Pwr Transfer Cable installation accomplished in MNB DA2 Actions column. No additional bus isolation steps reqd</p> <p>④3 If this action taken, activate H2O Pump Loop 2</p> <p>④4 Motor B remains</p> <p>④5 Redundant pwr source remains for equipment</p> <p>④6 H2O Loop 2 ICH Flow Rate snsr lost</p> <p>④7 Other detn in Av Bay remains</p> <p>④8 Current Snsr 1 remains</p> <p>④9 Cntr B remains</p>
43	(L1) • H2O PUMP LOOP 1 – OFF			
	(C2) • CRT 2 PWR – OFF			
	(C3) • MSTR MADS PWR – OFF			
	(F8) • INST PWR – OFF	R Inst Pwr (APU/HYD Meters, R HSI,AMI,AVVI)		
	(L4:N) • cb AC2 ΦC RAD ISOL A – op	44 Freon Loop 1,2 Rad Isol Motor A		
	(O6) • STAR TRKR PWR –Y – OFF	–Y Star Tracker		
	(O8) • RADAR ALTM 2 – OFF • MLS 2 – OFF			
	(O15:A) • RGA 2 – OFF	RGA 2		
	(O15:B) cb MNB OI SIG CONDR			
45	• OF 1/4 B – op			
45	• OF 2/3 A – op			
	cb MNB			
45	• OM 1/2 B – op			
45	• OI MDM OF 1/2 B – op			
	• OI SIG CONDR OM 3A – op			
45	• OI H2O BYP LOOP 2 SNSR – op	46 H2O Byp Loop 2 Snsr (ECLS SC12)		
	(O15:B) • cb MNA CONTR – op • MSN TIMER AFT – op • EVENT TIMER FWD – op	Aft Mission Timer Fwd Event Timer		
	(O15:C) cb MNB			
	• TACAN 2 – op	Tacan 2		
47	• SMOKE DETN BAY 1B/3A – op	Av Bay 1 Smoke Det B, Av Bay 3 Smoke Det A		
	• FIRE SUPPR BAY 1 – op			
	• UTIL PWR F1/MO13Q – op	MNB Utility pwr		
	• FLOOD R CNSL – op			
	• L CTR – op	R Console Floodlt L Seat/Ctr Console Floodlt		
	• ANNUN FWD ACA 1 – op			
	• ANNUN FWD ACA 2/3 – op			
	• ANNUN AFT ACA 4/5 – op			
	• CRYO O2 HTR TK2 SNSR 2 – op	48 Cryo O2 Tk2 Htr Current Snsr 2		
	(A15:H,I,J,K) • cb MNB TK6-TK9 O2 HTR SNSR 2 – op	48 Cryo O2 Tk6-9 Htr Current Snsr 2		
	(O15:D) cb MNB			
49	• FREON RAD CNTLR 1 – op			
49	• FREON RAD CNTLR 2 – op			
	• PPO2 C CAB dP/dT – op			
	(Continued)	(Continued)		NOM

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			⑧ Vlv holds position
50 <ul style="list-style-type: none"> ● N2 SPLY 2 – op ● O2/N2 CNTLR – op ● O2 XOVR 2 – op ● N2 REG INLET 2 – op ● CAB RELIEF A – op ● NWS – op 	Cabin Relief Vlv A Cntl NWS – 2		④⑤ Redundant pwr source remains for equipment
45 45 (O15:E) cb MNB <ul style="list-style-type: none"> ● RDR ALTM 2 – op ● MLS 2 – op ● ADTA 2 – op ● STAR TRKR –Y – op ● ACCEL 2 – op ● DDU L – op <li style="padding-left: 20px;">R – op ● INST R – op ● DRAG CHUTE SYS 2 – op 	8 ADTA 2 AA2		⑤① NWS 1 still available ⑤① CDR Arm remains
(O15:F) <ul style="list-style-type: none"> ● MMU 2 – OFF 	51 Drag Chute, PLT Arm		⑤② Six vlvs fail to non-isolation position
	52 ASA 4 Isol		⑤③ KU-BAND ANTENNA: CONTINGENCY STOW – W/EVA ANT GIMBAL ALIGNMENT (IFM) reqd to stow Ku-Bd. Jettison reqd if antenna cannot be positioned within GO FOR PLBD CLOSURE envelope
	52 ATVC 3 Isol ME 52 4 Isol ME		
(R1) <ul style="list-style-type: none"> ● PL AFT MNB – OFF 	MNB pwr to AUX PLB Bus Aft PL MNB pwr		
(R11U) <ul style="list-style-type: none"> ● FC PURGE VLV 2 – CL ● FC STARTUP HTR 2 – ENA 	FC2 Startup Htr Inhibit capability		
(R14:A) <ul style="list-style-type: none"> ● cb MNB AUD MIDDECK SPKR – op 	OV102 only Middeck SU ATU All except OV102 Middeck ATU		
45 (R14:B) <ul style="list-style-type: none"> ● cb MNB CNTL BUS CA 1/2/3 – op cb PALLET/DSC ● 1B – op (EDO) ● 4B – op (EDO) 	MNB pwr for CNTL CA 1,2,3 Buses		
(R14:C) <ul style="list-style-type: none"> cb MNB KU ● ELEC – op ● ANT HTR – op ● CABLE HTR – op 	53 Ku-Bd sys (I/F and cont Unit, RDR) Sig Proc & Dpy Assy Deployed Assy Htrs		
(R14:D) <ul style="list-style-type: none"> cb MNB ● TV A FWD BAY CAMR/PAN-TILT – op ● TV A FWD BAY CAMR HTR – op ● TV A FWD BAY PAN-TILT HTR – op ● TV CONTR UNIT – op ● TV MON 2 – op 	TV A Fwd Bay Camr/Pan-Tilt TV A Fwd Bay Camr Htr TV A Fwd Bay Camr Pan-Tilt Htr CCTV Mon 2		
(R14:E) <ul style="list-style-type: none"> cb MNB ● OS FLOOD – op ● RMS PORT RMS TV CAMR/PAN-TILT – op ● RMS PORT RMS TV CAMR HTR – op ● RMS PORT RMS TV PAN-TILT HTR – op 	OS Floodt Port RMS Camr/Pan-Tilt Port RMS Camr Htr Port RMS Camr Pan-Tilt Htr		
(Continued)	(Continued)		NOM

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM		DSP SYS PWR SYS 2 tb – OFF	⑧ Vlv holds position
(A7U) PL BAY FLOOD ● FWD BHD – OFF ● MID PORT – OFF ● FWD STBD – OFF	PLB Fwd Blkhd Floodlt Mid Port Floodlt Fwd Stbd Floodlt		②⑤ Htr A remains ⑤④ All docking mechanisms will have single mtr times
(A7L) IF DOCKING MISSION ● cb DEP MNB SYS 2 VENT ISOL – op ● cb DEP MNB SYS 2 VENT – op	Vest Dep Vlv Sys 2 Vent Vent Isol		⑤⑤ Logic buses 1(2) remain pwr'd via MNA(MNC) ⑤⑥ No redundancy
(A7L) IF DOCKING MISSION cb DOCK LT MNB ● TRUSS AFT – op ● VEST STBD – op ● SYS PWR SYS 2 MNB – OFF ● PSU PWR MNB – OFF cb MNB ● LOGIC 1 – op ● 2 – op LIGHTS ● AIRLK 2/3 MNB – OFF	54 MNB A7 Aft Truss Docking It Stbd Vestibule Docking It DSP SYS 2 Pwr PSU MNB Pwr 55 MNB pwr to DSP Logic buses 1,2 External Airlock Its 2,3		
(MA73C:A,B) MCA LOGIC MNB ● FWD 2 – OFF ● AFT 2 – OFF ● MID 1,2,3,4 (four) – OFF	MNB FMC2 Bus pwr AMC2 Bus pwr MMC1, MMC2, MMC3, MMC4 Bus pwr		
(ML86B:A) cb MNB ● H2O LINE HTR B – op ● SUPPLY H2O TKB INLET – op ● SUPPLY H2O TKC OUTLET – op ● SUPPLY H2O DUMP ISOL – op ● SUPPLY H2O B SPLY ISOL VLV – op	8 Sply H2O TKB Inlet Vlv Cntl 8 Sply H2O TKC Outlet Vlv Cntl 8 Sply H2O B Sply ISOL Vlv Cntl		
(ML86B:B) cb MNB ● VAC VENT NOZ HTR – op ● WASTE H2O TK1 DRAIN – op ● SUPPLY H2O TKD INLET – op ● VAC VENT ISOL VLV – op ● WCS CNTLR – op ● GALLEY H2O HTR – op	56 Waste H2O Vac Vent Noz Htr 8 Tk1 Drain Vlv Cntl 8 Sply H2O TKD Inlet Vlv Cntl WCS Press Xdcr Galley H2O Htrs		
(ML86B:D) cb MNB MMU ● PORT,STBD HTR B – op ● GN2 SPLY ISOL VLV B – op	25 MMU Port,Stbd Htr B 8 GN2 Sply Isol Vlv B		
(ML86B:E) cb MNB SEAT ● LEFT – op ● RIGHT – op cb MNB FLOOD ● TNL ADAPT 3 – op cb MNB ● CO2 COM INSTR – op	CO2 Rmvl Sys Filter dP CO2 Rmvl Sys Vacuum Press CO2 Rmvl Sys PPCO2 Snsr Inlet Temp TA Floodlt 3		
(ML86B:F) cb MNB FLOODS ● MIDDECK 2/6 – op ● BUNK 2/4 – op	Middeck Floods 2,6 Bunk Floodlts 2/4		
(Continued)	(Continued)		

NOM

EPS SSR-30 (Cont)
BUS LOSS: MNB DA2

48
57

BUS ISOLATION		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			L MPS He reg A < 680 during entry (MM 303)	④ If five tk sets flown on OV102, O2 TK4B Htrs are disconnected and associated avionics are connected to TK5A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4A,4B Htrs are wired in parallel to TK5A and TK5B Htrs
● PHS – op		PHS Floodlt		⑧ Vlv holds position
● AIRLK 3 – op		Airkl Flood 3		⑬ Vlv holds position. Loss of redundant hyd NLG deploy and NWS redundancy if failed closed
cb MNB CRYO O2		Cryo O2:		④⑧ Current Snsr 1 remains
● HTR TK3 SNSR 2 – op	48	Tk 3 Htr Current Snsr 2		⑤⑦ Current Snsr 2 remains
● TK4 SNSR 1 – op	57	4 Htr Current Snsr 1		⑤⑧ Mtrs 2 stow capability unaffected
	4	MNB pwr to CNTLAB 1,2,3 and CNTLBC 1,2,3		⑤⑨ Redundant coils remain
	58	Port,Stbd Rad Mtrs 2 Dpy capability Port,Stbd Rad Lat 1–6 Mtrs 2		⑥⑩ ✓MCC for OMS Qtys
	59	Fwd RCS Jet 2 Htrs L OMS ENG Press Vlv Coil 2, Cntl Vlv 1,2 Coil 2		⑥⑪ Pwr supply A remains. Turbine speed ind lost
	60	OMS Qty Gauging for all L OMS single engine burns		⑥⑫ Vlv fails closed. Redundant vlv remains
	13	Hyd Brake Isol Vlv 2 Cntl		⑥⑬ Pwr supply B remains. GG Bed T and GBX P lost when APU running
	61	APU 1 Cntrl Pwr Sply B		⑥⑭ Cntrls A,B Rad Byp Vlv Mtrs Auto Cntl and Cntrl B Rad Byp Vlv Mtr Man Cntl remain
	62	1 Fuel Tk Vlv B		⑥⑮ Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains
	63	2 Cntrl Pwr Sply A 2 Fuel Tk Vlv A APU 2 GBX GN2 Repress Vlv Hyd Rsvr 2 Qty Snsr		⑥⑯ Mtr 1 remains
	64	Freon Loop 2 Cntrl A Rad Byp Vlv Mtr Man Cntl		⑥⑰ Htr Cntrl 1 remains
	65	Freon Loop 1 Cntrl A Rad Byp Vlv Mtr		⑥⑱ ✓MCC for stow reqmts
	8	Freon Loop 1 Flow Prop Vlv Freon Loop 1 Cold Plate Flow Xdcr		
	66	L,R ADP Dpy Mtrs 2		
	67	Htr Cntrl 2 RH Vents 1,2,6,8,9 Mtrs 2 LH Vents 1,2,3,5,8,9 Mtrs 2		
		Tacan 2		
		NLG B/U Rel and Ext Sys 2 LMG, RMG B/U Rel Sys 2		
		–Y Star Trkr Dr OP and Sys 2 CL capability –Z Star Trkr Dr Sys 1 OP/CL capability		
	68	PL Reten Sys B Rel/Lat Mtrs Ku Ant Sto/Dpy Mtr 2		
	67	MPS: L Eng He Intercon Outlet Vlv		
	64	L Eng He Isol A		
	64	Pneu He Isol 2		
	70	Prplt F/D Inbd LO2 Vlv		
	70	Outbd LH2 Vlv		
	71	Manf Repress LH2 Vlv 1,2		
	72	ET Door Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Closure Mtr 2 Uplock Lat Mtr 2		
	73	NWS Hyd Sys 2		
	13	LG Extend Vlv 2		
		Ops Hyd Actr Instr		
	74	Hyd Main Pump 2 Depress Solenoid RPC A		
	74	Hyd Main Pump 1 Depress Solenoid RPC B		
			NOTES (Cont)	
			⑥⑲ Vlv fails closed	⑥⑵ Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains
			⑦⑰ Vlv holds position. Loss of manual capability to inert LO2 and LH2 Manf	⑥⑶ Mtr 1 remains
			⑦⑱ Vlv fails closed. LH2 Manf will not be pressurized with He during entry (MM304)	⑥⑷ Htr Cntrl 1 remains
			⑦⑲ Redundant mtrs remain	⑥⑸ ✓MCC for stow reqmts
			⑦⑳ Hyd Sys 1 still available for NWS	
			⑦⑲ Redundant RPC remains	

NOM

EPS SSR-31
BUS LOSS: MNB FPC2 (Includes MNB FLC2, MNB FMC2, AC2)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 <ul style="list-style-type: none"> Perform FC2 SHUTDN (FC SHUTDN Cue Card), pwrdrn not needed, then: 	2 FC2 Pumps and pH Snsr	MASTER ALARM Light/Tone – on CRT 2 blanks	<p>① TIME CRITICAL *</p> <p>FC2 must be shutdn within 9 min to avoid potentially hazardous condition</p> <p>② Will be repwrdr after AC Pwr Transfer Cable connected</p> <p>③ Man CL and full GPC cntl remains. Vlv holds position</p> <p>④ Man OP capability remains. Vlv holds position</p> <p>⑤ Do not reconfig for reg switch or I'CNCT procedures</p> <p>⑥ Rad isolation may cause FES shutdown</p> <p>⑦ REACQ and PSP reconfig procedures are flight specific. If reqd, procedures can be found in payload or ISS specific books</p> <p>⑧ When gear deployed, tb will not indicate DN</p> <p>⑨ OIU 2 interfaces with PSP 2 for commanding</p> <p>⑩ Vlv holds position</p>
(R1) <ul style="list-style-type: none"> cb AC CONTR AC2 (three) – cl INV/AC BUS 2 – OFF (tb-OFF) INV PWR 2 – OFF (tb-OFF) cb AC CONTR AC2 (three) – op 	AC2 ΦA,ΦB,ΦC Inverters	(F7) C/W FC PUMP It – on C/W AC VOLT It – on C/W FREON LOOP It – on C/W AV BAY/CAB AIR SM ALERT Light/Tone – on	
(L4:P) <ul style="list-style-type: none"> cb AC3 ΦA LG SNSR 1 – cl 	2 Prox Snsr Electronics Box 2	(F9) AC2 ΦA,ΦB,ΦC AC volts < 90	
Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv only if leak isolation reqd: (O8) <ul style="list-style-type: none"> FWD RCS He PRESS A,B 	3 Fwd RCS He Press Isol A man OP capability 4 Fwd RCS He Press Isol B man CL and full GPC Cntl RCS Manf F2 RJD pwr (F2F,F2R,F2U,F2D)	(COMM LOST) All S-BD A/G voice lost if Sys 1 selected	
(A1L) S-BD PM <ul style="list-style-type: none"> ANT SW ELEC – 2 XPNDR – 2 PWR AMPL OPER – 2 STBY – 2 PRE AMPL – 2 NSP PWR – 2 	S-BD PM Sys 1: Xpndr 1 Pre-Amp 1 Pwr Amp 1 PM, FM Ant Sw 1 NSP 1/COMSEC 1	(LIGHTS LOST) Right Ovhd pnl (pnls O1, O2,O3,O8,O9,O16,O17) Right pnl (pnls F4,F8,F9, R1,R2,R4) Ovhd Instr (pnls O1,O2,O3) Orbit Sta Numeric lts (pnls A2,A4)	
If simo loss of MNA & MNB: <ul style="list-style-type: none"> NSP ENCRYPTION MODE – SEL NSP ENCRYPTION SEL – BYP 	-----	(FSMs) S67 FPC/FLC 2 S67 AC VOLTS 2 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T (B) SM0 THRM HYD (B) S66 AV BAY 1,2 FAN S66 AV BAY 3 FAN S69 FC PUMP 2 S69 FC H2 PUMP 2 S88 FRN AFT CP 1 S88 FREON FLOW 1 S88 FRN PL HX 1	
If PSP and/or INTRG reqd for PL or ISS ops: <ul style="list-style-type: none"> S-BD PL PWR SYS – 2 CNTL – PNL – CMD 	S-BD PL Intrg 1 PSP 1	6 Possible 'S88 EVAP OUT T 1(2)'	
7 <ul style="list-style-type: none"> Reconfig PSP Perform PL INTRG REACQ (if reqd) 	-----	RM DLMA MANF S88 I/O ERROR CRT 2 S66 CABIN FAN S66 IMU FAN DP S66 IMU FN SPD B	
(A1R) <ul style="list-style-type: none"> S-BD FM PWR – 2 	S-BD FM Sys 1	(F6/F8) LDG GEAR L, NOSE tb – bp	
If no comm: (C3) <ul style="list-style-type: none"> S-BD PM CNTL – PNL – CMD 	-----	(F8) APU H2O QTY 1 ind – 0% HYD QTY 2 ind – 0%	
9 If OIU reqd: (SSP) <ul style="list-style-type: none"> OIU PWR – OIU 2 ON OIU tb – DN ✓MCC, OIU reconfig 	-----	(R1) FC2 COOL PUMP ΔP tb – bp	
(C2) <ul style="list-style-type: none"> R CRT SEL – 3 GPC/CRT O2 EXEC 	DEU/CRT 2	(O8) FWD RCS He PRESS B tb – bp FWD RCS MANF ISOL 2 tb – bp	
(A14) <ul style="list-style-type: none"> RCS/OMS HTR FWD RCS A AUTO 	Fwd RCS Htrs B (all)	(O1) AIR TEMP AV BAY 3 ind – 45 degF AIR TEMP CAB HX OUT ind – 45 degF FREON FLOW LOOP 1 ind – 578 pph	
(Continued)	(Continued)	(Continued)		NOM

EPS SSR-31 (Cont)
BUS LOSS: MNB FPC2

	ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	DPS UTILITY (G2,G8,S2)		(A4) MSN and EVENT TIME ind - blank	(11) Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION prepositioning
11	MMU ASSIGN • GNC - ITEM 2 EXEC • SM - ITEM 3 EXEC • PL - ITEM 5 EXEC	MMU 2	L,R ADP deploy times incr from 15 to 30 sec	(12) FSM caused by antenna miscompare
	If EMU(s) in battery charge mode: (AW18H) • PWR/BATT CHGR EMU 1(2) BUS SEL - MNA	EMU 1,2 Pwr/Batt Chgr MNB pwr	12 If site AOS and using S-BD Ant Elec 1: 'ANTENNA' (2) -Y,-Z Star Trkr Drs OP/CL time incr from 8 to 16 sec	(13) Instrumentation loss caused rad isolation
	Pre-seat ingress for Entry: • Discharge handheld fire ext into AV BAY 1	Av Bay 1 agent discharge capability	If Sys 1 pwrd: 'S62 BCE BYP PSP1' Loss of PL TLM and CMD	(14) AV Bay 3 Fan ΔP Air Out Temp Snrs lost
	If AC Pwr Cable to be installed to regain AC: • Go to EPS SSR-200; otherwise, continue with Bus Loss Actions		If PDI FDA Enabled: 'S62 PDI DECOM FAIL'	(15) Not applicable for OV102
	(R2) • BLR CNTLR/HTR 1 - B • 2 - A	Hyd H2O Blr 1 Cntrl A 2 Cntrl B RSVR 2 Qty Snsr	If NSP 1 selected: 'BCE STRG 1 NSP'	(16) Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate and Accum Qty Snrs lost
13	• Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 2		If Freon Loop 1 Pump B ON: 'S88 FREON FLOW 1' 'S88 FRN AFT CP 1' 'S88 FRN PL HX 1'	(17) Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate and Accum Qty Snrs lost
	(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) - cl		If Freon Sig Condr A(B) (O17:C) in AC2 position: 'S88 FREON FLOW 2(1)' 'S88 FRN PL HX 1(2)' 'S88 FREON QTY 2(1)'	
	(L1) • HUM SEP B - OFF • A - ON • CAB FAN B - OFF • A - ON • IMU FAN B - OFF • A(C) - ON • H2O PUMP LOOP 1 - A • AV BAY 1 FAN B - OFF • A - ON • 2 FAN A - OFF • B - ON • AV BAY 3 FAN A,B (two) - ON • FREON PUMP LOOP 1 - A • 2 - A	Humidity Sep B Cabin Fan B IMU Fan B H2O Loop 1 Pump B Av Bay 1 Fan B Av Bay 2 Fan A	(O1) FREON FLOW LOOP 2(1) ind - 578 pph	
	(MO13Q) If Arlk/Tnl Fan active: • ARLK FAN B - OFF • √A - ON	14 Av Bay 3 Sig Condr, Xdcrs (ECLS SC4) Freon Loop 1 Pump B	If H2O Loop 1 Pump B ON: C/W H2O LOOP It 'S88 H2O PUMP P 1' 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP'	
15		Arlk/Tnl Fan B	(O1) H2O PUMP OUT PRESS LOOP 1 ind - 20-25 psia	
	(O17:C) • SIG COND R FREON A - AC3 • SIG COND R FREON B - AC3	16 Freon Sig Condr A AC2 pwr (ECLS SC1A) 17 Freon Sig Condr B AC2 pwr (ECLS SC1B)	(F7) If APUs active and using H2O Blr Cntrl 2B(3A): C/W APU TEMP It after ~2 min	
	(WCS) • √MODE - AUTO • √CRADLE - AUTO • √Hose stowed in cradle • √WCS ON It - OFF • FAN SEP SEL sw - OFF • HOSE BLOCK - SEP 1 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete • FAN SEP SEL sw - 1	WCS Fan/Sep 2	During Rad Dpy/Sto ops: (R13L) RAD LAT CNTL tbs (two) indicate single mtr ops	
	(Continued)	(Continued)		

NOM

EPS SSR-31 (Cont)
BUS LOSS: MNB FPC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	-Y Star Trkr Dr Sys 2 OP/CL capability -Z Star Trkr Dr Sys 1 OP/CL capability		(2) Will be repwrd after AC Pwr Transfer Cable connected
	L,R ADP Dpy Mtrs 2 Htr Cntr 2 RH Vents 1,2,6,8,9 Mtrs 2 LH Vents 1,2,3,5,8,9 Mtrs 2		(25) Redundant mtrs remain (26) Single mtr time. One failure away from EVA to stow MPM or from RMS jettison. May be repwrd after AC Pwr Transfer Cable connected
25	ET Door Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Closure Mtr 2 Uplock Lat Mtr 2		(27) Single mtr time. May be repwrd after AC Pwr Transfer Cable connected
	Tacan 2		(28) ✓MCC for stow reqmts
26	Port RMS: MPM Mtr 2		
27	Fwd MRL Mtr 1		
27	Mid MRL Mtr 2		
2	D&C B/U edge lgt		
28	Ku Ant Sto/Dpy Mtr 2		
	PL Reten Sys B Rel/Lat Mtrs		
	Port,Stbd Rad Lat 1-6 Mtrs 2		
			<p style="text-align: center;">NOM</p>

EPS SSR-32
BUS LOSS: MNB MPC2

(Includes MNB MMC1, MNB MMC2, MNB MMC3, MNB MMC4)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1</p> <ul style="list-style-type: none"> Perform MNB BUS TIE (BUS TIE Cue Card) Monitor, record Δamps between FC2 and tied FC <p>(R1)</p> <ul style="list-style-type: none"> PL CAB – MNA <p>(A8L)</p> <ul style="list-style-type: none"> PORT RMS HTR B – OFF PORT RMS HTR A – AUTO <p>(L1)</p> <ul style="list-style-type: none"> TOP EVAP HTR DUCT – A If Hi Load Evap enabled HI LOAD DUCT HTR – A(C) <p>(L2)</p> <ul style="list-style-type: none"> FLASH EVAP FDLN HTR A SPLY – 1 <p>(A12)</p> <ul style="list-style-type: none"> HYD HTR AFT FUS B – AUTO HYD HTR AFT FUS A – OFF <p>(MA73C:C,D)</p> <ul style="list-style-type: none"> cb MCA PWR AC2 3Φ MID 2 – op cb MCA PWR AC2 3Φ MID 4 – op <p>For PLBD ops:</p> <ul style="list-style-type: none"> OP/CL Drs in man mode <p>(R15:C)</p> <ul style="list-style-type: none"> cb MNB KU ELEC – op ANT HTR – op CABLE HTR – op cb MNC KU SIG PROC – op <p>(ML86B:C)</p> <ul style="list-style-type: none"> cb MNA EXT ARLK HTR STRUC – cl <p>If OIU reqd, ✓MCC: (SSP 1)</p> <ul style="list-style-type: none"> OIU PWR – OIU 1 ON <p>(A1L)</p> <ul style="list-style-type: none"> S-BD PL PWR SYS – 1 CNTL – PNL CMD <p>(Continued)</p>	<p>1 FC2 Purge Vlv O2,H2 Flow Xdcrs SS ΔV Snrs</p> <p>1</p> <p>3 MNB pwr to CABPL1,2,3 Buses</p> <p>4 Port RMS: B/U pwr MPM Mtr 2</p> <p>5 Fwd MRL Mtr 1</p> <p>5 Mid MRL Mtr 2 Htr B</p> <p>Top Evap Duct Fwd,Aft Htrs B HI Load Duct Inbd,Outbd Htrs B</p> <p>FES H2O Fdln A Mid 2 Htr 2</p> <p>Aft Fuselage Hyd Htrs A</p> <p>6 Stbd Rad Lat 1–6 Mtr 2 Limit sw</p> <p>6 Port Rad Lat 1–6 Mtr 2 Limit sw</p> <p>PLBD: C/L Lat 13–16 Mtr 2 Stbd Aft Blkhd Lat Mtr 2 Port Door Mtr 2 Port,Stbd Fwd Blkhd Lat Mtr 2 Stbd Door Mtr 2 Port,Stbd Door Mtr 1 CL Limit sw</p> <p>7 Ext A/L Structural Htrs MNB pwr</p> <p>3 OIU 2 OIU 1 MNB pwr</p> <p>(Continued)</p>	<p>(L2)</p> <p>2 O2 SYS 2 SPLY tb – CL</p> <p>(LIGHTS LOST)</p> <p>PLB Fwd Blkhd Floodlt Mid Port Floodlt Fwd Stbd Floodlt</p> <p>(A8L)</p> <p>PORT RMS: DPY/STO tb – bp RETEN LAT tb – bp R–F–L FWD tb – bp</p> <p>SM 94 PDRS CONTROL</p> <p>Indications lost: MPM Mtr 2 STO/DPY Fwd MRL Mtr 1 LAT/REL/RDY Mid MRL Mtr 2 LAT/REL/RDY</p> <p>(R13L)</p> <p>During Rad Dpy ops: RAD CNTL tbs (two) indicate single mtr ops</p> <p>If in RDR/Comm Track, will break track</p> <p>(A1U)</p> <p>SIG STRENGTH – 0</p> <p>SM 201 ANTENNA</p> <p>SIG STR – 0 Erratic antenna motion</p> <p>SM (BFS SM 63) PL BAY DOORS</p> <p>If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'</p> <p>During MAN PLBD OP/CL single mtr run time noted on actuators listed at left</p> <p>S177 EXTERNAL AIRLOCK</p> <p>Indications lost: EXT A/L PRESS</p> <p>SM 212 OIU</p> <p>OIU 2 TEMP ≥ 140</p> <p>SM 62 PCMMU/PL COMM</p> <p>If OIU 2 active msg, 'S62 PDI DECOM FAIL'</p>	<p>① Buses are tied due to: <u>Loss of FC2 Purge Capability</u>. As FC2 loses performance, tied FC will pick up load, slowing FC2 degradation. If degradation projection does not allow nominal EOM, Fuel Cell will be shut down. ✓MCC and <u>Loss of FC2 SSΔV Snrs</u>. Change in ΔAmps > 12 amps indicates possible cell crossover problem. The ΔAmps shift due to loss of FC2 purge capability is indicated by change in ΔAmps between pre- and post-purge readings. MCC will aid in this determination</p> <p>② Vlv holds position</p> <p>③ Pwrs PL Timing Buffer, OIU 1, and OIU 2 (if flown). OIU 1 redundant pwr MNA MPC1 via CAB PL3</p> <p>④ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison</p> <p>⑤ Single mtr time</p> <p>⑥ If AC2 cbs not opened, Lat Mtrs 2 of actuators for Port and Stbd Rad Lat 1–6 continues to run until Sys B Lat Cntl sw placed to OFF</p> <p>⑦ MNA htrs remain</p>

EPS SSR-32 (Cont)
BUS LOSS: MNB MPC2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM		DSP SYS PWR SYS 2 tb – OFF	<p>② Vlv holds position</p> <p>⑦ MNA htrs remain</p> <p>⑧ All docking mechanisms will have single mtr times</p> <p>⑨ Logic buses 1(2) remain pwr'd via MNA(MNC)</p> <p>⑩ Cntrlrs, A,B Rad Byp Vlv Mtrs Auto Cntl and Cntrl B Rad Byp Vlv Mtr Man Cntl remain</p> <p>⑪ Mtr 2 stow capability remains</p> <p>⑫ Buses remain pwr'd</p> <p>⑬ With an inoperative limit sw, mtr will continue to run until DPY/STO sw placed to GND position</p> <p>⑭ KU-BAND ANTENNA: CONTINGENCY STOW – W/EVA ANT GIMBAL ALIGNMENT (IFM) req'd to stow Ku-Bd. Jettison req'd if ant cannot be positioned within GO FOR PLBD CLOSURE envelope</p> <p>⑮ MNC MMC2 pwr for Ku-Bd Xmit Enable signal remains</p> <p>⑯ MNC MMC2 pwr remains to supply pwr to Boom stow Enable II signal for stow mtrs</p> <p>⑰ Snsr 1 remains</p>
(R11U) ● FC PURGE VLV 2 – CL ● FC STARTUP HTR 2 – ENA	FC2 Startup Htr Inhibit capability		
(A7U) PL BAY FLOOD ● FWD BHD – OFF ● MID PORT – OFF ● FWD STBD – OFF	PLB Fwd Blkhd Floodlt Mid Port Floodlt Fwd Stbd Floodlt		
ONLY ON MCC CALL, PERFORM			
(A7L) IF DOCKING MISSION ● cb DEP MNB SYS 2 VENT ISOL – op ● cb DEP MNB SYS 2 VENT – op	Vest Dep Vlv Sys 2 Vent Vent Is		
(A7L) IF DOCKING MISSION cb DOCK LT MNB ● TRUSS AFT – op ● VEST STBD – op ● SYS PWR SYS 2 MNB – OFF ● PSU PWR MNB – OFF cb MNB ● LOGIC 1 – op ● 2 – op LIGHTS ● AIRLK 2/3 MNB – OFF	MNB A7 Aft Truss Docking It Stbd Vestibule Docking It DSP SYS 2 pwr PSU MNB pwr	8	
(A7L) ● MADS PCM – OFF	MADS PCM		
(MA73C:A,B) ● MCA LOGIC MNB MID (four) – OFF	MNB MMC1,2,3,4 Bus pwr	9	
	Freon Loop 2 Cntrl A Rad Byp Vlv Mtr Man Cntl Atm Press Cntl O2 Sys 2 Sply Vlv Cntl	10 2	
	Port,Stbd Rad Mtrs 2 Dpy capability LH Vent 3,5 Mtrs 2 RH Vent 6 Mtrs 2	11	
	MNB pwr to ESS1BC, ESS3AB AUX PLB BUS Pwr	12	
	Ku Ant Sto/Dpy Mtr 2 Sto and Dpy Limit sw	13	
	Ku-Bd Sys Deployed Assy including Htr Ckts (Rdr & Comm)	14	
	Redundant Ku-Bd Xmit Enable	15	
	Redundant Ku-Bd Boom Stow Enable II Excitation Signal	16	
(A15:H,I,J,K) ● cb MNB TK6-TK9 O2 HTR SNSR 2 – op	Cryo O2 Tk 6-9 Htr Current Snsr 2	17	
	FC1 Redundant Reac Vlv Close Cntl on pnl C3		
(ML86B:C) ● cb MNB EXT ARLK HTR STRUC – op	Ext A/L Structural Htrs MNB pwr	7	

EPS SSR-34
BUS LOSS: MNB APC5

(Includes MNB APC2, MNB ALC2, MNB AMC2)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A12)</p> <p>2 APU HTR</p> <ul style="list-style-type: none"> • GAS GEN/FUEL PUMP 1 – A AUTO <p>2</p> <ul style="list-style-type: none"> • GAS GEN/FUEL PUMP 2 – B AUTO • LUBE OIL LINE 1 – A AUTO • LUBE OIL LINE 2 – B AUTO <p>APU HTR TK/FU LINE/H2O</p> <p>2</p> <ul style="list-style-type: none"> • SYS 1A – AUTO • 1B – OFF <p>2</p> <ul style="list-style-type: none"> • 2A – OFF <p>2</p> <ul style="list-style-type: none"> • 2B – AUTO <p>HYD HTR</p> <ul style="list-style-type: none"> • RUD SPD BK A – AUTO • B – OFF • BDY FLP A – AUTO • B – OFF • ELEV A – AUTO • B – OFF <p>HYD CIRC PUMP</p> <ul style="list-style-type: none"> • PWR 1 – MNA • 2 – MNC 	<p>APU 1 GG/Fu Pump Htrs B</p> <p>APU 2 GG/Fu Pump Htrs A</p> <p>APU 1 Lube Oil Line Htrs B</p> <p>APU 2 Lube Oil Line Htrs A</p> <p>APU 1 Tk/Fu Line Htr B GG Inj H2O Htrs B 2 Tk/Fu Line Htr A</p> <p>Body Flap Htr B Elev Act Htr B</p> <p>Rudder/Speed Brake Htr B</p> <p>Circ Pump 1 MNB pwr 2 MNB pwr</p> <p>FES Sec Cntrlr</p> <p>Top Evap L Noz Htr B</p> <p>Top Evap R Noz Htr A</p> <p>Top Evap Duct L,R Htrs B Hi Load Duct Noz Htr B</p> <p>FES H2O Fdln A Htrs 2 (all except Mid 2)</p> <p>Hyd H2O Blr 1 Cntrlr A 2 Cntrlr B</p> <p>7 RCS Manf R5 RJD pwr (R5R,R5D)</p> <p>8 Aft L RCS He Pr Isol A man OP capability</p> <p>8 Aft R RCS He Pr Isol A man OP capability</p> <p>5 Aft R RCS He Pr Isol B GPC Cntl and man Cl capability</p> <p>Aft RCS L,R Jets 1 Htrs</p> <p>AFT L,R RCS TK ISOL 3/4/5 B CL microswitch feedback</p>	<p>1 MASTER ALARM Light/Tone – on</p> <p>(R4)</p> <p>3 HYD MPS/TVC ISOL VLV SYS 2 tb – CL</p> <p>4 HYD BRAKE ISOL VLV 2 tb – OP</p> <p>5 (O7) AFT R RCS He PRESS B tb – bp</p> <p>6 AFT L,R RCS TK ISOL 3/4/5 B tb – bp (if vlv in CL position)</p> <p>(F7) If APUs active and using BLR CNTLR/HTR 1A or 2B: C/W APU TEMP It – on after ~ 2 min</p> <p>If OMS GMBL cmd abs valve > 2 deg and Sec TVC selected: C/W OMS TVC It – on 'L OMS GMBL' (3,B)</p> <p>If first RGA failure and rates sensed: 'RM FAIL RGA' (3)</p> <p>1 (F7) C/W RCS JET It – on</p> <p>(FSM) 1 R RCS D,R JET</p>	<p>① Indications do not appear until jet commanded</p> <p>②</p> <p style="text-align: center;">* [TIME CRITICAL] *</p> <p>If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p> <p>③ Vlv holds position</p> <p>④ Vlv holds position. Loss of redundant hyd NLG deploy and NWS hyd redundancy if failed closed</p> <p>⑤ Man OP capability remains. Vlv holds position</p> <p>⑥ Full vlv capability remains. If switch in CL, vlv will continuously drive to CL position</p> <p>⑦ Manf status <u>not</u> automatically declared closed. Fail-offs will occur when jet commanded</p> <p>⑧ Man CL and GPC cntl remains. Vlv holds position</p> <p>⑨ Do not reconfig for reg switch or 'CNCT procedures</p>
<p>(L1)</p> <ul style="list-style-type: none"> • FLASH EVAP CNTLR PRI A(B) – ON (if reqd) • TOP EVAP HTR NOZ L – A AUTO • TOP EVAP HTR NOZ R – B AUTO • TOP EVAP HTR DUCT – A <p>If Hi Load Evap enabled</p> <ul style="list-style-type: none"> • HI LOAD DUCT HTR – A(C) <p>(L2)</p> <ul style="list-style-type: none"> • FLASH EVAP FDLN HTR A SPLY – 1 <p>(R2)</p> <ul style="list-style-type: none"> • BLR CNTLR/HTR 1 – B • 2 – A <p>• For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS)</p> <p>Refer to OMS/RCS Slide Rule for vlv loss info</p> <p>9 Reconfig following vlv(s) only if leak isolation reqd:</p> <p>(O7)</p> <ul style="list-style-type: none"> • AFT R RCS He PRESS A,B • L RCS He PRESS A <p style="border: 1px solid black; padding: 2px;">GNC 23 RCS</p> <ul style="list-style-type: none"> • Reprioritize L,R Manf 1 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc • Set aft pod(s) PRI JET FAIL LIMIT to 3 <p>If ICNCT config: (O7)</p> <p>6</p> <ul style="list-style-type: none"> • AFT L RCS TK ISOL 3/4/5 B – GPC (tb-bp) • AFT R RCS TK ISOL 3/4/5 B – GPC (tb-bp) 	<p>(Continued)</p>	<p>(Continued)</p>	

EPS SSR-34 (Cont)
BUS LOSS: MNB APC5

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	<p>Freon Loop 1 Cold Plate Flow Xdcr</p> <p>26 APU 1 Cntrl Pwr Sply B</p> <p>27 Fu Tk Vlv B</p> <p>28 2 Cntrl Pwr Sply A</p> <p>29 Fu Tk Vlv A GBX GN2 Repress Vlv</p> <p>MPS:</p> <p>30 L Eng He Intercon Outlet Vlv</p> <p>31 L Eng He Isol A</p> <p>Pneu He Isol 2</p> <p>32 Prplt F/D Inbd LO2 Vlv</p> <p>32 Outbd LH2 Vlv</p> <p>33 Manf Repress LH2 Vlv 1,2</p> <p>34 ET Door Mtrs: C/L Lat Actr 1 Mtr 2 GPC Cntl L Dr Uplock Lat Mtr 2 GPC Lat capability R Dr Uplock Lat Mtr 2 GPC Lat capability R Dr Closure Mtr 2 GPC CL capability</p> <p>35 AC pwr removal capability via Limit sw for ET Dr Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Uplock Lat Mtr 2 Closure Mtr 2</p>	<p>L MPS He Reg A < 680 during entry (MM 303)</p>	<p>②⑥ Pwr Sply A remains. Turbine speed ind lost</p> <p>②⑦ Vlv A remains</p> <p>②⑧ Pwr Sply B remains. GG Bed T and GBX P ind lost when APU running</p> <p>②⑨ Vlv B remains</p> <p>③⑩ Vlv fails closed</p> <p>③① Vlv fails closed. Redundant vlv remains</p> <p>③② Vlv holds position. Loss of manual capability to inert LO2 and LH2 manfs</p> <p>③③ Vlv fails closed. LH2 Manf will not be pressurized with He during entry (MM304)</p> <p>③④ Redundant mtrs remain</p> <p>③⑤ Actuators continue to operate until Stow, Rel/Lat, or OP/CL sw is taken to OFF</p>

**EPS SSR-35
BUS LOSS: MNB FLC2**

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
3	Refer to OMS/RCS Slide Rule for valve loss info Reconfig following vlv(s) only if leak isolation reqd: (O8) ● FWD RCS He PRESS A,B	1	Fwd RCS He Press Isol A man OP capability	2	MASTER ALARM Light/Tone – on	① Man CL and full GPC cntl remains. Vlv holds position ② Indications do not appear until jet commanded ③ Do not reconfig for reg switch or I'CNCT procedures ④ Man OP capability remains. Vlv holds position ⑤ FSM caused by antenna miscompare ⑥ REACQ and PSP reconfig procedures are flight specific. If reqd, procedure can be found in payload or ISS specific books ⑦ When gear deployed, tb will not indicate DN ⑧ OIU 2 interfaces with PSP 2 for commanding ⑨ Manf status <u>not</u> automatically declared closed. Jet fail-offs may occur ⑩ Htr Cntr 1 remains	
	(A1L) S-BD PM ● ANT SW ELEC – 2 ● XPNDR – 2 ● PWR AMPL OPER – 2 ● STBY – 2 ● PRE AMP – 2 ● NSP PWR – 2	4	Fwd RCS He Press Isol B man CL and GPC Cntl	S-BD PM Sys 1: Xpnder 1 Pre Amp 1 Pwr Amp 1 FM, PM Auto sw 1	2		(F7) C/W RCS JET It – on
							(COMM LOST) All S-BD A/G voice lost if Sys 1 selected
6	If PSP and/or INTRG reqd for PL or ISS ops: ● S-BD PL PWR SYS – 2 ● CNTL – PNL ● – CMD ● Reconfig PSP ● Perform PL INTRG REACQ (if reqd)	NSP 1	S-BD PL Intrg 1 PSP 1	2	(FSM) 'F RCS D(F,R,U) JET'		
					5		If site AOS and using S-BD ANT ELEC 1: 'ANTENNA' (2)
8	If no comm: (C3) ● S-BD PM CNTL – PNL ● – CMD			7	If sys 1 pwrd: 'S62 BCE BYP PSP1' Loss of PL TLM and CMD		
					If PDI FDA enabled: 'S62 PDI DECOM FAIL'		
9	If OIU reqd: (SSP) ● OIU PWR – OIU 2 ON ● OIU tb – DN ● ✓ MCC, OIU reconfig			4	If NSP 1 selected, 'BCE STRG 1 NSP'		
					(F6/F8) LDG GEAR L,NOSE tb – bp		
	(A1R) ● S-BD FM PWR – 2		S-BD FM Sys 1		(O8) FWD RCS He PRESS B tb – bp		
BUS ISOLATION ONLY ON MCC CALL, PERFORM (O15:C) ● cb MNB FIRE SUPPR BAY 1 – op							
		10	L,R ADP Htr Cntr 2				
			LMG, NLG, B/U Rel 2 Fire 2, Arm				

**EPS SSR-36
BUS LOSS: MNB ALC2**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A12)</p> <p>2 APU HTR</p> <ul style="list-style-type: none"> • GAS GEN/FUEL PUMP 1 – A AUTO <p>2</p> <ul style="list-style-type: none"> • GAS GEN/FUEL PUMP 2 – B AUTO • LUBE OIL LINE 1 – A AUTO • LUBE OIL LINE 2 – B AUTO <p>2 APU HTR TK/FU LINE/H2O</p> <ul style="list-style-type: none"> • SYS 1A – AUTO • 1B – OFF • 2A – OFF • 2B – AUTO <p>2 HYD HTR</p> <ul style="list-style-type: none"> • RUD SPD BRK A – AUTO • B – OFF • BDY FLP A – AUTO • B – OFF • ELEV A – AUTO • B – OFF <p>HYD CIRC PUMP</p> <ul style="list-style-type: none"> • PWR 1 – MNA • 2 – MNC 	<p>APU 1 GG/Fu Pump Htrs B</p> <p>APU 2 GG/Fu Pump Htrs A</p> <p>APU 1 Lube Oil Line Htrs B</p> <p>APU 2 Lube Oil Line Htrs A</p> <p>APU 1 Tk/Fu Line Htr B</p> <p>APU 2 Tk/Fu Line Htr A</p> <p>Body Flap Htr B</p> <p>Elev Act Htr B</p> <p>Rud/Spd Brake Htr B</p> <p>Circ Pump 1 MNB pwr 2 MNB pwr</p>	<p>1 MASTER ALARM Light/Tone – on</p> <p>(R4)</p> <p>3 HYD BRAKE ISOL VLV 2 tb – OP</p> <p>4 HYD MPS/TVC ISOL VLV SYS 2 tb – CL</p> <p>(O7)</p> <p>5 AFT R RCS He PRESS B tb – bp</p> <p>6 AFT L,R RCS TK ISOL 3/4/5 B tb – bp (if vlv in CL position)</p> <p>(F7)</p> <p>If APUs active and using BLR CNTLR/HTR 1A or 2B: C/W APU TEMP lt – on after ~2 min</p> <p>(F7)</p> <p>1 C/W RCS JET lt – on</p> <p>(FSM)</p> <p>1 R RCS D,R JET</p>	<p>① Indications do <u>not</u> appear until jet commanded</p> <p>②</p> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> <p>TIME CRITICAL</p> </div> <p>* * *</p> <p>If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p> <p>③ Vlv holds position. Loss of redundant hyd NLG deploy and NWS hyd redundancy if failed closed</p> <p>④ Vlv holds position</p> <p>⑤ Man OP capability remains. Vlv holds position</p> <p>⑥ Full vlv capability remains. If switch in CL, vlv will continuously drive to Cl position</p> <p>⑦ Man CL and full GPC Cntl remains. Vlv holds position</p> <p>⑧ HYD H2O Blr and Tk Htrs still operative, but GN2 SOV fails open and steam vent htr and spray logic are disabled. Alternate controller must be selected</p> <p>⑨ Do not reconfig for reg switch or I'CNCT procedures</p> <p>⑩ Manf status <u>not</u> automatically declared closed. Fail-offs will occur when jet commanded</p>
<p>(L1)</p> <ul style="list-style-type: none"> • FLASH EVAP CNTLR PRI A(B) – ON (if reqd) <p>TOP EVAP HTR</p> <ul style="list-style-type: none"> • NOZ L – A AUTO • R – B AUTO • DUCT – A <p>If Hi Load Evap enabled:</p> <ul style="list-style-type: none"> • HI LOAD DUCT HTR – A(C) 	<p>FES Sec Cntrl</p> <p>Top Evap L Noz Htr B R Noz Htr A Duct L,R Htrs B</p> <p>HI Load Duct Noz Htr B</p>		
<p>(L2)</p> <ul style="list-style-type: none"> • FLASH EVAP FDLN HTR A SPLY – 1 	<p>FES H2O Fdln A Htrs 2 (all except Mid 2)</p>		
<p>(R2)</p> <ul style="list-style-type: none"> • BLR CNTLR/HTR 1 – B • 2 – A 	<p>8 Hyd H2O Blr 1 Cntrl A 2 Cntrl B</p>		
<p>Refer to OMS/RCS Slide Rule for vlv loss info</p> <p>9 Reconfig following vlv(s) only if leak isolation reqd:</p> <p>(O7)</p> <ul style="list-style-type: none"> • AFT R RCS He PRESS A,B • L RCS He PRESS A 	<p>7 Aft L,R RCS He Pr Isol A man OP capability</p> <p>5 Aft R RCS He Pr Isol B GPC Cntl and man CL capability</p>		
<p>For attitude control:</p> <ul style="list-style-type: none"> • Perform LOSS OF VERNIERS (ORB OPS, RCS) 	<p>10 RCS Manf R5 RJD pwr (R5R,R5D)</p>		
<div style="border: 1px solid black; padding: 2px;">GNC 23 RCS</div> <ul style="list-style-type: none"> • Reprioritize L,R Manf 1 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc • Set aft pod(s) PRI JET FAIL LIMIT to 6 	<p>Aft L,R RCS Jet 1 Htrs</p>		
<p>(A14)</p> <ul style="list-style-type: none"> • RCS/OMS HTR OMS CRSFD LINES (two) – A AUTO, B OFF 	<p>OMS Crsfd Ln B Htrs (partial)</p>		
<p>(Continued)</p>	<p>(Continued)</p>		

EPS SSR-36 (Cont)
BUS LOSS: MNB ALC2

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS	NOTES
6	If ICNCT config: (O7) • AFT L RCS TK ISOL 3/4/5 B – GPC (tb-bp) • AFT R RCS TK ISOL 3/4/5 B – GPC (tb-bp)	6	AFT L,R RCS TK ISOL 3/4/5 B CL microswitch feedback	L MPS He Reg A < 680 during entry (MM303)	(3) Vlv holds position. Loss of redundant hyd NLG deploy and NWS hyd redundancy if failed closed (4) Vlv holds position (6) Full vlv capability remains. If switch in CL, vlv will continuously drive to CI position (11) Maintains deorbit capability for CNTL AB1 failure (12) To maintain He Isol redundancy (13) Man cntl remains (14) Sys B Pri Cntrl, auto switchover to Sec Cntrl remain (15) ✓ MCC for OMS Qtys (16) Vlv fails closed. Redundant vlv remains (17) Hyd Sys 1 still available for NWS (18) Vlv fails closed (19) Vlv holds position. Loss of manual capability to inert LO2,LH2 Manfs (20) Vlv fails closed. LH2 Manf will not be pressurized with He during entry (MM304)
	(O8) • Right OMS TK ISOL A – CL (tb-CL)	11	OMS Eng/Xfeed Redundancy		
	Prior to using L OMS: (O8) L OMS He PRESS/VAP ISOL • A – GPC • B – OP	12	L OMS He Pr Isol B GPC Cntl		
	For SSME Hyd Repress: (R4) • HYD MPS/TVC ISOL VLV SYS 1,3 (two) – OP • Wait 10 sec, then CL	4	MPS/TVC Hyd Sys 2 Isol Cntl		
	If reqd during entry (< 120K ft): (L1) • NH3 CNTLR A(B) – PRI/GPC	14	NH3 Sys B Sec Cntrl man ON capability		
BUS ISOLATION					
ONLY ON MCC CALL, PERFORM					
NONE		13	L OMS Eng Pr Vlv Coil 2 and Cntl Vlv 1,2 Coils 2		
		15	OMS Qty gauging for all L OMS single engine burns		
		16	APU 1 Fu Tk Vlv B		
		16	2 Fu Tk Vlv A		
		4	TVC Hyd Sys 2 Isol Cntl		
		3	Hyd Brake Isol 2 Cnt		
		17	NWS Hyd Sys 2		
		MPS:			
		18	L Eng He Intercon Outlet Vlv		
		16	L Eng He Isol A		
		16	Pneu He Isol 2		
		19	Prplt F/D Inbd LO2 Vlv		
		19	Outbd LH2 Vlv		
		20	Manf Repress LH2 Vlv 1,2		

**EPS SSR-37
BUS LOSS: MNB FMC2**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/ Tone – on	① Redundant mtr remains
(L1) • H2O PUMP LOOP 1 – A	H2O Loop 1 Pump B	(F7) SM ALERT Light/Tone – on	② Htr Cntrl 1 remains
Refer to OMS/RCS Slide Rule for vlv loss info GNC 23 RCS Override F2 Manf status to OP • RCS FWD ITEM 1 EXEC • MANF VLVS 2 OVRD ITEM 41 EXEC		(FSM) RM DLMA MANF	
		(O8) FWD RCS MANF ISOL 2 tb – bp	
		If H2O PUMP LOOP 1,B ON: C/W H2O LOOP It – on 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP' 'S88 H2O PUMP P 1' (O1) H2O PUMP OUT PRESS LOOP 1 ind – 20–25 psia	
		L,R ADP deploy time incr from 15 to 30 sec	
		STAR TRKR DRS POS –Y,–Z OP/CL time incr from 8 to 16 sec	
BUS ISOLATION ONLY ON MCC CALL, PERFORM (MA73C:A) • MCA LOGIC MNB FWD 2 – OFF	MNB FMC2 Bus pwr L,R Vents 1,2 Mtrs 2 1 ADP Deploy Mtrs 2 Deploy Disc 2 2 Htr Cntrl 2 1 –Y Star Trkr Dr Sys 2 OP/CL capability 1 –Z Star Trkr Dr Sys 1 OP/CL capability		

**EPS SSR-38
BUS LOSS: MNB MMC1**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	
BUS ISOLATION ONLY ON MCC CALL, PERFORM (MA73C:A) • MCA LOGIC MNB MID 1 – OFF	MNB MMC1 Bus pwr LH Vent 5 Mtr 2		

EPS SSR-39
BUS LOSS: MNB MMC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1 (MA73C:C)</p> <ul style="list-style-type: none"> • cb MCA PWR AC2 3Φ MID 2 – op <p>For PLBD ops:</p> <ul style="list-style-type: none"> • OP/CL Drs in man mode MANUAL PLBD CLOSING (DEORBIT PREP) 	<p>1 Stbd Rad Lat 1–6 Mtr 2 Limit sw</p> <p>2 Stbd Rad Mtr 2 Dpy capability</p> <p>PLBD: C/L Lat 13–16 Mtr 2 Stbd Aft Blkhd Lat Mtr 2 Port Door Mtr 2 Stbd Door Mtr 1 CL Limit sw</p>	<p>SM (BFS SM 63) PL BAY DOORS</p> <p>If in <u>AUTO</u> OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'</p> <p>-----</p> <p>During <u>MAN</u> PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	<p>① If AC2 cb not opened, Lat Mtr 2 of Stbd Lat 1–6 Actuator continues to run until Sys B Lat Control sw placed to OFF</p> <p>② Mtr 2 stow capability remains</p> <p>③ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison</p>
<p>BUS ISOLATION</p>			
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(MA73C:A)</p> <ul style="list-style-type: none"> • MCA LOGIC MNB MID 2 – OFF 	<p>MNB MMC2 Bus pwr</p>	<p>SM 94 PDRS CONTROL</p> <p>Indication lost: Mid MRL Mtr 1 LAT/REL/RDY</p>	<p>④ Single mtr time</p>
<p></p>	<p>3 Port RMS: MPM Mtr 2</p> <p>4 Fwd MRL Mtr 1</p>	<p>(R13L)</p> <p>During RAD Dpy ops: RAD CNTL STBD tb indicates single mtr ops</p>	
<p></p>	<p>LH Vent 3 Mtr 2</p>		

**EPS SSR-40
BUS LOSS: MNB MMC3**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:B) • MCA LOGIC MNB MID 3 – OFF	MNB MMC3 Bus pwr		

**EPS SSR-41
BUS LOSS: MNB MMC4**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (MA73C:D) • cb MCA PWR AC2 3Φ MID 4 – op	1 Port Rad Lat 1–6 Mtr 2 Limit sw 2 Port Rad Mtr 2 Dpy capability	SM (BFS SM 63) PL BAY DOORS	① If AC2 cb not opened, Lat Mtr 2 of Port Lat 1–6 Actuator continues to run until Sys B Lat Cntl sw placed to OFF
For PLBD ops: • OP/CL Drs in man mode MANUAL PLBD CLOSING (DEORBIT PREP)	PLBD: Port, Stbd Fwd Blkhd Lat Mtrs 2 Stbd Door Mtr 2 Port Door Mtr1 CL Limit sw	If in <u>AUTO</u> OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'	② Mtr 2 stow capability remains
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM		(R13L) During Rad Dpy ops, RAD CNTL PORT tb indicates single mtr ops	③ Single mtr time
(MA73C:B) • MCA LOGIC MNB MID 4 – OFF	MNB MMC4 Bus pwr	SM 94 PDRS CONTROL	④ With inoperative limit sw, mtr will continue to run until DPY/STO sw is placed in GND position
	RH Vent 6 Mtr 2	Indications lost: MPM Mtr 2 STO/DPY Mid MRL Mtr 2 LAT/REL/RDY	⑤ Redundant pwr (MNC) enables Ku-Band xmit
	Port RMS: Mid MRL Mtr 2		⑥ MNC MMC2 pwr remains to supply pwr to Boom Stow Enable II signal for stow mtrs
	3 Ku Ant Sto/Dpy Mtr 2 Sto and Dpy Limit sw		
	4 Redundant Ku-Band Xmit Enable		
	5 Redundant Boom Stow Enable II Excitation Signal		
	6		

**EPS SSR-42
BUS LOSS: MNB AMC2**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	MNB AMC2 Bus pwr LH,RH Vents 8,9 Mtrs 2	NONE	① Redundant mtrs remain
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:B) • MCA LOGIC MNB AFT 2 - OFF	1 ET Door Mtrs: C/L Lat Actr 1 Mtr 2 GPC Cntl L Dr Uplock Lat Mtr 2 GPC Lat capability R Dr Uplock Lat Mtr 2 GPC Lat capability R Dr Closure Mtr 2 GPC CL capability		② Actuators continue to operate until the Stow, Rel/Lat, or OP/CL sw is taken to OFF
	2 AC pwr removal capability via Limit sw for ET Dr Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Uplock Lat Mtr 2 Closure Mtr 2		

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EPS SSR-43
BUS LOSS: MNB R14

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A7U) If CCTV reqd: • TV PWR CONTR UNIT – MNA	Video Cntl Unit MNB pwr	CCTV Video and TV Annun Its lost if MNB selected for VCU CCTV Mon 2 lost	① IDP3, IDP4 ADC data lost. MDU port select may be reqd
(R14:C) • cb MNC KU SIG PROC – op	MDU CDR 2 MDU MFD 1 ADC 1B/2B	OS Floodlt lost	② MNA and MNC pwr sources remain
(A12) If VPU flown • VPU PWR – OFF	VPU OSVS OUT 2A video input to VPU	(FSM) 'BCE BYP KU' (2)	③ Redundant pwr sourc remains for equipment
BUS ISOLATION		(A2) Meters: X-PNTR will display 'OFF' flag Digital – display will blank	④ KU-BAND ANTENNA: CONTINGENCY STOW – W/EVA ANT GIMBAL ALIGNMENT (IFM) reqd to stow Ku-Bd. Jettison reqd if antenna cannot be positioned within GO FOR PLBD CLOSURE envelope
ONLY ON MCC CALL, PERFORM	<u>OV102 only</u> Middeck SU ATU <u>All except OV102</u> Middeck ATU	(F6) MDU CDR 2 blanks	
• MDU CDR 2 PWR – OFF • MDU MFD 1 PWR – OFF		(F7) MDU MFD 1 blanks	
(R14:A) • cb MNB AUD MIDDECK SPKR – op • ADC 1B/2B – op • MDU MFD 1 – op • MDU CDR 2 – op		OSVS OUT 2A video to ISS is lost	
(R14:B) • cb MNB CNTL BUS CA1/2/3 – op cb PALLET/DSC • 1B – op (EDO) • 4B – op (EDO)	2 MNB Pwr for CNTL CA1,2,3 Buses		
(R14:C) cb MNB KU • ELEC – op • ANT HTR – op • CABLE HTR – op	4 Ku-Bd Sys Rdr & Comm I/F Cont Unit (EA-1), RDR Sig Proc, Deployed Assy and Deployed Assy Htrs		
(R14:D) cb MNB TV A FWD BAY • CAMR/PAN-TILT – op • CAMR HTR – op • PAN-TILT HTR – op cb MNB TV • CONTR UNIT – op • MON 2 – op	TV A Fwd Bay Camr and Pan-Tilt TV A Fwd Bay Camr Htr TV A Fwd Bay Camr Pan-Tilt Htr CCTV Mon 2		
(R14:E) • cb MNB OS FLOOD – op cb MNB RMS PORT TV • CAMR/PAN-TILT – op • CAMR HTR – op • PAN-TILT HTR – op	OS Floodlt Port RMS: Camr/Pan-Tilt Camr Htr Camr Pan-Tilt Htr		

EPS SSR-44
BUSS LOSS: MNB O15&A8

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A8L) • PORT RMS HTR B – OFF • PORT RMS HTR A – AUTO	Port RMS: B/U pwr Htr B	NONE	① If Driver sw OFF when bus failed, F2 Manf Drivers lost
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(C3) • MSTR MADS PWR – OFF	All MADS equipment		
	1 RJDF 1A Drivers ON Cntl (Jets F2F,F2R,F2U,F2D)		

MEDS

**EPS SSR-45
BUS LOSS: MNB O15**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (R1) • BUS TIE MNA – ON (tb-ON)		MASTER ALARM Light/Tone – on	① FC1 only one failure away (loss of ESS1BC) from inability to bus tie ② ACAs recovered by switching to alternate pwr ③ Vlv holds position ④ O2/N2 Cntl Vlv 2 normally closed when unpowered ⑤ Vlv fails closed. IFM or real-time flow test will be required. ✓MCC for additional direction ⑥ Current Snsr 1 remains
(L1) • Perform ON-ORBIT RAD CNTLR SWITCH, <u>ECLS</u> SSR-13 for Freon Loop 1,2	Freon Loop 1,2 Rad Cntrl A	(F7) C/W CAB ATM It SM ALERT Light/Tone – on Fwd EVENT TIME ind blank	
(F6,F8) • HSI SEL SOURCE (two) – (other than MLS 2)	MLS 2	(A4) MSN TIME ind blank	
(F6,F8) • RADAR ALTM – 1	RA 2	(O1) CABIN dP/dT ind – .45 O2/N2 FLOW SNSR 1 ind – 0 pph PPO2 SNSR B,C ind – 0 psia	
(O6) ANNUN BUS SEL • ACA 1 – MNA • 2/3 – MNC	2 ACA 1 MNB pwr 2 2/3 MNB pwr	(FSMs) S66 CABIN PPO2 B,C S88 H2O LOOP 2 FLOW SM0 TIRE PRESS ----- If ADTA 2, MLS 2, –Y Star Trkr pwr: BCE STRG 2 ADTA (3,B) BCE STRG 2 MLS (3) BCE STRG 3 STKR (2,3)	
(A6U) • ANNUN BUS SEL – MNC	2 ACA 4/5 MNB pwr	(L2) 6 CABIN RELIEF A tb – bp 6 N2 SYS 2 SPLY tb – bp 6 N2 SYS 2 REG INLET tb – bp	
If on PCS 2: • Perform RECONFIG TO ALT PCS SYS, <u>ECLS</u> SSR-3	3 O2/N2 Cntl Sys 2: 3 N2 Sply Vlv 2 Cntl 3 N2 Reg Inlet Vlv 2 Cntl 4 O2/N2 Cntl Vlv 2 man Cntl 5 O2 Xover Vlv 2 OP capability O2/N2 Sys 2 Flow Xdcrs PPO2 Snsr B,C	If first AA failure and S/W processing accel data: 'RM FAIL ACC' (3)	
• Prior to seat ingress for entry: discharge handheld ext into AV BAY 1	dP/dT Snsr Av Bay 1 Agent discharge capability	(LIGHTS LOST) L Seat/Ctr Cnsl Floodlt R Ovhd Cnsl Floodlt If ACA 1 – MNB, lights lost: (C3) 2 DAP lights left four columns ALL (F2) PBIs except MA	
		If ACA 2/3 – MNB, lights lost: (C3) 2 DAP lights right two columns ALL (F6) Landing Gear ARM/DOWN (L1) Smoke detection, fire suppression ALL	
		If NWS 2 selected: (F3) NWS FAIL It – on	
		2 If ACA 4/5 – MNB, lights lost: (A6U) DAP lights ALL (A7U) Video input, output, Gamma, ALC	

MEDS

EPS SSR-45 (Cont)
BUS LOSS: MNB O15

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			③ Vlv holds position
(O6) ● STAR TRKR PWR -Y - OFF	-Y Star Trkr Dr OP capability Trkr		⑥ Current Snsr 1 remains
(O8) ● RADAR ALTM 2 - OFF ● MLS 2 - OFF			⑦ Redundant pwr source remains
7 (O15:B) cb MNB ● OI SIG CONDR OF 1/4 B - op ● OI SIG CONDR OF 2/3 A - op ● OI SIG CONDR OM 1/2 B - op ● OI MDM OF 1/2 B - op ● OI SIG CONDR OM3 A - op ● OI H2O BYP LOOP 2 SNSR - op ● OI TIRE PRESS - op ● MNA CONTR - op ● MSN TIMER AFT - op ● EVENT TIMER FWD - op	8 H2O Byp Loop 2 Snsr (ECLS SC12) 9 Tire Press Sig Condr A3,A4 Aft Mission Timer Fwd Event Timer		⑧ H2O Loop 2 ICH Flow Rate snsr lost ⑨ Redundant measurement remains. FDA Alarm BFS only; OPS 3,6 ⑩ Cntr B remains ⑪ NWS 1 still available ⑫ CDR Arm remains
----- (O15:C) cb MNB ● TACAN 2 - op ● SMOKE DETN BAY 1B/3A - op ● FIRE SUPPR BAY 1 - op ● UTIL PWR F1/MO13Q - op ● FLOOD R CNSL - op ● L CTR - op ● ANNUN FWD ACA 1,2/3 (two) - op ● ANNUN AFT ACA 4/5 - op ● CRYO O2 HTR TK2 SNSR 2 - op All except OV102 GPS 2 PRE AMPL UPPER - op	Tacan 2 Av Bay 1 Smoke Det B 3 Smoke Det A MNB Utility pwr R Ovhd Console Floodlt L Seat/Ctr Cnsl Floodlts 6 Cryo O2 Tk2 Htr Current Snsr 2		
10 (O15:D) cb MNB ● FREON RAD CNTLR 1,2 (two) - op ● PPO2 C CAB dP/dT - op ● N2 SPLY 2 - op ● O2/N2 CNTLR 2 - op ● O2 XOVR 2 - op ● N2 REG INLET 2 - op ● CAB RELIEF A - op 11 ● NWS - op All except OV102 GPS 2 PRE AMPL LOWER - op	PPO2 Snsr C 3 Cabin Relief Vlv A Cntrl NWS 2		
----- (O15:E) cb MNB ● RADAR ALTM 2 - op ● MLS 2 - op ● ADTA 2 - op ● STAR TRKR -Y - op ● ACCEL 2 - op ● DDU L - op ● R - op ● DRAG CHUTE SYS 2 - op	ADTA 2 AA2 7 Left DDU MNB pwr 7 Right DDU MNB pwr 12 Drag Chute, PLT Arm		

MEDS

EPS SSR-46
BUS LOSS: MNB R1A1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 MNB pwr to CNTLAB 1,2,3 CNTLBC 1,2,3 ESS1BC ESS3AB	NONE	① Buses remain pwrd
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE			

MEDS

EPS SSR-47
BUS LOSS: MNB A6&A14

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">GNC 23 RCS</div> <ul style="list-style-type: none"> • Reprioritize Fwd Manf 2,3 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc • Set forward pod PRI JET FAIL LIMIT to 4 	<p>Fwd RCS Jet 2,3 Htrs</p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">SM 97 RETENTION</div> <p>Indication lost: RELAX DEMATE MATE</p>	<p>① Single mtr time</p>
<p>BUS ISOLATION</p>			
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(C3) • MSTR MADS PWR – OFF</p>	<p>PL Reten Sys B Rel/Lat Mtrs All MADS equipment</p>		
	<p>ROEU Logic Pwr Sys 2 1 Orbiter arm drive mtr (ODM mtr 2 – mate B, demate B, relax B) 1 ODA mtr 2 latch/release</p>		

MEDS

**EPS SSR-48
BUS LOSS: MNB ML86B**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(ML86B:A) ● cb MNA H2O LINE HTR A - cl</p> <p>-----</p> <p>(ML86B:D) cb MNA MMU ● PORT,STBD HTR A (two) - cl</p>	<p>H2O Line Htr B: Waste Dump Line Sply Dump Line Vac Vent Line</p> <p>-----</p> <p>2 MMU Port,Stbd Htr B</p>	<p>(R11L) 1 SPLY H2O 1 DUMP ISOL VLV tb - bp 1 TKB INLET tb - bp 1 TKC OUTLET tb - bp 1 B SPLY ISOL VLV tb - bp</p>	<p>① Vlv holds position</p> <p>② Htr A remains</p> <p>③ MNA,MNC line htrs remain. MNA struct htrs remain</p>
<p>(ML31C) ● VAC VENT ISOL VLV BUS SEL - MNA</p>	<p>Vac Vent Isol Vlv MNB Cntl</p>	<p>(R13L) 1 MMU GN2 SPLY ISOL VLV B tb - bp</p>	
<p>(WCS) ● ✓MODE - AUTO ● ✓CRADLE - AUTO ● ✓Hose stowed in cradle ● ✓WCS ON It - OFF ● FAN SEP SEL sw - OFF ● HOSE BLOCK - SEP 1 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete ● FAN SEP SEL sw - 1</p>	<p>WCS Sep Fan 2 Mtr Relay</p>	<p>(ML31C) 1 WASTE H2O TK1 DRAIN VLV tb - bp 1 SPLY H2O TKD INLET tb - bp</p>	
<p>(EDO WCS) ● WCS PWR SEL - AUTO 1, OFF 2</p>	<p>Controller MNB pwr WCS Compactor MNB Cntl</p>	<p>(LIGHTS LOST) Middeck Floodlts 2,6 Bunk Floodlts 2/4 PHS Floodlt Airlk Floodlt 3 TA Floodlt 3 (SL only)</p>	
<p>(CDR's SEAT) ● CDR SEAT PWR BUS SEL - AC3 (dn)</p>	<p>CDR Seat Adj via AC2 pwr</p>	<p>(MO13Q) 1 ARLK H2O S/O VLV - bp</p>	
<p>(PLT's SEAT) ● PLT SEAT PWR BUS SEL - AC3 (dn)</p>	<p>PLT Seat Adj via AC2 pwr</p>		
<p>If Supply H2O Dump reqd and dump ISOL VLV is failed closed: ● Perform SUPPLY WATER DUMP USING FES (ORB OPS, ECLS)</p>	<p>1 Sply H2O Dump Isol Vlv Cntl</p>		
<p>(ML86B:C) ● cb MNA(MNC) EXT ARLK HTR LINE ZN1 - cl ● cb MNA(MNC) EXT ARLK HTR LINE ZN2 - cl ● cb MNA EXT ARLK HTR STRUC - cl</p>	<p>3 Ext A/L H2O and Structural Htrs MNB pwr</p>		
<p>(Continued)</p>	<p>(Continued)</p>		

MEDS

EPS SSR-48 (Cont)
BUS LOSS: MNB ML86B

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p><u>ONLY ON MCC CALL, PERFORM</u></p>			
<p>(ML86B:A) cb MNB ● SPLY H2O TKB INLET – op ● SPLY TKC OUTLET – op ● DUMP ISOL – op ● SPLY H2O B SPLY ISOL VLV – op ● H2O LINE HTR B – op</p>	<p>Sply H2O: 1 Tk B Inlet Vlv Cntl 1 Tk C Outlet Vlv Cntl 1 B Sply Isol Vlv Cntl</p>		<p>① Vlv holds position ② Htr A remains ③ MNA,MNC line htrs remain. MNA struct htrs remain ④ No redundancy</p>
<p>(ML86B:B) cb MNB ● VAC VENT NOZ HTR – op ● WASTE H2O TK1 DRAIN – op ● SPLY H2O TKD INLET – op ● VAC VENT ISOL VLV – op ● WCS CNTLR – op ● GALLEY H2O HTR – op</p>	<p>4 Waste H2O Vac Vent NozHtr 1 Tk 1 Drain Vlv Cntl 1 Sply H2O Tk D Inlet Vlv Cntl 5 WCS Press Xdcr Galley Hot H2O Htr (Five of six htr strips lost)</p>		<p>⑤ One htr strip pwrd by MNA ML86B still remains. Water will still heat, but at a very slow rate ⑥ One failure away from loss of jettison capability</p>
<p>(ML86B:D) cb MNB MMU ● PORT HTR B – op ● STBD HTR B – op ● GN2 SPLY ISOL VLV B – op cb PYRO JETT SYS A ● PORT RMS – op</p>	<p>2 MMU Port Htr B 2 Stbd Htr B 1 GN2 Sply Isol Vlv B 6 Port RMS: Jett Sys A Deadface Relays</p>		<p>⑦ Current Snsr 1 remains ⑧ Current Snsr 2 remains</p>
<p>(ML86B:E) cb MNB SEAT ● LEFT – op ● RIGHT – op cb MNB FLOOD ● TNL ADAPT 3 – op cb MNB ● CO2 COM INSTR – op</p>	<p>CO2 Rmvl Sys Filter dP CO2 Rmvl Sys Vacuum Press CO2 Rmvl Sys POCO2 Snsr Inlet Temp TA Floodlt 3</p>		<p>⑨ If five tk sets flown on OV102, O2 TK4 B Htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4 A, 4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs</p>
<p>(ML86B:F) cb MNB FLOODS ● MIDDECK 2/6 – op ● BUNK 2/4 – op ● PHS – op ● AIRLK 3 – op cb MNB CRYO</p>	<p>Middeck Floodlts 2,6 Bunk Floodlts 2/4 PHS Floodlt Airlk Floodlt 3</p>		
<p>7 ● O2 HTR TK3 SNSR 2 – op</p>	<p>7 Cryo O2 Tk 3 Htr Current Snsr 2</p>		
<p>8 ● O2 HTR TK4 SNSR 1 – op</p>	<p>8 Cryo O2 Tk 4 Htr Current Snsr 1</p>		
<p>(ML86B:C) ● cb MNB EXT ARLK HTR LINE ZN1 – op ● cb MNB EXT ARLK HTR LINE ZN2 – op ● cb MNB EXT ARLK HTR STRUC – op ● cb MNB EXT ARLK HTR S/O VLV – op</p>	<p>3 Ext A/L H2O Line and Structural Htrs MNB pwr 1 A/L H2O Isol Vlv Cntl</p>		

MEDS

EPS SSR-49a
BUS LOSS: MNB PPC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A15:C) <ul style="list-style-type: none"> • PALLET HTRS B – OFF • A – AUTO 	Pallet Structural Htrs B	SM ALERT Light/Tone – on (FSMs) 168 PALLET V B	① MNA PPC1 will now supply 100% of pwr to A and B Cryo Tk Htrs
(A15:D,E,F,G) <ul style="list-style-type: none"> • ✓ That at least one Htr (A or B) per Tk turned off 	1 Redundant pwr to Pallet Cryo Tk 6–9 Htrs B	SM 168 CRYO PALLET Pallet Volts MNB –0 ↓	
BUS ISOLATION ONLY ON MCC CALL, PERFORM (A15:B) <ul style="list-style-type: none"> • PALLET PWR MNB – OFF 			

EPS SSR-49b
BUS LOSS: MNB A15EDO

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE			① Snsr 1 remains
BUS ISOLATION ONLY ON MCC CALL, PERFORM (A15:H,I,J,K) <ul style="list-style-type: none"> • cb MNB TK6–TK9 O2 HTR SNSR 2 – op 	1 Cryo O2 Tk 6–9 Htr Current Snsr 2		

EPS SSR-49c
BUS LOSS: MNB A7

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE			① DSP SYS 2 pwr still available to all users except MNB A7
BUS ISOLATION ONLY ON MCC CALL, PERFORM (A7L) IF DOCKING MISSION <ul style="list-style-type: none"> • cb DEP MNB SYS 2 VENT ISOL – op • cb DEP MNB SYS 2 VENT – op • LTS AIRLK 2/3 MNB – OFF • cb DOCK LT MNB TRUSS AFT – op 	Vestibule Depress Vlv Sys 2 Vent Isol Vestibule Depress Vlv Sys 2 Vent External Airlock Its 2,3 Aft Truss Docking It	1 VEST DEP VLV SYS 2 VENT ISOL tb – bp VEST DEP VLV SYS 2 VENT tb – bp DSP SYS PWR SYS 2 tb – OFF	

MEDS

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**EPS SSR-50
BUS LOSS: MNC DA3**

(Includes all MNC sub-buses & AC3)

EPS MNC
SSR 50-66

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 2 • Perform FC3 SHUTDN (FC_SHUTDN Cue Card)	2 1 FC3 Pumps and pH Snr Purge Vlv O2,H2 Flow Xdcrs Cell Perf Monitor	SM ALERT Light/Tone – on MASTER ALARM Light/Tone – on	① Because of FC3 Purge Vlv loss, FC3 will remain isolated to limit voltage degradation and allow FC3 to MNB use during entry via PL Bus contactors
	3 3 3 3 MNC pwr to ESS1BC ESS2CA CNTLBC1,2,3 CNTLCA1,2,3	(F6) MDU CDR 1 blanks	
• Perform LOSS OF 1 FC (ORB PKT, PWRDN)		(F8) MDU PLT 2 blanks	② May be repwr after AC Pwr Transfer Cable connected
(R1) • cb AC CONTR AC3 ΦA,ΦB,ΦC (three) – cl • INV/AC BUS 3 – OFF (tb-off) • INV PWR 3 – OFF (tb-off) • cb AC CONTR AC3 ΦA,ΦB,ΦC (three) – op	AC3 ΦA,ΦB,ΦC Inverters	(AFT) MDU AFD 1 blanks	
• O2,H2 MANF VLV TK1,2 (four) – OP • O2,H2 TK3 HTR A – AUTO	Cryo O2,H2 Tk1 Htrs A if in Auto Cryo O2,H2 Tk1 Htrs B Tk2 Htrs A Tk4 Htrs A	(F7) C/W MN BUS UNDERVOLT It – on BACKUP C/W ALARM It – on C/W FREON LOOP It – on C/W FC PUMP It – on C/W AC VOLT It – on C/W H2O LOOP It – on MDU CRT 3,4 blank	③ Buses remain pwr ④ If five tk sets flown on OV102, O2 TK4 B Htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4 A,4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs
(C2) • L IDP/CRT SEL – 1 • R IDP/CRT SEL – 2 • GPC/CRT 03 EXEC • 04 EXEC	4 (OV104, OV105) Cryo O2,H2 Tk5 Htrs A in Auto Cryo O2,H2 Tk5 Htrs B	(COMM LOST) Comm via PS ATU & A/L All S-BD A/G voice lost if Sys 2 selected	
(A1L) S-BD PM • ANT SW ELEC – 1 • XPNDR – 1 • PWR AMPL OPER – 1 • STBY – 1 • PRE AMPL – 1 NSP • PWR – 1	6 IDP 3,4 MDU CRT 3,4 MDU CDR 1 MDU PLT 2 MDU AFD 1	(LIGHTS LOST) Inst Its L/Ctr (pnls C2,F6,F7) MS pnl Its (pnls R10,R12) OS pnl Its (pnls A1,A2,A6, A7,A8,A13,L9) PLB Floodlts Aft Port, Mid Stbd MS Floodlt R Seat/Ctr Cnsl Floodlts Middk Floodlts 3,4,5,7 MO13Q pnl It 1 Bunk Floodlts 1/3 Airlock Floodlt 4 TA Floodlt 4	⑤ If Aud Ctr 2 selected, all intercomm, A/G, and recorded voice lost until AUD CTR 1 selected ⑥ Loss of redundant port to the following: IDP 3 MDU MFD 1 (S) MDU MFD 2 (S) IDP 4 MDU MFD 1 (P)
If PSP and/or INTRG reqd for PL or ISS ops: (A1L) • S-BD PL PWR SYS – 1 • CNTL – PNL • – CMD	S-BD PM Sys 2: Xpndr 2 Pre Amp 2 Pwr Amp 2 PM, FM Ant sw 2 NSP 2 COM SEC 2	(F9) AC3 ΦA,ΦB,ΦC AC volts ind – < 90 DC VOLTS MNC ind – OSL	
7 7 • Reconfig PSP • Perform PL INTRG REACQ (if reqd)	S-BD PL Intrg 2 PSP 2	(FSMs) S67 CNTL RPC S67 AC VOLTS 3 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T S66 AV BAY 1 FAN S66 CABIN FAN (2) S68 FC PUMP 3 S69 FC H2 PUMP 3 S88 H2O PUMP P2 S88 H2O LOOP 2 FLOW S88 H2O LOOP 2 TEMP S88 H2O PUMP P 1 S88 H2O LOOP 1 TEMP S88 H2O LOOP 1 QTY S67 MAIN BUS V C RCS PWR FAIL S88 FREON FLOW 1 S88 FRN PL HX 2 S88 FREON QTY 1	⑦ REACQ and PSP reconfig procedures are flight specific. If reqd, procedures can be found in payload or ISS specific books ⑧ OIU 1 interfaces with PSP 1 for commanding ⑨
8 If OIU reqd: (SSP) • OIU PWR – OIU 1 ON • OIU tb – UP • ✓ MCC, OIU reconfig	APU 2 GG/Fu Pump Htrs B APU 3 GG/Fu Pump Htrs A APU 2 Lube Oil Ln Htr B 3 Lube Oil Ln Htr A	Possible 'S88 EVAP OUT T 1(2)'	
9 9 • GAS GEN/FUEL PUMP 2 – A AUTO • GAS GEN/FUEL PUMP 3 – B AUTO • LUBE OIL LINE 2 – A AUTO • LUBE OIL LINE 3 – B AUTO		SMO THRM/HYD (B) BCE STRG 3 ADTA (3,B) BCE STRG 4 ADTA (3,B) BCE STRG 3 MLS (3)	* [TIME CRITICAL] * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ⑩ Rad isolation may cause FES shutdown
(Continued)	(Continued)	(Continued)	

MEDS

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES	
9 (A12) APU HTR TK/FU LINE/H2O SYS ● 2A – AUTO ● 2B – OFF ● 3A – OFF ● 3B – AUTO HYD HTR ● AFT FUS A – AUTO ● B – OFF	APU 2 Tk/Fu Ln Htr B 3 Tk/Fu Ln Htr A APU 3 GG Inj H2O Htrs 3A, 23A Aft Fuselage Hyd Htrs B	(FSMs) I/O ERROR CRT 3 I/O ERROR CRT 4 RM DLMA MANF S67 FPC/FLC3 S67 MPC 3 S67 APC/ALC C If NSP 2 selected: BCE STRG 3 NSP If cooling by FES only: C/W FREON LOOP It – on 'S88 EVAP OUT T1' 'S88 EVAP OUT T2'	② May be repwr'd after AC Pwr Transfer Cable connected ⑨ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="text-align: center;">TIME CRITICAL</td></tr></table> * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp	TIME CRITICAL
TIME CRITICAL				
(A1R) ● S-BD FM PWR – 1	S-BD Fm Sig Proc 2, Xmtr 2	11 (L2) O2 EMER tb – bp 11 CAB RELIEF B tb – bp	⑪ Vlv holds position	
If no comm: (C3) ● S-BD PM CNTL – PNL ● – CMD ● AUD CTR – 1	Audio Ctr 2	(R1) FC3 COOL PUMP ΔP tb – bp	⑫ Indicates DN when NLG down	
(L1) ● FLASH EVAP CNTLR PRI A – OFF ● FLASH EVAP CNTLR PRI B(SEC) – ON (If req'd) ● TOP EVAP HTR NOZ R – A AUTO ● TOP EVAP HTR DUCT – A(B) If Hi Load Evap enabled: ● HI LOAD DUCT HTR – A(B)	Flash Evap Cntrl Pri A Topping Evap R Noz Htr B Topping Evap Duct Fwd,Aft Htrs C Hi Load Duct Inbd,Outbd, Noz Htrs C	12 (F6,F8) NOSE LDG GEAR tb – bp 13 R LDG GEAR tb – bp	⑬ Will <u>not</u> indicate DN when RMG down	
(L2) ● FLASH EVAP FDLN HTR B SPLY – 2	FES H2O Fdln B Htrs 1 (all)	<table border="1" style="width: 100px; margin: 0 auto;"> <tr><td style="text-align: center;">HYD/APU</td></tr> </table> HYD QTY 3 ind – 0% APU H2O QTY 2 ind – 0%	HYD/APU	⑭ Instrumentation loss caused rad isolation
HYD/APU				
14 ● Perform RAD ISOL RECOVERY, <u>ECLS</u> SSR-9 for Freon Loop 1		If SYS 2 pwr'd: 'S62 BCE BYP PSP2' Loss of PL TLM and CMD If PDI FDA enabled: 'S62 PDI DECOM FAIL'	⑮ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison	
(L4:P) ● cb AC2 ΦA LG SNSR 2 – cl	2 Prox Snr Electronics Box 1	(O1) H2O PUMP OUT PRESS LOOP 1 ind – 0 psia H2O PUMP OUT PRESS LOOP 2 ind – 20–25 psia	⑯ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists	
	Av Bay 2 Agent discharge capability	(O3) RCS/OMS PRPLT QTY display is blank	⑰ One failure away from loss of jettison capability	
	Port RMS: 15 MPM Mtr 1 16 Fwd MRL Mtr 2 16 Aft MRL Mtr 1 17 Jettison Sys B	R ADP deploy time incr from 15–30 sec	⑱ Do not reconfig for reg switch or I'CNCT procedures	
● For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS)	RCS Manf F5 RJD pwr (F5L,F5R)	11 (O7) AFT L RCS He PRESS B tb – bp 11 AFT L RCS MANF ISOL 5 tb – bp 11 AFT R RCS MANF ISOL 5 tb – bp	⑲ Man CL and GPC cntl remains	
	RCS Manf F4 RJD pwr (F4R,F4D)	11 (O8) FWD RCS TK ISOL 1/2 tb – bp 11 FWD RCS MANF ISOL 4 tb – bp 11 FWD RCS MANF ISOL 5 tb – bp	⑳ If SPLY H2O DUMP VLV ENA/NOZ HTR – OFF, tb upward and already bp	
(F6,F8) ● HSI SEL SOURCE – other than MLS or TACAN 3	MLS 3 Tacan 3	(R4) 11 HYD BRAKE ISOL VLV 3 tb – OP 11 HYD MPS/TVC ISOL VLV SYS 3 tb – CL		
(O6) ● ANNUN BUS SEL ACA 2/3 – MNB	ACA 2/3 MNC pwr	(R11L) 11 SPLY H2O TKA OUTLET tb – bp 20 SPLY H2O DUMP VLV tb – bp 11 SPLY H2O XOVR VLV tb – bp		
18 Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation req'd: (O7) ● AFT L RCS He PRESS B ● R RCS He PRESS B	11 Aft L RCS He Press Isol B GPC Cntl, man CL capability 19 F,R RCS He Press Isol B man OP capability			
(Continued)	(Continued)	(Continued)	MEDS	

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(O8) • FWD RCS He PRESS B		11 (R11L) SPLY H2O GALLEY SPLY VLV tb - bp	11 Vlv holds position
GNC 23 RCS • Reprioritize L,R Manf 3,4 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest priority, etc • Set aft pod(s) PRI JET FAIL LIMIT of 6	Aft RCS L,R Jet 3,4,5 Htrs Fwd RCS Jet 4,5 Htrs	11 SPLY H2O TKC INLET tb - bp	21 Lat Mtrs 2 of both actuators for Port,Stbd Rad will continue to run until Sys B Lat Cntl sw placed OFF
22 Save R OMS for deorbit (if reqd for additional on-orbit burns, √ MCC)	22 R OMS GN2 Press Vlv Op TM	21 (R13L) RAD CNTL STBD,PORT (two) tb - bp	22 Lost TM: GNC SYS SUMM 2
22 Prior to using L(R) OMS: (O8)	23 R OMS GN2 Press Vlv Op TM Eng Pr Vlv Coil 1	(A8L) PORT RMS: DPY/STO tb - bp RETEN LAT tb - bp R-F-L AFT tb - bp	R OMS ENG VLV 2: Assume VLV 2 status same as Vlv 1
24 R OMS He PRESS/VAP ISOL • A - GPC • B - OP	25 R OMS He Vap Isol 2 GPC Cntl	SM 94 PDRS CONTROL Indications lost: MPM Mtr 1 STO/DPY Fwd MRL Mtr 2 LAT/REL/RDY Aft MRL Mtr 1 LAT/REL/RDY	R OMS N2 P VLV: If ENG - ARM/PRESS, assume vlv OP
26 L OMS He PRESS/VAP ISOL • A(B) - GPC • B(A) - CL	22 L OMS He Pr/Vap Isol A,B man Cntl	(AW82D) EMU 1 H2O SPLY,WASTE tb - CL	23 Unable to confirm redundant coil
GNC XXXXX MNV R VYYYY (3,B)	R OMS Pri TVC	STAR TRKR DR POS -Z OP/CL time incr from 8-16 sec	24 Maintains He Isol redundancy
(A6U) • ANNUN BUS SEL - MNB	ACA 4/5 MNC pwr	If Cabin Fan A selected: C/W AV BAY/CAB AIR It - on 'S66 CABIN FAN'	25 Vlv norm closed. Manual cntl remains
(A12) HYD CIRC PUMP • PWR 2 - MNB • 3 - MNA	MNC Circ Pump 2 pwr 3 pwr	If site AOS and using S-BD ANT ELEC 2: 'ANTENNA' (2)	26 Prevents simultaneous opening of parallel reg paths and possibly rupturing burst disk
(A14) RCS/OMS HTR • L POD (two) - A AUTO, B OFF • R POD (two) - A AUTO, B OFF	L,R Pod Htrs B (partial)	If H2O Loop 2 Pump active: 'S88 H2O PUMP P2'	27 FSM caused by Antenna miscompare
(AW18D) • AIRLK AUD CNTL - MIDDECK	AL ATU,EMU CCU 1,2 PS ATU and CCU	If OMS Gmbl cmd abs value > 2 deg: C/W OMS TVC It - on 'R OMS GMBL' (3,B)	
(R11U) • FC H2O LINE HTR - A AUTO • FC H2O RELIEF HTR - A AUTO	FC H2O Line Htrs B FC H2O Relief Htrs B Noz Htr	(F7) If APUs active and using BLR CNTLR/HTR 2A or 3B: C/W APU TEMP It - on after ~2 min	
For PLBD ops: • OP/CL Drs in man mode	PLBD: C/L Lat 13-16 Mtr 1 1-4,5-8,9-12 Mtrs 2 Stbd Aft Blkhd Mtr 1 Port Aft Blkhd Mtr 2 Port Door Mtr 1 Stbd Door Mtr 2 CL Limit sw	If first RGA failure and Rates sensed: 'RM FAIL RGA'	
If supply H2O dump reqd: For TK A and/or TK B • Perform SUPPLY H2O SYS BACKUP DUMP TK A,B (IFM) For TK C and/or TK D • Perform SUPPLY WATER DUMP USING FES (ORB OPS, ECLS) using FLASH EVAP CNTLR PRI B	11 Sply H2O Dump Vlv Cntl Noz Htr 11 Xovr Vlv Cntl	If ANNUN BUS SEL ACA 2/3 - MNC, L/R Event Seq lts lost	
(Continued)	(Continued)	(L2) O2 EMER tb - bp CAB RELIEF B tb - bp	

MEDS

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
For SSME Hyd Repress: (R4) ● HYD MPS/TVC ISOL VLV SYS 1,2 (two) – OP, wait 10 sec, then CL	11 MPS/TVC Hyd Sys 3 Isol Cntl	<div style="border: 1px solid black; padding: 2px;">SM (BFS,SM) 63 PL BAY DOORS</div>	(11) Vlv holds position
If reqd during entry (< 120K ft): (L1) ● NH3 CNTLR A – PRI/GPC If reqd for Post Rollout: ● NH3 CNTLR B – SEC/ON	28 NH3 Sys A Sec Cntlr man ON capability 29 NH3 Sys B Pri Cntlr	If in <u>AUTO</u> OP/CL for PLBDs, sequence terminates immediately and msg ‘(S63) PBD CONFIG’ ----- During <u>MAN</u> PLBD OP/CL, single mtr run time noted on actuators listed at left	(28) Sys A Pri Cntlr, auto switchover to Sec Cntlr remains (29) Sys B Sec Cntlr man On capability remains
If AC Pwr Transfer Cable to be installed to regain AC: ● Go to <u>EPS SSR-200</u> ; otherwise, continue with bus loss actions		(R13L) During Rad Dpy/Sto ops: RAD LAT CNTL tb (two) indicate single mtr ops	(30) Not yet active on all vehicles
(R2) ● BLR CNTLR/HTR 2 – B ● 3 – A	Hyd H2O Blr 2 Cntlr A 3 Cntlr B	Impending: ‘S66 CO2 RL SYS PCO2’ ‘S66 CAB PPCO2’	(31) PEVs, Actuators, Bed A P, Bed B P, Bed dP will be recovered after system reconfig
	30 FC2 Redundant Reac Vlv Cntl on pnl C3		(32) H2O Loop 1 Pump Out P, Pump ΔP, Accum Qty, Pump Out Temp snrsr lost
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: ● Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, <u>ECLS</u>)	31 CO2 Rmvl Sys Cntlr 2 Fan AC3 pwr Compressor AC3 pwr		(33) Av Bay 1 Fan ΔP, Air Out Temp snrsr lost
(L4:F) ● cb AC1 H2O LOOP PUMP 1A/2 (three) – cl			(34) Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snrsr lost
(L1) ● IMU FAN B(A) – ON ● C – OFF ● H2O PUMP LOOP 2 – GPC ● Perform SSR-10 (H2O Loop 2 only), H2O PUMP OPS via GPC, <u>ECLS</u> ● H2O PUMP LOOP 1 – OFF ● CAB FAN A – OFF ● B – ON ● AV BAY 1 FAN A,B (two) – ON ● ✓ AV BAY 2 FAN A – ON ● B – OFF ● 3 FAN A – OFF ● ✓ B – ON ● FREON PUMP LOOP 2 – B	11 IMU Fan C 32 H2O Loop 2 Pump man ON capability H2O Loop 1 Byp Cntlr, Sig Condr H2O Loop 1 Byp Vlv pwr Cabin Fan A 33 Av Bay 1 Sig Condr, Xdcrs (ECLS SC2) Av Bay 2 Fan B 3 Fan A Freon Loop 2 Pump A		(35) Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate, and Accum Qty snrsr lost
(O17:C) ● SIG CONDR FREON A – AC2 ● SIG CONDR FREON B – AC2	34 Freon S/C A AC3 pwr (ECLS SC 1A) 35 Freon S/C B AC3 pwr (ECLS SC 1B)		(36) Maintains deorbit capability for CNTL BC1 failure
(CDR SEAT PNL) ● CDR SEAT PWR BUS SEL – AC2 (up)	CDR Seat adj via AC3 pwr		
(PLT SEAT PNL) ● PLT SEAT PWR BUS SEL – AC2 (up)	PLT Seat adj via AC3 pwr		
(O8) ● Right OMS XFEED B – OP (tb-OP)	36 OMS Eng/Xfeed Vlv Redundancy		
(Continued)	(Continued)		

MEDS

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">SM 60 SM TABLE MAINT</div> 37 • Inhibit 0612605, 0612600, 0612640, 0612610			(11) Vlv holds position (37) Inhibits H2O Loop 1 Pump ΔP, Pump Out Temp, Accum Qty, respectively
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
<ul style="list-style-type: none"> • MDU CRT 3 PWR – OFF • MDU CDR 1 PWR – OFF • MDU PLT 2 PWR – OFF 			
(C2) <ul style="list-style-type: none"> • IDP/CRT 3 PWR – OFF 			
(L4:N) <ul style="list-style-type: none"> • cb AC3 ΦC RAD ISOL B – op 	39 Freon Loop 1,2 Rad Isol Motor B		(38) AC3 bus isolation for AC Pwr Transfer Cable installation accomplished in MNC DA3 ACTIONS column. No additional bus isolation steps reqd
(R1) <ul style="list-style-type: none"> • PL AFT MNC – OFF 	Aft Payload C pwr		(39) Motor A remains (40) Redundant pwr source remains
(O8) <ul style="list-style-type: none"> • MLS 3 – OFF • R SEAT/CTR CNSL FLOOD – OFF 	R Seat/Ctr Cnsl Floodlts		(41) Current Snsr 1 remains (42) Current Snsr 2 remains
(O16:A) <ul style="list-style-type: none"> • RGA 3 – OFF 	RGA 3		(43) If Emer O2 Mission Kit not flown, cb is open prelaunch
(O16:B) cb MNC <ul style="list-style-type: none"> • OI SIG CONDR OM3B – op • OI SIG CONDR OF 2/3 – op • OI MDM OF 3/4B – op • MNB CONTR – op • AUX TIMING BUFFER – op 	Orbiter Timing Buffer Aft Mission Timer		
(O16:C) cb MNC <ul style="list-style-type: none"> • TACAN 3 – op • SMOKE DETN CAB – op • SMOKE DETN BAY 1A/2B – op • FIRE SUPPR BAY 2 – op • UTIL PWR A11/A15/MO30F – op • FLOOD R CTR – op • ANNUN FWD ACA 2/3 – op • ANNUN AFT ACA 4/5 – op • cb MNC CRYO O2 HTR TK1 SNSR 2 – op • cb MNC CRYO O2 HTR TK2 SNSR 1 – op 	Tacan 3 Cabin Smoke Detector Av Bay 1 Smoke Detector A 2 Smoke Detector B MNC DC Utility pwr outlets at panels A11, A15, MO30F	41 Cryo O2 Tk1 Htr Current Snsr 2 42 Cryo O2 Tk2 Htr Current Snsr 1	
(O16:D) cb MNC <ul style="list-style-type: none"> • H2O ALT PRESS – op • O2 EMER – op • CAB RELIEF B – op 	11 Emer O2 Sply Vlv Cntl 11 Cabin Relief Vlv B Cntl 11 H2O Alternate Press Vlv Cntl		
(Continued)	(Continued)		<div style="text-align: center; font-size: 2em; font-weight: bold; margin-top: 20px;">MEDS</div>

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			④④ PLT Arm remains
(O16:E) cb MNC • ADTA 3,4 (two) – op • MLS 3 – op • DDU R,AFT (two) – op • RCS/OMS PRPLT QTY GAUGE – op • DRAG CHUTE SYS 1 – op	ADTA 3, 4 MLS 3 RCS/OMS Prplt Qty Gauge 44 Drag Chute, CDR Arm		④⑤ Six vlvs fail to non-isolation position ④⑥ Logic buses 2(3) remain pwr'd via MNB(MNA) ④⑦ Redundant pwr source remains for equipment
	45 ATVC 1 Isol ME		④⑧ Ku Comm and RDR function lost. KU-BAND CONT STOW – EA1 ALTERNATE POWER IFM req'd to stow antenna. Jettison req'd if antenna cannot be positioned within GO FOR PLBD CLOSURE envelope
(A7U) PL BAY • FLOOD AFT PORT – OFF • MID STBD – OFF	PLB Aft Port Floodlt Mid Stbd Floodlt		
(A7L) IF DOCKING MISSION • PYRO PWR MNC – OFF cb MNC • LOGIC 2 – op • 3 – op	MNC Pyro system 46 MNC pwr to DSP Logic buses 2,3		
(R11U) • FC PURGE VLV 3 – CL • FC START UP HTR 3 – ENA • IDP/CRT 4 PWR – OFF • MDU CRT 4 PWR – OFF • MDU AFD 1 PWR – OFF	FC3 Start Up Htr Inhibit capability		
(R14:A) cb MNC • AUD CTR 2 – op • AUD PS/AIRLK – op • MDU CDR 1 – op • MDU PLT 2 – op • MDU AFD 1 – op			
(R14:B) cb MNC • UHF – op • GCILC – op • CNTL BUS AB1/2/3 – op	UHF redundant pwr GCILC redundant pwr MDM cmds to CCTV Sys MNC pwr for CNTLAB 1,2,3 Buses		
47 (R14:B) cb PALLET/DSC • 2A – op (EDO/OV102, OV105 only) • 3B/4A – op (EDO/OV105 only)			
(R14:C) • cb MNC KU SIG PROC – op	48 Ku-Bd Sys Rdr & Comm I/F Cont Unit (EA1), Ku Comm Sig Proc		
(R14:D) cb MNC B • TV B KEEL/EVA CAMR/PAN-TILT – op • TV B KEEL/EVA CAMR HTR – op • TV B KEEL/EVA PAN-TILT HTR – op • cb MNC TV CAB – op	TV B Keel/EVA Camr Pan/Tilt Htr TV B Keel/EVA Camr Pan/Tilt Htr Flt,Middeck TV Camrs and VFMs		
(R14:E) • cb MNC MS FLOOD – op	MS Floodlt		
(Continued)	(Continued)		MEDS

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			(11) Vlv holds position
(ML86B:F) cb MNC FLOODS • MIDDECK 5/7 – op • MIDDECK 3/4/MO13Q – op • BUNK 1/3 – op • AIRLK 4 – op	Middeck Floodlts 3,4,5,7 MO13Q Pnl Lt 1 Bunk Floodlts 1/3 Airlock Lt 4		(41) Current Snsr 1 remains (49) ✓MCC for Ku Ant stow reqmts (50) Redundant mtr remains (51) Htr Cntl 2 remains (52) LG can still be deployed by redundant Pyro Bkup Rel Sys 2 and by Pri Hyd Sys. NLG extension pwr assist available from redundant sys. NLG can also be deployed by Hyd Sys 2
(MA73C:A,B) • MCA LOGIC MNC FWD 3 – OFF • MCA LOGIC MNC MID 2 – OFF • MCA LOGIC MNC MID 4 – OFF • MCA LOGIC MNC AFT 3 – OFF	MNC FMC3 Bus pwr MMC2 Bus pwr MMC4 Bus pwr AMC3 Bus pwr		(53) SYS A remains (54) One failure away from loss of jettison capability (55) Normally not installed
	49 Ku Ant Sto/Dpy Mtr 1		
	50 R HUD –Z Star Trkr Dr Sys 2 OP/CL capability		
	PL MNC Cur Sig Condr		
	Port,Stbd Rad Dpy/Sto Mtr 2 Port,Stbd Rad Lat 7–12 Mtrs 2		
	50 R ADP Dpy Mtr 1 51 Htr Cntrl 1 LH Vents 1,2,3 Mtrs 1 6 Mtrs 2 RH Vents 8,9 Mtrs 1 3,5 Mtrs 2 52 NLG Extend Sys 1 NLG,LMG,RMG Bkup Rel Sys 1		
(ML86B:A) • cb MNC SPLY H2O TKA OUTLET – op • cb MNC SPLY H2O TKC INLET – op • cb MNC DUMP VLV/NOZ HTR – op • cb MNC SPLY H2O XOVR VLV – op • cb MNC SPLY H2O GALLEY SPLY – op	11 Sply H2O TK A Out Vlv Cntl 11 C In Vlv Cntl 11 Galley H2O Sply Vlv Cntl		
(ML86B:D) cb PYRO JETT SYS B • KU ANT – op • PORT RMS – op 55 • STBD RMS – op	53 Ku–Bd Jettison Sys B 54 Port RMS Jettison Sys B		
(ML86B:E) cb MNC EMU 1 H2O • WASTE – op • SPLY – op cb MNC SEAT • L – op • R – op cb MNC FLOOD • TNL ADAPT 4 – op cb MNC • CO2 SYS 2 CNTLR – op	11 EMU 1 Waste H2O Vlv Cntl 11 Sply H2O Vlv Cntl TA Floodlt 4		
(ML86B:F) • cb MNC CRYO O2 HTR TK4 SNSR 2 – op (OV104, OV105) • cb MNC CRYO O2 HTR TK5 SNSR 2 – op	41 Cryo O2 Tk4 Htr Current Snsr 2 (OV104, OV105) Cryo O2 Tk5 Htr Current Snsr 2		
(Continued)	(Continued)		

MEDS

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(MO63P) cb CB2/J2, CB3/J3, CB4/J4, CB5/J5, CB6/J6, RLY PWR (six) – op	MO63P DC Utility Pwr panel	R MPS He reg A < 680 during entry MM303)	①① Vlv holds position
	56 R OMS ENG Pr Vlv Coil 1 57 R OMS ENG Cntl Vlv 1,2 Coils 1 58 R OMS Purge Vlv 1,2 59 OMS QTY Gauging for all R OMS Single Engine burns Press Vlv Op Sig		⑤⑥ Unable to confirm redundant coils ⑤⑦ Redundant coils remain ⑤⑧ Vlv fails closed
	60 APU 2 Cntrl Sply B pwr 61 3 Cntrl Sply A pwr 62 2 Fu Tk Vlv B 58 3 Fuel Tk Vlv A APU 3 GBX GN2 Repress Vlv 11 Hyd Brake Isol 3 Cntl Rsvr 3 Qty Snsr		<div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p align="center">CAUTION</p> <p>No purge. Wait 10 min between burns</p> </div>
	11 EMU 1 Waste H2O Vlv Cntl 11 Sply H2O Vlv Cntl		⑤⑨ ✓MCC for OMS Tot Qtys. Aft Qtys are found on
	63 Freon Loop 1 Cntrl A Rad By Vlv Mtr man Cntl 64 Freon Loop 2 Cntrl A Rad By Vlv Mtr 11 Freon Loop 2 Flow Prop vlv Freon Loop 2 Cold Plate Flow Xdcr		GNC SYS SUMM 2
	MPS: 65 R Eng He Intercon Outlet Vlv 65 L Eng He Xovr Vlv 62 R Eng He Isol A 66 Manf Repress LO2 Vlv 1,2 67 Prplt F/D Outbd LO2 Vlv		⑥⑩ Pwr Sply A remains. Turbine speed ind lost ⑥⑪ Pwr Sply B remains. GG Bed T and GBX P ind lost when APU running
	68 ET Door Mtrs: C/L Lat Actr 2 Mtr 2 L Dr Closure Mtr 2 R Dr Closure Mtr 1 Uplock Lat Mtr 1		⑥⑫ Vlv fails closed. Redundant vlv remains ⑥⑬ Cntrls A,B Rad By Mtrs Auto Cntl and Cntlr B Rad By Vlv Mtr remain
	69 No WOW Relay K9,K11,K13		⑥⑭ Bypass vlv holds position and Cntrl B Rad By Vlv Mtr remains
	PLBD: C/L Lat 1-4, 5-8 Mtrs 2 9-12 Mtr 2 13-16 Mtr 1 Stbd Aft Blkhd Mtr 1 Port Aft Blkhd Mtr 2 Door Mtr 1		⑥⑮ Vlv fails closed. Redundant vlv remains ⑥⑯ Cntrls A,B Rad By Mtrs Auto Cntl and Cntlr B Rad By Vlv Mtr remain
	70 Hyd Main Pump 3 Depress Solenoid RPC A 70 Hyd Main Pump 2 Depress Solenoid RPC B		⑥⑰ Vlv fails closed. LO2 manf will not be pressured with He during entry (MM304) ⑥⑱ Vlv holds position. Loss of manual capability to inert LO2 manf
			⑥⑲ Redundant mtrs remain ⑥⑳ Brake/Skid Cntl Box A,B enabled before WOW
			⑦⑰ Vlv holds position. Loss of manual capability to inert LO2 manf ⑥⑲ Redundant mtrs remain ⑥⑳ Brake/Skid Cntl Box A,B enabled before WOW ⑦⑰ Redundant RPC remain

MEDS

**EPS SSR-51
BUS LOSS: MNC FPC3**

(Includes MNC FLC3, MNC FMC3, AC3)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 <ul style="list-style-type: none"> Perform FC3 SHUTDN (FC SHUTDN Cue Card), pwrdsn not needed, then: 	2 FC3 Pumps and pH Snsr	MASTER ALARM Light/Tone – on CRT 3,4 blank	① TIME CRITICAL * FC3 must be shutdn within 9 min to avoid potentially hazardous condition ② Will be repwrdr after AC Pwr Transfer Cable connected ③ Loss of redundant port to the following: IDP 3 MDU CDR 1 (P) MDU MFD 1 (S) MDU MFD 2 (S) MDU PLT 2 (P) IDP 4 MDU AFD 1 (P) ④ REACQ and PSP reconfig procedures are flight specific. If reqd, procedures can be found in payload or ISS specific books ⑤ OIU 1 interfaces with PSP 1 for commanding ⑥ Rad isolation may cause FES shutdown ⑦ Instrumentation loss caused rad isolation ⑧ Vlv holds position. Do not reconfig for reg switch or I'CNCT procedures ⑨ KU-BAND CONT STOW – EA1 ALTERNATE POWER IFM reqd to stow Ku Ant. Jettison reqd if antenna cannot be positioned within GO FOR PLBD CLOSURE envelope ⑩ Will indicate DN when NLG down ⑪ Will <u>not</u> indicate DN when RMG down ⑫ Performing DIRECT STOW, MECH SSR-5, may be reqd. ✓MCC
(R1) <ul style="list-style-type: none"> cb AC CONTR AC3 (three) – cl INV/AC BUS 3 – OFF (tb-OFF) INV PWR 3 – OFF (tb-OFF) cb AC CONTR AC3 (three) – op 	AC3 ΦA,ΦB,ΦC Inverters	(F7) C/W FREON LOOP It – on C/W FC PUMP It – on C/W AC VOLT It – on C/W H2O LOOP It – on SM ALERT Light/Tone – on	
(C2) <ul style="list-style-type: none"> L IDP CRT SEL – 1 R IDP CRT SEL – 2 GPC/CRT 03 EXEC 04 EXEC 	3 IDP 3,4 MDU CRT 3,4	(F9) AC3 ΦA,ΦB,ΦC AC volts < 90	
(A1L) S-BD PM <ul style="list-style-type: none"> ANT SW ELEC – 1 XPNDR – 1 PWR AMPL OPER – 1 STBY – 1 PRE AMPL – 1 NSP PWR – 1 	S-BD PM Sys 2: Xpndr 2 Pre Amp 2 Pwr Amp 2 PM,FM Ant Sw 2	(COMM LOST) All S-BD A/G voice lost if Sys 2 selected	
If PSP and/or INTRG reqd for PL or ISS ops: <ul style="list-style-type: none"> S-BD PL PWR SYS – 1 CNTL – PNL CMD 	NSP 2/COM SEC 2	(LIGHTS LOST) Instr Its L/Ctr (pnls C2,F6,F7) MS pnl Its (pnls R10,R12) OS pnl Its (pnls A1,A2, A6, A7,A8,A13,L9)	
4 <ul style="list-style-type: none"> Reconfig PSP Perform PL INTRG REACQ (if reqd) 	S-BD PL Intrg 2 PSP 2	(FSMs) S67 FPC/FLC 3 S69 FC H2 PUMP 3 S66 AV BAY 1 FAN S66 CABIN FAN S66 IMU FN SPD B S67 AC VOLTS 3 S69 FC PUMP 3 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T (B) SM0 THRM HYD S88 FREON FLOW 1 S88 FRN PL HX 2 S88 FREON QTY 1 S88 H2O PUMP P2 S88 H2O LOOP 2 FLOW S88 H2O LOOP 2 TEMP BCE BYP KU (2) S88 H2O PUMP P1 S88 H2O LOOP 1 TEMP S88 H2O LOOP 1 QTY	
(A1R) <ul style="list-style-type: none"> S-BD FM PWR – 1 	S-BD FM Sys 2	6 Possible 'S88 EVAP OUT T 1(2)'	
If no comm: (C3) <ul style="list-style-type: none"> S-BD PM CNTL – PNL CMD 		I/O ERROR CRT 3 I/O ERROR CRT 4 RM DLMA MANF	
5 If OIU reqd: (SSP) <ul style="list-style-type: none"> OIU PWR – OIU 1 ON OIU tb – UP ✓MCC, OIU reconfig 		If CABIN FAN A selected: C/W AV BAY/CAB AIR It – on 'S66 CABIN FAN'	
7 <ul style="list-style-type: none"> Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 1 		If SYS 2 pwrdr: 'S62 BCE BYP PSP 2' Loss of PL TLM and CMD If PDI FDA enabled: 'S62 PDI DECOM FAIL'	
(L4:P) <ul style="list-style-type: none"> cb AC2 ΦA LG SNSR 2 – cl 	Prox Snsr Electronics Box 1	If NSP 2 selected: BCE STRG 3 NSP If site AOS and using S-BD Ant Elect 2: 'ANTENNA' (2)	
Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O8) <ul style="list-style-type: none"> FWD RCS He PRESS B 	8 Fwd RCS He Press Isol B man OP capability	(R1) FC3 COOL PUMP ΔP tb – bp	
<ul style="list-style-type: none"> For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS) 	RCS Manf F5 RJD pwr (F5L,F5R)	(F6,F8) LDG GEAR NOSE L tb – bp LDG GEAR R,L tb – bp	
(R14:C) <ul style="list-style-type: none"> cb MNC KU SIG PROC – op 	9 Ku-Bd Sys Rdr & Comm I/F Cont Unit (EA1)	10 11	
(Continued)	(Continued)	(Continued)	

MEDS

EPS SSR-51 (Cont)
BUS LOSS: MNC FPC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
Pre-seat ingress for Entry: • Discharge handheld fire ext into AV BAY 2	Av Bay 2 agent discharge capability	HYD/APU HYD QTY 3 ind - 0% APU H2O QTY 2 ind - 0%	(13) MPM and MRLS may be repwr'd after AC Pwr Transfer Cable connected
If AC Pwr Transfer Cable to be installed to regain AC: • Go to <u>EPS SSR-200</u> ; otherwise, continue with bus loss actions	13 Port RMS: 14 MPM Mtr 1 15 Fwd MRL Mtr 2 16 Aft MRL Mtr 1	(O8) FWD RCS TK ISOL 1/2 tb - bp MANF ISOL 4 tb - bp 5 tb - bp	(14) Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
SM 60 SM TABLE MAINT 16 • INHIBIT 0612605, 0612600, 0612640, 0612610		(O1) H2O PUMP OUT PRESS LOOP 1 ind - 0 psia H2O PUMP OUT PRESS LOOP 2 ind - 20-25 psia	(15) Single mtr time. If unlatched, one failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists. If latched, one failure away from inability to use RMS
(CDR SEAT PNL) • CDR SEAT PWR BUS SEL - AC2 (up)	CDR Seat Adj via AC3 pwr	AIR TEMP AV BAY ind - 45 degF FREON FLOW 1 ind - 578 pph	(16) Inhibits H2O Loop 1 Pump ΔP, Pump Out Press, Pump Out Temp, Accum Qty, respectively
(PLT SEAT PNL) • PLT SEAT PWR BUS SEL - AC2 (up)	PLT Seat Adj via AC3 pwr	R ADP deploy time incr from 15 to 30 sec	(17) Vlv holds position
(O17) • SIG CONDR FREON A - AC2 • SIG CONDR FREON B - AC2	18 Freon Sig Condr A AC3 pwr (ECLS SC 1A) 19 Freon Sig Condr B AC3 pwr (ECLS SC 1B)	(F7) If APUs active and using BLR CNTLR/HTR 2A or 3B: C/W APU TEMP It - on after -2 min	(18) Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snsr's lost
(R2) • BLR CNTLR/HTR 2 - B • 3 - A	Hyd H2O Blr 2 Cntrl A 3 Cntrl B Rsvr 3 Qty Snsr	STAR TRKR DR POS -Z OP/CL time incr from 8 to 16 sec	(19) Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate, and Accum Qty snsr's lost
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) - cl		Impending: 'S66 CO2 RL SYS PCO2' 'S66 CAB PPCO2' (MO51F) CO2 RMVL SYS CNTLR 2 FAIL It on	(20) H2O Loop 1 Pump Out P, Pump ΔP, Accum Qty, Pump Out Temp snsr's lost
(L1) • IMU FAN B(A) - ON • C - OFF • H2O PUMP LOOP 2 - GPC • Perform (H2O Loop 2 only) H2O PUMP OPS via GPC, ECLS SSR-10 • H2O PUMP LOOP 1 - OFF • CAB FAN A - OFF • B - ON • AV BAY 1 FAN (two) - ON • ✓ AV BAY 2 FAN A - ON • B - OFF • 3 FAN A - OFF • ✓ B - ON • ✓ FREON PUMP LOOP 2 - B	17 IMU Fan C 20 H2O Loop 2 Pump man ON capability H2O Loop 1 Byp Cntrl, Sig Condr H2O Loop 1 Byp vlv pwr Cabin Fan A Av Bay 1 Sig condr, Xdcrs (ECLS SC2) Av Bay 2 Fan B Av Bay 3 Fan A Freon Loop 2 Pump A		(21) AV Bay 1 Fan ΔP, Air Out Temp snsr's lost (22) PEVs, Actuators, Bed A P, Bed B P, and Bed dP will be recovered after system reconfig
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	22 CO2 Rmvl Sys Cntrl 2		
(Continued)	(Continued)		<p style="text-align: center; font-size: 2em; font-weight: bold;">MEDS</p>

EPS SSR-51 (Cont)
BUS LOSS: MNC FPC3

23

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			(17) Vlv holds position
• MDU CRT 3 PWR – OFF			(23) AC3 Bus Isolation
(L4:N) • cb AC3 ΦC RAD ISOL B – op	24 Freon Loop 1,2 Rad Isol Motor B		for AC Pwr Transfer Cable installation accomplished in MNC FPC 3 ACTIONS column. No additional bus isolation steps reqd
(C2) • IDP/CRT 3 PWR – OFF			(24) Motor A remains
(O16:C) • cb MNC FIRE SUPPR BAY 2 – op			(25) Mtr 2 remains
• MDU CRT 4 PWR – OFF			(26) Htr Cntrl 2 remains
(R11L) • IDP/CRT 4 PWR – OFF			(27) LG can still be deployed by Pri Hyd System or by redundant Pyro Backup Release System 2. NLG extension pwr assist still available from redundant sys. NLG can also be deployed by Hyd Sys 2
(MA73C:A) • MCA LOGIC MNC FWD 3 – OFF	MNC FMC 3 Bus pwr		(28) Redundant mtrs remain
(R15:C) • cb MNB KU ELEC – op			(29) Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains
	AC3 FMC3 Bus Pwr LH Vents 1,2,3 Mtr 1 6 Mtr 2 –Z Star Trkr Dr Sys 2 OP/CL capability R ADP Dpy Mtr 1		(30) ✓MCC for Ku Ant stow reqmts
	25 PLT HUD		
	26 R ADP Htr Cntrl 1		
	27 NLG Ext Sys 1		
	27 NLG,LMG,RMG Bkup Rel Sys 1		
	MNC Pwr to CNTL Buses BC1,BC2,BC3,CA1,CA2, CA3		
	28 ET Door Mtrs: C/L Lat Actr 2 Mtr 2 L Dr Closure Mtr 2 R Dr Closure Mtr 1 Uplock Lat Mtr 1		
	29 Freon Loop 2 Cntrl A Rad Byp Vlv Mtr		
	17 Freon Loop 2 Flow Prop Vlv		
	Port,Stbd Rad Lat 7–12 Mtrs 2 Port,Stbd Rad Dpy/Sto Mtrs 2		
	PLBD: C/L Lat 1–4, 5–8 Mtrs 2 9–12 Mtr 2 13–16 Mtr 1 Stbd Aft Blkhd Mtr 1 Port Aft Blkhd Mtr 2 Door Mtr 1		
	30 Ku Ant Sto/Dpy Mtr 1		

MEDS

**EPS SSR-45
BUS LOSS: MNB O15**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (R1) • BUS TIE MNA – ON (tb-ON)		MASTER ALARM Light/Tone – on	① FC1 only one failure away (loss of ESS1BC) from inability to bus tie ② ACAs recovered by switching to alternate pwr ③ Vlv holds position ④ O2/N2 Cntl Vlv 2 normally closed when unpowered ⑤ Vlv fails closed. IFM or real-time flow test will be required. ✓MCC for additional direction ⑥ Current Snsr 1 remains
(L1) • Perform ON-ORBIT RAD CNTLR SWITCH, <u>ECLS</u> SSR-13 for Freon Loop 1,2	Freon Loop 1,2 Rad Cntlr A	(F7) C/W CAB ATM Lt SM ALERT Light/Tone – on Fwd EVENT TIME ind blank	
(F6) • HSI SEL SOURCE (two) – (other than MLS 2)	MLS 2	(F8) Rt HSI,AMI,AVVI Flags visible APU/HYD Meters lost	
(F7) • RADAR ALTM – 1	RA 2	(A4) MSN TIME ind blank	
(O6) ANNUN BUS SEL • ACA 1 – MNA • 2/3 – MNC	2 ACA 1 MNB pwr 2 2/3 MNB pwr	(O1) CABIN dP/dT ind – .45 O2/N2 FLOW SNSR 1 ind – 0 pph PPO2 SNSR B,C ind – 0 psia	
(A6U) • ANNUN BUS SEL – MNC	2 ACA 4/5 MNB pwr	(FSMs) S66 CABIN PPO2 B,C S88 H2O LOOP 2 FLOW SM0 TIRE PRESS ----- If ADTA 2, MLS 2, –Y Star Trkr pwrd: BCE STRG 2 ADTA (3,B) BCE STRG 2 MLS (3) BCE STRG 3 STKR (2,3)	
If on PCS 2: • Perform RECONFIG TO ALT PCS SYS, <u>ECLS</u> SSR-3	3 O2/N2 Cntl Sys 2: 3 N2 Sply Vlv 2 Cntl 3 N2 Reg Inlet Vlv 2 Cntl 4 O2/N2 Cntl Vlv 2 man Cntl 5 O2 Xover Vlv 2 OP capability O2/N2 Sys 2 Flow Xdcrs PPO2 Snsr B,C	(L2) 6 CABIN RELIEF A tb – bp 6 N2 SYS 2 SPLY tb – bp 6 N2 SYS 2 REG INLET tb – bp	
• Prior to seat ingress for entry: discharge handheld ext into AV BAY 1	dP/dT Snsr Av Bay 1 Agent discharge capability	If first AA failure and S/W processing accel data: 'RM FAIL ACC' (3)	
(Continued)	(Continued)	(LIGHTS LOST) L Seat/Ctr Cnsl Floodlt R Ovhd Cnsl Floodlt If ACA 1 – MNB, lights lost: (C3) 2 DAP lights left four columns ALL (F2) PBIs except MA	
		If ACA 2/3 – MNB, lights lost: (C3) 2 DAP lights right two columns ALL (F6) Landing Gear ARM/DOWN (L1) Smoke detection, fire suppression ALL	
		If NWS 2 selected: (F3) NWS FAIL Lt – on	
2 If ACA 4/5 – MNB, lights lost: (A6U) DAP lights ALL (A7U) Video input, output, Gamma, ALC		<p style="text-align: center; font-size: 2em; font-weight: bold;">NOM</p>	

EPS SSR-45 (Cont)
BUS LOSS: MNB O15

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			③ Vlv holds position
(F8) ● INST PWR – OFF	R Inst pwr (APU/HYD Meters, R HSI,AMI,AVVI)		⑥ Current Snsr 1 remains
(O6) ● STAR TRKR PWR –Y – OFF	–Y Star Trkr Dr OP capability Trkr		⑦ Redundant pwr source remains
(O8) ● RADAR ALTM 2 – OFF ● MLS 2 – OFF			⑧ H2O Loop 2 ICH Flow Rate snsr lost
7 (O15:B) cb MNB ● OI SIG CONDR OF 1/4 B – op ● OI SIG CONDR OF 2/3 A – op ● OI SIG CONDR OM 1/2 B – op ● OI MDM OF 1/2 B – op ● OI SIG CONDR OM3 A – op ● OI H2O BYP LOOP 2 SNSR – op ● OI TIRE PRESS – op ● MNA CONTR – op ● MSN TIMER AFT – op ● EVENT TIMER FWD – op	8 H2O Byp Loop 2 Snsr (ECLS SC12) 9 Tire Press Sig Condr A3,A4 Aft Mission Timer Fwd Event Timer		⑨ Redundant measurement remains. FDA Alarm BFS only; OPS 3,6
(O15:C) cb MNB ● TACAN 2 – op ● SMOKE DETN BAY 1B/3A – op ● FIRE SUPPR BAY 1 – op ● UTIL PWR F1/MO13Q – op ● FLOOD R CNSL – op ● L CTR – op ● ANNUN FWD ACA 1,2/3 (two) – op ● ANNUN AFT ACA 4/5 – op ● CRYO O2 HTR TK2 SNSR 2 – op	Tacan 2 Av Bay 1 Smoke Det B 3 Smoke Det A MNB Utility pwr R Ovhd Console Floodlt L Seat/Ctr Cnsl Floodlts		⑩ Cntr B remains
(O15:D) cb MNB ● FREON RAD CNTLR 1,2 (two) – op ● PPO2 C CAB dP/dT – op ● N2 SPLY 2 – op ● O2/N2 CNTLR 2 – op ● O2 XOVR 2 – op ● N2 REG INLET 2 – op ● CAB RELIEF A – op ● NWS – op	6 Cryo O2 Tk2 Htr Current Snsr 2 PPO2 Snsr C		⑪ NWS 1 still available
10 (O15:E) cb MNB ● RADAR ALTM 2 – op ● MLS 2 – op ● ADTA 2 – op ● STAR TRKR –Y – op ● ACCEL 2 – op ● DDU L – op ● R – op ● INST R – op ● DRAG CHUTE SYS 2 – op	3 Cabin Relief Vlv A Cntr NWS 2 ADTA 2 AA2 7 Left DDU MNB pwr 7 Right DDU MNB pwr		⑫ CDR Arm remains
	12 Drag Chute, PLT Arm		

NOM

EPS SSR-46
BUS LOSS: MNB R1A1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 MNB pwr to CNTLAB 1,2,3 CNTLBC 1,2,3 ESS1BC ESS3AB	NONE	① Buses remain pwr
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE			<p style="text-align: right;">NOM</p>

EPS SSR-47
BUS LOSS: MNB A6&A14

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">GNC 23 RCS</div> <ul style="list-style-type: none"> • Reprioritize Fwd Manf 2,3 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc • Set forward pod PRI JET FAIL LIMIT to 4 	<p>Fwd RCS Jet 2,3 Htrs</p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">SM 97 RETENTION</div> <p>Indication lost: RELAX DEMATE MATE</p>	<p>① Single mtr time</p>
<p align="center">BUS ISOLATION</p>			
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(C3) • MSTR MADS PWR – OFF</p>	<p>PL Reten Sys B Rel/Lat Mtrs All MADS equipment</p>		
	<p>ROEU Logic Pwr Sys 2 1 Orbiter arm drive mtr (ODM mtr 2 – mate B, demate B, relax B) 1 ODA mtr 2 latch/release</p>		

NOM

**EPS SSR-48
BUS LOSS: MNB ML86B**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(ML86B:A) ● cb MNA H2O LINE HTR A - cl</p> <p>-----</p> <p>(ML86B:D) cb MNA MMU ● PORT,STBD HTR A (two) - cl</p>	<p>H2O Line Htr B: Waste Dump Line Sply Dump Line Vac Vent Line</p> <p>-----</p> <p>2 MMU Port,Stbd Htr B</p>	<p>(R11L) 1 SPLY H2O 1 DUMP ISOL VLV tb - bp 1 TKB INLET tb - bp 1 TKC OUTLET tb - bp 1 B SPLY ISOL VLV tb - bp</p> <p>(R13L) 1 MMU GN2 SPLY ISOL VLV B tb - bp</p>	<p>① Vlv holds position</p> <p>② Htr A remains</p> <p>③ MNA,MNC line htrs remain. MNA struct htrs remain</p>
<p>(ML31C) ● VAC VENT ISOL VLV BUS SEL - MNA</p>	<p>Vac Vent Isol Vlv MNB Cntl</p>	<p>(ML31C) 1 WASTE H2O TK1 DRAIN VLV tb - bp 1 SPLY H2O TKD INLET tb - bp</p>	
<p>(WCS) ● ✓MODE - AUTO ● ✓CRADLE - AUTO ● ✓Hose stowed in cradle ● ✓WCS ON It - OFF ● FAN SEP SEL sw - OFF ● HOSE BLOCK - SEP 1 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete ● FAN SEP SEL sw - 1</p>	<p>WCS Sep Fan 2 Mtr Relay</p>	<p>(LIGHTS LOST) Middeck Floodlts 2,6 Bunk Floodlts 2/4 PHS Floodlt Airlk Floodlt 3 TA Floodlt 3 (SL only)</p>	
<p>(EDO WCS) ● WCS PWR SEL - AUTO 1, OFF 2</p>	<p>Controller MNB pwr WCS Compactor MNB Cntl</p>	<p>(MO13Q) 1 ARLK H2O S/O VLV - bp</p>	
<p>(CDR's SEAT) ● CDR SEAT PWR BUS SEL - AC3 (dn)</p>	<p>CDR Seat Adj via AC2 pwr</p>		
<p>(PLT's SEAT) ● PLT SEAT PWR BUS SEL - AC3 (dn)</p>	<p>PLT Seat Adj via AC2 pwr</p>		
<p>If Supply H2O Dump reqd and dump ISOL VLV is failed closed: ● Perform SUPPLY WATER DUMP USING FES (ORB OPS, ECLS)</p>	<p>1 Sply H2O Dump Isol Vlv Cntl</p>		
<p>(ML86B:C) ● cb MNA(MNC) EXT ARLK HTR LINE ZN1 - cl ● cb MNA(MNC) EXT ARLK HTR LINE ZN2 - cl ● cb MNA EXT ARLK HTR STRUC - cl</p>	<p>3 Ext A/L H2O and Structural Htrs MNB pwr</p>		
<p>(Continued)</p>	<p>(Continued)</p>		<p style="text-align: center;">NOM</p>

EPS SSR-48 (Cont)
BUS LOSS: MNB ML86B

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p><u>ONLY ON MCC CALL, PERFORM</u></p>			
<p>(ML86B:A) cb MNB ● SPLY H2O TKB INLET – op ● SPLY TKC OUTLET – op ● DUMP ISOL – op ● SPLY H2O B SPLY ISOL VLV – op ● H2O LINE HTR B – op</p>	<p>Sply H2O: 1 Tk B Inlet Vlv Cntl 1 Tk C Outlet Vlv Cntl 1 B Sply Isol Vlv Cntl</p>		<p>① Vlv holds position ② Htr A remains ③ MNA,MNC line htrs remain. MNA struct htrs remain ④ No redundancy</p>
<p>(ML86B:B) cb MNB ● VAC VENT NOZ HTR – op ● WASTE H2O TK1 DRAIN – op ● SPLY H2O TKD INLET – op ● VAC VENT ISOL VLV – op ● WCS CNTLR – op ● GALLEY H2O HTR – op</p>	<p>4 Waste H2O Vac Vent NozHtr 1 Tk 1 Drain Vlv Cntl 1 Sply H2O Tk D Inlet Vlv Cntl 5 WCS Press Xdcr Galley Hot H2O Htr (Five of six htr strips lost)</p>		<p>⑤ One htr strip pwrd by MNA ML86B still remains. Water will still heat, but at a very slow rate ⑥ One failure away from loss of jettison capability</p>
<p>(ML86B:D) cb MNB MMU ● PORT HTR B – op ● STBD HTR B – op ● GN2 SPLY ISOL VLV B – op cb PYRO JETT SYS A ● PORT RMS – op</p>	<p>2 MMU Port Htr B 2 Stbd Htr B 1 GN2 Sply Isol Vlv B 6 Port RMS: Jett Sys A Deadface Relays</p>		<p>⑦ Current Snsr 1 remains ⑧ Current Snsr 2 remains</p>
<p>(ML86B:E) cb MNB SEAT ● LEFT – op ● RIGHT – op cb MNB FLOOD ● TNL ADAPT 3 – op cb MNB ● CO2 COM INSTR – op</p>	<p>CO2 Rmvl Sys Filter dP CO2 Rmvl Sys Vacuum Press CO2 Rmvl Sys POCO2 Snsr Inlet Temp TA Floodlt 3</p>		<p>⑨ If five tk sets flown on OV102, O2 TK4 B Htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4 A, 4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs</p>
<p>(ML86B:F) cb MNB FLOODS ● MIDDECK 2/6 – op ● BUNK 2/4 – op ● PHS – op ● AIRLK 3 – op cb MNB CRYO</p>	<p>Middeck Floodlts 2,6 Bunk Floodlts 2/4 PHS Floodlt Airlk Floodlt 3</p>		
<p>7 ● O2 HTR TK3 SNSR 2 – op</p>	<p>7 Cryo O2 Tk 3 Htr Current Snsr 2</p>		
<p>8 ● O2 HTR TK4 SNSR 1 – op</p>	<p>8 Cryo O2 Tk 4 Htr Current Snsr 1</p>		
<p>(ML86B:C) ● cb MNB EXT ARLK HTR LINE ZN1 – op ● cb MNB EXT ARLK HTR LINE ZN2 – op ● cb MNB EXT ARLK HTR STRUC – op ● cb MNB EXT ARLK HTR S/O VLV – op</p>	<p>3 Ext A/L H2O Line and Structural Htrs MNB pwr 1 A/L H2O Isol Vlv Cntl</p>		

NOM

EPS SSR-49a
BUS LOSS: MNB PPC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A15:C) <ul style="list-style-type: none"> • PALLET HTRS B – OFF • A – AUTO 	Pallet Structural Htrs B	SM ALERT Light/Tone – on (FSMs) 168 PALLET V B	① MNA PPC1 will now supply 100% of pwr to A and B Cryo Tk Htrs
(A15:D,E,F,G) <ul style="list-style-type: none"> • ✓ That at least one Htr (A or B) per Tk turned off 	1 Redundant pwr to Pallet Cryo Tk 6–9 Htrs B	SM 168 CRYO PALLET Pallet Volts MNB –0 ↓	
BUS ISOLATION ONLY ON MCC CALL, PERFORM (A15:B) <ul style="list-style-type: none"> • PALLET PWR MNB – OFF 			

EPS SSR-49b
BUS LOSS: MNB A15EDO

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE			① Snsr 1 remains
BUS ISOLATION ONLY ON MCC CALL, PERFORM (A15:H,I,J,K) <ul style="list-style-type: none"> • cb MNB TK6–TK9 O2 HTR SNSR 2 – op 	1 Cryo O2 Tk 6–9 Htr Current Snsr 2		

EPS SSR-49c
BUS LOSS: MNB A7

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE			① DSP SYS 2 pwr still available to all users except MNB A7
BUS ISOLATION ONLY ON MCC CALL, PERFORM (A7L) IF DOCKING MISSION <ul style="list-style-type: none"> • cb DEP MNB SYS 2 VENT ISOL – op • cb DEP MNB SYS 2 VENT – op • LTS AIRLK 2/3 MNB – OFF • cb DOCK LT MNB TRUSS AFT – op 	Vestibule Depress Vlv Sys 2 Vent Isol Vestibule Depress Vlv Sys 2 Vent External Airlock Its 2,3 Aft Truss Docking It	1 VEST DEP VLV SYS 2 VENT ISOL tb – bp VEST DEP VLV SYS 2 VENT tb – bp DSP SYS PWR SYS 2 tb – OFF	

NOM

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**EPS SSR-50
BUS LOSS: MNC DA3**

(Includes all MNC sub-buses & AC3)

EPS MNC
SSR 50-66

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 2 • Perform FC3 SHUTDN (FC SHUTDN Cue Card)	2 1 FC3 Pumps and pH Snr Purge Vlv O2,H2 Flow Xdcrs Cell Perf Monitor	SM ALERT Light/Tone – on MASTER ALARM Light/Tone – on	① Because of FC3 Purge Vlv loss, FC3 will remain isolated to limit voltage degradation and allow FC3 to MNB use during entry via PL Bus contactors
• Perform LOSS OF 1 FC (ORB PKT, PWRDN)	3 3 3 3 MNC pwr to ESS1BC ESS2CA CNTLBC1,2,3 CNTLCA1,2,3	(F7) C/W MN BUS UNDERVOLT It – on BACKUP C/W ALARM It – on C/W FREON LOOP It – on C/W FC PUMP It – on C/W AC VOLT It – on C/W H2O LOOP It – on CRT 3,4 blank	
(R1) • cb AC CONTR AC3 ΦA,ΦB,ΦC (three) – cl • INV/AC BUS 3 – OFF (tb-off) • INV PWR 3 – OFF (tb-off) • cb AC CONTR AC3 ΦA,ΦB,ΦC (three) – op	AC3 ΦA,ΦB,ΦC Inverters	(COMM LOST) Comm via PS ATU & A/L 4 All S-BD A/G voice lost if Sys 2 selected	② May be repwr'd after AC Pwr Transfer Cable connected ③ Buses remain pwr'd ④ If Aud Ctr 2 selected, all intercomm, A/G, and recorded voice lost until AUD CTR 1 selected
• O2,H2 MANF VLV TK1,2 (four) – OP • O2,H2 TK3 HTR A – AUTO	5 Cryo O2,H2 Tk1 Htrs A if in Auto Cryo O2,H2 Tk1 Htrs B Tk2 Htrs A Tk4 Htrs A (OV104, OV105) Cryo O2,H2 Tk5 Htrs A in Auto Cryo O2,H2 Tk5 Htrs B	(LIGHTS LOST) Inst lts L/Ctr (pnls C2,F6,F7) MS pnl lts (pnls R10,R12) OS pnl lts (pnls A1,A2,A6, A7,A8,A13,L9) PLB Floodlts Aft Port, Mid Stbd MS Floodlt R Seat/Ctr Cnsl Floodlts Midck Floodlts 3,4,5,7 MO13Q pnl It 1 Bunk Floodlts 1/3 Airlock Floodlt 4 TA Floodlt 4	⑤ If five tk sets flown on OV102, O2 TK4 B Htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4 A,4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs
(C2) • L CRT SEL – 1 • R CRT SEL – 2 • GPC/CRT 03 EXEC • 04 EXEC	DEU/CRT 3,4	(F9) AC3 ΦA,ΦB,ΦC AC volts ind – < 90 DC VOLTS MNC ind – OSL	⑥ REACQ and PSP reconfig procedures are flight specific. If reqd, procedures can be found in payload or ISS specific books
(A1L) S-BD PM • ANT SW ELEC – 1 • XPNDR – 1 • PWR AMPL OPER – 1 • STBY – 1 • PRE AMPL – 1 NSP • PWR – 1	S-BD PM Sys 2: Xpndr 2 Pre Amp 2 Pwr Amp 2 PM, FM Ant sw 2 NSP 2 COM SEC 2	(FSMs) S67 CNTL RPC S67 AC VOLTS 3 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T S66 AV BAY 1 FAN S66 CABIN FAN (2) S68 FC PUMP 3 S69 FC H2 PUMP 3 S88 H2O PUMP P2 S88 H2O LOOP 2 FLOW S88 H2O LOOP 2 TEMP S88 H2O PUMP P 1 S88 H2O LOOP 1 TEMP S88 H2O LOOP 1 QTY S67 MAIN BUS V C RCS PWR FAIL S88 FREON FLOW 1 S88 FRN PL HX 2 S88 FREON QTY 1	⑦ OIU 1 interfaces with PSP 1 for commanding ⑧ Rad isolation may cause FES shutdown ⑨
If PSP and/or INTRG reqd for PL or ISS ops: (A1L) • S-BD PL PWR SYS – 1 • CNTL – PNL • – CMD • Reconfig PSP • Perform PL INTRG REACQ (if reqd)	S-BD PL Intrg 2 PSP 2	Possible 'S88 EVAP OUT T 1(2)'	* TIME CRITICAL *
If OIU reqd: (SSP) • OIU PWR – OIU 1 ON • OIU tb – UP • ✓ MCC, OIU reconfig		SM0 THRM/HYD (B) BCE STRG 3 ADTA (3,B) BCE STRG 4 ADTA (3,B) BCE STRG 3 MLS (3) I/O ERROR CRT 3 I/O ERROR CRT 4 RM DLMA MANF S67 FPC/FLC3 S67 MPC 3 S67 APC/ALC C	If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp
(A12) APU HTR • GAS GEN/FUEL PUMP 2 – A AUTO • GAS GEN/FUEL PUMP 3 – B AUTO • LUBE OIL LINE 2 – A AUTO • LUBE OIL LINE 3 – B AUTO	APU 2 GG/Fu Pump Htrs B APU 3 GG/Fu Pump Htrs A APU 2 Lube Oil Ln Htr B 3 Lube Oil Ln Htr A		
(Continued)	(Continued)	(Continued)	NOM

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
9 (A12) APU HTR TK/FU LINE/H2O SYS ● 2A – AUTO ● 2B – OFF ● 3A – OFF ● 3B – AUTO 9 HYD HTR ● AFT FUS A – AUTO ● B – OFF	APU 2 Tk/Fu Ln Htr B 3 Tk/Fu Ln Htr A	If NSP 2 selected: BCE STRG 3 NSP If cooling by FES only: C/W FREON LOOP It – on 'S88 EVAP OUT T1' 'S88 EVAP OUT T2'	② May be repwrd after AC Pwr Transfer Cable connected ⑨
(A1R) ● S-BD FM PWR – 1	APU 3 GG Inj H2O Htrs 3A, 23A	(L2) 10 O2 EMER tb – bp CAB RELIEF B tb – bp	* [TIME CRITICAL] * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp
If no comm: (C3) ● S-BD PM CNTL – PNL ● – CMD ● AUD CTR – 1	Aft Fuselage Hyd Htrs B	(R1) FC3 COOL PUMP ΔP tb – bp	⑩ Vlv holds position
(L1) ● FLASH EVAP CNTLR PRI A – OFF ● FLASH EVAP CNTLR PRI B(SEC) – ON (If reqd) ● TOP EVAP HTR NOZ R – A AUTO ● TOP EVAP HTR DUCT – A(B) If Hi Load Evap enabled: ● HI LOAD DUCT HTR – A(B)	S-BD Fm Sig Proc 2, Xmtr 2	(F6,F8) 11 NOSE LDG GEAR tb – bp 12 R LDG GEAR tb – bp	⑪ Indicates DN when NLG down
(L2) ● FLASH EVAP FDLN HTR B SPLY – 2	Audio Ctr 2	(F8) HYD QTY 3 ind – 0% APU H2O QTY 2 ind – 0%	⑫ Will not indicate DN when RMG down
13 ● Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 1	Flash Evap Cntrl Pri A	If SYS 2 pwrd: 'S62 BCE BYP PSP2' Loss of PL TLM and CMD If PDI FDA enabled: 'S62 PDI DECOM FAIL'	⑬ Instrumentation loss caused rad isolation
(L4:P) ● cb AC2 ΦA LG SNSR 2 – cl	Topping Evap R Noz Htr B	(O1) H2O PUMP OUT PRESS LOOP 1 ind – 0 psia H2O PUMP OUT PRESS LOOP 2 ind – 20-25 psia	⑭ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
	Topping Evap Duct Fwd,Aft Htrs C	(O3) RCS/OMS PRPLT QTY display is blank	⑮ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists
	Hi Load Duct Inbd,Outbd, Noz Htrs C	R ADP deploy time incr from 15-30 sec	⑯ One failure away from loss of jettison capability
	FES H2O Fdln B Htrs 1 (all)	(O7) 10 AFT L RCS He PRESS B tb – bp 10 AFT L RCS MANF ISOL 5 tb – bp 10 AFT R RCS MANF ISOL 5 tb – bp	⑰ If SPLY H2O DUMP VLV ENA/NOZ HTR – OFF, tb upward and already bp
	Prox Snsr Electronics Box 1	(O8) 10 FWD RCS TK ISOL 1/2 tb – bp 10 FWD RCS MANF ISOL 4 tb – bp 10 FWD RCS MANF ISOL 5 tb – bp	
	Av Bay 2 Agent discharge capability	(R4) 10 HYD BRAKE ISOL VLV 3 tb – OP 10 HYD MPS/TVC ISOL VLV SYS 3 tb – CL	
	Port RMS: 14 MPM Mtr 1 15 Fwd MRL Mtr 2 15 Aft MRL Mtr 1 16 Jettison Sys B	(R11L) 10 SPLY H2O TKA OUTLET tb – bp 17 SPLY H2O DUMP VLV tb – bp 10 SPLY H2O XOVR VLV tb – bp	
● For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS)	RCS Manf F5 RJD pwr (F5L,F5R)		
	RCS Manf F4 RJD pwr (F4R,F4D)		
(F6,F8) ● HSI SEL SOURCE – other than MLS or TACAN 3	MLS 3 Tacan 3		
(O6) ● ANNUN BUS SEL ACA 2/3 – MNB	ACA 2/3 MNC pwr		
(Continued)	(Continued)	(Continued)	NOM

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
18 Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O7) • AFT L RCS He PRESS B • R RCS He PRESS B ----- (O8) • FWD RCS He PRESS B <div style="border: 1px solid black; padding: 2px; width: fit-content;">GNC 23 RCS</div> • Reprioritize L,R Manf 3,4 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest priority, etc • Set aft pod(s) PRI JET FAIL LIMIT of 6	10 Aft L RCS He Press Isol B GPC Cntl, man CL capability 19 F,R RCS He Press Isol B man OP capability ----- Aft RCS L,R Jet 3,4,5 Htrs Fwd RCS Jet 4,5 Htrs	10 (R11L) SPLY H2O GALLEY SPLY VLV tb - bp 10 SPLY H2O TKC INLET tb - bp 20 (R13L) RAD CNTL STBD,PORT (two) tb - bp (A8L) PORT RMS: DPY/STO tb - bp RETEN LAT tb - bp R-F-L AFT tb - bp <div style="border: 1px solid black; padding: 2px; width: fit-content;">SM 94 PDRS CONTROL</div> Indications lost: MPM Mtr 1 STO/DPY Fwd MRL Mtr 2 LAT/REL/RDY Aft MRL Mtr 1 LAT/REL/RDY 10 (AW82D) EMU 1 H2O SPLY,WASTE tb - CL STAR TRKR DR POS -Z OP/CL time incr from 8-16 sec If Cabin Fan A selected: C/W AV BAY/CAB AIR It - on 'S66 CABIN FAN' If site AOS and using S-BD ANT ELEC 2: 'ANTENNA' (2) If H2O Loop 2 Pump active: 'S88 H2O PUMP P2' If OMS Gmbl cmd abs value > 2 deg: C/W OMS TVC It - on 'R OMS GMBL' (3,B) (F7) If APUs active and using BLR CNTLR/HTR 2A or 3B: C/W APU TEMP It - on after ~2 min If first RGA failure and Rates sensed: 'RM FAIL RGA' If ANNUN BUS SEL ACA 2/3 - MNC, L/R Event Seq lts lost 10 (L2) O2 EMER tb - bp 10 CAB RELIEF B tb - bp	⑩ Vlv holds position ⑱ Do not reconfig for reg switch or I'CNCT procedures ⑲ Man CL and GPC cntl remains ⑳ Lat Mtrs 2 of both actuators for Port,Stbd Rad will continue to run until Sys B Lat Cntl sw placed OFF ㉑ Lost TM: <div style="border: 1px solid black; padding: 2px; width: fit-content;">GNC SYS SUMM 2</div> R OMS ENG VLV 2: Assume VLV 2 status same as Vlv 1 R OMS N2 P VLV: If ENG - ARM/PRESS, assume vlv OP ㉒ Unable to confirm redundant coil ㉓ Maintains He Isol redundancy ㉔ Vlv norm closed. Manual cntl remains ㉕ Prevents simultaneous opening of parallel reg paths and possibly rupturing burst disk ㉖ FSM caused by Antenna miscompare
21 Save R OMS for deorbit (if reqd for additional on-orbit burns, ✓MCC) 21 Prior to using L(R) OMS: (O8) 23 R OMS He PRESS/VAP ISOL • A - GPC • B - OP 25 L OMS He PRESS/VAP ISOL • A(B) - GPC • B(A) - CL <div style="border: 1px solid black; padding: 2px; width: fit-content;">GNC XXXXX MNVV VYYYY (3,B)</div> Sel R OMS SEC TVC: • OMS GMBL SEC R ITEM 31 EXEC (A6U) • ANNUN BUS SEL - MNB	21 R OMS GN2 Press Vlv Op TM 22 Eng Pr Vlv Coil 1 24 R OMS He Vap Isol 2 GPC Cntl 24 R OMS He Pr Isol B GPC Cntl 21 L OMS He Pr/Vap Isol A,B man Cntl R OMS Pri TVC ACA 4/5 MNC pwr	26 If OMS Gmbl cmd abs value > 2 deg: C/W OMS TVC It - on 'R OMS GMBL' (3,B) (F7) If APUs active and using BLR CNTLR/HTR 2A or 3B: C/W APU TEMP It - on after ~2 min If first RGA failure and Rates sensed: 'RM FAIL RGA' If ANNUN BUS SEL ACA 2/3 - MNC, L/R Event Seq lts lost 10 (L2) O2 EMER tb - bp 10 CAB RELIEF B tb - bp	㉕ Prevents simultaneous opening of parallel reg paths and possibly rupturing burst disk ㉖ FSM caused by Antenna miscompare

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NOM

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A12) HYD CIRC PUMP ● PWR 2 – MNB ● 3 – MNA	MNC Circ Pump 2 pwr 3 pwr		⑩ Vlv holds position
(A14) RCS/OMS HTR ● L POD (two) – A AUTO, B OFF ● R POD (two) – A AUTO, B OFF	L,R Pod Htrs B (partial)		⑳ Sys A Pri Cntrl, auto switchover to Sec Cntrl remain
(AW18D) ● AIRLK AUD CNTL – MIDDECK	AL ATU,EMU CCU 1,2 PS ATU and CCU		㉔ Sys B Sec Cntrl man On capability remains
(R11U) ● FC H2O LINE HTR – A AUTO ● FC H2O RELIEF HTR – A AUTO	FC H2O Line Htrs B FC H2O Relief Htrs B Noz Htr		㉕ Not yet active on all vehicles
For PLBD ops: ● OP/CL Drs in man mode	PLBD: C/L Lat 13–16 Mtr 1 1–4,5–8,9–12 Mtrs 2 Stbd Aft Blkhd Mtr 1 Port Aft Blkhd Mtr 2 Port Door Mtr 1 Stbd Door Mtr 2 CL Limit sw	SM (BFS,SM) 63 PL BAY DOORS If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG' ----- During MAN PLBD OP/CL, single mtr run time noted on actuators listed at left	㉖ PEVs, Actuators, Bed A P, Bed B P, Bed dP will be recovered after system reconfig
If supply H2O dump reqd: For TK A and/or TK B ● Perform SUPPLY H2O SYS BACKUP DUMP TK A,B (IFM) For TK C and/or TK D ● Perform SUPPLY WATER DUMP USING FES (ORB OPS, ECLS) using FLASH EVAP CNTLR PRI B	10 Sply H2O Dump Vlv Cntl Noz Htr 10 Xovr Vlv Cntl	(R13L) During Rad Dpy/Sto ops: RAD LAT CNTL tb (two) indicate single mtr ops	㉗ Maintains deorbit capability for CNTL BC1 failure
For SSME Hyd Repress: (R4) ● HYD MPS/TVC ISOL VLV SYS 1,2 (two) – OP, wait 10 sec, then CL	10 MPS/TVC Hyd Sys 3 Isol Cntl	Impending: 'S66 CO2 RL SYS PCO2' 'S66 CAB PPCO2'	
If reqd during entry (< 120K ft): (L1) ● NH3 CNTLR A – PRI/GPC If reqd for Post Rollout: ● NH3 CNTLR B – SEC/ON	27 NH3 Sys A Sec Cntrl man ON capability 28 NH3 Sys B Pri Cntrl		
If AC Pwr Transfer Cable to be installed to regain AC: ● Go to EPS SSR-200; otherwise, continue with bus loss actions			
(R2) ● BLR CNTLR/HTR 2 – B ● 3 – A	Hyd H2O Blr 2 Cntrl A 3 Cntrl B		
	29 FC2 Redundant Reac Vlv Cntl on pnl C3		
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: ● Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	30 CO2 Rmvl Sys Cntrl 2 Fan AC3 pwr Compressor AC3 pwr		
(O8) ● Right OMS XFEED B – OP (tb-OP) (Continued)	31 OMS Eng/Xfeed Vlv Redundancy (Continued)		

NOM

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl			⑩ Vlv holds position
(L1) • IMU FAN B(A) – ON • C – OFF • H2O PUMP LOOP 2 – GPC • Perform SSR-10 (H2O Loop 2 only), H2O PUMP OPS via GPC, ECLS • H2O PUMP LOOP 1 – OFF • CAB FAN A – OFF • B – ON • AV BAY 1 FAN A,B (two) – ON • ✓ AV BAY 2 FAN A – ON • B – OFF • 3 FAN A – OFF • ✓ B – ON • FREON PUMP LOOP 2 – B	IMU Fan C H2O Loop 2 Pump man ON capability 10 H2O Loop 1 Byp Cntrl, Sig 32 Cond H2O Loop 1 Byp Vlv pwr Cabin Fan A 33 Av Bay 1 Sig Cond, Xdcrs (ECLS SC2) Av Bay 2 Fan B 3 Fan A Freon Loop 2 Pump A		③② H2O Loop 1 Pump Out P, Pump ΔP, Accum Qty, Pump Out Temp snrs lost ③③ Av Bay 1 Fan ΔP, Air Out Temp snrs lost ③④ Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snrs lost ③⑤ Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate, and Accum Qty snrs lost
(O17:C) • SIG CONDR FREON A – AC2 • SIG CONDR FREON B – AC2	34 Freon S/C A AC3 pwr (ECLS SC 1A) 35 Freon S/C B AC3 pwr (ECLS SC 1B)		③⑥ Inhibits H2O Loop 1 Pump ΔP, Pump Out Temp, Accum Qty, respectively
(CDR SEAT PNL) • CDR SEAT PWR BUS SEL – AC2 (up)	CDR Seat adj via AC3 pwr		③⑦ AC3 bus isolation for AC Pwr Transfer Cable installation accomplished in MNC DA3 ACTIONS column. No additional bus isolation steps reqd
(PLT SEAT PNL) • PLT SEAT PWR BUS SEL – AC2 (up)	PLT Seat adj via AC3 pwr		
36 <table border="1">SM 60 SM TABLE MAINT</table> • Inhibit 0612605, 0612600, 0612640, 0612610			③⑧ Motor A remains ③⑨ Redundant pwr source remains
37 BUS ISOLATION ONLY ON MCC CALL, PERFORM (C2) • CRT 3 PWR – OFF (L4:N) • cb AC3 ΦC RAD ISOL B – op (R1) • PL AFT MNC – OFF (O8) • MLS 3 – OFF • R SEAT/CTR CNSL FLOOD – OFF (O16:A) • RGA 3 – OFF (O16:B) cb MNC 39 • OI SIG CONDR OM3B – op • OI SIG CONDR OF 2/3 – op • OI MDM OF 3/4B – op • MNB CONTR – op • AUX TIMING BUFFER – op (Continued)	38 Freon Loop 1,2 Rad Isol Motor B Aft Payload C pwr R Seat/Ctr Cnsl Floodlts RGA 3 Orbiter Timing Buffer Aft Mission Timer (Continued)		

NOM

EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			
(R14:C) ● cb MNC KU SIG PROC – op	47 Ku-Bd Sys Rdr & Comm I/F Cont Unit (EA1), Ku Comm Sig Proc		⑩ Vlv holds position
(R14:D) cb MNC B ● TV B KEEL/EVA CAMR/PAN-TILT – op ● TV B KEEL/EVA CAMR HTR – op ● TV B KEEL/EVA PAN-TILT HTR – op ● cb MNC TV CAB – op	TV B Keel/EVA Camr Pan/Tilt Htr TV B Keel/EVA Camr Pan/Tilt Htr Flt, Middeck TV Camrs and VFMs		④⑦ Ku Comm and RDR function lost. KU-BAND CONT STOW – EA1 ALTERNATE POWER IFM reqd to stow antenna. Jettison reqd if antenna cannot be positioned within GO FOR PLBD CLOSURE envelope
----- (R14:E) ● cb MNC MS FLOOD – op	MS Floodlt		④⑧ ✓ MCC for Ku Ant stow reqmts
(ML86B:F) cb MNC FLOODS ● MIDDECK 5/7 – op ● MIDDECK 3/4/MO13Q – op ● BUNK 1/3 – op ● AIRLK 4 – op	Middeck Floodlts 3,4,5,7 MO13Q Pnl Lt 1 Bunk Floodlts 1/3 Airlock Lt 4		④⑨ Redundant mtr remains
(MA73C:A,B) ● MCA LOGIC MNC FWD 3 – OFF ● MCA LOGIC MNC MID 2 – OFF ● MCA LOGIC MNC MID 4 – OFF ● MCA LOGIC MNC AFT 3 – OFF	MNC FMC3 Bus pwr MMC2 Bus pwr MMC4 Bus pwr AMC3 Bus pwr		⑤① Htr Cntl 2 remains
	48 Ku Ant Sto/Dpy Mtr 1		⑤② LG can still be deployed by redundant Pyro Bkup Rel Sys 2 and by Pri Hyd Sys. NLG extension pwr assist available from redundant sys. NLG can also be deployed by Hyd Sys 2
	49 R HUD –Z Star Trkr Dr Sys 2 OP/CL capability		⑤③ SYS A remains
	PL MNC Cur Sig Condr		⑤④ One failure away from loss of jettison capability
	49 Port,Stbd Rad Dpy/Sto Mtr 2 50 Port,Stbd Rad Lat 7–12 Mtrs 2 R ADP Dpy Mtr 1 Htr Cntlr 1 LH Vents 1,2,3 Mtrs 1 6 Mtrs 2 RH Vents 8,9 Mtrs 1 3,5 Mtrs 2 51 NLG Extend Sys 1 NLG,LMG,RMG Bkup Rel Sys 1		⑤⑤ Normally not installed
(ML86B:A) ● cb MNC SPLY H2O TKA OUTLET – op ● cb MNC SPLY H2O TKC INLET – op ● cb MNC DUMP VLV/NOZ HTR – op ● cb MNC SPLY H2O XOVR VLV – op ● cb MNC SPLY H2O GALLEY SPLY – op	10 Sply H2O TK A Out Vlv Cntl 10 C In Vlv Cntl 10 Galley H2O Sply Vlv Cntl		
----- (ML86B:D) cb PYRO JETT SYS B ● KU ANT – op ● PORT RMS – op ● STBD RMS – op	52 Ku-Bd Jettison Sys B 53 Port RMS Jettison Sys B		
----- (Continued)	----- (Continued)		

NOM

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EPS SSR-50 (Cont)
BUS LOSS: MNC DA3

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(ML86B:E) cb MNC EMU 1 H2O • WASTE – op • SPLY – op cb MNC SEAT • L – op • R – op cb MNC FLOOD • TNL ADAPT 4 – op cb MNC • CO2 SYS 2 CNTLR – op ----- (ML86B:F) • cb MNC CRYO O2 HTR TK4 SNSR 2 – op (OV104, OV105) • cb MNC CRYO O2 HTR TK5 SNSR 2 – op	10 EMU 1 Waste H2O Vlv Cntl 10 Sply H2O Vlv Cntl TA Floodlt 4 ----- 40 Cryo O2 Tk4 Htr Current Snsr 2 (OV104, OV105) Cryo O2 Tk5 Htr Current Snsr 2 55 R OMS ENG Pri Vlv Coil 1 56 R OMS ENG Cntl Vlv 1,2 Coils 1 57 R OMS Purge Vlv 1,2 58 OMS QTY Gauging for all R OMS Single Engine burns Press Vlv Op Sig 59 APU 2 Cntrl Sply B pwr 60 3 Cntrl Sply A pwr 61 2 Fu Tk Vlv B 57 3 Fuel Tk Vlv A APU 3 GBX GN2 Repress Vlv 10 Hyd Brake Isol 3 Cntl Rsvr 3 Qty Snsr 10 EMU 1 Waste H2O Vlv Cntl 10 Sply H2O Vlv Cntl 62 Freon Loop 1 Cntrl A Rad Byp Vlv Mtr man Cntl 63 Freon Loop 2 Cntrl A Rad Byp Vlv Mtr 10 Freon Loop 2 Flow Prop vlv Freon Loop 2 Cold Plate Flow Xdcr MPS: 64 R Eng He Intercon Outlet Vlv 64 L Eng He Xovr Vlv 61 R Eng He Isol A 65 Manf Repress LO2 Vlv 1,2 66 Prplt F/D Outbd LO2 Vlv 67 ET Door Mtrs: C/L Lat Actr 2 Mtr 2 L Dr Closure Mtr 2 R Dr Closure Mtr 1 Uplock Lat Mtr 1 68 No WOW Relay K9,K11,K13 PLBD: C/L Lat 1-4, 5-8 Mtrs 2 9-12 Mtr 2 13-16 Mtr 1 Stbd Aft Blkhd Mtr 1 Port Aft Blkhd Mtr 2 Door Mtr 1 69 Hyd Main Pump 3 Depress Solenoid RPC A 69 Hyd Main Pump 2 Depress Solenoid RPC B	R MPS He reg A < 680 during entry MM303)	(10) Vlv holds position (40) Current Snsr 1 remains (55) Unable to confirm redundant coils (56) Redundant coils remain (57) Vlv fails closed <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px 0;"> CAUTION </div> No purge. Wait 10 min between burns (58) ✓ MCC for OMS Tot Qty. Aft Qty are found on <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px 0;"> GNC SYS SUMM 2 </div> (59) Pwr Sply A remains. Turbine speed ind lost (60) Pwr Sply B remains. GG Bed T and GBX P ind lost when APU running (61) Vlv fails closed. Redundant vlv remains (62) Cntrls A,B Rad Byp Mtrs Auto Cntl and Cntrl B Rad Byp Vlv Mtr remain (63) Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains (64) Vlv fails closed (65) Vlv fails closed. LO2 manf will not be pressured with He during entry (MM304) (66) Vlv holds position. Loss of manual capability to inert LO2 manf (67) Redundant mtrs remain (68) Brake/Skid Cntl Box A,B enabled before WOW (69) Redundant RPCs remain <div style="text-align: center; font-size: 2em; font-weight: bold; margin-top: 20px;"> NOM </div>

EPS SSR-51
BUS LOSS: MNC FPC3

(Includes MNC FLC3, MNC FMC3, AC3)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 <ul style="list-style-type: none"> Perform FC3 SHUTDN (FC SHUTDN Cue Card), pwrdsn not needed, then: 	2 <ul style="list-style-type: none"> FC3 Pumps and pH Snsr 	MASTER ALARM Light/Tone – on CRT 3,4 blank	① TIME CRITICAL * FC3 must be shutdn within 9 min to avoid potentially hazardous condition ② Will be repwrdr after AC Pwr Transfer Cable connected ③ REACQ and PSP reconfig procedures are flight specific. If reqd, procedures can be found in payload or ISS specific books ④ OIU 1 interfaces with PSP 1 for commanding ⑤ Rad isolation may cause FES shutdown ⑥ Instrumentation loss caused rad isolation ⑦ Vlv holds position. Do not reconfig for reg switch or I'CNCT procedures ⑧ KU-BAND CONT STOW – EA1 ALTERNATE POWER IFM reqd to stow Ku Ant. Jettison reqd if antenna cannot be positioned within GO FOR PLBD CLOSURE envelope ⑨ Performing DIRECT STOW, MECH SSR-5, may be reqd. ✓MCC
(R1) <ul style="list-style-type: none"> cb AC CONTR AC3 (three) – cl INV/AC BUS 3 – OFF (tb-OFF) INV PWR 3 – OFF (tb-OFF) cb AC CONTR AC3 (three) – op 	AC3 ΦA,ΦB,ΦC Inverters	(F7) C/W FREON LOOP It – on C/W FC PUMP It – on C/W AC VOLT It – on C/W H2O LOOP It – on SM ALERT Light/Tone – on	
(C2) <ul style="list-style-type: none"> L CRT SEL – 1 R CRT SEL – 2 GPC/CRT 03 EXEC 04 EXEC 	DEU/CRT 3,4	(F9) AC3 ΦA,ΦB,ΦC AC volts < 90	
(A1L) S-BD PM <ul style="list-style-type: none"> ANT SW ELEC – 1 XPNDR – 1 PWR AMPL OPER – 1 STBY – 1 PRE AMPL – 1 NSP PWR – 1 	S-BD PM Sys 2: Xpndr 2 Pre Amp 2 Pwr Amp 2 PM,FM Ant Sw 2	(COMM LOST) All S-BD A/G voice lost if Sys 2 selected	
If PSP and/or INTRG reqd for PL or ISS ops: <ul style="list-style-type: none"> S-BD PL PWR SYS – 1 CNTL – PNL CMD 	NSP 2/COM SEC 2	(LIGHTS LOST) Instr Its L/Ctr (pnls C2,F6,F7) MS pnl Its (pnls R10,R12) OS pnl Its (pnls A1,A2, A6, A7,A8,A13,L9)	
3 <ul style="list-style-type: none"> Reconfig PSP Perform PL INTRG REACQ (if reqd) 	S-BD PL Intrg 2 PSP 2	(FSMs) S67 FPC/FLC 3 S69 FC H2 PUMP 3 S66 AV BAY 1 FAN S66 CABIN FAN S66 IMU FN SPD B S67 AC VOLTS 3 S69 FC PUMP 3 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T (B) SM0 THRM HYD (B) S88 FREON FLOW 1 S88 FRN PL HX 2 S88 FREON QTY 1 S88 H2O PUMP P2 S88 H2O LOOP 2 FLOW S88 H2O LOOP 2 TEMP BCE BYP KU (2) S88 H2O PUMP P1 S88 H2O LOOP 1 TEMP S88 H2O LOOP 1 QTY	
(A1R) <ul style="list-style-type: none"> S-BD FM PWR – 1 	S-BD FM Sys 2	5 Possible 'S88 EVAP OUT T 1(2)'	
If no comm: (C3) <ul style="list-style-type: none"> S-BD PM CNTL – PNL CMD 		I/O ERROR CRT 3 I/O ERROR CRT 4 RM DLMA MANF	
4 If OIU reqd: (SSP) <ul style="list-style-type: none"> OIU PWR – OIU 1 ON OIU tb – UP ✓MCC, OIU reconfig 		If CABIN FAN A selected: C/W AV BAY/CAB AIR It – on 'S66 CABIN FAN'	
6 <ul style="list-style-type: none"> Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 1 	Prox Snsr Electronics Box 1	If SYS 2 pwrdr: 'S62 BCE BYP PSP 2' Loss of PL TLM and CMD If PDI FDA enabled: 'S62 PDI DECOM FAIL'	
(L4:P) <ul style="list-style-type: none"> cb AC2 ΦA LG SNSR 2 – cl 		If NSP 2 selected: BCE STRG 3 NSP If site AOS and using S-BD Ant Elect 2: 'ANTENNA' (2)	
Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O8) <ul style="list-style-type: none"> FWD RCS He PRESS B 	7 Fwd RCS He Press Isol B man OP capability	(R1) FC3 COOL PUMP ΔP tb – bp	
<ul style="list-style-type: none"> For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS) 	RCS Manf F5 RJD pwr (F5L,F5R)		
	RCS Manf F4 RJD pwr (F4R,F4D)		
9 (R14:C) <ul style="list-style-type: none"> cb MNC KU SIG PROC – op 	8 Ku-Bd Sys Rdr & Comm I/F Cont Unit (EA1)		
(Continued)	(Continued)	(Continued)	NOM

EPS SSR-51 (Cont)
BUS LOSS: MNC FPC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
Pre-seat ingress for Entry: • Discharge handheld fire ext into AV BAY 2	Av Bay 2 agent discharge capability	(F6,F8) LDG GEAR NOSE L tb – bp LDG GEAR R,L tb – bp	⑩ Will indicate DN when NLG down
	12 Port RMS: 13 MPM Mtr 1 14 Fwd MRL Mtr 2 15 Aft MRL Mtr 1	11 HYD QTY 3 ind – 0% APU H2O QTY 2 ind – 0% (O8) FWD RCS 16 TK ISOL 1/2 tb – bp 16 MANF ISOL 4 tb – bp 16 5 tb – bp	⑪ Will <u>not</u> indicate DN when RMG down ⑫ MPM and MRLS may be repwr'd after AC Pwr Transfer Cable connected
If AC Pwr Transfer Cable to be installed to regain AC: • Go to <u>EPS SSR-200</u> ; otherwise, continue with bus loss actions		(O1) H2O PUMP OUT PRESS LOOP 1 ind – 0 psia H2O PUMP OUT PRESS LOOP 2 ind – 20–25 psia	⑬ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
SM 60 SM TABLE MAINT 15 • INHIBIT 0612605, 0612600, 0612640, 0612610		AIR TEMP AV BAY ind – 45 degF FREON FLOW 1 ind – 578 pph	⑭ Single mtr time. If unlatched, one failure away from loss of two out of three MRLS. EVA or RMS jettison capability exists. If latched, one failure away from inability to use RMS
(CDR SEAT PNL) • CDR SEAT PWR BUS SEL – AC2 (up)	CDR Seat Adj via AC3 pwr	R ADP deploy time incr from 15 to 30 sec	
(PLT SEAT PNL) • PLT SEAT PWR BUS SEL – AC2 (up)	PLT Seat Adj via AC3 pwr	(F7) If APUs active and using BLR CNTLR/HTR 2A or 3B: C/W APU TEMP It – on after –2 min	
(O17) • SIG CONDR FREON A – AC2 • SIG CONDR FREON B – AC2	17 Freon Sig Condr A AC3 pwr (ECLS SC 1A) 18 Freon Sig Condr B AC3 pwr (ECLS SC 1B)	STAR TRKR DR POS –Z OP/CL time incr from 8 to 16 sec	⑮ Inhibits H2O Loop 1 Pump ΔP, Pump Out Press, Pump Out Temp, Accum Qty, respectively
(R2) • BLR CNTLR/HTR 2 – B • 3 – A	Hyd H2O Blr 2 Cntrl A 3 Cntrl B Rsvr 3 Qty Snsr	Impending: 'S66 CO2 RL SYS PCO2' 'S66 CAB PPCO2' (MO51F) CO2 RMVL SYS CNTLR 2 FAIL It on	⑯ Vlv holds position ⑰ Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snsr lost
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl			
(L1) • IMU FAN B(A) – ON • C – OFF • H2O PUMP LOOP 2 – GPC • Perform (H2O Loop 2 only) H2O PUMP OPS via GPC, ECLS SSR-10 • H2O PUMP LOOP 1 – OFF • CAB FAN A – OFF • B – ON • AV BAY 1 FAN (two) – ON • ✓ AV BAY 2 FAN A – ON • B – OFF • 3 FAN A – OFF • ✓ B – ON • ✓ FREON PUMP LOOP 2 – B	16 IMU Fan C 19 H2O Loop 2 Pump man ON capability H2O Loop 1 Byp Cntrl, Sig Condr H2O Loop 1 Byp vlv pwr Cabin Fan A Av Bay 1 Sig condr, Xdcrs (ECLS SC2) Av Bay 2 Fan B Av Bay 3 Fan A Freon Loop 2 Pump A		⑱ Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate, and Accum Qty snsr lost ⑲ H2O Loop 1 Pump Out P, Pump ΔP, Accum Qty, Pump Out Temp snsr lost ⑳ AV Bay 1 Fan ΔP, Air Out Temp snsr lost ㉑ PEVs, Actuators, Bed A P, Bed B P, and Bed dP will be recovered after system reconfig
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	21 CO2 Rmvl Sys Cntrl 2		
(Continued)	(Continued)		<p style="text-align: center; font-size: 2em; font-weight: bold;">NOM</p>

EPS SSR-51 (Cont)
BUS LOSS: MNC FPC3

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BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			①⑥ Vlv holds position
(L4:N) ● cb AC3 ΦC RAD ISOL B – op	23 Freon Loop 1,2 Rad Isol Motor B		②② AC3 Bus Isolation for AC Pwr Transfer Cable installation accomplished in MNC FPC 3 ACTIONS column. No additional bus isolation steps reqd
(C2) ● CRT3 PWR – OFF			②③ Motor A remains
(O16:C) ● cb MNC FIRE SUPPR BAY 2 – op			②④ Mtr 2 remains
(R11L) ● CRT4 PWR – OFF			②⑤ Htr Cntrl 2 remains
(MA73C:A) ● MCA LOGIC MNC FWD 3 – OFF	MNC FMC 3 Bus pwr		②⑥ LG can still be deployed by Pri Hyd System or by redundant Pyro Backup Release System 2. NLG extension pwr assist still available from redundant sys. NLG can also be deployed by Hyd Sys 2
(R15:C) ● cb MNB KU ELEC – op			②⑦ Redundant mtrs remain
	24 AC3 FMC3 Bus Pwr LH Vents 1,2,3 Mtr 1 6 Mtr 2 –Z Star Trkr Dr Sys 2 OP/CL capability R ADP Dpy Mtr 1		②⑧ Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains
	PLT HUD		②⑨ ✓MCC for Ku Ant stow reqmts
	25 R ADP Htr Cntrl 1		
	26 NLG Ext Sys 1		
	26 NLG,LMG,RMG Bkup Rel Sys 1		
	MNC Pwr to CNTL Buses BC1,BC2,BC3,CA1,CA2,CA3		
	27 ET Door Mtrs: C/L Lat Actr 2 Mtr 2 L Dr Closure Mtr 2 R Dr Closure Mtr 1 Uplock Lat Mtr 1		
	28 Freon Loop 2 Cntrl A Rad Byp Vlv Mtr		
	16 Freon Loop 2 Flow Prop Vlv		
	Port,Stbd Rad Lat 7–12 Mtrs 2 Port,Stbd Rad Dpy/Sto Mtrs 2		
	PLBD: C/L Lat 1–4, 5–8 Mtrs 2 9–12 Mtr 2 13–16 Mtr 1 Stbd Aft Blkhd Mtr 1 Port Aft Blkhd Mtr 2 Door Mtr 1		
	29 Ku Ant Sto/Dpy Mtr 1		

NOM

EPS SSR-52 BUS LOSS: MNC MPC3

(Includes MNC MMC2 & MNC MMC4)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1 • Perform MNC BUS TIE (BUS TIE Cue Card)</p> <p>1 • Monitor, record Δamps between FC3 and tied FC</p> <p>(L2)</p> <p>• FLASH EVAP FDLN HTR B SPLY - 2</p> <p>(A12)</p> <p>• HYD HTR AFT FUS A - AUTO</p> <p>• HYD HTR AFT FUS B - OFF</p> <p>(R11U)</p> <p>• FC H2O LINE HTR - A AUTO</p> <p>• FC H2O RELIEF HTR - A AUTO</p>	<p>1 FC3 Purge Vlv O2,H2 Flow Xdcrs SS ΔV Sntrs</p> <p>FES H2O Fdln B Mid 2 Htr 1</p> <p>Aft Fuselage Hyd Htrs B</p> <p>FC H2O Line Htrs B Relief Htrs B Noz Htr</p>	<p>1 (R13L) RAD CNTL PORT,STBD (two) tb - bp</p> <p>(Lights Lost) PLB Floodlts Aft Port, Mid Stbd</p> <p>If first RGA failure and rates sensed: 'RM FAIL RGA' (3)</p> <p>If FC H2O Rlf Htrs in B AUTO: SM ALERT Light/Tone - on 'S69 FUEL CELL'</p> <p>SM (BFS SM 63) PL BAY DOORS</p> <p>If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'</p> <p>----- During MAN PLBD OP/CL, single mtr run time noted on actuators listed at left</p> <p>(A8L) PORT RMS: DPY/STO tb - bp RETEN LAT tb - bp R-F-L AFT tb - bp</p> <p>SM 94 PDRS CONTROL</p> <p>Indications lost: MPM Mtr 1 STO/DPY Fwd MRL Mtr 2 LAT/REL/RDY Aft MRL Mtr 1 LAT/REL/RDY</p>	<p>① Buses are tied due to: <u>Loss of FC3 Purge capability.</u> As FC3 loses performance the tied FC will pick up load, slowing FC3 degradation. If degradation projection does not allow for nominal EOM, Fuel Cell will be shut down. ✓MCC and <u>Loss of FC3 SS ΔV Sntrs.</u> Change in ΔAmps >12 amps indicates possible cell crossover problem. ΔAmps shift due to loss of FC3 purge capability is indicated by change in ΔAmps between pre- and post-purge readings. MCC will aid in this determination</p> <p>② If AC3 MMC2 and MMC4 cbs not opened, Lat Mtrs 2 of actuators for Port,Stbd Rad Lat 7-12 continues to run until Sys B Lat Cntl sw placed to OFF</p> <p>③ Mtrs 1 will continue to drive until Sys A,B Cntl sw are taken to OFF</p> <p>④ This switch may be used to pwr other equipment</p> <p>⑤ Logic buses 2(3) remain pwr'd via MNB(MNA)</p> <p>⑥ Buses remain pwr'd</p> <p>⑦ Cntrls A,B Rad Byp Mtrs Auto Cntl and Cntrl B Rad Byp Vlv Mtr Man Cntl remain</p>
<p>(MA73C:C,D)</p> <p>2 • cb MCA PWR AC3 3Φ MID 2 - op</p> <p>2 • cb MCA PWR AC3 3Φ MID 4 - op</p> <p>For PLBD ops: • OP/CL Drs in man mode</p> <p>(L1)</p> <p>• TOP EVAP HTR DUCT - A(B)</p> <p>If Hi Load Evap enabled: • HI LOAD DUCT HTR - A(B)</p>	<p>2 Port,Stbd Rad Lat 7-12 Mtr 2 Limit sw</p> <p>3 Port,Stbd Rad Dpy/Sto Mtrs 1 Limit sw</p> <p>Port,Stbd Rad Dpy/Sto Mtrs 2</p> <p>PLBD: C/L Lat 13-16 Mtr 1 1-4,5-8,9-12 Mtr 2 Stbd Aft Blkhd Lat Mtr 1 Port Aft Blkhd Lat Mtr 2 Door Mtr 1 Stbd Door Mtr 2 CL Limit sw</p> <p>Topping Evap Duct Fwd,Aft Htr C</p> <p>Hi Load Duct Inbd,Outbd Htr C</p>	<p>SM 94 PDRS CONTROL</p>	
<p>BUS ISOLATION</p> <p>ONLY ON MCC CALL, PERFORM</p> <p>(A7U) PL BAY FLOOD</p> <p>• AFT PORT - OFF</p> <p>• MID STBD - OFF</p> <p>4 • RMS STBD SPOT - OFF</p> <p>(A7L) IF DOCKING MISSION</p> <p>• PYRO PWR MNC - OFF cb MNC</p> <p>• LOGIC 2 - op</p> <p>• 3 - op</p> <p>(O16:A) • RGA 3 - OFF</p> <p>(R11U) • FC PURGE VLV 3 - CL</p> <p>• FC STARTUP HTR 3 - ENA</p> <p>(MA73C:A,B) • MCA LOGIC MNC MID 2,4 (two) - OFF</p>	<p>PLB Aft Port Floodlt Mid Stbd Floodlt</p> <p>MNC Pyro system</p> <p>5 MNC pwr to DSP Logic buses 2,3</p> <p>RGA 3</p> <p>FC3 Startup Htr INH capability</p> <p>MNC MMC2, MNC MMC4 Bus pwr</p> <p>6 MNC pwr to ESS1BC,2CA</p> <p>7 Freon Loop 1 Cntrl A Rad Byp Vlv Mtr man Cntl</p> <p>(Continued)</p>		

EPS SSR-52 (Cont)
BUS LOSS: MNC MPC3

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	<p>Port RMS: 8 MPM Mtr 1 9 Fwd MRL Mtr 2 9 Aft MRL Mtr 1</p> <p>RH Vent 3 Mtr 2 5 Mtr 2 LH Vent 3 Mtr 2 6 Mtr 2</p> <p>10 Ku Ant Dpy/Sto Mtr 1 Limit sw</p> <p>11 Redundant Ku Band Xmit Enable</p> <p>12 Redundant Boom Stow Enable II Excitation Signal</p> <p>FC2 Redundant Reac Vlv Close Cntl on pnl C3</p>		<p>⑧ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison</p> <p>⑨ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists</p> <p>⑩ With an inop limit sw, mtr will continue to run until primary sw returned to GND</p> <p>⑪ Redundant sig (MNB) enables Ku Band Xmit</p> <p>⑫ MNB MMC4 pwr remains to supply pwr to Boom Stow Enable II signal for stow mtrs</p>

EPS SSR-53
BUS LOSS: MNC APC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>GNC 23 RCS</p> <p>1 DES INH on L Manf 3 Jets: • ITEM 2 EXEC • L3L ITEM 12 EXEC (*) • L3D ITEM 28 EXEC (*) • L3A ITEM 30 EXEC (*) Set aft pod(s) PRI JET FAIL LIMIT to 6</p>		<p>If OMS GMBL cmd abs value > 2 deg: C/W OMS TVC It - on 'R OMS GMBL' (3,B)</p>	<p>① Maintains control capability for APC4 failure</p>
<p>3 Refer to OMS/RCS Slide Rule for vlv loss info (use APC6 Slide for Aft RCS) Reconfig following vlv(s) only if leak isolation reqd: (O7) • AFT L RCS He PRESS B • R RCS He PRESS B</p>	<p>2 Aft L RCS He Press Isol B GPC Cntl, man CL capability 4 Aft R RCS He Press Isol B man OP capability 2 Aft L,R RCS Manf Isol 5 Cntl</p>		<p>② Vlv holds position ③ Do not reconfig for reg switch or I'CNCT procedures ④ Man CL and GPC cntl remains ⑤ Lost TM:</p>
<p>(A12) APU HTR TK/FU LN/H2O • SYS 3B - AUTO</p>	<p>APU 3 GG Inj H2O Htrs 3A,23A</p>		<p>GNC SYS SUMM 2</p> <p>R OMS Eng Vlv 2: Assume Vlv 2 status same as Vlv 1</p>
<p>(A14) RCS/OMS HTR • L POD (two) - A AUTO, B OFF • R POD (two) - A AUTO, B OFF</p>	<p>L,R Pod Htrs B (partial)</p>		<p>⑥ Maintains He Isol redundancy ⑦ Vlv normally closed. Man cntl remains ⑧ Prevents simultaneous opening of parallel reg paths and possibly rupturing burst disk</p>
<p>5 Prior to using L,R OMS: (O8) 6 R OMS He PRESS/VAP ISOL • A - GPC • B - OP 8 L OMS He PRESS/VAP ISOL • A(B) - GPC • B(A) - CL</p>	<p>7 R OMS He Vap Isol 2 GPC Cntl 7 R OMS He Pr Isol B GPC Cntl 9 L OMS He Pr/Vap Isol A,B man Cntl</p>		<p>⑨ Vlv normally closed. GPC cntl remains ⑩ Vlv fails closed. Redundant vlv remains</p>
<p>GNC XXXXX MNVR YYYYY (3,B)</p> <p>Sel R OMS SEC TVC: • GMBL SEC R - ITEM 31 EXEC</p>	<p>R OMS Pri TVC</p>		
<p>BUS ISOLATION</p>			
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(R1) • PL AFT MNC - OFF</p>	<p>Aft Payload C pwr</p>		
	<p>10 R OMS BPV 2 OP sig APU 2 Fu Tk Vlv B</p>		

EPS SSR-54
BUS LOSS: MNC APC6

(Includes MNC APC3, MNC ALC3, MNC AMC3)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(L1)</p> <ul style="list-style-type: none"> FLASH EVAP CNTLR PRI A – OFF FLASH EVAP CNTLR PRI B(SEC) – ON (If reqd) TOP EVAP HTR NOZ R – A AUTO <p>If HI LOAD EVAP enabled:</p> <ul style="list-style-type: none"> HI LOAD DUCT HTR – A(B) 	<p>Flash Evap Cntr Pri A</p> <p>Topping Evap R Noz Htr B Hi Load Duct Noz Htr C</p>	<p>(R4)</p> <p>1 HYD BRAKE ISOL VLV 3 tb – OP</p> <p>1 HYD MPS/TVC ISOL VLV SYS 3 tb – CL</p>	<p>① Vlv holds position</p> <p>② Do not reconfig for reg switch or I'CNCT procedures</p> <p>③ Man CL and GPC cntl remains</p> <p>④ Maintains control capability for APC1 failure</p> <p>⑤</p> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> <p>TIME CRITICAL</p> </div> <p>* If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p>
<p>(L2)</p> <ul style="list-style-type: none"> FLASH EVAP FDLN HTR B SPLY – 2 	<p>FES H2O Fdln B Htrs 1 (all except Mid 2)</p>	<p>(O7)</p> <p>1 AFT L RCS He PRESS B tb – bp</p> <p>1 AFT L,R RCS MANF ISOL 5 (two) tb – bp</p>	
<p>Refer to OMS/RCS Slide Rule for vlv loss info</p> <p>2 Reconfig following vlv(s) only if leak isolation reqd:</p> <p>(O7)</p> <ul style="list-style-type: none"> AFT L RCS He PRESS B R RCS He PRESS B 	<p>1 Aft L RCS He Press Isol B GPC Cntl and man CL capability</p> <p>3 Aft R RCS He Press Isol B man OP capability</p>	<p>(FSMs)</p> <p>S88 FRN AFT CP 2 RCS PWR FAIL</p> <p>If cooling by FES only: C/W FREON LOOP It – on 'S88 EVAP OUT T 1' 'S88 EVAP OUT T 2'</p>	
<p>GNC 23 RCS</p> <ul style="list-style-type: none"> Reprioritize L,R Manf 3,4 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc <p>4 DES INH on L Manf 3 Jets:</p> <ul style="list-style-type: none"> ITEM 2 EXEC L3L ITEM 12 EXEC (*) L3D ITEM 28 EXEC (*) L3A ITEM 30 EXEC (*) Set aft pod(s) PRI JET FAIL LIMIT to 6 	<p>Aft RCS L,R Jets 3,4 Htrs</p>	<p>(F7)</p> <p>If APUs active and using BLR CNTLR/HTR 2A or 3B, C/W APU TEMP It – on after ~2 min</p> <p>If OMS Gmbl cmd abs value > 2 deg: C/W OMS TVC It – on 'R OMS GMBL' (3,B)</p> <p>No R MPS He usage during entry (MM304)</p>	
<p>(R2)</p> <ul style="list-style-type: none"> BLR CNTLR/HTR 2 – B 3 – A 	<p>Hyd H2O Blr 2 Cntr A Blr 3 Cntr B</p>		
<p>(A12)</p> <p>5 APU HTR TK/FU LINE H2O</p> <ul style="list-style-type: none"> SYS 2A – AUTO 2B – OFF <p>5</p> <ul style="list-style-type: none"> SYS 3A – OFF 3B – AUTO <p>APU HTR GAS GEN/FUEL</p> <p>5</p> <ul style="list-style-type: none"> PUMP 2 – A AUTO 3 – B AUTO <p>APU HTR</p> <ul style="list-style-type: none"> LUBE OIL LINE 2 – A AUTO LUBE OIL LINE 3 – B AUTO <p>HYD CIRC</p> <ul style="list-style-type: none"> PUMP PWR 2 – MNB 3 – MNA 	<p>APU 2 TK/FU Ln Htr B</p> <p>3 TK/FU Ln Htr A 3 GG Inj H2O Htrs 3A,23A</p> <p>APU 2 GG/FU Pump Htr B 3 GG/FU Pump Htr A</p> <p>APU 2 Lube Oil Ln Htr B</p> <p>APU 3 Lube Oil Ln Htr A</p> <p>Circ Pmp 2 MNC pwr 3 MNC pwr</p>		
<p>(A14)</p> <p>RCS/OMS HTR</p> <ul style="list-style-type: none"> L POD (two) – A AUTO, B OFF R POD (two) – A AUTO, B OFF 	<p>L,R Pod Htrs B (partial)</p>		
<p>(Continued)</p>	<p>(Continued)</p>		

EPS SSR-54 (Cont)
BUS LOSS: MNC APC6

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	<p>1 Hyd Brake Isol 3 Cntl 19 R OMS Cntl Vlv 1,2 Coils 1 20 OMS Qty Gauging for all R OMS single engine burns 21 R OMS Purge Vlv 1,2 Aft RCS L,R Jet 5 Htr</p> <p>MPS: 22 R Eng He Intercon Outlet Vlv 23 R Eng He Isol A 22 L Eng He Xovr Vlv 24 Manf Repress LO2 Vlv 1,2 25 Prplt F/D Outbd LO2 Vlv</p> <p>26 ET Door Mtrs: C/L Lat Actr 2 Mtr 2 GPC Cntl L Dr Closure Mtr 2 GPC CL capability R Dr Closure Mtr 1 GPC CL capability R Dr Uplock Lat Mtr 1 GPC Lat capability</p> <p>----- AC Pwr removal capability via Limit sw for ET Dr Mtrs: C/L Lat Actr 2 Mtr 2 L Dr Closure Mtr 2 R Dr Closure Mtr 1 Uplock Lat Mtr 1</p>	<p>R MPS He reg A < 680 during entry (MM303)</p>	<p>① Vlv holds position</p> <p>⑱ Redundant coils remain</p> <p>⑳ ✓MCC for OMS Qtyts</p> <p>㉑</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px 0;"> <p style="text-align: center; margin: 0;">CAUTION</p> <p style="margin: 0;">No Purge. Wait 10 min between burns</p> </div> <p>㉒ Vlv fails closed</p> <p>㉓ Vlv fails closed. Redundant vlv remains</p> <p>㉔ Vlv fails closed. LO2 Manf will not be pressurized with He during entry (MM304)</p> <p>㉕ Vlv holds position. Loss of manual capability to inert LO2 manf</p> <p>㉖ Redundant mtrs remain</p>

**EPS SSR-55
BUS LOSS: MNC FLC3**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A1L) S-BD PM ● ANT SW ELEC - 1 ● XPNDR - 1 ● PWR AMPL OPER - 1 ● PWR AMPL STBY - 1 ● PRE AMP - 1 NSP ● PWR - 1</p> <hr/> <p>If PSP and/or INTRG reqd for PL or ISS ops: ● S-BD PL PWR SYS - 1 ● CNTRL - PNL ● - CMD</p> <p>5 ● Reconfig PSP 5 ● Perform PL INTRG REACQ (if reqd)</p>	<p>S-BD PM Sys 2: FM, PM Ant Sw 2 Xpndr 2 Pwr Ampl 2</p> <p>Pre Amp 2</p> <p>NSP 2</p>	<p>(COMM LOST) All S-BD A/G voice lost if Sys 2 selected</p>	<p>① Indications do not appear until jets commanded</p>
<p>(A1R) ● S-BD FM PWR - 1</p>	<p>S-BD FM Sys 2</p>	<p>1 (F7) C/W RCS JET lt - on</p>	<p>② Does not indicate DN when RMG down</p>
<p>If no comm: (C3) ● S-BD PM CNTRL - PNL ● - CMD</p>	<p>S-BD PL Intrg 2 PSP 2</p>	<p>2 (F6,F8) LDG GEAR R tb - bp 3 LDG GEAR NOSE tb - bp</p>	<p>③ Indicates DN when Nose Gear down</p>
<p>7 If OIU reqd: (SSP) ● OIU PWR - OIU 1 ON ● OIU tb - UP ● ✓ MCC, OIU reconfig</p>		<p>4 (O8) FWD RCS MANF ISOL 5 tb - bp</p>	<p>④ Vlv holds position</p>
<p>● For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS)</p>		<p>1 (FSMs) F RCS D(R) JET RM DLMA MANF</p>	<p>⑤ REACQ and PSP reconfig procedures are flight specific. If reqd, procedures can be found in payload or ISS specific books</p>
<p>GNC 23 RCS</p>		<p>6 If NSP 2 selected: 'BCE STRG 3 NSP' If site AOS and using S-BD ANT Elec 2: 'ANTENNA (2)</p>	<p>⑥ FSM caused by Antenna miscompare</p>
<p>8 Override F4 Manf status to CL: ● RCS FWD - ITEM 1 EXEC ● MANF VLVS 4 OVRD - ITEM 43 EXEC</p>		<p>If Sys 2 pwrd: 'S62 BCE BYP PSP2' Loss of PL TLM and CMD If PDI FDA enabled: 'S62 PDI DECOM FAIL'</p>	<p>⑦ OIU 1 interfaces with PSP 1 for commanding</p>
<p>9 Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv only if leak isolation reqd: (O8) ● FWD RCS He PRESS B</p>	<p>RCS Manf F5 RJD pwr (F5L,F5R)</p>		<p>⑧ Manf status <u>not</u> automatically declared closed. Jet fail-offs may occur when commanded</p>
<p>● Pre-seat ingress for Entry, discharge hand-held fire ext into AV BAY 2</p>	<p>RCS Manf F4 RJD pwr (F4R,F4D)</p>		<p>⑨ Do not reconfig for reg switch or I'CNCT procedures</p>
<p>BUS ISOLATION</p>	<p>4 Fwd RCS He Press Isol B man OP capability</p>		<p>⑩ Htr Cntrl 2 remains</p>
<p>ONLY ON MCC CALL, PERFORM</p>	<p>Av Bay 2 agent discharge capability</p>		
<p>(O16:C) ● cb MNC FIRE SUPPR BAY 2 - op</p>			
	<p>10 R ADP Htr Cntrl 1 NWS fail indication (pnl F2)</p>		
	<p>NLG, RMG B/U Rel 1 Fire 2, Arm</p>		

**EPS SSR-56
BUS LOSS: MNC ALC3**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(L1)</p> <ul style="list-style-type: none"> FLASH EVAP CNTLR PRI A – OFF FLASH EVAP CNTLR PRI B(SEC) – ON (If reqd) TOP EVAP HTR NOZ R – A AUTO <p>If HI LOAD EVAP enabled:</p> <ul style="list-style-type: none"> HI LOAD DUCT HTR – A(B) 	<p>FES Cntrl Pri A</p> <p>Topping Evap R Noz Htr B Hi Load Duct Noz Htr C</p>	<p>(R4)</p> <p>1 HYD BRAKE ISOL VLV 3 tb – OP</p> <p>1 HYD MPS/TVC ISOL VLV SYS 3 tb – CL</p>	<p>① Vlv holds position</p> <p>② Do not reconfig for reg switch or I'CNCT procedures</p>
<p>(L2)</p> <ul style="list-style-type: none"> FLASH EVAP FDLN HTR B SPLY – 2 	<p>FES H2O Fdln B Htrs 1 (all except Mid 2)</p>	<p>(O7)</p> <p>1 AFT L RCS He PRESS B tb – bp</p> <p>1 AFT L,R RCS MANF ISOL 5 (two) tb – bp</p>	<p>③ HYD H2O Blr and Tk Htrs are still operative, but GN2 SOV fails open and steam vent htr and spray logic are disabled. Alternate controller must be selected</p>
<p>Refer to OMS/RCS Slide Rule for bus loss info</p> <p>2 Reconfig following vlv(s) only if leak isolation reqd:</p> <p>(O7)</p> <ul style="list-style-type: none"> AFT R RCS He PRESS B L RCS He PRESS B 	<p>Aft R RCS He Pr Isol B man OP capability</p> <p>1 Aft L RCS He Press Isol B GPC Cntl, man CL capability</p>	<p>(FSMs)</p> <p>RCS PWR FAIL</p> <p>If cooling by FES only: C/W FREON LOOP It – on 'S88 EVAP OUT T1' 'S88 EVAP OUT T2'</p>	<p>④</p> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> <p>TIME CRITICAL</p> </div> <p>If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p>
<p>GNC 23 RCS</p> <ul style="list-style-type: none"> Reprioritize L,R Manf 3,4 Jets to first priority: DES INH twice all other jets; highest priority first, then next highest, etc Set aft pod(s) PRI JET FAIL LIMIT to 6 	<p>Aft RCS L,R Jet 3,4 Htrs</p>	<p>(F7)</p> <p>If APUs active and using BLR CNTLR/HTR 2A or 3B: C/W APU TEMP It – on after ~2 min</p>	<p>⑤ Lost TM:</p> <div style="border: 1px solid black; padding: 2px;"> <p>GNC SYS SUMM 2</p> </div> <p>R OMS N2 P VLV If Eng – ARM/PRESS, assume vlv OP</p>
<p>(R2)</p> <ul style="list-style-type: none"> BLR CNTLR/HTR 2 – B 3 – A 	<p>3 Hyd H2O Blr 2 Cntrl A</p> <p>3 3 Cntrl B</p>		<p>⑥ Unable to confirm redundant coils</p>
<p>(A12)</p> <p>4 APU HTR TK/FU LINE/H2O</p> <ul style="list-style-type: none"> SYS 2A – AUTO 2B – OFF 3A – OFF 3B – AUTO <p>4 APU HTR GAS GEN/FUEL</p> <ul style="list-style-type: none"> PUMP 2 – A AUTO 3 – B AUTO <p>4 APU HTR LUBE OIL</p> <ul style="list-style-type: none"> LINE 2 – A AUTO 3 – B AUTO <p>HYD CIRC</p> <ul style="list-style-type: none"> PUMP PWR 2 – MNB 3 – MNA 	<p>APU 2 Tk/Fu Ln Htr B</p> <p>APU 3 Tk/Fu Ln Htr A</p> <p>APU 2 GG/FU Pump Htr B 3 GG/FU Pump Htr A</p> <p>APU 2 Lube Oil Ln Htr B 3 Lube Oil Ln Htr A</p> <p>Circ Pump 2 MNC pwr 3 MNC pwr</p>		<p>⑦ Maintains He Isol redundancy</p>
<p>5 Save R OMS eng for deorbit (If reqd for additional on-orbit burns, ✓MCC)</p>	<p>5 R OMS GN2 Press Vlv OP TM</p> <p>6 R OMS Eng Pr Vlv Coil 1</p>		<p>⑧ Vlv normally closed. Man cntl remains</p>
<p>Prior to using R OMS: (O8)</p> <p>7 R OMS He PRESS/VAP ISOL</p> <ul style="list-style-type: none"> A – GPC B – OP 	<p>8 R OMS He Pr Isol B GPC Cntl</p>		
<p>For SSME Hyd Repress: (R4)</p> <ul style="list-style-type: none"> HYD MPS/TVC ISOL VLV SYS 1,2 (two) – OP, wait 10 sec, then CL 	<p>1 MPS/TVC Hyd Sys 3 Isol Cntl</p>		
(Continued)	(Continued)		

EPS SSR-56 (Cont)
BUS LOSS: MNC ALC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>If reqd during entry (< 120K ft): (L1)</p> <ul style="list-style-type: none"> • NH3 CNTLR A – PRI/GPC <p>If reqd for Post Rollout:</p> <ul style="list-style-type: none"> • NH3 CNTLR B – SEC/ON <p>-----</p> <p>If NH3 CNTLR A(B) – SEC/ON reqd, then: (L1)</p> <ul style="list-style-type: none"> • H2O PUMP LOOP 1,2 (two) – ON • ✓ FLOW PROP VLV LOOP 1,2 (two) – ICH <p>If applicable:</p> <ul style="list-style-type: none"> • Activate PL H2O LOOP(s) 	<p>9 NH3 Sys A Sec Cntrl man ON capability</p> <p>10 NH3 Sys B Pri Cntrl and Auto sw over to Sec Cntrl</p> <p>-----</p>	<p>R MPS He reg A < 680 during entry (MM303)</p>	<p>① Vlv holds position</p> <p>⑨ Sys A Pri Cntrl, auto switchover to Sec Cntrl remain</p> <p>⑩ Sys B Sec Cntrl man On capability remains</p> <p>⑪ Redundant coils remain</p> <p>⑫ ✓ MCC for OMS Qty's</p> <p>⑬</p>
<p>BUS ISOLATION</p>			
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>NONE</p>	<p>11 R OMS Eng Cntl Vlv 1,2 Coils 1</p> <p>12 OMS Qty Gauging for all R OMS Single Engine burns</p> <p>13 R OMS Purge Vlv 1,2 Aft RCS L,R Jet 5 Htr</p> <p>1 Hyd Brake Isol 3 Cntl</p> <p>14 APU 2 Fu Tk Vlv B</p> <p>14 3 Fu Tk Vlv A</p> <p>MPS:</p> <p>15 R Eng He Intercon Outlet Vlv</p> <p>14 R Eng He Isol A</p> <p>15 L Eng He Xovr Vlv</p> <p>16 Manf Repress LO2 Vlv 1,2</p> <p>17 Prplt F/D Outbd LO2 Vlv</p>		<p>CAUTION</p> <p>No Purge. Wait 10 min between burns</p> <p>⑭ Vlv fails closed. Redundant vlv remains</p> <p>⑮ Vlv fails closed</p> <p>⑯ Vlv fails closed. LO2 Manf will not be pressurized with He during entry (MM304)</p> <p>⑰ Vlv holds position. Loss of manual capability to inert LO2 manf</p>

EPS SSR-57
BUS LOSS: MNC FMC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<ul style="list-style-type: none"> Refer to OMS/RCS Slide Rule for vlv loss info <div style="border: 1px solid black; padding: 2px; width: fit-content;">GNC 23 RCS</div> Override F4 Manf status to OP <ul style="list-style-type: none"> RCS FWD – ITEM 1 EXEC MANF VLVS 4 OVRD – ITEM 43 EXEC 		(FSM) RM DLMA MANF	① Vlv holds position
		(O8) 1 FWD RCS TK ISOL 1/2 tb – bp 1 FWD RCS MANF ISOL 4 tb – bp	② Mtr 2 remains ③ Htr Cntrl 2 remains
		R ADP deploy time incr from 15 to 30 sec	
		STAR TRKR DR POS –Z OP/CL time incr from 8 to 16 sec	
	–Z Star Trkr Dr Sys 2 OP/CL capability 2 R ADP Deploy Mtr 1 Disc 1		
	3 MNC FMC3 Bus pwr R ADP Htr Cntrl 1 LH Vent 1,2 Mtr 1		
BUS ISOLATION ONLY ON MCC CALL, PERFORM			
(MA73C:A) • MCA LOGIC MNC FWD 3 – OFF			

EPS SSR-58
BUS LOSS: MNC MMC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (MA73C:C) • cb MCA PWR AC3 3Φ MID 2 – op	1 Stbd Rad Lat 7–12 Mtr 2 Limit sw 2 Port Rad Dpy/Sto Mtr 1 Limit sw Stbd Rad Dpy/Sto Mtr 2	1 (R13L) RAD CNTL PORT tb – bp If STBD RAD pnl deployed: RAD CNTL STBD tb – bp	① If AC3 MMC2 cb not opened, Lat Mtr 2 of Stbd Lat 7–12 Actuator continues to run until Sys B Lat Cntl sw placed to OFF
For PLBD Ops: • OP/CL Drs in man mode, MANUAL PLBD CLOSING (DEORBIT PREP)	PLBD: C/L Lat 1–4 Mtr 2 5–8 Mtr 2 Port Aft Blkhd Lat Mtr 2	<div style="border: 1px solid black; padding: 2px; width: fit-content;">SM (BFS SM 63) PL BAY DOORS</div> If in <u>AUTO</u> OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'	② Mtr 1 will continue to drive until Sys B Cntl sw is taken to OFF
		During <u>MAN</u> PLBD OP/CL, single mtr run time noted on actuators listed at left	③ With an inoperative limit switch, mtr will continue to run until stow sw returned to gnd
BUS ISOLATION ONLY ON MCC CALL, PERFORM		(A8L) PORT RMS: DPY/STO tb – bp RETEN LAT tb – bp R–F–L AFT tb – bp	④ Redundant sig (MNB) enables Ku–Band Xmit
(MA73C:A) • MCA LOGIC MNC MID 2 – OFF	MNC MMC2 Bus pwr	<div style="border: 1px solid black; padding: 2px; width: fit-content;">SM 94 PDRS CONTROL</div> Indications lost: MPM Mtr 1 STO/DPY Aft MRL Mtr 1 LAT/REL/RDY	⑤ MNB MMC4 pwr remains to supply pwr to Boom Stow Enable II Signal for Stow mtrs
	LH Vents 3 Mtr 1 6 Mtr 2		⑥ Single mtr time
	3 Ku Ant Dpy/Sto Mtr 1 limit sw 4 Redundant Ku–Band Xmit Enable 5 Redundant Boom Stow Enable II Excitation Signal 6 Port RMS Aft MRL Mtr 1		

EPS SSR-59
BUS LOSS: MNC MMC4

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1 (MA73C:D)</p> <ul style="list-style-type: none"> • cb MCA PWR AC3 3Φ MID 4 – op <p>For PLBD ops:</p> <ul style="list-style-type: none"> • OP/CL Drs in man mode, MANUAL PLBD CLOSING (DEORBIT PREP) 	<p>1 Port Rad Lat 7–12 Mtr 2 Limit sw Port Rad Dpy/Sto Mtr 2</p> <p>2 Stbd Rad Dpy/Sto Mtr 1 Limit sw</p> <p>PLBD: C/L Lat 9–12 Mtr 2 13–16 Mtr 1 Stbd Aft Bkhd Lat Mtr 1 Port Door Mtr 1 Stbd Door Mtr 2 CL Limit sw</p>	<p>(R13L) RAD CNTL STBD tb – bp If PORT RAD pnl deployed: RAD CNTL PORT tb – bp</p> <p>SM (BFS SM 63) PL BAY DOORS</p> <p>If in <u>AUTO</u> OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'</p> <p>----- During <u>MAN</u> PLBD OP/CL, single mtr run time noted on actuators listed at left</p> <p>PORT RMS: SM 94 PDRS CONTROL</p> <p>Indications lost: Fwd MRL Mtr 2 LAT/REL/RDY</p>	<p>① If AC3 MMC4 cb not opened, Lat Mtr 2 of Port Lat 7–12 Actuator continues to run until Sys B Lat Control sw placed to OFF</p> <p>② Mtr 1 will continue to drive until Sys A Cntl sw is taken to OFF</p> <p>③ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison</p> <p>④ Single mtr time</p>
<p>BUS ISOLATION</p> <p>ONLY ON MCC CALL, PERFORM</p> <p>(MA73C:B)</p> <ul style="list-style-type: none"> • MCA LOGIC MNC MID 4 – OFF 	<p>MNC MMC 4 Bus pwr</p> <p>RH Vent 5 Mtr 2 3 Mtr 2</p> <p>Port RMS: MPM Mtr 1 Fwd MRL Mtr 2</p>		

**EPS SSR-60
BUS LOSS: MNC AMC3**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	RH Vents 8,9 Mtr 1	NONE	① Redundant mtrs remain
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:B) • MCA LOGIC MNC AFT 3 – OFF	MNC AMC3 Bus pwr		
	1 ET Door Mtrs: C/L Lat Actr 2 Mtr 2 GPC Cntl L Dr Closure Mtr 2 GPC CL capability R Dr Closure Mtr 1 GPC CL capability R Dr Uplock Lat Mtr 1 GPC Lat capability ----- AC pwr removal capability via Limit sw for ET Dr Mtrs: C/L Lat Actr 2 Mtr 2 L Dr closure Mtr 2 R Dr closure Mtr 1 Uplock Mtr 1		

**EPS SSR-61
BUS LOSS: MNC R14**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1 (C3) • AUD CTR - 1</p> <p>(AW18D) • AIRLK AUD CNTL - MIDDECK</p>	<p>1 Audio Center 2</p> <p>A/L ATU, EMU CCU 1,2 PS ATU, CCU</p>	<p>MS Floodlt lost Comm via PS ATU lost 1 If Aud Ctr 2 selected, all comm lost</p>	<p>① If AUD CTR 2 selected, all intercom, A/G, recorded voice lost until AUD CTR 1 selected</p>
<p>BUS ISOLATION</p>		<p>2 If operating Ku-Band comm, no U/L voice</p>	<p>② Ku comm function lost. RDR function OK</p>
<p>ONLY ON MCC CALL, PERFORM</p>		<p>(F6) MDU CDR 1 blanks</p>	<p>③ Redundant pwr source remains for equipment</p>
<p>(R14:A) cb MNC • AUD AUD CTR 2 - op • PS/AIRLK - op • MDU CDR 1 - op • MDU PLT 2 - op • MDU AFD 1 - op</p>	<p>MDU CDR 1 MDU PLT 2 MDU AFD 1</p>	<p>(F8) MDU PLT 2 blanks</p>	
<p>(R14:B) cb MNC • UHF - op • GCILC - op • CNTL BUS AB1/2/3 - op</p>	<p>UHF redundant pwr GCILC redundant pwr MDM cmds to CCTV Sys MNC pwr for CNTL AB1,AB2 AB3</p>	<p>(AFT) MDU AFD 1 blanks</p>	
<p>3 cb PALLET/DSC • 2A - op (EDO/OV102, OV105 only) • 3B/4A - op (EDO/OV105 only)</p>			
<p>(R14:C) • cb MNC KU SIG PROC - op</p>	<p>2 Ku Comm Sig Proc</p>		
<p>(R14:D) cb MNC TV • CAB - op cb MNC TV B KEEL/EVA • CAMR/PAN-TILT - op • CAMR HTR - op • KEEL/EVA PAN-TILT HTR - op</p>	<p>Fit, Middeck TV Camrs, VFMs TV B Keel/EVA Camr/Pan-Tilt TV B Keel/EVA Camr Htr Pan-Tilt Htr</p>		
<p>(R14:E) • cb MNC MS FLOOD - op</p>	<p>MS Floodlt</p>		
<p>• MDU CDR 1 PWR - OFF • MDU PLT 2 PWR - OFF • MDU AFD 1 PWR - OFF</p>			

MEDS

**EPS SSR-62
BUS LOSS: MNC O16RJD**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 ON Cntl of RCS F4 Manf Drivers (F4D,F4R)		① F4 Manf Drivers lost if both F3 Driver sw and F4 Driver sw OFF when bus failed. F1 Driver sw now controls pwr to F3 Manf Drivers
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE			

**EPS SSR-63
BUS LOSS: MNC O16**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (R1) • BUS TIE MNB – ON (tb-ON)		(FSMs) BCE STRG 3 ADTA (3,B) 4 ADTA (3,B) 3 MLS (3)	① FC2 only one failure away (loss of ESS2CA) from inability to bus tie
(O6) • ANNUN BUS SEL ACA 2/3 – MNB	2 ACA 2/3 MNC pwr	(O3) RCS/OMS Prplt Qty Gauge blanks	② ACAs recovered by switching to alternate pwr
(F6,F8) • HSI SEL SOURCE (two) – other than MLS 3	MLS 3	3 (L2) O2 EMER tb – bp CAB RELIEF B tb – bp	③ If EMER O2 Mission Kit not flown, cb is opened prelaunch
(A6U) • ANNUN BUS SEL – MNB	2 ACA 4/5 MNC pwr	Time stops updating	
		(LIGHTS LOST) R Seat/Ctr Cnsl Floodlts If ACA 2/3 – MNC, lights lost: (C3) DAP lights right two columns ALL (F6) Landing Gear ARM/DOWN (F3) NWS FAIL It (L1) Smoke detection fire suppression ALL	
		2 If ACA 4/5 – MNC, lights lost: (A6U) DAP lights ALL (A7U) Video input, output, Gamma, ALC	
(Continued)	(Continued)		

MEDS

**EPS SSR-61
BUS LOSS: MNC R14**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (C3) • AUD CTR - 1 (AW18D) • AIRLK AUD CNTL - MIDDECK	1 Audio Center 2 A/L ATU, EMU CCU 1,2 PS ATU, CCU	MS Floodt lost Comm via PS ATU lost 1 If Aud Ctr 2 selected, all comm lost	① If AUD CTR 2 selected, all intercom, A/G, recorded voice lost until AUD CTR 1 selected
BUS ISOLATION ONLY ON MCC CALL, PERFORM		2 If operating Ku-Band comm, no U/L voice	② Ku comm function lost. RDR function OK
(R14:A) cb MNC • AUD AUD CTR 2 - op • PS/AIRLK - op ----- (R14:B) cb MNC • UHF - op • GCILC - op • CNTL BUS AB1/2/3 - op	UHF redundant pwr GCILC redundant pwr MDM cmds to CCTV Sys MNC pwr for CNTL AB1,AB2 AB3		③ Redundant pwr source remains for equipment
3 cb PALLET/DSC • 2A - op (EDO/OV102, OV105 only) • 3B/4A - op (EDO/OV105 only)	2 Ku Comm Sig Proc		
(R14:C) • cb MNC KU SIG PROC - op	Flt, Middeck TV Camrs, VFMs TV B Keel/EVA Camr/Pan-Tilt TV B Keel/EVA Camr Htr Pan-Tilt Htr		
(R14:D) cb MNC TV • CAB - op cb MNC TV B KEEL/EVA • CAMR/PAN-TILT - op • CAMR HTR - op • KEEL/EVA PAN-TILT HTR - op	MS Floodt		
(R14:E) • cb MNC MS FLOOD - op			

NOM

**EPS SSR-62
BUS LOSS: MNC O16RJD**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 ON Cntl of RCS F4 Manf Drivers (F4D,F4R)		① F4 Manf Drivers lost if both F3 Driver sw and F4 Driver sw OFF when bus failed. F1 Driver sw now controls pwr to F3 Manf Drivers
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE			

06/8/98

**EPS SSR-63
BUS LOSS: MNC O16**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (R1) • BUS TIE MNB - ON (tb-ON)		(FSMs) BCE STRG 3 ADTA (3,B) 4 ADTA (3,B) 3 MLS (3)	① FC2 only one failure away (loss of ESS2CA) from inability to bus tie
(O6) • ANNUN BUS SEL ACA 2/3 - MNB	2 ACA 2/3 MNC pwr	(O3) RCS/OMS Prplt Qty Gauge blanks	② ACAs recovered by switching to alternate pwr
(F6,F8) • HSI SEL SOURCE (two) - other than MLS 3	MLS 3	3 (L2) O2 EMER tb - bp CAB RELIEF B tb - bp	③ If EMER O2 Mission Kit not flown, cb is opened prelaunch
(A6U) • ANNUN BUS SEL - MNB	2 ACA 4/5 MNC pwr	Time stops updating	
		(LIGHTS LOST) R Seat/Ctr Cnsl Floodlts If ACA 2/3 - MNC, lights lost: (C3) DAP lights right two columns ALL (F6) 2 Landing Gear ARM/DOWN (F3) NWS FAIL It (L1) Smoke detection fire suppression ALL	
		If ACA 4/5 - MNC, lights lost: (A6U) 2 DAP lights ALL (A7U) Video input, output, Gamma, ALC	
(Continued)	(Continued)		NOM

02/09/00

EPS SSR-63 (Cont)
BUS LOSS: MNC O16

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
Pre-seat ingress for entry, • Discharge handheld fire ext into AV BAY 2	Av Bay 2 Agent discharge capability		③ If EMER O2 Mission Kit not flown, cb is opened prelaunch
BUS ISOLATION			④ Redundant pwr remains
ONLY ON MCC CALL, PERFORM			⑤ L,R L+ DK smoke detectors remain
(O8) • MLS 3 – OFF • R SEAT/CTR CNSL FLOOD – OFF	R Seat/Ctr Cnsl Floodlts		⑥ Current Snsr 1 remains
(O16:B) cb MNC 4 • OI SIG CONDR OM3 B – op • OI SIG CONDR OF 2/3 B – op • OI MDM OF 3/4 B – op • MNB CONTR – op • AUX TIMING BUFF – op	Orbiter Timing Buffer Aft Mission Timer		⑦ Current Snsr 2 remains ⑧ Vlv remains closed ⑨ Vlv holds position
(O16:C) cb MNC • TACAN 3 – op • SMOKE DETN CAB – op • SMOKE DETN BAY 1A/2B – op • UTIL PWR A11/A15/MO30F – op • FIRE SUPP BAY 2 – op • FLOOD R CTR – op • ANNUN FWD ACA 2/3 – op • ANNUN AFT ACA 4/5 – op • CRYO O2 HTR TK1 SNSR 2 – op • CRYO O2 HTR TK2 SNSR 1 – op	Tacan 3 5 Cabin Smoke Detector Av Bay 1 Smoke Detector A 2 Smoke Detector B MNC Utility pwr 6 Cryo O2 Tk1 Htr Current 7 Snsr 2 Cryo O2 Tk2 Htr Current Snsr 1		⑩ ✓MCC for total OMS Qtys. Aft Qtys are found on <div style="border: 1px solid black; padding: 2px; display: inline-block;">GNC SYS SUMM 2</div> ⑪ PLT Arm remains
(O16:D) cb MNC 3 • H2O ALT PRESS – op • O2 EMER – op • CAB RELIEF B – op	8 H2O Alternate Press Vlv 9 Emer O2 Sply Vlv 9 Cabin Relief Vlv B		
(O16:E) cb MNC • ADTA 3,4 (two) – op • MLS 3 – op • DDU R, AFT (two) – op • RCS/OMS PRPLT QTY GAUGE – op • DRAG CHUTE SYS 1 – op	ADTA 3,4 4 R,Aft DDU MNC pwr 10 RCS/OMS Prplt Qty Gauge 11 Drag Chute, CDR Arm		

MEDS |

EPS SSR-64
BUS LOSS: MNC R1A1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 MNC pwr to CNTLBC1,2,3 and CNTLCA1,2,3 2 MNC pwr to ESS1BC, ESS2CA		① Cntl Buses remain pwr'd ② ESS1BC and ESS2CA remain pwr'd
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE			

EPS SSR-65
BUS LOSS: MNC A14

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
GNC 23 RCS • Reprioritize Fwd Manf 4 jets to first priority: Des INH twice all other jets, highest priority first, then next highest priority, etc	Fwd RCS Jet 4,5 Htrs		
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE			

EPS SSR-66
BUS LOSS: MNC ML86B

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(PLT SEAT PNL) • PLT SEAT PWR BUS SEL – AC2 (up)	CDR Seat Adj via AC3 pwr	(AW82D) 1 EMU 1 H2O SPLY tb – CL 1 WASTE tb – CL	① Vlv holds position ② If SPLY H2O DUMP VLV ENA/NOZ HTR – OFF, tb unpwr'd and already bp
(CDR SEAT PNL) • CDR SEAT PWR BUS SEL – AC2 (up)	PLT Seat Adj via AC3 pwr	(R11L) SPLY H2O 1 TKA OUTLET tb – bp 2 DUMP VLV tb – bp 1 XOVV VLV tb – bp 1 GALLEY SPLY VLV tb – bp 1 TKC INLET tb – bp	③ PEVs, Actuators, Bed A P, Bed B P, Bed dP will be recovered after system reconfig
If Supply H2O Dump req'd: For TK A and/or TK B • Perform SUPPLY WATER DUMP USING FES (ORB OPS, ECLS), using FLASH EVAP CNTLR PRI A For TK C and/or TK D • Perform SUPPLY WATER DUMP USING FES (ORB OPS, ECLS), using FLASH EVAP CNTLR PRI B	1 Sply H2O Dump Vlv Cntl Noz Htr 1 Xovv Vlv Cntl	(LIGHTS LOST) Middeck Floodlts 3,4,5,7 Bunk Floodlts 1/3 Airlock Floodlt 4 MO13Q Pnl It 1 TA Floodlt 4	④ MNA, MNB line htrs remain
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	3 CO2 Rmvl Sys Cntl 2	'S66 CO2 RL SYS MALF'	
(ML86B:C) • cb MNA(MNB) EXT ARLK HTR LINE ZN1 – cl • cb MNA(MNB) EXT ARLK HTR LINE ZN2 – cl	4 Ext A/L H2O Line Htrs MNC pwr		

EPS SSR-66 (Cont)
BUS LOSS: MNC ML86B

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p><u>ONLY ON MCC CALL, PERFORM</u></p>			<p>① Vlv holds position</p>
<p>(ML86B:A) cb SPLY H2O ● GALLEY SPLY – op ● XOVR VLV – op ● TK C INLET – op ● TKA OUTLET – op ● DUMP VLV/NOZ HTR – op</p>	<p>1 Galley H2O Sply Vlv Cntl 1 Sply H2O Tk C In Vlv Cntl Tk A Out Vlv Cntl Dump Noz Htr</p>		<p>④ MNA, MNB line htrs remain ⑤ Sys A remains ⑥ One failure away from loss of jettison capability</p>
<p>(ML86B:D) cb PYRO JETT SYS B ● KU ANT – op ● PORT RMS – op ● STBD RMS – op</p>	<p>5 Ku-BD Jettison Sys B 6 Port RMS Jettison Sys B</p>		<p>⑦ Normally not installed ⑧ Current Snsr 1 remains</p>
<p>(ML86B:E) cb MNC EMU 1 H2O ● WASTE – op ● SPLY – op cb MNC SEAT ● L – op ● R – op cb MNC FLOOD ● TNL ADAPT 4 – op ● cb MNA CO2 SYS 2 CNTLR – op</p>	<p>1 EMU 1 Waste H2O Vlv Cntl 1 Sply H2O Vlv Cntl TA Floodlt 4</p>		<p>⑨ If five tk sets flown on OV102, O2 TK4 B htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4 A, 4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs</p>
<p>(ML86B:F) cb MNC FLOODS ● MIDDECK 5/7 – op ● MIDDECK 3/4/MO13Q – op ● BUNK 1/3 – op ● AIRLK 4 – op cb MNC CRYO ● O2 HTR TK4 SNSR 2 – op</p> <p>(OV105 only) ● cb MNC CRYO O2 HTR TK5 SNSR 2 – op</p>	<p>Middeck Floodlts 3,4,5,7 MO13Q Pnl It 1 Bunk Floodlts 1/3 Airlk Floodlt 4 8 Cryo O2 Tk4 9 Current Snsr 2 (OV105 only) Cryo O2 Tk5 Current Snsr 2</p>		
<p>(ML86B:C) ● cb MNC EXT ARLK HTR LINE ZN1 – op ● cb MNC EXT ARLK HTR LINE ZN2 – op</p>	<p>4 Ext A/L H2O Line Htrs MNC pwr</p>		

EPS ESS
SSR 70-95

EPS SSR-70
BUS LOSS: ESS1BC DA1 (Includes all ESS1BC sub-buses)

EPS ESS
SSR 70-95

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
1	<ul style="list-style-type: none"> Perform FC1 SHUTDN (FC SHUTDN Cue Card), then: 	1	FC1 Controller and Pumps	2	MASTER ALARM Light/Tone – on	<div style="border: 1px dashed black; padding: 5px; display: inline-block;"> * TIME CRITICAL * </div>	FC1 must be shut down within 9 min to avoid potentially hazardous condition
3		4		FC1 Reac Vlv Cntl via pnl R1 sw				L Audio lost
4		(R1)	5	MNA pwr to CABPL 1,2,3 buses	L Glrshld Floodlt lost		
		(O5)			(F7)			No C/W Its Two of four bulbs in MA Its not lit SM ALERT Light/Tone – on
2	<ul style="list-style-type: none"> PL CAB – MNB 	2	L Audio pwr	6	(R1) FC/MN BUS A tb – OFF MN BUS TIE A tb – OFF INV/AC BUS 1 tb – OFF O2 MANF VLV TK1 tb – CL H2 MANF VLV TK1 tb – CL FC1 REAC (two) tb – CL FC1 RDY tb – bp FC1 COOL PUMP ΔP tb – bp	(2) No intercom, A/G, or recorded voice from CDR ATU. When L AUD CNTL switched to RIGHT, only listen capability restored	
		(O6)					MTU Pwr Sply A/Osc 1
	If add'l ltg reqd: (C3) • EMER LTG – ON/OFF	8	L Glareshield Floodlts via pnl O6 sw	7	(FSMs) S67 ESS BUS V 1BC S69 FC PUMP 1 S69 FC REAC 1 S68 O2 MANF VLV S68 H2 MANF VLV S68 O2 CNTL P 2,4 S68 H2 CNTL P 2,4 S69 FC H2 PUMP 1	(3) FC/MN BUS A and MN BUS TIE A sws work, but tbs are lost	
		(R1)	10	Cryo O2,H2 Tk1 Manf Vlv Cntl Cryo Tk1 O2,H2 Htrs Auto ops if O2,H2 Tk2 Htrs A(B) in Auto Cryo Tk2 O2,H2 Htrs Auto ops			
	<ul style="list-style-type: none"> O2,H2 TK2 HTRS A,B (four) – OFF O2,H2 TK1,3 HTRS A (four) – AUTO O2,H2 MAN VLV TK2 (two) – OP 		Cryo Tk3 Htrs in Auto ops if Tk4 in Auto Cryo Tk4 Htrs Auto ops	11	(Continued)	(4) Vlv holds position, but tb and sw lost. Redundant Reac Vlv Close Cntl on pnl C3 remains	
		(A11)		Pallet Cryo Tk 6,7 Htrs Auto ops			
	<ul style="list-style-type: none"> O2,H2 TK4 HTRS A,B (four) – OFF (refer to EPS, 7.6 CRYO TABLE A for nomenclature) 	12	Cryo Tk3 O2,H2 Htrs Auto ops if O2,H2 Tk4 Htrs A(B) in AUTO Cryo Tk4 O2,H2 Htrs Auto ops			(5) Pwrs PL Timing Buffer and VTR	
13	If GPC 1 or 4 dump reqd, attempt S/W dump in RUN	13	GPC Mode sw Halt Contacts for GPCs 1,4 (pnl O6)			(6) Retain backup C/W thru Sys B, Ref C/W MAL 4.1b[5] for C/W capabilities lost. Only two of four bulbs lit in MA It	
		13	GPC Output sw Terminate capability for GPCs 1,4				
14	To release crewmember from constant monitoring requirement					(7) Switch works but tb lost	
15		<ul style="list-style-type: none"> Perform C&W EU CONTINGENCY POWER (IFM) 					(8) Flood Its available via EMER LTG (C3,ML18F)
	When reqd: • For FC1, perform FUEL CELL PURGE – MANUAL (ORB OPS, EPS)	16	FC1 Auto purge capability			(9) AC1 remains pwr'd, but tb lost. INV/AC BUS 1 sw inop. INV PWR 1 sw also inop	
							(10) Vlv holds position, but tb and sw lost
	(Continued)					(11) FC1 Coolant Pump ΔP tb lost	
							(12) If five tk sets flown on OV102, O2 TK4 B Htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4 A, 4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs
						(13) Unable to HALT or terminate GPC, IPL GPC, or perform HISAM dump. Do not pwr off GPCs 1 or 4 since they must be transitioned thru HALT to force RUN state	
							(14) Until IFM cables installed: a) Loss of ESS2CA DA2 would not generate aural alarm so that Fuel Cell 2 could be safed within 9 min. FSM should be closely monitored. b) Loss of C/W B system would not be annunciated and subsequent orbiter problems would not trigger aural alarm
						(15) IFM procedure recovers C/W A system by providing pwr source, which bypasses failed ESS1BC DA1 bus	
							(16) Caused by loss of purge vlv sw position TM

EPS SSR-70 (Cont)
BUS LOSS: ESS1BC DA1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>ONLY ON MCC CALL, PERFORM</p>		<p>(F9) ESS 1BC DC VOLTS – OSL</p>	<p>③ FC/MN BUS A and MN BUS TIE A sws work, but tbs are lost</p>
<p>(O13:A) cb ESS 1BC ● C/W A – op ● AC1 SNSR – op ● MTU A – op</p>	<p>6 Pri C/W Sys, Annun pnl F7 17 AC1 Bus Snsr</p>	<p>SM 67 ELECTRIC ESS 1BC VOLTS < 20</p>	<p>⑥ Retain backup C/W thru Sys B. Ref C/W MAL 4.1b [5] for C/W capabilities lost. Only two of four bulbs lit in MA It</p>
<p>(O13:B) cb ESS 1BC ● CRYO CNTLR O2,H2 TK2 (two) – op ● CRYO QTY O2,H2 TK2 (two) – op</p>	<p>Cryo O2,H2 Tk2 Htrs Auto ops Cryo O2,H2 Tk2 Qty Xdcrs</p>	<p>(O2) CRYO O2,H2 TK2,4 QTY METER (four) – 0%</p>	
<p>(R14:F) cb ESS 1BC ● FLOOD L GLRSHLD – op ● AUD L – op</p>		<p>Airlock Floodlt 2 lost Tnl Adapt Floodlt 1 lost</p>	
<p>(ML86B:G) cb ESS 1BC ● FLOOD AIRLK 2 – op ● FLOOD TNL ADAPT 1 – op ● CRYO CNTLR O2,H2 TK4 (two) – op ● CRYO QTY O2,H2 TK4 (two) – op</p>	<p>12 Airlock Floodlt 2 Tnl Adapt Floodlt 1 12 Cryo O2,H2 Tk4 Htrs Auto ops Cryo O2,H2 Tk4 Qty Xdcrs</p>	<p>(A15) 18 PALLET PWR MNA tb – OFF</p>	<p>⑫ If five tk sets flown on OV102, O2 TK4 B Htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4 A, 4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs</p>
	<p>12 Cryo Tk2,Tk4 Htr Snsr Test/Reset sw</p>		<p>⑬ Disables AC1 AUTO TRIP. AC1 Voltage and OVLD c/w lost</p>
	<p>19 AC1 Inverters: Input DC pwr Cntl INV/AC Bus Cntl 3 ESS pwr to FC1 MN BUS A and MN BUS TIE A pwr contactor cntl Capability to switch to MADS Rcdr Trk Seq 2 AUX PLA Bus pwr LG Arm/Dn Reset capability Tacan 1 Auto Self-Test</p>		<p>⑭ MNA PPC1 bus pwr remains; tb pwr lost</p>
	<p>20 APU 1 Fu Tk Vlv A</p>		<p>⑮ AC1 inverters and buses remain pwr'd, but sws and tb lost. INV/AC BUS 1 sw inop. INV PWR 1 sw also inop</p>
			<p>⑯ Vlv closes. Redundant vlv B remains</p>

EPS SSR-71
BUS LOSS: ESS1BC FP&LC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 AC1 Inverters Input DC pwr Cntl	(R1) 1 INV PWR 1 tb – OFF	① Inverters remain pwr'd, but tb and sw lost
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE	Capability to switch to MADS Rcdr Trk Seq 2		

EPS SSR-72
BUS LOSS: ESS1BC MPC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 • Perform FC1 SHUTDN 2 (FC SHUTDN Cue Card)	1 FC1 Controller and Pumps 2 FC1 Reac Vlv Cntl via pnl R1 sw	MASTER ALARM Light/Tone – on	①
BUS ISOLATION		(F7) 2 C/W FC REAC It C/W FC PUMP It SM ALERT Light/Tone	* [TIME CRITICAL] *
ONLY ON MCC CALL, PERFORM		(R1) 2 O2 MANF VLV TK1 tb – CL 2 H2 MANF VLV TK1 tb – CL 2 FC1 REAC (two) tb – CL FC1 RDY tb – bp 3 FC1 COOL PUMP ΔP tb – bp	FC1 must be shut down within 9 min to avoid potentially hazardous condition
NONE	2 Cryo O2,H2 Tk1 Manf Vlv Cntl	(FSMs) S68 H2 MANF VLV S68 O2 MANF VLV S69 FC PUMP 1 2 S69 FC REAC 1 S69 FC H2 PUMP 1	② Vlv holds position, but tb and sw lost. Redundant Reac Vlv Close Cntl on pnl C3 remains
			③ FC1 Coolant Pump ΔP tb lost

EPS SSR-73
BUS LOSS: ESS1BC ML86B

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A11)</p> <ul style="list-style-type: none"> • CRYO TK4 HTR O2,H2 A,B (four) – OFF (if OV102, refer to EPS, 7.6, CRYO TABLE A for switch nomenclature) 	<p>1 Cryo Tk3 O2,H2 Htrs Auto ops if O2,H2 Tk4 Htrs A(B) in Auto</p> <p>1 Cryo Tk4 O2,H2 Htrs Auto ops</p>	<p>MASTER ALARM Light/Tone – on</p>	<p>① If five tk sets flown on OV102, O2 TK4 B Htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK 4 and TK5. H2 TK4 A, 4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs</p>
BUS ISOLATION		<p>(F7) C/W O2 PRESS It C/W H2 PRESS It</p>	
<p>ONLY ON MCC CALL, PERFORM</p>		<p>(FSMs) S68 H2 CNTL P 4 S68 O2 CNTL P 4</p>	
<p>(ML86B:G) cb ESS 1BC</p> <ul style="list-style-type: none"> • FLOOD AIRLK 2 – op • FLOOD TNL ADAPT 1 – op • CRYO CNTLR O2,H2 TK4 (two) – op • CRYO QTY O2,H2 TK4 (two) – op 	<p>Airrk Floodlt 2 TA Floodlt 1</p> <p>Cryo O2,H2 Tk4 Qty Xdcrs</p>	<p>(O2) CRYO O2,H2 QTY TK4 meters (two) = 0%</p>	
		<p>Airrk Floodlt 2 lost TA Floodlt 1</p>	

EPS SSR-74
BUS LOSS: ESS1BC FD

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
1	<ul style="list-style-type: none"> Perform FC1 SHUTDN (FC SHUTDN Cue Card), then: 	1	FC1 Controller and Pumps	MASTER ALARM Light/Tone – on	<p>①</p> <p>* [TIME CRITICAL] *</p> <p>FC1 must be shut down within 9 min to avoid potentially hazardous condition</p> <p>② Pwrs PL Timing Buffer and OIU 1 (if flown). OIU 1 redundant pwr MNB MPC2 via CAB PL3</p> <p>③ Unable to HALT or terminate GPC, IPL GPC, or perform HISAM dump. Do not pwr off GPCs 1 or 4 since they must be transitioned through HALT to force RUN state</p> <p>④ FC1 Coolant Pump ΔP tb lost</p> <p>⑤ Caused by loss of purge vlv sw position TM</p> <p>⑥ OIU 1 redundant pwr MNB MPC2 via CAB PC3</p> <p>⑦ AC1 inverters and buses remain pwr. INV PWR 1 and INV/AC BUS 1 switches and INV PWR 1 tb lost</p>		
	(R1) • PL CAB – MNB	2	MNA pwr to CABPL 1,2,3 Buses	(F7) C/W FC PUMP It			
3	If GPC 1 or 4 dump reqd, attempt S/W dump in RUN	3	GPC Mode sw Halt Contacts for GPCs 1,4 (pnl O6)	(R1) FC1 RDY tb – bp FC1 COOL PUMP ΔP tb – bp			
	When reqd: • For FC1, perform FUEL CELL PURGE – MANUAL (ORB OPS, EPS)	3	GPC Output sw Terminate capability for GPCs 1,4 (pnl O6)	(FSMs) S69 FC H2 PUMP 1 S69 FC PUMP 1			
	(A15) If Tk6,7 in use: • PALLET TK6,TK7 HTRS A,B (eight) – OFF then:	5	FC1 Auto purge capability	(F9) ESS 1BC DC VOLTS – OSL			
	(R1) • O2,H2 TK3 HTR A (two) – AUTO		Pallet Cryo Tk 6,7 Htrs Auto ops	SM 67 ELECTRIC			
		6	OIU 1 MNA pwr	ESS1BC Volts 25–32V			
		5	AUXPLA Bus				
		7	AC1 Inverters: Input DC Pwr Cntl Inv/AC Bus Cntl Cryo O2 Tk2,4 Htr Snsr Test/Reset sw				
			Tacan 1 Auto Self Test				
BUS ISOLATION							
ONLY ON MCC CALL, PERFORM							
NONE							

EPS SSR-75
BUS LOSS: ESS1BC O13&R14

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
1	(O5) • L AUD CNTL – R	1	L Audio pwr	1	MASTER ALARM Light/Tone – on	<p>① No intercom, A/G, or recorded voice from CDR ATU. When L AUD CNTL switched to RIGHT, only listen capability is restored</p> <p>② Retain BACKUP C/W thru Sys B. Ref C/W MAL 4.1b for C/W capabilities lost. Only two of four bulbs lit in MA Its</p> <p>③ Floodlts available via EMER LTG (C3, ML18F)</p> <p>④ AC1 bus remains pwr. INV/AC BUS 1 sw works, but tb lost</p> <p>⑤ Until IFM cables installed: a) Loss of ESS2CA DA2 would not generate aural alarm so that Fuel Cell 2 could be safed within 9 min. FSM should be closely monitored. b) Loss of C/W B system would not be annunciated and subsequent orbiter problems would not trigger aural alarm</p> <p>⑥ IFM procedure recovers C/W A system by providing pwr source, which bypasses failed ESS1BC O13&R14 bus</p>	
	(O6) • MTU – OSC 2		MTU Pwr Sply A/Osc 1		L Audio lost L Glrshld Floodlt lost		
	(R1) • O2,H2 TK1,3 HTRS A (four) – AUTO • O2,H2 TK2 HTRS A,B (four) – OFF • O2,H2 MANF VLV TK2 (two) – OP		Cryo Tk1 O2,H2 Htrs Auto ops if O2,H2 Tk2 Htrs A(B) in Auto Cryo Tk2 O2,H2 Htrs Auto ops	2	(F7) No C/W Its Two of four bulbs in MA Its not ON SM ALERT Light/Tone – on		
	If add'l lgt reqd: (C3) • EMER LTG – ON/OFF	3	L Glareshield Floodlts via pnl O6 sw		(FSMs) S68 H2 CNTL P 2 S68 O2 CNTL P 2		
5	To release crewmember from constant monitoring requirement			4	(R1) INV/AC BUS 1 tb – OFF		
6	• Perform C&W EU CONTINGENCY POWER (IFM)				(O2) CRYO O2,H2 QTY TK2 METER (two) ind – 0%		
	(Continued)		(Continued)				

EPS SSR-75 (Cont)
BUS LOSS: ESS1BC O13&R14

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			
(O13:A) cb ESS1BC ● C/W A – op ● AC1 SNSR – op ● MTU A – op	2 Pri C/W Sys, Annun Pnl F7 7 AC1 Bus Snsr		② Retain BACKUP C/W thru Sys B. Ref C/W MAL 4.1b for C/W capabilities lost. Only two of four bulbs lit in MA lts
(O13:B) cb ESS1BC ● CRYO CNTLR O2,H2 TK2 (two) – op ● CRYO QTY O2,H2 TK2 (two) – op	Cryo O2,H2 Tk2 Htrs Auto ops Cryo O2,H2 Tk2 Qty Xdcrs		⑦ Disables AC1 Auto Trip. AC1 Voltage and OVLD C/W lost
(R14:F) cb ESS1BC ● FLOOD L GLRSHLD – op ● AUD L – op			⑧ Switches and tbs still operate
	LG ARM/DN Reset capability		
	8 ESS pwr to FC/MN BUS A and MN BUS TIE A Pwr Contactor Cntl		

EPS SSR-80

BUS LOSS: ESS2CA DA2 (Includes all ESS2CA sub-buses)

	ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 3 4	<ul style="list-style-type: none"> Perform FC2 SHUTDN (FC SHUTDN Cue Card), then: 	1 FC2 Controller and Pumps 4 FC2 Reac Vlv Cntl via pnl R1 sw	2 All comm lost via AUD CTR 1 2 R AUDIO lost R Glareshield Floodlt lost	① TIME CRITICAL * [] * FC2 must be shut down within 9 min to avoid potentially hazardous condition ② If Aud Ctr 1 active, all intercom, A/G, and recorded voice lost until Aud Ctr 2 selected. No intercom A/G, or recorded voice from PLT ATU. When R AUD CNTL switched to LEFT, only listen capability restored ③ FC/MN BUS B and MN BUS TIE B SWS work, but tbs lost ④ Vlv holds position, but tb and sw lost. Redundant Reac Vlv Close Cntl on pnl C3 remains ⑤ Pwrs PL Timing Buffer and VTR ⑥ Retain C/W Sys A Alarm tones (Pri & B/U) Ref C/W MAL 4.1a [8] for capabilities lost. Only two of four bulbs lit in MA It. PRIMARY C/W and BACKUP C/W ALARM Its are not resettable ⑦ Floodlts available via EMER LTG (C3, ML18F) ⑧ Vlv holds position, but tb and sw lost ⑨ MNB PPC2 bus pwr remains; tb pwr lost ⑩ Caused by loss of FC Purge Htr - GPC sw position TM pwr ⑪ Unable to HALT or terminate GPC, IPL GPC, or perform HISAM dump. Do not pwr-off GPC 2 since it must be transitioned thru HALT to force RUN state. GPC 5 (BFS) may be pwr'd off, but pwr'd up in STBY
	(R1) • PL CAB - MNA	5 MNB pwr to CABPL 1,2,3 Buses	MASTER ALARM Light/Tone - on	
2	(C3) • AUD CTR - 2	2 Audio Center 1	(F7) C/W O2 PRESS It - on C/W H2 PRESS It - on C/W FC REAC It - on C/W FC PUMP It - on C/W PRI C/W It - on C/W BACKUP C/W ALARM It - on Two of four bulbs in MA Its - inoperative SM ALERT It/Tone - on	
2	(O9) • R AUD CNTL - L	2 R Audio pwr	4 6	
	(O6) • MTU - OSC 1	MTU Pwr Sply B/Osc 2		
	If add'l Itg reqd: (C3) • EMER LTG - ON/OFF	7 R Glareshield Floodlts via pnl O8 sw	(FSMs) S69 FC PUMP 2 S69 FC REAC 2 S67 ESS BUS V 2CA S68 O2 CNTL P 1 S68 H2 CNTL P 1 S68 H2 MANF VLV S68 O2 MANF VLV S69 FC H2 PUMP 2	
	(R1) • O2,H2 MANF VLV TK1 (two) - OP • O2,H2 TK1 HTRS A,B (four) - OFF • O2,H2 TK2,3 HTRS A (four) - AUTO	8 Cryo O2,H2 Tk2 Manf Vlv Cntl Cryo Tk2 O2,H2 Htrs Auto ops if O2,H2 Tk1 Htrs A(B) in Auto Cryo Tk1 O2,H2 Htrs Auto ops Pallet Cryo Tk 8,9 Htrs Auto ops	9 (A15) PALLET PWR MNB tb - OFF	
	When reqd: • Perform FUEL CELL PURGE - MANUAL (ORB OPS, EPS)	10 All FC Auto Purge capability		
11	If GPC 2 or 5 dump reqd, attempt S/W dump in RUN	11 GPC Mode sw Halt Contacts for GPCs 2,5 (pnl O6) 11 GPC Output sw Terminate capability for GPCs 2,5 (pnl O6)		
	(Continued)	(Continued)	(Continued)	

EPS SSR-81
BUS LOSS: ESS2CA FP&LC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 AC2 Inverters Input DC Pwr Cntl	1 (R1) INV PWR 2 tb - OFF	① Loss of tb and sw. Inverters remain pwr'd
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
NONE			

EPS SSR-82
BUS LOSS: ESS2CA MPC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 • Perform FC2 SHUTDN (FC SHUTDN Cue Card)	1 FC2 Controller and Pumps 2 FC2 Reac Vlv Cntl via pnl R1 sw	MASTER ALARM Light/Tone - on	①
BUS ISOLATION		(F7) C/W FC REAC It C/W FC PUMP It SM ALERT Light/Tone	* [TIME CRITICAL] *
ONLY ON MCC CALL, PERFORM		(R1) 2 O2 MANF VLV TK2 tb - CL 2 H2 MANF VLV TK2 tb - CL 2 FC2 REAC (two) tb - CL RDY tb - bp	FC2 must be shut down within 9 min to avoid potentially hazardous condition
NONE	3 Cryo O2,H2 Tk2 Manf Vlv Cntl 4 MNB/PRIPL and MNC/PRIPL pwr-off capability via Spacelab Pwr-Kill Signal	5 FC2 COOL PUMP ΔP tb - bp	② Vlv holds position, but tb and sw lost. Redundant Reac Vlv Close Cntl on pnl C3 remains
		(FSMs) 2 S69 FC PUMP 2 S69 FC REAC 2 S69 FC H2 PUMP 2 S68 H2 MANF VLV S68 O2 MANF VLV	③ Vlv holds position, but tb and sw lost
			④ FC3/PRIPL pwr-off capability of SL not affected. MNB/PRIPL sw, MNC/PRIPL sw, pnl R1 not affected
			⑤ FC2 Coolant Pump ΔP tb lost

**EPS SSR-83
BUS LOSS: ESS2CA FD**

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
1	<ul style="list-style-type: none"> Perform FC2 SHUTDN (FC SHUTDN Cue Card) 	1	FC2 Controller and Pumps	MASTER ALARM Light/Tone – on	(1) * TIME CRITICAL * FC2 must be shut down within 9 min to avoid potentially hazardous condition		
	(R1) <ul style="list-style-type: none"> PL CAB – MNA 	2	MNB pwr to CABPL 1,2,3 Buses	(F7) C/W FC PUMP It			
	When reqd: <ul style="list-style-type: none"> Perform FUEL CELL PURGE – MANUAL (ORB OPS, EPS) 	3	All FC Auto Purge capability	(R1) FC2 RDY tb – bp FC2 COOL PUMP ΔP tb – bp			
	5 If GPC 2 or 5 dump reqd, attempt S/W dump in RUN	5	GPC Mode sw Halt Contacts for GPCs 2,5 (Pnl O6)	(FSMs) S69 FC PUMP 2 S69 FUEL CELL			
		5	GPC Output sw Terminate capability for GPCs 2,5 (pnl O6)	(F9) ESS2CA DC VOLTS – OSL			
(A15) If Tks 8,9 in use: <ul style="list-style-type: none"> PALLET TK8,TK9 HTRS A,B (eight) – OFF then: 		Pallet Cryo Tk 8,9 Htrs Auto ops	SM 67 ELECTRIC ESS2CA Volts 25–32V	(2) Pwrs PL Timing Buffer, OIU 1, and OIU 2 (if flown). OIU 1 redundant pwr MNA MPC1 via CAB PL3			
(R1) <ul style="list-style-type: none"> O2,H2 TK3 HTR A (two) – AUTO 			SM 62 PCMMU 'S62 PDI DECOM FAIL'	(3) Caused by loss of FC Purge Htr – GPC sw position TM pwr			
If OIU reqd: (SSP 1) <ul style="list-style-type: none"> OIU PWR – OIU 1 ON ----- (AIL) <ul style="list-style-type: none"> S-BD PL PWR SYS – 1 • CNTL – PNL • – CMD 	2	OIU 2 OIU 1 MNB pwr	S 212 OIU OIU 2 TEMP ≥ 140	(4) FC 2 Coolant Pump ΔP tb lost (5) Unable to HALT or terminate GPC, IPL GPC, or perform HISAM dump. Do not pwr-off GPC 2 since it must be transitioned thru HALT to force RUN state. GPC 5 (BFS) may be pwrd off, but pwrd up in STBY			
BUS ISOLATION					(6) AC2 inverters and buses remain pwrd. INV PWR 2 and INV/AC BUS 2 switches lost and INV PWR 2 tb lost		
ONLY ON MCC CALL, PERFORM							
NONE		6	AUXPLB Bus AC2 Inverters: Input DC Pwr Cntl Inv/AC Bus Cntl				
			Tacan 2 Auto Self-Test				
			Cryo O2 Tk1 Htr Snsr Test/Reset sw				
			(OV105 only) Cryo O2 Tk5 Htr Snsr Test/Reset sw				

EPS SSR-85
BUS LOSS: ESS2CA ML86B

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
If OV105 and Tk5 in use: (R1) • O2,H2 TK3 HTR A – AUTO	(OV105) Cryo Tk5 O2,H2 Htrs if in Auto	(OV105) MASTER ALARM Light/Tone – on	
BUS ISOLATION		(F7) (OV105) C/W O2 PRESS It C/W H2 PRESS It	
(ML86B:G) cb ESS 2CA • CRYO CNTRLR O2,H2 TK5 (two) – op (OV105 only) • CRYO QTY O2,H2 TK5 (two) – op (OV102, OV105 only)	(OV102,OV105) Cryo O2,H2 Tk5 Qty Xdcrs	(FSMs) (OV105) S68 CRYO O2 PRESS S68 CRYO H2 PRESS	
		(O2) (OV102,OV105) CRYO O2,H2 QTY Tk5 = 0%	

EPS SSR-90 (Cont)
BUS LOSS: ESS3AB DA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	11 Lost BFS select and BF engage capability to all GPCs 12 FC3/PRIPL pwr-off capability via Spacelab Pwr-Kill Signal Tacan 3 Auto Self Test 2 ESS pwr to FC/MN BUS C and MN BUS TIE C Pwr Contactor Cntl 13 APU 3 Fu Tk Vlv A		② FC/MN BUS C and MN BUS TIE C switches work, but tbs are lost ⑪ Pressing Engage button will cause all PASS GNC GPCs to go to software halt ⑫ MNB/PRIPL and MNC/PRIPL pwr-off capability of SL not affected. FC3/PRIPL sw, pnl R1 not affected ⑬ Vlv closes. Redundant vlv B remains

EPS SSR-91
BUS LOSS: ESS3AB FP&LC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 AC3 Inverters Input DC Pwr Cntl 2 Emer Ltg capability (Middeck Floodlts 6,7,8, L,R Glareshield Floodlts, OS Floodlt)	1 (R1) INV PWR 3 tb - OFF	① Inverters remain pwr'd, but tb and sw lost ② Ltg pwr remains via individual lt switches
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(C3) 2 ● EMER LTG - OFF/ON			
(ML18F) 2 ● EMER LTG - ON/OFF			

EPS SSR-92
BUS LOSS: ESS3AB MPC3

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
1	<ul style="list-style-type: none"> Perform FC3 SHUTDN (FC SHUTDN Cue Card) 	1	FC3 Controller and Pumps	MASTER ALARM Light/Tone - on		(1) * TIME CRITICAL * FC3 must be shut down within 9 min to avoid potentially hazardous condition	
2		2	FC3 Reac Vlv Cntl via pnl R1 sw	2	(F7) C/W FC REAC It - on C/W FC PUMP It - on		
BUS ISOLATION							
ONLY ON MCC CALL, PERFORM							
NONE		3	FC3/PRIPL pwr-off capability via Spacelab Pwr-Kill Signal	2	(R1) FC3 REAC (two) tb - CL FC3 RDY tb - bp	(2) Vlv holds position, but tb and sw lost. Redundant Reac Vlv Close Cntl on pnl C3 remains (3) MNB/PRIPL and MNC/PRIPL pwr-off capability of SL not affected. FC3/PRIPL sw pnl R1 not affected	
				4	FC3 COOL PUMP ΔP tb - bp		
				(FSMs) S69 FC PUMP 3 S69 FC REAC 3 S69 FC H2 PUMP 3		(4) FC3 Coolant Pump ΔP tb lost	

**EPS SSR-93
BUS LOSS: ESS3AB FD**

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
1	<ul style="list-style-type: none"> Perform FC3 SHUTDN (FC SHUTDN Cue Card) 	1	FC3 Controller and Pumps	MASTER ALARM Light/Tone – on		① * [TIME CRITICAL] * FC3 must be shut down within 9 min to avoid potentially hazardous condition	
3	<ul style="list-style-type: none"> If GPC 3 dump reqd, attempt S/W dump in RUN 	2	FC GPC Purge Seq Start sw	(F7) C/W FC PUMP It			
		3	GPC Mode sw Halt Contact for GPC 3 (pnl O6)	(R1) FC3 RDY tb – bp FC3 COOL PUMP ΔP tb – bp		② GPC Purge Seq Start capability remains using TMBU or SM 60 constant. MCC will normally initiate auto purge via TMBU	
		3	GPC Output sw Terminate capability for GPC 3 (pnl O6)	4 (FSMs) S69 FC PUMP 3 S69 FC H2 PUMP 3			
				(F9) ESS3AB DC VOLTS – OSL		③ Unable to HALT or terminate GPC, IPL GPC, or perform HISAM dump. Do not pwr-off GPC 3 since it must be transitioned thru HALT to force RUN state	
		5	Emer Ltg capability (Middeck Floodlts 6,7,8, L,R Glrshld Floodlts OS Floodlt)	<div style="border: 1px solid black; padding: 2px; display: inline-block;">SM 67 ELECTRIC</div> ESS3AB Volts 25–32V			
						④ FC3 Coolant Pump ΔP tbs lost ⑤ Ltg pwr remains via individual It sws	
		6	Lost BFS select and BFS engage capability to all GPCs				
						⑥ Pressing the engage button will cause all PASS GNC GPCs to go to software halt ⑦ AC3 Inverters and Buses remain pwr'd. INV PWR 3 and INV/AC BUS 3 switches lost and INV PWR 3 tb lost	
		7	AC3 Inverters: Input DC Pwr Cntl INV/AC Bus Cntl				
				Cryo O2 Tk3 Htr Snsr Test/Reset sw			
				Tacan 3 Auto Self-Test			

**EPS SSR-100
BUS LOSS: CNTLAB1**

EPS CNTL
SSR 100-108

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(A12) APU HTR 1 • GAS GEN/FUEL PUMP 1 – B AUTO 1 • GAS GEN/FUEL PUMP 3 – A AUTO • LUBE OIL LINE 1 – B AUTO APU HTR TK/FU LINE/H2O/ 1 • SYS 1A – OFF 1 • 1B – AUTO 1 • 3A – AUTO 1 • 3B – OFF HYD HTR • ELEV A – OFF • B – AUTO • AFT FUS A – OFF • B – AUTO HYD CIRC PUMP • PWR 1 – MNB • 3 – MNC	(A12) APU 1 GG/Fu Pump Htrs A APU 3 GG/Fu Pump Htrs B APU 1 Lube Oil Line Htrs A 1 Tk/Fu Ln Htrs A APU 1,2 GG Inj H2O Htrs 4A,5A APU 3 Tk/Fu Ln Htrs B Elevon Actr Htrs A Aft Fuselage Htrs A Circ Pump 1 MNA pwr 3 MNA pwr	CRT 1 blanks SM ALERT Light/Tone – on (FSMs) S68 H2 MANF VLV S68 O2 MANF VLV S86 APU/HYD APU SM0 THRM HYD S67 CNTL BUS V S69 FC REAC 1 I/O ERROR CRT 1 SM 67 ELECTRIC CNTL AB1 Volts < 20 During Rad Dpy/Sto: (R13L) RAD CNTL tbs (four) indicate single mtr ops L ADP deploy time incr from 15 to 30 sec STAR TRKR DR POS –Y OP/CL time incr from 8 to 16 sec (F7) If APUs active and using BLR CNTLR/HTR 1B: C/W APU TEMP It – on after ~2 min CCTV Video TV Annun is lost if MNA selected for VCU SM 76 COMMUNICATIONS Ku Band A,B, GMBL and PA TEMP Read High '↑' SM (BFS,SM) 63 PL BAY DOORS During PLBD OP/CL, single mtr run time noted on actuators listed at left	① TIME CRITICAL * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ② Msg occurs only if A AUTO (pnl R12U) selected for FC H2O Relief Htr ③ Pri B Man ON Sel capability remains. Pri A and Sec Cntrlr remain ④ Vlv holds position. Vlv B remains ⑤ Do not reconfig for reg switch or I'CNCT procedures ⑥ Vlv holds position ⑦ Vlv normally closed ⑧ Pwr to MCA Drivers lost through ENABLE sw
(L1) If using B CNTLR: • FLASH EVAP CNTLR PRI B – ON • TOP EVAP HTR DUCT – B If Hi Load Evap enabled: • HI LOAD DUCT HTR – B(C)	3 (L1A2) Flash Evap Cntrlr Pri B GPC Sel capability Top Evap Duct Fwd,Aft L,R Htrs A Hi Load Duct Outbd,Inbd Noz Htrs A		
(L2) • FLASH EVAP FDLN HTR B SPLY – 2	(L2A1) FES H2O Fdln B Htrs 1		
(R2) • BLR CNTLR/HTR 1 – A	(R2) Hyd H2O Blr 1 Cntrlr B		
Refer to OMS/RCS Slide Rule for vlv loss info 5 Reconfig following vlv(s) only if leak isolation reqd: (O7) • AFT L RCS He PRESS A • AFT L,R RCS XFEED 3/4/5 ----- (O8) • L OMS XFEED A • R OMS XFEED A • FWD RCS He PRESS A	4 (O7) Aft L RCS He Pr Isol A man CL capability 6 Aft L,R RCS Xfeed Vlv 3/4/5 man CL capability ----- 7 (O8) R OMS He Press Isol A man Cntl and He Vap Isol 1,2 man Cntl 4 L,R OMS Tk Isol A man CL capability 4 L,R OMS Xfeed Vlv A man CL capability 4 Fwd RCS He Press Isol A man CL capability		
	8 (R13A2) PLBD: C/L Lat 9-12 Mtr 1 Port,Stbd Fwd Blkhd Mtrs 1 Stbd Door Mtr 1		
If AB1,2,3 unpwr'd at same time: GNC 23 RCS Override F1 Manf status to CL: • RCS FWD – ITEM 1 EXEC • MANF VLVS 1 OVRD – ITEM 40 EXEC	(O14) RCS Manf F1 RJD pwr (F1F, F1L, F1U, F1D)		
(Continued)	(Continued)		

MEDS

EPS SSR-100 (Cont)
BUS LOSS: CNTLAB1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(C2) ● L IDP/CRT SEL – 3 ● GPC/CRT 01 EXEC	9 (C2A2) MDU CRT 1 IDP 1		⑦ Vlv normally closed
10 SM 1 DPS UTILITY (G2,G8,S2) MMU ASSIGN ● GNC – ITEM 1 EXEC ● SM – ITEM 4 EXEC ● PL – ITEM 6 EXEC	(O14) MMU 1		⑨ Loss of redundant port to the following: MDU CDR 1 (S) MDU CDR 2 (P) MDU MFD 2 (P) MDU PLT 1 (S)
(R11U) ● FC H2O RELIEF HTR – B AUTO ● FC H2O LINE HTR – B AUTO	11 (R11U) FC H2O Relief: Vlv Htrs A Vent Line Htrs A Barrel Htrs A Noz Htrs A H2O Line Htrs A		⑩ Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION prepositioning
When reqd: ● For FC1, perform FUEL CELL PURGE – AUTO (ORB OPS, EPS)	7 (R11U) FC1 Purge Vlv man Cntl		⑪ Noz Htr A not wired; Noz Htr B still operates in A AUTO position. Other A Relief Htrs lost
During OPS 8: GNC 43 CONTROLLERS Deselect L Pnl Trim L1: ● DES PNL TRIM L1 – ITEM 36 EXEC Deselect Bdy Flp UP/DN L1: ● DES BDY FLP L1 – ITEM 19 EXEC	12 (F6A7) L Trim RHC INH capability Pnl ON capability 12 (L2A1) L Bdy Flp UP/DN capability		⑫ Right Trim and Body Flap cntl remains. Left Trim and Body Flap cntl function is regained after the lost contacts have been deselected in OPS-8 (3,B)
(A14) RCS/OMS HTR ● FWD RCS – B AUTO ● L POD (two) – A OFF, B AUTO	13 (A14) Fwd RCS A Htrs (all) 13 L Pod A Htrs (all)		⑬ B Htrs remain
GNC 23 RCS ● Reprioritize L, R Manf 2 Jets to first priority: DES INH twice, all other jets highest priority first, then next highest priority, etc ● Set aft pod(s) PRI JET FAIL LIMIT to 3	(A14) Aft RCS L,R Jet 2 Htrs		⑭ Sys A Pri Cntrl, Auto switchover to Sec Cntrl remains
(A1L) ● NSP PWR – 2	(A1A2) COMSEC 1 key		⑮ When SM not available, use NSP block to inhibit UL cmds. 'BCE STRG 1(3) NSP' annunciates and it requires GNC I/O RESET after UPLK – ENA for AOS
If no comm: (C3) ● S-BD PM CNTL – PNL ● – CMD			
If reqd during entry (< 120K ft): (L1) ● NH3 CNTLR A(B) – PRI/GPC	14 (L1A2) NH3 Sys A Sec Cntrl man ON capability		
15 If AB1,2,3 unprwd at same time: (A1L) ● NSP ENCRYPTION MODE – SEL ● NSP ENCRYPTION SEL – BYP	If AB1,2,3 unprwd at same time: (A1A2) COMSEC 1,2 Key		
No SM GPC and LOS: (C3) ● UPLK – NSP BLK			
(Continued)	(Continued)		

MEDS

EPS SSR-100 (Cont)
BUS LOSS: CNTLAB1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES	
ONLY ON MCC CALL, PERFORM			⑥ Vlv holds position	
• MDU CRT 1 PWR – OFF			⑬ Loss of manual capability to inert LH2 Manf	
(C2) • IDP/CRT1 PWR – OFF			⑰ Switch may be used to pwr other equipment	
(O14:F) • MMU 1 – OFF			⑱ Auto Cntl of these Htrs also lost if single Htr Ops and tank not paired	
(F3) • TRIM RHC PNL – ENA • PNL – OFF			⑲ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists	
(R4) • MPS FILL/DRAIN LH2 INBD – GND	16 (R4) Prplt F/D Inbd LH2 Vlv Man OP capability		⑳ Single mtr time	
If CCTV reqd: (A7U) • TV PWR CONTR UNIT – MNB			㉑ Vlv holds position. FC1 Redundant Reac Vlv Close Cntl on pnl C3 remains	
(R14D) • cb MNA TV CONTR UNIT – op	(A7A1) Video Cntl Unit MNA pwr		㉒ Vlv holds position. Sys 2 remains	
(A7U) PL BAY • FLOOD AFT STBD – OFF • FLOOD FWD PORT – OFF • FLOOD FWD BHD – OFF RMS • SPOT STBD – OFF	(A7A1) PLB Floodlts: Aft Stbd Fwd Port Blkhd		㉓ Cntlrs A,B Rad Byp Vlv Mtrs Auto Cntl and Cntl A Rad Byp Vlv Mtr Man Cntl remain	
17	18 (R1A2) Man ON Cntl of Cryo O2,H2 Tk1 Htrs B, Tk3 Htrs A 6 Cryo O2,H2 Tk1 Manf Vlv Cntl			
	19 (A8L) Port RMS: Fwd MRL Mtr 1 Mid MRL Mtr 1 Aft MRL Mtr 2			
	20 ROEU AC1 PBM MMC 1 pwr to: Orbiter arm drive mtr (ODM mtr 1 – mate A, demate A, relax A) ODA mtr 1 latch/release			
	21 (R1A2) FC1 Reac Vlv Cntl via pnl R1 sw FC1 STOP capability via START/STOP sw (pnl R1)			
	(R2) Ctr MPS He Isol A Man Cntl			
	(C3) FC3 Redundant Reac Vlv Close Cntl			
	22 (L2A1) Atm Press Cntl O2 Sys 1 Sply Vlv Cntl			
	23 (L1A2) Freon Loop 1,2 Cntl B Rad Byp Vlv Mtrs Man Cntl			

MEDS

EPS SSR-100 (Cont)
BUS LOSS: CNTLAB1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	<p>(O14) 24 RJDF 1B F1 Manf Logic sw pwr (F1F,F1L,F1U,F1D)</p> <p>(F6A1) L ADI Att Ref Set capability</p> <p>(R13A2) 26 Rad Cntl Sys: Port Lat 7-12 Mtr 1 Dpy/Sto Mtr 1 Stbd Lat 1-6 Mtr 1 Dpy/Sto Mtr 2</p> <p>(R2) 27 APU 1 Fu Tk Vlv A 28 Cntrl Pwr Sply A APU 1 GBX GN2 Repress Vlv 29 Hyd Main Pump 1 Depress Solenoid RPC A 29 Hyd Main Pump 3 Depress Solenoid RPC B</p> <p>(R4) 6 TVC Hyd Sys 1 Isol man Cntl 30 Hyd Brake Isol 1 man Cntl (F6A6,F8A5) NLG Backup Rel and Extension Sys 2 LMG, RMG Backup Rel Sys 2 31 LG Extend Vlv 2 32 NWS Hyd Sys 2</p> <p>(FPC1/AW18H) 33 EMU 1,2 Pwr/Batt chgr MNA pwr</p> <p>(O6) -Y Star Trkr Dr Sys 1 OP/CL capability</p> <p>(C3A5) 34 L ADP Dpy Mtr 1 35 Htr Cntrl 1</p> <p>(A6A1) PL Reten Sys A Rel/Lat Mtrs</p> <p>(R2) 26 ET Door Mtrs: C/L Lat Actr 1 Mtr 1 man STO capability C/L Lat Act 2 Mtr 1 man STO capability L Dr Closure Mtr 1 man Cntl L Dr Uplock Lat Mtr 2 man Cntl R Dr Uplock Lat Mtr 2 man Cntl</p> <p>(A14) 6 Ku-Band Temp Meas PA, Rcvr, A&B Gimbal, Rate Snr, Ant Feed</p> <p>(C3A1) 36 L OMS Arm 1, Arm/Press 1 sw Contacts 37 L OMS Eng Pr Vlv Coil 1, Cntl Vlv 1,2 Coils 1</p>	<p>(F3) 25 NWS fail lt (for actuator pressure sw)</p>	<p>6 Vlv holds position</p> <p>24</p> <div style="border: 2px solid black; padding: 5px; text-align: center;">WARNING</div> <p>Driver pwr to F1 jets lost if RJDF 1B Driver sw OFF (O14:F)</p> <p>25 NWS fail light still driven by miscompare logic feedback on rollout</p> <p>26 Redundant mtrs remain</p> <p>27 Vlv closes. Redundant vlv remains</p> <p>28 Redundant pwr sply remains. GG Bed T and GBX P ind lost when APU running</p> <p>29 Redundant RPC remains</p> <p>30 Vlv holds position. GPC OP capability remains during entry</p> <p>31 Loss of redundant hyd NLG deploy and NWS redundancy</p> <p>32 Hyd Sys 1 still available for NWS</p> <p>33 MNB pwr select capability remains</p> <p>34 Mtr 2 remains</p> <p>35 Htr Cntrl 2 remains</p> <p>36 L OMS auto shutdown if Pc < 80% and ↓ on MNVR EXEC display</p> <div style="border: 2px solid black; padding: 5px; text-align: center;">CAUTION</div> <p>No Purge. Wait 10 min between burns</p> <p>37 Redundant coils remain</p>

MEDS

**EPS SSR-101
BUS LOSS: CNTLAB2**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES	
<p>(A12) APU HTR 2 ● GAS GEN/FUEL PUMP 1 – B AUTO APU HTR TK/FU LINE/H2O/ 2 ● SYS 1A – OFF 2 ● 1B – AUTO 2 ● 3A – AUTO 2 ● 3B – OFF HYD HTR ● RUD SPD BK A – OFF ● B – AUTO ● CIRC PUMP PWR 1 – MNB</p>	<p>(A12) APU 1 GG/Fu Pump Htrs A APU 1 TK/Fu Ln Htrs A APU GG Inj H2O Tank Htrs 1A,2A APU 3 Tk/Fu Ln Htrs B Rud/Spd Brk Htr A (R2) Circ Pump 1 MNA pwr</p>	<p>(F7) 1 C/W RCS JET It – on SM ALERT Light/Tone – on (FSMs) S86 APU/HYD W/B SM0 THRM HYD (B) S67 CNTL BUS V S67 DISPLAY SW L 1 F RCS D(F,L,U) JET S68 H2 MANF VLV S68 O2 MANF VLV</p>	<p>① Indications do not appear until jet commanded ② <table border="1" style="margin: auto;"><tr><td style="text-align: center;">TIME CRITICAL</td></tr></table> If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p>	TIME CRITICAL
TIME CRITICAL				
<p>(L1) ● H2O PUMP LOOP 1 – B ● FLASH EVAP CNTLR PRI A – ON (if reqd) ● TOP EVAP HTR NOZ L – A AUTO ● TOP EVAP HTR DUCT – B If Hi Load Evap enabled ● HI LOAD DUCT HTR – B(C)</p>	<p>(L1A2) H2O Loop 1 Pump A man ON capability 3 Flash Evap Cntrl Pri B man 4 ON Sel capability Top Evap L Noz Htr B Top Evap Duct Fwd,Aft L,R Htrs A Hi Load Duct Outbd,Inbd Htrs A</p>	<p>SM 67 ELECTRIC CNTL AB2 Volts < 20 During Rad Dpy/Sto ops: (R13L) RAD CNTL tbs (four) indicate single mtr ops</p>	<p>③ Pri B GPC Sel capability remains. Pri A and Sec Cntrs remain</p>	
<p>(L2) ● FLASH EVAP FDLN HTR A SPLY – 2</p>	<p>(L2A1) FES H2O Fdln A Htrs 1 (all)</p>	<p>If H2O PUMP LOOP 1,A active: C/W H2O LOOP It – on 'S88 H2O PUMP P1' 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP' (O1) H2O PUMP OUT PRESS meter ind – 20–25 psia</p>	<p>④ In OPS 2, FES GPC cmd is not present, but one may be sent if reqd ⑤ Vlv holds position. Isol B remains</p>	
<p>Place CDR disp sws (eight) to green dot position: (F6) ● AIR DATA – NAV ● ADI ATT – LVLH ● ERR – MED ● RATE – MED ● HSI SEL MODE – ENTRY ● HSI SEL SOURCE (two) – NAV, 3</p>	<p>(F6A1) Air Data Source Sel capability L ADI Att, Err, Rate Sel capability (F6A5) L HSI Mode, Source Sel capability</p>	<p>L ADP deploy time incr from 15 to 30 sec</p>	<p>⑥ Do not reconfig for reg switch or I'CNCT procedures</p>	
<p>(F7) ● RADAR ALTM – 2</p>	<p>(F6A7) L Radar Altm Sel capability</p>	<p>STAR TRKR DR POS –Y CL time incr from 8 to 16 sec</p>	<p>⑦ Vlv holds position</p>	
<p>Refer to OMS/RCS Slide Rule for vlv loss info 6 Reconfig following vlv(s) only if leak isolation reqd: (O7) ● AFT R RCS He PRESS A ● L, R RCS XFEED 3/4/5</p>	<p>(O7) 5 Aft L RCS He Pr Isol A man Cntl and GPC CL capability 5 Aft R RCS He Pr Isol A man CL capability 7 Aft L,R RCS Xfeed Vlv 3/4/5 man CL capability</p>	<p>(F7) If APUs active and using H2O BLR CNTLR/HTR 1B: C/W APU TEMP It – on after ~2 min</p>	<p>⑧ Pwr to MCA Drivers lost through ENABLE sw</p>	
<p>(O8) ● L OMS XFEED A ● R OMS XFEED A</p>	<p>(O8) 5 L,R OMS Tk Isol A man CL cap 5 L,R OMS Xfeed Vlv A man CL cap 5 Fwd RCS He Pr Isol A man Cntl and GPC CL cap Fwd RCS Tk Isol 3/4/5 man CL and man Ovrd of GPC CL cap</p>	<p>SM (BFS,SM) 63 PL BAY DOORS During PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	<p>⑨ Vlv holds position. GPC OP capability remains during entry</p>	
<p>(R13A2) 8 PLBD: C/L Lat 1–4, 5–8 Mtrs 1 Port Aft Blkhd Mtr 1</p>	<p>(R13A2) 8 PLBD: C/L Lat 1–4, 5–8 Mtrs 1 Port Aft Blkhd Mtr 1</p>			
<p>(R4) 9 LG Extend Isol Vlv man Cntl</p>	<p>(R4) 9 LG Extend Isol Vlv man Cntl</p>			
<p>(Continued)</p>	<p>(Continued)</p>		<p style="text-align: center; font-size: 2em; font-weight: bold;">MEDS</p>	

**EPS SSR-100
BUS LOSS: CNTLAB1**

EPS CNTL
SSR 100-108

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A12) APU HTR ● GAS GEN/FUEL PUMP 1 – B AUTO ● GAS GEN/FUEL PUMP 3 – A AUTO ● LUBE OIL LINE 1 – B AUTO APU HTR TK/FU LINE/H2O/ ● SYS 1A – OFF ● 1B – AUTO ● 3A – AUTO ● 3B – OFF HYD HTR ● ELEV A – OFF ● B – AUTO ● AFT FUS A – OFF ● B – AUTO HYD CIRC PUMP ● PWR 1 – MNB ● 3 – MNC</p>	<p>(A12) APU 1 GG/Fu Pump Htrs A APU 3 GG/Fu Pump Htrs B APU 1 Lube Oil Line Htrs A 1 Tk/Fu Ln Htrs A APU 1,2 GG Inj H2O Htrs 4A,5A APU 3 Tk/Fu Ln Htrs B Elevon Actr Htrs A Aft Fuselage Htrs A Circ Pump 1 MNA pwr 3 MNA pwr</p>	<p>CRT 1 blanks SM ALERT Light/Tone – on (FSMs) S68 H2 MANF VLV S68 O2 MANF VLV S86 APU/HYD APU SM0 THRM HYD S67 CNTL BUS V S69 FC REAC 1 I/O ERROR CRT 1 SM 67 ELECTRIC CNTL AB1 Volts < 20 (F8) APU 1 FUEL QTY % inaccurate (displays H2O qty) During Rad Dpy/Sto: (R13L) RAD CNTL tbs (four) indicate single mtr ops L ADP deploy time incr from 15 to 30 sec STAR TRKR DR POS –Y OP/CL time incr from 8 to 16 sec (F7) If APUs active and using BLR CNTLR/HTR 1B: C/W APU TEMP It – on after ~2 min CCTV Video TV Annun is lost if MNA selected for VCU SM 76 COMMUNICATIONS Ku-Band A,B, GMBL and PA TEMP Read High '↑' SM (BFS,SM) 63 PL BAY DOORS During PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	<p>① TIME CRITICAL * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ② Msg occurs only if A AUTO (pnl R12U) selected for FC H2O Relief Htr ③ Pri B Man ON Sel capability remains. Pri A and Sec Cntrlr remain ④ Vlv holds position. Vlv B remains ⑤ Do not reconfig for reg switch or I'CNCT procedures ⑥ Vlv holds position ⑦ Vlv normally closed ⑧ Pwr to MCA Drivers lost through ENABLE sw</p>
<p>(L1) If using B CNTLR: ● FLASH EVAP CNTLR PRI B – ON ● TOP EVAP HTR DUCT – B If Hi Load Evap enabled: ● HI LOAD DUCT HTR – B(C)</p>	<p>(L1A2) 3 Flash Evap Cntrlr Pri B GPC Sel capability Top Evap Duct Fwd,Aft L,R Htrs A Hi Load Duct Outbd,Inbd Noz Htrs A</p>		
<p>(L2) ● FLASH EVAP FDLN HTR B SPLY – 2</p>	<p>(L2A1) FES H2O Fdln B Htrs 1</p>		
<p>(R2) ● BLR CNTLR/HTR 1 – A</p>	<p>(R2) Hyd H2O Blr 1 Cntrlr B</p>		
<p>Refer to OMS/RCS Slide Rule for vlv loss info 5 Reconfig following vlv(s) only if leak isolation reqd: (O7) ● AFT L RCS He PRESS A ● AFT L,R RCS XFEED 3/4/5</p>	<p>(O7) 4 Aft L RCS He Pr Isol A man CL capability 6 Aft L,R RCS Xfeed Vlv 3/4/5 man CL capability</p>		
<p>(O8) ● L OMS XFEED A ● R OMS XFEED A ● FWD RCS He PRESS A</p>	<p>(O8) 7 R OMS He Press Isol A man Cntl and He Vap Isol 1,2 man Cntl 4 L,R OMS Tk Isol A man CL capability 4 L,R OMS Xfeed Vlv A man CL capability 4 Fwd RCS He Press Isol A man CL capability</p>		
<p>If AB1,2,3 unpwr'd at same time: GNC 23 RCS Override F1 Manf status to CL: ● RCS FWD – ITEM 1 EXEC ● MANF VLVS 1 OVRD – ITEM 40 EXEC</p>	<p>8 (R13A2) PLBD: C/L Lat 9-12 Mtr 1 Port,Stbd Fwd Blkhd Mtrs 1 Stbd Door Mtr 1 (O14) RCS Manf F1 RJD pwr (F1F, F1L, F1U, F1D)</p>		
(Continued)	(Continued)		

NOM

EPS SSR-100 (Cont)
BUS LOSS: CNTLAB1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(C2) ● L CRT SEL – 3 ● GPC/CRT 01 EXEC	(C2A2) DEU/CRT 1		⑦ Vlv normally closed
SM 1 DPS UTILITY (G2,G8,S2) MMU ASSIGN 9 ● GNC – ITEM 1 EXEC ● SM – ITEM 4 EXEC ● PL – ITEM 6 EXEC	(O14) MMU 1		⑨ Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION prepositioning
(R11U) ● FC H2O RELIEF HTR – B AUTO ● FC H2O LINE HTR – B AUTO	10 (R11U) FC H2O Relief: Vlv Htrs A Vent Line Htrs A Barrel Htrs A Noz Htrs A H2O Line Htrs A		⑩ Noz Htr A not wired; Noz Htr B still operates in A AUTO position. Other A Relief Htrs lost
When reqd: ● For FC1, perform FUEL CELL PURGE – AUTO (ORB OPS, EPS)	7 (R11U) FC1 Purge Vlv man Cntl		⑪ Right Trim and Body Flap cntl remains. Left Trim and Body Flap cntl function is regained after the lost contacts have been deselected in OPS-8 (3,B)
During OPS 8: GNC 43 CONTROLLERS Deselect L Pnl Trim L1: ● DES PNL TRIM L1 – ITEM 36 EXEC Deselect Bdy Flp UP/DN L1: ● DES BDY FLP L1 – ITEM 19 EXEC	11 (F6A7) L Trim RHC INH capability Pnl ON capability 11 (L2A1) L Bdy Flp UP/DN capability		⑫ B Htrs remain ⑬ Sys A Pri Cnltr, Auto switchover to Sec Cnltr remains
(A14) RCS/OMS HTR ● FWD RCS – B AUTO ● L POD (two) – A OFF, B AUTO	12 (A14) Fwd RCS A Htrs (all) 12 L Pod A Htrs (all)		⑭ When SM not available, use NSP block to inhibit UL cmds. 'BCE STRG 1(3) NSP' annunciates and it requires GNC I/O RESET after UPLK – ENA for AOS
GNC 23 RCS ● Reprioritize L, R Manf 2 Jets to first priority: DES INH twice, all other jets highest priority first, then next highest priority, etc ● Set aft pod(s) PRI JET FAIL LIMIT to 3	(A14) Aft RCS L,R Jet 2 Htrs		
(A1L) ● NSP PWR – 2	(A1A2) COMSEC 1 Key		
If no comm: (C3) ● S-BD PM CNTL – PNL ● – CMD			
If reqd during entry (< 120K ft): (L1) ● NH3 CNTLR A(B) – PRI/GPC	13 (L1A2) NH3 Sys A Sec Cnltr man ON capability		
14 If AB1,2,3 unprwd at same time: (A1L) ● NSP ENCRYPTION MODE – SEL ● NSP ENCRYPTION SEL – BYP	If AB1,2,3 unprwd at same time: (A1A2) COMSEC 1,2 Key		
No SM GPC and LOS: (C3) ● UPLK – NSP BLK			
(Continued)	(Continued)		

NOM

EPS SSR-100 (Cont)
BUS LOSS: CNTLAB1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			⑥ Vlv holds position
(C2) • CRT1 PWR – OFF			⑮ APU 1 Fuel/H2O Qty meter (pnl F8) displays H2O qty when in FUEL position
(O14:F) • MMU 1 – OFF			⑯ Loss of manual capability to inert LH2 Manf
(F3) • TRIM RHC PNL – ENA • PNL – OFF			⑰ Switch may be used to pwr other equipment
(F8) • APU sel (two) – H2O, 1(2,3)	15 (F8) APU 1 Fuel Qty display		⑱ Auto Cntl of these Htrs also lost if single Htr Ops and tank not paired
(R4) • MPS FILL/DRAIN LH2 INBD – GND	16 (R4) Prplt F/D Inbd LH2 Vlv Man OP capability		⑲ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists
If CCTV reqd: (A7U) • TV PWR CONTR UNIT – MNB			⑳ Single mtr time
(R14D) • cb MNA TV CONTR UNIT – op	(A7A1) Video Cntl Unit MNA pwr		㉑ Vlv holds position. FC1 Redundant Reac Vlv Close Cntl on pnl C3 remains
17 (A7U) PL BAY • FLOOD AFT STBD – OFF • FLOOD FWD PORT – OFF • FLOOD FWD BHD – OFF RMS • SPOT STBD – OFF	(A7A1) PLB Floodlts: Aft Stbd Fwd Port Blkhd		㉒ Vlv holds position. Sys 2 remains
	18 (R1A2) Man ON Cntl of Cryo O2,H2 Tk1 Htrs B, Tk3 Htrs A 6 Cryo O2,H2 Tk1 Manf Vlv Cntl		㉓ Cntlrs A,B Rad Byp Vlv Mtrs Auto Cntl and Cntl A Rad Byp Vlv Mtr Man Cntl remain
	19 (A8L) Port RMS: Fwd MRL Mtr 1 19 Mid MRL Mtr 1 19 Aft MRL Mtr 2		
	20 ROEU AC1 PBM MMC 1 pwr to: Orbiter arm drive mtr (ODM mtr 1 – mate A, demate A, relax A) 20 ODA mtr 1 latch/release		
	21 (R1A2) FC1 Reac Vlv Cntl via pnl R1 sw FC1 STOP capability via START/STOP sw (pnl R1)		
	(R2) Ctr MPS He Isol A Man Cntl		
	(C3) FC3 Redundant Reac Vlv Close Cntl		
	22 (L2A1) Atm Press Cntl O2 Sys 1 Sply Vlv Cntl (L1A2)		
	23 Freon Loop 1,2 Cntl B Rad Byp Vlv Mtrs Man Cntl		
	(Continued)		

NOM

EPS SSR-100 (Cont)
BUS LOSS: CNTLAB1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	<p>(O14) 24 RJDF 1B F1 Manf Logic sw pwr (F1F,F1L,F1U,F1D)</p> <p>(F6A1) L ADI Att Ref Set capability</p> <p>(R13A2) 26 Rad Cntl Sys: Port Lat 7-12 Mtr 1 Dpy/Sto Mtr 1 Stbd Lat 1-6 Mtr 1 Dpy/Sto Mtr 2</p> <p>(R2) 27 APU 1 Fu Tk Vlv A 28 Cntrl Pwr Sply A APU 1 GBX GN2 Repress Vlv 29 Hyd Main Pump 1 Depress Solenoid RPC A 29 Hyd Main Pump 3 Depress Solenoid RPC B</p> <p>(R4) 6 TVC Hyd Sys 1 Isol man Cntl 30 Hyd Brake Isol 1 man Cntl (F6A6,F8A5) NLG Backup Rel and Extension Sys 2 LMG, RMG Backup Rel Sys 2 31 LG Extend Vlv 2 32 NWS Hyd Sys 2</p> <p>(FPC1/AW18H) 33 EMU 1,2 Pwr/Batt chgr MNA pwr</p> <p>(O6) -Y Star Trkr Dr Sys 1 OP/CL capability</p> <p>(C3A5) 34 L ADP Dpy Mtr 1 35 Htr Cntrl 1</p> <p>(A6A1) PL Reten Sys A Rel/Lat Mtrs</p> <p>(R2) 26 ET Door Mtrs: C/L Lat Actr 1 Mtr 1 man STO capability C/L Lat Act 2 Mtr 1 man STO capability L Dr Closure Mtr 1 man Cntl L Dr Uplock Lat Mtr 2 man Cntl R Dr Uplock Lat Mtr 2 man Cntl</p> <p>(A14) 6 Ku-Band Temp Meas PA, Rcvr, A&B Gimbal, Rate Snr, Ant Feed</p> <p>(C3A1) 36 L OMS Arm 1, Arm/Press 1 sw Contacts 37 L OMS Eng Pr Vlv Coil 1, Cntl Vlv 1,2 Coils 1</p>	<p>(F3) 25 NWS fail lt (for actuator pressure sw)</p>	<p>6 Vlv holds position</p> <p>24</p> <div style="border: 2px solid black; padding: 5px; text-align: center;"> <p>WARNING</p> <p>Driver pwr to F1 jets lost if RJDF 1B Driver sw OFF (O14:F)</p> </div> <p>25 NWS fail light still driven by miscompare logic feedback on rollout</p> <p>26 Redundant mtrs remain</p> <p>27 Vlv closes. Redundant vlv remains</p> <p>28 Redundant pwr sply remains. GG Bed T and GBX P ind lost when APU running</p> <p>29 Redundant RPC remains</p> <p>30 Vlv holds position. GPC OP capability remains during entry</p> <p>31 Loss of redundant hyd NLG deploy and NWS redundancy</p> <p>32 Hyd Sys 1 still available for NWS</p> <p>33 MNB pwr select capability remains</p> <p>34 Mtr 2 remains</p> <p>35 Htr Cntrl 2 remains</p> <p>36 L OMS auto shutdown if Pc < 80% and '↓' on MNVR EXEC display</p> <div style="border: 2px solid black; padding: 5px; text-align: center;"> <p>CAUTION</p> <p>No Purge. Wait 10 min between burns</p> </div> <p>37 Redundant coils remain</p>

NOM

**EPS SSR-101
BUS LOSS: CNTLAB2**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES	
<p>(A12) APU HTR 2 ● GAS GEN/FUEL PUMP 1 – B AUTO APU HTR TK/FU LINE/H2O/ 2 ● SYS 1A – OFF 2 ● 1B – AUTO 2 ● 3A – AUTO 2 ● 3B – OFF HYD HTR ● RUD SPD BK A – OFF ● B – AUTO ● CIRC PUMP PWR 1 – MNB</p>	<p>(A12) APU 1 GG/Fu Pump Htrs A APU 1 TK/Fu Ln Htrs A APU GG Inj H2O Tank Htrs 1A,2A APU 3 Tk/Fu Ln Htrs B Rud/Spd Brk Htr A (R2) Circ Pump 1 MNA pwr</p>	<p>(F7) 1 C/W RCS JET It – on SM ALERT Light/Tone – on (FSMs) S86 APU/HYD W/B SM0 THRM HYD (B) S67 CNTL BUS V S67 DISPLAY SW L 1 F RCS D(F,L,U) JET S68 H2 MANF VLV S68 O2 MANF VLV</p>	<p>① Indications do not appear until jet commanded ② <table border="1" style="margin: auto;"><tr><td style="text-align: center;">TIME CRITICAL</td></tr></table> If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p>	TIME CRITICAL
TIME CRITICAL				
<p>(L1) ● H2O PUMP LOOP 1 – B ● FLASH EVAP CNTLR PRI A – ON (if reqd) ● TOP EVAP HTR NOZ L – A AUTO ● TOP EVAP HTR DUCT – B If Hi Load Evap enabled ● HI LOAD DUCT HTR – B(C)</p>	<p>(L1A2) H2O Loop 1 Pump A man ON capability 3 Flash Evap Cntrl Pri B man 4 ON Sel capability Top Evap L Noz Htr B Top Evap Duct Fwd,Aft L,R Htrs A Hi Load Duct Outbd,Inbd Htrs A</p>	<p>SM 67 ELECTRIC CNTL AB2 Volts < 20 During Rad Dpy/Sto ops: (R13L) RAD CNTL tbs (four) indicate single mtr ops</p>	<p>③ Pri B GPC Sel capability remains. Pri A and Sec Cntrs remain</p>	
<p>(L2) ● FLASH EVAP FDLN HTR A SPLY – 2</p>	<p>(L2A1) FES H2O Fdln A Htrs 1 (all)</p>	<p>If H2O PUMP LOOP 1,A active: C/W H2O LOOP It – on 'S88 H2O PUMP P1' 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP' (O1) H2O PUMP OUT PRESS meter ind – 20–25 psia</p>	<p>④ In OPS 2, FES GPC cmd is not present, but one may be sent if reqd ⑤ Vlv holds position. Isol B remains</p>	
<p>Place CDR disp sws (eight) to green dot position: (F6) ● AIR DATA – NAV ● ADI ATT – LVLH ● ERR – MED ● RATE – MED ● HSI SEL MODE – ENTRY ● HSI SEL SOURCE (two) – NAV, 3</p>	<p>(F6A1) Air Data Source Sel capability L ADI Att, Err, Rate Sel capability (F6A5) L HSI Mode, Source Sel capability</p>	<p>L ADP deploy time incr from 15 to 30 sec STAR TRKR DR POS –Y CL time incr from 8 to 16 sec</p>	<p>⑥ Do not reconfig for reg switch or I'CNCT procedures ⑦ Vlv holds position</p>	
<p>(F7) ● RADAR ALTM – 2</p>	<p>(F6A7) L Radar Altm Sel capability</p>	<p>(F7) If APUs active and using H2O BLR CNTLR/HTR 1B: C/W APU TEMP It – on after ~2 min</p>	<p>⑧ Pwr to MCA Drivers lost through ENABLE sw</p>	
<p>Refer to OMS/RCS Slide Rule for vlv loss info 6 Reconfig following vlv(s) only if leak isolation reqd: (O7) ● AFT R RCS He PRESS A ● L, R RCS XFEED 3/4/5</p>	<p>(O7) 5 Aft L RCS He Pr Isol A man Cntl and GPC CL capability 5 Aft R RCS He Pr Isol A man CL capability 7 Aft L,R RCS Xfeed Vlv 3/4/5 man CL capability</p>	<p>SM (BFS,SM) 63 PL BAY DOORS During PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	<p>⑨ Vlv holds position. GPC OP capability remains during entry</p>	
<p>(O8) ● L OMS XFEED A ● R OMS XFEED A</p>	<p>(O8) 5 L,R OMS Tk Isol A man CL cap 5 L,R OMS Xfeed Vlv A man CL cap 5 Fwd RCS He Pr Isol A man Cntl and GPC CL cap Fwd RCS Tk Isol 3/4/5 man CL and man Ovrd of GPC CL cap</p>			
	<p>(R13A2) 8 PLBD: C/L Lat 1–4, 5–8 Mtrs 1 Port Aft Blkhd Mtr 1</p>			
	<p>9 (R4) LG Extend Isol Vlv man Cntl</p>			
<p>(Continued)</p>	<p>(Continued)</p>		<p>NOM</p>	

EPS SSR-101 (Cont)
BUS LOSS: CNTLAB2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(R1) If TK1 in use: O2,H2 TK1 ● HTR A (two) – AUTO ● B (two) – OFF If TK3 in use: O2,H2 TK3 HTR ● HTR A (two) – OFF ● B (two) – AUTO	(R1A2) 7 Cryo O2,H2 Tk1 Manf Vlv Cntl Cryo O2,H2 Tk1 Htrs B Cryo O2,H2 Tk3 Htrs A		⑦ Vlv holds position ⑩ Auto Cntl of these Htrs also lost if single Htr Ops and tank not paired ⑪ Manf status <u>not</u> automatically declared closed. Jet fail-offs may occur
(R2) ● BLR CNTLR/HTR 1 – A	(A15) 10 Pallet Cryo Tk 6-9 Htrs A man On Cntl		⑫ Selecting failed MMU for GNC MF protects against GPC MMU Rcvr failure after OPS XTION repositioning
11 GNC 23 RCS Override F1 Manf status to CL: ● RCS FWD – ITEM 1 EXEC ● MANF VLVS 1 OVRD – ITEM 40 EXEC	(R2) Hyd H2O Blr 1 Cntlr B (O14) RCS Manf F1 RJD pwr (F1F,F1L,F1U,F1D)		⑬ When SM unavailable, use NSP block to inhibit UL Cmds. 'BCE STRING 1(3) NSP' annunciates and it requires GNC I/O RESET after UPLK – ENA for AOS
12 SM 1 DPS UTILITY (G2,G8,S2) MMU ASSIGN ● GNC – ITEM 2 EXEC ● SM – ITEM 3 EXEC ● PL – ITEM 5 EXEC	(O15) MMU 2		⑭ Vlv normally closed ⑮ B Htrs remain
If no SM GPC and LOS: (C3) ● UPLK – NSP BLK	13 (C3A5) Uplink switch GPC block of UL Cmds capability		⑯ RM sw downmodes to 2-level for -X position
When reqd: ● Perform FC1 purges in AUTO mode (ORB OPS)	14 (R11U) FC1 Purge Vlv man Cntl		
	(C3) FC3 Redundant Reac Vlv Close Cntl		
(A14) RCS/OMS HTR ● FWD RCS – B AUTO ● L POD (two) – A OFF, B AUTO	15 Fwd RCS A Htrs (all) L Pod A Htrs (partial)		
If SENSE – -Z: (A6U) ● SENSE – -X ● Wait at least 1 sec, then reposition as desired	16 (A6A1) 3-level sw RM for -X Sense		
(A15) ● PALLET HTR A – OFF ● B – AUTO	(A15) Pallet Structure Htr A Stbd		
If AB1,2,3 unprwd at same time: (A1L) ● NSP ENCRYPTION MODE – SEL ● NSP ENCRYPTION SEL – BYP	If AB1,2,3 unprwd at same time: (A1A2) COMSEC 1,2 Key		
(Continued)	(Continued)		

EPS SSR-101 (Cont)
BUS LOSS: CNTLAB2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
If reqd during entry (< 120K ft): (L1) • NH3 CNTLR A(B) – PRI/GPC	17 (L1A2) NH3 Sys B Sec Cntrl man ON capability		⑦ Vlv holds position ⑰ Sys B Pri Cntrl, Auto switchover to Sec Cntrl remain
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(R2) • MPS He I'CONNECT CTR – GPC	(R2) Ctr MPS He Intercom Vlvs man Cntl		⑱ Loss of manual capability to inert LH2 Manf ⑲ Six vlvs fail to non-isolation position
(R4) • MPS FILL/DRAIN LH2 INBD – GND	18 (R4) Prplt F/D LH2 Inbd Vlv man Cntl		⑳ Vlv holds positions. FC1 Redundant Reac Vlv Close Cntl on pnl C3 remains
(O15:F) • MMU 2 – OFF			㉑ FC1 can be stopped via FC1 CNTLR sw (O14:A)
	19 (O17) ATVC 2 Isol ME		㉒ Vlv holds position. Sys 2 remains
	20 (R1A2) FC1 Reac Vlv Cntl via pnl R1 sw		㉓ Redundant mtrs remain
	21 FC1 STOP capability via START/STOP sw (pnl R1)		㉔ Mtr 2 remains
	22 (L2A1) Atm Press Cntl O2 Sys 1 Sply Vlv Cntl		㉕ Htr Cntrl 2 remains
	(F6) L HUD		㉖
	(F6A1) L ADI Att Ref Set capability		
	6 (R4) TVC Hyd Sys 1 Isol man Cntl		
	23 (O6) –Y Star Trkr Dr Sys 1 CL capability		
	24 (C3A5) L ADP Deploy Mtr 1		
	25 Htr Cntrl 1		
	(R2) L MPS He Isol B man Cntl		
	23 (R13A2) Rad Cntl Sys Port Lat 1–6 Mtr 1 Dpy/Sto Mtr 1 Stbd Lat 7–12 Mtr 1 Dpy/Sto Mtr 2		
	26 (O15) RJDA L Vernier Logic pwr (L5L)		
	(Continued)		<div style="border: 2px solid black; padding: 5px; width: fit-content;"> <p style="text-align: center; margin: 0;">WARNING</p> <p style="margin: 0;">Driver pwr to L5 jets lost if L5/F5/R5 Driver sw OFF (O16:F)</p> </div>

EPS SSR-101 (Cont)
BUS LOSS: CNTLAB2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	<p>(R2) 23 ET Door Mtrs C/L Lat Actr 1 Mtr 2 man Stow capability C/L Lat Actr 2 Mtr 2 man Stow capability L Dr Uplock Lat Mtr 2 man Cntl R Dr Closure Mtr 2 man Cntl R Dr Uplock Lat Mtr 2 man Cntl</p> <p>(C3A1) 27 L OMS ARM 2, ARM/PRESS 2 sw Contacts 28 L OMS Eng Pr Vlv Coil 2, Cntl Vlv 1,2 Coils 2</p> <p>(R2) 29 APU 2 Fu TK Vlv B 30 Hyd Main Pump 1 Depress Solenoid RPC A 30 Hyd Main Pump 3 Depress Solenoid RPC B</p>		<p>②③ Redundant mtrs remain</p> <p>②⑦ L OMS auto shutdown if Pc < 80% and '↓' on MNVR EXEC display</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">CAUTION</p> <p>No Purge. Wait 10 min between burns</p> </div> <p>②⑧ Redundant coils remain</p> <p>②⑨ Vlv closes. Redundant vlv remains</p> <p>③⑩ Redundant RPC remains</p>

EPS SSR-102

BUS LOSS: CNTLAB3 (Includes MNA FMC1, MNA MMC1, MNA MMC3, MNA AMC1)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A12) APU HTR</p> <p>1 ● GAS GEN/FUEL PUMP 1 1 – A AUTO 1 ● LUBE OIL LINE 1 – A 1 AUTO 1 APU HTR TK/FU LINE/H2O/ 1 ● SYS 1A – OFF 1 ● 1B – AUTO 1 ● 3A – AUTO 1 ● 3B – OFF</p> <p>HYD HTR ● BDY FLP A – OFF ● B – AUTO ● CIRC PUMP PWR 1 – MNA</p>	<p>(A12) APU 1 GG/Fu Pump Htrs B 1 Lube Oil Line Htrs B 1 Tk/Fu Ln Htrs A</p> <p>APU 3 Tk/Fu Ln Htrs B</p> <p>APU 3 GG Inj H2O Htrs 3B, 23B</p> <p>Body Flap Htr A</p> <p>Circ Pump 1 MNB pwr</p>	<p>SM ALERT Light/Tone – on 'S67 CNTL/ESS V' 'S88 THERMAL FRN' (2)</p> <p>(FSM) RM DLMA MANF</p> <p>(L1) 2 FLOW PROP VLV LOOP 1 tb – bp</p> <p>(O8) 3 FWD RCS 3 TK ISOL 3/4/5 tb – bp MANF ISOL 1 tb – bp</p> <p>(R13L) 4 RAD CNTL STBD tb – bp 4 PORT tb – bp</p>	<p>①</p> <p>* [TIME CRITICAL] *</p> <p>If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p> <p>② Freon Loop 1 Flow Prop Vlv operation not affected</p> <p>③ Vlv holds position</p> <p>④ If AC1 cb not opened, Lat Mtrs 1 of actuators for Port, Stbd Rad Lat 1-6, 7-12 continue to run until Sys A Lat Cntl sw placed to OFF. Other equip pwrd by AC1 MMC1 and AC1 MMC3 are lost because MNA MMC1 and MNA MMC3 lost</p> <p>⑤ Vlv holds position. GPC OP capability remains. Isol B remains. Auto Overpress protection lost on R RCS A reg</p>
<p>(R2) ● BLR CNTLR/HTR 1,3 (two) – B</p>	<p>(R2) Hyd H2O BLR 1,3 Cntr A</p>	<p>SM 67 ELECTRIC</p> <p>CNTL AB3 Volts < 20</p>	
<p>(A14) RCS/OMS HTR ● OMS CRSFD LINES – A OFF, B AUTO</p>	<p>(A14) OMS Crsfd Ln Htrs A</p>	<p>LADP deploy time incr from 15 to 30 sec</p>	
<p>(L1) ● H2O PUMP LOOP 1 – B ● TOP EVAP HTR DUCT – B</p> <p>If Hi Load Evap enabled: ● HI LOAD DUCT HTR – B(C)</p>	<p>(L1A2) H2O Loop 1 Pump A Top Evap Duct Fwd, Aft Htrs A</p> <p>Hi Load Duct Outbd, Inbd Noz Htrs A</p>	<p>(F7) If APUs active and using H2O BLR CNTLR/HTR 1A or 3A: C/W APU TEMP It – on after ~2 min</p>	
<p>Refer to OMS/RCS Slide Rule for vlv loss info</p>	<p>5 (O7) Aft R RCS He Press Isol A man Cntl, GPC CL capability</p>		
<p>4 (MA73C:C,D) ● cb MCA PWR AC1 3Φ MID 1,3 (two) – op</p>	<p>4 (MA73C) Port, Stbd Rad Lat 1-6, 7-12 Mtrs 1 Limit sw</p>		
<p>For PLBD ops: ● OP/CL Drs in man mode</p>	<p>(MA73C) PLBD: C/L Lat 1-4, 5-8, 9-12 Mtrs 1 Port, Stbd Fwd Blkhd Mtrs 1 Port Aft Blkhd Mtr 1 Stbd Door Mtr 1 Port Door Mtr 2 CL Limit sw</p>	<p>SM (BFS, SM) 63 PL BAY DOORS</p> <p>If in <u>AUTO</u> OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'</p> <p>During <u>MAN</u> PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	
<p>Do not perform if AB1,2,3 unpwr at same time: GNC 23 RCS</p> <p>Override F1 Manf status to OP: ● RCS FWD – ITEM 1 EXEC ● MANF VLVS 1 OVRD – ITEM 40 EXEC</p>			
<p>● PLT RHC pb – push, if BFS engage reqd</p>	<p>(F6) CDR BFS no eng capability GPC 1,2,4 no eng capability</p>		
<p>(A1L) ● NSP PWR – 1</p> <p>If no comm: (C3) ● S-BD PM CNTL – PNL ● – CMD</p>	<p>(A1A2) COMSEC 2 Key</p>		
<p>(Continued)</p>	<p>(Continued)</p>	<p>(Continued)</p>	

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**EPS SSR-103
BUS LOSS: CNTLBC1**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (A12) APU HTR • GAS GEN/FUEL PUMP 1 – A AUTO 1 • GAS GEN/FUEL PUMP 2 – B AUTO • LUBE OIL LINE 2 – B AUTO APU HTR TK/FU LINE/H2O/ • SYS 1A – AUTO 1 • 1B – OFF 1 • 2A – OFF 1 • 2B – AUTO HYD HTR • BDY FLP A – AUTO • B – OFF • CIRC PUMP PWR 1 – MNA • CIRC PUMP PWR 2 – MNC	(A12) APU 1 GG/Fu Pump Htrs B APU 2 GG/Fu Pump Htrs A APU 2 Lube Oil Line Htrs A APU 1 Tk/Fu Ln Htr B APU 1,2 GG Inj H2O Htrs 4B,5B APU 2 Tk/Fu Line Htr A Body Flap Htr B MNB Circ Pump 1 pwr MNB Circ Pump 2 pwr	MASTER ALARM Light/Tone – on (F7) SM ALERT Light/Tone – on SM 67 ELECTRIC CNTL BC1 Volts < 20 C/W RCS JET It – on (FSMs) S69 FC H2O RLF HTR S67 CNTL BUS V S86 APU/HYD W/B SM0 THRM HYD (B) 2 F,L,R RCS L,R,D JET (COMM LOST) All S-BD A/G voice lost if Sys 1 selected (L1) 4 RAD BYP VLV 2 tb – bp If Site AOS and using S-BD Ant Elec 1: 5 'ANTENNA' If NSP 1 selected: 'BCE STRG 1 NSP' During Rad Dpy/Sto: (R13L) RAD CNTL STBD tb indicates single mtr ops RAD LAT CNTL tbs (two) indicate single mtr ops L,R ADP deploy time incr from 15 to 30 sec STAR TRKR DR POS –Y CL time incr from 8 to 16 sec STAR TRKR DR POS –Z OP/CL time incr from 8 to 16 sec If SYS 1 pwrd: 'S62 BCE BYP PSP 1' Loss of PL TLM and CMD If PDI FDA enabled: 'S62 PDI DECOM FAIL' If first RGA failure and rates sensed: 'RM FAIL RGA' (3) (F7) If APUs active and using BLR CNTLR/HTR 2B: C/W APU TEMP It – on after ~2 min CCTV Video and Annun is lost if MNB selected for VCU PLB Floodlts lost: Fwd Stbd Mid Port SM (BFS,SM) 63 PL BAY DOORS During PLBD OP/CL, single mtr run time noted on actuators listed at left	① * [TIME CRITICAL] * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ② Indications do <u>not</u> appear until jet commanded ③ Msg occurs only if B AUTO (pnl R12U) selected for FC H2O Relief Htr ④ Vlv still functional ⑤ FSM caused by antenna miscompare ⑥ REACQ and PSP reconfig procedures are flight specific. If reqd, procedures can be found in payload or ISS specific books ⑦ OIU 2 interfaces with PSP 2 for commanding ⑧ Pwr to MCA Drivers lost through ENABLE sw
(A1L) S-BD PM • ANT SW ELEC – 2 • XPNDR – 2 • PWR AMPL OPER – 2 • STBY – 2 • PRE AMP – 2 NSP • PWR – 2 If PSP and/or INTRG reqd for PL or ISS ops: • S-BD PL PWR SYS – 2 • CNTL – PNL • – CMD 6 • Reconfig PSP 6 • Perform PL INTRG REACQ (if reqd)	(A1A2) S-BD PM Sys 1: Xpndr 1 Pre-Amp 1 Pwr Amp 1 PM Ant Sw 1 FM Ant Sw 1 NSP 1/COMSEC 1 S-BD PL INTRG 1 PSP 1	(A1A3) S-BD FM Sys 1	
If no comm: (C3) • S-BD PM CNTL – PNL • – CMD 7 If OIU reqd: (SSP) • OIU PWR – OIU 2 ON • OIU tb – DN • ✓ MCC, OIU reconfig			
(L1) • TOP EVAP HTR NOZ L – B AUTO • TOP EVAP HTR DUCT – A If Hi Load Evap enabled: • HI LOAD DUCT HTR – A (C)	(L1A2) Top Evap L Noz Htr A Top Evap Duct Fwd,Aft Htrs B Hi Load Duct Outbd,Inbd Noz Htrs B		
(R2) • BLR CNTLR/HTR 2 – A	(R2) Hyd H2O Blr 2 Cntr B		
	8 (R13A2) PLBD: C/L Lat 13-16 Mtr 2 Stbd Aft Blkhd Mtr 2 Port Drive Mtr 2		
(Continued)	(Continued)		

EPS SSR-103 (Cont)
BUS LOSS: CNTLBC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(O8) • If Straight feed config, Right OMS Crossfeed A – OP (tb-OP). Otherwise, ✓ MCC	9 OMS Eng/Xfeed Vlv Redundancy		⑨ Maintains deorbit capability for MNC DA3 failure
Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O7) • AFT R RCS He PRESS B	10 (O8) F,R,RCS He Press Isol B man CL capability		⑩ Vlv holds position. Man OP and full GPC cntl remains ⑪ Do not reconfig for reg switch or I'CNCT procedures
11 (O8) • L OMS XFEED B • R OMS XFEED B • FWD RCS He PRESS B	10 (O8) L OMS Tk Isol B man CL capability 10 L,R OMS Xfeed Vlv B man CL capability		⑫ Manf status <u>not</u> automatically declared closed. Fail-offs will occur when jet commanded
If BC1,2,3 unpwr'd at same time: GNC 23 RCS Override F2 Manf status to CL: • RCS FWD – ITEM 1 EXEC • MANF VLVS 2 OVRD – ITEM 41 EXEC			⑬ NOZ Htr A not wired ⑭ Vlv normally closed. GPC cntl remains. Man override of GPC OP CMD is lost
For attitude control, perform RCS, LOSS OF VERNIERS (ORB OPS)	12 (O16) RCS Manf F5,L5,R5 RJD pwr (F5L,F5R,L5L,L5D,R5R,R5D)		
GNC 23 RCS • Reprioritize L,R Manf 1 Jets to first priority: DES INH twice, all other jets highest priority first, then next highest priority, etc • Set aft pod(s) PRI JET FAIL LIMIT to 3	(A14) Aft RCS L,R Jet 1 Htrs		
(A14) RCS/OMS HTR • FWD RCS – A AUTO • L POD (two) – A AUTO, B OFF • R POD (two) – A OFF, B AUTO	(A14) Fwd RCS Htrs B (all) L Pod Htrs B (all) R Pod Htrs A (all)		
13 (R11U) FC H2O • LINE HTR – A AUTO • RELIEF HTR – A AUTO	(R11U) FC H2O Line Htrs B Relief Htrs B Vent Line Htrs B Barrel Htrs B Rlf Noz Htrs B		
When reqd: • For FC2, perform FUEL CELL PURGE – AUTO (ORB OPS, EPS)	14 (R11U) FC2 Purge Vlv man Cntl		
Prior to using L(R) OMS: (O8) L, R OMS He PRESS/VAP • ISOL A (two) – OP, then • – GPC • B (two) – GPC	14 (O8) L,R OMS He Press Isol B man Cntl and VAP ISOL 1,2 Man B Cntl		
If CCTV reqd: (A7U) • TV PWR CONTR UNIT – MNA	(A7A1) Video Cntl Unit MNB pwr		
(Continued)	(Continued)		

EPS SSR-103 (Cont)
BUS LOSS: CNTLBC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
If EMU(s) in battery charge mode: (AW18H) • PWR/BATT CHGR EMU 1(2) BUS SEL – MNA	(FPC2/AW18H) EMU 1,2 Pwr/Batt Chgr MNB pwr		(15) Right Trim and Body Flap Cntl remains. Left Trim and Body Flap cntl function is regained after the lost contacts have been deselected in OPS-8 (3,B)
During OPS 8: GNC 43 CONTROLLERS Deselect L Pnl Trim L2: • DES PNL TRIM L2 – ITEM 37 EXEC Deselect L Bdy Flp UP/DN L2: • DES BDY FLP L2 – ITEM 20 EXEC	(F6A7) 15 L Trim RHC – INH capability 15 Pnl – ON capability (L2A1) 15 L Bdy Flp Cntl		(16) Vlv holds position (17) Vlv holds position. Loss of manual capability to inert LO2 and LH2 Manfs
For SSME Hyd Repress: (R4) • HYD MPS/TVC ISOL VLV SYS 1,3 (two) – OP • Wait 10 sec, then CL	(R4) 16 MPS/TVC Hyd Sys 2 Isol man Cntl		(18) Auto Cntl of these Htrs also lost if single Htr Ops and tank not paired. If five tk sets flown on OV102, O2 TK4 B Htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4 A,4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(F3) • TRIM RHC – ENA • PNL – OFF			
(R4) MPS • FILL/DRAIN LO2 INBD – GND • FILL/DRAIN LH2 OUTBD – GND	(R4) 17 Prplt F/D Inbd LO2 Vlv man OP capability 17 Prplt F/D Outbd LH2 Vlv man Cntl		(19) Vlv holds position. FC2 Redundant Reac Vlv Close Cntl on pnl C3 remains
(O15:A) • RGA 2 – OFF	(O15) RGA 2		(20) FC2 can be stopped via FC2 CNTLR sw on pnl O15:A
(R14:D) cb MNB • TV CONTR UNIT – op			
(A7U) PL BAY FLOOD • MID PORT – OFF • FWD STBD – OFF	(A7A1) PLB Mid Port Floodlt Fwd Stbd Floodlt		(21) Cntlrs A, B Rad Byp Vlv Mtrs Auto Cntl and Cntlr B Rad Byp Vlv Mtr Man Cntl remain
	(R1A2) 18 Cryo O2,H2 Tk2,4 Htrs A man On Cntl 16 Cryo O2,H2 Tk2 Manf Vlv Cntl		
	(R2) R MPS He isol B man Cntl		
	(A15) (OV105 only) Cryo O2,H2 Tk5 Htr B man On Cntl		
	(R1A2) 19 FC2 Reac Vlv Cntl via pnl R1 sw 20 FC2 Stop capability via START/STOP sw (pnl R1)		
	(C3) FC1 Redundant Reac Vlv Cntl		
	(L1A2) 21 Freon Loop 1 Cntlr A Rad Byp Vlv Mtr man Cntl		
	(Continued)		

EPS SSR-103 (Cont)
BUS LOSS: CNTLBC1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	22 (L2A1) Atm Press Cntl O2 Sys 2 Sply Vlv Cntl		22 Vlv holds position. Sys 1 remains
	(F8) R HUD Rt ADI Aft Ref Set capability (C3A5) L,R ADP Dpy Mtrs 2 Probe Htr Cntrl 2		23 Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
	(A8L,R13A2) Port RMS: MPM Mtr 2		24 Single mtr time
23	Fwd MRL Mtr 1		25
24	Mid MRL Mtr 2		<div style="border: 2px solid black; padding: 5px; text-align: center;"> WARNING </div> Driver pwr to F2 jets lost if RJDF 1A Driver sw OFF (pnl O15:F)
24	ROEU AC2 pwr to: Orbiter arm drive mtr (ODM mtr 2 - mate B, demate B, relax B) ODA mtr 2 latch/release		
24	(O6) -Y Star Trkr Dr Sys 2 CL capability -Z Star Trkr Dr Sys 1 OP/CL capability		26 Redundant pwr sply remains. Turbine speed ind lost
24	(O15) RJDF 1A F2 Manf Logic pwr (F2F,F2R,F2U,F2D)		27 Redundant RPC remains
25	(R2) APU 1 Cntrl Pwr Sply B Hyd Main Pump 2 Depress Solenoid RPC A		28 Vlv closes. Redundant vlv A remains
26	Hyd Main Pump 1 Depress Solenoid RPC B		29 Loss of redundant hyd NLG deploy and NWS redundancy
27	APU 1 Fu Tk Vlv B		30 Hyd Sys 1 still available for NWS
27	(F6A5,F8A5) NLG Ext 2 Fire 1, Fire 2 NLG,LMG,RMG Bkup Rel 2 Fire 1		31 Vlv holds position. GPC cntl remains. Loss of redundant hyd NLG deploy and NWS redundancy if failed closed
28	LG Extend Vlv 2		32 Mtr 1 remains
29	NWS Hyd Sys 2		33 Redundant stow initiate sig (CNTL CA1) to Ku-Band remains
30	(R4) Hyd Brake Isol 2 Man Cntl		34 Plt Dpy/Jett remains
31	(R13A2) Rad Cntl sys: Stbd Rad Lat 1-6 Mtr 2 Dpy/Sto Mtr 1 Port Rad Lat 1-6 Mtr 2		
32	(R13A2) PL Reten Sys B Rad/Lat Mtrs Ku Ant Sto/Dpy Mtr 2 Direct Stow Mtr 2		
33	Redundant Stow Initiate Signal to Ku-Band		
34	(F2,F3) CDR Dpy Fire 2 Jett Fire 2		
34			

MEDS

**EPS SSR-104
BUS LOSS: CNTLBC2**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A1L) S-BD PM ● ANT SW ELEC - 1 ● XPNDR - 1 ● PWR AMP OPER - 1 ● STBY - 1 ● PRE AMP - 1 NSP ● PWR - 1 If PSP and/or INTRG reqd for PL or ISS ops: ● S-BD PL PWR SYS - 1 ● CNTL - PNL ● - CMD ● Reconfig PSP ● Perform PL INTRG REACQ (if reqd)</p> <hr/> <p>(A1R) ● S-BD FM PWR - 1</p> <hr/> <p>If no comm: (C3) ● S-BD PM CNTL - PNL ● - CMD</p>	<p>(A1A2) S-BD PM Sys 2: Xpndr 2 Pre Amp 2, Pwr Amp 2 PM and FM Ant sw 2</p> <p>NSP 2/COM SEC 2</p> <p>S-BD PL Intrg 2 PSP 2</p>	<p>All S-BD A/G voice lost if sys 2 selected CRT 2 blanks</p> <p>(F7) RCS JET C/W It - on SM ALERT Light/Tone - on</p> <p>(FSMs) S86 APU/HYD W/B SM0 THRM HYD (B) BCE STRG 3 NSP (if using NSP 2) S67 CNTL/ESS V DISPLAY SW R F,L,R RCS(F,R,L,U,D) JET I/O ERROR CRT2</p>	<p>① If S-BD PM Sys 2 being used at time of bus failure, A/G comm capabilities lost until Sys 1 selected</p> <p>② Indications do not appear until jets commanded</p> <p>③ REACQ and PSP reconfig procedures are flight specific. If reqd, procedures can be found in payload or ISS specific books</p> <p>④ Indication appears only during site AOS and using antenna miscompares</p> <p>⑤ OIU 1 interfaces with PSP 1 for commanding</p> <p>⑥</p>
<p>If OIU reqd: (SSP) ● OIU PWR - OIU 1 ON ● OIU tb - UP ● ✓ MCC, OIU reconfig</p>		<p>SM 67 ELECTRIC CNTL BC2 Volts < 20</p> <p>If site AOS and using S-BD Ant Elec 2: 'ANTENNA' (2)</p>	<p>⑦</p> <p>* TIME CRITICAL *</p>
<p>(A12) APU HTR ● GAS GEN/FUEL PUMP 2 - B AUTO APU HTR TK/FU LINE/H2O/ ● SYS 1A - AUTO ● 1B - OFF ● 2A - OFF ● 2B - AUTO HYD HTR ● ELEV A - AUTO ● B - OFF ● CIRC PUMP PWR 2 - MNC</p>	<p>(A12) APU 2 GG/Fu Pump Htrs A 1 Tk/Fu Line Htrs B</p> <p>APU GG Inj H2O Tank Htrs B</p> <p>APU 2 Tk/Fu Line Htrs A</p> <p>Elevon Actr Htrs B (R2) Circ Pump 2 MNB pwr</p>	<p>(L1) If H2O PUMP LOOP 1,B active: C/W H2O LOOP It 'S88 H2O PUMP P1' 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP'</p> <p>(O1) H2O PUMP OUT PRESS LOOP 1 - 20-25 psia</p> <p>During Rad Dpy/Sto: (R13L) RAD LAT CNTL tbs (two) indicate single mtr ops RAD CNTL STBD tb indicates single mtr ops</p>	<p>If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p> <p>⑦ Sec Cntrl Man ON Sel capability remains. Pri A,B Cntrls remain</p> <p>⑧ Single mtr time</p> <p>⑨ Pwr to MCA Drivers lost through ENABLE sw</p>
<p>(L4:F) ● cb AC1 H2O LOOP PUMP 1A/2 (three) - cl</p>		<p>STAR TRKR DR POS -Y OP/CL time incr from 8 to 16 sec</p> <p>STAR TRKR DR POS -Z CL time incr from 8 to 16 sec</p>	
<p>(L1) ● H2O PUMP LOOP 1 - A</p> <p>If using Sec Cntrl: ● FLASH EVAP CNTLR SEC - ON ● TOP EVAP HTR DUCT - A If Hi Load Evap enabled: ● HI LOAD DUCT HTR - A(C)</p>	<p>(L1A2) H2O Loop 1 Pump B man ON capability</p> <p>7 FES Sec Cntrl GPC Sel capability Top Evap Duct Fwd,Aft Htrs B</p> <p>Hi Load Duct Outbd,Inbd Noz Htrs B</p>	<p>(F7) If APUs active and using H2O BLR CNTLR/HTR 2B: C/W APU TEMP It - on after -2 min</p> <p>If sys pwrd: 'S62 BCE BYP PSP 2' Loss of PL TLM and CMD If PDI FDA enabled: 'S62 PDI DECOM FAIL'</p>	
<p>(L2) ● FLASH EVAP FDLN HTR A SPLY - 1</p>	<p>(L2A1) FES H2O Fdln A Htrs 2 (all)</p>	<p>SM (BFS SM 63) PL BAY DOORS</p> <p>During PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	
	<p>ROEU AC2 pwr to: Orbiter arm drive mtr (ODM mtr 2 - mate B, demate B, relax B) ODA mtr 2 latch/release</p>		
	<p>(R13A2) PLBD: Port,Stbd Fwd Blkhd Mtrs 2 Stbd Door Mtr 2</p>		
(Continued)	(Continued)		

MEDS

EPS SSR-104 (Cont)
BUS LOSS: CNTLBC2

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
11	Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O8) • L OMS XFEED B • R OMS XFEED B	(O8) 10 F,R RCS He Pr Isol B man Cntl, GPC CL capability 12 L OMS Tk Isol B man CL capability 12 L,R OMS Xfeed Vlv B man CL capability		(10) Vlv holds position. GPC OP capability remains. Isol A remains (11) Do not reconfig for reg switch or I'CNCT procedures (12) Vlv holds position. Man OP and full GPC Cntl remains (13) Vlv holds position (14) If five tk sets flown on OV102, O2 TK4B Htrs are disconnected and associated avionics are connected to TK5A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4A, 4B Htrs are wired in parallel to TK5A and TK5B Htrs (15) Loss of redundant port to the following: MDU CDR 2 (S) MDU MFD 1 (P) MDU PLT 1 (P) MDU PLT 2 (S) MDU AFD 1 (S)
	(R1) If Tk2 in use: O2,H2 TK2 • HTR A (two) – OFF • B (two) – AUTO	(R1A2) 13 Cryo O2,H2 Tk2 Manf Vlv Cntl Cryo O2,H2 Tk2 Htrs A		(16) Manf status not automatically declared closed. Jet fail-offs may occur (17) When SM not available, use NSP block to inhibit UL cmds. 'BCE STRING 1(3) NSP' annunciates and it requires GNC I/O RESET after UPLK – ENA for AOS
	(A11) If not OV102 and Tk4 in use: O2,H2 TK4 • HTR A (two) – OFF • B (two) – AUTO	(A11) 14 Cryo O2,H2 Tk4 Htrs A		
	(R1) • O2 TK3 HTR A – AUTO • H2 TK3 HTR A,B – AUTO			
	(A11) If OV102 and O2,H2 TK4/5 in use: • O2 HTR TK4,TK5 (two) – OFF • H2 HTR TK4/5 A,B (two) – OFF			
	Refer to EPS 7.6 CRYO TABLE A for switch nomenclature			
	(R2) • BLR CNTLR/HTR 2 – A	(R2) Hyd H2O Blr 2 Cntlr B		
	(C2) • R IDP/CRT SEL – 3 • GPC/CRT O2 EXEC	(C2A2) 15 MDU CRT 2 IDP 2		
		(C3) FC1 Redundant Reac Vlv Close Cntl		
	GNC 23 RCS			
	16	Override F2 Manf status to CL: • ITEM 1,41 EXEC • For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS)	(O15) RCS Manf F2 RJD pwr (F2F,F2R,F2U,F2D) 16 (O16) RCS Manf F5/R5/L5 RJD pwr (F5L,F5R,L5L,L5D,R5R,R5D)	
17		No SM GPC and LOS: (C3) • UPLK – NSP BLK	(C3A5) 17 Uplink switch GPC Block of UL Cmd capability	
	Place PLT disp sws (eight) to green dot position: (F8) • AIR DATA – NAV • ADI ATT – LVLH • ERR – MED • RATE – MED • HSI SEL MODE – ENTRY • HSI SEL SOURCE (two) – NAV 3 • RADAR ALTM – 1	(F8) Air Data Source Sel capability R ADI Att, Err, Rate Sel capability R HSI Mode, Source Sel capability R Radar ALTM Sel capability		
(Continued)		(Continued)		MEDS

EPS SSR-104 (Cont)
BUS LOSS: CNTLBC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
When reqd: • For FC2, perform FUEL CELL PURGE – AUTO (ORB OPS, EPS)	18 (R11U) FC2 Purge Vlv man Cntl		⑬ Vlv holds position ⑱ Vlv normally closed
(A6U) If SENSE – –Z: • SENSE – –X • Wait 1 sec, reposition as desired	19 (A6A1) 3–Level sw RM for –X Sense		⑲ RM sw downmodes to 2–level for –X position ⑳ Left Trim and Body Flap control remains. Right Trim and Body Flap cntl function is regained after the lost contacts have been deselected in OPS–8 (3,B)
During OPS 8: GNC 43 CONTROLLER Desel R Pnl Trim R2: • DES PNL TRIM R2 ITEM 39 EXEC Desel R Bdy Flp up/dn R2: • DES BDY FLP UP/DN R2 ITEM 22 EXEC	20 (F8) R Trim RHC INH capability 20 R Trim Pnl ON capability (C3A1) 20 R Bdy Flp UP/DN capability		
For SSME Hyd Repress: (R4) • HYD MPS/TVC ISOL VLV SYS 1,2 – OP, wait 10 sec, then CL	13 (R4) MPS/TVC Hyd Sys 2 Isol man Cntl		㉑ Sys B Sec Cntlr man ON capability remains ㉒ A Htrs remain ㉓ B Htrs remain
If reqd during entry (< 120K ft): (L1) • NH3 CNTLR A – PRI/GPC If reqd for Post Rollout: (L1) • NH3 CNTLR B – SEC/ON	21 (L1A2) NH3 SYS B Pri Cntlr and Auto Swover to Sec Cntlr		㉔ Vlv holds position. Loss of manual capability to inert LO2 Manf
If NH3 CNTLR A(B) – SEC/ON reqd, then: (L1) H2O PUMP • LOOP 1 (two) – ON, A(B) • LOOP 2 – ON • ✓ FLOW PROP VLV LOOP (two) – ICH • Activate PL H2O loop(s) (if applicable)			
(A14) RCS/OMS HTR • FWD RCS – A AUTO • L POD (two) – A AUTO, B OFF • R POD (two) – A OFF, B AUTO	22 (A14) Fwd RCS B Htrs (all) 22 L Pod B Htrs (partial) 23 R Pod A Htrs (partial)		
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
• MDU CRT 2 PWR – OFF			
(C2) • IDP/CRT2 PWR – OFF			
(F3) • R TRIM RHC/PNL – ENA • PNL – OFF			
(R2) • MPS He I'CONNECT L – GPC	(R2) L MPS He Intercon Vlv man Cntl		
(R4) • MPS FILL/DRAIN LO2 INBD – GND	24 (R4) MPS Prplt F/D Inbd LO2 Vlv man OP capability		
	(Continued)		

MEDS

EPS SSR-104 (Cont)
BUS LOSS: CNTLBC2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	(O16) 25 ASA 4 Isol Driver pwr		⑧ Single mtr time
	(L2A1) 13 Atm Press Cntl O2 Sys 2 Sply Vlv Cntl		⑬ Vlv holds position
	(R1A2) 26 FC2 Reac Vlv Cntl via pnl R1 sw		⑵⑤ Six vlvs fail to non-isolation position
	27 FC2 STOP capability via START/STOP sw (pnl R1)		⑵⑥ Vlv holds position. FC2 Redundant Reac Vlv Close Cntl on pnl C3 remains
	(R2) C MPS He Isol B man Cntl		⑵⑦ Able to stop FC2 via FC2 CNTLR sw (pnl O15:A)
	(A6A1) 28 R ADI Att Ref set capability Aft Pnl Trans X,Y Norm and Pulse Sel capability		⑵⑧ Use Fwd pnl C3 pbs
	28 Aft Pnl Trans Z High,Norm, and Pulse Sel capability		⑵⑨ Redundant mtrs remain
	28 Aft Pnl Trans Low Z Sel capability		⑵⑩ Htr Cntrls 1 remain
	28 Aft Pnl Rot Roll,Pitch,Yaw Disc Rate, and Pulse Sel capability		⑵⑪ Sys 1 remains
	28 Aft Pnl PRI,ALT,VERN Sel capability		⑵⑫ Hyd Sys 1 still available for NWS
	28 Aft Pnl PCT Exec capability		⑵⑬ Loss of redundant hyd NLG deploy and NWS redundancy
	(R13A2) 29 Rad Cntl Sys: Port,Stbd Lat 1-6 Mtr 2 Stbd Dpy/Sto Mtr 1		⑵⑭ Mtr 1 remains
	(C3A5) 29 L,R ADP Dpy Mtrs 2 30 Htr Cntrls 2		⑵⑮ Redundant pwr sply remains. GG Bed T and GBX P ind lost when APU running
	(O6) 29 -Y Star Trkr Dr Sys 2 OP/CL capability		⑵⑯ Redundant RPC remains
	29 -Z Star Trkr Dr Sys 1 CL capability		⑵⑰ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
	(F6A5, F8A5) 31 NLG Bkup Release,Extension Sys 2		
	31 LMG, RMG Bkup Release Sys 2		
	32 NWS Hyd Sys 2		
	33 LG Extend Vlv 2		
	(R13A2) PL Reten Sys B Rel/Lat Mtrs		
	(R13A2) 34 Ku Ant Sto/Dpy Mtr 2 Direct Sto Mtr 2		
	(R2) 35 APU 2 Cntrl pwr Sply A APU 2 GBX GN2 Repress Vlv		
	36 Hyd Main Pump 2 Depress Solenoid RPC A		
	36 Hyd Main Pump 1 Depress Solenoid RPC B		
	(R13A2) Port RMS: 37 MPM Mtr 2 8 Fwd MRL Mtr 1 8 Mid MRL Mtr		
	(Continued)		

MEDS

EPS SSR-104 (Cont)
BUS LOSS: CNTLBC2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	<p>(O17) Freon Loop 1 Cold Plate Flow Xdcr Aft PL MNB current Xdcr</p> <hr/> <p>(R2) 38 APU 2 Fu Tk Vlv B</p> <hr/> <p>(F2,F3) 39 CDR Dpy Fire 1 39 Jett Fire 1</p>		<p>③⑧ Vlv closes. Redundant Vlv A remains</p> <p>③⑨ PLT Dpy/Jett remains</p>

MEDS

EPS SSR-105

BUS LOSS: CNTLBC3 (Includes MNB FMC2, MNB MMC1, MNB MMC2, MNB MMC3, MNB MMC4, MNB AMC2)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A12)</p> <p>1 APU HTR</p> <ul style="list-style-type: none"> • GAS GEN/FUEL PUMP 2 – A AUTO • LUBE OIL LINE 2 – A AUTO <p>1 APU HTR TK/FU LINE/H2O/</p> <ul style="list-style-type: none"> • SYS 1A – AUTO • 1B – OFF • 2A – OFF • 2B – AUTO <p>1 HYD HTR</p> <ul style="list-style-type: none"> • RUD SPD BK A – AUTO • B – OFF <p>1 HYD</p> <ul style="list-style-type: none"> • CIRC PUMP PWR 2 – MNB 	<p>(A12)</p> <p>APU 2 GG/Fu Pump Htr B</p> <p>2 Lube Oil Line Htrs B</p> <p>1 Tk/Fu Line Htr B</p> <p>APU 2 Tk/Fu Line Htr A</p> <p>Rud/Spd Bk Htr B</p> <p>Circ Pump 2 MNC pwr</p>	<p>SM ALERT Light/Tone – on S67 CNTL/ESS V</p> <p>SM 67 ELECTRIC</p> <p>CNTL BC3 Volts < 20</p> <p>(FSM)</p> <p>RM DLMA MANF</p> <p>2 (O8)</p> <p>FWD RCS MANF ISOL 2</p> <p>tb – bp</p> <p>If H2O PUMP LOOP 1,B – ON:</p> <p>C/W H2O LOOP It – on 'S88 H2O PUMP P 1' 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP'</p> <p>(O1)</p> <p>H2O PUMP OUT PRESS LOOP 1 meter ind – 20–25 psia</p> <p>(F7)</p> <p>If APUs active and using H2O BLR CNTLR/HTR 1A or 2A:</p> <p>C/W APU TEMP It on after ~2 min</p> <p>During Rad Dpy ops: (R13L)</p> <p>RAD CNTLR tbs (two) indicate single mtr ops</p> <p>L,R ADP deploy time incr from 15 to 30 sec</p> <p>STAR TRKR DR POS (two) OP/CL time incr from 8 to 16 sec</p> <p>SM (BFS SM 63) PL BAY DOORS</p> <p>If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG'</p> <p>During MAN PLBD OP/CL, single mtr run time noted on actuators listed at left</p> <p>(A8L)</p> <p>Port RMS:</p> <p>DPY/STO tb – bp</p> <p>RETEN LAT tb – bp</p> <p>R-F-L FWD tb – bp</p> <p>SM 94 PDRS CONTROL</p> <p>Indications lost:</p> <p>MPM Mtr 2 STO/DPY</p> <p>Fwd MRL Mtr 1 LAT/REL/RDY</p> <p>Mid MRL Mtr 2 LAT/REL/RDY</p>	<p>①</p> <p>* TIME CRITICAL *</p> <p>If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p> <p>② Vlv holds position</p> <p>③ In OPS 2, FES GPC cmd is not present, but one may be sent if reqd</p> <p>④ Sec Cntrl On sel capability remains. Pri A,B Cntrls remain</p> <p>⑤ If AC2 cbs not opened, Lat Mtrs 2 of actuators for Port,Stbd Rad Lat 1–6 continue to run until Sys B Lat Cntl sw placed to OFF. Other equip pwr'd by AC2 MMC2 and AC2 MMC4 lost because of MNB MMC2 and MNB MMC4 loss</p> <p>⑥ Sys A Sec Cntrl man On capability remains</p>
<p>(A14)</p> <ul style="list-style-type: none"> • RCS/OMS HTR OMS CRSFD LINES – A AUTO, B OFF 	<p>(A14)</p> <p>OMS Crsfd Ln Htrs B (all)</p>		
<p>(L4:F)</p> <ul style="list-style-type: none"> • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl 			
<p>3 (L1)</p> <ul style="list-style-type: none"> • H2O PUMP LOOP 1 – A • FLASH EVAP CNTLR SEC – GPC (if using Sec Cntrl) • TOP EVAP HTR NOZ R – B AUTO • TOP EVAP HTR DUCT – A(C) <p>If HI LOAD EVAP enabled:</p> <ul style="list-style-type: none"> • HI LOAD DUCT HTR – A(C) 	<p>4 (L1A2)</p> <p>H2O Loop 1 Pump B</p> <p>4 FES Sec Cntrl man On Sel capability</p> <p>Top Evap R Noz Htr A</p> <p>Top Evap Duct Fwd,Aft L,R Htrs B</p> <p>Hi Load Duct Outbd,Inbd Htrs B</p>		
<p>(R2)</p> <ul style="list-style-type: none"> • BLR CNTLR/HTR 1,2 (two) – B <p>Refer to OMS/RCS Slide Rule for vlv loss info</p> <p>Do not perform if BC1,2,3 unpwrd at same time:</p> <p>GNC 23 RCS</p> <p>Override F2 Manf status to OP:</p> <ul style="list-style-type: none"> • RCS FWD – ITEM 1 EXEC • MANF VLVS 2 OVRD – ITEM 41 EXEC 	<p>(R2)</p> <p>Hyd H2O Blr 1,2 Cntrl A</p>		
<p>5 (MA73C:C,D)</p> <ul style="list-style-type: none"> • cb MCA PWR AC2 3Φ MID 2,4 (two) – op <p>For PLBD ops:</p> <ul style="list-style-type: none"> • OP/CL Drs in man mode 	<p>5 (MA73C)</p> <p>Stbd,Port Rad Lat 1–6 Mtr 2 Limit sw</p> <p>(MA73C)</p> <p>PLBD:</p> <p>C/L Lat 13–16 Mtr 2</p> <p>Stbd Aft Blkhd Mtr 2</p> <p>Port Drive Mtr 2</p> <p>Port,Stbd Fwd Blkhd Mtr 2</p> <p>Stbd Door Mtr 2</p> <p>Port,Stbd Door Mtr 1 CL Limit sw</p>		
<p>If reqd during entry (< 120K ft):</p> <p>(L1)</p> <ul style="list-style-type: none"> • NH3 CNTLR B – PRI/GPC 	<p>6 (L1A2)</p> <p>NH3 Sys A Pri Cntrl and Auto Swover to Sec Cntrl</p>		
<p>(Continued)</p>	<p>(Continued)</p>		

MEDS

EPS SSR-105 (Cont)
BUS LOSS: CNTLBC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>If NH3 CNTLR A(B) – SEC/ON reqd, then: (L1) H2O PUMP ● LOOP 1 (two) – ON, A(B) ● LOOP 2 – ON ● ✓ FLOW PROP VLV LOOP (two) – ICH If applicable: ● Activate PL H2O LOOP(s)</p>	<p>(MA73C) Port RMS: 7 MPM Mtr 2 8 Fwd MRL Mtr 1 8 Mid MRL Mtr 2</p>		<p>⑦ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison</p> <p>⑧ Single mtr time</p> <p>⑨</p>
<p>BUS ISOLATION ONLY ON MCC CALL, PERFORM (L1) ● SMOKE DETN CKT TEST – OFF</p>	<p>(L1A1) Smoke Detn Test capability (all dets)</p>		<p>WARNING Driver pwr to F4/F5 Jets lost only if both RJDF 2B and L5/F5/R5 Driver sws (pnl O16:F) OFF simultaneously</p>
	<p>9 (O16) RJDF 2B F4/F5 Manf Logic pwr (F4R,F4D,F5L,F5R)</p> <p>10 (O17) TVC 3 Isol ME 10 4 Isol ME</p> <p>11 (R1A2) Man ON Cntl of Cryo O2,H2 Tk 2,4 Htrs B</p> <p>(A15) (OV105 only) Cryo O2, H2 Tk5 Htr B</p> <p>(MA73C) L Vents 1,2,3,5,8,9 Mtrs 2 R Vents 1,2,6,8,9 Mtrs 2</p> <p>12 (C3A6) Fwd Pnl Trans X,Y Norm, Pulse, Fwd Pnl Rot Roll, Pitch,Yaw Disc Rate, Pulse Sel capability</p> <p>12 Fwd Pnl Trans Low Z Sel capability</p> <p>12 Fwd Pnl Trans Z High, Norm, Pulse Sel capability</p> <p>12 Fwd Pnl PRI,ALT,VERN Sel capability</p> <p>12 Fwd Pnl PCT Exec capability</p> <p>(R2) Pneu He Isol 2 man Cntl L MPS He Isol A man Cntl (F6A5, F8A5) NLG, LMG, RMG Bkup Rel Sys 1, NLG Pyro Extension Sys 1</p> <p>13 (MA73C) Port,Stbd Rad Mtrs 2 Dpy capability –Y Star Trkr Dr Sys 2 OP/CL capability –Z Star Trkr Dr Sys 1 OP/CL capability L,R ADP Htr Cntr 2 Deploy Mtrs 2 Deploy Disc 2</p>		<p>⑩ Six vlvs fail to non-isolation position</p> <p>⑪ Auto Cntl of these Htrs also lost if single Htr Ops and tank not paired. If five tk sets flown on OV102, O2 TK4 B Htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4 A,4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs</p> <p>⑫ Use pb on AFT pnl A6</p> <p>⑬ Stow capability remains</p>
	(Continued)		

MEDS

EPS SSR-105 (Cont)
BUS LOSS: CNTLBC3

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	14 (MA73C) ET Door Mtrs: C/L Lat Actr 1 Mtr 2 GPC Cntl L Dr Uplock Lat Mtr 2 GPC Lat capability R Dr Uplock Lat Mtr 2 GPC Lat capability R Dr Closure Mtr 2 GPC CL capability		①④ Redundant mtrs remain ①⑤ With inoperative limit sw, mtr will continue to run until DPY/STO sw is placed to GND position ①⑥ MNC MMC2 pwr for Ku-Bd Xmit Enable signal remains ①⑦ MNC MMC2 pwr remains to supply pwr to Boom stow enable II signal for stow mtrs ①⑧ Vlv closes. Redundant Vlv A remains
	(MA73C) AC pwr removal capability via Limit sw for ET Dr Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Uplock Lat Mtr 2 Closure Mtr 2		
	15 (MA73C) Ku Ant Sto/Dpy Mtr 2 Sto and Dpy Limit sw		
	16 Redundant Ku-Bd Xmit Enable Signal		
	17 Redundant Ku-Bd Boom Stow Enable II Excitation Signal		
18 (R2) APU 3 Fu Tk Vlv B			

MEDS

**EPS SSR-106
BUS LOSS: CNTLCA1**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A12) APU HTR 1 • GAS GEN/FUEL PUMP 2 – A AUTO 1 • GAS GEN/FUEL PUMP 3 – B AUTO • LUBE OIL LINE 3 – B AUTO APU HTR TK/FU LINE/H2O/ 1 • SYS 2A – AUTO 1 • 2B – OFF 1 • 3A – OFF 1 • 3B – AUTO HYD HTR • AFT FUS A – AUTO • B – OFF HYD CIRC PUMP PWR • 2 – MNB • 3 – MNA</p>	<p>(A12) APU 2 GG/Fu Pump Htr B APU 3 GG/Fu Pump Htr A 3 Lube Oil Ln Htr A 2 Tk/Fu Ln Htr B APU 3 Tk/Fu Ln Htr A Aft Fuselage Htrs B Circ Pump 2 MNC pwr 3 MNC pwr</p>	<p>(F7) SM ALERT Light/Tone – on CRT 3 blanks (FSMs) S69 FC REAC S67 CNTL BUS V I/O ERROR CRT3 SM 67 ELECTRIC CNTL CA1 < 20 V During Rad Dpy/Sto ops: (R13L) RAD CNTL PORT tb indicates single mtr ops RAD LAT CNTL STBD tb indicates single mtr ops R ADP deploy time incr from 15 to 30 sec PLB Floodlts lost: Mid Stbd Aft Port Docking (F7) If APUs active and using BLR CNTLR/HTR 3B: C/W APU TEMP It – on after ~2 min</p>	<p>① TIME CRITICAL If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ② Pri A man On Sel capability remains. Pri B and Sec Cntrs remain ③ Loss of redundant port to the following: MDU CDR 1 (P) MDU MFD 1 (S) MDU MFD 2 (S) MDU AFD 1 (S) MDU PLT 2 (P) ④ Wrong FDA limit set is selected by SM preconditioning software due to loss of H2O Loop 2 pump On switch scan ⑤ Do not reconfig for reg switch or I'CNCT procedures</p>
<p>(L1) • H2O PUMP LOOP 2 – ON • H2O PUMP LOOP 1 – GPC • FLASH EVAP CNTLR PRI A – ON (if using A Cntr) • TOP EVAP HTR NOZ R – A AUTO If HI LOAD EVAP enabled: • HI LOAD DUCT HTR – A(B)</p>	<p>(L1A2) H2O Loop 2 Pump GPC Cntl 2 FES Cntr Pri A GPC Sel capability Topping Evap R Noz Htr B Topping Evap Duct L,R Fwd, Aft Htr C Hi Load Duct Inbd,Outbd Htrs C</p>	<p>(L2A1) FES H2O Fdln B Htrs 2 (all)</p>	
<p>(L2) • FLASH EVAP FDLN HTR B SPLY – 1</p>		<p>SM (BFS,SM) 63 PL BAY DOORS During PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	
<p>(C2) • L IDP/CRT SEL – 1 • R IDP/CRT SEL – 2 • GPC/CRT 03 EXEC</p>	<p>(C2A2) MDU CRT 3 3 IDP 3</p>	<p>4 SM 88 APU/ENVIRON THERM H2O LOOP 2 PUMP ΔP↑</p>	
<p>(R2) • BLR CNTLR/HTR 3 – A • If BFS in GPC 3 or 5, move BFS • If BFS in GPC 1, 2, or 4; and if engage reqd, use pb CDR RHC</p>	<p>(R2) Hyd H2O Blr 3 Cntr B (F6A5) GPC 3,5 engage capability PLT BFS engage capability</p>		
<p>If CA1,2,3 unpwr'd at same time: GNC 23 RCS Override F3 Manf status to CL: • RCS FWD – ITEM 1 EXEC • MANF VLVS 3 OVRD – ITEM 42 EXEC</p>	<p>(O16) RCS Manf F3 RJD pwr (F3F, F3L,F3U,F3D)</p>		
<p>(A14) • RCS/OMS HTR R POD (two) – A AUTO, B OFF</p>	<p>(A14) R Pod Htrs B (all)</p>		
<p>5 Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O7) • AFT L RCS He PRESS B • TK 1/2 • XFEED 1/2 • R RCS TK 1/2 • XFEED 1/2</p>	<p>(O7) Aft L RCS He Press Isol B man CL capability Aft L,R RCS Tk Isol 1/2 man CL capability Aft L,R RCS Xfeed Vlv 1/2 man CL capability</p>		
<p>(Continued)</p>	<p>(Continued)</p>		<p>MEDS</p>

EPS SSR-106 (Cont)
BUS LOSS: CNTLCA1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(O8) • R OMS TK ISOL B	(O8) R OMS Tk Isol B man CL capability		⑥ Vlv normally closed
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">GNC 23 RCS</div> <ul style="list-style-type: none"> • Reprioritize L,R Manf 3 Jets to first priority: DES INH twice all other jets, highest priority first, then next highest, etc • Set aft pod(s) PRI JET FAIL LIMIT to 3 	(A14) Aft RCS L,R Jet 3 Htrs		⑦ Sys B Pri Cntrl, auto switchover to Sec Cntrl remain
When reqd: • For FC3, perform FUEL CELL PURGE – AUTO (ORB OPS, <u>EPS</u>)	6 (R11U) FC3 Purge Vlv man Cntl		⑧ Loss of manual capability to inert LO2 Manf
Prior to using L OMS: (O8) L OMS He PRESS/VAP ISOL • A – GPC • B – OP	(O8) L OMS He Press Isol A man Cntl, He Vap Isol 1,2 man A Cntl		⑨ Six vlvs fail to non-isolation position
For SSME Hyd Repress: (R4) • HYD MPS/TVC ISOL VLV SYS 1,2 – OP, wait 10 sec, then CL	(R4) MPS/TVC Hyd Sys 3 Isol man Cntl		⑩ Redundant mtr remains
If reqd during entry (< 120K ft): (L1) • NH3 CNTLR A(B) – PRI/GPC	7 (L1A2) NH3 Sys B Sec Cntrl man On capability		⑪ Htr Cntrl 2 remains
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
• MDU CRT 3 PWR – OFF			
(C2) • IDP/CRT3 PWR – OFF			
(R2) • MPS He I'CONNECT R – GPC	(R2) R Eng He Intercon Vlv man Cntl		
(R4) • MPS FILL/DRAIN LO2 OUTBD – GND	8 (R4) Prplt F/D Outbd LO2 Vlv man Cntl		
(O16:A) • RGA 3 – OFF	(O16) RGA 3		
	9 (O17) ATVC 1 Isol ME		
(A7U) PL BAY • FLOOD AFT PORT – OFF • MID STBD – OFF • DOCKING – OFF RMS • SPOT PORT – OFF	(A7A1) PLB Floodlts Aft Port Mid Stbd Docking RMS Spot Port		
	10 (C3A5) R ADP Dpy Mtr 1 11 Htr Cntrl 1		
	12 (R1A2) FC3 Reac Vlv Cntl via pnl R1 sw		
	13 FC3 STOP capability via START/STOP sw		
	(Continued)		

MEDS

EPS SSR-106 (Cont)
BUS LOSS: CNTLCA1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	(C3) FC2 Redundant Reac Vlv Close Cntl		⑩ Redundant mtr remains
	14 (R1A2) Cryo O2,H2 Tk1 Htrs A man On and Tk3 Htrs B man On Cntl		⑭ Auto Cntl of these Htrs also lost if single Htr Ops and tank not paired
	(R2) L MPS He Isol B man Cntl		⑮ Pwr to MCA Drivers lost through ENABLE sw
	14 (R13A2) Cryo O2,H2 Tk5 Htr A man On Cntl Pallet Cryo Tk 6,9 Htr B man On Cntl		⑯ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists
	15 (R13A2) PLBD: C/L Lat 1-4, 5-8 Mtrs 2 Port Aft Blkhd Mtr 2		⑰ Cntrlrs A, B Rad By Vlv Mtrs Auto Cntl and Cntrl B Rad By Vlv Mtr Man Cntl remain
(A15) ● PALLET HTR B - OFF ● A - AUTO	(A15) Pallet Structure Htr B Stbd		⑱
	16 (A8L) Port RMS: Fwd MRL Mtr 2 16 Mid MRL Mtr 2 16 Aft MRL Mtr 1		⑲ Redundant coils remain
	17 (L1A2) Freon Loop 2 Cntrlr A Rad By Vlv Mtr man Cntl		⑳ R OMS auto shdtn if Pc < 80% and '↓' on MNVR EXEC display
	(A6A1) Aft ADI Att ref set capability		⑲ Redundant coils remain
	18 (O16) RJDF 2A F3 Manf Logic pwr (F3L,F3D,F3U,F3F)		⑳ R OMS auto shdtn if Pc < 80% and '↓' on MNVR EXEC display
	19 (C3A1) R OMS Eng Pr Vlv Coil 1 and Cntl Vlv 1,2 Coils 1		⑲ Redundant coils remain
	20 R OMS Arm 1, Arm/Press 1 sw contacts		⑳ R OMS auto shdtn if Pc < 80% and '↓' on MNVR EXEC display
	21 (R4) Hyd Brake Isol 3 man Cntl (F6A5,F8A5)		⑲ Redundant coils remain
	22 LG Extend Vlv 1		⑳ R OMS auto shdtn if Pc < 80% and '↓' on MNVR EXEC display
	23 NWS Hyd Sys 1		⑲ Redundant coils remain
	10 (O6) -Z Star Trkr Dr Sys 2 OP/CL capability		⑲ Redundant coils remain
	(R13A2) Rad Cntl Sys: Stbd Rad Lat 7-12 Mtr 2 Port Rad Dpy/Sto Mtr 2		⑲ Redundant coils remain
	10 (R2) ET Door Mtrs: C/L Lat Actr 1 Mtr 1 man Sto capability C/L Lat Actr 2 Mtr 1 man Sto capability L Dr Closure Mtr 2 man Cntl L Dr Uplock Lat Mtr 1 man Cntl R Dr Uplock Lat Mtr 1 man Cntl		⑲ Redundant coils remain
(Continued)			⑲ Redundant coils remain

WARNING

Driver pwr to F3
Jets lost if RJDF 2A
Driver sw OFF
(O16:F)

⑲ Redundant coils
remain

⑳ R OMS auto
shdtn if Pc < 80% and
'↓' on MNVR EXEC
display

CAUTION

No Purge. Wait 10
min between burns

⑳ R OMS auto
shdtn if Pc < 80% and
'↓' on MNVR EXEC
display

⑲ Redundant coils
remain

⑳ R OMS auto
shdtn if Pc < 80% and
'↓' on MNVR EXEC
display

⑲ Redundant coils
remain

⑲ Redundant coils
remain

⑲ Redundant coils
remain

⑲ Redundant coils
remain

MEDS

EPS SSR-106 (Cont)
BUS LOSS: CNTLCA1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	24 (R13A2) Ku Ant Sto/Dpy Mtr 1 Direct Sto Mtr 1		(24) Mtr 2 remains
	25 (R13A2) Redundant Sto Initiate Signal to Ku-Band		(25) Redundant stow initiate sig (CNTL BC1) to Ku-Band remains
	(O17) Freon Loop 2 Cold Plate Flow Xdcr		(26) Vlv fails closed. Redundant vlv remains
26 (R2) APU 1 Fu Tk Vlv B			(27) Redundant RPC remains
27 Hyd Main Pump 3 Depress Solenoid RPC A			(28) CDR Dpy/Jett remains
27 Hyd Main Pump 2 Depress Solenoid RPC B			
	(O17) Aft PL MNC current Xdcr		
28 (F3,F4) PLT Dpy Fire 2			
28 Jett Fire 2			

MEDS

EPS SSR-107 (Cont)
BUS LOSS: CNTLCA2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>7 Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O7) • AFT L,R RCS TK 1/2 • XFEED 1/2</p>	<p>(O7) AFT L RCS: Tk Isol 1/2 man CL capability He Press Isol B man Cntl, GPC CL capability Xfeed vlv 1/2 man CL capability AFT R RCS: Tk Isol 1/2 man CL capability Xfeed Vlv 1/2 man CL capability (O8) R OMS Tk Isol B man CL capability FWD RCS: Tk Isol 1/2 man CL and man Ovr of GPC CL capability</p>		<p>⑦ Do not reconfig for reg switch or I'CNCT procedures ⑧ Vlv normally closed ⑨ Manf status <u>not</u> automatically declared closed. Jet fail-offs may occur ⑩ RM sw downmodes to 2-level for -X position</p>
<p>When reqd: • Perform FC3 purges in AUTO mode (ORB OPS)</p>	<p>8 (R11U) FC3 Purge Vlv man Cntl</p>		
<p>(A6U) • ADI ATT – LVLH • ERR – MED • RATE – MED</p>	<p>(A6A1) Aft ADI capability: Att Sel Error Scale Sel Rate Scale Sel Att ref set</p>		
<p>(A14) RCS/OMS HTR • R POD (two) – A AUTO, B OFF</p>	<p>(A14) R Pod B Htrs (partial)</p>		
<p>GNC 23 RCS 9 Override F3 Manf status to CL: • RCS FWD – ITEM 1 EXEC • OVRD MANF VLVS STAT 3 – ITEM 42 EXEC</p>	<p>(O16) RCS Manf F3 RJD pwr (F3L,F3D,F3U,F3F)</p>		
<p>(A6U) If SENSE – -Z: • SENSE – -X • Wait at least 1 sec, then reposition as desired</p>	<p>10 (A6A1) 3-level sw RM for -X Sense</p>		
<p>GNC 23 RCS • Reprioritize L,R Manf 4 Jets to first priority: DES INH twice all other jets, highest priority first, then next highest priority, etc • Set aft pod(s) PRI JET FAIL LIMIT to 6</p>	<p>(A14) Aft RCS L,R Jet 4 Htr</p>		
<p>(Continued)</p>	<p>(Continued)</p>		<p>MEDS</p>

EPS SSR-107 (Cont)
BUS LOSS: CNTLCA2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>During OPS 8:</p> <p>GNC 43 CONTROLLERS</p> <p>Deselect R Pnl Trim R1: • DES PNL TRIM R1 – ITEM 38 EXEC</p> <p>Deselect R BDY FLP UP/DN R1: • DES BDY FLP R1 – ITEM 21 EXEC</p> <p>For SSME Hyd Repress: (R4) • HYD MPS/TVC ISOL VLV SYS 1,2 – OP, wait 10 sec, then CL</p> <p>If reqd during entry (< 120K ft): (L1) • NH3 CNTLR A(B) – PRI/GPC</p>	<p>(F8A7) 11 R Trim RHC – INH capability 11 PNL – ON capability</p> <p>(C3A1) 11 R Bdy Flp – UP/DN capability</p> <p>(R4) MPS/TVC Hyd Sys 3 Isol man Cntl</p> <p>(L1A2) 12 NH3 Sys A Sec Cntrl man On capability</p>		<p>①① L Trim and Body Flap cntls remain. Right Trim and Body Flap cntl function is regained after lost contacts have been deselected in OPS-8 (3,B)</p> <p>①② Sys A Pri Cntrl, auto switchover to Sec Cntrl remain</p> <p>①③ Redundant mtrs remain</p> <p>①④ Vlv holds position. FC3 Redundant Reac Vlv Close Cntl on pnl C3 remains</p> <p>①⑤ FC3 can be stopped via FC3 CNTLR sw (pnl O16:A)</p>
<p>BUS ISOLATION</p> <p>ONLY ON MCC CALL, PERFORM</p> <p>(F3) • TRIM RHC – ENA • PNL – OFF</p> <p>(R11L) • IDP/CRT4 PWR – OFF</p> <p>• MDU CRT 4 PWR – OFF</p>	<p>(O6) 13 –Z Star Trkr Dr Sys 2 CL capability</p> <p>(R1A2) 14 FC3 Reac Vlv Cntl via pnl R1 sw</p> <p>15 FC3 STOP capability via START/STOP sw</p>		<p>①⑥ Htr Cntrl 2 remains</p> <p>①⑦ Use pbs at pnl C3</p> <p>①⑧ Redundant coils remain</p> <p>①⑨ R OMS auto shtdn if Pc < 80% and '↓' on MNVR EXEC display</p>
	<p>(C3A5) 13 R ADP Dpy Mtr 1 16 Htr Cntrl 1</p> <p>(A6A1) 17 Aft Panel Trans X,Y, Norm, Pulse, Rot Roll, Pitch, Yaw Disc Rate, and Pulse Sel capability 17 Aft Pnl Trans Z High, Norm Pulse Sel capability 17 Aft Pnl Trans Low Z Sel capability 17 Aft Pnl PRI,ALT,VERN Sel capability 17 Aft Pnl PCT Exec capability</p> <p>(C3A1) 18 R OMS Eng Pr Vlv Coil 2 and Cntl Vlv 1,2 Coil 2 19 R OMS Arm 2, Arm/Press 2 sw contacts</p> <p>(F6A5,F8A5) NLG Ext Sys 1 NLG,LMG,RMG Bkup Rel Sys 1</p> <p>(R2) R MPS He Isol A man Cntl</p> <p>(R13A2) Rad Cntl Sys: Port RAD Lat 7-12 Mtr 2 Dpy/Sto Mtr 2</p>		<p>CAUTION</p> <p>No Purge. Wait 10 min between burns</p> <p>MEDS</p>
	(Continued)		

EPS SSR-107 (Cont)
BUS LOSS: CNTLCA2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	(A8L) 20 Port RMS MPM Mtr 1		⑬ Redundant mtrs remain
	(R2) 13 ET Door Mtrs: C/L Lat Actr 1 Mtr 2 man Stow capability C/L Lat Actr 2 Mtr 2 man Stow capability L Dr Uplock Lat Mtr 1 man R Dr Closure Mtr 1 man Cntl R Dr Uplock Lat Mtr 1 man Cntl		⑳ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison ㉑ Mtr 2 remains ㉒ Vlv closed. Redundant vlv remains
	(R13A2) 21 Ku Ant Sto/Dpy Mtr 1 Direct Sto Mtr 1		㉓ Redundant pwr sply remains. Turbine speed ind lost
	(R2) 22 APU 2 Fu Tk Vlv A		㉔ Redundant RPC remains
	23 Cntlr Pwr Sply B		
	24 Hyd Main Pump 3 Depress Solenoid RPC A		㉕ Pwr to MCA Drivers lost through ENABLE sw
	24 Hyd Main Pump 2 Depress Solenoid RPC B		
	(R13A2) 25 PLBD: C/L Lat 9-12 Mtr 2 13-16 Mtr 1 Stbd Aft Blkhd Mtr 1 Port Door Mtr 1		㉖ CDR Dpy/Jett remains
	(F3,F4) 26 PLT Dpy Fire 1 26 Jett Fire 1		

MEDS

EPS SSR-108

BUS LOSS: CNTLCA3

(Includes MNC FMC3, MNC MMC2, MNC MMC4, MNC AMC3)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (A12) APU HTR • GAS GEN/FUEL PUMP 3 – A AUTO • LUBE OIL LINE 3 – A AUTO APU HTR TK/FU LINE/H2O/ 1 • SYS 2A – AUTO 1 • 2B – OFF 1 • 3A – OFF 1 • 3B – AUTO HYD CIRC • PUMP PWR 3 – MNC	(A12) APU 3 GG/Fu Pump Htrs B APU 3 Lube Oil Ln Htr B APU 2 Tk/Fu Ln Htr B APU 3 Tk/Fu Ln Htr A Hyd Circ Pump 3 MNA pwr	MASTER ALARM Light/Tone – on (F7) SM ALERT Light/Tone – on (FSM) S67 CNTL BUS V RM DLMA MANF SM 67 ELECTRIC CNTL CA3 Volts < 20	① * [TIME CRITICAL] * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ② Vlv holds position ③ Vlv ops not affected ④ If five tk sets flown on OV102, O2 TK4B Htrs are disconnected and associated avionics are connected to TK5A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4A,4B Htrs are wired in parallel to TK5A and TK5B Htrs ⑤ If AC3 cbs not opened, Lat Mtrs 2 of actuators for Port,Stbd Rad Lat 7-12 would continue to run until Sys B Lat Cntl sw placed to OFF. Other equip pwr'd by AC3 MMC2 and AC3 MMC4 is lost because of MNC MMC2 and MNC MMC4 loss ⑥ Manf 4 status automatically declared closed
(R1) If Tk2 in use: O2, H2 TK2 • HTR A (two) – AUTO • HTR B (two) – OFF	(R1A2) Cryo O2,H2 Tk2 Htrs B	2 (O8) FWD RCS TK ISOL 1/2 tb – bp 2 FWD RCS MANF ISOL 3,4 tb – bp	
(A11) If not OV102 and TK4 in use: O2, H2 TK4 • HTR A (two) – AUTO • HTR B (two) – OFF ----- (A11) If OV102 and O2,H2 TK4/5 in use: • O2 HTR TK5 – OFF • H2 HTR TK4/5 B – OFF ----- Refer to EPS 7.6 CRYO TABLE A for switch nomenclature	4 (A11) Cryo O2,H2 TK4 Htrs B ----- ----- -----	3 (L1) RAD BYP VLV 1 tb – bp 3 FLOW PROP VLV LOOP 2 tb – bp (R13L) 5 RAD CNTL (two) tb – bp R ADP deploy time incr from 15 to 30 sec STAR TRKR DR POS –Z OP/CL time incr from 8 to 16 sec	
(R2) • BLR CNTLR/HTR 2 – B • 3 – B Refer to OMS/RCS Slide Rule for vlv loss info	(R2) Hyd H2O Blr 2 Cntlr A 3 Cntlr A	(F7) If APUs active, using BLR CNTLR/HTR 2A or 3A: C/W APU TEMP lt – on after ~2 min	
Refer to OMS/RCS Slide Rule for vlv loss info	(O16) 6 RCS Manf F4 RJD pwr (F4R,F4D)		
5 (MA73C:C,D) • cb MCA PWR AC3 MID 2,4 (two) – op	5 (MA73C) Stbd,Port Rad Lat 7-12 Mtr 2 Limit sw		
(Continued)	(Continued)		

MEDS

EPS SSR-108 (Cont)
BUS LOSS: CNTLCA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
For PLBD ops: • OP/CL Drs in man mode	(MA73C) Port,Stbd Rad Dpy/Sto Mtrs 2 PLBD: C/L Lat 1-4,5-8,9-12 Mtrs 2 13-16 Mtr 1 Port Aft Blkhd Mtr 2 Stbd Aft Blkhd Mtr 1 Port Door Mtr 1 Stbd Door Mtr 2 CL Limit sw	<div style="border: 1px solid black; padding: 2px;">SM (BFS,SM) 63 PL BAY DOORS</div>	⑦ Mtr 2 remains
(L1) • TOP EVAP HTR DUCT – A(B) If HI LOAD EVAP enabled: • HI LOAD DUCT HTR – A(B)	(L1A2) Topping Evap Duct Fwd,Aft Htrs C Hi Load Duct Outbd,Inbd Noz Htrs C	If in <u>AUTO</u> OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG' ----- During <u>MAN</u> PLBD OP/CL, single mtr run time noted on actuators listed at left	⑧ Htr Cntr 2 remains ⑨ Redundant mtrs remain
<div style="border: 1px solid black; padding: 2px; text-align: center;">BUS ISOLATION</div> <div style="border: 1px solid black; padding: 2px;">ONLY ON MCC CALL, PERFORM</div>		(A8L) PORT RMS: DPY/STO tb – bp RETEN LAT tb – bp R-F-L AFT tb – bp	⑩ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
		<div style="border: 1px solid black; padding: 2px;">SM 94 PDRS CONTROL</div>	⑪ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists
	(A14) Aft RCS L,R Jet 5 Htrs	Indications lost: MPM Mtr 1 STO/DPY Fwd MRL Mtr 2 LAT/REL/RDY Aft MRL Mtr 1 LAT/REL/RDY	
	(R2) C MPS He Isol B man Cntl		
	(MA73C) –Z Star Trkr Dr Sys 2 OP/CL capability 7 R ADP Deploy Mtr 1 8 Deploy Dsc 1 Htr Cntr 1		
	(MA73C) LH Vents 1,2,3 Mtrs 1 Vent 6 Mtr 2 RH Vents 8,9 Mtrs 1 Vent 3 Mtr 2 Vent 5 Mtr 2		
	9 (MA73C) ET Door Mtrs: C/L Lat Actr 2 Mtr 2 GPC Cntl L Dr Closure Mtr 2 GPC CL capability R Dr Closure Mtr 1 GPC CL capability R Dr Uplock Lat Mtr 1 GPC Lat capability		
	(MA73C) AC pwr removal capability via Limit sw for ET Dr Mtrs: C/L Lat Actr 2 Mtr 2 L Dr Closure Mtr 2 R Dr Closure Mtr 1 Uplock Lat Mtr 1		
	10 (MA73C) Port RMS: MPM Mtr 1 11 Fwd MRL Mtr 2 11 Aft MRL Mtr 1		
	(Continued)		

MEDS

EPS SSR-108 (Cont)
BUS LOSS: CNTLCA3

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	(MA73C) 12 Ku Ant Sto/Dpy Mtr 1 Limit sw and Stow capability		⑫ With an inop limit sw, mtr will continue to run until primary sw returned to GND
	(MA73C) 13 Redundant Ku-Bd Xmit Enable Signal		⑬ MNB MMC4 pwr for Ku-Bd Xmit Enable Signal remains
	14 Redundant Boom Stow Enable II Excitation Signal		⑭ MNB MMC4 pwr remains to supply pwr to Boom stow enable II signal for stow mtrs
	(R2) 15 APU 3 FU Tk Vlv A 16 Cntrl pwr Sply A GBX GN2 Repress Vlv		⑮ Vlv closed. Redundant vlv remains ⑯ Redundant pwr sply remains

MEDS

**EPS SSR-109
CONTROL BUS – PANEL WIRING MATRIX**

CNTL BUS PANEL	AB1	AB2	AB3	BC1	BC2	BC3	CA1	CA2	CA3
O6	X	X	X	X	X	X	X	X	X
O14	X	X					X	X	X
L2A1	X	X		X	X		X		
L1A2	X	X	X	X	X	X	X	X	X
L1A1						X			
F6	X	X	X	X	X	X	X	X	X
F2 (OV102)	X			X			X		
C3A7	X			X			X		
C3A1	X	X	X	X	X	X	X	X	X
C3A5	X	X	X	X	X		X	X	X
C3A6			X			X			X
C2A2	X			X	X		X		
F4 (OV102)						X			
F8	X	X	X	X	X	X	X	X	X
O7	X	X	X	X	X		X	X	X
O15	X	X		X	X	X	X		X
R1A2	X	X		X	X	X	X	X	X
R2	X	X	X	X	X	X	X	X	X
R4	X	X	X	X	X	X	X	X	X
O16				X	X	X	X	X	X
O8	X	X		X	X		X	X	
O17	X	X	X	X	X	X	X	X	X
R12A1	X	X		X	X		X	X	
R12A2								X	
R13A2	X	X	X	X	X		X	X	X
A1A2	X		X	X	X		X		
A1A3	X	X		X	X		X	X	
A11A1				X	X	X			X
A12	X	X	X	X	X	X	X	X	X
A6A1	X	X		X	X		X	X	
A7A1	X			X			X		
A8A2	X	X		X			X	X	X
A7A2 (OV102)									X
A13	X			X			X	X	
A14	X	X	X	X	X	X	X	X	X
MA73C	X	X	X	X	X	X	X	X	X

NOTE

This table shows control bus and "daisy-chained" panels that make up that particular control bus

**EPS SSR-110
BUS LOSS: AC1**

(Includes all AC1 sub-buses)

ACTIONS	
1	<ul style="list-style-type: none"> Perform FC1 SHUTDN FC SHUTDN (Cue Card)
	(R2)
	<ul style="list-style-type: none"> BLR CNTLR/HTR 1 – A 3 – B
	(L1)
	<ul style="list-style-type: none"> HUM SEP A – OFF ✓B – ON IMU FAN A – OFF B(C) – ON H2O PUMP LOOP 1 (two) – ON, B H2O LOOP 1 BYP MODE – AUTO H2O PUMP LOOP 2 – OFF AV BAY 1 FAN A – OFF ✓B – ON AV BAY 2 FAN (two) – ON AV BAY 3 FAN A – ON B – OFF FREON PUMP LOOP 1 – B FREON PUMP LOOP 2 – A
	(MO13Q)
5	If Arlk/Tnl Fan active:
	<ul style="list-style-type: none"> ARLK FAN A – OFF B – ON
6	<ul style="list-style-type: none"> Maintain LiOH canister(s) changeout per cue card and FLIGHT PLAN During sleep periods:
	(L1)
7	<ul style="list-style-type: none"> CAB FAN (two) – ON
	(R13U)
9	<ul style="list-style-type: none"> C/W PARAM SEL tw (three) – 033,115,074, 092, 062 C/W PARAM – INH MEM – CLEAR C/W PARAM SEL tw (three) – > 119
10	<div style="border: 1px solid black; padding: 2px;">SM 60 SM TABLE MAINT</div> <ul style="list-style-type: none"> Inhibits 0612705, 0612700, 0612740, 0612710
	(WCS)
	<ul style="list-style-type: none"> ✓MODE – AUTO ✓CRADLE – AUTO ✓Hose stowed in cradle ✓WCS ON It – OFF FAN SEP SEL sw – OFF HOSE BLOCK – SEP 2 In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete FAN SEP SEL sw – 2
	(EDO WCS)
	<ul style="list-style-type: none"> URINAL SEL – SEP 2 URINE DIVERTER VLV – FAN SEP 2
	(Continued)

EQUIP/FUNCTION LOST	
	FC1 Pumps and pH Snsr
	Hyd H2O Blr 1 Cntrl B 3 Cntrl A
	Humidity Sep A
	IMU Fan A
2	H2O Loop 2 Byp Cntrl, Sig Condr
3	H2O Loop 2 Byp Vlv pwr 2 Pump GPC Cntl 1 Pump A
	Av Bay 1 Fan A
4	Av Bay 2 Sig Condr, Xdcrs (ECLS SC3)
	Av Bay 3 Fan B
	Freon Loop 1 Pump A
	2 Pump B
	Ark/Tnl Fan A
8	Cabin Air S/C (ECLS SC6)
	WCS Fan/Sep 1
	Urine Sep 1 Fan 1 Commode Fan 1
	(Continued)

CREW INDICATIONS	
	MASTER ALARM Light/Tone – on
	(F7) EVENT TIME ind blank C/W FC PUMP It – on C/W AC VOLT It – on C/W FREON LOOP It – on C/W AV BAY/CAB AIR It – on C/W H2O LOOP It – on SM ALERT Light/Tone – on
	(F9) AC1 ΦA,ΦB,ΦC AC volts < 90
	(LIGHTS LOST) Instr Its R (pnls C2,F8,F9) Pnl Its L/Ctr (pnls L1,L2,L4, C2,C3,F2,F6,F7) Pnl Its L/OH (pnls O5,O6, O7,O13,O14,O15) Numeric Its (pnls O3,F7) Orbit Sta Instr Its (pnls A1, A2)
	(FSMs) S67 AC VOLTS 1 S86 HYD RSVR Q S86 WSB T SM2 HYD QTY (B) SM0 THRM HYD (B) S66 AV BAY 3 FAN S66 AV BAY 2 FAN S69 FC PUMP 1 S69 FC H2 PUMP 1 S88 FREON FLOW 2 S88 FRN AFT CP 2 S88 FRN PL HX 2 S88 H2O PUMP P 2 S88 H2O LOOP 2 QTY S88 H2O LOOP 2 TEMP
	(R1) FC1 COOL PUMP ΔP tb – bp
	<div style="border: 1px solid black; padding: 2px;">HYD/APU</div> HYD QTY 1 ind – 0% APU H2O QTY 3 ind – 0%
	(O1) AIR TEMP AV BAY 2 ind – 45 degF H2O PUMP OUT PRESS LOOP 2 ind – 0 psia FREON FLOW LOOP 1 ind – 578 pph
	(O3) RCS/OMS PRPLT QTY Gage and MSN TIME ind blank
	(L1) If H2O LOOP 1 PUMP A active: 'S88 H2O PUMP P 1' 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP'
	(O1) H2O PUMP OUT PRESS LOOP 1 ind – 20-25 psia
	If HUM SEP A ON: 'S66 HUMID SEP A'
	(Continued)

NOTES	
①	<div style="border: 1px dashed black; padding: 5px; text-align: center;">TIME CRITICAL</div> <p>FC1 must be shutdn within 9 min to avoid potentially hazardous condition</p>
②	H2O Loop 2 Pump Out Press, Pump ΔP, Accum Qty, Pump Out Temp snrs lost
③	H2O Loop 2 Byp vlv holds position
④	Av Bay 2 Fan ΔP, Air Out Temp snrs lost
⑤	Not applicable for OV102
⑥	Crew and gnd have lost POCO2 Xcdr
⑦	Use streamers (if flown) or monitor by feel during wake period
⑧	CO2 partial Press and Cabin Fan ΔP snrs lost
⑨	Inhibits Primary C/W for AC1 Voltage, CAB Fan ΔP, H2O Loop 2 Pump P, FC1 stack Temp, FC1 Cool Pump ΔP
⑩	Inhibits H2O Loop 2 Pump ΔP, Pump Out Press, Pump Out Temp, Accum Qty, respectively
	MEDS

EPS SSR-110 (Cont)
BUS LOSS: AC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>If CAB TEMP CNTLR 2 active: (L1) ● CAB TEMP CNTLR – OFF</p> <p>-----</p> <p>(MD44F) ● Remove pin from SEC ACTUATOR and BYP vlv linkage, connect linkage to PRI ACTUATOR</p> <p>(L1) ● CAB TEMP CNTLR – 1</p>	<p>11 Cabin Temp Cntrl 2, Hx Byp Vlv Mtr 2</p> <p>-----</p> <p>-----</p>	<p>(MO51F) CO2 RMVL SYS CNTLR 1 FAIL It on Impending: 'S66 CO2 RL SYS PCO2'</p>	<p>⑪ Lose Auto Temp Cntl via Cntrl 2 and H2O Loop 2 Cabin Hx In Temp Snsr. Hx Byp Vlv holds position</p>
<p>(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: ● Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)</p>	<p>12 CO2 Rmvl Sys: Cntrl 1 Fan AC1 pwr Compressor AC1 pwr</p>	<p>If IMU FAN A ON: 'S66 IMU FN SPD A' 'S66 IMU FAN DP'</p>	<p>⑫ PEVs, Actuators, Bed A P, Bed B P, Bed dP will be recovered after system reconfig</p>
<p>Refer to OMS/RCS Slide Rule for vlv loss info (use FPC1 Slide for Aft RCS and FMC1 Slide for Fwd RCS)</p>		<p>If APUs active and using H2O BLR CNTLR/HTR 1B or 3A, then C/W APU TEMP It on after ~2 min</p>	<p>⑬ Redundant mtr remains</p>
<p>BUS ISOLATION</p>		<p>STAR TRKR DR POS –Y OP/CL time incr from 8 to 16 sec</p>	<p>⑭ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists</p>
<p>ONLY ON MCC CALL, PERFORM</p>		<p>L ADP deploy time incr from 15 to 30 sec</p>	
<p>(MA73C:C) cb MCA PWR ● AC1 3Φ FWD 1 – op ● MID 1 – op</p>	<p>13 AC1 FMC1 Bus pwr RH Vent 1,2 Mtr 1 –Y Star Trkr Dr Sys 1 OP/CL capability</p> <p>13 L ADP Dpy Mtr 1 AC1 MMC1 Bus pwr RH Vents 3,5,6 Mtrs 1 PL Reten Sys A Rel/Lat Mtrs Port Rad Lat 1–6, 7–12 Mtrs 1 Port Rad Dpy/Sto Mtr 1 PLBD: C/L Lat 9–12 Mtr 1 Port,Stbd Fwd Blkhd Mtrs 1 Stbd Door Mtr 1</p>	<p>If Freon Loop 2 Pump B on: 'S88 FREON FLOW 2' 'S88 FRN AFT CP 2' 'S88 FRN PL HX 2'</p>	
<p>(MA73C:D) cb MCA PWR ● AC1 3Φ MID 3 – op ● AFT 1 – op</p>	<p>PLBD: C/L Lat 1–4, 5–8 Mtrs 1 Port, Aft Blkhd Mtr 1 AC1 MMC3 Bus pwr AMC1 Bus pwr LH Vent 8,9 Mtr 1</p>	<p>(O1) FREON FLOW LOOP 2 ind – 578 pph</p>	<p>SM (BFS SM 63) PL BAY DOORS</p>
<p>(MA73C:E) ● cb AC1 WCS FAN SEP 1 (three) – op</p>		<p>During PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	
<p>(MA73C:F) cb AC1 ● RMS PRI ΦA – op</p>		<p>During Rad Dpy/Sto ops: (R13L) RAD CNTL tbs (four) indicate single mtr ops</p>	
<p>● MAR 3Φ – op</p>			
<p>● OPS INST HYD ACTR ΦC – op</p>	<p>14 Port RMS: Mid MRL Mtr 1 Aft MRL Mtr 2 D&C Primary Itg Shldr Brace release AC1 Middeck Utility Pnl (MUP) Ops Hyd Actr Instr</p>		
<p>(MA73C:G) IF DOCKING MISSION ● cb AC1 ARLK/TNL FAN A (three) – op</p>	<p>Ark/Tnl Fan A</p>		
<p>(Continued)</p>	<p>(Continued)</p>		

MEDS

EPS SSR-110 (Cont)
BUS LOSS: AC1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			
(MA73C:H,I) ● cb AC1 FWD RCS VLV (three) – op ● cb AC1 AFT POD VLV GP 1 (three) – op			⑮ Bypass vlvs hold position and Cntrl A Rad Byp Vlv Mtrs remain
(L4:A-E) ● cb UTIL PWR F1/MO52J ● AC1 – op	AC1 Util pwr (F1/MO52J)		
----- cb AC1 ● FC1 PUMPS (three) – op ● CTR ENG (three) – op ● R ENG (three) – op			
(L4:F-J) cb AC1 ● √ H2O LOOP PUMP 1A/2 (three) – op ● AV BAY 1 FAN A (three) – op ● AV BAY 3 FAN B (three) – op ● IMU FAN A (three) – op ● HUM SEP A (three) – op			
(L4:K) cb AC1 ● ϕA H2O CNTLR 2 – op ● ϕB CAB AIR S/C – op			
(L4:L) cb AC1 ● ϕA CAB T CNTLR 2 – op ● ϕB AV BAY 2 S/C – op			
(L4:M,N) cb AC1 ϕA, ϕB, ϕC ● FREON LOOP 1 PUMP A (three) – op ● FREON LOOP 2 PUMP B (three) – op			
(L4:O) cb AC1 ● ϕA BLR HYD BYP 1B – op ● ϕB HYD QTY 1 – op ● ϕC BLR HYD BYP 3A – op	Hyd Rsvr 1 Qty Snsr		
(L4:P) cb AC1 ● ϕA RAD CNTLR 1B – op ● ϕB RAD CNTLR 2B – op ● ϕC TACAN 1 – op	15 Freon Loop 1 Cntrl B Rad Byp Vlv Mtr Freon Loop 2 Cntrl B Rad Byp Vlv Mtr Tacan 1		
(L4:Q) cb AC1 ● ϕA LTG PNL L/CTR – op ● ϕB LTG PNL L OVHD – op ● ϕC LTG INST OS – op	Pnl Its L/Ctr Pnl Its L/OH (pnls O5,O6,O7, O13,O14,O15) Orbit Sta Instr Its		
(Continued)	(Continued)		MEDS

EPS SSR-110 (Cont)
BUS LOSS: AC1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(L4:R) cb AC1 •ΦA LG INST R – op •ΦB NUMERIC FWD – op</p>	<p>16 Inst Its R Numeric Its (pnls O3,F7) (RCS/OMS Prplt Qty, Gauge, Mission and Event Timers)</p>		<p>⑬ Redundant mtr remains</p> <p>⑯ ✓MCC for total OMS Qtys. Aft Qtys are found on</p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">GNC SYS SUMM 2</div>
	<p>LH Vents 5,6 Mtrs 1 Stbd Rad 1 Lat 1-6,7-12 Mtrs 1 Stbd Rad Dpy/Sto Mtr 1</p>		
	<p>13 ET Door Mtrs: C/L Lat Actr 1,2 Mtr 1 L Dr Closure Mtr 1 Uplock Lat Mtr 1</p>		
			<p style="text-align: right; font-size: 24pt; font-weight: bold; margin-top: 20px;">MEDS</p>

**EPS SSR-111
BUS LOSS: AC1 Φ A**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(L1)</p> <ul style="list-style-type: none"> • ✓HUM SEP A – OFF • ✓B – ON • ✓IMU FAN A – OFF • ✓B(C) – ON • H2O PUMP LOOP 1 (two) – ON, B • H2O LOOP 1 BYP MODE – AUTO • H2O PUMP LOOP 2 – OFF • ✓FREON PUMP LOOP 1 – B • ✓FREON PUMP LOOP 2 – A • ✓AV BAY 1 FAN A – OFF • ✓B – ON • 3 FAN A – ON • B – OFF 	<p>1Φ of Hum Sep A</p> <p>1Φ of IMU Fan A</p> <p>1 H2O Loop 2 Byp Cntrl, Sig Condr, Byp Vlv pwr</p> <p>1Φ of H2O Loop 2 Pump GPC Cntrl pwr</p> <p>1Φ of H2O Loop 1 Pump A Freon Loop 1 Pump A 2 Pump B</p> <p>1Φ of AV Bay 1 Fan A</p> <p>1Φ of AV Bay 3 Fan B</p>	<p>MASTER ALARM Light/Tone – on</p> <p>(F7) C/W AC VOLT It – on C/W H2O LOOP It – on SM ALERT Light/Tone – on</p> <p>(F9) AC1 ΦA AC volts < 90</p> <p>(LIGHTS LOST) Instr Its R (pnls C2,F8,F9) Pnl Its L/Ctr (pnls L1,L2,L4, C2,C3,F2,F6,F7)</p> <p>(FSMs) S67 AC VOLTS 1 S69 FC H2 PUMP 1 S86 WSB T SM0 THRM HYD (B) S88 H2O PUMP P 2 S88 H2O LOOP 2 QTY S88 H2O LOOP 2 TEMP</p> <p>(O1) H2O PUMP OUT PRESS LOOP 2 ind – 0 psia</p> <p>If H2O PUMP LOOP 1, A active: 'S88 H2O PUMP P 1'</p> <p>(O1) H2O PUMP OUT PRESS LOOP 1 ind – 40–45 psia</p> <p>If IMU FAN A ON: 'S66 IMU FN SPD A' 'S66 IMU FAN DP'</p> <p>If HUM SEP A ON: 'S66 HUMID SEP A'</p> <p>If APUs active, and using BLR CNTLR/HTR 1B: C/W APU TEMP It – on after ~2 min</p>	<p>① H2O Loop 2 Byp Vlv holds position and H2O Loop 2 Pump Out Press, Pump ΔP Accum Qty, Pump Out Temp snrs lost</p> <p>② Not applicable for OV102</p> <p>③ Inhibits H2O Loop 2 Pump ΔP, Pump Out Press, Pump Out Temp, and Accum Qty, respectively</p> <p>④ If H2O Loop 1 Pump A active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W</p> <p>⑤ Lose Auto Temp Cntl via Cntrl 2 and H2O Loop 2 Cabin Hx In Temp snsr. Hx Byp vlv holds position</p> <p>⑥ Inhibits Primary C/W for AC1 voltage and H2O Loop 2 Pump P</p> <p>⑦ For EDO WCS, Urine Fans and Seps are DC motors. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1Φ down; however, crew actions will pwr fans through alternate pwr source, with full 3Φ pwr. For WCS, 2Φ ops will result in degraded airflow. Urine Fan, Seps are unusable for urine collection or EMU drain</p>
<p>(MO13Q)</p> <p>If Arlk/Tnl Fan active:</p> <ul style="list-style-type: none"> • ARLK FAN A – OFF • B – ON 	<p>1Φ of Arlk/Tnl Fan A</p>		
<p>(R2)</p> <ul style="list-style-type: none"> • BLR CNTLR/HTR 1 – A 	<p>Hyd H2O Blr 1 Cntrl B</p>		
<p>SM 60 SM TABLE MAINT</p> <p>3</p> <ul style="list-style-type: none"> • Inhibit 0612705, 0612700, 0612740, 0612710 • Reset upper limit of 0450114 (FC1 H2 PUMP STATUS) to current value +0.3 volts 	<p>1Φ of FC1 H2 Pump</p> <p>1Φ of FC1 Coolant Pump</p>	<p>4</p> <p>4</p>	
<p>If CAB TEMP CNTLR 2 active:</p> <p>(L1)</p> <ul style="list-style-type: none"> • CAB TEMP CNTLR – OFF 	<p>5 Cabin Temp Cntrl 2, Hx Byp Vlv Mtr 2</p>		
<p>(MD44F)</p> <ul style="list-style-type: none"> • Remove pin from SEC ACTUATOR and BYP vlv linkage, connect linkage to PRI ACTUATOR 			
<p>(L1)</p> <ul style="list-style-type: none"> • CAB TEMP CNTLR – 1 			
<p>(R13U)</p> <ul style="list-style-type: none"> • C/W PARAM SEL tw (three) – 033,115 • C/W PARAM – INH • MEM – CLEAR • C/W PARAM SEL tw (three) – > 119 			
<p>(WCS)</p> <ul style="list-style-type: none"> • ✓MODE – AUTO • ✓CRADLE – AUTO • ✓Hose stowed in cradle • ✓WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 2 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30–sec run complete. • FAN SEP SEL sw – 2 	<p>7 1Φ of WCS Fan/Sep 1</p>		
<p>(EDO WCS)</p> <ul style="list-style-type: none"> • URINAL SEL – SEP 2 • URINE DIVERTER VLV – FAN SEP 2 	<p>7 Urine Sep 1 Fan 1 1Φ of Commode Fan 1</p>		
<p>(Continued)</p>	<p>(Continued)</p>		

MEDS

EPS SSR-111 (Cont)
BUS LOSS: AC1 Φ A

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
9	If bus shorted: <ul style="list-style-type: none"> Open all AC1 ΦA cbs that pwr 3Φ loads on pnls L4: C-J,M,N (9 cbs), MA73C: E,G,H,I (4 cbs) Open all AC1 3Φ ganged cbs on pnls L4: B (1 cb), MA73C: C,D,F (5cbs) 	8 1 Φ of AC Utility Power Outlets at F1 and MO52J	(MO51F) CO2 RMVL SYS CNTLR 1 FAIL It - on Impending: 'S66 CO2 RL SYS PCO2' 'S66 CAB PPCO2'	⑧ MCC will provide equipment reconfig info if required ⑨ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into shorts. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpowering sub-buses: SSR-114, SSR-115, SSR-116, SSR-117
	(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: <ul style="list-style-type: none"> Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS) 	9 AC1 FMC1 Bus pwr MMC1 Bus pwr MMC3 Bus pwr AMC1 Bus pwr		
	11 If bus not shorted: <ul style="list-style-type: none"> Perform the following BUS ISOLATION steps 	10 CO2 Rmvl Sys Cntrl 1 1 Φ of CO2 Rmvl Sys: Fan AC1 pwr Compressor AC1 pwr		⑩ PEVs, Actuators, Bed A P, Bed B P, Bed dP will be recovered after system reconfig ⑪ For unshorted bus, perform single Φ isolation steps to prevent powering single phase loads with coupled energy from remaining two phases ⑫ Bypass vlv holds position and Cntrl A Rad Byp Vlv Mtr remains
11	BUS ISOLATION			
	IF BUS NOT SHORTED, PERFORM			
	(L4:K) <ul style="list-style-type: none"> cb AC1 ΦA H2O CNTLR 2 - op 			
	(L4:L) <ul style="list-style-type: none"> cb AC1 ΦA CAB T CNTLR 2 - op 			
	(L4:O) <ul style="list-style-type: none"> cb AC1 ΦA BLR HYD BYP 1B - op 			
	(L4:P) <ul style="list-style-type: none"> cb AC1 ΦA RAD CNTLR 1B - op 	12 Freon Loop 1 Cntrl B Rad Byp Vlv Mtr		
	(L4:Q) <ul style="list-style-type: none"> cb AC1 ΦA LTG PNL L/CTR - op 	Pnl Its L/Ctr (pnls L1,L2,L4, C2,C3,F2,F6,F7)		
	(L4:R) <ul style="list-style-type: none"> cb AC1 ΦA INST R - op 	Instr Its R (pnls C2,F8,F9)		
	(MA73C:F) <ul style="list-style-type: none"> cb AC1 RMS PRI ΦA - op 	Port RMS Shldr Brace Release D&C Primary Itg 1 Φ of Mid MRL Mtr 1 Aft MRL Mtr 2		
		FC1 pH Snsr		

MEDS

**EPS SSR-112
BUS LOSS: AC1 ΦB**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(L1)</p> <ul style="list-style-type: none"> • ✓ H2O PUMP LOOP 2 - ON • ✓ H2O PUMP LOOP 1 (two) - GPC, B • AV BAY 2 FAN (two) - ON • FREON PUMP LOOP 1 - B • FREON PUMP LOOP 2 - A • ✓ AV BAY 1 FAN A - OFF • ✓ B - ON • 3 FAN A - ON • B - OFF 	<p>1Φ of Hum Sep A</p> <p>1Φ of IMU Fan A</p> <p>1Φ of H2O Loop 2 Pump GPC Cntrl pwr</p> <p>1 1Φ of H2O Loop 1 Pump A</p> <p>2 Av Bay 2 Sig Condr, Xdcrs (ECLS SC3)</p> <p>1Φ Freon Loop 1 Pump A 2 Pump B</p> <p>1Φ of AV Bay 1 Fan A</p> <p>1Φ of AV Bay 3 Fan B</p>	<p>MASTER ALARM Light/Tone - on</p> <p>(F7) C/W AC VOLT It - on C/W AV BAY/CAB AIR It - on SM ALERT Light/Tone - on</p> <p>(F7) EVENT TIME ind blank</p> <p>(F9) AC1 ΦB volts < 90</p> <p>(LIGHTS LOST) Pnl Its L/OH (pnls O5,O6, O7,O13,O14,O15) Numeric Its (pnls O3,F7)</p>	<p>① If H2O Loop 1 Pump A active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W</p> <p>② Av Bay 2 Fan ΔP, Air Out Temp snrsrs lost</p> <p>③ Not applicable for OV102</p> <p>④ Crew and GND have lost POCO2 Xcdr</p> <p>⑤ Use streamers (if flown) or monitor by feel during wake period</p> <p>⑥ CO2 partial Press and Cabin Fan ΔP snrsrs lost</p> <p>⑦ Inhibits Primary C/W for AC1 voltage and Cabin Fan ΔP</p> <p>⑧ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep.</p> <p>⑨ MCC will provide equipment reconfig info if reqd</p>
<p>(MO13Q) If Arlk/Tnl Fan active:</p> <p>3 • ARLK FAN A - OFF</p> <p>• B - ON</p>	<p>1Φ of Arlk/Tnl Fan A</p>	<p>(FSMs) S67 AC VOLTS 1 S69 FC H2 PUMP 1 S86 HYD RSVR Q SM2 HYD QTY (B)</p>	
<p>4 • Maintain LiOH canister(s) changeout per cue card and FLIGHT PLAN</p> <p>During sleep periods: (L1)</p> <p>5 • CAB FAN (two) - ON</p>	<p>5 Cab Air Sig Cond</p> <p>6 (ECLS SC6)</p>	<p>HYD/APU HYD QTY 1 - 0%</p> <p>(O1) AIR TEMP AV BAY 2 - 45 degF</p> <p>(O3) RCS/OMS PRPLT QTY Gage and MSN TIME ind blank</p>	
<p>(R13U)</p> <p>7 • C/W PARAM SEL tw (three) - 033,074</p> <p>• C/W PARAM - INH</p> <p>• MEM - CLEAR</p> <p>• C/W PARAM SEL tw (three) - > 119</p>		<p>If H2O PUMP LOOP 1,A active: H2O LOOP C/W It 'S88 H2O PUMP P 1' (O1) H2O PUMP OUT PRESS LOOP 1 - 40-45 psia</p>	
<p>(WCS)</p> <ul style="list-style-type: none"> • ✓ MODE - AUTO • ✓ CRADLE - AUTO • ✓ Hose stowed in cradle • ✓ WCS ON It - OFF • FAN SEP SEL sw - OFF • HOSE BLOCK - SEP 2 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete. • FAN SEP SEL sw - 2 	<p>8 1Φ of WCS Fan/Sep 1</p>		
<p>(EDO WCS)</p> <ul style="list-style-type: none"> • URINAL SEL - SEP 2 • URINE DIVERTER VLV - FAN SEP 2 	<p>8 Urine Fan 1 Sep 1 1Φ of Commode Fan 1</p>		
<p>SM 60 SM TABLE MAINT</p> <ul style="list-style-type: none"> • Reset upper limit of 0450114 (FC1 H2 PUMP STATUS) to current value + 0.3 volts 	<p>1Φ of FC1 H2 Pump</p> <p>1Φ of FC1 Coolant Pump</p>		
<p>(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected:</p> <ul style="list-style-type: none"> • Perform CO2 REMOVAL SYSTEM CNTLR 1(2) CONFIG (ORB OPS, ECLS) 	<p>1Φ of CO2 Rmvl Sys: Fan AC1 pwr Compressor AC1 pwr</p>		
	<p>9 1Φ of AC Utility Power Outlets at F1 and MO52J</p>		
(Continued)	(Continued)		

MEDS

EPS SSR-112 (Cont)
BUS LOSS: AC1 ΦB

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
10 If bus shorted: • Open all AC1 ΦB cbs that pwr 3Φ loads on pnls L4: C-J,M,N (9 cbs), MA73C: E,G,H,I (4 cbs) • Open all AC1 3Φ ganged cbs on pnls L4:B (1 cb), MA73C: C,D,F (5 cbs)	10 AC1 FMC1 Bus pwr MMC1 Bus pwr MMC3 Bus pwr AMC1 Bus pwr		<p>⑩ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpowering sub-buses: SSR-114, SSR-115, SSR-116, SSR-117</p> <p>⑪ For unshorted bus, perform single Φ isolation steps to prevent powering single phase loads with coupled energy from remaining two phases</p> <p>⑫ Bypass vlv holds position and Cntrl A Rad Byp Vlv Mtr remains</p> <p>⑬ ✓ MCC for total OMS Qtys. Aft Qtys are found on</p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">GNC SYS SUMM 2</div>
11 If bus not shorted: • Perform the following BUS ISOLATION steps			
BUS ISOLATION			
IF BUS <u>NOT</u> SHORTED, PERFORM			
	Port RMS: 1Φ of Mid MRL Mtr 1 Aft MRL Mtr 2		
(L4:K) • cb AC1 ΦB CAB AIR S/C – op			
(L4:L) • cb AC1 ΦB AV BAY 2 S/C – op			
(L4:O) • cb AC1 ΦB HYD QTY 1 – op	Hyd Rsvr 1 Qty Snsr		
(L4:P) • cb AC1 ΦB RAD CNTLR 2B – op	12 Freon Loop 2 Cntrl B Rad Byp Vlv Mtr		
(L4:Q) • cb AC1 ΦB LTG PNL L OVHD – op	Pnl Its L/OH (pnls O5,O6,O7, O13,O14,O15)		
(L4:R) • cb AC1 ΦB NUMERIC FWD – op	13 Numeric Its (pnls O3,F7) (RCS/OMS Prplt Qty Gage, Mission, and Event Timers)		

EPS SSR-113
BUS LOSS: AC1 ΦC

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(R2) • BLR CNTLR/HTR 3 – B	Hyd H2O Blr 3 Cntrl A	MASTER ALARM Light/Tone – on	<p>① For unshorted bus, perform single Φ isolation steps to prevent powering single phase loads with coupled energy from remaining two phases</p>
(L1) • ✓ HUM SEP A – OFF • ✓ B – ON • ✓ IMU FAN A – OFF • ✓ B(C) – ON • H2O PUMP LOOP 2 – ON	1 1Φ of Hum Sep A 1 1Φ of IMU Fan A	(F7) C/W AC VOLT It – on SM ALERT Light/Tone – on	
• H2O PUMP LOOP 1 (two) – GPC, B • FREON PUMP LOOP 1 – B • 2 – A • ✓ AV BAY 1 FAN A – OFF • ✓ B – ON • 3 FAN A – ON • B – OFF	2 1Φ of H2O Loop 2 Pump GPC Cntrl pwr 1Φ of H2O Loop 1 Pump A 1Φ Freon Loop 1 Pump A 2 Pump B 1Φ of AV Bay 1 Fan A 1Φ of AV Bay 3 Fan A	(F9) AC1 ΦC AC volts < 90	② If H2O Loop 1 Pump A active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W
(MO13Q) If Arlk/Tnl Fan active: • ARLK FAN A – OFF • B – ON	1Φ of Arlk/Tnl Fan A	(FSMs) S67 AC VOLTS 1 S69 FC H2 PUMP 1 S86 WSB T SM0 THRM HYD (B)	③ Not applicable for OV102
(Continued)	(Continued)	HYD/APU APU H2O QTY 3 – 0%	MEDS
		(Continued)	

EPS SSR-113 (Cont)
BUS LOSS: AC1 Φ C

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(R13U) • C/W PARAM SEL tw (three) – 033 (AC1 voltage) • C/W PARAM – INH MEM – CLEAR • C/W PARAM SEL tw (three) – > 119		2 If H2O PUMP LOOP 1, A active: C/W H2O LOOP It – on 'S88 H2O PUMP P 1' (O1) 2 H2O PUMP OUT PRESS LOOP 1 – 40–45 psia	② If H2O Loop 1 Pump A active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W ④ For EDO WCS, Urine Fans and Seeps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1 Φ down; however, crew actions will pwr fans through alternate pwr source with full 3 Φ pwr. For WCS, 2 Φ ops will result in degraded airflow. Urine Fan, Seeps are unusable for urine collection or EMU drain
(WCS) • ✓ MODE – AUTO • ✓ CRADLE – AUTO • ✓ Hose stowed in cradle • ✓ WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 2 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30–sec run complete. • FAN SEP SEL sw – 2	4 1 Φ of WCS Fan/Sep 1	If APUs active and using H2O BLR CNTLR/HTR 3A: C/W APU TEMP It – on after ~2 min	⑤ MCC will provide equipment reconfig info if reqd ⑥ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpowering sub-buses: SSR-114, SSR-115, SSR-116, SSR-117
(EDO WCS) • URINAL SEL – SEP 2 • URINE DIVERTER VLV – FAN SEP 2	Urine Sep 1 Fan 1 4 1 Φ of Commode Fan 1		
SM 60 SM TABLE MAINT • Reset upper limit of 0450114 (FC1 H2 PUMP STATUS) to current value + 0.3 volts	1 Φ of FC1 H2 Pump 1 Φ of FC1 Coolant Pump		
5 1 Φ of AC Utility Power Outlets at F1 and MO52J			
6 If bus shorted: • Open all AC1 Φ C cbs that pwr 3 Φ loads on pnls L4: C–J,M,N (9 cbs), MA73C: E,G,H,I (4 cbs) • Open all AC1 3 Φ ganged cbs on pnls L4:B (1 cb), MA73C: C,D,F (5 cbs)	6 AC1 FMC1 Bus pwr MMC1 Bus pwr MMC3 Bus pwr AMC1 Bus pwr		
If bus not shorted: • Perform the following BUS ISOLATION steps			
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	1 Φ of CO2 Rmvl Sys: Fan AC1 pwr Compressor AC1 pwr		⑦ For unshorted bus, perform single isolation steps to prevent powering single phase loads with coupled energy from remaining two phases
7 BUS ISOLATION			
IF BUS NOT SHORTED, PERFORM			
(L4:O) • cb AC1 Φ C BLR HYD BYP 3A – op			
(L4:P) • cb AC1 Φ C TACAN 1 – op	Tacan 1		
(L4:Q) • cb AC1 Φ C LTG INST OS – op	Orbit Sta Instr Its (Pnls A1,A2)		
(Continued)	(Continued)		MEDS

EPS SSR-113 (Cont)
BUS LOSS: AC1 Φ C

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(MA73C:F) • cb AC1 OPS INST HYD ACTR Φ C - op	Ops Hyd Actr Instr		
	Port RMS: 1 Φ of Mid MRL Mtr 1 Aft MRL Mtr 2		
			<p style="text-align: right;">MEDS</p>

**EPS SSR-114
BUS LOSS: AC1 FMC1**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		L ADP deploy time incr from 15 to 30 sec	① Redundant mtr remains
		-Y Star Trkr OP/CL time incr from 8 to 16 sec	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:C) • cb MCA LOGIC MCA PWR AC1 3Φ FWD 1 – op	AC1 FMC1 Bus pwr RH Vent 1,2 Mtr 1 1 L ADP Dpy Mtr 1 1 -Y Star Trkr Dr Sys 1 OP/CL capability		

**EPS SSR-115
BUS LOSS: AC1 MMC1**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		SM (BFS SM 63) PL BAY DOORS	① Single mtr time
		During PLBD OP/CL, single mtr run time noted on actuators listed at left	
BUS ISOLATION		During Rad Dpy/Sto ops: (R13L) RAD CNTL PORT tb (two) indicates single mtr ops	
ONLY ON MCC CALL, PERFORM			
(MA73C:C) • cb MCA LOGIC MCA PWR AC1 3Φ MID 1 – op	PLBD: C/L Lat 9-12 Mtr 1 Port, Stbd Fwd Blkhd Mtrs 1 Stbd Door Mtr 1 RH Vents 3,5,6 Mtrs 1 AC1 MMC1 Bus pwr Port Rad Lat 1-6, 7-12 Mtrs 1 Dpy/Sto Mtr 1 PL Reten Sys A Rel/Lat Mtrs 1 Port RMS Mid MRL Mtr 1 ROEU 1 Orbiter arm drive mtr (ODM mtr 1 – mate A, demate A, relax A) 1 ODA mtr 1 latch/release		

**EPS SSR-116
BUS LOSS: AC1 MMC3**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		SM (BFS SM 63) PL BAY DOORS	① Single mtr time
		During PLBD OP/CL, single mtr run time noted on actuators listed at left	
BUS ISOLATION		During Rad Dpy/Sto ops: (R13L) RAD CNTL STBD tb (two) indicates single mtr ops	
ONLY ON MCC CALL, PERFORM			
(MA73C:D) • cb MCA LOGIC MCA PWR AC1 3Φ MID 3 – op	PLBD C/L Lat 1-4, 5-8 Mtrs 1 Port Aft Blkhd Mtr 1 LH Vents 5,6 Mtrs 1 AC1 MMC3 Bus pwr Stbd Rad Lat 1-6, 7-12 Mtrs 1 Dpy/Sto Mtr 1 1 Port RMS Aft MRL Mtr 2		

MEDS

EPS SSR-117
BUS LOSS: AC1 AMC1

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	① Redundant mtrs remain
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:D) • cb MCA PWR AC1 3Φ AFT 1 – op	AC1 AMC1 Bus pwr LH Vent 8,9 Mtr 1		
	1 ET Door Mtrs: C/L Lat Actr 1 Mtr 1 2 Mtr 1 L Dr Closure Mtr 1 Uplock Lat Mtr 1		

EPS SSR-120
BUS LOSS: AC2

(Includes all AC2 sub-buses)

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 • Perform FC2 SHUTDN (FC SHUTDOWN Cue Card)	FC2 Pumps and pH Snsr	MASTER ALARM Light/Tone – on	①
(R2) • BLR CNTLR/HTR 1 – B • 2 – A	Hyd H2O Blr 1 Cntr A 2 Cntr B	(F7) C/W FC PUMP It – on C/W AC VOLT It – on C/W FREON LOOP It – on SM ALERT Light/Tone – on C/W AV BAY/CABIN AIR It	* [TIME CRITICAL] * FC2 must be shut down within 9 min to avoid potentially hazardous condition
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		(F9) AC2 ΦA, ΦB, ΦC AC volts < 90	② Av Bay 3 Fan ΔP, Air Out Temp snsr lost
(L1) • HUM SEP B – OFF • A – ON • CAB FAN B – OFF • A – ON • IMU FAN B – OFF • A(C) – ON • H2O PUMP LOOP 1 (two) – GPC, A • H2O PUMP LOOP 2 – ON • AV BAY 1 FAN B – OFF • A – ON • 2 FAN A – OFF • B – ON • AV BAY 3 FAN (two) – ON • FREON PUMP LOOP 1,2 (two) – A	Humidity Sep B Cabin Fan B IMU Fan B H2O Loop 1 Pump B Av Bay 1 Fan B Av Bay 2 Fan A	(LIGHTS LOST) R Ovhd pnl (pnls O1,O2, O3,O8,O9,O16,O17) R pnl (pnls F4,F8,F9,R1,R2, R4) Ovhd Instr (pnls O1,O2,O3) Orbit Sta Numeric (pnls A2,A4)	③ Freon Loop 2 pump switched to avoid having both loops powered by AC 1
3 If AV BAY FIRE POWERDOWN not performed: 4 • Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 2	2 Av Bay 3 Sig Condr, Xdcrs (ECLS SC4)	(FSMs) S67 AC VOLTS 2 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T SM0 THRM HYD (B) S66 AV BAY 1,2,3 FAN S69 FC PUMP 2 S69 FC H2 PUMP 2 S88 FREON FLOW 1 S88 FRN AFT CP 1 S88 FRN PL HX 1 S88 FREON QTY 2 S88 FREON FLOW 2 S88 H2O LOOP 1 TEMP S66 IMU FN SPD B S66 IMU FAN DP	④ Instrumentation loss caused rad isolaton ⑤ Not applicable for OV102 ⑥ Rad isolation may cause FES shutdown ⑦ Brake/Skid Cntl Box A,B enabled before WOW
5 (MO13Q) If Arlk/Tnl Fan active: • ARLK FAN B – OFF • √A – ON	Freon Loop 1 Pump B		⑧ Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snsr lost
(L4:P) • cb AC3 ΦA LG SNSR 1 – cl		6 Possible 'S88 EVAP OUT T 1(2)'	⑨ When gear deployed, tb will not indicate DN
(O17:C) • SIG CONDR FREON A – AC3 • SIG CONDR FREON B – AC3	7 Prox Snsr Elec Box 2	9 (F6,F8) LDG GEAR L,NOSE tb – bp	⑩ Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate and Accum Qty snsr lost
(CDR SEAT PNL) • CDR SEAT PWR BUS SEL – AC3 (dn)	8 Freon Sig Condr A AC2 pwr (ECLS SC1A) 10 Freon Sig Condr B AC2 pwr (ECLS SC1B)	HYD/APU APU H2O QTY 1 ind – 0% HYD QTY 2 ind – 0%	
(Continued)	CDR Seat Adj via AC2 pwr		
	(Continued)	(Continued)	

MEDS

EPS SSR-120 (Cont)
BUS LOSS: AC2

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ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(PLT SEAT PNL) ● PLT SEAT PWR BUS SEL - AC3 (dn)	PLT Seat Adj via AC2 pwr	(R1) FC2 COOL PUMP ΔP tb - bp	(11) Inhibits Primary C/W for AC2 Voltage, FC2 Stack Temp, and Pump ΔP
(R13U) ● C/W PARAM SEL tw (three) - 043,072,102 ● C/W PARAM - INH ● MEM - CLEAR ● C/W PARAM SEL tw (three) - > 119		(O1) AIR TEMP AV BAY 3 - 45 degF FREON FLOW LOOP 2 - 578 pph AIR TEMP CAB HX OUT - 45 degF	(12) Lose Auto Temp Cntl via Cntl 1 and Cabin Temp, Cabin Hx Air Out Temp and H2O Loop 1 Cabin Hx In Temp snrs. Hx Byp Vlv holds position
(WCS) ● ✓ MODE - AUTO ● ✓ CRADLE - AUTO ● ✓ Hose stowed in cradle ● ✓ WCS ON It - OFF ● FAN SEP SEL sw - OFF ● HOSE BLOCK - SEP 1 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete ● FAN SEP SEL sw - 1	WCS Fan/Sep 2	(A4) Mission and Event Timers blank	(13) Redundant mtr remains
(EDO WCS) ● URINAL SEL - SEP 1 ● URINE DIVERTER VLV - FAN SEP 1	Urine Sep 2 Fan 2 Commode Fan 2	If Freon Loop 1 Pump B ON: 'S88 FREON FLOW 1'	
If CAB TEMP CNTLR 1 active: (L1) ● CAB TEMP CNTLR - OFF	12 Cabin Temp Cntl 1 and Hx Byp Vlv Mtr 1	If APU active and using H2O Blr Cntl 1A or 2B: C/W APU TEMP It - on after ~2 min	
(MD44F) ● Remove pin from PRI ACTUATOR and BYP Vlv linkage, connect linkage to SEC ACTUATOR		If H2O Loop 1 Pump B active: H2O LOOP C/W It 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP' 'S88 H2O PUMP P1'	
(L1) ● CAB TEMP CNTLR - 2		(O1) H2O PUMP OUT PRESS LOOP 1 - 20-25 psia	
Refer to OMS/RCS Slide Rule for vlv loss info (use FPC2 Slide for Aft RCS and FMC2 for Fwd RCS)		L,R ADP deploy times incr from 15 to 30 sec	
BUS ISOLATION		<div style="border: 1px solid black; padding: 2px;"> SM (BFS SM 63) PL BAY DOORS </div>	
ONLY ON MCC CALL, PERFORM		During PLBD OP/CL, single mtr run time noted on actuators listed at left	
(MA73C:C) cb MCA PWR ● AC2 3Φ FWD 2 - op ● AC2 3Φ MID 1 - op ● AC2 3Φ MID 2 - op	13 AC2 FMC2 Bus pwr 13 L,R Vents 1,2 Mtrs 2 13 ADP Deploy Mtrs 2 13 -Y Star Trkr Dr Sys 2 OP/CL capability 13 -Z Star Trkr Dr Sys 1 OP/CL capability AC2 MNC1 Bus pwr LH Vent 5 Mtr 2 AC2 MMC2 Bus pwr PLBD C/L Lat 13-16 Mtr 2 Stbd Aft Blkhd Mtr 2 Port Door Mtr 2 Stbd Rad Lat 1-6 Mtr 2 LH Vent 3 Mtr 2	(R13L) During Rad Dpy/Sto ops: RAD LAT CNTL tbs (two) indicate single mtr ops	
(Continued)	(Continued)		

MEDS

EPS SSR-120 (Cont)
BUS LOSS: AC2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			
(MA73C:D) cb MCA PWR ● AC2 3Φ AFT 2 – op ● AC2 3Φ MID 3 – op ● AC2 3Φ MID 4 – op	14 Ku Ant Sto/Dpy Mtr 2 AC2 AMC2 Bus pwr LH,RH Vents 8,9 Mtr 2 AC2 MMC3 Bus pwr PL Reten Sys B Rel/Lat Mtrs AC2 MMC4 Bus pwr PLBD Port,Stbd Fwd Blkhd Mtrs 2 PLBD Stbd Door Mtr 2 Port Rad Lat 1-6 Mtr 2 RH Vent 6 Mtr 2		①4 ✓MCC for Ku Ant stow reqmts ①5 Single mtr time. One failure away from EVA to stow MPM or from RMS jettison ①6 Single mtr time
----- (MA73C:E) ● cb AC2 WCS FAN SEP 2 (three) – op ● cb AC2 PAYLOAD 3Φ – op	AC2 pwr to MS,PS Patch pnl		
----- (MA73C:F) cb AC2 ● RMS B/U ΦA – op ● OPS INST HYD ACTR ΦC – op	15 Port RMS: MPM Mtr 2 16 Fwd MRL Mtr 1 16 Mid MRL Mtr 2 D&C B/U edge Itg Ops Hyd Actr Inst		
----- (MA73C:G) IF DOCKING MISSION ● cb AC2 ARLK/TNL FAN B (three) – op	Ark/Tnl Fan B		
----- (MA73C:H,I) cb AC2 ● FWD RCS VLV (three) – op ● AFT POD VLV GP 2 (three) – op			
----- (L4:C-E) cb AC2 ● FC2 PUMPS (three) – op ● CTR ENG (three) – op ● L ENG (three) – op			
----- (L4:F-I) cb AC2 ● H2O LOOP PUMP 1B (three) – op ● AV BAY 1 FAN B (three) – op ● AV BAY 2 FAN A (three) – op ● IMU FAN B (three) – op			
----- (L4:J-K) cb AC2 ● HUM SEP B (three) – op ● CAB FAN B (three) – op			
----- (L4:L) cb AC2 ● ΦA CAB T CNTLR 1 – op ● ΦB AV BAY 3 S/C – op			
----- (L4:M) cb AC2 ● FREON LOOP 1 PUMP B (three) – op			
(Continued)	(Continued)		MEDS

EPS SSR-120 (Cont)
BUS LOSS: AC2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(L4:N) cb AC2 • ΦA FREON FLOW PROP 1 – op • ΦB FREON SIG CONDR – op</p>	<p>17 Freon Loop 1 Flow Prop Vlv</p>		<p>⑬ Redundant mtr remains</p>
<p>• cb AC2 ΦC RAD ISOLA – op</p>	<p>18 Freon Loop 1,2 Rad Isol Motor A</p>		<p>⑰ Flow prop vlv holds position</p>
<p>(L4:O) cb AC2 • ΦA BLR HYD BYP 1A – op • ΦB HYD QTY 2 – op • ΦC BLR HYD BYP 2B – op</p>	<p>Hyd Rsvr 2 Qty Snsr</p>		<p>⑱ Motor B remains</p>
<p>(L4:P) cb AC2 • ΦA LG SNSR 2 – op • ΦB RAD CNTLR 1A – op • ΦC TACAN 2 – op</p>	<p>19 Freon Loop 1 Cntrl A Rad Byp Vlv Mtr Tacan 2</p>		<p>⑲ Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains</p>
<p>(L4:Q) cb AC2 • ΦA LTG PNL R OVHD – op • ΦB LTG PNL R – op • ΦC LTG NUMERIC OS – op</p>	<p>R Ovhd Pnl Its R Pnl Lts OS Numeric Its</p>		
<p>(L4:R) • cb AC2 ΦB LTG INST OVHD – op</p>	<p>Ovhd Inst Its</p>		
	<p>13 ET Doors Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Closure Mtr 2 Uplock Lat Mtr 2</p>		
	<p>NLG, LMG B/U Rel 2 Fire 2, Arm</p>		

MEDS

**EPS SSR-121
BUS LOSS: AC2 Φ A**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	① If H2O Loop 1 Pump B active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W
(L1) • HUM SEP A – ON • B – OFF • IMU FAN A(C) – ON • B – OFF • H2O PUMP LOOP 1 (two) – GPC,A • H2O PUMP LOOP 2 – ON • FREON PUMP LOOP 1,2 (two) – A • AV BAY 1 FAN A – ON • B – OFF • 2 FAN A – OFF • B – ON	1 Φ of Hum Sep B 1 Φ of IMU Fan B 1 Φ of H2O Loop 1 Pump B 1 Φ of Freon Loop 1 Pump B 1 Φ of AV Bay 1 Fan B 1 Φ of AV Bay 2 Fan A	(F7) C/W AC VOLT It – on SM ALERT Light/Tone – on (F9) AC2 Φ A AC volts < 90 (LIGHTS LOST) R Ovhd pnl lts (pnls O1,O2,O3,O8,O9,O16,O17) (F6/F8) LDG GEAR L,NOSE tb – bp	② Freon Loop 2 pump switched to avoid having both loops powered by AC1 ③ When gear deployed, tb will not indicate DN
(MO13Q) If Arlk/Tnl Fan active: • ARLK FAN B – OFF • \checkmark A – ON	1 Φ of Arlk/Tnl Fan B	HYD/APU APU H2O QTY 3 ind – 0%	④ Not applicable for OV102
(L4:P) • cb AC3 Φ A LG SNSR 1 – cl	1 Φ of Cabin Fan B	(FSMs) S67 AC VOLTS 2 S69 FC H2 PUMP 2 S86 WSB T SM0 THRM HYD (B) S66 IMU FAN DP S66 IMU FN SPD B S88 H2O LOOP 1 TEMP	⑤ Brake/Skid Cntl Box A,B enabled before WOW
(R2) • BLR CNTLR/HTR 1 – B	5 Prox Snsr Elec Box 2	(O1) AIR TEMP CAB HX OUT ind – 45 degF	⑥ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1 Φ down; however, crew actions will pwr fans through alternate pwr source, with full 3 Φ pwr. For WCS, 2 Φ ops will result in degraded airflow. Urine Fan, Seps are unusable for urine collection or EMU drain
(WCS) • \checkmark MODE – AUTO • \checkmark CRADLE – AUTO • \checkmark Hose stowed in cradle • \checkmark WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 1 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete • FAN SEP SEL sw – 1	6 1 Φ of WCS Fan/Sep 2	If H2O PUMP LOOP 1,B active: C/W H2O LOOP It – on 'S88 H2O PUMP P 1'	
(EDO WCS) • URINAL SEL – SEP 1 • URINE DIVERTER VLV – FAN SEP 1	6 Urine Sep 2 Fan 2 1 Φ of Commode Fan 2	(O1) H2O PUMP OUT PRESS LOOP 1 ind – 40-45 psia	
If Cab Temp Cntrl 1 active: (L1) • CAB TEMP CNTLR – OFF	7 Cabin Temp Cntrl 1, Hx Byp Vlv Mtr 1	If IMU FAN B ON: 'S66 IMU FAN DP' 'S66 IMU FN SPD B'	
(MD44F) • Remove pin from PRI Actuator and BYP vlv linkage, connect linkage to SEC Actuator		If HUM SEP B ON: 'S66 HUMID SEP B'	
(L1) • CAB TEMP CNTLR – 2		If APUs active and using BLR CNTLR/HTR 1A: C/W APU TEMP It – on after ~2 min	⑦ Lose Auto Temp Cntl via Cntrl 1 and Cabin Temp, Cabin Hx A Out Temp and H2O Loop 1 Cabin Hx In Temp snrs Hx Byp Vlv hold position
(Continued)	(Continued)		

MEDS

EPS SSR-121 (Cont)
BUS LOSS: AC2 ΦA

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(R13U) • C/W PARAM SEL tw (three) – 043 (AC2 voltage) • C/W PARAM – INH MEM – CLEAR • C/W PARAM SEL tw (three) – > 119			⑧ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from two phases into short
<div style="border: 1px solid black; padding: 2px; width: fit-content;">SM 60 SM TABLE MAINT</div> • Reset upper limit of 0450214 (FC2 H2 PUMP STATUS) to current value + 0.3 volts	1Φ of FC2 H2 Pump 1Φ of FC2 Coolant Pump		⑨ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpwring sub-buses: SSR-124, SSR-125, SSR-126, SSR-127, SSR-128, SSR-129
9 If bus shorted: • Open all AC2 ΦA cbs that pwr 3Φ loads on pnl L4: C-K,M (10 cbs), pnl MA73C: E,G,H,I (4 cbs) • Open all AC2 3Φ ganged cbs on pnl MA73C: C-G (9 cbs)	8 If bus shorted: AC2 payload 3Φ Bus pwr (pwr MS, PS Patch panel) 9 AC2 FMC2 Bus pwr MMC1 Bus pwr MMC2 Bus pwr MMC3 Bus pwr MMC4 Bus pwr AMC2 Bus pwr		⑩ For unshorted bus, perform single Φ isolation steps to prevent pwring single phase loads with coupled energy from remaining two phases
10 If bus not shorted: • Perform the following BUS ISOLATION steps			
10 BUS ISOLATION			⑪ Flow prop vlv holds position
IF BUS NOT SHORTED, PERFORM			
(L4:L) • cb AC2 ΦA CAB T CNTLR 1 – op			
(L4:N) • cb AC2 ΦA FREON FLOW PROP 1 – op	11 Freon Loop 1 Flow Prop Vlv		
(L4:O) • cb AC2 ΦA BLR HYD BYP 1A – op			
(L4:P) • cb AC2 ΦA LG SNSR 2 – op			
(L4:Q) • cb AC2 ΦA LTG PNL R OVHD – op	R Ovhd pnl lts (pnls O1,O2, O3,O8,O9,O16,O17)		
(MA73C:F) • cb AC2 RMS B/U ΦA – op	Port RMS: D&C B/U edge Itg MPM Mtr 2 FWD MRL Mtr 1 MID MRL Mtr 2		
	NLG, LMG B/U Rel 2 Fire 2, Arm		
	FC2 pH Snsr		
			<div style="text-align: center; font-size: 2em; font-weight: bold; margin-top: 20px;">MEDS</div>

**EPS SSR-122
BUS LOSS: AC2 ΦB**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	① If H2O Loop 1 Pump B active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W
(L1) • HUM SEP A – ON • B – OFF • IMU FAN A(C) – ON • B – OFF • H2O PUMP LOOP 1 (two) – GPC,A • H2O PUMP LOOP 2 – ON • AV BAY 3 FAN (two) – ON • FREON PUMP LOOP 1,2 (two) – A	1Φ of Hum Sep B 1Φ of IMU Fan B 1 1Φ of H2O Loop 1 Pump B 2 AV Bay 3 Sig Condr,Xdcrs (ECLS SC4)	(F7) C/W AC VOLT It C/W FREON LOOP It SM ALERT Light/Tone (F9) AC2 ΦB AC volts < 90	② Av Bay 3 Fan ΔP, Air Out Temp snrsrs lost
3 • AV BAY 1 FAN A – ON • B – OFF • 2 FAN A – OFF • B – ON	1Φ of Freon Loop 1 Pump B AV Bay 1 Fan B 1Φ of AV Bay 2 Fan A	(LIGHTS LOST) Ovhd Instr (pnls O1,O2,O3) R pnl (pnls F4,F8,F9,R1, R2,R4)	③ Freon Loop 2 pump switched to avoid having both Freon loops powered by AC1
4 • Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 2		(FSMs) S67 AC VOLTS 2 S69 FC H2 PUMP 2 S86 HYD RSVR Q SM2 HYD QTY (B) S66 AV BAY 3 TEMP S66 AV BAY 3 FAN S88 FREON FLOW 2 S88 FRN PL HX 1 S88 FREON QTY 2	④ Instrumentation loss caused rad isolation ⑤ Rad isolation may cause FES shutdown
(MO13Q) If Arlk/Tnl Fan active: 6 • ARLK FAN B – OFF • ✓A – ON	1Φ of Arlk/Tnl Fan B 1Φ of Cabin Fan B	5 Possible 'S88 EVAP OUT T 1(2)'	⑥ Not applicable for OV102 ⑦ Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snrsrs lost
(O17:C) • SIG CONDR FREON A – AC3 • SIG CONDR FREON B – AC3	7 Freon Sig Condr A AC2 pwr (ECLS SC1A) 8 Freon Sig Condr B AC2 pwr (ECLS SC1B)	(A4) Mission and Event Timers blank	⑧ Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate, and Accum Qty snrsrs lost
(R13U) • C/W PARAM SEL tw (three) – 043 (AC2 voltage) • C/W PARAM – INH • MEM – CLEAR • C/W PARAM SEL tw (three) – > 119		HYD/APU HYD QTY 2 – 0%	⑨ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1Φ down; however, crew actions will pwr fans through alternate pwr source, with full 3Φ pwr. For WCS, 2Φ ops will result in degraded airflow. Urine Fan and Seps are unusable for urine collection or EMU drain
SM 60 SM TABLE MAINT • Reset upper limit of 0450214 (FC2 H2 PUMP STATUS) to current value + 0.3 volts	1Φ of FC2 H2 Pump 1Φ of FC2 Coolant Pump	(O1) AIR TEMP AV BAY 3 – 45 degF FREON FLOW LOOP 2 – 578 pph 1 If H2O Loop 1 Pump active: C/W H2O LOOP It 'S88 H2O PUMP P1'	
(WCS) • ✓MODE – AUTO • ✓CRADLE – AUTO • ✓Hose stowed in cradle • ✓WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 1 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete • FAN SEP SEL sw – 1	9 1Φ of WCS Fan/Sep 2	1 (O1) H2O PUMP OUT PRESS LOOP 1 – 40-45 psia	
(Continued)	(Continued)		

MEDS

EPS SSR-122 (Cont)
BUS LOSS: AC2 ΦB

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(EDO WCS) • URINAL SEL – SEP 1 • URINE DIVERTER VLV – FAN SEP 1	9 Urine Sep 2 Fan 2 1Φ of Commode Fan 2		⑨ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller.
10 If bus shorted: • Open all AC2 ΦB cbs that pwr 3Φ loads on pnl L4: C-K,M (10 cbs), pnl MA73C: E,G,H,I (4 cbs) • Open all AC2 3Φ ganged cbs on pnl MA73C: C-G (9 cbs)	11 If bus shorted: AC2 payload 3Φ Bus pwr (pwrs MS, PS Patch panel) 10 AC2 FMC2 Bus pwr MMC1 Bus pwr MMC2 Bus pwr MMC3 Bus pwr MMC4 Bus pwr AMC2 Bus pwr		Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1Φ down; however, crew actions will pwr fans through alternate pwr source, with full 3Φ pwr. For WCS, 2Φ ops will result in degraded airflow. Urine Fan and Seps are unusable for urine collection or EMU drain
12 If bus not shorted: • Perform the following BUS ISOLATION steps			
12			
BUS ISOLATION			
IF BUS NOT SHORTED, PERFORM			
(L4:L) • cb AC2 ΦB AV BAY 3 S/C – OP			⑩ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short.
(L4:N) • cb AC2 ΦB FREON SIG CONDR – op			After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpwring sub-buses:
(L4:O) • cb AC2 ΦB HYD QTY 2 – op	13 Hyd Rdvr 2 Qty Snsr		SSR-124, SSR-125, SSR-126, SSR-127, SSR-128, SSR-129
(L4:P) • cb AC2 ΦB RAD CNTLR 1A – op	Freon Loop 1 Cntrl A Rad Byp Vlv Mtr H2O Ln pH Snsr		⑪ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short
(L4:Q) • cb AC2 ΦB LTG PNL R – op	R pnl Itg (pnls F4,F8,F9,R1, R2,R4)		
(L4:R) • cb AC2 ΦB INST OVHD – op	Ovhd Instr Itg (pnls O1,O2, O3)		⑫ For unshorted bus, perform single Φ isolation steps to prevent pwring single phase loads with coupled energy from remaining two phases
	Port RMS: 1Φ of MPM Mtr 2 FWD MRL Mtr 1 MID MRL Mtr 2		
	1Φ of AC2 payload 3Φ Bus pwr (pwrs MS, PS Patch pnl)		⑬ Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains
			<p style="text-align: center;">MEDS</p>

EPS SSR-123
BUS LOSS: AC2 Φ C

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	<p>① If H2O Loop 1 Pump B active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W</p> <p>② Freon Loop 2 pump switched to avoid having both loops powered by AC1</p> <p>③ Not applicable for OV102</p> <p>④ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1Φ down; however, crew actions will pwr fans through alternate pwr source with full 3Φ pwr. For WCS, 2Φ ops will result in degraded airflow. Urine Fan and Seps are unusable for urine collection or EMU drain</p>
(L1) • HUM SEP A – ON • B – OFF • IMU FAN A(C) – ON • B – OFF • H2O PUMP LOOP 1 (two) – GPC,A • H2O PUMP LOOP 2 – ON 2 • FREON PUMP LOOP 1,2 (two) – A • AV BAY 1 FAN A – ON • B – OFF • 2 FAN A – OFF • B – ON	1 Φ of Hum Sep B 1 Φ of IMU Fan B 1 1 Φ of H2O Loop 1 Pump B 1 Φ of Freon Loop 1 Pump B AV Bay 1 Fan B 1 Φ of AV Bay 2 Fan A	(F7) C/W AC VOLT It SM ALERT Light/Tone (LIGHTS LOST) Orbit Sta Numeric (pnls A2,A4) (FSM) S67 AC VOLTS 2 S69 FC H2 PUMP 2 S86 WSB T SM0 THRM HYD (B)	
(MO13Q) If Arlk/Tnl Fan active: 3 • ARLK FAN B – OFF • \checkmark A – ON	1 Φ of Arlk/Tnl Fan B	1 If H2O Loop 1 Pump B active: C/W H2O LOOP It 'S88 H2O PUMP P 1'	
	1 Φ of Cabin Fan B	(O1) H2O PUMP OUT PRESS LOOP 1 = 40–45 psia	
(R2) • BLR CNTLR PWR/HTR 2 – A	HYD H2O Blr 2 Cntr B	If APUs active and using H2O BLR CNTLR 2B: C/W APU TEMP It after ~2 min	
(R13U) • C/W PARAM SEL tw (three) – 043 (AC2 voltage) • C/W PARAM – INH • C/W MEM – CLEAR • C/W PARAM SEL tw (three) – > 119			
SM 60 SM TABLE MAINT • Reset upper limit of 0450214 (FC2 H2 PUMP STATUS) to current value + 0.3 volts	1 Φ of FC2 H2 Pump 1 Φ of FC2 Coolant Pump		
(WCS) • \checkmark MODE – AUTO • \checkmark CRADLE – AUTO • \checkmark Hose stowed in cradle • \checkmark WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 1 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30–sec run complete • FAN SEP SEL sw – 1	4 1 Φ of WCS Fan/Sep 2		
(EDO WCS) • URINAL SEL – SEP 1 • URINE DIVERTER VLV – FAN SEP 1	4 Urine Sep 2 Fan 2 1 Φ of Commode Fan 2		
(Continued)	(Continued)		

MEDS

EPS SSR-123 (Cont)
BUS LOSS: AC2 ΦC

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
5 If bus shorted: • Open all AC2 ΦC cbs that pwr 3Φ loads on pnl L4: C-K,M (10 cbs), pnl MA73C: E,G,H,I (4 cbs) • Open all AC2 3Φ ganged cb1 on pnl MA73C: C-G (9 cbs)	6 If bus shorted: AC2 payload 3Φ Bus pwr (pwrs MS, PS Patch panel) 5 AC2 FMC2 Bus pwr MMC1 Bus pwr MMC2 Bus pwr MMC3 Bus pwr MMC4 Bus pwr AMC2 Bus pwr		⑤ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpwring sub-buses: SSR-124, SSR-125, SSR-126, SSR-127, SSR-128, SSR-129
7 If bus not shorted: • Perform the following BUS ISOLATION steps			
BUS ISOLATION			
IF BUS NOT SHORTED, PERFORM			
(L4:N) • cb AC2 ΦC RAD ISOLA - op	8 Freon Loop 1,2 Rad Isol Motor A		⑥ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short
(L4:O) • cb AC2 ΦC BLR HYD BYP 2B - op			⑦ For unshorted bus, perform single isolation steps to prevent pwring single phase loads with coupled energy from remaining two phases
(L4:P) • cb AC2 ΦC TACAN 2 - op	Tacan 2		
(L4:Q) • cb AC2 ΦC LTG NUMERIC OS - op	Orbit Sta Numeric Ltg (pnls A2,A4)		⑧ Motor B remains
(MA73C:F) • cb AC2 OPS INST HYD ACTR ΦC - op	Ops Hyd Act Inst		
	Port RMS: 1Φ of MPM Mtr 2 FWD MRL Mtr 1 MID MRL Mtr 2		
	1Φ of AC2 payload 3Φ Bus pwr (pwrs MS, PS Patch pnl)		

MEDS

EPS SSR-124
BUS LOSS: AC2 FMC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		L,R ADP deploy times incr from 15 to 30 sec	① Redundant mtr remains
		-Y,-Z Star Trkr OP/CL time incr from 8 to 16 sec	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:C) • cb MCA LOGIC MCA PWR AC2 3Φ FWD 2 – op	AC2 FMC2 Bus pwr 1 L,R Vents 1,2 Mtrs 2 1 ADP Dpy Mtrs 2 1 -Y Star Trkr Dr Sys 2 OP/CL capability 1 -Z Star Trkr Dr Sys 1 OP/CL capability		

EPS SSR-125
BUS LOSS: AC2 MMC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:C) • cb MCA LOGIC MCA PWR AC2 3Φ MID 1 – op	AC2 MMC1 Bus pwr LH Vent 5 Mtr 2		

EPS SSR-126
BUS LOSS: AC2 MMC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 Port RMS: 2 MPM Mtr 2 Fwd MRL Mtr 1	SM (BFS SM 63) PL BAY DOORS	① Single mtr time. One failure away from EVA to stow MPM or from RMS jettison ② Single mtr time
		During PLBD OP/CL, single mtr run time noted on actuators listed at left	
BUS ISOLATION		(R13) During Rad Dpy/Sto ops, RAD LAT CNTL STBD tb indicates single mtr ops	
ONLY ON MCC CALL, PERFORM			
(MA73C:C) • cb MCA LOGIC MCA PWR AC2 3Φ MID 2 – op	AC2 MMC2 Bus pwr PLBD C/L Lat 13-16 Mtr 2 Stbd Aft Bkhd Mtr 2 Port Door Mtr 2		
	Stbd Rad Lat 1-6 Mtr 2 LH Vent 3 Mtr 2		

MEDS

**EPS SSR-127
BUS LOSS: AC2 MMC3**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	① Single mtr time
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:D) • cb MCA LOGIC MCA PWR AC2 3Φ MID 3 – op	AC2 MMC3 Bus pwr PL Reten Sys B Rel/Lat Mtrs		
	ROEU		
	1 Orbiter arm drive mtr (ODM mtr 2 – mate B, demate B, relax B)		
	1 ODA mtr 2 latch/release		

**EPS SSR-128
BUS LOSS: AC2 MMC4**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		SM (BFS SM 63) PL BAY DOORS	① Single mtr time
BUS ISOLATION		During PLBD OP/CL, single mtr run time noted on actuators listed at left	② ✓MCC for Ku Ant stow reqmts
ONLY ON MCC CALL, PERFORM		(R13L) During Rad Dpy/Sto ops: RAD LAT CNTL PORT tb indicates single mtr ops	
(MA73C:D) • cb MCA LOGIC MCA PWR AC2 3Φ MID 4 – op	AC2 MMC4 Bus pwr PLBD Port,Stbd Fwd Bkhd Mtrs 2 PLBD Stbd Door Mtr 2		
	Port Rad Lat 1-6 Mtr 2 RH Vent 6 Mtr 2		
	1 Port RMS Mid MRL Mtr 2		
	2 Ku Ant Sto/Dpy Mtr 2		

**EPS SSR-129
BUS LOSS: AC2 AMC2**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	① Redundant mtrs remain
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:D) • cb MCA LOGIC MCA PWR AC2 3Φ AFT 2 – op	AC2 AMC2 Bus pwr LH,RH Vents 8,9 Mtr 2		
	1 ET Door Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Closure Mtr 2 Uplock Lat Mtr 2		

MEDS

EPS SSR-130 (Cont)
BUS LOSS: AC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM		R ADP deploy time incr from 15 to 30 sec	
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	13 CO2 Rmvl Sys: Cntlr 2 Fan AC3 pwr Compressor AC3 pwr	SM (BFS SM 63) PL BAY DOORS	⑬ PEVs, Actuators, Bed A P, Bed B P, and Bed dP will be recovered after system reconfig
(MA73C:C) cb MCA LOGIC MCA PWR • AC3 3Φ FWD 3 – op • AC3 3Φ MID 2 – op	14 KU ANT Sto/Dpy Mtr 1 AC3 FMC3 Bus pwr 15 R ADP Dpy Mtr 1 15 -Z Star Trkr Dr Sys 2 OP/CL capability LH Vents 1,2 Mtr 1 AC3 MMC2 Bus pwr PLBD C/L Lat 1-4 Mtr 2 5-8 Mtr 2 Port Aft Blkhd Mtr 2 Stbd Rad Lat 7-12 Mtr 2 Dpy/Sto Mtr 2 LH Vent 6 Mtr 2 3 Mtr 1	During PLBD OP/CL, single mtr run time noted on actuators listed at left	⑭ ✓MCC for Ku Ant stow reqmts
(MA73C:D) cb MCA LOGIC MCA PWR • AC3 3Φ AFT 3 – op • MID 4 – op	AC3 AMC3 Bus pwr RH Vents 8,9 Mtr 1 AC3 MMC4 Bus pwr PLBD C/L Lat 9-12 Mtr 2 13-16 Mtr 1 Stbd Aft Blkhd Mtr 1 Port Door Mtr 1 Port Rad Lat 7-12 Mtr 2 Dpy/Sto Mtr 2 RH Vents 3,5 Mtrs 2	During Rad Dpy/Sto ops: (R13L) RAD CNTL tbs (four) indicate single mtr ops	⑮ Redundant mtrs remain
(MA73C:E) • cb AC3 PAYLOAD 3Φ – op	AC3 pwr to MS, PS Patch pnls		⑯ Hum Sep A,B Speed Norm Snsrs lost
(MA73C:G) • cb AC3 GALLEY FAN (three) – op	Galley Fan		⑰ IMU Fan A,B,C Speed Norm Snsrs lost
(MA73C:H,I) • cb AC3 FWD RCS VLV (three) – op • cb AC3 AFT POD VLV GP 3 (three) – op			
(L4:A) • cb UTIL PWR A15/MO13Q AC3 – op	AC3 Utility pwr (A15/MO13Q)		
(L4:C-E) cb AC3 • FC3 PUMPS (three) – op • R ENG (three) – op • L ENG (three) – op			
(L4:F-H) cb AC3 • H2O LOOP PUMP 2 (three) – op • AV BAY 3 FAN A (three) – op • AV BAY 2 FAN B (three) – op			
(L4:I,J) cb AC3 • IMU FAN C (three) – op • ΦA SIG/CONDR HUM SEP – op • ΦB SIG/CONDR IMU FAN – op	16 Hum Sep Sig Condr (ECLS SC5) 17 IMU Fan Sig Condr (ECLS SC7)		
(Continued)	(Continued)		

MEDS

EPS SSR-130 (Cont)
BUS LOSS: AC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>ONLY ON MCC CALL, PERFORM</p>			<p>② Vlv holds position</p>
<p>(L4:K,L) cb AC3 ● CABIN FAN A (three) – op ● ΦA H2O CNTLR 1 – op ● ΦB AV BAY 1 S/C – op</p>			<p>①⑤ Redundant mtrs remain</p>
<p>(L4:M,N) cb AC3 ● FREON LOOP 2 PUMP A (three) – op ● ΦA FREON FLOW PROP 2 – op ● ΦB FREON SIG/CONDR – op</p>	<p>2 Freon Loop 2 Flow Prop Vlv</p>		<p>①⑧ Motor A remains</p>
<p>(L4:N) ● cb AC3 ΦC RAD ISOL B – op</p>	<p>18 Freon Loop 1,2 Rad Isol Motor B</p>		<p>①⑨ Bypass vlv holds position and Cntr B Rad Byp Vlv Mtr remains</p>
<p>(L4:O) cb AC3 ● ΦA BLR HYD BYP 1A – op ● ΦB HYD QTY 3 – op ● ΦC BLR HYD BYP 3B – op</p>	<p>Hyd Rsvr 3 Qty Snsr</p>		<p>②⑩ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison</p>
<p>(L4:P) cb AC3 ● ΦA LG SNSR 1 – op ● ΦB RAD CNTLR 2A – op ● ΦC TACAN 3 – op</p>	<p>19 Freon Loop 2 Cntr A Rad Byp Vlv Mtr Tacan 3</p>		<p>②⑪ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists</p>
<p>(L4:Q) cb AC3 ● ΦA LTG COAS – op ● ΦB LTG PNL MS – op ● ΦC LTG PNL OS – op</p>	<p>Sta 1,2 COAS ltg pwr MS pnl lts (pnls R10,R12) OS pnl lts (pnls A1,A2,A6, A7,A8,A13,L9)</p>		
<p>(L4:R) ● cb AC3 ΦB INST L/CTR – op</p>	<p>L/Ctr Inst lts (pnls C2,F6,F7)</p>		
	<p>15 ET Door Mtrs: C/L Lat Actr 2 Mtr 2 L Dr Closure Mtr 2 R Dr Closure Mtr 1 Uplock Lat Mtr 1</p>		
	<p>20 Port RMS: MPM Mtr 1 21 FWD MRL Mtr 2 21 AFT MRL Mtr 1</p>		

MEDS

EPS SSR-131
BUS LOSS: AC3 ΦA

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	① If H2O Loop 2 Pump active, Loop 2 Pump Out Press must drop below 45 psia to trigger C/W
(L1) • ✓ IMU FAN B – ON • ✓ C – OFF • H2O PUMP LOOP 1 (two) – ON, B • H2O PUMP LOOP 2 – GPC • Perform (H2O Loop 2 only), H2O PUMP OPS via GPC, ECLS SSR-10 • H2O PUMP LOOP 1 – OFF • FREON PUMP LOOP 2 – B • ✓ AV BAY 2 FAN A – ON • ✓ B – OFF • ✓ 3 FAN A – OFF • ✓ B – ON	1Φ of IMU Fan C	1 (F7) C/W AC VOLT It – on C/W H2O LOOP It – on	
	1 1Φ of H2O Loop 2 Pump man ON	(F9) AC3 ΦA AC volts < 90	② Indicates DN when NLG down
	3 H2O Loop 1 Byp Cntrl, Sig Condr	(F6/F8) LDG GEAR NOSE, R tb – bp	③ H2O Loop 1 Pump Out Press, Pump ΔP, Accum Qty, Pump Out Temp snrs lost
	5 H2O Loop 1 Byp vlv pwr	(O1) H2O PUMP OUT PRESS LOOP 1 meter ind – 0 psia	④ Will not indicate DN when RMG down
	1Φ of Freon Loop 2 Pump A	(FSMs) S67 AC VOLTS 3 S69 FC H2 PUMP 3 S86 WSB T S66 HUMID SEP B S88 H2O PUMP P 1 S88 H2O LOOP TEMP S88 H2O LOOP 1 QTY SM0 THRM HYD (B)	⑤ H2O Loop 1 Byp Vlv holds position
	1Φ of AV Bay 2 Fan B		⑥ Brake/Skid Cntl Box A,B enabled before WOW
	1Φ of AV Bay 3 Fan A		⑦ Inhibits H2O Loop 1 Pump ΔP, Pump Out Press, Pump Out Temp, Accum Qty, respectively
	1Φ of Cabin Fan A	HYD/APU APU H2O QTY 2 ind – 0%	⑧ Inhibits Primary C/W for H2O Loop 1,2 Pump P and AC3 voltage
(L4:P) • cb AC2 ΦA LG SNSR 2 – cl	6 Prox Snr Electronics Box 1	If H2O PUMP LOOP 2 active: 'S88 H2O PUMP P 2' (O1) H2O PUMP OUT PRESS LOOP 2 ind – 40–45 psia	⑨ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpwrng sub-buses: SSR-134, SSR-135, SSR-136, SSR-137
SM 60 SM TABLE MAINT		If APUs active and using BLR CNTLR/HTR 2A: C/W APU TEMP It – on after ~2 min	⑩ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short
7 • Inhibit 0612605, 0612600, 0612640, 0612610 • Reset upper limit of 0450314 (FC3 H2 PUMP STATUS) to current value +0.3 volts	1Φ of FC3 H2 Pump	If IMU FAN C ON: S66 IMU FAN DP S66 IMU FN SPD C	
	1Φ of FC3 Coolant Pump	If CO2 Removal Sys Cntrl 2 selected: (MO51F) CO2 RMVL SYS CNTLR 2 FAIL It – on	⑪ MCC will provide equipment reconfig info if reqd
(R2) • BLR CNTLR/HTR 2 – B	Hyd H2O Blr 2 Cntrl A		
(R13U) • C/W PARAM SEL tw (three) – 105, 115, 053 • C/W PARAM – INH • C/W MEM – CLEAR • C/W PARAM SEL tw (three) – > 119			
8 • If bus shorted: • Open all AC3 ΦA cbs that pwr 3Φ loads on pnls L4: C-I,K,M (9 cbs), MA73C: G-I (3 cbs) • Open all AC3 3Φ ganged cbs on pnls L4:B (1 cb), MA73C: C-G (7 cbs)	10 If bus shorted: AC3 payload 3Φ Bus pwr (pwrs MS, PS Patch panel)		
	9 AC3 FMC3 Bus pwr MMC2 Bus pwr MMC4 Bus pwr AMC3 Bus pwr		
	11 1Φ of AC Utility Power Outlets at A15 and MO13Q		
(Continued)	(Continued)		

MEDS

EPS SSR-131 (Cont)
BUS LOSS: AC3 Φ A

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(M051F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)</p> <p>13 If bus not shorted: (L1)</p> <p>14 • Install sw guard (stowed in IFM tool kit) over Cab Fan A sw • Perform the following BUS ISOLATION steps</p>	<p>12 CO2 Rmvl Sys Cntrl 2 1 Φ of CO2 Rmvl Sys: Fan AC3 pwr Compressor AC3 pwr</p>	<p>(M051F) CO2 RMVL SYS CNTLR 2 FAIL It - on Impending: 'S66 CO2 RL SYS PCO2' 'S66 CAB PPCO2'</p>	<p>⑫ PEVs, Actuators, Bed A dP, Bed B dP, and Fan dP will be recovered after system recovered</p> <p>⑬ For unshorted bus, perform single Φ isolation steps to prevent pwring single phase loads with coupled energy from remaining two phases</p> <p>⑭ Switch guard installed to prevent Cab Fan A from being turned off during LiOH can changeout and cabin fan filter cleaning</p> <p>⑮ Hum Sep A,B Speed Norm snrs lost</p> <p>⑯ Vlv holds position</p>
<p>13 BUS ISOLATION</p> <p>IF BUS <u>NOT</u> SHORTED, PERFORM</p> <p>(L4:J) • cb AC3 ΦA SIG CONDR HUM SEP - op</p> <p>(L4:L) • cb AC3 ΦA H2O CNTLR 1 - op</p> <p>(L4:N) • cb AC3 ΦA FREON FLOW PROP 2 - op</p> <p>(L4:O) • cb AC3 ΦA BLR HYD BYP 2A - op</p> <p>(L4:P) • cb AC3 ΦA LG SNSR 1 - op</p> <p>(L4:Q) • cb AC3 ΦA LTG COAS - op</p>	<p>15 Hum Sep Sig Condr (ECLS SC 5)</p> <p>16 Freon Loop 2 Flow Prop Vlv</p> <p>Sta 1,2 COAS pwr</p> <p>NLG,RMG Backup Rel 1 Fire 2, Arm FC 3 pH Snsr</p> <p>Port RMS: 1Φ of MPM Mtr 1 FWD MRL Mtr 2 AFT MRL Mtr 1</p> <p>1Φ of AC3 payload 3Φ Bus pwr (pwrs MS, PS Patch pnl)</p>		

MEDS

**EPS SSR-132
BUS LOSS: AC3 ΦB**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	① If H2O Loop 2 Pump active, Loop 2 Pump Out Press must drop below 45 psia to trigger C/W
(L1) • ✓ IMU FAN B – ON • ✓ C – OFF • H2O PUMP LOOP 1 (two) – ON,B • H2O PUMP LOOP 2 – GPC • AV BAY 1 FAN (two) – ON • FREON PUMP LOOP 2 – B • ✓ AV BAY 2 FAN A – ON • ✓ B – OFF • ✓ 3 FAN A – OFF • ✓ B – ON	1 Φ of IMU Fan C 1 1Φ of H2O Loop 2 Pump man ON capability 2 Av Bay 1 Sig Condr, Xdcrs (ECLS SC2) 1Φ of Freon Loop 2 Pump A 1Φ of AV Bay 2 Fan B 1Φ of AV Bay 3 Fan A	(F7) C/W AC VOLT It C/W FREON LOOP It SM ALERT It C/W H2O PUMP It (F9) AC3 ΦB AC volts < 90 (FSMs) S67 AC VOLTS 3 S69 FC H2 PUMP 3 S86 HYD RSVR Q SM2 HYD QTY (B) S66 AV BAY 1 FAN S66 IMU FN SPD B S88 FREON FLOW 1 S88 FRN PL HX 2 S88 FREON QTY 1 S88 H2O PUMP P 2	② Av Bay 1 Fan ΔP, Air Out Temp snrs lost ③ Instrumentation loss caused rad isolation ④ Rad isolation may caused FES shutdown ⑤ Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snrs lost
3 • Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 1		4 Possible 'S88 EVAP OUT T 1(2)'	⑥ Freon Loop 2 P/L Hx Flow Rate Freon Loop 1 ICH Flow Rate, and Accum Qty snrs lost
(O17:C) • SIG CONDR FREON A – AC2 • SIG CONDR FREON B – AC2	5 Freon Sig Condr A AC3 pwr (ECLS SC1A) 6 Freon Sig Condr B AC3 pwr (ECLS SC1B)	HYD/APU HYD QTY 3 – 0%	⑦ Inhibits Primary C/W for AC3 Voltage and H2O Loop 2 Pump P
(R13U) 7 • C/W PARAM SEL tw (three) – 053,115 • C/W PARAM – INH 8 • Change PRI C/W PARAM 105 low limit to 1.50 • C/W MEM – CLEAR • C/W PARAM SEL tw (three) – > 119		(LIGHTS LOST) L/Ctr Instr Its (pnls C2,F6,F7) MS pnl Its (pnls R10,R12)	⑧ Sets H2O Loop 1 Pump P low limit to 45 psia
SM 60 SM TABLE MAINT • Reset upper limit of 0450314 (FC3 H2 PUMP STATUS) to current value + 0.3 volts	1Φ of FC3 H2 Pump 1Φ of FC3 Coolant Pump	(O1) 1 H2O PUMP OUT PRESS LOOP 2 – 40–45 psia FREON FLOW 1 – 578 pph AV Bay 1 Air Out – 45 degF	⑨ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpwring sub-buses: SSR-134, SSR-135, SSR-136, SSR-137
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	1Φ of CO2 Rmvl Sys: Fan AC3 pwr Compressor AC3 pwr		⑩ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into shorts
9 If bus shorted: • Open all AC3 ΦB cbs that pwr 3Φ loads on pnls L4: C-I,K,M (9 cbs), MA73C: G-I (3 cbs) • Open all AC3 3Φ ganged cbs on pnls L4:B (1 cb), MA73C: C-G (7 cbs)	10 If bus shorted: AC3 payload 3Φ Bus pwr (pwrs MS, PS Patch panel) 9 AC3 FMC3 Bus pwr MMC2 Bus pwr MMC4 Bus pwr AMC3 Bus pwr		⑪ MCC will provide equipment reconfig info if reqd
	11 1Φ of AC Utility Power Outlets at A15 and MO13Q		
(Continued)	(Continued)		MEDS

EPS SSR-132 (Cont)
BUS LOSS: AC3 Φ B

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
12 If bus not shorted: (L1) 13 • Install sw guard (stowed in IFM tool kit) over Cab Fan A sw • Perform the following BUS ISOLATION steps			⑫ For unshorted bus, perform single Φ isolation steps to prevent pwrng single phase loads with coupled energy from remaining two phases
BUS ISOLATION			⑬ Switch guard installed to prevent Cab Fan A from being turned off during LiOH can changeout and cabin fan filter cleaning
IF BUS <u>NOT</u> SHORTED, PERFORM			
(L4:J) • cb AC3 Φ B SIG CONDR IMU FAN – op	14 IMU Fan Sig Condr (ECLS SC7)		⑭ IMU Fan A,B,C Speed Norm snsr lost
(L4:L) • cb AC3 Φ B AV BAY 1 S/C – op			⑮ Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains
(L4:N) • cb AC3 Φ B FREON SIG CONDR – op			
(L4:O) • cb AC3 Φ B HYD QTY 3 – op	Hyd Rsvr 3 Qty Snsr		
(L4:P) • cb AC3 Φ B RAD CNTLR 2A – op	15 Freon Loop 2 Cntrl A Rad Byp Vlv Mtr		
(L4:Q) • cb AC3 Φ B LTG PNL MS – op	MS pnl lts (pnl R10,R12)		
(L4:R) • cb AC3 Φ B INST L/CTR – op	L/Ctr Inst lts (pnl C2,F6,F7)		
	Port RMS: 1 Φ of MPM Mtr 1 FWD MRL Mtr 2 AFT MRL Mtr 1		
	1 Φ of AC3 payload 3 Φ Bus pwr (pwr MS, PS Patch pnl)		

MEDS

EPS SSR-133
BUS LOSS: AC3 Φ C

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	<p>① H2O Loop 2 Pump Out Press must drop below 45 psia to trigger C/W</p> <p>② Inhibits Primary C/W for AC3 Voltage and H2O Loop 2 Pump P</p> <p>③ Sets H2O Loop 1 Pump P low limit to 45 psia</p> <p>④ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into shorts</p> <p>⑤ Ganged cd. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unprwing subbuses: SSR-134, SSR-135, SSR-136, SSR-137</p> <p>⑥ For unshorted bus, perform single Φ isolation steps to prevent pwring single phase loads with coupled energy from remaining two phases</p> <p>⑦ MCC will provide equipment reconfig info if reqd</p> <p>⑧ Switch guard installed to prevent Cab Fan A from being turned off during LiOH can changeout and cabin fan filter cleaning</p>
(L1) • ✓ IMU FAN B – ON • ✓ C – OFF • H2O PUMP LOOP 1 (two) – ON,B • H2O PUMP LOOP 2 – GPC • ✓ FREON PUMP LOOP 2 – B • ✓ AV BAY 2 FAN A – ON • ✓ B – OFF • ✓ 3 FAN A – OFF • ✓ B – ON	1 Φ of IMU Fan C 1 Φ of H2O Loop 2 Pump man ON capability 1 Φ of Freon Loop 2 Pump A 1 Φ of AV Bay 2 Fan B 1 Φ of AV Bay 3 Fan A	(F7) C/W AC VOLT It – on C/W FREON LOOP It – on SM ALERT It – on C/W H2O PUMP It – on (F9) AC3 Φ C AC volts < 90 (LIGHTS LOST) OS pnl lts (pnls A1,A2,A6,A7,A8,A13,L9)	
	1 Φ of Cabin Fan A	(FSMs) S69 FC H2 PUMP 3 S86 WSB T SM0 THRM HYD S88 H2O PUMP P 2 (B)	
(R2) • BLR CNTLR/HTR 3 – A	Hyd H2O Blr 3 Cntlr B	(O1) H2O PUMP OUT PRESS LOOP 2 ind – 40-45 psia	
(R13U) • C/W PARAM SEL tw (three) – 053, 115 • C/W PARAM – INH • Change PRI C/W PARAM 105 low limit to 1.50 • C/W MEM – CLEAR • C/W PARAM SEL tw (three) – > 119		If APUs active and using BLR CNTLR/HTR 3B: C/W APU TEMP It – on after ~2 min	
SM 60 SM TABLE MAINT • Reset upper limit of 0450314 (FC3 H2 PUMP STATUS) to current value + 0.3 volts	1 Φ of FC3 H2 Pump 1 Φ of FC3 Coolant Pump		
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	1 Φ of CO2 Rmvl Sys: Fan AC3 pwr Compressor AC3 pwr		
If bus shorted: 5 • Open all AC3 Φ C cbs that pwr 3 Φ loads on pnls L4: C-I,K,M (9 cbs), MA73C: G-I (3 cbs) • Open all AC3 3 Φ ganged cbs on pnls L4:B (1 cb), MA73C: C-G (7 cbs)	4 If bus shorted: AC3 payload 3 Φ Bus pwr (pwrs MS, PS Patch panel) 5 AC3 FMC3 Bus Pwr MMC2 Bus Pwr MMC4 Bus Pwr AMC3 Bus Pwr		
If bus not shorted: (L1) 8 • Install sw guard (stowed in IFM tool kit) over Cab Fan A sw • Perform the following BUS ISOLATION steps	7 1 Φ of AC Utility Power Outlets at A15 and MO13Q		
(Continued)	(Continued)		

MEDS

EPS SSR-103 (Cont)
BUS LOSS: CNTLBC1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	<p>(L2A1) 15 Atm Press Cntl O2 Sys 2 Sply Vlv Cntl</p>		<p>①5 Vlv holds position. Sys 1 remains</p>
	<p>(F8) R HUD Rt ADI Aft Ref Set capability (C3A5) L,R ADP Dpy Mtrs 2 Probe Htr Cntrl 2</p>		<p>①6 Single mtr time. One failure away from EVA to stow MPM or from RMS jettison</p>
	<p>(A8L,R13A2) Port RMS: 16 MPM Mtr 2 17 Fwd MRL Mtr 1 17 Mid MRL Mtr 2</p>		<p>①7 Single mtr time</p> <p>①8</p>
	<p>ROEU AC2 pwr to: Orbiter arm drive mtr (ODM mtr 2 - mate B, demate B, relax B) 17 ODA mtr 2 latch/release</p>		<p>WARNING Driver pwr to F2 jets lost if RJDF 1A Driver sw OFF (pnl O15:F)</p>
	<p>(O6) -Y Star Trkr Dr Sys 2 CL capability -Z Star Trkr Dr Sys 1 OP/CL capability</p>		<p>①9 Redundant pwr sply remains. Turbine speed ind lost</p>
	<p>(O15) 18 RJDF 1A F2 Manf Logic pwr (F2F,F2R,F2U,F2D)</p>		<p>②0 Redundant RPC remains</p>
	<p>(R2) 19 APU 1 Cntrl Pwr Sply B 20 Hyd Main Pump 2 Depress Solenoid RPC A 20 Hyd Main Pump 1 Depress Solenoid RPC B 21 APU 1 Fu Tk Vlv B</p>		<p>②1 Vlv closes. Redundant vlv A remains</p>
	<p>(F6A5,F8A5) NLG Ext 2 Fire 1, Fire 2 NLG,LMG,RMG Bkup Rel 2 Fire 1 22 LG Extend Vlv 2 23 NWS Hyd Sys 2 (R4) 24 Hyd Brake Isol 2 Man Cntl</p>		<p>②2 Loss of redundant hyd NLG deploy and NWS redundancy</p> <p>②3 Hyd Sys 1 still available for NWS</p> <p>②4 Vlv holds position. GPC cntl remains. Loss of redundant hyd NLG deploy and NWS redundancy if failed closed</p>
	<p>(R13A2) Rad Cntl sys: Stbd Rad Lat 1-6 Mtr 2 Dpy/Sto Mtr 1 Port Rad Lat 1-6 Mtr 2</p>		<p>②5 Mtr 1 remains</p>
	<p>(R13A2) PL Reten Sys B Rad/Lat Mtrs 25 Ku Ant Sto/Dpy Mtr 2 Direct Stow Mtr 2 26 Redundant Stow Initiate Signal to Ku-Band</p>		<p>②6 Redundant stow initiate sig (CNTL CA1) to Ku-Band remains</p>
	<p>(F2,F3) 27 CDR Dpy Fire 2 27 Jett Fire 2</p>		<p>②7 Plt Dpy/Jett remains</p>

NOM

**EPS SSR-104
BUS LOSS: CNTLBC2**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A1L) S-BD PM ● ANT SW ELEC - 1 ● XPNDR - 1 ● PWR AMP OPER - 1 ● STBY - 1 ● PRE AMP - 1 NSP ● PWR - 1 If PSP and/or INTRG reqd for PL or ISS ops: ● S-BD PL PWR SYS - 1 ● CNTL - PNL ● - CMD ● Reconfig PSP ● Perform PL INTRG REACQ (if reqd)</p> <hr/> <p>(A1R) ● S-BD FM PWR - 1</p> <hr/> <p>If no comm: (C3) ● S-BD PM CNTL - PNL ● - CMD</p>	<p>(A1A2) S-BD PM Sys 2: Xpndr 2 Pre Amp 2, Pwr Amp 2 PM and FM Ant sw 2</p> <p>NSP 2/COM SEC 2</p> <p>S-BD PL Intrg 2 PSP 2</p>	<p>All S-BD A/G voice lost if sys 2 selected CRT 2 blanks</p> <p>(F7) RCS JET C/W It - on SM ALERT Light/Tone - on</p> <p>(FSMs) S86 APU/HYD W/B SM0 THRM HYD (B) BCE STRG 3 NSP (if using NSP 2) S67 CNTL/ESS V DISPLAY SW R F,L,R RCS(F,R,L,U,D) JET I/O ERROR CRT2</p>	<p>① If S-BD PM Sys 2 being used at time of bus failure, A/G comm capabilities lost until Sys 1 selected</p> <p>② Indications do not appear until jets commanded</p> <p>③ REACQ and PSP reconfig procedures are flight specific. If reqd, procedures can be found in payload specific books</p> <p>④ OIU 1 interfaces with PSP 1 for commanding</p> <p>⑤ Indication appears only during site AOS for antenna miscompares</p> <p>⑥</p>
<p>If OIU reqd: (SSP) ● OIU PWR - OIU 1 ON ● OIU tb - UP ● ✓ MCC, OIU reconfig</p>	<p>(A1A3) S-BD FM Sys 2</p>	<p>SM 67 ELECTRIC CNTL BC2 Volts < 20</p> <p>(F8) APU FUEL QTY 2 ind - % inaccurate (displays H2O QTY)</p>	<p>④ OIU 1 interfaces with PSP 1 for commanding</p> <p>⑤ Indication appears only during site AOS for antenna miscompares</p> <p>⑥</p>
<p>(A12) APU HTR ● GAS GEN/FUEL PUMP 2 - B AUTO APU HTR TK/FU LINE/H2O/ ● SYS 1A - AUTO ● 1B - OFF ● 2A - OFF ● 2B - AUTO HYD HTR ● ELEV A - AUTO ● B - OFF ● CIRC PUMP PWR 2 - MNC</p>	<p>(A12) APU 2 GG/Fu Pump Htrs A 1 Tk/Fu Line Htrs B</p> <p>APU GG Inj H2O Tank Htrs B APU 2 Tk/Fu Line Htrs A</p> <p>Elevon Actr Htrs B (R2) Circ Pump 2 MNB pwr</p>	<p>(L1) If H2O PUMP LOOP 1,B active: C/W H2O LOOP It 'S88 H2O PUMP P1' 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP'</p> <hr/> <p>(O1) H2O PUMP OUT PRESS LOOP 1 - 20-25 psia</p>	<p>* TIME CRITICAL *</p> <p>If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp</p> <p>⑦ Sec Cntrl Man ON Sel capability remains. Pri A,B Cntrls remain</p> <p>⑧ Single mtr time</p> <p>⑨ Pwr to MCA Drivers lost through ENABLE sw</p>
<p>(L4:F) ● cb AC1 H2O LOOP PUMP 1A/2 (three) - cl</p>		<p>During Rad Dpy/Sto: (R13L) RAD LAT CNTL tbs (two) indicate single mtr ops RAD CNTL STBD tb indicates single mtr ops</p>	
<p>(L1) ● H2O PUMP LOOP 1 - A</p> <p>If using Sec Cntrl: ● FLASH EVAP CNTLR SEC - ON ● TOP EVAP HTR DUCT - A If Hi Load Evap enabled: ● HI LOAD DUCT HTR - A(C)</p>	<p>(L1A2) H2O Loop 1 Pump B man ON capability</p> <p>7 FES Sec Cntrl GPC Sel capability Top Evap Duct Fwd,Aft Htrs B</p> <p>Hi Load Duct Outbd,Inbd Noz Htrs B</p>	<p>STAR TRKR DR POS -Y OP/CL time incr from 8 to 16 sec</p> <p>STAR TRKR DR POS -Z CL time incr from 8 to 16 sec</p> <p>(F7) If APUs active and using H2O BLR CNTLR/HTR 2B: C/W APU TEMP It - on after -2 min</p>	
<p>(L2) ● FLASH EVAP FDLN HTR A SPLY - 1</p>	<p>(L2A1) FES H2O Fdln A Htrs 2 (all)</p>	<p>If sys pwrd: 'S62 BCE BYP PSP 2' Loss of PL TLM and CMD If PDI FDA enabled: 'S62 PDI DECOM FAIL'</p>	
	<p>ROEU AC2 pwr to: Orbiter arm drive mtr (ODM mtr 2 - mate B, demate B, relax B) ODA mtr 2 latch/release</p>	<p>SM (BFS SM 63) PL BAY DOORS</p> <p>During PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	
	<p>(R13A2) PLBD: Port,Stbd Fwd Blkhd Mtrs 2 Stbd Door Mtr 2</p>		
(Continued)	(Continued)		

NOM

EPS SSR-104 (Cont)
BUS LOSS: CNTLBC2

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
11	Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O8) ● L OMS XFEED B ● R OMS XFEED B	(O8) 10 F,R RCS He Pr Isol B man Cntl, GPC CL capability 12 L OMS Tk Isol B man CL capability 12 L,R OMS Xfeed Vlv B man CL capability		(10) Vlv holds position. GPC OP capability remains. Isol A remains (11) Do not reconfig for reg switch or I'CNCT procedures (12) Vlv holds position. Man OP and full GPC Cntl remains (13) Vlv holds position (14) If five tk sets flown on OV102, O2 TK4B Htrs are disconnected and associated avionics are connected to TK5A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4A, 4B Htrs are wired in parallel to TK5A and TK5B Htrs (15) Manf status <u>not</u> automatically declared closed. Jet fail-offs may occur (16) When SM not available, use NSP block to inhibit UL cmds. 'BCE STRING 1(3) NSP' annunciates and it requires GNC I/O RESET after UPLK - ENA for AOS
	(R1) If Tk2 in use: O2,H2 TK2 ● HTR A (two) - OFF ● B (two) - AUTO	(R1A2) 13 Cryo O2,H2 Tk2 Manf Vlv Cntl Cryo O2,H2 Tk2 Htrs A		
	(A11) If not OV102 and Tk4 in use: O2,H2 TK4 ● HTR A (two) - OFF ● B (two) - AUTO	(A11) 14 Cryo O2,H2 Tk4 Htrs A		
	(R1) ● O2 TK3 HTR A - AUTO ● H2 TK3 HTR A,B - AUTO			
	(A11) If OV102 and O2,H2 TK4/5 in use: ● O2 HTR TK4,TK5 (two) - OFF ● H2 HTR TK4/5 A,B (two) - OFF			
	Refer to EPS 7.6 CRYO TABLE A for switch nomenclature			
	(R2) ● BLR CNTLR/HTR 2 - A	(R2) Hyd H2O Blr 2 Cntlr B		
	(C2) ● R CRT SEL - 3 ● GPC/CRT O2 EXEC	(C2A2) DEU/CRT 2		
		(C3) FC1 Redundant Reac Vlv Close Cntl		
	GNC 23 RCS			
	15	Override F2 Manf status to CL: ● ITEM 1,41 EXEC ● For attitude control, perform LOSS OF VERNIERS (ORB OPS, RCS)	(O15) RCS Manf F2 RJD pwr (F2F,F2R,F2U,F2D) 15 (O16) RCS Manf F5/R5/L5 RJD pwr (F5L,F5R,L5L,L5D,R5R,R5D)	
16		No SM GPC and LOS: (C3) ● UPLK - NSP BLK	(C3A5) 16 Uplink switch GPC Block of UL Cmd capability	
	Place PLT disp sws (eight) to green dot position: (F8) ● AIR DATA - NAV ● ADI ATT - LVLH ● ERR - MED ● RATE - MED ● HSI SEL MODE - ENTRY ● HSI SEL SOURCE (two) - NAV 3 ● RADAR ALTM - 1	(F8) Air Data Source Sel capability R ADI Att, Err, Rate Sel capability R HSI Mode, Source Sel capability R Radar ALTM Sel capability		
(Continued)		(Continued)		

NOM

EPS SSR-104 (Cont)
BUS LOSS: CNTLBC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
When reqd: • For FC2, perform FUEL CELL PURGE – AUTO (ORB OPS, EPS)	17 (R11U) FC2 Purge Vlv man Cntl		(13) Vlv holds position (17) Vlv normally closed
(A6U) If SENSE – –Z: • SENSE – –X • Wait 1 sec, reposition as desired	18 (A6A1) 3–Level sw RM for –X Sense		(18) RM sw downmodes to 2–level for –X position
During OPS 8: GNC 43 CONTROLLER Desel R Pnl Trim R2: • DES PNL TRIM R2 ITEM 39 EXEC Desel R Bdy Flp up/dn R2: • DES BDY FLP UP/DN R2 ITEM 22 EXEC	19 (F8) R Trim RHC INH capability 19 R Trim Pnl ON capability (C3A1) 19 R Bdy Flp UP/DN capability		(19) Left Trim and Body Flap control remains. Right Trim and Body Flap cntl function is regained after the lost contacts have been deselected in OPS–8 (3,B)
For SSME Hyd Repress: (R4) • HYD MPS/TVC ISOL VLV SYS 1,2 – OP, wait 10 sec, then CL	13 (R4) MPS/TVC Hyd Sys 2 Isol man Cntl		(20) Sys B Sec Cntlr man ON capability remains
If reqd during entry (< 120K ft): (L1) • NH3 CNTLR A – PRI/GPC If reqd for Post Rollout: (L1) • NH3 CNTLR B – SEC/ON	20 (L1A2) NH3 SYS B Pri Cntlr and Auto Swover to Sec Cntlr		(21) A Htrs remain (22) B Htrs remain
If NH3 CNTLR A(B) – SEC/ON reqd, then: (L1) H2O PUMP • LOOP 1 (two) – ON, A(B) • LOOP 2 – ON • ✓ FLOW PROP VLV LOOP (two) – ICH • Activate PL H2O loop(s) (if applicable)			(23) APU 2 Qty meter (pnl F8) displays H2O qty when in FUEL position
(A14) RCS/OMS HTR • FWD RCS – A AUTO • L POD (two) – A AUTO, B OFF • R POD (two) – A OFF, B AUTO	21 (A14) Fwd RCS B Htrs (all) 21 L Pod B Htrs (partial) 22 R Pod A Htrs (partial)		(24) Vlv holds position. Loss of manual capability to inert LO2 Manf
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(C2) • CRT2 PWR – OFF			
(F3) • R TRIM RHC/PNL – ENA • PNL – OFF			
23	(F8) • APU sel (two) – H2O, 1(2,3)	23 (F8A8) APU 2 Fuel Qty display	
(R2) • MPS He I'CONNECT L – GPC		(R2) L MPS He Intercon Vlv man Cntl	
(R4) • MPS FILL/DRAIN LO2 INBD – GND		24 (R4) MPS Prplt F/D Inbd LO2 Vlv man OP capability	
		(Continued)	

NOM

EPS SSR-104 (Cont)
BUS LOSS: CNTLBC2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	(O16) 25 ASA 4 Isol Driver pwr		⑧ Single mtr time
	(L2A1) 13 Atm Press Cntl O2 Sys 2 Sply Vlv Cntl		⑬ Vlv holds position
	(R1A2) 26 FC2 Reac Vlv Cntl via pnl R1 sw		⑵⑤ Six vlvs fail to non-isolation position
	27 FC2 STOP capability via START/STOP sw (pnl R1)		⑵⑥ Vlv holds position. FC2 Redundant Reac Vlv Close Cntl on pnl C3 remains
	(R2) C MPS He Isol B man Cntl		⑵⑦ Able to stop FC2 via FC2 CNTLR sw (pnl O15:A)
	(A6A1) 28 R ADI Att Ref set capability Aft Pnl Trans X,Y Norm and Pulse Sel capability		⑵⑧ Use Fwd pnl C3 pbs
	28 Aft Pnl Trans Z High,Norm, and Pulse Sel capability		⑵⑨ Redundant mtrs remain
	28 Aft Pnl Trans Low Z Sel capability		⑵⑩ Htr Cntrls 1 remain
	28 Aft Pnl Rot Roll,Pitch,Yaw Disc Rate, and Pulse Sel capability		⑵⑪ Sys 1 remains
	28 Aft Pnl PRI,ALT,VERN Sel capability		⑵⑫ Hyd Sys 1 still available for NWS
	28 Aft Pnl PCT Exec capability		⑵⑬ Loss of redundant hyd NLG deploy and NWS redundancy
	(R13A2) 29 Rad Cntl Sys: Port,Stbd Lat 1-6 Mtr 2 Stbd Dpy/Sto Mtr 1		⑵⑭ Mtr 1 remains
	(C3A5) 29 L,R ADP Dpy Mtrs 2 30 Htr Cntrls 2		⑵⑮ Redundant pwr sply remains. GG Bed T and GBX P ind lost when APU running
	(O6) 29 -Y Star Trkr Dr Sys 2 OP/CL capability		⑵⑯ Redundant RPC remains
	29 -Z Star Trkr Dr Sys 1 CL capability		⑵⑰ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
	(F6A5, F8A5) 31 NLG Bkup Release,Extension Sys 2		
	31 LMG, RMG Bkup Release Sys 2		
	32 NWS Hyd Sys 2		
	33 LG Extend Vlv 2		
	(R13A2) PL Reten Sys B Rel/Lat Mtrs		
	(R13A2) 34 Ku Ant Sto/Dpy Mtr 2 Direct Sto Mtr 2		
	(R2) 35 APU 2 Cntrl pwr Sply A APU 2 GBX GN2 Repress Vlv		
	36 Hyd Main Pump 2 Depress Solenoid RPC A		
	36 Hyd Main Pump 1 Depress Solenoid RPC B		
	(R13A2) Port RMS: 37 MPM Mtr 2 8 Fwd MRL Mtr 1 8 Mid MRL Mtr		
	(Continued)		

NOM

EPS SSR-104 (Cont)
BUS LOSS: CNTLBC2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	<p>(O17) Freon Loop 1 Cold Plate Flow Xdcr Aft PL MNB current Xdcr</p> <hr/> <p>(R2) 38 APU 2 Fu Tk Vlv B</p> <hr/> <p>(F2,F3) 39 CDR Dpy Fire 1 39 Jett Fire 1</p>		<p>③⑧ Vlv closes. Redundant Vlv A remains</p> <p>③⑨ PLT Dpy/Jett remains</p>

NOM

EPS SSR-105

BUS LOSS: CNTLBC3 (Includes MNB FMC2, MNB MMC1, MNB MMC2, MNB MMC3, MNB MMC4, MNB AMC2)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (A12) APU HTR • GAS GEN/FUEL PUMP 2 – A AUTO • LUBE OIL LINE 2 – A AUTO APU HTR TK/FU LINE/H2O/ 1 • SYS 1A – AUTO 1 • 1B – OFF 1 • 2A – OFF 1 • 2B – AUTO HYD HTR • RUD SPD BK A – AUTO • B – OFF HYD • CIRC PUMP PWR 2 – MNB	(A12) APU 2 GG/Fu Pump Htr B 2 Lube Oil Line Htrs B 1 Tk/Fu Line Htr B APU 2 Tk/Fu Line Htr A Rud/Spd Bk Htr B Circ Pump 2 MNC pwr	SM ALERT Light/Tone – on S67 CNTL/ESS V SM 67 ELECTRIC CNTL BC3 Volts < 20 (FSM) RM DLMA MANF 2 (O8) FWD RCS MANF ISOL 2 tb – bp If H2O PUMP LOOP 1,B – ON: C/W H2O LOOP It – on 'S88 H2O PUMP P 1' 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP' ----- (O1) H2O PUMP OUT PRESS LOOP 1 meter ind – 20–25 psia (F7) If APUs active and using H2O BLR CNTLR/HTR 1A or 2A: C/W APU TEMP It on after ~2 min During Rad Dpy ops: (R13L) RAD CNTLR tbs (two) indicate single mtr ops L,R ADP deploy time incr from 15 to 30 sec STAR TRKR DR POS (two) OP/CL time incr from 8 to 16 sec SM (BFS SM 63) PL BAY DOORS If in AUTO OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG' ----- During MAN PLBD OP/CL, single mtr run time noted on actuators listed at left (A8L) Port RMS: DPY/STO tb – bp RETEN LAT tb – bp R-F-L FWD tb – bp SM 94 PDRS CONTROL Indications lost: MPM Mtr 2 STO/DPY Fwd MRL Mtr 1 LAT/REL/RDY Mid MRL Mtr 2 LAT/REL/RDY	① TIME CRITICAL * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ② Vlv holds position ③ In OPS 2, FES GPC cmd is not present, but one may be sent if reqd ④ Sec Cntrl On sel capability remains. Pri A,B Cntrls remain ⑤ If AC2 cbs not opened, Lat Mtrs 2 of actuators for Port,Stbd Rad Lat 1–6 continue to run until Sys B Lat Cntl sw placed to OFF. Other equip pwr'd by AC2 MMC2 and AC2 MMC4 lost because of MNB MMC2 and MNB MMC4 loss ⑥ Sys A Sec Cntrl man On capability remains
(A14) • RCS/OMS HTR OMS CRSFD LINES – A AUTO, B OFF	(A14) OMS Crsfd Ln Htrs B (all)		
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl			
3 (L1) • H2O PUMP LOOP 1 – A • FLASH EVAP CNTLR SEC – GPC (if using Sec Cntrl) • TOP EVAP HTR NOZ R – B AUTO • TOP EVAP HTR DUCT – A(C) If HI LOAD EVAP enabled: • HI LOAD DUCT HTR – A(C)	4 (L1A2) H2O Loop 1 Pump B FES Sec Cntrl man On Sel capability Top Evap R Noz Htr A Top Evap Duct Fwd,Aft L,R Htrs B Hi Load Duct Outbd,Inbd Htrs B		
(R2) • BLR CNTLR/HTR 1,2 (two) – B	(R2) Hyd H2O Blr 1,2 Cntrl A		
Refer to OMS/RCS Slide Rule for vlv loss info Do not perform if BC1,2,3 unpwrd at same time: GNC 23 RCS Override F2 Manf status to OP: • RCS FWD – ITEM 1 EXEC • MANF VLVS 2 OVRD – ITEM 41 EXEC			
5 (MA73C:C,D) • cb MCA PWR AC2 3Φ MID 2,4 (two) – op	5 (MA73C) Stbd,Port Rad Lat 1–6 Mtr 2 Limit sw		
For PLBD ops: • OP/CL Drs in man mode	(MA73C) PLBD: C/L Lat 13–16 Mtr 2 Stbd Aft Blkhd Mtr 2 Port Drive Mtr 2 Port,Stbd Fwd Blkhd Mtr 2 Stbd Door Mtr 2 Port,Stbd Door Mtr 1 CL Limit sw		
If reqd during entry (< 120K ft): (L1) • NH3 CNTLR B – PRI/GPC	6 (L1A2) NH3 Sys A Pri Cntrl and Auto Swover to Sec Cntrl		
(Continued)	(Continued)		

NOM

EPS SSR-105 (Cont)
BUS LOSS: CNTLBC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>If NH3 CNTLR A(B) – SEC/ON reqd, then: (L1) H2O PUMP • LOOP 1 (two) – ON, A(B) • LOOP 2 – ON • ✓ FLOW PROP VLV LOOP (two) – ICH If applicable: • Activate PL H2O LOOP(s)</p>	<p>(MA73C) Port RMS: 7 MPM Mtr 2 8 Fwd MRL Mtr 1 8 Mid MRL Mtr 2</p>		<p>⑦ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison</p> <p>⑧ Single mtr time</p> <p>⑨</p>
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(L1) • SMOKE DETN CKT TEST – OFF	(L1A1) Smoke Detn Test capability (all dets)		<p>⑩ Six vlvs fail to non-isolation position</p> <p>⑪ Auto Cntl of these Htrs also lost if single Htr Ops and tank not paired. If five tk sets flown on OV102, O2 TK4 B Htrs are disconnected and associated avionics are connected to TK5 A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4 A,4 B Htrs are wired in parallel to TK5 A and TK5 B Htrs</p>
	9 (O16) RJDF 2B F4/F5 Manf Logic pwr (F4R,F4D,F5L,F5R)		<p>⑫ Use pb on AFT pnl A6</p> <p>⑬ Stow capability remains</p>
	10 (O17) TVC 3 Isol ME 10 4 Isol ME		
	11 (R1A2) Man ON Cntl of Cryo O2,H2 Tk 2,4 Htrs B		
	(A15) (OV105 only) Cryo O2, H2 Tk5 Htr B		
	(MA73C) L Vents 1,2,3,5,8,9 Mtrs 2 R Vents 1,2,6,8,9 Mtrs 2		
	12 (C3A6) Fwd Pnl Trans X,Y Norm, Pulse, Fwd Pnl Rot Roll, Pitch,Yaw Disc Rate, Pulse Sel capability		
	12 Fwd Pnl Trans Low Z Sel capability		
	12 Fwd Pnl Trans Z High, Norm, Pulse Sel capability		
	12 Fwd Pnl PRI,ALT,VERN Sel capability		
	12 Fwd Pnl PCT Exec cability		
	(R2) Pneu He Isol 2 man Cntl L MPS He Isol A man Cntl (F6A5, F8A5) NLG, LMG, RMG Bkup Rel Sys 1, NLG Pyro Extension Sys 1		
	13 (MA73C) Port,Stbd Rad Mtrs 2 Dpy capability –Y Star Trkr Dr Sys 2 OP/CL capability –Z Star Trkr Dr Sys 1 OP/CL capability L,R ADP Htr Cntr 2 Deploy Mtrs 2 Deploy Disc 2		
	(Continued)		

WARNING

Driver pwr to F4/F5 Jets lost only if both RJDF 2B and L5/F5/R5 Driver sws (pnl O16:F) OFF simultaneously

NOM

EPS SSR-105 (Cont)
BUS LOSS: CNTLBC3

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	<p>14 (MA73C) ET Door Mtrs: C/L Lat Actr 1 Mtr 2 GPC Cntl L Dr Uplock Lat Mtr 2 GPC Lat capability R Dr Uplock Lat Mtr 2 GPC Lat capability R Dr Closure Mtr 2 GPC CL capability</p> <p>(MA73C) AC pwr removal capability via Limit sw for ET Dr Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Uplock Lat Mtr 2 Closure Mtr 2</p> <p>(MA73C) 15 Ku Ant Sto/Dpy Mtr 2 Sto and Dpy Limit sw 16 Redundant Ku-Bd Xmit Enable Signal 17 Redundant Ku-Bd Boom Stow Enable II Excitation Signal</p> <p>(R2) 18 APU 3 Fu Tk Vlv B</p>		<p>①④ Redundant mtrs remain</p> <p>①⑤ With inoperative limit sw, mtr will continue to run until DPY/STO sw is placed to GND position</p> <p>①⑥ MNC MMC2 pwr for Ku-Bd Xmit Enable signal remains</p> <p>①⑦ MNC MMC2 pwr remains to supply pwr to Boom stow enable II signal for stow mtrs</p> <p>①⑧ Vlv closes. Redundant Vlv A remains</p>

NOM

**EPS SSR-106
BUS LOSS: CNTLCA1**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(A12) APU HTR 1 • GAS GEN/FUEL PUMP 2 – A AUTO 1 • GAS GEN/FUEL PUMP 3 – B AUTO • LUBE OIL LINE 3 – B AUTO APU HTR TK/FU LINE/H2O/ 1 • SYS 2A – AUTO 1 • 2B – OFF 1 • 3A – OFF 1 • 3B – AUTO HYD HTR • AFT FUS A – AUTO • B – OFF HYD CIRC PUMP PWR • 2 – MNB • 3 – MNA</p>	<p>(A12) APU 2 GG/Fu Pump Htr B APU 3 GG/Fu Pump Htr A 3 Lube Oil Ln Htr A 2 Tk/Fu Ln Htr B APU 3 Tk/Fu Ln Htr A Aft Fuselage Htrs B Circ Pump 2 MNC pwr 3 MNC pwr</p>	<p>(F7) SM ALERT Light/Tone – on CRT 3 blanks (FSMs) S69 FC REAC S67 CNTL BUS V I/O ERROR CRT3 SM 67 ELECTRIC CNTL CA1 < 20 V During Rad Dpy/Sto ops: (R13L) RAD CNTL PORT tb indicates single mtr ops RAD LAT CNTL STBD tb indicates single mtr ops R ADP deploy time incr from 15 to 30 sec PLB Floodlts lost: Mid Stbd Aft Port Docking (F7) If APUs active and using BLR CNTLR/HTR 3B: C/W APU TEMP It – on after ~2 min SM (BFS,SM) 63 PL BAY DOORS During PLBD OP/CL, single mtr run time noted on actuators listed at left SM 88 APU/ENVIRON THERM H2O LOOP 2 PUMP ΔP↑</p>	<p>① TIME CRITICAL If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ② Pri A man On Sel capability remains. Pri B and Sec Cntrs remain ③ Wrong FDA limit set is selected by SM preconditioning software due to loss of H2O Loop 2 pump On switch scan ④ Do not reconfig for reg switch or I'CNCT procedures</p>
<p>(L1) • H2O PUMP LOOP 2 – ON • H2O PUMP LOOP 1 – GPC • FLASH EVAP CNTLR PRI A – ON (if using A Cntrl) • TOP EVAP HTR NOZ R – A AUTO If HI LOAD EVAP enabled: • HI LOAD DUCT HTR – A(B)</p>	<p>(L1A2) H2O Loop 2 Pump GPC Cntl 2 FES Cntrl Pri A GPC Sel capability Topping Evap R Noz Htr B Topping Evap Duct L,R Fwd, Aft Htr C Hi Load Duct Inbd,Outbd Htrs C</p>	<p>(L2) • FLASH EVAP FDLN HTR B SPLY – 1 (C2) • L CRT SEL – 1 • R CRT SEL – 2 • GPC/CRT 03 EXEC (R2) • BLR CNTLR/HTR 3 – A • If BFS in GPC 3 or 5, move BFS • If BFS in GPC 1, 2, or 4; and if engage reqd, use pb CDR RHC If CA1,2,3 unpwr'd at same time: GNC 23 RCS Override F3 Manf status to CL: • RCS FWD – ITEM 1 EXEC • MANF VLVS 3 OVRD – ITEM 42 EXEC</p>	<p>(L2A1) FES H2O Fdln B Htrs 2 (all) (C2A2) DEU/CRT 3 (R2) Hyd H2O Blr 3 Cntrl B (F6A5) GPC 3,5 engage capability PLT BFS engage capability</p>
<p>(A14) • RCS/OMS HTR R POD (two) – A AUTO, B OFF</p>	<p>(A14) R Pod Htrs B (all)</p>	<p>(O7) Aft L RCS He Press Isol B man CL capability Aft L,R RCS Tk Isol 1/2 man CL capability Aft L,R RCS Xfeed Vlv 1/2 man CL capability</p>	<p>3</p>
<p>4 Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O7) • AFT L RCS He PRESS B • TK 1/2 • XFEED 1/2 • R RCS TK 1/2 • XFEED 1/2 (Continued)</p>	<p>(Continued)</p>	<p>(Continued)</p>	<p>NOM</p>

EPS SSR-106 (Cont)
BUS LOSS: CNTLCA1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(O8) • R OMS TK ISOL B	(O8) R OMS Tk Isol B man CL capability		⑤ Vlv normally closed
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">GNC 23 RCS</div> <ul style="list-style-type: none"> • Reprioritize L,R Manf 3 Jets to first priority: DES INH twice all other jets, highest priority first, then next highest, etc • Set aft pod(s) PRI JET FAIL LIMIT to 3 	(A14) Aft RCS L,R Jet 3 Htrs		⑥ Sys B Pri Cntrl, auto switchover to Sec Cntrl remain
When reqd: • For FC3, perform FUEL CELL PURGE – AUTO (ORB OPS, <u>EPS</u>)	5 (R11U) FC3 Purge Vlv man Cntl		⑦ Loss of manual capability to inert LO2 Manf
Prior to using L OMS: (O8) L OMS He PRESS/VAP ISOL • A – GPC • B – OP	(O8) L OMS He Press Isol A man Cntl, He Vap Isol 1,2 man A Cntl		⑧ Six vlvs fail to non-isolation position
For SSME Hyd Repress: (R4) • HYD MPS/TVC ISOL VLV SYS 1,2 – OP, wait 10 sec, then CL	(R4) MPS/TVC Hyd Sys 3 Isol man Cntl		⑨ Redundant mtr remains
If reqd during entry (< 120K ft): (L1) • NH3 CNTLR A(B) – PRI/GPC	6 (L1A2) NH3 Sys B Sec Cntrl man On capability		⑩ Htr Cntrl 2 remains
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(C2) • CRT3 PWR – OFF			
(R2) • MPS He I'CONNECT R – GPC	(R2) R Eng He Intercon Vlv man Cntl		
(R4) • MPS FILL/DRAIN LO2 OUTBD – GND	7 (R4) Prplt F/D Outbd LO2 Vlv man Cntl		
(O16:A) • RGA 3 – OFF	(O16) RGA 3		
(A7U) PL BAY • FLOOD AFT PORT – OFF • MID STBD – OFF • DOCKING – OFF RMS • SPOT PORT – OFF	8 (O17) ATVC 1 Isol ME (A7A1) PLB Floodlts Aft Port Mid Stbd Docking RMS Spot Port		
	9 (C3A5) R ADP Dpy Mtr 1 10 Htr Cntrl 1		
	11 (R1A2) FC3 Reac Vlv Cntl via pnl R1 sw 12 FC3 STOP capability via START/STOP sw		
	(Continued)		

- ⑪ Vlv holds position. FC3 Redundant Reac Vlv Close Cntl on pnl C3 remains
- ⑫ FC3 can be stopped via FC3 CNTLR sw (O16:A)

NOM

EPS SSR-106 (Cont)
BUS LOSS: CNTLCA1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	(C3) FC2 Redundant Reac Vlv Close Cntl		⑨ Redundant mtr remains
	13 (R1A2) Cryo O2,H2 Tk1 Htrs A man On and Tk3 Htrs B man On Cntl		⑬ Auto Cntl of these Htrs also lost if single Htr Ops and tank not paired
	(R2) L MPS He Isol B man Cntl		⑭ Pwr to MCA Drivers lost through ENABLE sw
	13 (R2) Cryo O2,H2 Tk5 Htr A man On Cntl Pallet Cryo Tk 6,9 Htr B man On Cntl		⑮ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists
	14 (R13A2) PLBD: C/L Lat 1-4, 5-8 Mtrs 2 Port Aft Blkhd Mtr 2		⑯ Cntrlrs A, B Rad By Vlv Mtrs Auto Cntl and Cntrl B Rad By Vlv Mtr Man Cntl remain
(A15) ● PALLET HTR B - OFF ● A - AUTO	(A15) Pallet Structure Htr B Stbd		⑰
	15 (A8L) Port RMS: Fwd MRL Mtr 2 15 Mid MRL Mtr 2 15 Aft MRL Mtr 1		⑰
	16 (L1A2) Freon Loop 2 Cntrl A Rad By Vlv Mtr man Cntl		<div style="border: 2px solid black; padding: 5px; text-align: center;">WARNING</div> Driver pwr to F3 Jets lost if RJDF 2A Driver sw OFF (O16:F)
	(A6A1) Aft ADI Att ref set capability		
	17 (O16) RJDF 2A F3 Manf Logic pwr (F3L,F3D,F3U,F3F)		⑱ Redundant coils remain
	18 (C3A1) R OMS Eng Pr Vlv Coil 1 and Cntl Vlv 1,2 Coils 1		⑲ R OMS auto shdtn if Pc < 80% and '↓' on MNVR EXEC display
	19 R OMS Arm 1, Arm/Press 1 sw contacts		<div style="border: 2px solid black; padding: 5px; text-align: center;">CAUTION</div> No Purge. Wait 10 min between burns
	20 (R4) Hyd Brake Isol 3 man Cntl (F6A5,F8A5)		
	21 LG Extend Vlv 1		
	22 NWS Hyd Sys 1		
	9 (O6) -Z Star Trkr Dr Sys 2 OP/CL capability		⑳ Vlv holds position. GPC capability remains
	(R13A2) Rad Cntl Sys: Stbd Rad Lat 7-12 Mtr 2 Port Rad Dpy/Sto Mtr 2		㉑ Lost Hyd deploy capability for all Ldg Gr. Pyro Backup Release Sys will deploy Ldg Gr. NLG can also be deployed by Hyd Sys 2
	9 (R2) ET Door Mtrs: C/L Lat Actr 1 Mtr 1 man Sto capability C/L Lat Actr 2 Mtr 1 man Sto capability L Dr Closure Mtr 2 man Cntl L Dr Uplock Lat Mtr 1 man Cntl R Dr Uplock Lat Mtr 1 man Cntl		㉒ Hyd Sys 2 still available for NWS
	(Continued)		

NOM

EPS SSR-106 (Cont)
BUS LOSS: CNTLCA1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	23 (R13A2) Ku Ant Sto/Dpy Mtr 1 Direct Sto Mtr 1		(23) Mtr 2 remains
	24 (R13A2) Redundant Sto Initiate Signal to Ku-Band		(24) Redundant stow initiate sig (CNTL BC1) to Ku-Band remains
	(O17) Freon Loop 2 Cold Plate Flow Xdcr		(25) Vlv fails closed. Redundant vlv remains
	(R2) 25 APU 1 Fu Tk Vlv B 26 Hyd Main Pump 3 Depress Solenoid RPC A 26 Hyd Main Pump 2 Depress Solenoid RPC B		(26) Redundant RPC remains
	(O17) Aft PL MNC current Xdcr		(27) CDR Dpy/Jett remains
	(F3,F4) 27 PLT Dpy Fire 2 27 Jett Fire 2		

NOM

EPS SSR-107 (Cont)
BUS LOSS: CNTLCA2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>6 Refer to OMS/RCS Slide Rule for vlv loss info Reconfig following vlv(s) only if leak isolation reqd: (O7) • AFT L,R RCS TK 1/2 • XFEED 1/2</p>	<p>(O7) AFT L RCS: Tk Isol 1/2 man CL capability He Press Isol B man Cntl, GPC CL capability Xfeed vlv 1/2 man CL capability AFT R RCS: Tk Isol 1/2 man CL capability Xfeed Vlv 1/2 man CL capability (O8) R OMS Tk Isol B man CL capability FWD RCS: Tk Isol 1/2 man CL and man Ovr of GPC CL capability</p>		<p>⑥ Do not reconfig for reg switch or I'CNCT procedures ⑦ Vlv normally closed ⑧ Manf status <u>not</u> automatically declared closed. Jet fail-offs may occur ⑨ RM sw downmodes to 2-level for -X position</p>
<p>When reqd: • Perform FC3 purges in AUTO mode (ORB OPS)</p>	<p>7 (R11U) FC3 Purge Vlv man Cntl</p>		
<p>(A6U) • ADI ATT – LVLH • ERR – MED • RATE – MED</p>	<p>(A6A1) Aft ADI capability: Att Sel Error Scale Sel Rate Scale Sel Att ref set</p>		
<p>(A14) RCS/OMS HTR • R POD (two) – A AUTO, B OFF</p>	<p>(A14) R Pod B Htrs (partial)</p>		
<p>GNC 23 RCS 8 Override F3 Manf status to CL: • RCS FWD – ITEM 1 EXEC • OVRD MANF VLVS STAT 3 – ITEM 42 EXEC</p>	<p>(O16) RCS Manf F3 RJD pwr (F3L,F3D,F3U,F3F)</p>		
<p>(A6U) If SENSE – -Z: • SENSE – -X • Wait at least 1 sec, then reposition as desired</p>	<p>9 (A6A1) 3-level sw RM for -X Sense</p>		
<p>GNC 23 RCS • Reprioritize L,R Manf 4 Jets to first priority: DES INH twice all other jets, highest priority first, then next highest priority, etc • Set aft pod(s) PRI JET FAIL LIMIT to 6</p>	<p>(A14) Aft RCS L,R Jet 4 Htr</p>		
<p>(Continued)</p>	<p>(Continued)</p>		<p>NOM</p>

EPS SSR-107 (Cont)
BUS LOSS: CNTLCA2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>During OPS 8:</p> <p>GNC 43 CONTROLLERS</p> <p>Deselect R Pnl Trim R1: • DES PNL TRIM R1 – ITEM 38 EXEC</p> <p>Deselect R BDY FLP UP/DN R1: • DES BDY FLP R1 – ITEM 21 EXEC</p> <p>For SSME Hyd Repress: (R4) • HYD MPS/TVC ISOL VLV SYS 1,2 – OP, wait 10 sec, then CL</p> <p>If reqd during entry (< 120K ft): (L1) • NH3 CNTLR A(B) – PRI/GPC</p>	<p>(F8A7) 10 R Trim RHC – INH capability 10 PNL – ON capability</p> <p>(C3A1) 10 R Bdy Flp – UP/DN capability</p> <p>(R4) MPS/TVC Hyd Sys 3 Isol man Cntl</p> <p>(L1A2) 11 NH3 Sys A Sec Cntrl man On capability</p>		<p>⑩ L Trim and Body Flap cntls remain. Right Trim and Body Flap cntl function is regained after lost contacts have been deselected in OPS-8 (3,B)</p> <p>⑪ Sys A Pri Cntrl, auto switchover to Sec Cntrl remain</p> <p>⑫ Redundant mtrs remain</p> <p>⑬ Vlv holds position. FC3 Redundant Reac Vlv Close Cntl on pnl C3 remains</p> <p>⑭ FC3 can be stopped via FC3 CNTLR sw (pnl O16:A)</p> <p>⑮ Htr Cntrl 2 remains</p> <p>⑯ Use pbs at pnl C3</p> <p>⑰ Redundant coils remain</p> <p>⑱ R OMS auto shtdn if Pc < 80% and '↓' on MNVR EXEC display</p>
<p>BUS ISOLATION</p>			
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(F3) • TRIM RHC – ENA • PNL – OFF</p>	<p>(O6) 12 –Z Star Trkr Dr Sys 2 CL capability</p>		
<p>(R11L) • CRT4 PWR – OFF</p>	<p>(R1A2) 13 FC3 Reac Vlv Cntl via pnl R1 sw 14 FC3 STOP capability via START/STOP sw</p>		
	<p>(C3A5) 12 R ADP Dpy Mtr 1 15 Htr Cntrl 1</p>		
	<p>(A6A1) 16 Aft Panel Trans X,Y, Norm, Pulse, Rot Roll, Pitch, Yaw Disc Rate, and Pulse Sel capability</p>		
	<p>16 Aft Pnl Trans Z High, Norm Pulse Sel capability</p>		
	<p>16 Aft Pnl Trans Low Z Sel capability</p>		
	<p>16 Aft Pnl PRI,ALT,VERN Sel capability</p>		
	<p>16 Aft Pnl PCT Exec capability</p>		
	<p>(C3A1) 17 R OMS Eng Pr Vlv Coil 2 and Cntl Vlv 1,2 Coil 2</p>		
	<p>18 R OMS Arm 2, Arm/Press 2 sw contacts</p>		
	<p>(F6A5,F8A5) NLG Ext Sys 1 NLG,LMG,RMG Bkup Rel Sys 1</p>		
	<p>(R2) R MPS He Isol A man Cntl</p>		
	<p>(R13A2) Rad Cntl Sys: Port RAD Lat 7-12 Mtr 2 Dpy/Sto Mtr 2</p>		
<p>(Continued)</p>			<p>NOM</p>

CAUTION
 No Purge. Wait 10 min between burns

EPS SSR-107 (Cont)
BUS LOSS: CNTLCA2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	(A8L) 19 Port RMS MPM Mtr 1		(12) Redundant mtrs remain
	(R2) 12 ET Door Mtrs: C/L Lat Actr 1 Mtr 2 man Stow capability C/L Lat Actr 2 Mtr 2 man Stow capability L Dr Uplock Lat Mtr 1 man R Dr Closure Mtr 1 man Cntl R Dr Uplock Lat Mtr 1 man Cntl		(19) Single mtr time. One failure away from EVA to stow MPM or from RMS jettison (20) Mtr 2 remains (21) Vlv closed. Redundant vlv remains
	(R13A2) 20 Ku Ant Sto/Dpy Mtr 1 Direct Sto Mtr 1		(22) Redundant pwr sply remains. Turbine speed ind lost
	(R2) 21 APU 2 Fu Tk Vlv A 22 Cntlr Pwr Sply B		(23) Redundant RPC remains
	23 Hyd Main Pump 3 Depress Solenoid RPC A		(24) Pwr to MCA Drivers lost through ENABLE sw
	23 Hyd Main Pump 2 Depress Solenoid RPC B		
	(R13A2) 24 PLBD: C/L Lat 9-12 Mtr 2 13-16 Mtr 1 Stbd Aft Blkhd Mtr 1 Port Door Mtr 1		(25) CDR Dpy/Jett remains
	(F3,F4) 25 PLT Dpy Fire 1 25 Jett Fire 1		

NOM

EPS SSR-108

BUS LOSS: CNTLCA3

(Includes MNC FMC3, MNC MMC2, MNC MMC4, MNC AMC3)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 (A12) APU HTR • GAS GEN/FUEL PUMP 3 – A AUTO • LUBE OIL LINE 3 – A AUTO APU HTR TK/FU LINE/H2O/ 1 • SYS 2A – AUTO 1 • 2B – OFF 1 • 3A – OFF 1 • 3B – AUTO HYD CIRC • PUMP PWR 3 – MNC	(A12) APU 3 GG/Fu Pump Htrs B APU 3 Lube Oil Ln Htr B APU 2 Tk/Fu Ln Htr B APU 3 Tk/Fu Ln Htr A Hyd Circ Pump 3 MNA pwr	MASTER ALARM Light/Tone – on (F7) SM ALERT Light/Tone – on (FSM) S67 CNTL BUS V RM DLMA MANF SM 67 ELECTRIC CNTL CA3 Volts < 20	① * [TIME CRITICAL] * If not done within 20 min, may freeze N2H4 and lose APU. However, SM ALERT occurs above freezing temp ② Vlv holds position ③ Vlv ops not affected ④ If five tk sets flown on OV102, O2 TK4B Htrs are disconnected and associated avionics are connected to TK5A Htrs. This results in A Htrs only for O2 TK4 and TK5. H2 TK4A,4B Htrs are wired in parallel to TK5A and TK5B Htrs ⑤ If AC3 cbs not opened, Lat Mtrs 2 of actuators for Port,Stbd Rad Lat 7-12 would continue to run until Sys B Lat Cntl sw placed to OFF. Other equip pwr'd by AC3 MMC2 and AC3 MMC4 is lost because of MNC MMC2 and MNC MMC4 loss ⑥ Manf 4 status automatically declared closed
(R1) If Tk2 in use: O2, H2 TK2 • HTR A (two) – AUTO • HTR B (two) – OFF	(R1A2) Cryo O2,H2 Tk2 Htrs B	2 FWD RCS TK ISOL 1/2 tb – bp 2 FWD RCS MANF ISOL 3,4 tb – bp	
(A11) If not OV102 and TK4 in use: O2, H2 TK4 • HTR A (two) – AUTO • HTR B (two) – OFF ----- (A11) If OV102 and O2,H2 TK4/5 in use: • O2 HTR TK5 – OFF • H2 HTR TK4/5 B – OFF ----- Refer to EPS 7.6 CRYO TABLE A for switch nomenclature	4 (A11) Cryo O2,H2 TK4 Htrs B	3 RAD BYP VLV 1 tb – bp 3 FLOW PROP VLV LOOP 2 tb – bp	
(R2) • BLR CNTLR/HTR 2 – B • 3 – B Refer to OMS/RCS Slide Rule for vlv loss info	(R2) Hyd H2O Blr 2 Cntlr A 3 Cntlr A	5 (R13L) RAD CNTL (two) tb – bp R ADP deploy time incr from 15 to 30 sec STAR TRKR DR POS –Z OP/CL time incr from 8 to 16 sec	
(MA73C:C,D) 5 • cb MCA PWR AC3 MID 2,4 (two) – op	6 (O16) RCS Manf F4 RJD pwr (F4R,F4D) 5 (MA73C) Stbd,Port Rad Lat 7-12 Mtr 2 Limit sw	(F7) If APUs active, using BLR CNTLR/HTR 2A or 3A: C/W APU TEMP It – on after ~2 min	
(Continued)	(Continued)		

NOM

EPS SSR-108 (Cont)
BUS LOSS: CNTLCA3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
For PLBD ops: • OP/CL Drs in man mode	(MA73C) Port,Stbd Rad Dpy/Sto Mtrs 2 PLBD: C/L Lat 1-4,5-8,9-12 Mtrs 2 13-16 Mtr 1 Port Aft Blkhd Mtr 2 Stbd Aft Blkhd Mtr 1 Port Door Mtr 1 Stbd Door Mtr 2 CL Limit sw	<div style="border: 1px solid black; padding: 2px;">SM (BFS,SM) 63 PL BAY DOORS</div>	⑦ APU 3 Qty meter (pnl F8) displays H2O qty when in FUEL position
(L1) • TOP EVAP HTR DUCT – A(B) If HI LOAD EVAP enabled: • HI LOAD DUCT HTR – A(B)	(L1A2) Topping Evap Duct Fwd,Aft Htrs C Hi Load Duct Outbd,Inbd Noz Htrs C	If in <u>AUTO</u> OP/CL for PLBDs, sequence terminates immediately and msg '(S63) PBD CONFIG' ----- During <u>MAN</u> PLBD OP/CL, single mtr run time noted on actuators listed at left	⑧ Mtr 2 remains
		(A8L) PORT RMS: DPY/STO tb – bp RETEN LAT tb – bp R-F-L AFT tb – bp	⑨ Htr Cntrl 2 remains
BUS ISOLATION		<div style="border: 1px solid black; padding: 2px;">SM 94 PDRS CONTROL</div>	⑩ Redundant mtrs remain
ONLY ON MCC CALL, PERFORM		Indications lost: MPM Mtr 1 STO/DPY Fwd MRL Mtr 2 LAT/REL/RDY Aft MRL Mtr 1 LAT/REL/RDY	⑪ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
(F8) • APU FUEL/H2O QTY – H2O	7 (F8A8) APU 3 Fuel Qty display		⑫ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists
	8 (A14) Aft RCS L,R Jet 5 Htrs		
	9 (R2) C MPS He Isol B man Cntl		
	8 (MA73C) –Z Star Trkr Dr Sys 2 OP/CL capability R ADP Deploy Mtr 1		
	9 Deploy Dsc 1 Htr Cntrl 1		
	(MA73C) LH Vents 1,2,3 Mtrs 1 Vent 6 Mtr 2 RH Vents 8,9 Mtrs 1 Vent 3 Mtr 2 Vent 5 Mtr 2		
	10 (MA73C) ET Door Mtrs: C/L Lat Actr 2 Mtr 2 GPC Cntl L Dr Closure Mtr 2 GPC CL capability R Dr Closure Mtr 1 GPC CL capability R Dr Uplock Lat Mtr 1 GPC Lat capability		
	(MA73C) AC pwr removal capability via Limit sw for ET Dr Mtrs: C/L Lat Actr 2 Mtr 2 L Dr Closure Mtr 2 R Dr Closure Mtr 1 Uplock Lat Mtr 1		
	(MA73C) Port RMS: MPM Mtr 1 Fwd MRL Mtr 2 Aft MRL Mtr 1		
		(Continued)	

NOM

EPS SSR-108 (Cont)
BUS LOSS: CNTLCA3

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
	(MA73C) 13 Ku Ant Sto/Dpy Mtr 1 Limit sw and Stow capability		⑬ With an inop limit sw, mtr will continue to run until primary sw returned to GND
	(MA73C) 14 Redundant Ku-Bd Xmit Enable Signal		⑭ MNB MMC4 pwr for Ku-Bd Xmit Enable Signal remains
	15 Redundant Boom Stow Enable II Excitation Signal		⑮ MNB MMC4 pwr remains to supply pwr to Boom stow enable II signal for stow mtrs
	(R2) 16 APU 3 FU Tk Vlv A		⑯ Vlv closed. Redundant vlv remains
	17 Cntrl pwr Sply A GBX GN2 Repress Vlv		⑰ Redundant pwr sply remains
			NOM

**EPS SSR-109
CONTROL BUS – PANEL WIRING MATRIX**

CNTL BUS PANEL	AB1	AB2	AB3	BC1	BC2	BC3	CA1	CA2	CA3
O6	X	X	X	X	X	X	X	X	X
O14	X	X					X	X	X
L2A1	X	X		X	X		X		
L1A2	X	X	X	X	X	X	X	X	X
L1A1						X			
F6	X	X	X	X	X	X	X	X	X
F2 (OV102)	X			X			X		
C3A7	X			X			X		
C3A1	X	X	X	X	X	X	X	X	X
C3A5	X	X	X	X	X		X	X	X
C3A6			X			X			X
C2A2	X			X	X		X		
F4 (OV102)						X			
F8	X	X	X	X	X	X	X	X	X
O7	X	X	X	X	X		X	X	X
O15	X	X		X	X	X	X		X
R1A2	X	X		X	X	X	X	X	X
R2	X	X	X	X	X	X	X	X	X
R4	X	X	X	X	X	X	X	X	X
O16				X	X	X	X	X	X
O8	X	X		X	X		X	X	
O17	X	X	X	X	X	X	X	X	X
R12A1	X	X		X	X		X	X	
R12A2								X	
R13A2	X	X	X	X	X		X	X	X
A1A2	X		X	X	X		X		
A1A3	X	X		X	X		X	X	
A11A1				X	X	X			X
A12	X	X	X	X	X	X	X	X	X
A6A1	X	X		X	X		X	X	
A7A1	X			X			X		
A8A2	X	X		X			X	X	X
A7A2 (OV102)									X
A13	X			X			X	X	
A14	X	X	X	X	X	X	X	X	X
MA73C	X	X	X	X	X	X	X	X	X

NOTE

This table shows control bus and "daisy-chained" panels that make up that particular control bus

**EPS SSR-110
BUS LOSS: AC1**

(Includes all AC1 sub-buses)

ACTIONS	
1	<ul style="list-style-type: none"> Perform FC1 SHUTDN (FC SHUTDN Cue Card)
	(R2) <ul style="list-style-type: none"> BLR CNTLR/HTR 1 – A 3 – B
	(L1) <ul style="list-style-type: none"> HUM SEP A – OFF ✓B – ON IMU FAN A – OFF B(C) – ON H2O PUMP LOOP 1 (two) – ON, B H2O LOOP 1 BYP MODE – AUTO H2O PUMP LOOP 2 – OFF AV BAY 1 FAN A – OFF ✓B – ON AV BAY 2 FAN (two) – ON AV BAY 3 FAN A – ON B – OFF FREON PUMP LOOP 1 – B FREON PUMP LOOP 2 – A
5	(MO13Q) If Arlk/Tnl Fan active: <ul style="list-style-type: none"> ARLK FAN A – OFF B – ON
6	<ul style="list-style-type: none"> Maintain LiOH canister(s) changeout per cue card and FLIGHT PLAN During sleep periods: (L1)
7	<ul style="list-style-type: none"> CAB FAN (two) – ON
9	(R13U) <ul style="list-style-type: none"> C/W PARAM SEL tw (three) – 033,115,074, 092, 062 C/W PARAM – INH MEM – CLEAR C/W PARAM SEL tw (three) – > 119
10	<div style="border: 1px solid black; padding: 2px;">SM 60 SM TABLE MAINT</div> <ul style="list-style-type: none"> Inhibits 0612705, 0612700, 0612740, 0612710
	(WCS) <ul style="list-style-type: none"> ✓MODE – AUTO ✓CRADLE – AUTO ✓Hose stowed in cradle ✓WCS ON It – OFF FAN SEP SEL sw – OFF HOSE BLOCK – SEP 2 In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete FAN SEP SEL sw – 2
	(EDO WCS) <ul style="list-style-type: none"> URINAL SEL – SEP 2 URINE DIVERTER VLV – FAN SEP 2
(Continued)	

EQUIP/FUNCTION LOST	
FC1 Pumps and pH Snsr	
Hyd H2O Blr 1 Cntrl B 3 Cntrl A	
Humidity Sep A	
IMU Fan A	
2	H2O Loop 2 Byp Cntrl, Sig Condr
3	H2O Loop 2 Byp Vlv pwr 2 Pump GPC Cntrl 1 Pump A
Av Bay 1 Fan A	
4	Av Bay 2 Sig Condr, Xdcrs (ECLS SC3)
Av Bay 3 Fan B	
Freon Loop 1 Pump A	
2 Pump B	
Arlk/Tnl Fan A	
Cabin Air S/C (ECLS SC6)	
WCS Fan/Sep 1	
Urine Sep 1 Fan 1	
Commode Fan 1	
(Continued)	

CREW INDICATIONS	
MASTER ALARM Light/Tone – on	
(F7) EVENT TIME ind blank C/W FC PUMP It – on C/W AC VOLT It – on C/W FREON LOOP It – on C/W AV BAY/CAB AIR It – on C/W H2O LOOP It – on SM ALERT Light/Tone – on	
(F9) AC1 ΦA,ΦB,ΦC AC volts < 90	
(LIGHTS LOST) Instr Its R (pnls C2,F8,F9) Pnl Its L/Ctr (pnls L1,L2,L4, C2,C3,F2,F6,F7) Pnl Its L/OH (pnls O5,O6, O7,O13,O14,O15) Numeric Its (pnls O3,F7) Orbit Sta Instr Its (pnls A1, A2)	
(FSMs) S67 AC VOLTS 1 S86 HYD RSVR Q S86 WSB T SM2 HYD QTY (B) SM0 THRM HYD (B) S66 AV BAY 3 FAN S66 AV BAY 2 FAN S69 FC PUMP 1 S69 FC H2 PUMP 1 S88 FREON FLOW 2 S88 FRN AFT CP 2 S88 FRN PL HX 2 S88 H2O PUMP P 2 S88 H2O LOOP 2 QTY S88 H2O LOOP 2 TEMP	
(R1) FC1 COOL PUMP ΔP tb – bp	
(F8) HYD QTY 1 ind – 0% APU H2O QTY 3 ind – 0%	
(O1) AIR TEMP AV BAY 2 ind – 45 degF H2O PUMP OUT PRESS LOOP 2 ind – 0 psia FREON FLOW LOOP 1 ind – 578 pph	
(O3) RCS/OMS PRPLT QTY Gage and MSN TIME ind blank	
(L1) If H2O LOOP 1 PUMP A active: 'S88 H2O PUMP P 1' 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP'	
(O1) H2O PUMP OUT PRESS LOOP 1 ind – 20-25 psia	
If HUM SEP A ON: 'S66 HUMID SEP A'	
(Continued)	

NOTES	
①	<div style="border: 1px dashed black; padding: 5px; width: fit-content; margin: auto;"> TIME CRITICAL </div>
FC1 must be shut down within 9 min to avoid potentially hazardous condition	
②	H2O Loop 2 Pump Out Press, Pump ΔP, Accum Qty, Pump Out Temp snrs lost
③	H2O Loop 2 Byp vlv holds position
④	Av Bay 2 Fan ΔP, Air Out Temp snrs lost
⑤	Not applicable for OV102
⑥	Crew and gnd have lost POCO2 Xcdr
⑦	Use streamers (if flown) or monitor by feel during wake period
⑧	CO2 partial Press and Cabin Fan ΔP snrs lost
⑨	Inhibits Primary C/W for AC1 Voltage, CAB Fan ΔP, H2O Loop 2 Pump P, FC1 stack Temp, FC1 Cool Pump ΔP
⑩	Inhibits H2O Loop 2 Pump ΔP, Pump Out Press, Pump Out Temp, Accum Qty, respectively
NOM	

EPS SSR-110 (Cont)
BUS LOSS: AC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>If CAB TEMP CNTLR 2 active: (L1) ● CAB TEMP CNTLR – OFF</p> <p>----- (MD44F) ● Remove pin from SEC ACTUATOR and BYP vlv linkage, connect linkage to PRI ACTUATOR</p> <p>(L1) ● CAB TEMP CNTLR – 1</p>	<p>11 Cabin Temp Cntrl 2, Hx Byp Vlv Mtr 2</p> <p>-----</p> <p>-----</p>	<p>(MO51F) CO2 RMVL SYS CNTLR 1 FAIL It on Impending: 'S66 CO2 RL SYS PCO2'</p>	<p>⑪ Lose Auto Temp Cntl via Cntrl 2 and H2O Loop 2 Cabin Hx In Temp Snsr. Hx Byp Vlv holds position</p>
<p>(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: ● Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)</p>	<p>12 CO2 Rmvl Sys: Cntrl 1 Fan AC1 pwr Compressor AC1 pwr</p>	<p>If IMU FAN A ON: 'S66 IMU FN SPD A' 'S66 IMU FAN DP'</p>	<p>⑫ PEVs, Actuators, Bed A P, Bed B P, Bed dP will be recovered after system reconfig</p>
<p>Refer to OMS/RCS Slide Rule for vlv loss info (use FPC1 Slide for Aft RCS and FMC1 Slide for Fwd RCS)</p>		<p>If APUs active and using H2O BLR CNTLR/HTR 1B or 3A, then C/W APU TEMP It on after ~2 min</p>	<p>⑬ Redundant mtr remains</p>
<p>BUS ISOLATION</p>		<p>STAR TRKR DR POS –Y OP/CL time incr from 8 to 16 sec</p>	<p>⑭ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists</p>
<p>ONLY ON MCC CALL, PERFORM</p>		<p>L ADP deploy time incr from 15 to 30 sec</p>	
<p>(MA73C:C) cb MCA PWR ● AC1 3Φ FWD 1 – op ● MID 1 – op</p>	<p>13 AC1 FMC1 Bus pwr RH Vent 1,2 Mtr 1 –Y Star Trkr Dr Sys 1 OP/CL capability</p> <p>13 L ADP Dpy Mtr 1 AC1 MMC1 Bus pwr RH Vents 3,5,6 Mtrs 1 PL Reten Sys A Rel/Lat Mtrs Port Rad Lat 1–6, 7–12 Mtrs 1 Port Rad Dpy/Sto Mtr 1 PLBD: C/L Lat 9–12 Mtr 1 Port,Stbd Fwd Blkhd Mtrs 1 Stbd Door Mtr 1</p>	<p>If Freon Loop 2 Pump B on: 'S88 FREON FLOW 2' 'S88 FRN AFT CP 2' 'S88 FRN PL HX 2'</p>	
<p>(MA73C:D) cb MCA PWR ● AC1 3Φ MID 3 – op ● AFT 1 – op</p>	<p>PLBD: C/L Lat 1–4, 5–8 Mtrs 1 Port, Aft Blkhd Mtr 1 AC1 MMC3 Bus pwr AMC1 Bus pwr LH Vent 8,9 Mtr 1</p>	<p>(O1) FREON FLOW LOOP 2 ind – 578 pph</p>	<p>SM (BFS SM 63) PL BAY DOORS</p>
<p>(MA73C:E) ● cb AC1 WCS FAN SEP 1 (three) – op</p>		<p>During PLBD OP/CL, single mtr run time noted on actuators listed at left</p>	
<p>(MA73C:F) cb AC1 ● RMS PRI ΦA – op</p>	<p>14 Port RMS: Mid MRL Mtr 1 Aft MRL Mtr 2 D&C Primary Itg Shldr Brace release AC1 Middeck Utility Pnl (MUP) Ops Hyd Actr Instr</p>	<p>During Rad Dpy/Sto ops: (R13L) RAD CNTL tbs (four) indicate single mtr ops</p>	
<p>● MAR 3Φ – op</p>			
<p>● OPS INST HYD ACTR ΦC – op</p>			
<p>(MA73C:G) IF DOCKING MISSION ● cb AC1 ARLK/TNL FAN A (three) – op</p>	<p>Ark/Tnl Fan A</p>		
<p>(Continued)</p>	<p>(Continued)</p>		

NOM

EPS SSR-110 (Cont)
BUS LOSS: AC1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM			
(MA73C:H,I) ● cb AC1 FWD RCS VLV (three) – op ● cb AC1 AFT POD VLV GP 1 (three) – op			
(L4:A-E) ● cb UTIL PWR F1/MO52J ● AC1 – op	AC1 Util pwr (F1/MO52J)		
----- cb AC1 ● FC1 PUMPS (three) – op ● CTR ENG (three) – op ● R ENG (three) – op			
(L4:F-J) cb AC1 ● √ H2O LOOP PUMP 1A/2 (three) – op ● AV BAY 1 FAN A (three) – op ● AV BAY 3 FAN B (three) – op ● IMU FAN A (three) – op ● HUM SEP A (three) – op			
(L4:K) cb AC1 ● φA H2O CNTLR 2 – op ● φB CAB AIR S/C – op			
(L4:L) cb AC1 ● φA CAB T CNTLR 2 – op ● φB AV BAY 2 S/C – op			
(L4:M,N) cb AC1 φA, φB, φC ● FREON LOOP 1 PUMP A (three) – op ● FREON LOOP 2 PUMP B (three) – op			
(L4:O) cb AC1 ● φA BLR HYD BYP 1B – op ● φB HYD QTY 1 – op ● φC BLR HYD BYP 3A – op	Hyd Rsvr 1 Qty Snsr		
(L4:P) cb AC1 ● φA RAD CNTLR 1B – op ● φB RAD CNTLR 2B – op ● φC TACAN 1 – op	15 Freon Loop 1 Cntr B Rad Byp Vlv Mtr Freon Loop 2 Cntr B Rad Byp Vlv Mtr Tacan 1		
(L4:Q) cb AC1 ● φA LTG PNL L/CTR – op ● φB LTG PNL L OVHD – op ● φC LTG INST OS – op	Pnl Its L/Ctr Pnl Its L/OH (pnls O5,O6,O7, O13,O14,O15) Orbit Sta Instr Its		
(Continued)	(Continued)		

⑮ Bypass vlvs hold position and Cntr A Rad Byp Vlv Mtrs remain

NOM

EPS SSR-110 (Cont)
BUS LOSS: AC1

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>ONLY ON MCC CALL, PERFORM</p>			<p>⑬ Redundant mtr remains</p>
<p>(L4:R) cb AC1 •ΦA LG INST R – op •ΦB NUMERIC FWD – op</p>	<p>16 Inst Its R Numeric Its (pnls O3,F7) (RCS/OMS Prplt Qty, Gauge, Mission and Event Timers)</p>		<p>⑭ ✓MCC for total OMS Qtys. Aft Qtys are found on GNC SYS SUMM 2</p>
	<p>LH Vents 5,6 Mtrs 1 Stbd Rad 1 Lat 1-6,7-12 Mtrs 1 Stbd Rad Dpy/Sto Mtr 1</p>		
	<p>13 ET Door Mtrs: C/L Lat Actr 1,2 Mtr 1 L Dr Closure Mtr 1 Uplock Lat Mtr 1</p>		
			<p style="text-align: right; font-size: 24pt; font-weight: bold;">NOM</p>

EPS SSR-111
BUS LOSS: AC1 Φ A

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(L1)</p> <ul style="list-style-type: none"> • ✓HUM SEP A – OFF • ✓B – ON • ✓IMU FAN A – OFF • ✓B(C) – ON • H2O PUMP LOOP 1 (two) – ON, B • H2O LOOP 1 BYP MODE – AUTO • H2O PUMP LOOP 2 – OFF • ✓FREON PUMP LOOP 1 – B • ✓FREON PUMP LOOP 2 – A • ✓AV BAY 1 FAN A – OFF • ✓B – ON • 3 FAN A – ON • B – OFF 	<p>1Φ of Hum Sep A</p> <p>1Φ of IMU Fan A</p> <p>1 H2O Loop 2 Byp Cntrl, Sig Condr, Byp Vlv pwr</p> <p>1Φ of H2O Loop 2 Pump GPC Cntrl pwr</p> <p>1Φ of H2O Loop 1 Pump A Freon Loop 1 Pump A 2 Pump B</p> <p>1Φ of AV Bay 1 Fan A</p> <p>1Φ of AV Bay 3 Fan B</p>	<p>MASTER ALARM Light/Tone – on</p> <p>(F7) C/W AC VOLT It – on C/W H2O LOOP It – on SM ALERT Light/Tone – on</p> <p>(F9) AC1 ΦA AC volts < 90</p> <p>(LIGHTS LOST) Instr Its R (pnls C2,F8,F9) Pnl Its L/Ctr (pnls L1,L2,L4,C2,C3,F2,F6,F7)</p> <p>(FSMs) S67 AC VOLTS 1 S69 FC H2 PUMP 1 S86 WSB T SM0 THRM HYD (B) S88 H2O PUMP P 2 S88 H2O LOOP 2 QTY S88 H2O LOOP 2 TEMP</p> <p>(O1) H2O PUMP OUT PRESS LOOP 2 ind – 0 psia</p> <p>If H2O PUMP LOOP 1, A active: 'S88 H2O PUMP P 1'</p> <p>(O1) H2O PUMP OUT PRESS LOOP 1 ind – 40–45 psia</p> <p>If IMU FAN A ON: 'S66 IMU FN SPD A' 'S66 IMU FAN DP'</p> <p>If HUM SEP A ON: 'S66 HUMID SEP A'</p> <p>If APUs active, and using BLR CNTLR/HTR 1B: C/W APU TEMP It – on after ~2 min</p>	<p>① H2O Loop 2 Byp Vlv holds position and H2O Loop 2 Pump Out Press, Pump ΔP Accum Qty, Pump Out Temp snrs lost</p> <p>② Not applicable for OV102</p> <p>③ Inhibits H2O Loop 2 Pump ΔP, Pump Out Press, Pump Out Temp, and Accum Qty, respectively</p> <p>④ If H2O Loop 1 Pump A active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W</p> <p>⑤ Lose Auto Temp Cntl via Cntrl 2 and H2O Loop 2 Cabin Hx In Temp snsr. Hx Byp vlv holds position</p> <p>⑥ Inhibits Primary C/W for AC1 voltage and H2O Loop 2 Pump P</p> <p>⑦ For EDO WCS, Urine Fans and Seps are DC motors. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1Φ down; however, crew actions will pwr fans through alternate pwr source, with full 3Φ pwr. For WCS, 2Φ ops will result in degraded airflow. Urine Fan, Seps are unusable for urine collection or EMU drain</p>
<p>(MO13Q)</p> <p>If Arlk/Tnl Fan active:</p> <ul style="list-style-type: none"> • ARLK FAN A – OFF • B – ON 	<p>1Φ of Arlk/Tnl Fan A</p>		
<p>(R2)</p> <ul style="list-style-type: none"> • BLR CNTLR/HTR 1 – A 	<p>Hyd H2O Blr 1 Cntrl B</p>		
<p>SM 60 SM TABLE MAINT</p> <p>3</p> <ul style="list-style-type: none"> • Inhibit 0612705, 0612700, 0612740, 0612710 • Reset upper limit of 0450114 (FC1 H2 PUMP STATUS) to current value +0.3 volts 	<p>1Φ of FC1 H2 Pump</p> <p>1Φ of FC1 Coolant Pump</p>	<p>4</p> <p>4</p>	
<p>If CAB TEMP CNTLR 2 active:</p> <p>(L1)</p> <ul style="list-style-type: none"> • CAB TEMP CNTLR – OFF 	<p>5 Cabin Temp Cntrl 2, Hx Byp Vlv Mtr 2</p>		
<p>(MD44F)</p> <ul style="list-style-type: none"> • Remove pin from SEC ACTUATOR and BYP vlv linkage, connect linkage to PRI ACTUATOR 			
<p>(L1)</p> <ul style="list-style-type: none"> • CAB TEMP CNTLR – 1 			
<p>(R13U)</p> <ul style="list-style-type: none"> • C/W PARAM SEL tw (three) – 033,115 • C/W PARAM – INH • MEM – CLEAR • C/W PARAM SEL tw (three) – > 119 			
<p>(WCS)</p> <ul style="list-style-type: none"> • ✓MODE – AUTO • ✓CRADLE – AUTO • ✓Hose stowed in cradle • ✓WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 2 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30–sec run complete. • FAN SEP SEL sw – 2 	<p>7 1Φ of WCS Fan/Sep 1</p>		
<p>(EDO WCS)</p> <ul style="list-style-type: none"> • URINAL SEL – SEP 2 • URINE DIVERTER VLV – FAN SEP 2 	<p>7 Urine Sep 1 Fan 1 1Φ of Commode Fan 1</p>		
<p>(Continued)</p>	<p>(Continued)</p>		

NOM

EPS SSR-111 (Cont)
BUS LOSS: AC1 Φ A

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
9 If bus shorted: <ul style="list-style-type: none"> Open all AC1 ΦA cbs that pwr 3Φ loads on pnls L4: C-J,M,N (9 cbs), MA73C: E,G,H,I (4 cbs) Open all AC1 3Φ ganged cbs on pnls L4: B (1 cb), MA73C: C,D,F (5cbs) 	8 1 Φ of AC Utility Power Outlets at F1 and MO52J 9 AC1 FMC1 Bus pwr MMC1 Bus pwr MMC3 Bus pwr AMC1 Bus pwr	(MO51F) CO2 RMVL SYS CNTLR 1 FAIL It - on Impending: 'S66 CO2 RL SYS PCO2' 'S66 CAB PPCO2'	⑧ MCC will provide equipment reconfig info if reqd ⑨ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into shorts. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpowering sub-buses: SSR-114, SSR-115, SSR-116, SSR-117
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: <ul style="list-style-type: none"> Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS) 	10 CO2 Rmvl Sys Cntrl 1 1 Φ of CO2 Rmvl Sys: Fan AC1 pwr Compressor AC1 pwr		⑩ PEVs, Actuators, Bed A P, Bed B P, Bed dP will be recovered after system reconfig
11 If bus not shorted: <ul style="list-style-type: none"> Perform the following BUS ISOLATION steps 			⑪ For unshorted bus, perform single Φ isolation steps to prevent powering single phase loads with coupled energy from remaining two phases
11 BUS ISOLATION IF BUS NOT SHORTED, PERFORM (L4:K) <ul style="list-style-type: none"> cb AC1 ΦA H2O CNTLR 2 - op ----- (L4:L) <ul style="list-style-type: none"> cb AC1 ΦA CAB T CNTLR 2 - op ----- (L4:O) <ul style="list-style-type: none"> cb AC1 ΦA BLR HYD BYP 1B - op ----- (L4:P) <ul style="list-style-type: none"> cb AC1 ΦA RAD CNTLR 1B - op ----- (L4:Q) <ul style="list-style-type: none"> cb AC1 ΦA LTG PNL L/CTR - op ----- (L4:R) <ul style="list-style-type: none"> cb AC1 ΦA INST R - op ----- (MA73C:F) <ul style="list-style-type: none"> cb AC1 RMS PRI ΦA - op 	12 Freon Loop 1 Cntrl B Rad Byp Vlv Mtr Pnl Its L/Ctr (pnls L1,L2,L4,C2,C3,F2,F6,F7) Instr Its R (pnls C2,F8,F9) Port RMS Shldr Brace Release D&C Primary Itg 1 Φ of Mid MRL Mtr 1 Aft MRL Mtr 2		⑫ Bypass vlv holds position and Cntrl A Rad Byp Vlv Mtr remains
	FC1 pH Snsr		<p style="text-align: center;">NOM</p>

**EPS SSR-112
BUS LOSS: AC1 Φ B**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(L1)</p> <ul style="list-style-type: none"> • \checkmark HUM SEP A – OFF • \checkmark B – ON • \checkmark IMU FAN A – OFF • \checkmark B(C) – ON • H2O PUMP LOOP 2 – ON • H2O PUMP LOOP 1 (two) – GPC, B • AV BAY 2 FAN (two) – ON • FREON PUMP LOOP 1 – B • FREON PUMP LOOP 2 – A • \checkmark AV BAY 1 FAN A – OFF • \checkmark B – ON • 3 FAN A – ON • B – OFF 	<p>1 Φ of Hum Sep A</p> <p>1 Φ of IMU Fan A</p> <p>1 Φ of H2O Loop 2 Pump GPC Cntrl pwr</p> <p>1 1 Φ of H2O Loop 1 Pump A</p> <p>2 Av Bay 2 Sig Condr, Xdcrs (ECLS SC3)</p> <p>1 Φ Freon Loop 1 Pump A 2 Pump B</p> <p>1 Φ of AV Bay 1 Fan A</p> <p>1 Φ of AV Bay 3 Fan B</p>	<p>MASTER ALARM Light/Tone – on</p> <p>(F7) C/W AC VOLT It – on C/W AV BAY/CAB AIR It – on SM ALERT Light/Tone – on</p> <p>(F7) EVENT TIME ind blank</p> <p>(F9) AC1 ΦB volts < 90</p> <p>(LIGHTS LOST) Pnl Its L/OH (pnls O5,O6, O7,O13,O14,O15) Numeric Its (pnls O3,F7)</p> <p>(FSMs) S67 AC VOLTS 1 S69 FC H2 PUMP 1 S86 HYD RSVR Q SM2 HYD QTY (B) S66 AV BAY 2 FAN S66 CAB PPCO2 S66 CABIN FAN S88 H2O LOOP 2 TEMP</p> <p>(F8) HYD QTY 1 – 0%</p> <p>(O1) AIR TEMP AV BAY 2 – 45 degF</p> <p>(O3) RCS/OMS PRPLT QTY Gage and MSN TIME ind blank</p> <p>If H2O PUMP LOOP 1,A active: H2O LOOP C/W It 'S88 H2O PUMP P 1' (O1) H2O PUMP OUT PRESS LOOP 1 – 40–45 psia</p>	<p>① If H2O Loop 1 Pump A active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W</p> <p>② Av Bay 2 Fan ΔP, Air Out Temp snrs lost</p> <p>③ Not applicable for OV102</p> <p>④ Crew and GND have lost PPCO2 xdcr</p> <p>⑤ Use streamers (if flown) or monitor by feel during wake period</p> <p>⑥ CO2 partial Press and Cabin Fan ΔP snrs lost</p> <p>⑦ Inhibits Primary C/W for AC1 voltage and Cabin Fan ΔP</p> <p>⑧ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1 Φ down; however, crew actions will pwr fans through alternate pwr source with full 3 Φ pwr. For WCS, 2 Φ ops will result in degraded airflow. Urine Fan, Seps are unusable for urine collection or EMU drain</p> <p>⑨ MCC will provide equipment reconfig info if reqd</p>
<p>(MO13Q) If Arlk/Tnl Fan active:</p> <p>3 • ARLK FAN A – OFF</p> <p>• B – ON</p>	<p>1 Φ of Arlk/Tnl Fan A</p>		
<p>4 • Maintain LiOH canister(s) changeout per cue card and FLIGHT PLAN</p> <p>During sleep periods: (L1)</p> <p>5 • CAB FAN (two) – ON</p>	<p>5 Cab Air Sig Cond 6 (ECLS SC6)</p>		
<p>(R13U)</p> <p>7 • C/W PARAM SEL tw (three) – 033,074</p> <p>• C/W PARAM – INH</p> <p>• MEM – CLEAR</p> <p>• C/W PARAM SEL tw (three) – > 119</p>			
<p>(WCS)</p> <ul style="list-style-type: none"> • \checkmark MODE – AUTO • \checkmark CRADLE – AUTO • \checkmark Hose stowed in cradle • \checkmark WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 2 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30–sec run complete. • FAN SEP SEL sw – 2 	<p>8 1 Φ of WCS Fan/Sep 1</p>	<p>1</p> <p>1</p>	
<p>(EDO WCS)</p> <ul style="list-style-type: none"> • URINAL SEL – SEP 2 • URINE DIVERTER VLV – FAN SEP 2 	<p>8 Urine Fan 1 Sep 1 1 Φ of Commode Fan 1</p>		
<p>SM 60 SM TABLE MAINT</p> <ul style="list-style-type: none"> • Reset upper limit of 0450114 (FC1 H2 PUMP STATUS) to current value + 0.3 volts 	<p>1 Φ of FC1 H2 Pump</p> <p>1 Φ of FC1 Coolant Pump</p>		
<p>(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected:</p> <ul style="list-style-type: none"> • Perform CO2 REMOVAL SYSTEM CNTLR 1(2) CONFIG (ORB OPS, ECLS) 	<p>1 Φ of CO2 Rmvl Sys: Fan AC1 pwr Compressor AC1 pwr</p>		
	<p>9 1 Φ of AC Utility Power Outlets at F1 and MO52J</p>		
(Continued)	(Continued)		

NOM

EPS SSR-112 (Cont)
BUS LOSS: AC1 Φ B

ACTION		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
10	If bus shorted: <ul style="list-style-type: none"> Open all AC1 ΦB cbs that pwr 3Φ loads on pnls L4: C-J,M,N (9 cbs), MA73C: E,G,H,I (4 cbs) Open all AC1 3Φ ganged cbs on pnls L4:B (1 cb), MA73C: C,D,F (5 cbs) 	10 AC1 FMC1 Bus pwr MMC1 Bus pwr MMC3 Bus pwr AMC1 Bus pwr		<p>⑩ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpowering sub-buses: SSR-114, SSR-115, SSR-116, SSR-117</p> <p>⑪ For unshorted bus, perform single Φ isolation steps to prevent powering single phase loads with coupled energy from remaining two phases</p> <p>⑫ Bypass vlv holds position and Cntrl A Rad Byp Vlv Mtr remains</p> <p>⑬ \checkmark MCC for total OMS Qty. Aft Qty's are found on</p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">GNC SYS SUMM 2</div>
11	If bus not shorted: <ul style="list-style-type: none"> Perform the following BUS ISOLATION steps 			
<p style="text-align: center;">BUS ISOLATION</p> <p>IF BUS <u>NOT</u> SHORTED, PERFORM</p>				
		Port RMS: 1 Φ of Mid MRL Mtr 1 Aft MRL Mtr 2		
(L4:K) <ul style="list-style-type: none"> cb AC1 ΦB CAB AIR S/C - op 				
(L4:L) <ul style="list-style-type: none"> cb AC1 ΦB AV BAY 2 S/C - op 				
(L4:O) <ul style="list-style-type: none"> cb AC1 ΦB HYD QTY 1 - op 		Hyd Rsvr 1 Qty Snsr		
(L4:P) <ul style="list-style-type: none"> cb AC1 ΦB RAD CNTLR 2B - op 		12 Freon Loop 2 Cntrl B Rad Byp Vlv Mtr		
(L4:Q) <ul style="list-style-type: none"> cb AC1 ΦB LTG PNL L OVHD - op 		Pnl Its L/OH (pnls O5,O6,O7, O13,O14,O15)		
(L4:R) <ul style="list-style-type: none"> cb AC1 ΦB NUMERIC FWD - op 		13 Numeric Its (pnls O3,F7) (RCS, OMS Prplt Qty, Gage, Mission and Event Timers)		

EPS SSR-113
BUS LOSS: AC1 Φ C

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(R2)	<ul style="list-style-type: none"> BLR CNTLR/HTR 3 - B 	Hyd H2O Blr 3 Cntrl A	MASTER ALARM Light/Tone - on	<p>① For unshorted bus, perform single Φ isolation steps to prevent powering single phase loads with coupled energy from remaining two phases</p>
(L1)	<ul style="list-style-type: none"> \checkmark HUM SEP A - OFF \checkmark B - ON \checkmark IMU FAN A - OFF \checkmark B(C) - ON H2O PUMP LOOP 2 - ON 	1 1 Φ of Hum Sep A	(F7) C/W AC VOLT It - on SM ALERT Light/Tone - on	
	<ul style="list-style-type: none"> H2O PUMP LOOP 1 (two) - GPC, B FREON PUMP LOOP 1 - B 2 - A \checkmark AV BAY 1 FAN A - OFF \checkmark B - ON 3 FAN A - ON B - OFF 	2 1 Φ of H2O Loop 2 Pump GPC Cntrl pwr	(F9) AC1 Φ C AC volts < 90	<p>② If H2O Loop 1 Pump A active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W</p>
		1 Φ of H2O Loop 1 Pump A	(LIGHTS LOST) Orbit Sta Instr Its (pnls A1,A2)	
		1 Φ Freon Loop 1 Pump A 2 Pump B	(FSMs) S67 AC VOLTS 1 S69 FC H2 PUMP 1 S86 WSB T SM0 THRM HYD (B)	<p>③ Not applicable for OV102</p>
		1 Φ of AV Bay 1 Fan A	(F8) APU H2O QTY 3 - 0%	
3	(MO13Q) If Arlk/Tnl Fan active: <ul style="list-style-type: none"> ARLK FAN A - OFF B - ON 	1 Φ of Arlk/Tnl Fan A		
(Continued)		(Continued)	(Continued)	NOM

EPS SSR-113 (Cont)
BUS LOSS: AC1 Φ C

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(R13U) • C/W PARAM SEL tw (three) – 033 (AC1 voltage) • C/W PARAM – INH MEM – CLEAR • C/W PARAM SEL tw (three) – > 119		2 If H2O PUMP LOOP 1, A active: C/W H2O LOOP It – on ‘S88 H2O PUMP P 1’ (O1) 2 H2O PUMP OUT PRESS LOOP 1 – 40–45 psia	② If H2O Loop 1 Pump A active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W ④ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1 Φ down; however, crew actions will pwr fans through alternate pwr source with full 3 Φ pwr. For WCS, 2 Φ ops will result in degraded airflow. Urine Fan, Seps are unusable for urine collection or EMU drain
(WCS) • ✓ MODE – AUTO • ✓ CRADLE – AUTO • ✓ Hose stowed in cradle • ✓ WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 2 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30–sec run complete. • FAN SEP SEL sw – 2	4 1 Φ of WCS Fan/Sep 1	If APUs active and using H2O BLR CNTLR/HTR 3A: C/W APU TEMP It – on after ~2 min	④ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1 Φ down; however, crew actions will pwr fans through alternate pwr source with full 3 Φ pwr. For WCS, 2 Φ ops will result in degraded airflow. Urine Fan, Seps are unusable for urine collection or EMU drain
(EDO WCS) • URINAL SEL – SEP 2 • URINE DIVERTER VLV – FAN SEP 2	Urine Sep 1 Fan 1 4 1 Φ of Commode Fan 1		④ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1 Φ down; however, crew actions will pwr fans through alternate pwr source with full 3 Φ pwr. For WCS, 2 Φ ops will result in degraded airflow. Urine Fan, Seps are unusable for urine collection or EMU drain
SM 60 SM TABLE MAINT • Reset upper limit of 0450114 (FC1 H2 PUMP STATUS) to current value + 0.3 volts	1 Φ of FC1 H2 Pump 1 Φ of FC1 Coolant Pump		⑤ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpowering sub-buses: SSR-114, SSR-115, SSR-116, SSR-117
5 If bus shorted: • Open all AC1 Φ C cbs that pwr 3 Φ loads on pnls L4: C–J,M,N (9 cbs), MA73C: E,G,H,I (4 cbs) • Open all AC1 3 Φ ganged cbs on pnls L4:B (1 cb), MA73C: C,D,F (5 cbs)	6 1 Φ of AC Utility Power Outlets at F1 and MO52J 5 AC1 FMC1 Bus pwr MMC1 Bus pwr MMC3 Bus pwr AMC1 Bus pwr		⑤ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpowering sub-buses: SSR-114, SSR-115, SSR-116, SSR-117
If bus not shorted: • Perform the following BUS ISOLATION steps			⑥ MCC will provide equipment reconfig info if reqd
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 1 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	1 Φ of CO2 Rmvl Sys: Fan AC1 pwr Compressor AC1 pwr		⑦ For unshorted bus, perform single isolation steps to prevent powering single phase loads with coupled energy from remaining two phases
7 BUS ISOLATION IF BUS NOT SHORTED, PERFORM (L4:O) • cb AC1 Φ C BLR HYD BYP 3A – op ----- (L4:P) • cb AC1 Φ C TACAN 1 – op ----- (L4:Q) • cb AC1 Φ C LTG INST OS – op (Continued)	Tacan 1 Orbit Sta Instr Its (Pnls A1,A2) (Continued)		(Continued)

NOM

EPS SSR-113 (Cont)
BUS LOSS: AC1 Φ C

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(MA73C:F) • cb AC1 OPS INST HYD ACTR Φ C - op	Ops Hyd Actr Instr		
	Port RMS: 1 Φ of Mid MRL Mtr 1 Aft MRL Mtr 2		<p style="text-align: right; font-size: 2em; font-weight: bold;">NOM</p>

**EPS SSR-114
BUS LOSS: AC1 FMC1**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		L ADP deploy time incr from 15 to 30 sec	① Redundant mtr remains
		-Y Star Trkr OP/CL time incr from 8 to 16 sec	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:C) • cb MCA LOGIC MCA PWR AC1 3Φ FWD 1 – op	AC1 FMC1 Bus pwr RH Vent 1,2 Mtr 1 1 L ADP Dpy Mtr 1 1 -Y Star Trkr Dr Sys 1 OP/CL capability		

**EPS SSR-115
BUS LOSS: AC1 MMC1**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE			① Single mtr time
		SM (BFS SM 63) PL BAY DOORS	
BUS ISOLATION		During PLBD OP/CL, single mtr run time noted on actuators listed at left	
ONLY ON MCC CALL, PERFORM		During Rad Dpy/Sto ops: (R13L) RAD CNTL PORT tb (two) indicates single mtr ops	
(MA73C:C) • cb MCA LOGIC MCA PWR AC1 3Φ MID 1 – op	PLBD: C/L Lat 9-12 Mtr 1 Port, Stbd Fwd Blkhd Mtrs 1 Stbd Door Mtr 1 RH Vents 3,5,6 Mtrs 1 AC1 MMC1 Bus pwr Port Rad Lat 1-6, 7-12 Mtrs 1 Dpy/Sto Mtr 1 PL Reten Sys A Rel/Lat Mtrs 1 Port RMS Mid MRL Mtr 1 ROEU 1 Orbiter arm drive mtr (ODM mtr 1 – mate A, demate A, relax A) 1 ODA mtr 1 latch/release		

**EPS SSR-116
BUS LOSS: AC1 MMC3**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE			① Single mtr time
		SM (BFS SM 63) PL BAY DOORS	
BUS ISOLATION		During PLBD OP/CL, single mtr run time noted on actuators listed at left	
ONLY ON MCC CALL, PERFORM		During Rad Dpy/Sto ops: (R13L) RAD CNTL STBD tb (two) indicates single mtr ops	
(MA73C:D) • cb MCA LOGIC MCA PWR AC1 3Φ MID 3 – op	PLBD C/L Lat 1-4, 5-8 Mtrs 1 Port Aft Blkhd Mtr 1 LH Vents 5,6 Mtrs 1 AC1 MMC3 Bus pwr Stbd Rad Lat 1-6, 7-12 Mtrs 1 Dpy/Sto Mtr 1 1 Port RMS Aft MRL Mtr 2		

NOM

EPS SSR-117
BUS LOSS: AC1 AMC1

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	① Redundant mtrs remain
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:D) <ul style="list-style-type: none"> • cb MCA PWR AC1 3Φ AFT 1 – op 			
	AC1 AMC1 Bus pwr LH Vent 8,9 Mtr 1		
	1 ET Door Mtrs: C/L Lat Actr 1 Mtr 1 2 Mtr 1 L Dr Closure Mtr 1 Uplock Lat Mtr 1		

EPS SSR-120
BUS LOSS: AC2

(Includes all AC2 sub-buses)

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 • Perform FC2 SHUTDN (FC SHUTDN Cue Card)	FC2 Pumps and pH Snsr	MASTER ALARM Light/Tone – on	①
(R2) • BLR CNTLR/HTR 1 – B • 2 – A	Hyd H2O Blr 1 Cntr A 2 Cntr B	(F7) C/W FC PUMP It – on C/W AC VOLT It – on C/W FREON LOOP It – on SM ALERT Light/Tone – on C/W AV BAY/CABIN AIR It	* [TIME CRITICAL] * FC2 must be shut down within 9 min to avoid potentially hazardous condition
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		(F9) AC2 ΦA, ΦB, ΦC AC volts < 90	② Av Bay 3 Fan ΔP, Air Out Temp snsr lost
(L1) • HUM SEP B – OFF • A – ON • CAB FAN B – OFF • A – ON • IMU FAN B – OFF • A(C) – ON • H2O PUMP LOOP 1 (two) – GPC, A • H2O PUMP LOOP 2 – ON • AV BAY 1 FAN B – OFF • A – ON • 2 FAN A – OFF • B – ON • AV BAY 3 FAN (two) – ON • FREON PUMP LOOP 1,2 (two) – A	Humidity Sep B Cabin Fan B IMU Fan B H2O Loop 1 Pump B Av Bay 1 Fan B Av Bay 2 Fan A	(LIGHTS LOST) R Ovhd pnl (pnls O1,O2, O3,O8,O9,O16,O17) R pnl (pnls F4,F8,F9,R1,R2, R4) Ovhd Instr (pnls O1,O2,O3) Orbit Sta Numeric (pnls A2,A4)	③ Freon Loop 2 pump switched to avoid having both loops powered by AC 1
3 If AV BAY FIRE POWERDOWN not performed: 4 • Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 2	2 Av Bay 3 Sig Condr, Xdcrcs (ECLS SC4)	(FSMs) S67 AC VOLTS 2 S86 HYD RSVR Q SM2 HYD QTY (B) S86 WSB T SM0 THRM HYD (B) S66 AV BAY 1,2,3 FAN S69 FC PUMP 2 S69 FC H2 PUMP 2 S88 FREON FLOW 1 S88 FRN AFT CP 1 S88 FRN PL HX 1 S88 FREON QTY 2 S88 FREON FLOW 2 S88 H2O LOOP 1 TEMP S66 IMU FN SPD B S66 IMU FAN DP	④ Instrumentation loss caused rad isolaton ⑤ Not applicable for OV102 ⑥ Rad isolation may cause FES shutdown
5 (MO13Q) If Arlk/Tnl Fan active: • ARLK FAN B – OFF • √A – ON	Freon Loop 1 Pump B		⑦ Brake/Skid Cntl Box A,B enabled before WOW
(L4:P) • cb AC3 ΦA LG SNSR 1 – cl		6 Possible 'S88 EVAP OUT T 1(2)'	⑧ When gear deployed, tb will not indicate DN
(O17:C) • SIG CONDR FREON A – AC3 • SIG CONDR FREON B – AC3	7 Prox Snsr Elec Box 2	8 (F6,F8) LDG GEAR L,NOSE tb – bp	⑨ Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snsr lost
(CDR SEAT PNL) • CDR SEAT PWR BUS SEL – AC3 (dn)	9 Freon Sig Condr A AC2 pwr (ECLS SC1A) 10 Freon Sig Condr B AC2 pwr (ECLS SC1B)	(F8) APU H2O QTY 1 ind – 0% HYD QTY 2 ind – 0%	⑩ Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate and Accum Qty snsr lost
(Continued)	CDR Seat Adj via AC2 pwr		
	(Continued)	(Continued)	NOM

EPS SSR-120 (Cont)
BUS LOSS: AC2

11

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(PLT SEAT PNL) ● PLT SEAT PWR BUS SEL - AC3 (dn)	PLT Seat Adj via AC2 pwr	(R1) FC2 COOL PUMP ΔP tb - bp	(11) Inhibits Primary C/W for AC2 Voltage, FC2 Stack Temp, and Pump ΔP
(R13U) ● C/W PARAM SEL tw (three) - 043,072,102 ● C/W PARAM - INH ● MEM - CLEAR ● C/W PARAM SEL tw (three) - > 119		(O1) AIR TEMP AV BAY 3 - 45 degF FREON FLOW LOOP 2 - 578 pph AIR TEMP CAB HX OUT - 45 degF	(12) Lose Auto Temp Cntl via Cntl 1 and Cabin Temp, Cabin Hx Air Out Temp and H2O Loop 1 Cabin Hx In Temp snrs. Hx Byp Vlv holds position
(WCS) ● ✓ MODE - AUTO ● ✓ CRADLE - AUTO ● ✓ Hose stowed in cradle ● ✓ WCS ON It - OFF ● FAN SEP SEL sw - OFF ● HOSE BLOCK - SEP 1 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete ● FAN SEP SEL sw - 1	WCS Fan/Sep 2	(A4) Mission and Event Timers blank	(13) Redundant mtr remains
(EDO WCS) ● URINAL SEL - SEP 1 ● URINE DIVERTER VLV - FAN SEP 1	Urine Sep 2 Fan 2 Commode Fan 2	If Freon Loop 1 Pump B ON: 'S88 FREON FLOW 1'	
If CAB TEMP CNTLR 1 active: (L1) ● CAB TEMP CNTLR - OFF	12 Cabin Temp Cntl 1 and Hx Byp Vlv Mtr 1	If APU active and using H2O Blr Cntl 1A or 2B: C/W APU TEMP It - on after ~2 min	
(MD44F) ● Remove pin from PRI ACTUATOR and BYP Vlv linkage, connect linkage to SEC ACTUATOR		If H2O Loop 1 Pump B active: H2O LOOP C/W It 'S88 H2O LOOP 1 FLOW' 'S88 H2O LOOP 1 TEMP' 'S88 H2O PUMP P1'	
(L1) ● CAB TEMP CNTLR - 2		(O1) H2O PUMP OUT PRESS LOOP 1 - 20-25 psia	
Refer to OMS/RCS Slide Rule for vlv loss info (use FPC2 Slide for Aft RCS and FMC2 for Fwd RCS)		L,R ADP deploy times incr from 15 to 30 sec	
BUS ISOLATION		<div style="border: 1px solid black; padding: 2px;"> SM (BFS SM 63) PL BAY DOORS </div>	
ONLY ON MCC CALL, PERFORM		During PLBD OP/CL, single mtr run time noted on actuators listed at left	
(MA73C:C) cb MCA PWR ● AC2 3Φ FWD 2 - op ● AC2 3Φ MID 1 - op ● AC2 3Φ MID 2 - op	13 AC2 FMC2 Bus pwr 13 L,R Vents 1,2 Mtrs 2 13 ADP Deploy Mtrs 2 13 -Y Star Trkr Dr Sys 2 OP/CL capability 13 -Z Star Trkr Dr Sys 1 OP/CL capability AC2 MNC1 Bus pwr LH Vent 5 Mtr 2 AC2 MMC2 Bus pwr PLBD C/L Lat 13-16 Mtr 2 Stbd Aft Blkhd Mtr 2 Port Door Mtr 2 Stbd Rad Lat 1-6 Mtr 2 LH Vent 3 Mtr 2	(R13L) During Rad Dpy/Sto ops: RAD LAT CNTL tbs (two) indicate single mtr ops	
(Continued)	(Continued)		

NOM

EPS SSR-120 (Cont)
BUS LOSS: AC2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(MA73C:D) cb MCA PWR ● AC2 3Φ AFT 2 – op ● AC2 3Φ MID 3 – op ● AC2 3Φ MID 4 – op</p>	<p>14 Ku Ant Sto/Dpy Mtr 2 AC2 AMC2 Bus pwr LH,RH Vents 8,9 Mtr 2 AC2 MMC3 Bus pwr PL Reten Sys B Rel/Lat Mtrs AC2 MMC4 Bus pwr PLBD Port,Stbd Fwd Blkhd Mtrs 2 PLBD Stbd Door Mtr 2 Port Rad Lat 1-6 Mtr 2 RH Vent 6 Mtr 2</p>		<p>⑭ ✓MCC for Ku Ant stow reqmts ⑮ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison ⑯ Single mtr time</p>
<p>(MA73C:E) ● cb AC2 WCS FAN SEP 2 (three) – op ● cb AC2 PAYLOAD 3Φ – op</p>	<p>AC2 pwr to MS,PS Patch pnl</p>		
<p>(MA73C:F) cb AC2 ● RMS B/U ΦA – op ● OPS INST HYD ACTR ΦC – op</p>	<p>15 Port RMS: MPM Mtr 2 16 Fwd MRL Mtr 1 16 Mid MRL Mtr 2 D&C B/U edge Itg Ops Hyd Actr Inst</p>		
<p>(MA73C:G) IF DOCKING MISSION ● cb AC2 ARLK/TNL FAN B (three) – op</p>	<p>ArIk/Tnl Fan B</p>		
<p>(MA73C:H,I) cb AC2 ● FWD RCS VLV (three) – op ● AFT POD VLV GP 2 (three) – op</p>			
<p>(L4:C-E) cb AC2 ● FC2 PUMPS (three) – op ● CTR ENG (three) – op ● L ENG (three) – op</p>			
<p>(L4:F-I) cb AC2 ● H2O LOOP PUMP 1B (three) – op ● AV BAY 1 FAN B (three) – op ● AV BAY 2 FAN A (three) – op ● IMU FAN B (three) – op</p>			
<p>(L4:J-K) cb AC2 ● HUM SEP B (three) – op ● CAB FAN B (three) – op</p>			
<p>(L4:L) cb AC2 ● ΦA CAB T CNTLR 1 – op ● ΦB AV BAY 3 S/C – op</p>			
<p>(L4:M) cb AC2 ● FREON LOOP 1 PUMP B (three) – op</p>			
<p>(Continued)</p>	<p>(Continued)</p>		<p>NOM</p>

EPS SSR-120 (Cont)
BUS LOSS: AC2

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>ONLY ON MCC CALL, PERFORM</p>			
<p>(L4:N) cb AC2 • ΦA FREON FLOW PROP 1 – op • ΦB FREON SIG CONDR – op</p>	<p>17 Freon Loop 1 Flow Prop Vlv</p>		<p>⑬ Redundant mtr remains</p>
<p>• cb AC2 ΦC RAD ISOLA – op</p>	<p>18 Freon Loop 1,2 Rad Isol Motor A</p>		<p>⑰ Flow prop vlv holds position</p>
<p>(L4:O) cb AC2 • ΦA BLR HYD BYP 1A – op • ΦB HYD QTY 2 – op • ΦC BLR HYD BYP 2B – op</p>	<p>Hyd Rsvr 2 Qty Snsr</p>		<p>⑱ Motor B remains</p>
<p>(L4:P) cb AC2 • ΦA LG SNSR 2 – op • ΦB RAD CNTLR 1A – op • ΦC TACAN 2 – op</p>	<p>19 Freon Loop 1 Cntrl A Rad Byp Vlv Mtr Tacan 2</p>		<p>⑲ Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains</p>
<p>(L4:Q) cb AC2 • ΦA LTG PNL R OVHD – op • ΦB LTG PNL R – op • ΦC LTG NUMERIC OS – op</p>	<p>R Ovhd Pnl Its R Pnl Lts OS Numeric Its</p>		
<p>(L4:R) • cb AC2 ΦB LTG INST OVHD – op</p>	<p>Ovhd Inst Its</p>		
	<p>13 ET Doors Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Closure Mtr 2 Uplock Lat Mtr 2</p>		
	<p>NLG, LMG B/U Rel 2 Fire 2, Arm</p>		
			<p style="text-align: center;">NOM</p>

**EPS SSR-121
BUS LOSS: AC2 Φ A**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) ● cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	① If H2O Loop 1 Pump B active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W
(L1) ● HUM SEP A – ON ● B – OFF ● IMU FAN A(C) – ON ● B – OFF ● H2O PUMP LOOP 1 (two) – GPC,A ● H2O PUMP LOOP 2 – ON ● FREON PUMP LOOP 1,2 (two) – A ● AV BAY 1 FAN A – ON ● B – OFF ● 2 FAN A – OFF ● B – ON	1 Φ of Hum Sep B 1 Φ of IMU Fan B 1 Φ of H2O Loop 1 Pump B 1 Φ of Freon Loop 1 Pump B 1 Φ of AV Bay 1 Fan B 1 Φ of AV Bay 2 Fan A	(F7) C/W AC VOLT It – on SM ALERT Light/Tone – on (F9) AC2 Φ A AC volts < 90 (LIGHTS LOST) R Ovhd pnl lts (pnls O1,O2,O3,O8,O9,O16,O17)	② Freon Loop 2 pump switched to avoid having both loops powered by AC1
2 (MO13Q) If Arlk/Tnl Fan active: ● ARLK FAN B – OFF ● \checkmark A – ON	1 Φ of Arlk/Tnl Fan B	3 (F6/F8) LDG GEAR L,NOSE tb – bp	③ When gear deployed, tb will not indicate DN
(L4:P) ● cb AC3 Φ A LG SNSR 1 – cl	1 Φ of Cabin Fan B	(F8) APU H2O QTY 3 ind – 0%	④ Not applicable for OV102
(R2) ● BLR CNTLR/HTR 1 – B	5 Prox Snsr Elec Box 2	(FSMs) S67 AC VOLTS 2 S69 FC H2 PUMP 2 S86 WSB T SM0 THRM HYD (B) S66 IMU FAN DP S66 IMU FN SPD B S88 H2O LOOP 1 TEMP	⑤ Brake/Skid Cntl Box A,B enabled before WOW
(WCS) ● \checkmark MODE – AUTO ● \checkmark CRADLE – AUTO ● \checkmark Hose stowed in cradle ● \checkmark WCS ON It – OFF ● FAN SEP SEL sw – OFF ● HOSE BLOCK – SEP 1 ● In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete ● FAN SEP SEL sw – 1	6 1 Φ of WCS Fan/Sep 2	(O1) AIR TEMP CAB HX OUT ind – 45 degF	⑥ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1 Φ down; however, crew actions will pwr fans through alternate pwr source, with full 3 Φ pwr. For WCS, 2 Φ ops will result in degraded airflow. Urine Fan, Seps are unusable for urine collection or EMU drain
(EDO WCS) ● URINAL SEL – SEP 1 ● URINE DIVERTER VLV – FAN SEP 1	Urine Sep 2 Fan 2 6 1 Φ of Commode Fan 2	(O1) If H2O PUMP LOOP 1,B active: C/W H2O LOOP It – on 'S88 H2O PUMP P 1'	
If Cab Temp Cntrl 1 active: (L1) ● CAB TEMP CNTLR – OFF	7 Cabin Temp Cntrl 1, Hx Byp Vlv Mtr 1	(O1) H2O PUMP OUT PRESS LOOP 1 ind – 40-45 psia	
(MD44F) ● Remove pin from PRI Actuator and BYP vlv linkage, connect linkage to SEC Actuator		If IMU FAN B ON: 'S66 IMU FAN DP' 'S66 IMU FN SPD B'	
(L1) ● CAB TEMP CNTLR – 2		If HUM SEP B ON: 'S66 HUMID SEP B'	
		If APUs active and using BLR CNTLR/HTR 1A: C/W APU TEMP It – on after ~2 min	⑦ Lose Auto Temp Cntl via Cntrl 1 and Cabin Temp, Cabin Hx A Out Temp and H2O Loop 1 Cabin Hx In Temp snrs Hx Byp Vlv hold position
(Continued)	(Continued)		

NOM

EPS SSR-121 (Cont)
BUS LOSS: AC2 ΦA

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(R13U) • C/W PARAM SEL tw (three) – 043 (AC2 voltage) • C/W PARAM – INH • MEM – CLEAR • C/W PARAM SEL tw (three) – > 119			⑧ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from two phases into short
<div style="border: 1px solid black; padding: 2px; width: fit-content;">SM 60 SM TABLE MAINT</div> • Reset upper limit of 0450214 (FC2 H2 PUMP STATUS) to current value + 0.3 volts	1Φ of FC2 H2 Pump 1Φ of FC2 Coolant Pump		⑨ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpwring sub-buses: SSR-124, SSR-125, SSR-126, SSR-127, SSR-128, SSR-129
9 If bus shorted: • Open all AC2 ΦA cbs that pwr 3Φ loads on pnl L4: C-K,M (10 cbs), pnl MA73C: E,G,H,I (4 cbs) • Open all AC2 3Φ ganged cbs on pnl MA73C: C-G (9 cbs)	8 If bus shorted: AC2 payload 3Φ Bus pwr (pwrs MS, PS Patch panel) 9 AC2 FMC2 Bus pwr MMC1 Bus pwr MMC2 Bus pwr MMC3 Bus pwr MMC4 Bus pwr AMC2 Bus pwr		⑩ For unshorted bus, perform single Φ isolation steps to prevent pwring single phase loads with coupled energy from remaining two phases
10 If bus not shorted: • Perform the following BUS ISOLATION steps			
10 BUS ISOLATION			
IF BUS NOT SHORTED, PERFORM			
(L4:L) • cb AC2 ΦA CAB T CNTLR 1 – op			
(L4:N) • cb AC2 ΦA FREON FLOW PROP 1 – op	11 Freon Loop 1 Flow Prop Vlv		
(L4:O) • cb AC2 ΦA BLR HYD BYP 1A – op			
(L4:P) • cb AC2 ΦA LG SNSR 2 – op			
(L4:Q) • cb AC2 ΦA LTG PNL R OVHD – op	R Ovhd pnl lts (pnls O1,O2, O3,O8,O9,O16,O17)		
(MA73C:F) • cb AC2 RMS B/U ΦA – op	Port RMS: D&C B/U edge ltg MPM Mtr 2 FWD MRL Mtr 1 MID MRL Mtr 2		
	NLG, LMG B/U Rel 2 Fire 2, Arm		
	FC2 pH Snsr		
			<div style="text-align: center; font-size: 2em; font-weight: bold;">NOM</div>

**EPS SSR-122
BUS LOSS: AC2 Φ B**

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	① If H2O Loop 1 Pump B active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W
(L1) • HUM SEP A – ON • B – OFF • IMU FAN A(C) – ON • B – OFF • H2O PUMP LOOP 1 (two) – GPC,A • H2O PUMP LOOP 2 – ON • AV BAY 3 FAN (two) – ON • FREON PUMP LOOP 1,2 (two) – A • AV BAY 1 FAN A – ON • B – OFF • 2 FAN A – OFF • B – ON	1 Φ of Hum Sep B 1 Φ of IMU Fan B 1 Φ of H2O Loop 1 Pump B 2 AV Bay 3 Sig Condr,Xdcrs (ECLS SC4) 1 Φ of Freon Loop 1 Pump B AV Bay 1 Fan B 1 Φ of AV Bay 2 Fan A	(F7) C/W AC VOLT It C/W FREON LOOP It SM ALERT Light/Tone (F9) AC2 Φ B AC volts < 90 (LIGHTS LOST) Ovhd Instr (pnls O1,O2,O3) R pnl (pnls F4,F8,F9,R1, R2,R4) (FSMs) S67 AC VOLTS 2 S69 FC H2 PUMP 2 S86 HYD RSVR Q SM2 HYD QTY (B) S66 AV BAY 3 TEMP S66 AV BAY 3 FAN S88 FREON FLOW 2 S88 FRN PL HX 1 S88 FREON QTY 2	② Av Bay 3 Fan Δ P, Air Out Temp snrsrs lost ③ Freon Loop 2 pump switched to avoid having both Freon loops powered by AC1 ④ Instrumentation loss caused rad isolation ⑤ Rad isolation may cause FES shutdown ⑥ Not applicable for OV102
3 4 • Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 2 (MO13Q) If Arlk/Tnl Fan active: 6 • ARLK FAN B – OFF • \checkmark A – ON	1 Φ of Arlk/Tnl Fan B 1 Φ of Cabin Fan B	5 Possible 'S88 EVAP OUT T 1(2)' (A4) Mission and Event Timers blank (F8) HYD QTY 2 – 0%	⑦ Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snrsrs lost ⑧ Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate, and Accum Qty snrsrs lost
(O17:C) • SIG CONDR FREON A – AC3 • SIG CONDR FREON B – AC3	7 Freon Sig Condr A AC2 pwr (ECLS SC1A) 8 Freon Sig Condr B AC2 pwr (ECLS SC1B)	(O1) AIR TEMP AV BAY 3 – 45 degF FREON FLOW LOOP 2 – 578 pph	⑨ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep.
(R13U) • C/W PARAM SEL tw (three) – 043 (AC2 voltage) • C/W PARAM – INH • MEM – CLEAR • C/W PARAM SEL tw (three) – > 119		1 If H2O Loop 1 Pump active: C/W H2O LOOP It 'S88 H2O PUMP P1'	Commode Fans may work with 1 Φ down; however, crew actions will pwr fans through alternate pwr source, with full 3 Φ pwr. For WCS, 2 Φ ops will result in degraded airflow. Urine Fan and Seps are unusable for urine collection or EMU drain
SM 60 SM TABLE MAINT • Reset upper limit of 0450214 (FC2 H2 PUMP STATUS) to current value + 0.3 volts	1 Φ of FC2 H2 Pump 1 Φ of FC2 Coolant Pump	1 (O1) H2O PUMP OUT PRESS LOOP 1 – 40-45 psia	
(WCS) • \checkmark MODE – AUTO • \checkmark CRADLE – AUTO • \checkmark Hose stowed in cradle • \checkmark WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 1 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30-sec run complete • FAN SEP SEL sw – 1	9 1 Φ of WCS Fan/Sep 2		
(Continued)	(Continued)		

NOM

EPS SSR-122 (Cont)
BUS LOSS: AC2 ΦB

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(EDO WCS) <ul style="list-style-type: none"> • URINAL SEL – SEP 1 • URINE DIVERTER VLV – FAN SEP 1 	9 Urine Sep 2 Fan 2 1Φ of Commode Fan 2		⑨ For EDO WCS, Urine Fans and Seps are DC mtrs. AC converted to DC internal to controller.
10 If bus shorted: <ul style="list-style-type: none"> • Open all AC2 ΦB cbs that pwr 3Φ loads on pnl L4: C-K,M (10 cbs), pnl MA73C: E,G,H,I (4 cbs) • Open all AC2 3Φ ganged cbs on pnl MA73C: C-G (9 cbs) 	11 If bus shorted: AC2 payload 3Φ Bus pwr (pwrs MS, PS Patch panel) 10 AC2 FMC2 Bus pwr MMC1 Bus pwr MMC2 Bus pwr MMC3 Bus pwr MMC4 Bus pwr AMC2 Bus pwr		Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1Φ down; however, crew actions will pwr fans through alternate pwr source, with full 3Φ pwr. For WCS, 2Φ ops will result in degraded airflow. Urine Fan and Seps are unusable for urine collection or EMU drain
12 If bus not shorted: <ul style="list-style-type: none"> • Perform the following BUS ISOLATION steps 			
12			
BUS ISOLATION			
IF BUS NOT SHORTED, PERFORM			
(L4:L) <ul style="list-style-type: none"> • cb AC2 ΦB AV BAY 3 S/C – OP 			
(L4:N) <ul style="list-style-type: none"> • cb AC2 ΦB FREON SIG CONDR – op 			
(L4:O) <ul style="list-style-type: none"> • cb AC2 ΦB HYD QTY 2 – op 	13 Hyd Rdvr 2 Qty Snsr		
(L4:P) <ul style="list-style-type: none"> • cb AC2 ΦB RAD CNTLR 1A – op 	Freon Loop 1 Cntrl A Rad Byp Vlv Mtr H2O Ln pH Snsr		
(L4:Q) <ul style="list-style-type: none"> • cb AC2 ΦB LTG PNL R – op 	R pnl Itg (pnls F4,F8,F9,R1, R2,R4)		
(L4:R) <ul style="list-style-type: none"> • cb AC2 ΦB INST OVHD – op 	Ovhd Instr Itg (pnls O1,O2, O3)		
	Port RMS: 1Φ of MPM Mtr 2 FWD MRL Mtr 1 MID MRL Mtr 2		
	1Φ of AC2 payload 3Φ Bus pwr (pwrs MS, PS Patch pnl)		
			⑩ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpwring sub-buses: SSR-124, SSR-125, SSR-126, SSR-127, SSR-128, SSR-129
			⑪ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short
			⑫ For unshorted bus, perform single Φ isolation steps to prevent pwring single phase loads with coupled energy from remaining two phases
			⑬ Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains
			NOM

EPS SSR-123
BUS LOSS: AC2 Φ C

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	<p>① If H2O Loop 1 Pump B active, Loop 1 Pump Out Press must drop below 45 psia to trigger C/W</p> <p>② Freon Loop 2 pump switched to avoid having both loops powered by AC1</p> <p>③ Not applicable for OV102</p> <p>④ For EDO WCS, Urine Fans and Seps are <u>DC</u> mtrs. AC converted to DC internal to controller. Design is such that loss of one AC phase results in loss of Urine Fan or Sep. Commode Fans may work with 1Φ down; however, crew actions will pwr fans through alternate pwr source with full 3Φ pwr. For WCS, 2Φ ops will result in degraded airflow. Urine Fan and Seps are unusable for urine collection or EMU drain</p>
(L1) • HUM SEP A – ON • B – OFF • IMU FAN A(C) – ON • B – OFF • H2O PUMP LOOP 1 (two) – GPC,A • H2O PUMP LOOP 2 – ON 2 • FREON PUMP LOOP 1,2 (two) – A • AV BAY 1 FAN A – ON • B – OFF • 2 FAN A – OFF • B – ON	1 Φ of Hum Sep B 1 Φ of IMU Fan B 1 1 Φ of H2O Loop 1 Pump B 1 Φ of Freon Loop 1 Pump B AV Bay 1 Fan B 1 Φ of AV Bay 2 Fan A	(F7) C/W AC VOLT It SM ALERT Light/Tone (LIGHTS LOST) Orbit Sta Numeric (pnls A2,A4) (FSM) S67 AC VOLTS 2 S69 FC H2 PUMP 2 S86 WSB T SM0 THRM HYD (B)	
(MO13Q) If Arlk/Tnl Fan active: 3 • ARLK FAN B – OFF • \checkmark A – ON	1 Φ of Arlk/Tnl Fan B	1 If H2O Loop 1 Pump B active: C/W H2O LOOP It 'S88 H2O PUMP P 1'	
	1 Φ of Cabin Fan B	(O1) H2O PUMP OUT PRESS LOOP 1 = 40–45 psia	
(R2) • BLR CNTLR PWR/HTR 2 – A	HYD H2O Blr 2 Cntr B	If APUs active and using H2O BLR CNTLR 2B: C/W APU TEMP It after ~2 min	
(R13U) • C/W PARAM SEL tw (three) – 043 (AC2 voltage) • C/W PARAM – INH • C/W MEM – CLEAR • C/W PARAM SEL tw (three) – > 119			
SM 60 SM TABLE MAINT • Reset upper limit of 0450214 (FC2 H2 PUMP STATUS) to current value + 0.3 volts	1 Φ of FC2 H2 Pump 1 Φ of FC2 Coolant Pump		
(WCS) • \checkmark MODE – AUTO • \checkmark CRADLE – AUTO • \checkmark Hose stowed in cradle • \checkmark WCS ON It – OFF • FAN SEP SEL sw – OFF • HOSE BLOCK – SEP 1 • In next step, alternate fan sep will turn on for 30 sec. Normal ops may proceed after 30–sec run complete • FAN SEP SEL sw – 1	4 1 Φ of WCS Fan/Sep 2		
(EDO WCS) • URINAL SEL – SEP 1 • URINE DIVERTER VLV – FAN SEP 1	4 Urine Sep 2 Fan 2 1 Φ of Commode Fan 2		
(Continued)	(Continued)		

NOM

EPS SSR-123 (Cont)
BUS LOSS: AC2 ΦC

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
5 If bus shorted: • Open all AC2 ΦC cbs that pwr 3Φ loads on pnl L4: C-K,M (10 cbs), pnl MA73C: E,G,H,I (4 cbs) • Open all AC2 3Φ ganged cbs on pnl MA73C: C-G (9 cbs)	6 If bus shorted: AC2 payload 3Φ Bus pwr (pwrs MS, PS Patch panel) 5 AC2 FMC2 Bus pwr MMC1 Bus pwr MMC2 Bus pwr MMC3 Bus pwr MMC4 Bus pwr AMC2 Bus pwr		⑤ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpwring sub-buses: SSR-124, SSR-125, SSR-126, SSR-127, SSR-128, SSR-129
7 If bus not shorted: • Perform the following BUS ISOLATION steps			
BUS ISOLATION			
IF BUS NOT SHORTED, PERFORM			
(L4:N) • cb AC2 ΦC RAD ISOLA - op	8 Freon Loop 1,2 Rad Isol Motor A		⑥ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short
(L4:O) • cb AC2 ΦC BLR HYD BYP 2B - op			⑦ For unshorted bus, perform single isolation steps to prevent pwring single phase loads with coupled energy from remaining two phases
(L4:P) • cb AC2 ΦC TACAN 2 - op	Tacan 2		
(L4:Q) • cb AC2 ΦC LTG NUMERIC OS - op	Orbit Sta Numeric Ltg (pnls A2,A4)		⑧ Motor B remains
(MA73C:F) • cb AC2 OPS INST HYD ACTR ΦC - op	Ops Hyd Act Inst		
	Port RMS: 1Φ of MPM Mtr 2 FWD MRL Mtr 1 MID MRL Mtr 2		
	1Φ of AC2 payload 3Φ Bus pwr (pwrs MS, PS Patch pnl)		

NOM

EPS SSR-124
BUS LOSS: AC2 FMC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		L,R ADP deploy times incr from 15 to 30 sec	① Redundant mtr remains
		-Y,-Z Star Trkr OP/CL time incr from 8 to 16 sec	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:C) • cb MCA LOGIC MCA PWR AC2 3Φ FWD 2 – op	1 AC2 FMC2 Bus pwr 1 L,R Vents 1,2 Mtrs 2 1 ADP Dpy Mtrs 2 1 -Y Star Trkr Dr Sys 2 OP/CL capability 1 -Z Star Trkr Dr Sys 1 OP/CL capability		

EPS SSR-125
BUS LOSS: AC2 MMC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:C) • cb MCA LOGIC MCA PWR AC2 3Φ MID 1 – op	AC2 MMC1 Bus pwr LH Vent 5 Mtr 2		

EPS SSR-126
BUS LOSS: AC2 MMC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 Port RMS: 2 MPM Mtr 2 Fwd MRL Mtr 1	SM (BFS SM 63) PL BAY DOORS	① Single mtr time. One failure away from EVA to stow MPM or from RMS jettison ② Single mtr time
		During PLBD OP/CL, single mtr run time noted on actuators listed at left	
BUS ISOLATION		(R13) During Rad Dpy/Sto ops, RAD LAT CNTL STBD tb indicates single mtr ops	
ONLY ON MCC CALL, PERFORM			
(MA73C:C) • cb MCA LOGIC MCA PWR AC2 3Φ MID 2 – op	AC2 MMC2 Bus pwr PLBD C/L Lat 13-16 Mtr 2 Stbd Aft Bkhd Mtr 2 Port Door Mtr 2		
	Stbd Rad Lat 1-6 Mtr 2 LH Vent 3 Mtr 2		

NOM

EPS SSR-127
BUS LOSS: AC2 MMC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	① Single mtr time
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:D) • cb MCA LOGIC MCA PWR AC2 3Φ MID 3 – op	AC2 MMC3 Bus pwr PL Reten Sys B Rel/Lat Mtrs		
	ROEU		
	1 Orbiter arm drive mtr (ODM mtr 2 – mate B, demate B, relax B)		
	1 ODA mtr 2 latch/release		

06/09/98

EPS SSR-128
BUS LOSS: AC2 MMC4

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
06/09/98 NONE		SM (BFS SM 63) PL BAY DOORS	① Single mtr time
BUS ISOLATION		During PLBD OP/CL, single mtr run time noted on actuators listed at left	② ✓MCC for Ku Ant stow reqmts
ONLY ON MCC CALL, PERFORM		(R13L) During Rad Dpy/Sto ops: RAD LAT CNTL PORT tb indicates single mtr ops	
(MA73C:D) • cb MCA LOGIC MCA PWR AC2 3Φ MID 4 – op	AC2 MMC4 Bus pwr PLBD Port,Stbd Fwd Bkhd Mtrs 2 PLBD Stbd Door Mtr 2		
	Port Rad Lat 1-6 Mtr 2 RH Vent 6 Mtr 2		
	1 Port RMS Mid MRL Mtr 2		
	2 Ku Ant Sto/Dpy Mtr 2		

EPS SSR-129
BUS LOSS: AC2 AMC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	① Redundant mtrs remain
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:D) • cb MCA LOGIC MCA PWR AC2 3Φ AFT 2 – op	AC2 AMC2 Bus pwr LH,RH Vents 8,9 Mtr 2		
	1 ET Door Mtrs: C/L Lat Actr 1 Mtr 2 L Dr Uplock Lat Mtr 2 R Dr Closure Mtr 2 Uplock Lat Mtr 2		

01/06/00

NOM

EPS SSR-130
BUS LOSS: AC3 (Includes all AC3 sub-buses)

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1 <ul style="list-style-type: none"> Perform FC3 SHUTDN (FC SHUTDN Cue Card), then: 	FC3 Pumps and pH Snsr	MASTER ALARM Light/Tone – on	<p>① TIME CRITICAL*</p> <p>FC3 must be shutdn within 9 min to avoid potentially hazardous condition</p> <p>② Vlv holds position</p> <p>③ Av Bay 1 Fan ΔP, Air Out Temp snrsr lost</p> <p>④ Instrumentation loss caused rad isolation</p> <p>⑤ Rad isolation may cause FES shutdown</p> <p>⑥ Brake/Skid Cntl Box A,B enabled before WOW</p> <p>⑦ Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snrsr lost</p> <p>⑧ Freon Loop 2 P/L Hx Flow Rate, Freon Loop 1 ICH Flow Rate, and Accum Qty snrsr lost</p> <p>⑨ Indicates DN when NLG down</p> <p>⑩ Will <u>not</u> indicate DN when RMG down</p> <p>⑪ Inhibits H2O Loop 1 Pump ΔP, Pump Out Temp, Accum Qty, respectively</p> <p>⑫ Inhibits Primary C/W for FC3 Stack Temp and Pump ΔP, AC3 Voltage, H2O Loop 1,2 Pump P</p>
(R2) <ul style="list-style-type: none"> BLR CNTLR/HTR 2 – B 3 – A 	Hyd H2O Blr 2 Cntrl A 3 Cntrl B	(F7) C/W FREON LOOP It – on C/W FC PUMP It – on C/W AC VOLT It – on C/W H2O LOOP It – on SM ALERT Light/Tone – on	
(L4:F) <ul style="list-style-type: none"> cb AC1 H2O LOOP PUMP 1A/2 (three) – cl 		(F9) AC ΦA,ΦB,ΦC AC volts < 90	
(L1) <ul style="list-style-type: none"> IMU FAN B(A) – ON C – OFF H2O PUMP LOOP 2 – GPC Perform (H2O Loop 2 only), H2O PUMP OPS via GPC, ECLS SSR-10 H2O PUMP LOOP 1 – OFF CAB FAN A – OFF B – ON AV BAY 1 FAN (two) – ON 	IMU Fan C H2O Loop 2 Pump man ON capability H2O Loop 1 Byp Cntrl, Sig Condr	(LIGHTS LOST) Instr Its L/Ctr (pnls C2,F6, F7) MS pnl Its (pnls R10, R12) OS pnl Its (pnls A1,A2,A6, A7,A8,A13,L9)	
<ul style="list-style-type: none"> √ AV BAY 2 FAN A – ON B – OFF 3 FAN A – OFF √ B – ON FREON PUMP LOOP 2 – B 	2 H2O Loop 1 Byp Vlv pwr Cabin Fan A	(FSMs) S67 AC VOLTS 3 S86 HYD RSVR Q S86 WSB T S66 AV BAY 1 FAN S66 CABIN FAN S66 IMU FN SPD B S69 FC PUMP 3 S69 FC H2 PUMP 3 S88 FREON FLOW 1 S88 FREON QTY 1 S88 FRN PL HX 2 S88 H2O PUMP P1 S88 H2O PUMP P2 SM0 THRM HYD (B) SM2 HYD QTY (B)	
4 If AV BAY FIRE POWERDOWN not performed: <ul style="list-style-type: none"> Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 1 	3 Av Bay 1 Sig Condr, Xdcrs (ECLS SC2) Av Bay 2 Fan B Av Bay 3 Fan A Freon Loop 2 Pump A	5 Possible 'S88 EVAP OUT T 1(2)'	
(L4:P) <ul style="list-style-type: none"> cb AC2 ΦA LG SNSR 2 – cl 	6 Prox Snsr Elec box 1	(R1) FC3 COOL PUMP ΔP tb – bp	
(O17:C) <ul style="list-style-type: none"> SIG CONDR FREON A – AC2 SIG CONDR FREON B – AC2 	7 Freon Sig Condr A AC3 pwr (ECLS SC1A) 8 Freon Sig Condr B AC3 pwr (ECLS SC1B)	(F6,F8) LDG GEAR NOSE, R tb – bp	
(CDR SEAT PNL) <ul style="list-style-type: none"> CDR SEAT PWR BUS SEL – AC2 (up) 	CDR Seat Adj via AC3 pwr	(F8) HYD QTY 3 ind – 0% APU H2O QTY ind – 0%	
(PLT SEAT PNL) <ul style="list-style-type: none"> SEAT PWR BUS SEL – AC2 (up) 	PLT Seat Adj via AC3 pwr	(O1) H2O PUMP OUT PRESS LOOP 1 meter ind: 0 psia H2O PUMP OUT PRESS LOOP 2 ind: 20–25 psia	
11 SM 60 SM TABLE MAINT <ul style="list-style-type: none"> Inhibit 0612605, 0612600, 0612640, 0612610 		If CABIN FAN A selected: C/W AV BAY/CAB AIR It – on 'S66 CABIN AIR'	
12 <ul style="list-style-type: none"> C/W PARAM SEL tw (three) – 082, 112, 053, 105, 115 C/W PARAM – INH C/W MEM – CLEAR C/W PARAM SEL tw (three) – > 119 		If APUs active and using BLR CNTLR/HTR 2A or 3B: C/W APU TEMP It – on after ~2 min	
Refer to OMS/ RCS Slide Rule for vlv loss info (use FPC3 Slide for Aft RCS, and FMC3 for Fwd RCS)		STAR TRKR DR POS –Z – OP/CL time incr from 8 to 16 sec	
	NLG, RMG B/U Rel 1 Fire 2, Arm	(MO51F) CO2 RMVL SYS CNTLR 2 FAIL It – on Impending: 'S66 CO2 RL SYS PCO2' 'S66 CAB PPCO2'	
(Continued)	(Continued)	(Continued)	

NOM

EPS SSR-130 (Cont)
BUS LOSS: AC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
ONLY ON MCC CALL, PERFORM		R ADP deploy time incr from 15 to 30 sec	
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	13 CO2 Rmvl Sys: Cntlr 2 Fan AC3 pwr Compressor AC3 pwr	SM (BFS SM 63) PL BAY DOORS	⑬ PEVs, Actuators, Bed A P, Bed B P, and Bed dP will be recovered after system reconfig
(MA73C:C) cb MCA LOGIC MCA PWR • AC3 3Φ FWD 3 – op • AC3 3Φ MID 2 – op	14 KU ANT Sto/Dpy Mtr 1 AC3 FMC3 Bus pwr 15 R ADP Dpy Mtr 1 15 –Z Star Trkr Dr Sys 2 OP/CL capability LH Vents 1,2 Mtr 1 AC3 MMC2 Bus pwr PLBD C/L Lat 1–4 Mtr 2 5–8 Mtr 2 Port Aft Blkhd Mtr 2 Stbd Rad Lat 7–12 Mtr 2 Dpy/Sto Mtr 2 LH Vent 6 Mtr 2 3 Mtr 1	During PLBD OP/CL, single mtr run time noted on actuators listed at left	⑭ ✓MCC for Ku Ant stow reqmts
(MA73C:D) cb MCA LOGIC MCA PWR • AC3 3Φ AFT 3 – op • MID 4 – op	AC3 AMC3 Bus pwr RH Vents 8,9 Mtr 1 AC3 MMC4 Bus pwr PLBD C/L Lat 9–12 Mtr 2 13–16 Mtr 1 Stbd Aft Blkhd Mtr 1 Port Door Mtr 1 Port Rad Lat 7–12 Mtr 2 Dpy/Sto Mtr 2 RH Vents 3,5 Mtrs 2	During Rad Dpy/Sto ops: (R13L) RAD CNTL tbs (four) indicate single mtr ops	⑮ Redundant mtrs remain
(MA73C:E) • cb AC3 PAYLOAD 3Φ – op	AC3 pwr to MS, PS Patch pnls		⑯ Hum Sep A,B Speed Norm Snsrs lost
(MA73C:G) • cb AC3 GALLEY FAN (three) – op	Galley Fan		⑰ IMU Fan A,B,C Speed Norm Snsrs lost
(MA73C:H,I) • cb AC3 FWD RCS VLV (three) – op • cb AC3 AFT POD VLV GP 3 (three) – op			
(L4:A) • cb UTIL PWR A15/MO13Q AC3 – op	AC3 Utility pwr (A15/MO13Q)		
(L4:C-E) cb AC3 • FC3 PUMPS (three) – op • R ENG (three) – op • L ENG (three) – op			
(L4:F-H) cb AC3 • H2O LOOP PUMP 2 (three) – op • AV BAY 3 FAN A (three) – op • AV BAY 2 FAN B (three) – op			
(L4:I,J) cb AC3 • IMU FAN C (three) – op • ΦA SIG/CONDR HUM SEP – op • ΦB SIG/CONDR IMU FAN – op	16 Hum Sep Sig Condr (ECLS SC5) 17 IMU Fan Sig Condr (ECLS SC7)		
(Continued)	(Continued)		

NOM

EPS SSR-130 (Cont)
BUS LOSS: AC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>ONLY ON MCC CALL, PERFORM</p>			<p>② Vlv holds position</p>
<p>(L4:K,L) cb AC3 ● CABIN FAN A (three) – op ● ΦA H2O CNTLR 1 – op ● ΦB AV BAY 1 S/C – op</p>			<p>①⑤ Redundant mtrs remain</p>
<p>(L4:M,N) cb AC3 ● FREON LOOP 2 PUMP A (three) – op ● ΦA FREON FLOW PROP 2 – op ● ΦB FREON SIG/CONDR – op</p>	<p>2 Freon Loop 2 Flow Prop Vlv</p>		<p>①⑧ Motor A remains</p>
<p>(L4:N) ● cb AC3 ΦC RAD ISOL B – op</p>	<p>18 Freon Loop 1,2 Rad Isol Motor B</p>		<p>①⑨ Bypass vlv holds position and Cntr B Rad Byp Vlv Mtr remains</p>
<p>(L4:O) cb AC3 ● ΦA BLR HYD BYP 1A – op ● ΦB HYD QTY 3 – op ● ΦC BLR HYD BYP 3B – op</p>	<p>Hyd Rsvr 3 Qty Snsr</p>		<p>②⑩ Single mtr time. One failure away from EVA to stow MPM or from RMS jettison</p>
<p>(L4:P) cb AC3 ● ΦA LG SNSR 1 – op ● ΦB RAD CNTLR 2A – op ● ΦC TACAN 3 – op</p>	<p>19 Freon Loop 2 Cntr A Rad Byp Vlv Mtr Tacan 3</p>		<p>②⑪ Single mtr time. One failure away from loss of two out of three MRLs. EVA or RMS jettison capability exists</p>
<p>(L4:Q) cb AC3 ● ΦA LTG COAS – op ● ΦB LTG PNL MS – op ● ΦC LTG PNL OS – op</p>	<p>Sta 1,2 COAS ltg pwr MS pnl lts (pnls R10,R12) OS pnl lts (pnls A1,A2,A6,A7,A8,A13,L9)</p>		
<p>(L4:R) ● cb AC3 ΦB INST L/CTR – op</p>	<p>L/Ctr Inst lts (pnls C2,F6,F7)</p>		
	<p>15 ET Door Mtrs: C/L Lat Actr 2 Mtr 2 L Dr Closure Mtr 2 R Dr Closure Mtr 1 Uplock Lat Mtr 1</p>		
	<p>20 Port RMS: MPM Mtr 1 21 FWD MRL Mtr 2 21 AFT MRL Mtr 1</p>		
			<p style="text-align: center;">NOM</p>

EPS SSR-131
BUS LOSS: AC3 ΦA

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	① If H2O Loop 2 Pump active, Loop 2 Pump Out Press must drop below 45 psia to trigger C/W
(L1) • ✓ IMU FAN B – ON • ✓ C – OFF • H2O PUMP LOOP 1 (two) – ON, B • H2O PUMP LOOP 2 – GPC • Perform (H2O Loop 2 only), H2O PUMP OPS via GPC, ECLS SSR-10 • H2O PUMP LOOP 1 – OFF • FREON PUMP LOOP 2 – B • ✓ AV BAY 2 FAN A – ON • ✓ B – OFF • ✓ 3 FAN A – OFF • ✓ B – ON	1Φ of IMU Fan C	1 (F7) C/W AC VOLT It – on C/W H2O LOOP It – on	
	1 1Φ of H2O Loop 2 Pump man ON	(F9) AC3 ΦA AC volts < 90	② Indicates DN when NLG down
	3 H2O Loop 1 Byp Cntrl, Sig Condr	(F6/F8) LDG GEAR NOSE, R tb – bp	③ H2O Loop 1 Pump Out Press, Pump ΔP, Accum Qty, Pump Out Temp snrs lost
	5 H2O Loop 1 Byp vlv pwr	(O1) H2O PUMP OUT PRESS LOOP 1 meter ind – 0 psia	④ Will not indicate DN when RMG down
	1Φ of Freon Loop 2 Pump A	(FSMs) S67 AC VOLTS 3 S69 FC H2 PUMP 3 S86 WSB T S66 HUMID SEP B S88 H2O PUMP P 1 S88 H2O LOOP TEMP S88 H2O LOOP 1 QTY SM0 THRM HYD (B)	⑤ H2O Loop 1 Byp Vlv holds position
	1Φ of AV Bay 2 Fan B		⑥ Brake/Skid Cntl Box A,B enabled before WOW
	1Φ of AV Bay 3 Fan A		⑦ Inhibits H2O Loop 1 Pump ΔP, Pump Out Press, Pump Out Temp, Accum Qty, respectively
	1Φ of Cabin Fan A	(F8) APU H2O QTY 2 ind – 0%	⑧ Inhibits Primary C/W for H2O Loop 1,2 Pump P and AC3 voltage
(L4:P) • cb AC2 ΦA LG SNSR 2 – cl	6 Prox Snr Electronics Box 1	If H2O PUMP LOOP 2 active: 'S88 H2O PUMP P 2' (O1) H2O PUMP OUT PRESS LOOP 2 ind – 40–45 psia	⑨ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpwring sub-buses: SSR-134, SSR-135, SSR-136, SSR-137
SM 60 SM TABLE MAINT		If APU active and using BLR CNTLR/HTR 2A: C/W APU TEMP It – on after ~2 min	
7 • Inhibit 0612605, 0612600, 0612640, 0612610 • Reset upper limit of 0450314 (FC3 H2 PUMP STATUS) to current value +0.3 volts	1Φ of FC3 H2 Pump	If IMU FAN C ON: S66 IMU FAN DP S66 IMU FN SPD C	⑩ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into shorts
	1Φ of FC3 Coolant Pump	If CO2 Removal Sys Cntrl 2 selected: (MO51F) CO2 RMVL SYS CNTLR 2 FAIL It – on	⑪ MCC will provide equipment reconfig info if reqd
(R2) • BLR CNTLR/HTR 2 – B	Hyd H2O Blr 2 Cntrl A		
(R13U) • C/W PARAM SEL tw (three) – 105, 115, 053 • C/W PARAM – INH • C/W MEM – CLEAR • C/W PARAM SEL tw (three) – > 119			
8			
9 If bus shorted: • Open all AC3 ΦA cbs that pwr 3Φ loads on pnls L4: C-I,K,M (9 cbs), MA73C: G-I (3 cbs) • Open all AC3 3Φ ganged cbs on pnls L4:B (1 cb), MA73C: C-G (7 cbs)	10 If bus shorted: AC3 payload 3Φ Bus pwr (pwrs MS, PS Patch panel)		
	9 AC3 FMC3 Bus pwr MMC2 Bus pwr MMC4 Bus pwr AMC3 Bus pwr		
	11 1Φ of AC Utility Power Outlets at A15 and MO13Q		
(Continued)	(Continued)		

NOM

EPS SSR-131 (Cont)
BUS LOSS: AC3 Φ A

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>(M051F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)</p> <p>13 If bus not shorted: (L1)</p> <p>14 • Install sw guard (stowed in IFM tool kit) over Cab Fan A sw • Perform the following BUS ISOLATION steps</p>	<p>12 CO2 Rmvl Sys Cntrl 2 1 Φ of CO2 Rmvl Sys: Fan AC3 pwr Compressor AC3 pwr</p>	<p>(M051F) CO2 RMVL SYS CNTLR 2 FAIL It – on Impending: 'S66 CO2 RL SYS PCO2' 'S66 CAB PPCO2'</p>	<p>⑫ PEVs, Actuators, Bed A dP, Bed B dP, and Fan dP will be recovered after system recovered</p> <p>⑬ For unshorted bus, perform single Φ isolation steps to prevent pwring single phase loads with coupled energy from remaining two phases</p> <p>⑭ Switch guard installed to prevent Cab Fan A from being turned off during LiOH can changeout and cabin fan filter cleaning</p> <p>⑮ Hum Sep A,B Speed Norm snrs lost</p> <p>⑯ Vlv holds position</p>
<p>13 BUS ISOLATION</p> <p>IF BUS <u>NOT</u> SHORTED, PERFORM</p> <p>(L4:J) • cb AC3 ΦA SIG CONDR HUM SEP – op</p> <p>(L4:L) • cb AC3 ΦA H2O CNTLR 1 – op</p> <p>(L4:N) • cb AC3 ΦA FREON FLOW PROP 2 – op</p> <p>(L4:O) • cb AC3 ΦA BLR HYD BYP 2A – op</p> <p>(L4:P) • cb AC3 ΦA LG SNSR 1 – op</p> <p>(L4:Q) • cb AC3 ΦA LTG COAS – op</p>	<p>15 Hum Sep Sig Condr (ECLS SC 5)</p> <p>16 Freon Loop 2 Flow Prop Vlv</p> <p>Sta 1,2 COAS pwr</p> <p>NLG,RMG Backup Rel 1 Fire 2, Arm FC 3 pH Snsr</p> <p>Port RMS: 1Φ of MPM Mtr 1 FWD MRL Mtr 2 AFT MRL Mtr 1</p> <p>1Φ of AC3 payload 3Φ Bus pwr (pwrs MS, PS Patch pnl)</p>		

NOM

EPS SSR-132
BUS LOSS: AC3 ΦB

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	① If H2O Loop 2 Pump active, Loop 2 Pump Out Press must drop below 45 psia to trigger C/W
(L1) • ✓ IMU FAN B – ON • ✓ C – OFF • H2O PUMP LOOP 1 (two) – ON,B • H2O PUMP LOOP 2 – GPC • AV BAY 1 FAN (two) – ON • FREON PUMP LOOP 2 – B • ✓ AV BAY 2 FAN A – ON • ✓ B – OFF • ✓ 3 FAN A – OFF • ✓ B – ON	1Φ of IMU Fan C 1 1Φ of H2O Loop 2 Pump man ON capability 2 Av Bay 1 Sig Condr, Xdcrs (ECLS SC2) 1Φ of Freon Loop 2 Pump A 1Φ of AV Bay 2 Fan B 1Φ of AV Bay 3 Fan A	(F7) C/W AC VOLT It C/W FREON LOOP It SM ALERT It C/W H2O PUMP It (F9) AC3 ΦB AC volts < 90 (FSMs) S67 AC VOLTS 3 S69 FC H2 PUMP 3 S86 HYD RSVR Q SM2 HYD QTY (B) S66 AV BAY 1 FAN S66 IMU FN SPD B S88 FREON FLOW 1 S88 FRN PL HX 2 S88 FREON QTY 1 S88 H2O PUMP P 2	② Av Bay 1 Fan ΔP, Air Out Temp snrs lost ③ Instrumentation loss caused rad isolation ④ Rad isolation may caused FES shutdown ⑤ Freon Loop 1 P/L Hx Flow Rate, Freon Loop 2 ICH Flow Rate, and Accum Qty snrs lost
3,4 • Perform RAD ISOL RECOVERY, ECLS SSR-9 for Freon Loop 1	1Φ of Cabin Fan A	4 Possible 'S88 EVAP OUT T 1(2)'	⑥ Freon Loop 2 P/L Hx Flow Rate Freon Loop 1 ICH Flow Rate, and Accum Qty snrs lost
(O17:C) • SIG CONDR FREON A – AC2 • SIG CONDR FREON B – AC2	5 Freon Sig Condr A AC3 pwr (ECLS SC1A) 6 Freon Sig Condr B AC3 pwr (ECLS SC1B)	(F8) HYD QTY 3 – 0% (LIGHTS LOST) L/Ctr Instr Its (pnls C2,F6,F7) MS pnl Its (pnls R10,R12)	⑦ Inhibits Primary C/W for AC3 Voltage and H2O Loop 2 Pump P
7 (R13U) • C/W PARAM SEL tw (three) – 053,115 • C/W PARAM – INH 8 • Change PRI C/W PARAM 105 low limit to 1.50 • C/W MEM – CLEAR • C/W PARAM SEL tw (three) – > 119		(O1) 1 H2O PUMP OUT PRESS LOOP 2 – 40–45 psia FREON FLOW 1 – 578 pph AV Bay 1 Air Out – 45 degF	⑧ Sets H2O Loop 1 Pump P low limit to 45 psia ⑨ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unpwring sub-buses: SSR-134, SSR-135, SSR-136, SSR-137
SM 60 SM TABLE MAINT • Reset upper limit of 0450314 (FC3 H2 PUMP STATUS) to current value + 0.3 volts	1Φ of FC3 H2 Pump 1Φ of FC3 Coolant Pump		⑩ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	1Φ of CO2 Rmvl Sys: Fan AC3 pwr Compressor AC3 pwr		⑪ MCC will provide equipment reconfig info if reqd
9 If bus shorted: • Open all AC3 ΦB cbs that pwr 3Φ loads on pnls L4: C-I,K,M (9 cbs), MA73C: G-I (3 cbs) • Open all AC3 3Φ ganged cbs on pnls L4:B (1 cb), MA73C: C-G (7 cbs)	10 If bus shorted: AC3 payload 3Φ Bus pwr (pwrs MS, PS Patch panel) 9 AC3 FMC3 Bus pwr MMC2 Bus pwr MMC4 Bus pwr AMC3 Bus pwr		
	11 1Φ of AC Utility Power Outlets at A15 and MO13Q		
(Continued)	(Continued)		

NOM

EPS SSR-132 (Cont)
BUS LOSS: AC3 ΦB

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
12 If bus not shorted: (L1) 13 • Install sw guard (stowed in IFM tool kit) over Cab Fan A sw • Perform the following BUS ISOLATION steps			⑫ IMU Fan A,B,C Speed Norm snsr lost ⑬ Switch guard installed to prevent Cab Fan A from being turned off during LiOH can changeout and cabin fan filter cleaning
BUS ISOLATION			
IF BUS <u>NOT</u> SHORTED, PERFORM			
(L4:J) • cb AC3 ΦB SIG CONDR IMU FAN – op	12 IMU Fan Sig Condr (ECLS SC7)		⑭ For unshorted bus, perform single Φ isolation steps to prevent pwrng single phase loads with coupled energy from remaining two phases
(L4:L) • cb AC3 ΦB AV BAY 1 S/C – op			
(L4:N) • cb AC3 ΦB FREON SIG CONDR – op			⑮ Bypass vlv holds position and Cntrl B Rad Byp Vlv Mtr remains
(L4:O) • cb AC3 ΦB HYD QTY 3 – op	Hyd Rsvr 3 Qty Snsr		
(L4:P) • cb AC3 ΦB RAD CNTLR 2A – op	15 Freon Loop 2 Cntrl A Rad Byp Vlv Mtr		
(L4:Q) • cb AC3 ΦB LTG PNL MS – op	MS pnl lts (pnl R10,R12)		
(L4:R) • cb AC3 ΦB INST L/CTR – op	L/Ctr Inst lts (pnl C2,F6,F7)		
	Port RMS: 1Φ of MPM Mtr 1 FWD MRL Mtr 2 AFT MRL Mtr 1 1Φ of AC3 payload 3Φ Bus pwr (pwrs MS, PS Patch pnl)		

NOM

EPS SSR-133
BUS LOSS: AC3 ΦC

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
(L4:F) • cb AC1 H2O LOOP PUMP 1A/2 (three) – cl		MASTER ALARM Light/Tone – on	<p>① H2O Loop 2 Pump Out Press must drop below 45 psia to trigger C/W</p> <p>② Inhibits Primary C/W for AC3 Voltage and H2O Loop 2 Pump P</p> <p>③ Sets H2O Loop 1 Pump P low limit to 45 psia</p> <p>④ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short</p> <p>⑤ Ganged cb. Isolation of shorted phase reqd to prevent coupling of energy from remaining two phases into short. After opening cbs, refer to the following SSRs for functions lost and crew indications caused by unprwring subbuses: SSR-134, SSR-135, SSR-136, SSR-137</p> <p>⑥ For unshorted bus, perform single Φ isolation steps to prevent pwring single phase loads with coupled energy from remaining two phases</p> <p>⑦ MCC will provide equipment reconfig info if reqd</p> <p>⑧ Switch guard installed to prevent Cab Fan A from being turned off during LiOH can changeout and cabin fan filter cleaning</p>
(L1) •√ IMU FAN B – ON • √C – OFF • H2O PUMP LOOP 1 (two) – ON,B • H2O PUMP LOOP 2 – GPC •√ FREON PUMP LOOP 2 – B •√ AV BAY 2 FAN A – ON • √B – OFF • √3 FAN A – OFF • √B – ON	1Φ of IMU Fan C 1 1Φ of H2O Loop 2 Pump man ON capability 1Φ of Freon Loop 2 Pump A 1Φ of AV Bay 2 Fan B 1Φ of AV Bay 3 Fan A	(F7) C/W AC VOLT It – on C/W FREON LOOP It – on SM ALERT It – on C/W H2O PUMP It – on (F9) AC3 ΦC AC volts < 90 (LIGHTS LOST) OS pnl lts (pnls A1,A2,A6, A7,A8,A13,L9)	
	1Φ of Cabin Fan A	(FSMs) S69 FC H2 PUMP 3 S86 WSB T SM0 THRM HYD (B) S88 H2O PUMP P 2	
(R2) • BLR CNTLR/HTR 3 – A	Hyd H2O Blr 3 Cntlr B	1 (O1) H2O PUMP OUT PRESS LOOP 2 ind – 40-45 psia	
(R13U) • C/W PARAM SEL tw (three) – 053, 115 • C/W PARAM – INH • Change PRI C/W PARAM 105 low limit to 1.50 • C/W MEM – CLEAR • C/W PARAM SEL tw (three) – > 119		If APUs active and using BLR CNTLR/HTR 3B: C/W APU TEMP It – on after ~2 min	
SM 60 SM TABLE MAINT • Reset upper limit of 0450314 (FC3 H2 PUMP STATUS) to current value + 0.3 volts	1Φ of FC3 H2 Pump 1Φ of FC3 Coolant Pump		
(MO51F) If CO2 RMVL SYS flown and if CO2 RMVL SYS CNTLR 2 selected: • Perform CO2 RMVL SYS CNTLR CONFIG: ACT 1/ DEACT 2(ACT 2/DEACT 1) (ORB OPS, ECLS)	1 Φ of CO2 Rmvl Sys: Fan AC3 pwr Compressor AC3 pwr		
If bus shorted: 5 • Open all AC3 ΦC cbs that pwr 3Φ loads on pnls L4: C-I,K,M (9 cbs), MA73C: G-I (3 cbs) • Open all AC3 3Φ ganged cbs on pnls L4:B (1 cb), MA73C: C-G (7 cbs)	4 If bus shorted: AC3 payload 3Φ Bus pwr (pwr MS, PS Patch panel) 5 AC3 FMC3 Bus Pwr MMC2 Bus Pwr MMC4 Bus Pwr AMC3 Bus Pwr		
6 If bus not shorted: (L1) 8 • Install sw guard (stowed in IFM tool kit) over Cab Fan A sw • Perform the following BUS ISOLATION steps	7 1Φ of AC Utility Power Outlets at A15 and MO13Q		
(Continued)	(Continued)		

NOM

EPS SSR-133 (Cont)
BUS LOSS: AC3 Φ C

BUS ISOLATION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>6 IF BUS <u>NOT</u> SHORTED, PERFORM</p> <p>(L4:N) • cb AC3 ΦC RAD ISOL B – op</p> <p>-----</p> <p>(L4:O) • cb AC3 ΦC BLR HYD BYP 3B – op</p> <p>-----</p> <p>(L4:P) • cb AC3 ΦC TACAN 3 – op</p> <p>-----</p> <p>(L4:Q) • cb AC3 ΦC LTG PNL OS – op</p>	<p>9 Freon Loop 1,2 Rad Isol Motor B</p> <p>-----</p> <p>Tacan 3</p> <p>-----</p> <p>OS pnl lts (pnls A1,A2,A6, A7,A8,A13,L9)</p> <p>Port RMS: 1Φ of MPM Mtr 1 FWD MRL Mtr 2 AFT MRL Mtr 1</p> <p>1Φ of AC3 payload 3Φ Bus pwr (pwrs MS, PS Patch pnl)</p>		<p>⑥ For unshorted bus, perform single Φ isolation steps to prevent pwrng single phase loads with coupled energy from remaining two phases</p> <p>⑨ Motor A remains</p>

EPS SSR-134
BUS LOSS: AC3 FMC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		-Z Star Trkr Dr OP/CL time incr from 8 to 16 sec	① Redundant mtr remains
BUS ISOLATION		R ADP deploy time incr from 15 to 30 sec	
ONLY ON MCC CALL, PERFORM			
(MA73C:C) • cb MCA LOGIC MCA PWR AC3 3Φ FWD 3 - op	AC3 FMC3 Bus pwr LH Vent 1,2 Mtr 1 R ADP Dpy Mtr 1 -Z Star Trkr Dr Sys 2 OP/CL capability		

EPS SSR-135
BUS LOSS: AC3 MMC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		SM (BFS SM 63) PL BAY DOORS	① Single mtr time ② ✓ MCC for Ku Ant stow reqmts
BUS ISOLATION		During PLBD OP/CL, single mtr run time noted on actuators listed at left	
ONLY ON MCC CALL, PERFORM		(R13L)	
(MA73C:C) • cb MCA LOGIC MCA PWR AC3 3Φ MID 2 - op	AC3 MMC2 Bus pwr PLBD C/L Lat 1-4 Mtr 2 5-8 Mtr 2 Port Aft Bkhd Mtr 2 Stbd Rad Lat 7-12 Mtr 2 Dpy/Sto Mtr 2 LH Vent 6 Mtr 2 3 Mtr 1	During Rad Dpy/Sto ops, RAD CNTL STBD tb (two) indicates single mtr ops	
	1 Port RMS Aft MRL Mtr 1		
	2 KU ANT Dpy/Sto Mtr 1		

EPS SSR-136
BUS LOSS: AC3 MMC4

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE	1 Port RMS: MPM Mtr 1 2 Fwd MRL Mtr 2	SM (BFS SM 63) PL BAY DOORS	① Single mtr time. One failure away from EVA to stow MPM or from RMS jettison
BUS ISOLATION		During PLBD OP/CL, single mtr run time noted on actuators listed at left	② Single mtr time
ONLY ON MCC CALL, PERFORM		(R13L)	
(MA73C:D) • cb MCA LOGIC MCA PWR AC3 3Φ MID 4 – op	AC3 MMC4 Bus pwr PLBD C/L Lat 9-12 Mtr 2 13-16 Mtr 1 Stbd Aft Blkhd Mtr 1 Port Door Mtr 1 RH Vents 3,5 Mtrs 2 Port Rad Lat 7-12 Mtr 2 Dpy/Sto Mtr 2	During Rad Dpy/Sto ops, RAD CNTL PORT tb (two) indicates single mtr ops	

EPS SSR-137
BUS LOSS: AC3 AMC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
NONE		NONE	
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM			
(MA73C:D) • cb MCA LOGIC MCA PWR AC3 3Φ AFT 3 – op	AC3 AMC3 Bus pwr RH Vents 8,9 Mtr 1		
	1 ET Door Mtrs: C/L Lat Actr 2 Mtr 2 L Dr Closure Mtr 2 R Dr Closure Mtr 2 Uplock Lat Mtr 1		① Redundant mtrs remain

EPS SSR-140
BUS LOSS: AC1 RCS/FMC1

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
Refer to OMS/RCS Slide Rule for vlv loss info (Use FMC1 Slide for Fwd RCS)		1 The following tb indications do not change position in response to cmds: (O8) FWD RCS TK ISOL 3/4/5 MANF ISOL 1	① Vlv remains in tb indicated position
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM (MA73C:H) • cb AC1 FWD RCS VLV (three) – op			

EPS SSR-141
BUS LOSS: AC2 RCS/FMC2

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
Refer to OMS/RCS Slide Rule for vlv loss info (Use FMC2 Slide for Fwd RCS)		1 The following tb indication does not change position in response to cmds: (O8) FWD RCS MANF ISOL 2	① Vlv remains in tb indicated position
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM (MA73C:H) • cb AC2 FWD RCS VLV (three) – op			

EPS SSR-142
BUS LOSS: AC3 RCS/FMC3

ACTIONS	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
Refer to OMS/RCS Slide Rule for vlv loss info (Use FMC3 Slide for Fwd RCS)		1 The following tb indications do not change position in response to cmds: (O8) FWD RCS TK ISOL 1/2 MANF ISOL 3 4	① Vlv remains in tb indicated position
BUS ISOLATION			
ONLY ON MCC CALL, PERFORM (MA73C:H) • cb AC3 FWD RCS VLV (three) – op			

EPS SSR-143
BUS LOSS: AC1 POD/AMC1

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1	Refer to OMS/RCS Slide Rule for vlv loss info (use FPC1 Slide for Aft RCS)			① Vlv remains in tb indicated position
	BUS ISOLATION			
	ONLY ON MCC CALL, PERFORM (MA73C:I) • cb AC 1 AFT POD VLV GP 1 (three) – op			

EPS SSR-144
BUS LOSS: AC2 POD/AMC2

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1	Refer to OMS/RCS Slide Rule for vlv loss info (use FPC2 Slide for Aft RCS)			① Vlv remains in tb indicated position
	BUS ISOLATION			
	ONLY ON MCC CALL, PERFORM (MA73C:I) • cb AC2 AFT POD VLV GP 2 (three) – op			

EPS SSR-145
BUS LOSS: AC3 POD/AMC3

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1	Refer to OMS/RCS Slide Rule for vlv loss info (use FPC3 Slide for Aft RCS)			① Vlv remains in tb indicated position
BUS ISOLATION				
ONLY ON MCC CALL, PERFORM				
(MA73C:I) • cb AC3 AFT POD VLV GP 3 (three) – op				

EPS SSR-146
BUS LOSS: MNA/B POD/AMC1

ACTIONS		EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1	Refer to OMS/RCS Slide Rule for vlv loss info (use FPC1 Slide for Aft RCS)		1 (O8) L,R OMS TK ISOL A tb – bp L OMS XFEED A tb – bp	① Vlv remains in last commanded position
BUS ISOLATION			(O7) AFT L,R RCS TK ISOL 3/4/5 A tb – bp MANF ISOL 2 tb – bp XFEED 3/4/5 tb – bp	② ✓MCC for impacts to OMS Gauging
ONLY ON MCC CALL, PERFORM			(FSMs) RCS PWR FAIL	
(MA73C:I) • AFT POD VLV LOGIC GP 1/3, 1/2 (two) – OFF		2 OMS Qty Gauging Degraded		

EPS SSR-147
BUS LOSS: MNB/C POD/AMC2

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
1	Refer to OMS/RCS Slide Rule for vlv loss info (use FPC2 Slide for Aft RCS)			1	(O8) L,R OMS XFEED B tb - bp	① Vlv remains in last commanded position ② ✓MCC for impacts to OMS Gauging	
					(O7) AFT L,R RCS TK ISOL 3/4/5 B tb - bp MANF ISOL 1 tb - bp		
					(FSMs) RCS PWR FAIL		
BUS ISOLATION							
ONLY ON MCC CALL, PERFORM							
(MA73C:I) • AFT POD VLV LOGIC GP 1/2, 2/3 (two) - OFF		2 OMS Qty Gauging Degraded					

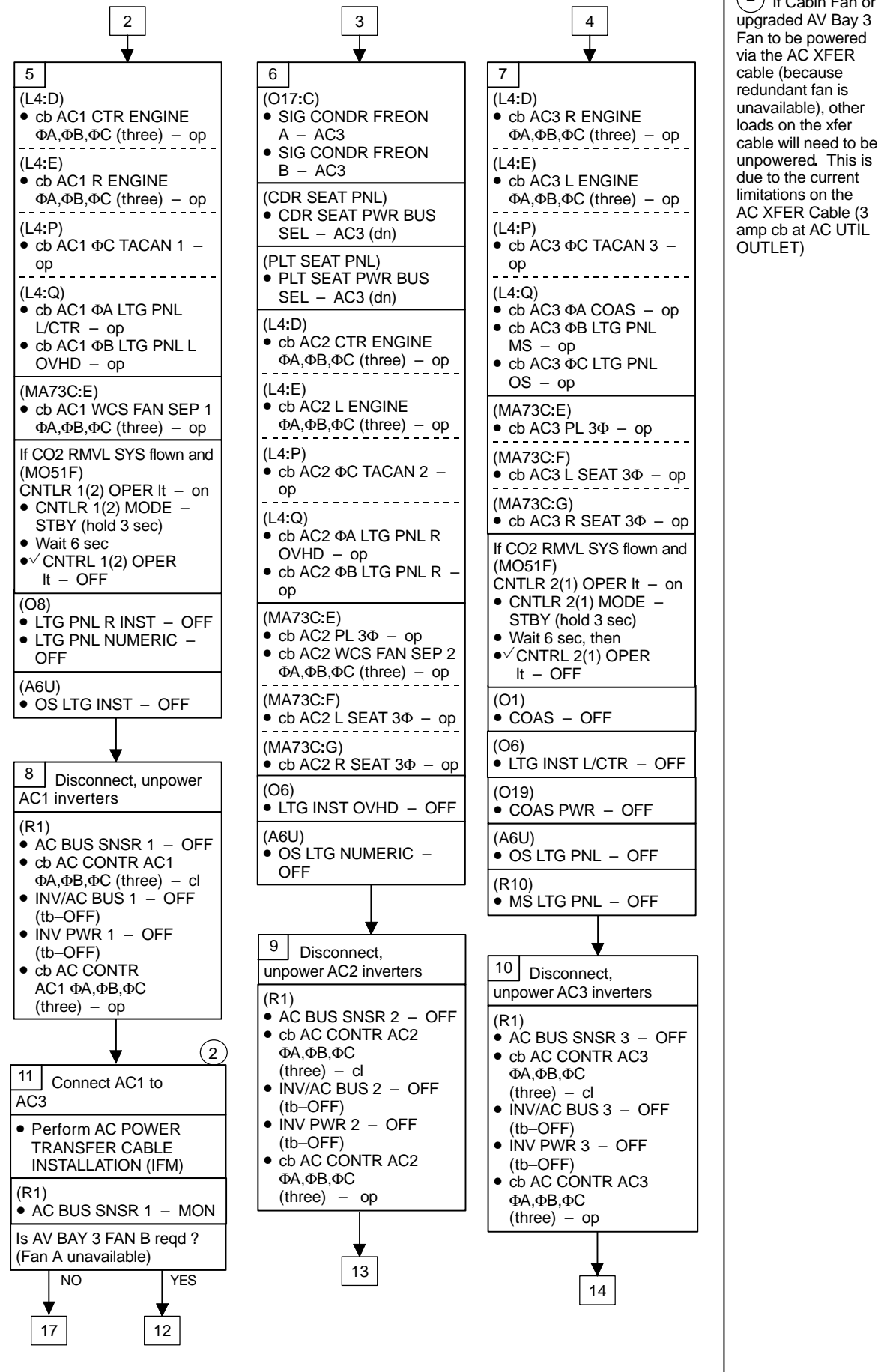
EPS SSR-148
BUS LOSS: MNC/A POD/AMC3

ACTIONS		EQUIP/FUNCTION LOST		CREW INDICATIONS		NOTES	
1	Refer to OMS/RCS Slide Rule for vlv loss info (use FPC3 Slide for Aft RCS)			1	(O8) L,R OMS TK ISOL B tb - bp R OMS XFEED A tb - bp	① Vlv remains in last commanded position ② ✓MCC for impacts to OMS Gauging	
					(O7) AFT L,R RCS TK ISOL 1/2 tb - bp MANF ISOL 3,4 tb - bp XFEED 1/2 tb - bp		
					(FSMs) RCS PWR FAIL		
BUS ISOLATION							
ONLY ON MCC CALL, PERFORM							
(MA73C:I) • AFT POD VLV LOGIC GP 1/3, 2/3 (two) - OFF		2 OMS Qty Gauging Degraded					

EPS SSR-150 ALTERNATE PRIMARY PAYLOAD PWR

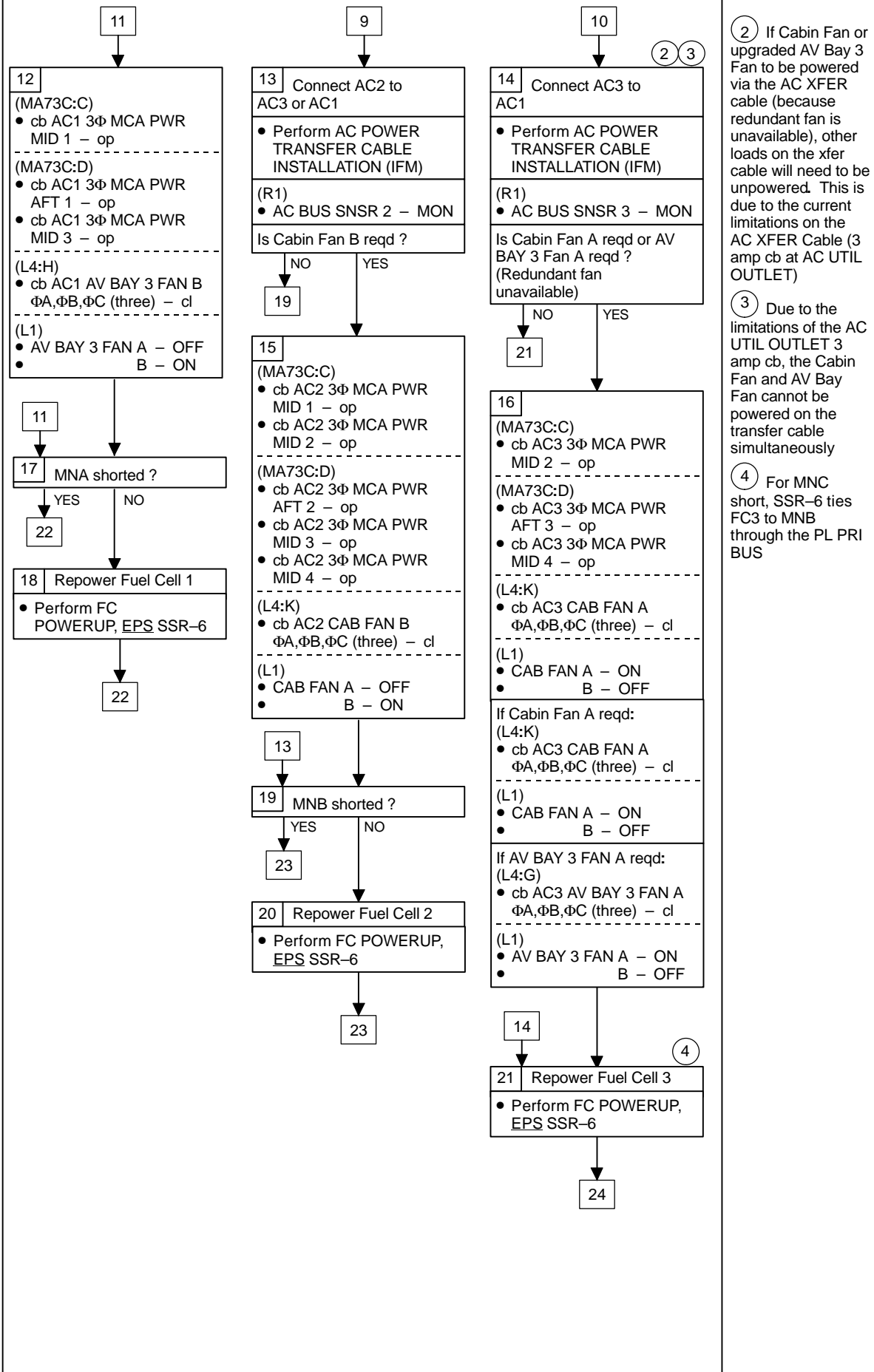
1.1	
	Attempt MNC/PRIPL connection again:
O13:E	1. ✓cb ESS 3AB MNC CONTR - cl
O14:B	2. ✓cb MNA MNC CONTR - cl
R1	3. PL PRI MNC - OFF, ON (tb-ON)
	If MNC/PRIPL connection failed, attempt FC3/PRIPL connection:
R1	4. PL PRI MNC - OFF (tb-OFF)
	5. FC3 - ON (tb-ON)
	If FC3/PRIPL connection failed, attempt MNB/PRIPL connection:
O13:C	6. ✓cb ESS 2CA MNB CONTR - cl
O16:B	7. ✓cb MNC MNB CONTR - cl
R1	8. PL PRI FC3 - OFF (tb-OFF)
	9. MNB - ON (tb-ON)

EPS SSR-200 (Cont)

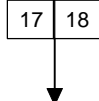


② If Cabin Fan or upgraded AV Bay 3 Fan to be powered via the AC XFER cable (because redundant fan is unavailable), other loads on the xfer cable will need to be unpowered. This is due to the current limitations on the AC XFER Cable (3 amp cb at AC UTIL OUTLET)

EPS SSR-200 (Cont)



EPS SSR-200 (Cont)



AC1 LOAD REFERENCE TABLE

5

22	CONTINUOUS EQUIPMENT	AC CURRENT (amps/phase)	AC1 CURRENT AFTER CABLE INSTALLED		
			ΦA	ΦB	ΦC
	After cable installation, the following equipment will be powered CONTINUOUSLY:				
	(R1) FUEL CELL 1 PUMPS (6)	.81	.81	.81	.81
	(L4:K) AC1 ΦA H2O CNTLR 2 (S/C)	.06	.06		
	ΦB CAB AIR S/C	.04		.04	
	(L4:L) ΦB AV BAY 2 S/C	.02		.02	
	(L4:O) ΦB HYD QTY 1	.02		.02	
	ΦA BLR HYD BYP SENSOR 1B	.07	.07		
	ΦC BLR HYD BYP SENSOR 3A	.07			.07
	(L4:L) ΦA CABIN TEMP CNTLR 2 (EL)	.04	.04		
	(MA73C:F) ΦC OPS HYD ACTR INST (7)	.06			.06
	(8) SUBTOTAL AMPS/PHASE		.98	.89	.94
INTERMITTENT EQUIPMENT		AC CURRENT (amps/phase)	AC1 CURRENT		
After cable installation, the following equipment will be available for INTERMITTENT operation:			ΦA	ΦB	ΦC
	(L4:K) AC1 ΦA H2O CNTLR 2 (BYP VLV) (9)	.14			
	(L4:O) ΦA BLR HYD BYP VLV 1B	.21			
	ΦC BLR HYD BYP VLV 3A	.21			
	(L4:P) ΦA RAD CNTLR 1B (FREON LOOP 1 CNTLR B RAD BYP VLV MTR) (9) (10)	.17			
	ΦB RAD CNTLR 2B (FREON LOOP 2 CNTLR B RAD BYP VLV MTR) (9) (10)	.17			
	(MA73C:C) AC1 3Φ FWD 1 RH VENTS 1/2 MTR 1	OP - .28 CL - .21			
	-Y STAR TRKR DR SYS 1 OP/CL (9)	.14			
	L ADP DPY MTR 1 (9)	.14			
	AC1 3Φ MID 1 RH VENT 3 MTR 1	OP - .59 CL - .29			
	5 MTR 1	OP - .59 CL - .29			
	6 MTR 1	OP - .57 CL - .27			
	PL RETEN LAT MTR 1	.41			
	PORT RAD LAT 1-6, 7-12 MTRS 1 (2 ea)	.26			
	PORT RAD DPY/STO MTR 1	.26			
	PLBD C/L LAT 9-12 MTR 1	.72			
	PORT, STBD FWD BLKHD MTRS 1	.87			
	PLBD STBD DOOR MTR 1	1.64			
	PORT RMS MID RETN LAT MTR 1	.25			

- 5 Total current for each phase of AC bus must not exceed 3 amps continuous. Table should be used to calculate total phase current. CONTINUOUS EQUIPMENT will be powered continuously. INTERMITTENT EQUIPMENT will be available for intermittent ops. CONTINGENCY EQUIPMENT will be available for contingency use only
- 6 If MNA shorted, FC pumps will not be restarted
- 7 Includes RUD/SPDBRK and ELVN SW VLV Xdcrs
- 8 AC Utility Outlet cb can handle up to 6 amps for up to 5 sec. AC current for vent door ops peaks at ~4.5 amps/phase for 1 sec for dual mtr ops, peaks for 6 sec for single mtr ops. The cb should not trip if steady-state loads less than 3 amps/phase for dual mtr ops or less than 1 amp/phase for single mtr ops on all associated vent doors
- 9 Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase
- 10 If MNA DA1 is not regained, these mtrs (auto and man cntl) will not be operational

EPS SSR-200 (Cont)

AC1 LOAD REFERENCE TABLE (Cont)

INTERMITTENT EQUIPMENT (Cont)	AC CURRENT (amps/phase)	AC1 CURRENT AFTER CABLE INSTALLED		
		ΦA	ΦB	ΦC
(MA73C:D) AC1 3Φ MID 3 PLBD LAT 1-4, 5-8 MTR 1 (2 ea)	.72			
L AFT BLKHD MTR 1	.87			
LH VENTS 5 MTR 1	OP - .59 CL - .27			
6 MTR 1	OP - .57 CL - .27			
STBD RAT LAT 1-6, 7-12 MTRS 1 (2 ea)	.26			
STBD RAD DPY/STO MTR 1	.26			
PORT RMS AFT RETN LAT MTR 2	.25			
AC1 3Φ AFT 1 LH VENT 8/9 MTR 1	OP - .67 CL - .39			
ET DOORS L DRIVE MTR 1	1.06			
L LAT MTR 1	1.28			
C/L LAT 1 MTR 1	.41			
C/L LAT 2 MTR 1	.41			
(MA73C:F) ΦA RMS PRIMARY	.93			
(MA73C:H) FWD RCS VLV (3 ea) ⑨	.42			
(MA73C:I) AFT POD VLV GP 1 AFT RCS ISOL L MANF 2 FU VLV ⑨	.42			
L MANF 2 OX VLV	.42			
R MANF 2 FU VLV	.42			
R MANF 2 OX VLV	.42			
L TK 3/4/5A FU VLV	.42			
L TK 3/4/5A OX VLV	.42			
R TK 3/4/5A FU VLV	.42			
R TK 3/4/5A OX VLV	.42			
RCS XFEED R MANF 3/4/5 FU VLV	.42			
R MANF 3/4/5 OX VLV	.42			
L MANF 3/4/5 FU VLV	.42			
L MANF 3/4/5 OX VLV	.42			
L OMS XFEED 3/4/5 FU VLV	.42			
3/4/5 OX VLV	.42			
OMS ISOL L FU VLV A	.42			
L OX VLV A	.42			
R FU VLV A	.42			
R OX VLV A	.42			
(Cont)				

⑨ Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

MEDS

EPS SSR-200 (Cont)

AC1 LOAD REFERENCE TABLE (Cont)

CONTINGENCY EQUIPMENT After cable installation, the following AC1 continuous equipment will be powered off but available for CONTINGENCY use only. Minimize loading to prevent exceeding 3 amps/phase	AC CURRENT (amps/phase)	AC1 CURRENT AFTER CABLE INSTALLED		
		ΦA	ΦB	ΦC
(L4:J) HUM SEP A (9)	.28			
(L4:I) IMU FAN A (9)	.17			
(L4:F) H2O LOOP PUMP 1A (9)	1.01			
(L4:F) H2O LOOP PUMP 2 (9) (11)	1.03			
(L4:G) AV BAY 1 FAN A (9)	.69			
(L4:H) AV BAY 3 FAN B (upgraded) (9)	1.66			
(L4:H) AV BAY 3 FAN B (9)	.73			
(L4:M) FREON LOOP 1 PUMP A	1.68			
(L4:N) FREON LOOP 2 PUMP B (9)	1.68			
(L4:L) AC1 ΦA CABIN TEMP CNTLR 2	.15			
(L4:Q) AC1 ΦA LTG PNL L/CTR (12)	2.85			
ΦB LTG PNL L/OVHD (12)	1.94			
(L4:R) ΦA LTG R INST	.31			
ΦB LTG NUMERIC	.16			
(L4:Q) ΦC OS LTG INST	.13			
(L4:P) ΦC TACAN 1 (old)	1.66			
(MA73C:E) WCS FAN SEP 1	.86			
(F1/MO52J) AC1 UTILITY POWER				
VACUUM CLEANER	1.44			
(MO51F) CO2 RMVL SYS 1(2) (9)	.91			
	TOTAL AMPS/PHASE			

- (9) Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase
- (11) H2O LOOP 2 PUMP GPC position pwr'd by AC1
- (12) cb opened to prevent powering lights inadvertently

MEDS

EPS SSR-200 (Cont)

AC1 LOAD REFERENCE TABLE (Cont)

INTERMITTENT EQUIPMENT (Cont)	AC CURRENT (amps/phase)	AC1 CURRENT AFTER CABLE INSTALLED		
		ΦA	ΦB	ΦC
(MA73C:D) AC1 3Φ MID 3 PLBD LAT 1-4, 5-8 MTR 1 (2 ea)	.72			
L AFT BLKHD MTR 1	.87			
LH VENTS 5 MTR 1	OP - .59 CL - .27			
6 MTR 1	OP - .57 CL - .27			
STBD RAT LAT 1-6, 7-12 MTRS 1 (2 ea)	.26			
STBD RAD DPY/STO MTR 1	.26			
PORT RMS AFT RETN LAT MTR 2	.25			
AC1 3Φ AFT 1 LH VENT 8/9 MTR 1	OP - .67 CL - .39			
ET DOORS L DRIVE MTR 1	1.06			
L LAT MTR 1	1.28			
C/L LAT 1 MTR 1	.41			
C/L LAT 2 MTR 1	.41			
(MA73C:F) ΦA RMS PRIMARY	.93			
(MA73C:H) FWD RCS VLV (3 ea) ⑨	.42			
(MA73C:I) AFT POD VLV GP 1 AFT RCS ISOL L MANF 2 FU VLV ⑨	.42			
L MANF 2 OX VLV	.42			
R MANF 2 FU VLV	.42			
R MANF 2 OX VLV	.42			
L TK 3/4/5A FU VLV	.42			
L TK 3/4/5A OX VLV	.42			
R TK 3/4/5A FU VLV	.42			
R TK 3/4/5A OX VLV	.42			
RCS XFEED R MANF 3/4/5 FU VLV	.42			
R MANF 3/4/5 OX VLV	.42			
L MANF 3/4/5 FU VLV	.42			
L MANF 3/4/5 OX VLV	.42			
L OMS XFEED 3/4/5 FU VLV	.42			
3/4/5 OX VLV	.42			
OMS ISOL L FU VLV A	.42			
L OX VLV A	.42			
R FU VLV A	.42			
R OX VLV A	.42			
(Cont)				

⑨ Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

NOM

EPS SSR-200 (Cont)

AC1 LOAD REFERENCE TABLE (Cont)

CONTINGENCY EQUIPMENT After cable installation, the following AC1 continuous equipment will be powered off but available for CONTINGENCY use only. Minimize loading to prevent exceeding 3 amps/phase	AC CURRENT (amps/phase)	AC1 CURRENT AFTER CABLE INSTALLED		
		ΦA	ΦB	ΦC
(L4:J) HUM SEP A (9)	.28			
(L4:I) IMU FAN A (9)	.17			
(L4:F) H2O LOOP PUMP 1A (9)	1.01			
(L4:F) H2O LOOP PUMP 2 (9) (11)	1.03			
(L4:G) AV BAY 1 FAN A (9)	.69			
(L4:H) AV BAY 3 FAN B (upgraded) (9)	1.66			
(L4:H) AV BAY 3 FAN B (9)	.73			
(L4:M) FREON LOOP 1 PUMP A	1.68			
(L4:N) FREON LOOP 2 PUMP B (9)	1.68			
(L4:L) AC1 ΦA CABIN TEMP CNTLR 2	.15			
(L4:Q) AC1 ΦA LTG PNL L/CTR (12)	2.85			
ΦB LTG PNL L/OVHD (12)	1.94			
(L4:R) ΦA LTG R INST	.46			
ΦB LTG NUMERIC	.16			
(L4:Q) ΦC OS LTG INST	.13			
(L4:P) ΦC TACAN 1 (old)	1.66			
(MA73C:E) WCS FAN SEP 1	.86			
(F1/MO52J) AC1 UTILITY POWER				
VACUUM CLEANER	1.44			
(MO51F) CO2 RMVL SYS 1(2) (9)	.91			
	TOTAL AMPS/PHASE			

- (9) Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phas
- (11) H2O LOOP 2 PUMP GPC position pwr'd by AC1
- (12) cb opened to prevent powering lights inadvertently

NOM

EPS SSR-200 (Cont)

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AC2 LOAD REFERENCE TABLE

5

23	CONTINUOUS EQUIPMENT	AC CURRENT (amps/phase)	AC2 CURRENT AFTER CABLE INSTALLED		
			ΦA	ΦB	ΦC
After cable installation, the following AC2 equipment will be powered CONTINUOUSLY:					
(R1)	FUEL CELL 2 PUMPS (13)	.81	.81	.81	.81
(L4:L)	AC2 ΦB AV BAY 3 S/C	.02		.02	
(L4:O)	ΦB HYD QTY 2	.02		.02	
(L4:L)	ΦA CABIN TEMP CNTLR 1 (EL)	.04	.04		
(L4:O)	ΦA BLR HYD CNTL SENSOR 1A	.07	.07		
	ΦC BLR HYD CNTL SENSOR 2B	.06			.06
(L4:P)	ΦA LG PROX SNSR 2	.07	.07		
(MA73C:F)	ΦC OPS INST HYD ACTR (14)	.13			.13
	(15) SUBTOTAL AMPS/PHASE		.99	.85	1.00
INTERMITTENT EQUIPMENT					
After cable installation, the following equipment will be available for INTERMITTENT operation:					
(L4:O)	AC2 ΦA BLR HYD BYPASS VLV 1A	.22			
	ΦC BLR HYD BYPASS VLV 2B	.21			
(L4:P)	ΦB RAD CNTLR 1A (FREON LOOP 1 CNTLR A RAD BYP VLV MTR) (9) (16)	.17			
(L4:N)	ΦA FREON FLOW PROP 1 (VLV) (9)	.30			
(MA73C:C)	AC2 3 Φ FWD 2 LH VENTS 1/2 MTR 2	OP - .28 CL - .15			
	RH VENTS 1/2 MTR 2	OP - .28 CL - .15			
	L,R ADP DPY MTR 2 (9)	.14			
	-Y STR TRKR DR SYS 2 MTR CNTL (9)	.14			
	-Z STR TRKR DR SYS 1 MTR CNTL (9)	.14			
	AC2 3 Φ MID 1 LH VENT 5 MTR 2	OP - .65 CL - .33			
	AC2 3 Φ MID 2 LH VENT 3 MTR 2	OP - .65 CL - .33			
	PLBD PORT DOOR MTR 2	1.64			
	STBD AFT BLKHD LAT MTR 2	.87			
	C/L LATCH 13-16 MTR 2	.72			
	KU BAND ANT DPLY MTR 2	.82			
	STBD RAD LAT 1-6 MTR 2	.26			
	PORT RMS DPLY MTR 2	.29			
	PORT RMS FWD RETN LAT MTR 1	.25			

5 Total current for each phase of AC bus must not exceed 3 amps continuous. Table should be used to calculate total phase current. CONTINUOUS EQUIPMENT will be powered continuously. INTERMITTENT EQUIPMENT will be available for intermittent ops. CONTINGENCY EQUIPMENT will be available for contingency use only

9 Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

13 If MNB lost, FC2 pumps will not be restarted

14 Includes ELIVN PS2 and ME TVC SW VLV Xdcrs

15 AC Utility Outlet cb can handle up to 6 amps for up to 5 sec. AC current for vent door ops peaks at ~5.1 amps/phase for 1 sec for dual mtr ops, peaks for 6 sec for single mtr ops. The cb should not trip if steady-state loads less than 3 amps/phase for dual mtr ops or less than 1 amp/phase for single mtr ops on all associated vent doors

16 If MNB DA2 is not regained, this mtr (auto cntl) will not be operational

EPS SSR-200 (Cont)

AC2 LOAD REFERENCE TABLE (Cont)

INTERMITTENT EQUIPMENT (Cont)	AC CURRENT (amps/phase)	AC2 CURRENT		
		ΦA	ΦB	ΦC
(MA73C:C) (Cont) AC2 3 Φ AFT 2 RH VENTS 8/9 MTR 2	OP - .73 CL - .35			
LH VENTS 8/9 MTR 2	OP - .67 CL - .38			
ET DOORS L LAT MTR 2	1.28			
C/L LAT 1 MTR 2	.41			
ET DOORS R DRIVE MTR 2	1.06			
R LAT MTR 2	1.28			
AC2 3 Φ MID 3				
PL RET LAT MTR 2	.41			
AC2 3 Φ MID 4				
RH VENT 6 MTR 2	OP - .59 CL - .29			
PLBD STBD DOOR MTR 2	1.64			
PORT FWD BLKHD LAT MTR 2	.87			
STBD FWD BLKHD LAT MTR 2	.87			
PORT RAD LAT 1-6 MTR 2	.26			
DPLY MTR 2	.26			
PORT RMS MID RETN LAT MTR 2	.25			
(MA73C:F) PAYLOAD				
AC2 ΦA RMS BACKUP	.07			
LEFT SEAT (9)	.99			
AC2 ΦA PORT RMS SHLD BRACE ACTR	.25			
(MA73C:G) OMS KIT VLV				
(MA73C:H) FWD RCS VLV (3 ea) (9)	.42			
(MA73C:I) AFT POD VLV GP 2 (9) AFT RCS ISOL L MANF 1 FU VLV	.42			
L MANF 1 OX VLV	.42			
R MANF 1 FU VLV	.42			
R MANF 1 OX VLV	.42			
L TK 3/4/5B FU VLV	.42			
L TK 3/5/5B OX VLV	.42			
R TK 3/4/5B FU VLV	.42			
R TK 3/4/5B OX VLV	.42			
OMS XFEED L FU VLV B	.42			
L OX VLV B	.42			
R FU VLV B	.42			
R OX VLV B	.42			
(Cont)				

(9) Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

EPS SSR-200 (Cont)

AC2 LOAD REFERENCE TABLE (Cont)

CONTINGENCY EQUIPMENT	AC CURRENT (amps/phase)	AC2 CURRENT AFTER CABLE INSTALLED		
		ΦA	ΦB	ΦC
After cable installation, the following AC2 continuous equipment will be powered off but available for CONTINGENCY use only. Minimize loading to prevent exceeding 3 amps/phase				
(L4:F) H2O LOOP PUMP 1B (9)	1.02			
(L4:G) AV BAY 1 FAN B (9)	.69			
(L4:H) AV BAY 2 FAN A (9)	.70			
(L4:I) IMU FAN B (9)	.18			
(L4:J) HUM SEP B (9)	.28			
(L4:K) CABIN FAN B	1.67			
(L4:M) FREON LOOP 1 PUMP B (9)	1.68			
(L4:L) AC2 ΦA CABIN TEMP CNTLR 1	.15			
(L4:R) AC2 ΦB LTG INST OVHD	.26			
(L4:Q) AC2 ΦB OS LTG NUMERIC	.20			
(L4:P) AC2 ΦC TACAN 2 (old)	1.66			
(L4:Q) AC2 ΦA LTG PNL R OVHD (12)	1.34			
AC2 ΦB LTG PNL R (12)	1.51			
(L4:N) AC2 ΦB FREON SIG CONDR	.05			
(MA73C:E) WCS FAN SEP 2 (9)	0.86			
	TOTAL AMPS/PHASE			

(9) Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

(12) cb opened to prevent powering lights inadvertently

MEDS

EPS SSR-200 (Cont)

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AC3 LOAD REFERENCE TABLE

5

24	CONTINUOUS EQUIPMENT	AC CURRENT (amps/phase)	AC3 CURRENT AFTER CABLE INSTALLED		
			ΦA	ΦB	ΦC
	After cable installation, the following AC3 equipment will be powered CONTINUOUSLY:				
	(R1) FUEL CELL 3 PUMPS	.81	.81	.81	.81
	(L4:J) AC3 ΦA HUM SEP S/C	.02	.02		
	(L4:J) AC3 ΦB IMU FAN S/C	.02		.02	
	(L4:L) AC3 ΦA H2O CNTLR 1 (S/C)	.06	.06		
	AC3 ΦB AV BAY 1 S/C	.02		.02	
	(L4:O) AC3 ΦB HYD QTY 3	.02		.02	
	AC3 ΦA BLR HYD BYP SENSOR 2A	.07	.07		
	AC3 ΦC BLR HYD BYP SENSOR 3B	.07			.07
	(L4:P) AC3 ΦA LG PROX SNSR 1	.07	.07		
	(15) SUBTOTAL AMPS/PHASE		1.03	.87	.87
	INTERMITTENT EQUIPMENT	AC CURRENT (amps/phase)	AC3 CURRENT		
	After cable installation, the following AC3 equipment will be available for INTERMITTENT operation:		ΦA	ΦB	ΦC
	(L4:L) AC3 ΦA H2O CNTLR 1 (BYP VLV) (9)	.14			
	(L4:N) AC3 ΦA FREON FLOW PROP 2 (VLV) (9)	.30			
	(L4:O) AC3 ΦA BLR HYD BYP VLV 2A	.21			
	AC3 ΦC BLR HYD BYP VLV 3B	.21			
	(L4:P) AC3 ΦB RAD CNTLR 2A (FREON LOOP 2 CNTLR A RAD BYP VLV MTR) (9)	.17			
	(MA73C:C) AC3 3Φ FWD 3 FWD RCS ISOL TK 1/2 FU VLV (9)	.42			
	TK 1/2 OX VLV (9)	.42			
	MANF 3 FU VLV (9)	.42			
	OX VLV (9)	.42			
	4 FU VLV (9)	.42			
	OX VLV (9)	.42			
	LH VENTS 1/2 MTR 1	OP - .29 CL - .21			
	R ADP MTR 1, 18	.14			
	-Z STAR TRKR SYS 2 MTR CNTRL (9)	.14			
	AC3 3Φ MID 2 LH VENT 3 MTR 1	OP - .59 CL - .29			
	LH VENT 6 MTR 2	OP - .59 CL - .29			
	PLBD PORT AFT BLKHD LAT MTR 2	.87			
	(Cont)				

5 Total current for each phase of AC bus must not exceed 3 amps continuous. Table should be used to calculate total phase current. CONTINUOUS EQUIPMENT will be powered continuously. INTERMITTENT EQUIPMENT will be available for intermittent ops. CONTINGENCY EQUIPMENT will be available for contingency use only

9 Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

15 AC Utility Outlet cb can handle up to 6 amps for up to 5 sec. AC current for vent door ops peaks at ~4.2 amps/phase for 1 sec for dual mtr ops, peaks for 6 sec for single mtr ops. The cb should not trip if steady-state loads less than 3 amps/phase for dual mtr ops or less than 1.3 amp/phase for single mtr ops on all associated vent doors

MEDS

EPS SSR-200 (Cont)

AC3 LOAD REFERENCE TABLE (Cont)

INTERMITTENT EQUIPMENT (Cont)	AC CURRENT (amps/phase)	AC3 CURRENT AFTER CABLE INSTALLED		
		ΦA	ΦB	ΦC
(MA73C:C) (Cont) AC3 Φ3 PLBD C/L 1-4 LAT MTR 2	.72			
C/L 5-8 LAT MTR 2	.72			
KU BAND ANT DPLY MTR 1	.82			
STBD RAD DPY/STD MTR 2	.26			
LAT 7-12 MTR 2	.26			
AC3 Φ3 MID 2 PORT RMS AFT SYS RETN LCH MTR 1	.25			
(MA73C:D) AC3 3Φ AFT 3 RH VENTS 8/9 MTR 1	OP - .68 CL - .34			
ET DOORS L DRIVE MTR 2	1.06			
C/L LAT 2 MTR 2	.41			
R DRIVE MTR 1	1.06			
R LAT MTR 1	1.28			
AC3 3Φ MID 4 RH VENT 3 MTR 2	OP - .65 CL - .32			
5 MTR 2	OP - .65 CL - .32			
PLBD PORT DOOR MTR 1	1.64			
STBD AFT BLKHD LAT MTR 1	.87			
C/L 9-12 LAT MTR 2	.72			
C/L 13-16 LAT MTR 1	.72			
KU BAND ANT DPY MTR 1	.82			
PORT RAD DPY MTR 2	.26			
7-12 LAT MTR 2	.26			
PORT RMS DPY MTR 1	.29			
FWD RETN LAT MTR 2	.25			
(MA73C:E) PAYLOAD				
(MA73C:G) GALLEY FAN (9)	.37			
RIGHT SEAT (9)	.99			
(MA73C:H) FWD RCS VLV (3 ea) (9)	.42			
(MA73C:I) AFT POD VLV GP 3 (9) AFT RCS ISOL L TK 1/2 FU VLV	.42			
L TK 1/2 OX VLV	.42			
R TK 1/2 FU VLV	.42			
R TK 1/2 OX VLV	.42			
L MANF 3 FU VLV	.42			
L MANF 3 OX VLV	.42			
(Cont)				

9 Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

MEDS

EPS SSR-200 (Cont)

AC3 LOAD REFERENCE TABLE (Cont)

INTERMITTENT EQUIPMENT (Cont)	AC CURRENT (amps/phase)	AC3 CURRENT AFTER CABLE INSTALLED		
		ΦA	ΦB	ΦC
(MA73C:I) (Cont) AFT RCS ISOL R MANF 3 FU VLV	.42			
R MANF 3 OX VLV	.42			
L MANF 4 FU VLV	.42			
L MANF 4 OX VLV	.42			
(MA73C:I) (9) AFT POD VLV GP 3 R MANF 4 FU VLV	.42			
R MANF 4 OX VLV	.42			
AFT RCS XFEED L MANF 1/2 FU VLV	.42			
L MANF 1/2 OX VLV	.42			
R MANF 1/2 FU VLV	.42			
R MANF 1/2 OX VLV	.42			
OMS XFEED R FU VLV A	.42			
R OX VLV A	.42			
OMS ISOL L FU VLV B	.42			
L OX VLV B	.42			
R FU VLV B	.42			
R OX VLV B	.42			
CONTINGENCY EQUIPMENT				
After cable installation, the following AC3 continuous equipment will be switched off but available for CONTINGENCY use only. Minimize loading to prevent exceeding 3 amps/phase				
(L4:F) H2O LOOP PUMP 2 (9)(17)	1.03			
(L4:G) AV BAY 3 FAN A (upgraded) (9)	1.66			
(L4:G) AV BAY 3 FAN A (9)	.75			
(L4:H) AV BAY 2 FAN B (9)	.75			
(L4:I) IMU FAN C (9)	.18			
(L4:K) CABIN FAN A	1.66			
(L4:M) FREON LOOP 2 PUMP A (9)	1.68			
(L4:R) AC3 ΦB LTG INST L/CTR	.31			
(L4:P) AC3 ΦC TACAN 3 (old)	1.66			
(L4:N) AC3 ΦB FREON SIG CONDR	.05			
(L4:Q) AC3 ΦA LIGHTING COAS	.11			
(R10) AC3 ΦB MS LTG PNL	.31			
AC3 ΦC LIGHTING PANEL OS (12)	2.66			
(MO51F) CO2 RMVL SYS 2(1) (9)	.91			
(A15,MO13Q) AC3 UTILITY POWER				
VACUUM CLEANER	1.44			
	TOTAL AMPS/PHASE			

(9) Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

(12) cb opened to prevent powering lights inadvertently

(17) H2O LOOP 2 PUMP Man ON pwr'd by AC3



EPS SSR-200 (Cont)

AC2 LOAD REFERENCE TABLE (Cont)

CONTINGENCY EQUIPMENT	AC CURRENT (amps/phase)	AC2 CURRENT AFTER CABLE INSTALLED		
		ΦA	ΦB	ΦC
(L4:F) H2O LOOP PUMP 1B (9)	1.02			
(L4:G) AV BAY 1 FAN B (9)	.69			
(L4:H) AV BAY 2 FAN A (9)	.70			
(L4:I) IMU FAN B (9)	.18			
(L4:J) HUM SEP B (9)	.28			
(L4:K) CABIN FAN B	1.67			
(L4:M) FREON LOOP 1 PUMP B (9)	1.68			
(L4:L) AC2 ΦA CABIN TEMP CNTLR 1	.15			
(L4:R) AC2 ΦB LTG INST OVHD	.26			
(L4:Q) AC2 ΦB OS LTG NUMERIC	.20			
(L4:P) AC2 ΦC TACAN 2 (old)	1.66			
(L4:Q) AC2 ΦA LTG PNL R OVHD (12)	1.34			
AC2 ΦB LTG PNL R (12)	1.56			
(L4:N) AC2 ΦB FREON SIG CONDR	.05			
(MA73C:E) WCS FAN SEP 2 (9)	0.86			
	TOTAL AMPS/PHASE			

(9) Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

(12) cb opened to prevent powering lights inadvertently

NOM

EPS SSR-200 (Cont)

21

AC3 LOAD REFERENCE TABLE

5

22	CONTINUOUS EQUIPMENT	AC CURRENT (amps/phase)	AC3 CURRENT AFTER CABLE INSTALLED		
			ΦA	ΦB	ΦC
	After cable installation, the following AC3 equipment will be powered CONTINUOUSLY:				
	(R1) FUEL CELL 3 PUMPS	.81	.81	.81	.81
	(L4:J) AC3 ΦA HUM SEP S/C	.02	.02		
	(L4:J) AC3 ΦB IMU FAN S/C	.02		.02	
	(L4:L) AC3 ΦA H2O CNTLR 1 (S/C)	.06	.06		
	AC3 ΦB AV BAY 1 S/C	.02		.02	
	(L4:O) AC3 ΦB HYD QTY 3	.02		.02	
	AC3 ΦA BLR HYD BYP SENSOR 2A	.07	.07		
	AC3 ΦC BLR HYD BYP SENSOR 3B	.07			.07
	(L4:P) AC3 ΦA LG PROX SNSR 1	.07	.07		
	(15) SUBTOTAL AMPS/PHASE		1.03	.87	.87
	INTERMITTENT EQUIPMENT	AC CURRENT (amps/phase)	AC3 CURRENT		
	After cable installation, the following AC3 equipment will be available for INTERMITTENT operation:		ΦA	ΦB	ΦC
	(L4:L) AC3 ΦA H2O CNTLR 1 (BYP VLV) (9)	.14			
	(L4:N) AC3 ΦA FREON FLOW PROP 2 (VLV) (9)	.30			
	(L4:O) AC3 ΦA BLR HYD BYP VLV 2A	.21			
	AC3 ΦC BLR HYD BYP VLV 3B	.21			
	(L4:P) AC3 ΦB RAD CNTLR 2A (FREON LOOP 2 CNTLR A RAD BYP VLV MTR) (9)	.17			
	(MA73C:C) AC3 3Φ FWD 3 FWD RCS ISOL TK 1/2 FU VLV (9)	.42			
	TK 1/2 OX VLV (9)	.42			
	MANF 3 FU VLV (9)	.42			
	OX VLV (9)	.42			
	4 FU VLV (9)	.42			
	OX VLV (9)	.42			
	LH VENTS 1/2 MTR 1	OP - .29 CL - .21			
	R ADP MTR 1, 18	.14			
	-Z STAR TRKR SYS 2 MTR CNTRL (9)	.14			
	AC3 3Φ MID 2 LH VENT 3 MTR 1	OP - .59 CL - .29			
	LH VENT 6 MTR 2	OP - .59 CL - .29			
	PLBD PORT AFT BLKHD LAT MTR 2	.87			
	(Cont)				

5 Total current for each phase of AC bus must not exceed 3 amps continuous. Table should be used to calculate total phase current. CONTINUOUS EQUIPMENT will be powered continuously. INTERMITTENT EQUIPMENT will be available for intermittent ops. CONTINGENCY EQUIPMENT will be available for contingency use only

9 Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

15 AC Utility Outlet cb can handle up to 6 amps for up to 5 sec. AC current for vent door ops peaks at ~4.2 amps/phase for 1 sec for dual mtr ops, peaks for 6 sec for single mtr ops. The cb should not trip if steady-state loads less than 3 amps/phase for dual mtr ops or less than 1.3 amp/phase for single mtr ops on all associated vent doors

NOM

EPS SSR-200 (Cont)

AC3 LOAD REFERENCE TABLE (Cont)

INTERMITTENT EQUIPMENT (Cont)	AC CURRENT (amps/phase)	AC3 CURRENT AFTER CABLE INSTALLED		
		ΦA	ΦB	ΦC
(MA73C:C) (Cont) AC3 Φ3 PLBD C/L 1-4 LAT MTR 2	.72			
C/L 5-8 LAT MTR 2	.72			
KU BAND ANT DPLY MTR 1	.82			
STBD RAD DPY/STD MTR 2	.26			
LAT 7-12 MTR 2	.26			
AC3 Φ3 MID 2 PORT RMS AFT SYS RETN LCH MTR 1	.25			
(MA73C:D) AC3 3Φ AFT 3 RH VENTS 8/9 MTR 1	OP - .68 CL - .34			
ET DOORS L DRIVE MTR 2	1.06			
C/L LAT 2 MTR 2	.41			
R DRIVE MTR 1	1.06			
R LAT MTR 1	1.28			
AC3 3Φ MID 4 RH VENT 3 MTR 2	OP - .65 CL - .32			
5 MTR 2	OP - .65 CL - .32			
PLBD PORT DOOR MTR 1	1.64			
STBD AFT BLKHD LAT MTR 1	.87			
C/L 9-12 LAT MTR 2	.72			
C/L 13-16 LAT MTR 1	.72			
KU BAND ANT DPY MTR 1	.82			
PORT RAD DPY MTR 2	.26			
7-12 LAT MTR 2	.26			
PORT RMS DPY MTR 1	.29			
FWD RETN LAT MTR 2	.25			
(MA73C:E) PAYLOAD				
(MA73C:G) GALLEY FAN (9)	.37			
RIGHT SEAT (9)	.99			
(MA73C:H) FWD RCS VLV (3 ea) (9)	.42			
(MA73C:I) AFT POD VLV GP 3 (9) AFT RCS ISOL L TK 1/2 FU VLV	.42			
L TK 1/2 OX VLV	.42			
R TK 1/2 FU VLV	.42			
R TK 1/2 OX VLV	.42			
L MANF 3 FU VLV	.42			
L MANF 3 OX VLV	.42			
(Cont)				

9 Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

NOM

EPS SSR-200 (Cont)

AC3 LOAD REFERENCE TABLE (Cont)

INTERMITTENT EQUIPMENT (Cont)	AC CURRENT (amps/phase)	AC3 CURRENT AFTER CABLE INSTALLED		
		ΦA	ΦB	ΦC
(MA73C:I) (Cont) AFT RCS ISOL R MANF 3 FU VLV	.42			
R MANF 3 OX VLV	.42			
L MANF 4 FU VLV	.42			
L MANF 4 OX VLV	.42			
(MA73C:I) (9) AFT POD VLV GP 3 R MANF 4 FU VLV	.42			
R MANF 4 OX VLV	.42			
AFT RCS XFEED L MANF 1/2 FU VLV	.42			
L MANF 1/2 OX VLV	.42			
R MANF 1/2 FU VLV	.42			
R MANF 1/2 OX VLV	.42			
OMS XFEED R FU VLV A	.42			
R OX VLV A	.42			
OMS ISOL L FU VLV B	.42			
L OX VLV B	.42			
R FU VLV B	.42			
R OX VLV B	.42			
CONTINGENCY EQUIPMENT				
After cable installation, the following AC3 continuous equipment will be switched off but available for CONTINGENCY use only. Minimize loading to prevent exceeding 3 amps/phase				
(L4:F) H2O LOOP PUMP 2 (9)(17)	1.03			
(L4:G) AV BAY 3 FAN A (upgraded) (9)	1.66			
(L4:G) AV BAY 3 FAN A (9)	.75			
(L4:H) AV BAY 2 FAN B (9)	.75			
(L4:I) IMU FAN C (9)	.18			
(L4:K) CABIN FAN A	1.66			
(L4:M) FREON LOOP 2 PUMP A (9)	1.68			
(L4:R) AC3 ΦB LTG INST L/CTR	.53			
(L4:P) AC3 ΦC TACAN 3 (old)	1.66			
(L4:N) AC3 ΦB FREON SIG CONDR	.05			
(L4:Q) AC3 ΦA LIGHTING COAS	.11			
(R10) AC3 ΦB MS LTG PNL	.28			
AC3 ΦC LIGHTING PANEL OS (12)	2.66			
(MO51F) CO2 RMVL SYS 2(1) (9)	.91			
(A15,MO13Q) AC3 UTILITY POWER				
VACUUM CLEANER	1.44			
	TOTAL AMPS/PHASE			

(9) Normal individual load operation should not trip AC Utility Outlet cb if steady-state loads less than 3 amps/phase

(12) cb opened to prevent powering lights inadvertently

(17) H2O LOOP 2 PUMP Man ON pwr'd by AC3

NOM

EPS SSR-201 CRYO HTR MANUAL OPS

①

1 | Config limits				
Config SM ALERT limits for affected tank which requires manual htr ops via SM SPEC 60. Do not use B/U C/W limits unless necessary (e.g., Tank P XDCR failure). Do not alter hardware C/W limits. Use appropriate ID listed below to modify SM ALERT, limit set #1				
TANK #	SM ALERT (TANK P)		B/U C/W (CNTLR P)	
	O2	H2	O2	H2
1	0451100	0452100	0451110	0452110
2	0451200	0452200	0451210	0452210
3	0451300	0452300	0451310	0452310
4	0451400	0452400	0451410	0452410
5	0451500	0452500	0451510	0452510
6	0453100	0454100	0453110	0454110
7	0453200	0454200	0453210	0454210
8	0453300	0454300	0453310	0454310
9	0453400	0454400	0453410	0454410

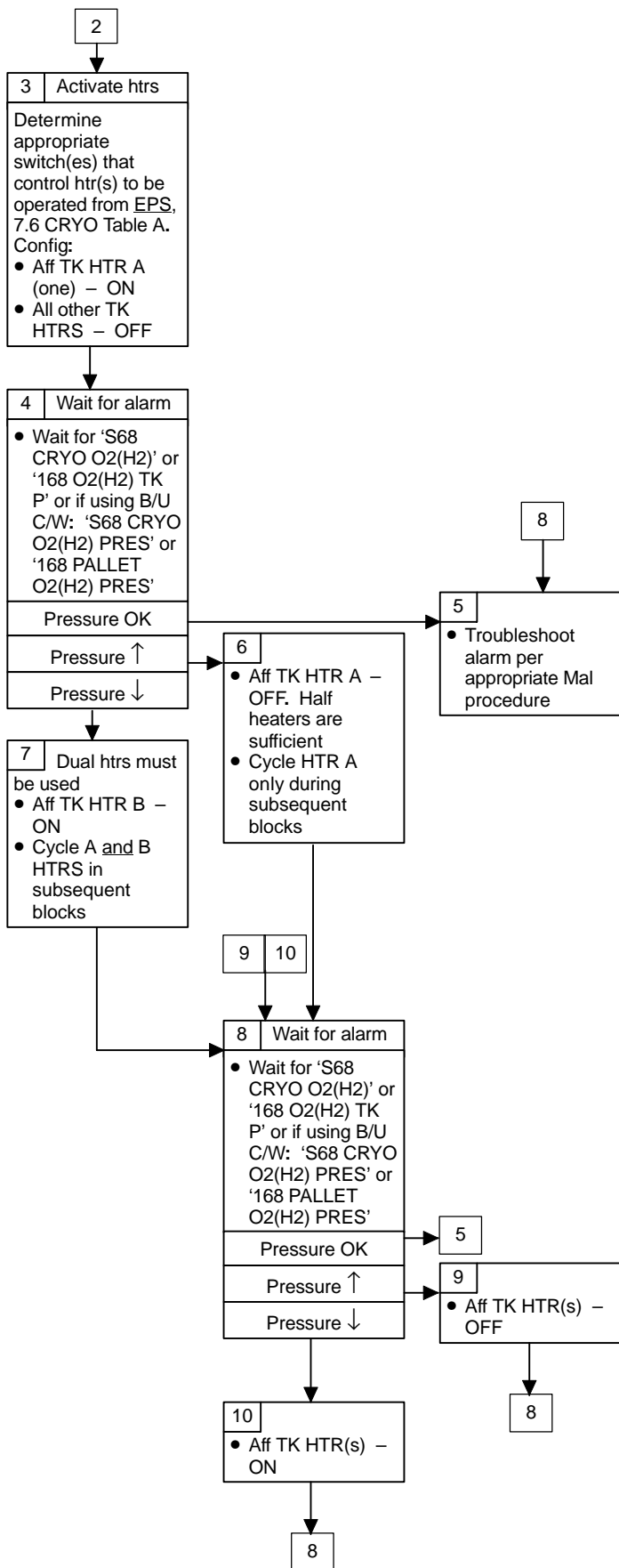
② ③

2 | Define alert limits		
Define upper and lower limits to be used for tank which requires manual heater operations		
CRYOGENIC	LOWER LIMIT	UPPER LIMIT
O2	780	920
H2	200	260

3

- ① SM ALERT LIMIT SET 1 is used when both heater switches are in OFF or ON. Limit set 2 is used only when one or both heater switches are in AUTO
- ② MCC may recommend new lower limit based on TK quantity. Limit supplied is ok for all TK QTYs
- ③ This procedure assumes that both manifold vlvs are open

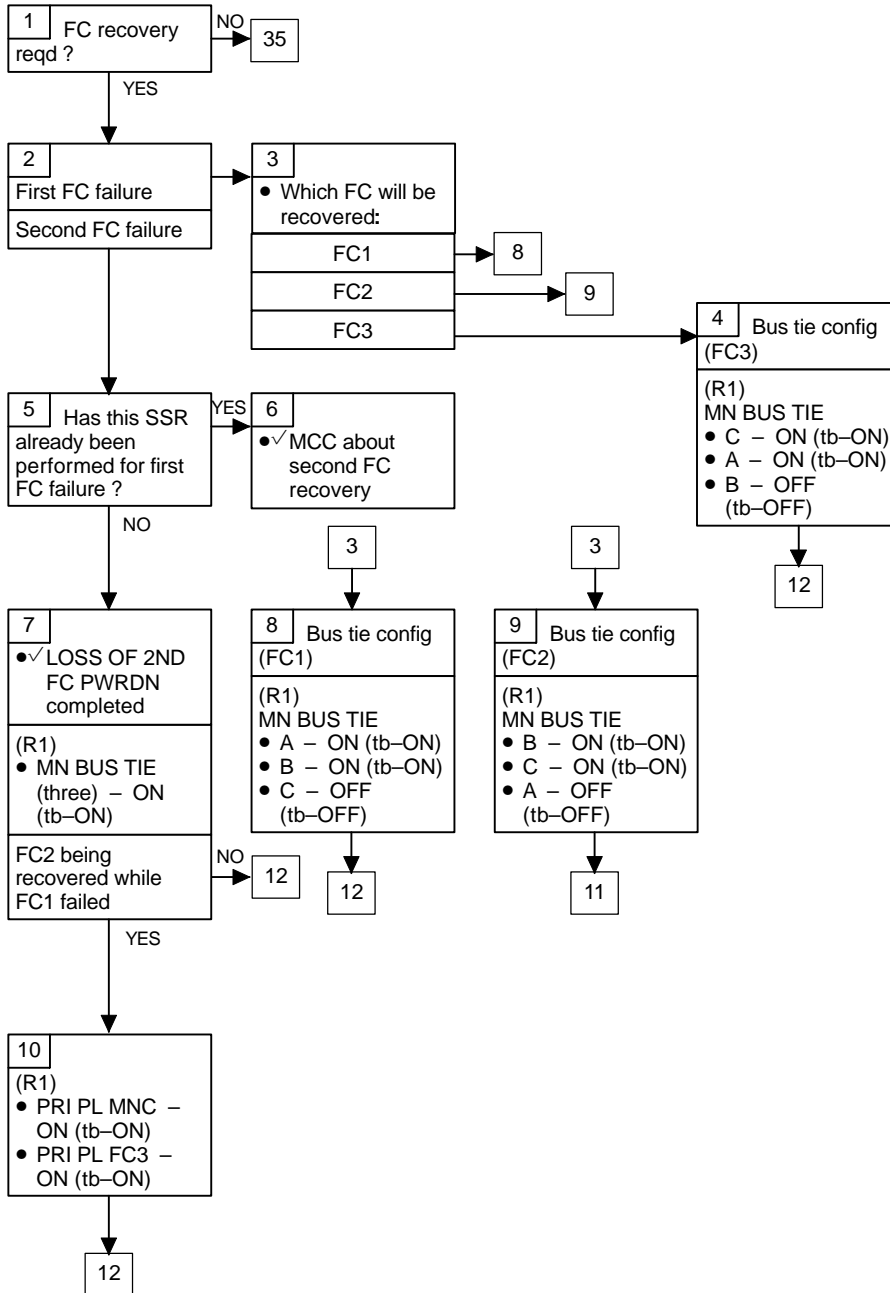
EPS SSR-201 (Cont)



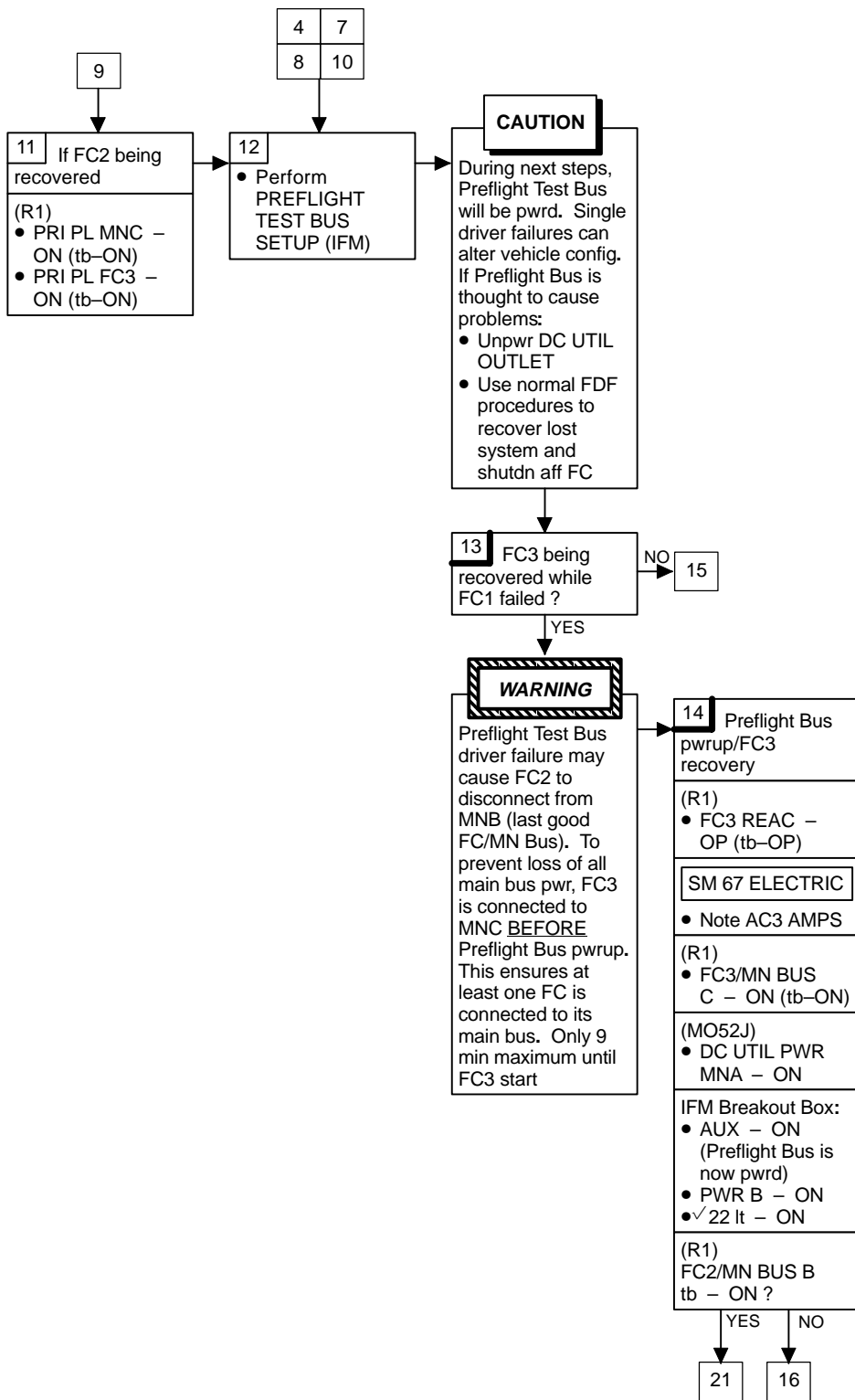
EPS SSR-202 PREFLIGHT TEST BUS USE

NOTE

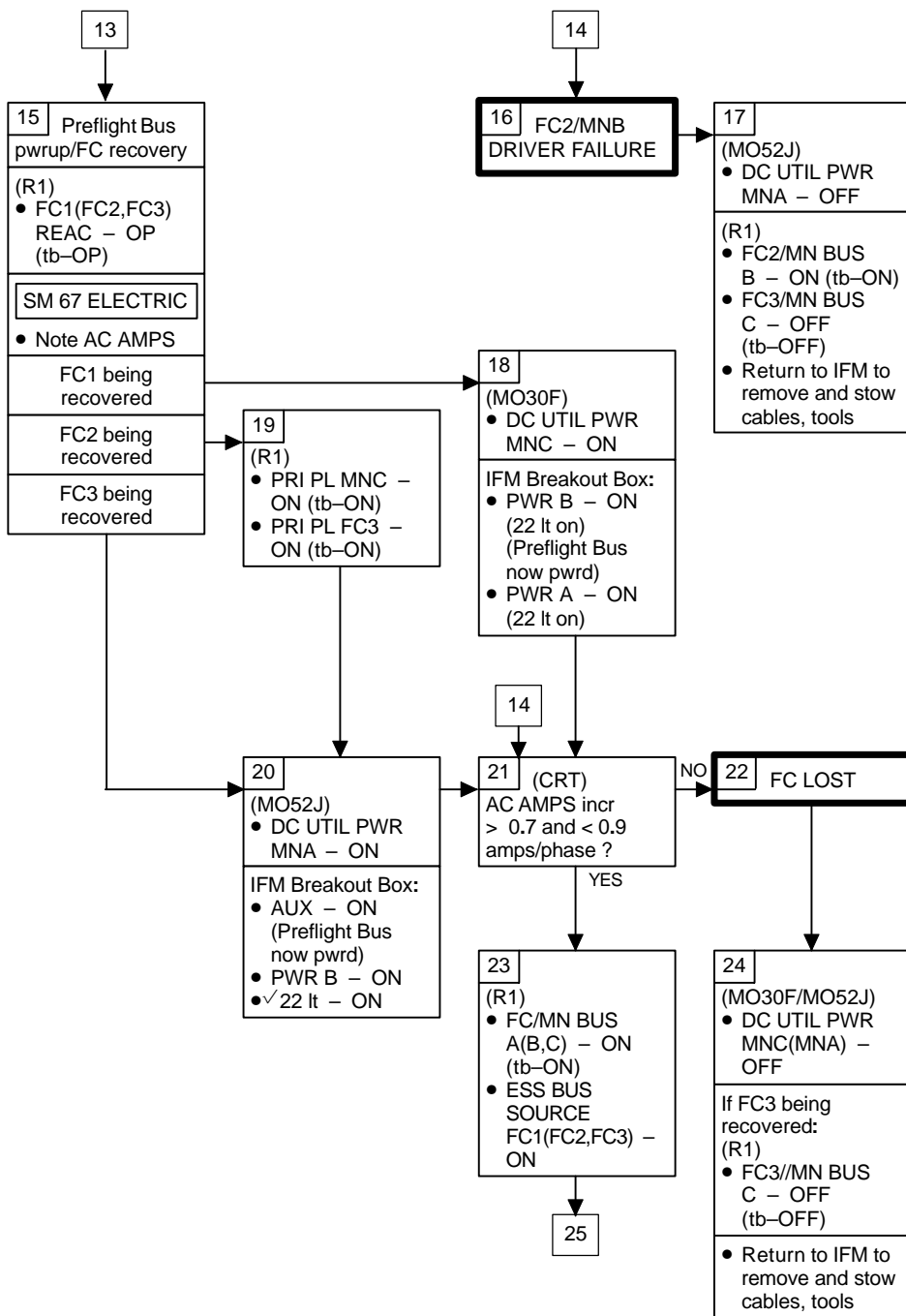
Powering Preflight Test Bus enables single string circuits that use launch MDMs and data bus normally used to operate many orbiter systems during ground turnaround. Due to design, a single driver failure could cause equipment to be inadvertently commanded whenever Preflight Test Bus is powered. See Table 1 for reference to possible commands available through Preflight MDM/data bus. For any problems experienced that could be attributed to Preflight Bus, remove pwr to Preflight Bus, recover lost systems, and shut down affected FC within 9 min if reqd



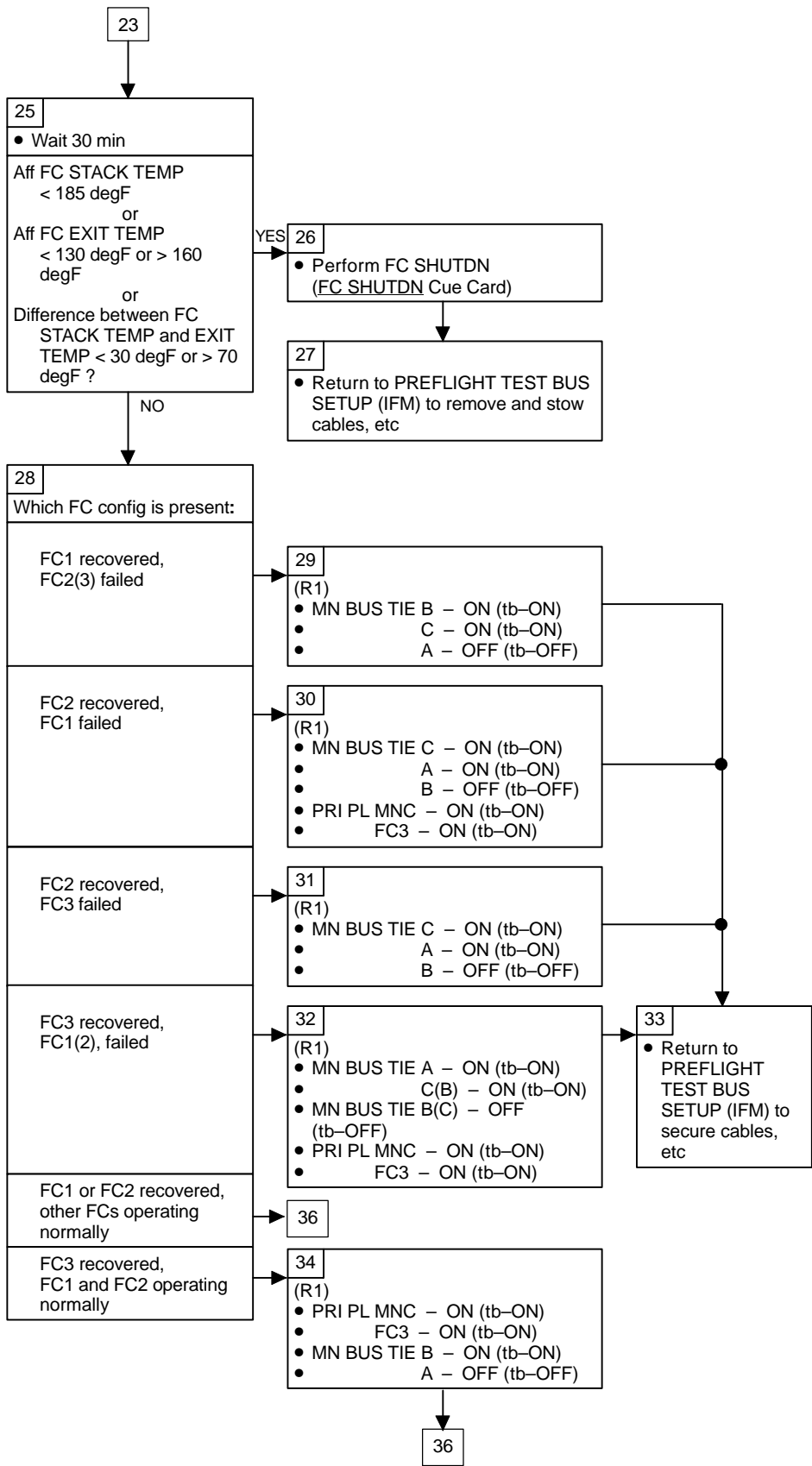
EPS SSR-202 (Cont)



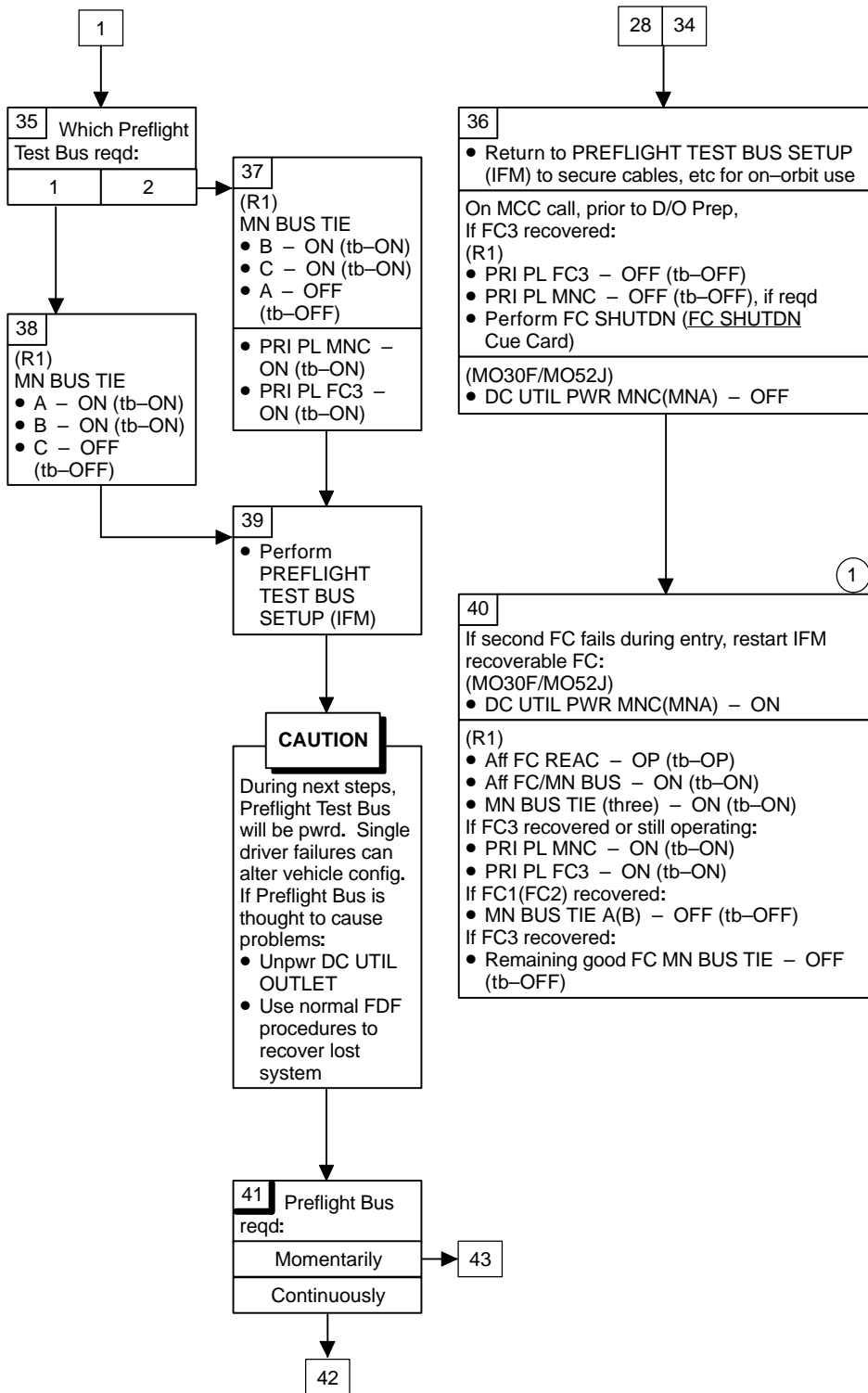
EPS SSR-202 (Cont)



EPS SSR-202 (Cont)

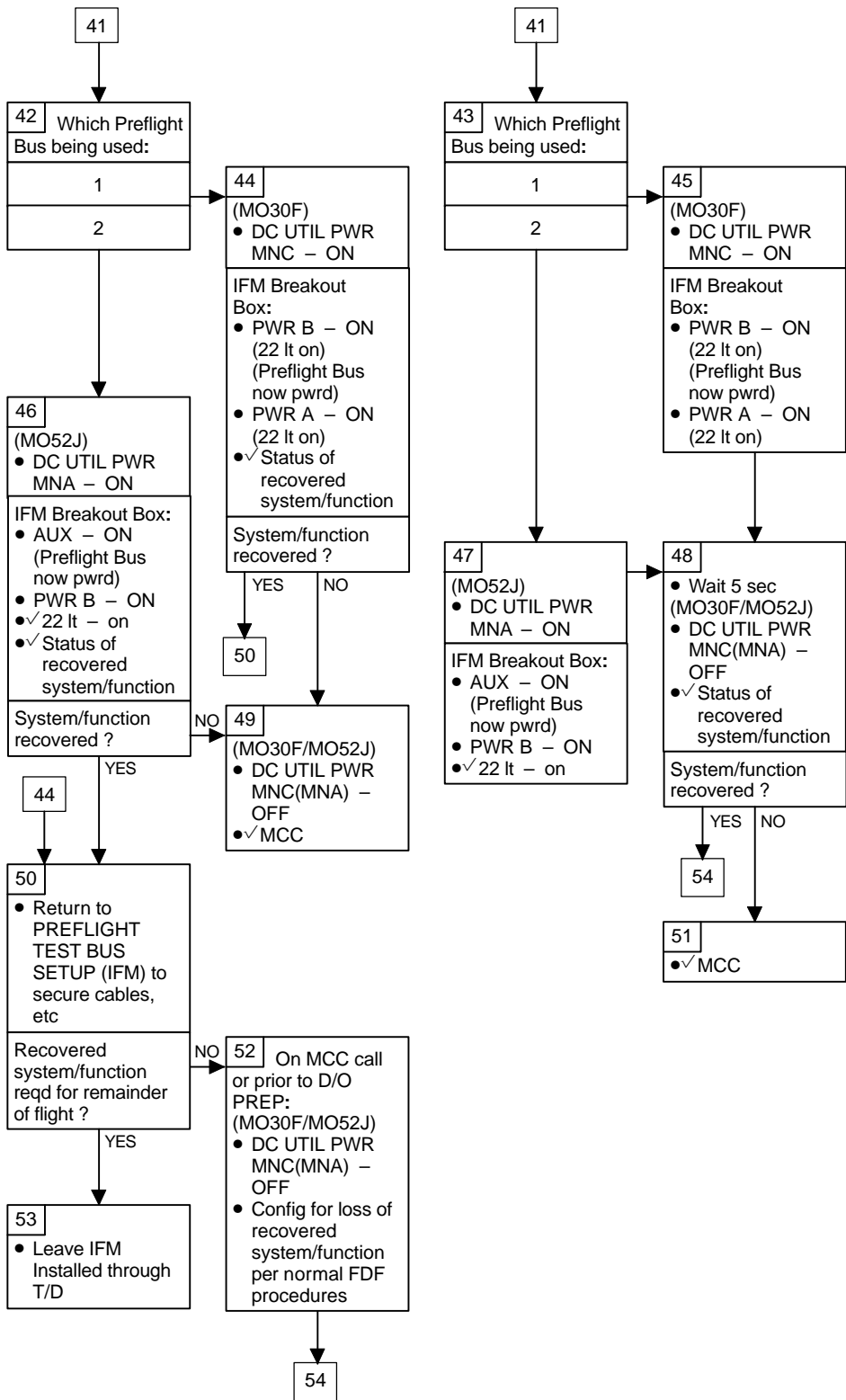


EPS SSR-202 (Cont)

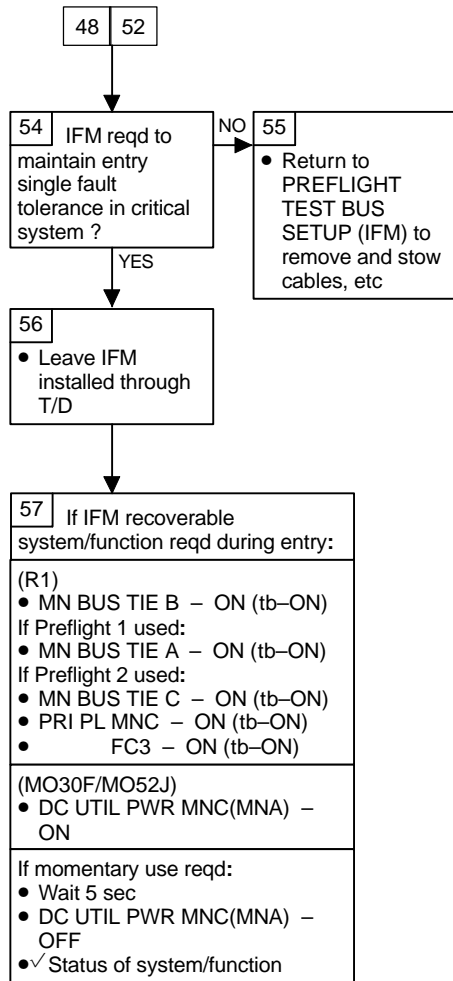


① Crewmember must be able to reach DC UTIL PWR switch while secured in seat

EPS SSR-202 (Cont)



EPS SSR-202 (Cont)



**TABLE 1
POSSIBLE PREFLIGHT TEST AND DATA BUSES COMMANDS**

NOTE

This table identifies the major Preflight Test Bus single-driver failures that impact critical orbiter systems. After the Preflight Test Bus has been powered, if a driver failure is suspected, the Preflight Test Bus must be unpowered before the affected system can be recovered by standard FDF procedures

Preflight Test Bus 1

FC1 PUMP POWER
AV BAY 3 FIRE SUPP INH
FC1 TO MNA ON/OFF
MNA BUS TIE ON/OFF
AC1 INV PWR ON/OFF
AC1 INV TO BUS ON/OFF
APU 1 FU VLV 1 OP (NC)
APU 1 FU VLV 2 CL (NO)
FCL PUMP 1A ON
SMOKE DETN H/W ALERT INH

Preflight Test Bus 2

FC2(3) PUMP POWER
AV BAY 1(2) FIRE SUPP INH
FC2(3) TO MNB(C) ON/OFF
MNB(C) BUS TIE ON/OFF
AC2(3) INV PWR ON/OFF
AC2(3) INV TO BUS ON/OFF
APU 2(3) FU VLV 1 OP (NC)
APU 2(3) FU VLV 2 CL (NO)
FCL PUMP 2A ON
CAB FAN A(B) ON
IMU FAN A(B,C) ON

GNC

GNC FRP

GNC FRP-1	IMU REFERENCE RECOVERY AFTER GNC GPCs IPL'D	8-4
FRP-2	RECOVERY	8-5
FRP-3	IMU RECOVERY WITH AT LEAST ONE IMU AS GOOD REFERENCE	8-6

GNC SSR

GNC SSR-1	ACTIVATE IMU(s)	8-8
SSR-2	MATRIX (STAR) ALIGN USING HUD STAR DATA	8-8
SSR-3	ALIGN USING STR TRKR STAR DATA	8-10
SSR-4	RESERVED	not used
SSR-5	RESERVED	not used
SSR-6	RESERVED	not used
SSR-7	RESERVED	not used
SSR-8	POSITION OMS THROUGH CG	8-11
SSR-9	RM DESELECTION OF FAILED OPEN THC CONTACT	8-12

The following Fault Msgs have no corresponding MAL procedures in this book:

- | | |
|-------------------|-----------------|
| AERO DRIVE | IMU BITE/T |
| DAP DNMODE | RM FAIL IMU |
| DISPLAY SW A(L,R) | RM DLMA IMU |
| L(R) OMS GMBL | RHC L(R,A) |
| NAV EDIT | SBTC/THC L(R,A) |
| SEL AUTO | |
| SENSE SW | |

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GNC FRP

GNC FRP-1

IMU REFERENCE RECOVERY AFTER GNC GPCs IPL'D

NOTE

Preferable to accomplish this procedure in GNC OPS 2;
however, procedure is also valid for MM301

- O6
1. Ensure pwr ON to both STAR TRKRs and doors open
 - ✓STAR TRKR PWR (two) – ON
 - ✓DR CNTL SYS (two) – OP
 2. Mass Memory Read of IMU calibration data (gyro and accel biases, scale factors, etc.) computed in preflight cal
 - GNC 21 IMU ALIGN
 - Select all IMUs for MASS MEMORY READ
 - IMU 1,2,3 – ITEM 10,11,12 EXEC (*)
 - MM READ – ITEM 19 EXEC (*)
 - ✓MM READ – ITEM 19 (no *)

NOTE

'IMU BITE/T' may be annunciated until READ/WRITE is performed to restore IMU gyro delta bias terms. Previous IMU Bias and Scale Factor READ/WRITEs of uplinks will have to be performed again

3. Reselect one IMU for attitude reference
 - GNC 21 IMU ALIGN
 - ✓IMU 1,2, or 3: DES – ITEM 7,8, or 9 (no *)
 - Deselect remaining two IMUs
 - ✓IMU DES – ITEM 7(8,9) (*)
4. Perform Matrix Align of IMUs 1,2,3 in MATRIX (STAR) ALIGN USING HUD STAR DATA GNC SSR-2
5. Reselect all deselected IMUs
 - GNC 21 IMU ALIGN
 - IMU DES – ITEM 7(8,9) EXEC (no *)

NOTE

Do not proceed until uplink of REFSMMATs verified with MCC

6. Reestablish skew between IMUs with IMU TO IMU ALIGN
Perform IMU ALIGNMENT IMU/IMU – IMUs 1,2,3 using best IMU as reference (ORB OPS, GNC)

NOTE

IPL causes loss of previous HUD CAL.
✓MCC for performing CAL

7. Go to IMU ALIGN – S TRK (ORB OPS, GNC)

GNC FRP

GNC FRP-2 IMU REFERENCE RECOVERY

NOTE

If GNC GPCs IPL'd, use GNC FRP-1 for Reference Recovery.
Preferable to accomplish this procedure in OPS 2; however, it
is also valid for MM301

- O6 1. Apply pwr to both STAR TRKRs
 ✓ STAR TRKR PWR -Y,-Z - ON
- O14:A,
O15:A,
O16:A 2. Ensure pwr applied to all IMUs
 IMU 1,2,3 - ON
- If not, ACTIVATE IMU(s). GNC SSR-1

3. Ensure all IMUs in OPERATE mode
 GNC 21 IMU ALIGN
✓ IMUs: OPER - ITEM 4,5,6 EXEC (*)

NOTE

If ITEMS 4,5, or 6 executed, wait for asterisks to appear (~90 sec)

4. Enable serial data link
 GNC I/O RESET
5. Select one IMU for attitude reference
 GNC 21 IMU ALIGN
✓ IMU 1,2, or 3: DES - ITEM 7,8, or 9 EXEC (no *)
 Deselect remaining two IMUs
✓ IMUs: DES - ITEM 7(8,9) EXEC (*)
6. Perform MATRIX ALIGN IMUs 1,2,3 USING HUD STAR DATA. GNC SSR-2
7. Reselect all deselected IMUs
 GNC 21 IMU ALIGN
✓ IMUs: DES - ITEM 7(8,9) EXEC (no *)
8. Reestablish skew between IMUs with IMU TO IMU ALIGN
 Perform IMU/IMU ALIGNMENT - IMUs 1,2,3 using best IMU as reference (ORB OPS, GNC)
9. Go to IMU ALIGN - S TRK (ORB OPS, GNC)

GNC FRP-3 IMU RECOVERY WITH AT LEAST ONE IMU AS GOOD REFERENCE

NOTE

Procedure must be accomplished in GNC OPS 2 or GNC OPS 3

1. Deselect IMUs being recovered

GNC 21 IMU ALIGN

✓IMUs: DES – ITEM 7(8,9) EXEC (*)
- O14:A, O15:A, O16:A 2. Ensure pwr applied to all IMUs
If not, ACTIVATE IMU(s) GNC SSR-1
3. Ensure all IMUs in OPERATE mode

GNC 21 IMU ALIGN

✓IMUs: OPER – ITEM 4,5,6 EXEC (*)

NOTE

If ITEMS 4,5, or 6 executed, wait for asterisks to appear (~90 sec)

4. Enable serial data link
GNC I/O RESET

NOTE

Possible erroneous IMU BITE/T 1(2,3) msg
after GNC I/O RESET. Ignore msg unless
MCC advises otherwise, or if no comm

5. Reestablish skew between IMUs. Choose IMU with good reference and align other two IMUs with IMU to IMU ALIGN. Use good IMU as reference for align – IMU to IMU ALIGNMENT (ORB OPS, GNC)

NOTE

Both nonreference IMUs should be aligned to preclude possibility of IMU RM FAIL (RM threshold reset following any align)

6. Reselect IMUs previously deselected
If GNC OPS 3:

GNC 50 HORIZ SIT

NAV DELTA zero update

GNC 21 IMU ALIGN

DES – ITEM 7(8,9) EXEC (no *)

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GNC SSR-1 ACTIVATE IMU(s)

- O6 ✓ MDM FF 1(2,3) – ON
 O14:A, IMU 1(2,3) – ON
 O15:A,
 O16:A
 L1 ✓ IMU FAN A(B,C) – ON (if avail)

GNC 21 IMU ALIGN

NOTE

IMU 1(2,3) TEMP – LO indication may be displayed. Proceed

- CRT ✓ IMU 1(2,3): DES – ITEM 7(8,9) EXEC (*)
 OPER – ITEM 4(5,6) EXEC (*)

NOTE

If ITEMS 4,5, or 6 executed, wait for asterisks to appear (~90 sec)

GNC I/O RESET

GNC SSR-2 MATRIX (STAR) ALIGN USING HUD STAR DATA

CAUTION

If RMS/payload unberthed, either enable Aft PRCS only or berth payload before proceeding

NOTE

In OPS 201, if Verniers not available, use FREE mode

- F3 Remove L(R) HUD Cover
 F6U(F8U) L(R) HUD PWR – ON
 MODE – TEST
 Wait ~15 sec for final symbology of test mode
 ✓ Final test mode display symbology
 (ORB OPS, HUD CALIBRATION, GNC 201)
 L(R) HUD BRT – MAN NIGHT
 MAN BRT – as reqd

- O14:E, ✓ cb DDU L(R) (two) – cl
 O15:E,
 O16:E
 F7(F8)

FLT CNTLR PWR – ON

If OPS 2:

Change DAP A,B to A1,B5
 DAP: INRTL/VERN(FREE/PRI)

If OPS 3:

GNC 23 RCS

- CRT RCS FWD – ITEM 1 EXEC (*)
 MANF VLV OVRD 1 – ITEM 40 EXEC (CL)
 2 – ITEM 41 EXEC (CL)
 3 – ITEM 42 EXEC (CL)
 4 – ITEM 43 EXEC (CL)
 5 – ITEM 44 EXEC (CL)

NOTE

Position ADI ATT sw on pnl F6(F8) to REF and depress ATT REF pb prior to enabling COAS SIGHT mode

GNC 22 S TRK/COAS CNTL

GNC SSR-2 (Cont)

✓S TABLE CLR – ITEM 20 EXEC
 COAS REQD ID – ITEM 21 +__ __ __ EXEC

 POS +X – ITEM 26 EXEC
 SIGHT mode – ITEM 22 EXEC (*)
 DAP: as reqd for precise manual mnvr
 Mnvr to center star in HUD boresight ('P' in 'COMPLETE'):

F6(F8) ATT REF pb – push
 (Repeat mark if desired)
 CRT COAS ACCEPT – ITEM 23 EXEC
 ✓S TABLE TRK ID 2: (reqd ID)

CAUTION

Do not deselect COAS SIGHT mode between sightings

DAP: as reqd for large manual mnvr
 Mnvr to second HUD star att

NOTE

Second star should be > 35° and < 145° from the first

CRT COAS REQD ID – ITEM 21 +__ __ __ EXEC
 DAP: as reqd for precise manual mnvr
 Mnvr to center star in HUD boresight:
 F6(F8) ATT REF pb – push
 (Repeat mark if desired)
 CRT COAS ACCEPT – ITEM 23 EXEC
 ✓S TABLE TRK ID 1: (reqd ID)
 ANG DIF 1 ≥ 35 deg, ≤ 145 deg
 ERR 1 ≤ .2
 ✓SEL – ITEM 17,18 (*)
 COAS: DES – ITEM 25 EXEC (*)
 F7(F8) FLT CNTLR PWR – OFF
 O14:E, cb DDU L(R) (two) – as reqd
 O15:E,
 O16:E

GNC 21 IMU ALIGN

✓IMU 1(2,3) STAT – (blank)
 ALIGN IMU 1(2,3) – ITEM 10(11,12) EXEC (*)
 If Matrix Align
 ALIGN MATRIX – ITEM 15 EXEC (*)
 DAP: INRTL
 DAP ROT: PULSE/PULSE/PULSE
 EXEC – ITEM 16 EXEC (*), Rcd MET ___ : ___ : ___
 ✓EXEC – ITEM 16 (no *)
 DAP: as reqd
 If Star Align
 STAR ALIGN – ITEM 13 EXEC (*)
 ✓ANG 1,2,3 ΔX,ΔY,ΔZ: <= .80
 Rcd ANG 1 2 3
 ΔX () ___ . ___ () ___ . ___ () ___ . ___
 ΔY () ___ . ___ () ___ . ___ () ___ . ___
 ΔZ () ___ . ___ () ___ . ___ () ___ . ___

CAUTION

If ANG ΔX,ΔY,ΔZ > .80 for two or more IMUs:
 DO NOT TORQUE PLATFORMS
 EXCEPT UNDER MCC INSTRUCTIONS

CRT EXEC – ITEM 16 EXEC (*), Rcd MET ___ : ___ : ___
 ✓EXEC – ITEM 16 (no *)

GNC SSR-2 (Cont)

F6U(F8U) HUD MODE – NORM
F3 PWR – OFF
Install L(R) HUD Cover
If OPS 3:

GNC 23 RCS

RCS FWD – ITEM 1 EXEC (*)
MANF VLVS OVRD 1 – ITEM 40 EXEC (OP)
2 – ITEM 41 EXEC (OP)
3 – ITEM 42 EXEC (OP)
4 – ITEM 43 EXEC (OP)
5 – ITEM 44 EXEC (OP)

DAP: as reqd

GNC SSR-3 MATRIX ALIGN USING STR TRKR STAR DATA

NOTE

Procedure assumes S TRKs on at least 15 min and vehicle
at S TRK star attitude. DAP as reqd for star trk ops

GNC 22 S TRK/COAS CNTL

- ✓ S TRK –Y,–Z REQD ID, ITEM 11,12 0
STATUS – (no BITE)
SHUTTER – OP
- ✓ S TABLE CLR – ITEM 20 EXEC (*)
STAR TRK –Y,–Z – ITEM 3,4 EXEC (*)
- ✓ S TABLE TRK ID 1,2 (reqd ID)
ANG ERR: < .09, Rcd ___ . ___ ___
SEL – ITEM 17,18 (*)

GNC 21 IMU ALIGN

- ✓ IMU 1(2,3) STAT – (blank)
MATRIX – ITEM 15 EXEC (*)
ALIGN IMU 1(2,3) – ITEM 10(11,12) EXEC (*)
EXEC – ITEM 16 EXEC (*), Rcd MET ___ : ___ : ___
- ✓ EXEC – ITEM 16 (no *)

GNC SSR-8

POSITION OMS THROUGH CG

NOTE

This procedure sets up a dummy single engine L(R) OMS burn to position L(R) OMS Thrust Vector through CG. Actual burn will not be executed. When procedure completed, L(R) OMS will be protected from loss due to PRI(SEC) GMBL pwr or data path failures

GNC, OPS 202(302) PRO

GNC XXXXX MNVR YYYYY

If L OMS to be positioned:

| L OMS PRI(SEC) SEL - ITEM 28(30) EXEC

If R OMS to be positioned:

R OMS PRI(SEC) - ITEM 29(31) EXEC

C3
CRT

✓ OMS ENG (two) - OFF
SEL OMS L(R) - ITEM 2(3) EXEC

TRIM LOAD P ITEM 6 ±X.X EXEC
LY ITEM 7 +X.X EXEC
RY ITEM 8 -X.X EXEC

NOTE

Actual values dependent on CG.

If reqd, generic CG trims are:

P = +0.0

LY = +5.2

RY = -5.2

TGT PEG 7

ITEM 19 +1.0 +0 +0 EXEC

TIG - ITEM 10 + (current MET + 2 min) EXEC

LOAD - ITEM 22 EXEC

NOTE

Do NOT MNVR to burn attitude; ignore flashing EXEC

After T-15 sec:

✓ GMBL position: P = ±X.X

LY = +X.X

RY = -X.X

L(R) GMBL OFF - ITEM 32(33) EXEC

If in OPS 202:

| GNC, OPS 201 PRO

If in OPS 3, and at burn attitude:

Reload Burn Pad

NOTE

Displayed GMBL position is not updated when GMBL OFF.

If in OPS 2, on transition to OPS 3 (prior to deorbit) P/Y positions will read 1.0 deg and GMBL fail will be annunciated

GNC SSR-9

RM DESELECTION OF FAILED OPEN THC CONTACT

NOTE

This procedure will allow RM to deselection failed open THC contact in OPS 2. Use this SSR only under direction from MCC. Procedure will cause primary RCS jet firings which must be coordinated with MCC. Assumes two good channels exist in axis/direction with failed open contact

1. CONFIG DAP FOR MINIMUM TRANS PULSE
GNC 20 DAP CONFIG
C3 DAP A(B) TRANS PLS - ITEM 17(37) +0.0 1 EXEC
DAP TRANS: PULSE/PULSE/PULSE/LOW Z

2. RESELECT FAILED OPEN CONTACT
GNC 25 RM ORBIT
SEL FAILED CONTACT - ITEM X EXEC

Verify no '↓'s on affected row
✓ SW RM INH - ITEM 16 (no *)

3. DEFLECT THC
O14:E, ✓ cb DDU L(A) (two) - cl
O15:E,
O16:E
F7(A6U) L(A) FLT CNTLR PWR - ON
L(A) THC - deflect in aff axis for 1 sec

NOTE

This step will cause PRCS jets to fire for 80-320 msec.
Expect SBTC/THC Fault Summary msg

Verify '↓' for failed contact

4. RECONFIG DAP
GNC 20 DAP CONFIG
F7(A6U) Reload DAP A(B) as reqd
O14:E, DAP TRANS: as reqd
O15:E, L(A) FLT CNTLR PWR - OFF
O16:E, cb DDU L(A) (two) - as reqd

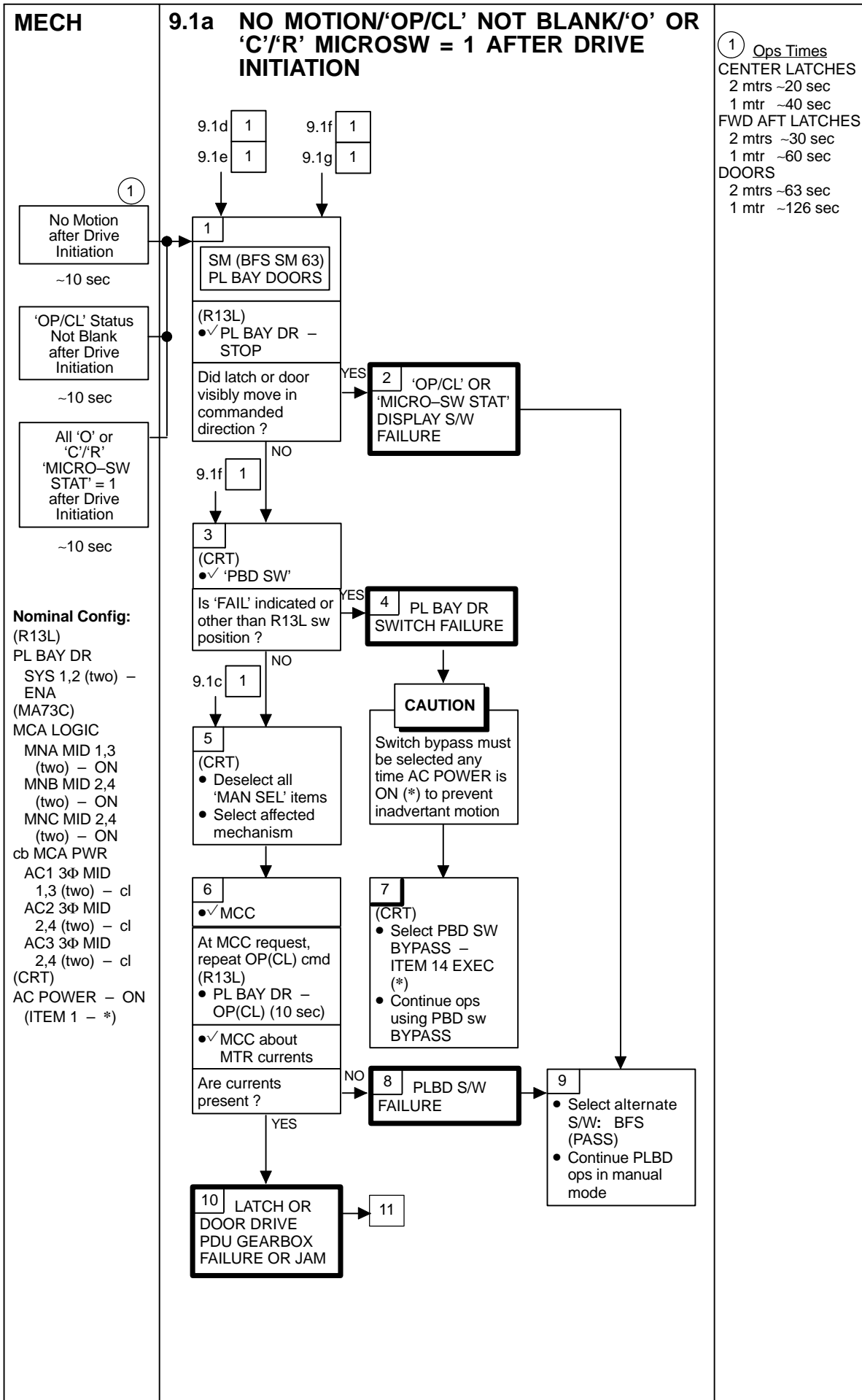
MECH

	RADIATOR POWER CONFIGURATION	9-2
	PLBD CLOSING TABLE	9-3
<u>9.1</u>	<u>PLB DOORS</u>	
9.1a	NO MOTION/'OP/CL' NOT BLANK/'O' OR 'C'/'R' MICROSW = 1 AFTER DRIVE INITIATION	9-4
9.1b	'?' DISPLAYED IN 'OP/CL' COLUMN	9-6
9.1c	PBD SEQ FAIL	9-7
9.1d	LATCH GANG NOT 'OP' IN SINGLE MTR TIME	9-8
9.1e	'CL' IN SINGLE MTR TIME	9-10
9.1f	DOOR NOT 'OP' IN SINGLE MTR TIME	9-12
9.1g	'CL' IN SINGLE MTR TIME	9-15
9.1h	PBD CONFIG	9-17
<u>9.2</u>	<u>RADIATOR</u>	
9.2a	RAD LAT CNTL PORT(STBD) tb NOT LAT IN 60 SEC OR REL IN 30 SEC	9-18
9.2b	RAD CNTL tb NOT DPY OR STO WITHIN 50 SEC AND NO MOTION	9-20
<u>9.3</u>	<u>KU ANT</u>	
9.3a	KU ANT tb NOT DPY IN 46 SEC	9-22
9.3b	NOT STO IN 46 SEC	9-23
9.3c	GIMBAL ANGLES INCORRECT AFTER 50 SEC	9-24
<u>9.4</u>	<u>MEC ROEU</u>	
9.4a	ROEU DEMATE - tb NOT REL, MICROSW IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME	9-26
9.4b	ROEU MATE - tb NOT LAT, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME	9-28
9.4c	ROEU RELEASE - tb NOT REL, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME	9-30
9.4d	ROEU LATCH - tb NOT LAT, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME	9-32
9.4e	ROEU RELAX - tb NOT NOMINAL, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME	9-34
9.4f	ROEU ELEC CONT - tb NOT NOMINAL OR IND NOT NOMINAL	9-36
<u>MECH SSR</u>		
MECH	SSR-1 PORT(STBD) RAD OPS	9-38
	SSR-2 CONTINGENCY PLBD CLOSURE	9-39
	SSR-3 SIMULTANEOUS PLBD CL	9-46
	SSR-4 PLBD CHECKOUT AFTER MDM CHANGEOUT	9-51
	SSR-5 CONTINGENCY KU-BD ANT DIRECT STOW (CIL)	9-52
	SSR-6 PLBD CL MICROSW FAILURE WORKAROUND	9-53
	SSR-7 KU-BAND ANTENNA DPY/STO MICROSW FAILURE	9-55
	SSR-8 RAD DPY/STO MICROSW FAILURE WORKAROUND	9-57

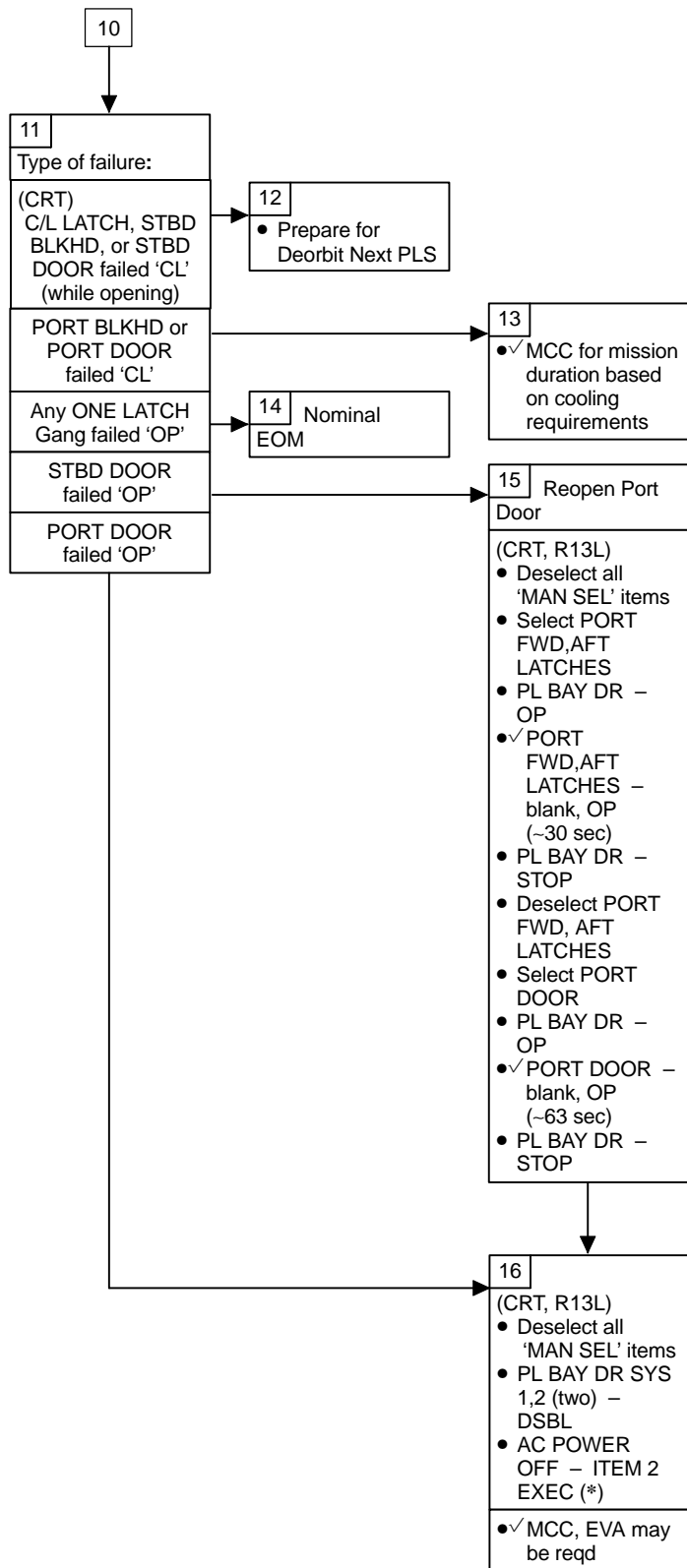
RADIATOR POWER CONFIGURATION

ACTUATOR	MTR	M-MCA	AC PWR			MCA LOGIC		LAT CNTL		RAD CNTL	
			BUS	MECH PWR 1	MECH PWR 2	DC BUS	CNTL BUS	SYS A	SYS B	SYS A	SYS B
STBD 1-6	1	3	1		AB1,CA1 AND AB2,CA2	A (MPC1)	AB3	AB1			
	2	2	2	BC1 AND BC2		B (MPC2)	BC3		BC1		
STBD 7-12	1	3	1		AB1,CA1 AND AB2,CA2	A (MPC1)	AB3	AB2			
	2	2	3	AB1,CA1 AND AB2,CA2		C (MPC3)	CA3		CA1		
STBD DRIVE	1	3	1		AB1,CA1 AND AB2,CA2	A (MPC1)	AB3				BC1 AND BC2
	2	2	3	AB1,CA1 AND AB2,CA2		C (MPC3)	CA3			AB1 AND AB2	
PORT 1-6	1	1	1	AB1,CA1 AND AB2,CA2		A (MPC1)	AB3	AB2			
	2	4	2		BC1 AND BC2	B (MPC2)	BC3		BC2		
PORT 7-12	1	1	1	AB1,CA1 AND AB2,CA2		A (MPC1)	AB3	AB1			
	2	4	3		AB1,CA1 AND AB2,CA2	C (MPC3)	CA3		CA2		
PORT DRIVE	1	1	1	AB1,CA1 AND AB2,CA2		A (MPC1)	AB3			AB1 AND AB2	
	2	4	3		AB1,CA1 AND AB2,CA2	C (MPC3)	CA3				CA1 AND CA2

FUNCTION	PLBD CONTROL								PLBD DISPLAY PL MDM								
	Ref: MA73C: C&D for MCA (cb)																
	MTR 1				MTR 2				C	C	O	O	C	R	R	R	O
	AC/MCA	CNTL	MDM	SYS	AC/MCA	CNTL	MDM	SYS	A	B	A	B	A	B	C		
LATCH																	
5-8	1/MID3	AB3/AB2	PL1	2	3/MID2	CA3/CA1	PL2	1	1	2	1	2					
9-12	1/MID1	AB3/AB1	PL1	1	3/MID4	CA3/CA2	PL2	2	1	2	1	2					
1-4	1/MID3	AB3/AB2	PL1	2	3/MID2	CA3/CA1	PL2	1	1	2	1	2					
13-16	3/MID4	CA3/CA2	PL2	2	2/MID2	BC3/BC1	PL1	1	2	1	2	1					
S FWD	1/MID1	AB3/AB1	PL1	1	2/MID4	BC3/BC2	PL2	2	1	2	1	2					
S AFT	3/MID4	CA3/CA2	PL2	2	2/MID2	BC3/BC1	PL1	1	2	1	2	1					
S DOOR	1/MID1	AB3/AB1	PL1	1	2/MID4	BC3/BC2	PL2	2					1	1	2	2	1
													2	1	2	2	2
P FWD	1/MID1	AB3/AB1	PL1	1	2/MID4	BC3/BC2	PL2	2	1	2	1	2					
P AFT	1/MID3	AB3/AB2	PL1	2	3/MID2	CA3/CA1	PL2	1	1	2	1	2					
P DOOR	3/MID4	CA3/CA2	PL2	2	2/MID2	BC3/BC1	PL1	1					2	1	1	2	2
													1	1	1	2	1



MECH 9.1a (Cont)



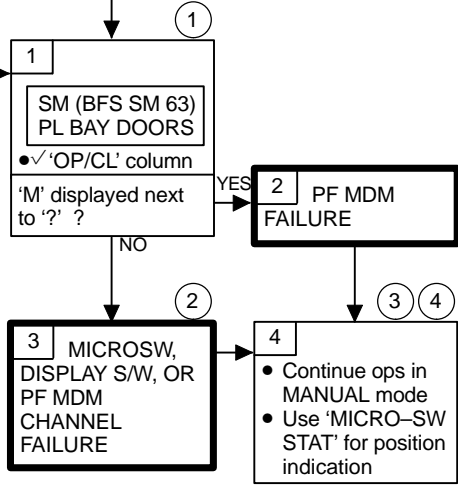
MECH

9.1b '?' DISPLAYED IN 'OP/CL' COLUMN

9.1c	2
9.1d	1
9.1e	1
9.1f	1
9.1g	1
9.1h	5

'?' Displayed in 'OP/CL' Column

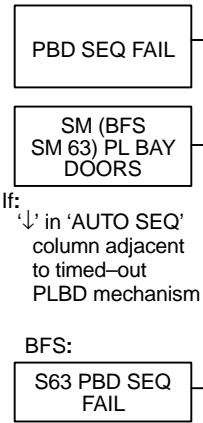
Nominal Config:
 (R13L)
 PL BAY DR
 SYS 1,2 (two) – ENA
 (MA73C)
 MCA LOGIC
 MNA MID 1,3 (two) – ON
 MNB MID 2,4 (two) – ON
 MNC MID 2,4 (two) – ON
 cb MCA PWR
 AC1 3Φ MID 1,3 (two) – cl
 AC2 3Φ MID 2,4 (two) – cl
 AC3 3Φ MID 2,4 (two) – cl
 (CRT)
 AC POWER – ON
 (ITEM 1 – *)



- ① '?' is displayed for the following:
 LATCH:
 At least one '1' displayed for both 'O' and 'C' microsws
 DOOR:
 '1' displayed in:
 two 'C' and two 'O' microsws or
 two 'C' and not (two of three) FWD and AFT 'R': microsws or
 two 'O' and (two of three) FWD or AFT 'R' microsws
- ② Failed-on door CL microsw can be bypassed to regain mtr function (refer to MECH SSR-6)
- ③ In most cases, AUTO mode will not work with '?' indicated
- ④ One microsw attained in commanded direction within single mtr time is sufficient verification of position if visual cues not available

MECH

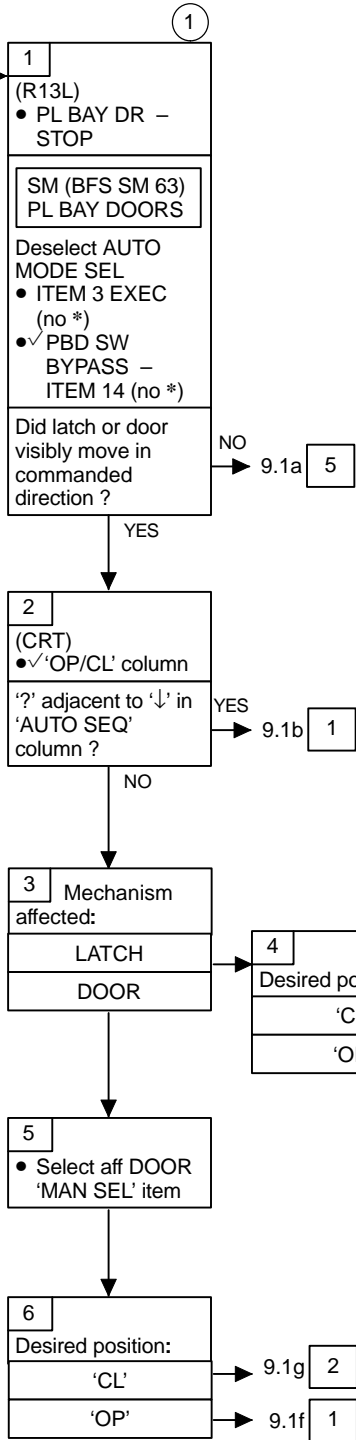
9.1c PBD SEQ FAIL



If: '↓' in 'AUTO SEQ' column adjacent to timed-out PLBD mechanism

BFS:

- Nominal Config:**
- (R13L)
 - PL BAY DR
 - SYS 1,2 (two) – ENA
 - (MA73C)
 - MCA LOGIC
 - MNA MID 1,3 (two) – ON
 - MNB MID 2,4 (two) – ON
 - MNC MID 2,4 (two) – ON
 - cb MCA PWR
 - AC1 3Φ MID 1,3 (two) – cl
 - AC2 3Φ MID 2,4 (two) – cl
 - AC3 3Φ MID 2,4 (two) – cl
 - (CRT)
 - AC POWER – ON (ITEM 1 – *)
 - AUTO MODE – SEL (ITEM 3 – *)



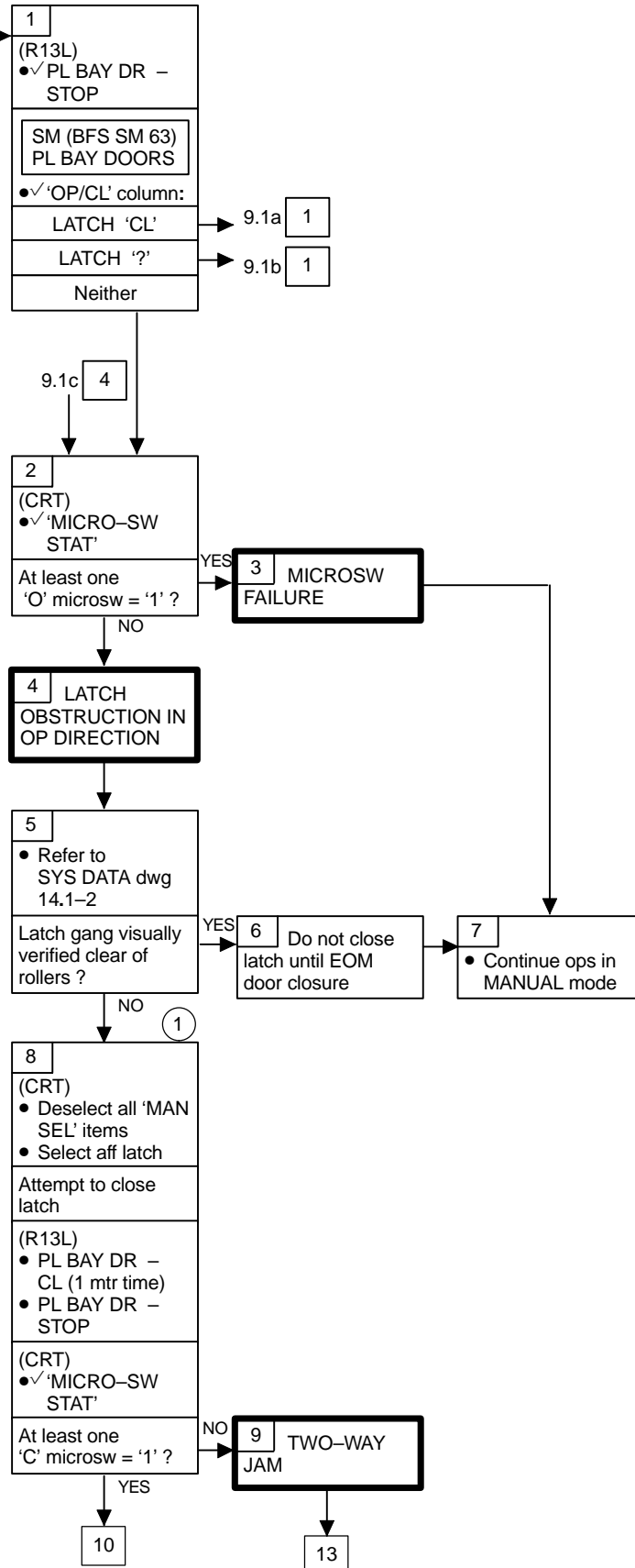
① Although PBD SEQ FAIL will terminate AUTO MODE, ITEM 3 (AUTO MODE SEL) remains selected (*). To reselect AUTO MODE, ITEM 3 must be turned OFF, then ON

MECH

9.1d LATCH GANG NOT 'OP' IN SINGLE MTR TIME

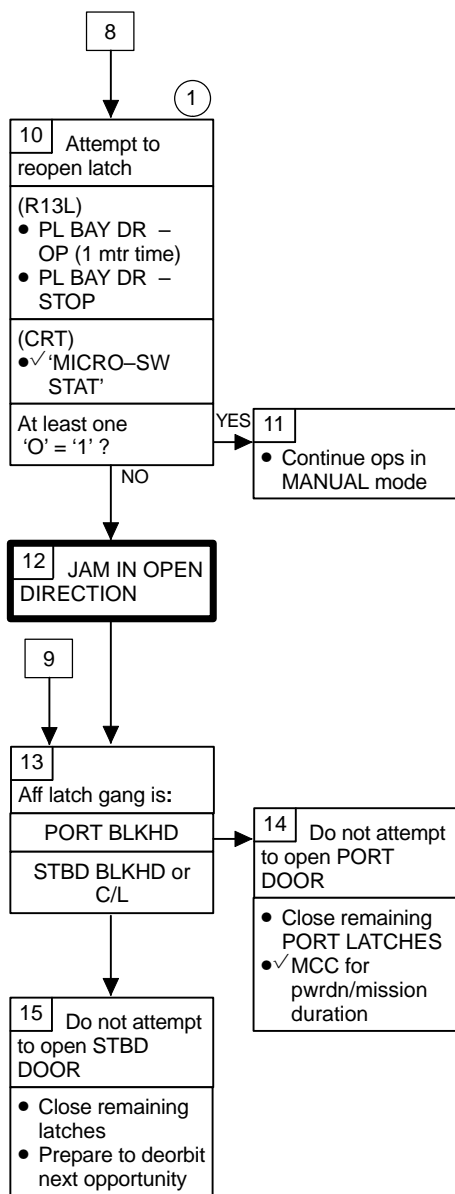
① Latch Gang Does Not Indicate 'OP' in Single Mtr Drive Time

Nominal Config:
 (R13L)
 PL BAY DR
 SYS 1,2 (two) - ENA
 (MA73C)
 MCA LOGIC
 MNA MID 1,3 (two) - ON
 MNB MID 2,4 (two) - ON
 MNC MID 2,4 (two) - ON
 cb MCA PWR
 AC1 3Φ MID 1,3 (two) - cl
 AC2 3Φ MID 2,4 (two) - cl
 AC3 3Φ MID 2,4 (two) - cl
 (CRT)
 AC POWER - ON (ITEM 1 - *)



① Ops Times
 CENTER LATCHES
 2 mtrs -20 sec
 1 mtr -40 sec
 FWD,AFT LATCHES
 2 mtrs -30 sec
 1 mtr -60 sec
 DOORS
 2 mtrs -63 sec
 1 mtr -126 sec

MECH 9.1d (Cont)



- ① Ops Times
 CENTER LATCHES
 2 mtrs ~20 sec
 1 mtr ~40 sec
 FWD,AFT LATCHES
 2 mtrs ~30 sec
 1 mtr ~60 sec
 DOORS
 2 mtrs ~63 sec
 1 mtr ~126 sec

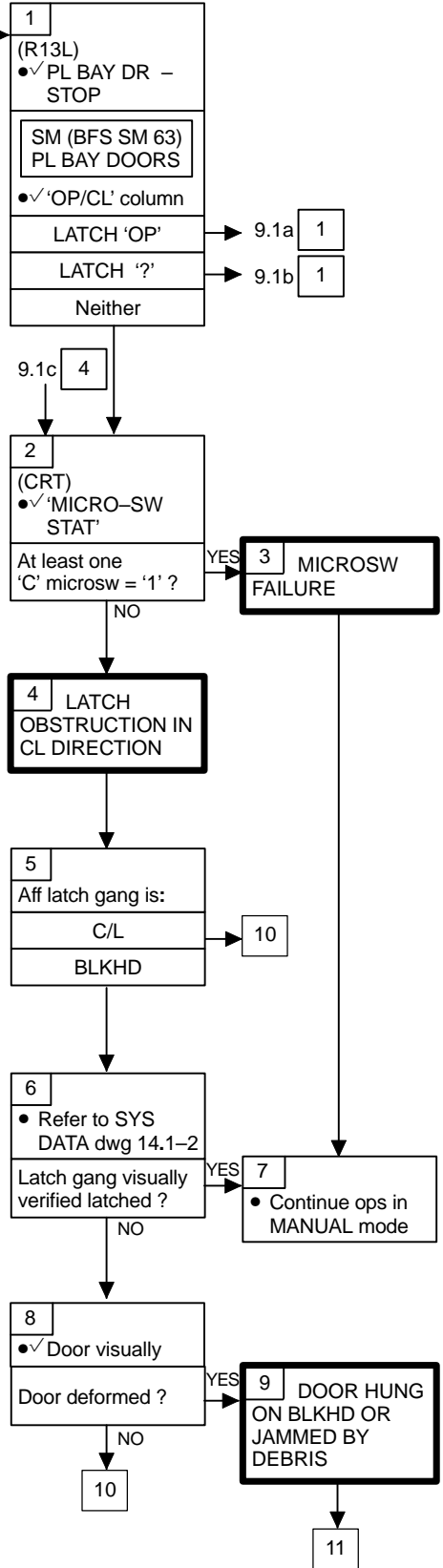
MECH

9.1e LATCH GANG NOT 'CL' IN SINGLE MTR TIME

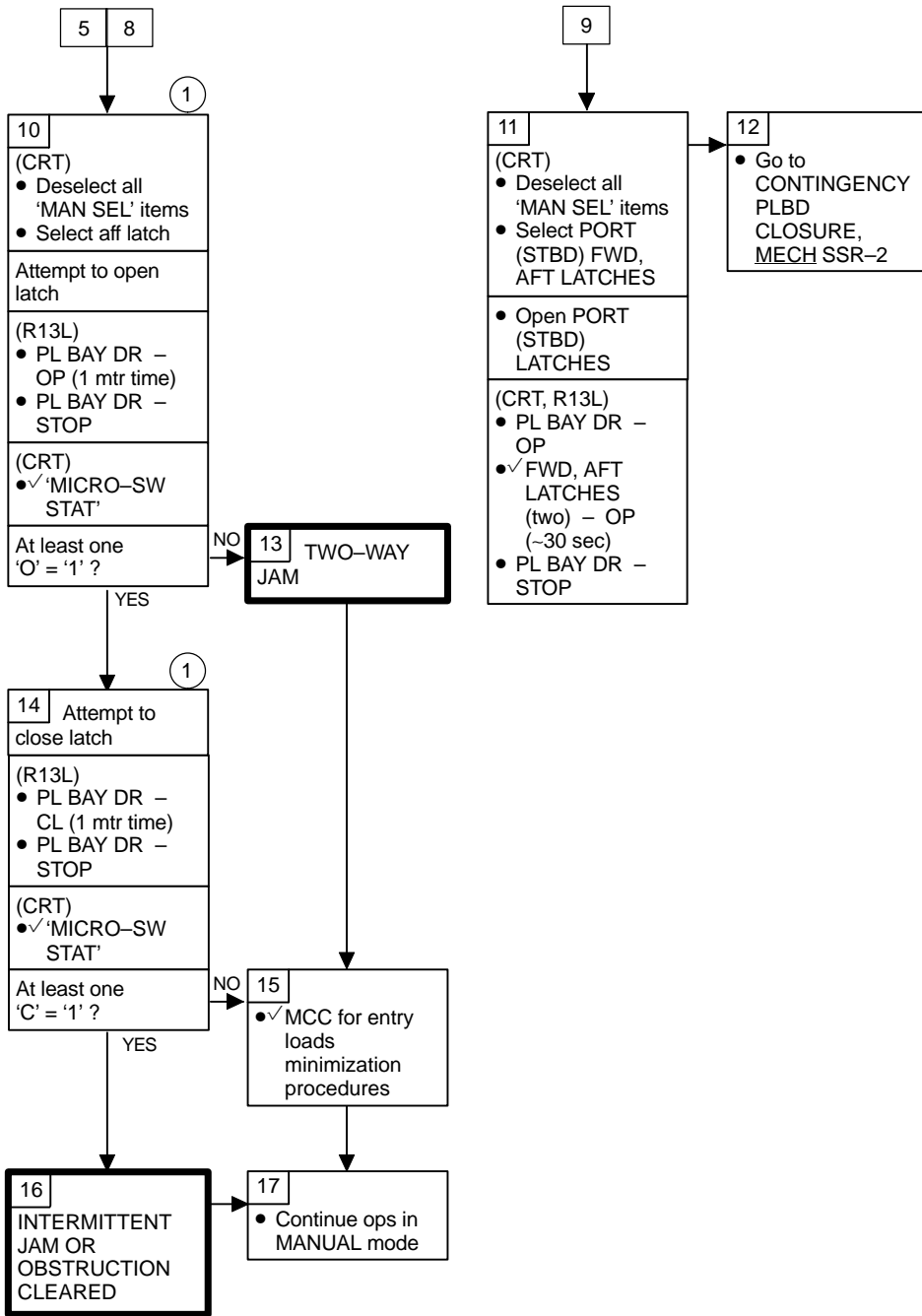
- ① Ops Times
 CENTER LATCHES
 2 mtrs ~20 sec
 1 mtr ~40 sec
 FWD,AFT LATCHES
 2 mtrs ~30 sec
 1 mtr ~60 sec
 DOOR
 2 mtrs ~63 sec
 1 mtr ~126 sec

①
 Latch Gang Does Not Indicate 'CL' in Single Mtr Drive Time

Nominal Config:
 (R13L)
 PL BAY DR
 SYS 1,2 (two) - ENA
 (MA73C)
 MCA LOGIC
 MNA MID 1,3 (two) - ON
 MNB MID 2,4 (two) - ON
 MNC MID 2,4 (two) - ON
 cb MCA PWR
 AC1 3Φ MID 1,3 (two) - cl
 AC2 3Φ MID 2,4 (two) - cl
 AC3 3Φ MID 2,4 (two) - cl
 (CRT)
 AC POWER - ON
 (ITEM 1 - *)



MECH 9.1e (Cont)



- ① Ops Times
 CENTER LATCHES
 2 mtrs ~20 sec
 1 mtr ~40 sec
 FWD, AFT LATCHES
 2 mtrs ~30 sec
 1 mtr ~60 sec
 DOOR
 2 mtrs ~63 sec
 1 mtr ~126 sec

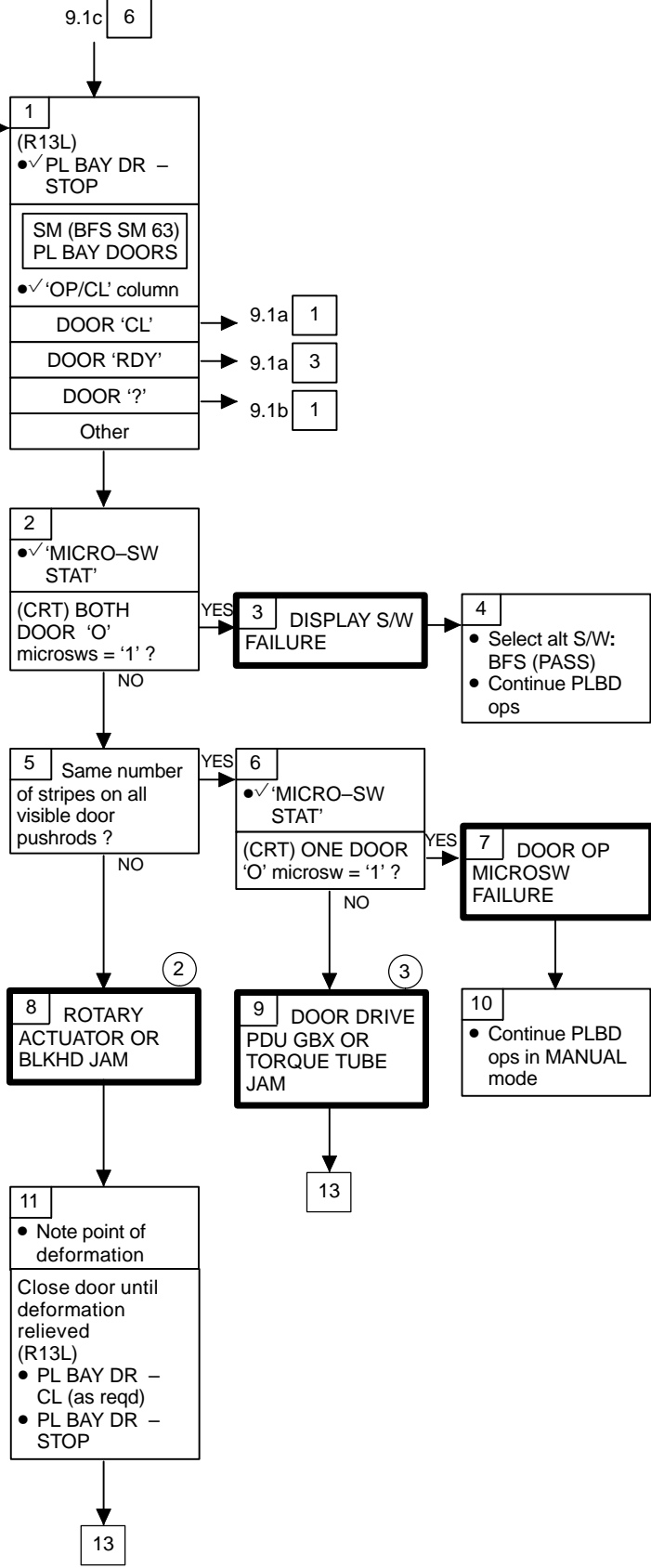
MECH

9.1f DOOR NOT 'OP' IN SINGLE MTR TIME

① Door Does Not Indicate 'OP' in Single Mtr Time

Nominal Config:

- (R13L)
- PL BAY DR
- SYS 1,2 (two) – ENA
- (MA73C)
- MCA LOGIC
- MNA MID 1,3 (two) – ON
- MNB MID 2,4 (two) – ON
- MNC MID 2,4 (two) – ON
- cb MCA PWR
- AC1 3Φ MID 1,3 (two) – cl
- AC2 3Φ MID 2,4 (two) – cl
- AC3 3Φ MID 2,4 (two) – cl
- (CRT)
- AC POWER – ON (ITEM 1 – *)

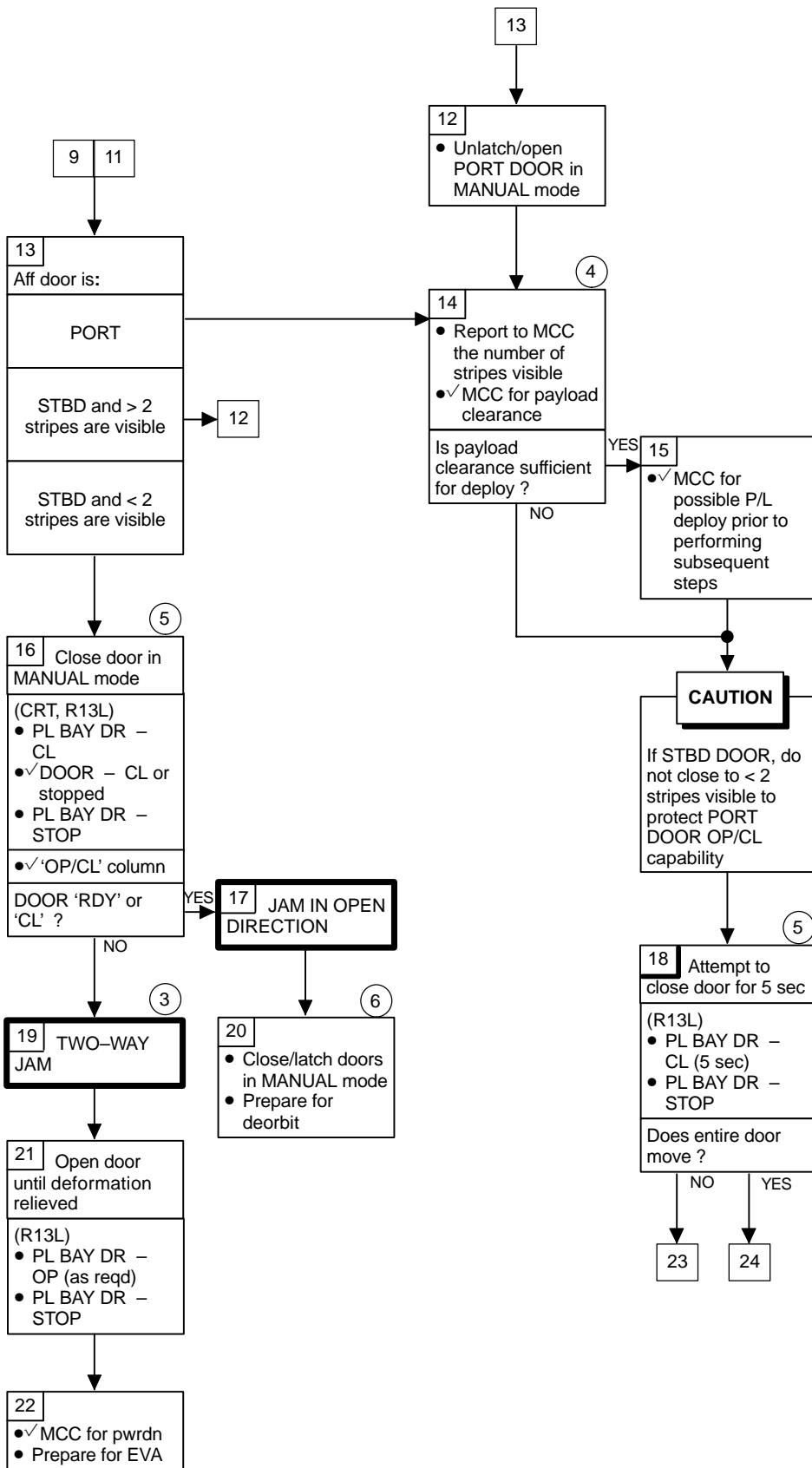


- ① Ops Times
 CENTER LATCHES
 2 mtrs ~20 sec
 1 mtr ~40 sec
 FWD,AFT LATCHES
 2 mtrs ~30 sec
 1 mtr ~60 sec
 DOORS
 2 mtrs ~63 sec
 1 mtr ~126 sec

② EVA reqd to cut PLB door drive linkage for at least one rotary actuator (i.e., one nearest point of deformation)

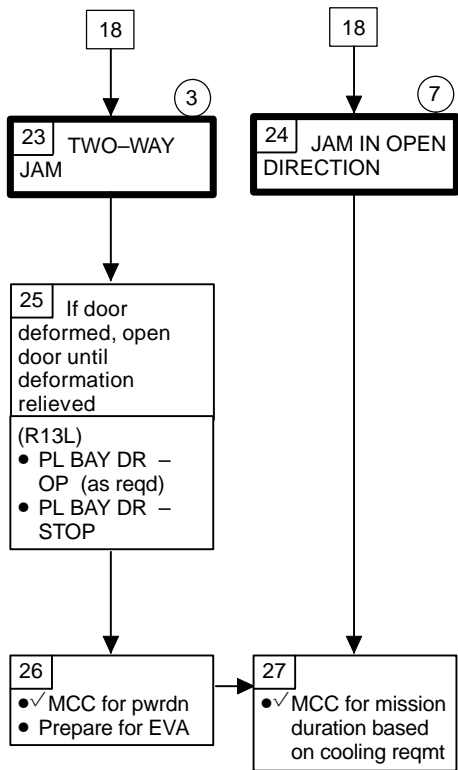
③ EVA reqd to disconnect PDU

MECH 9.1f (Cont)



- ③ EVA reqd to disconnect PDU
- ④ Door may interfere with P/L deploy
- ⑤ Cmd DOOR CL to see if EVA necessary to CL
- ⑥ If door reopen were attempted, two-way jam could occur causing day-1 EVA

MECH 9.1f (Cont)



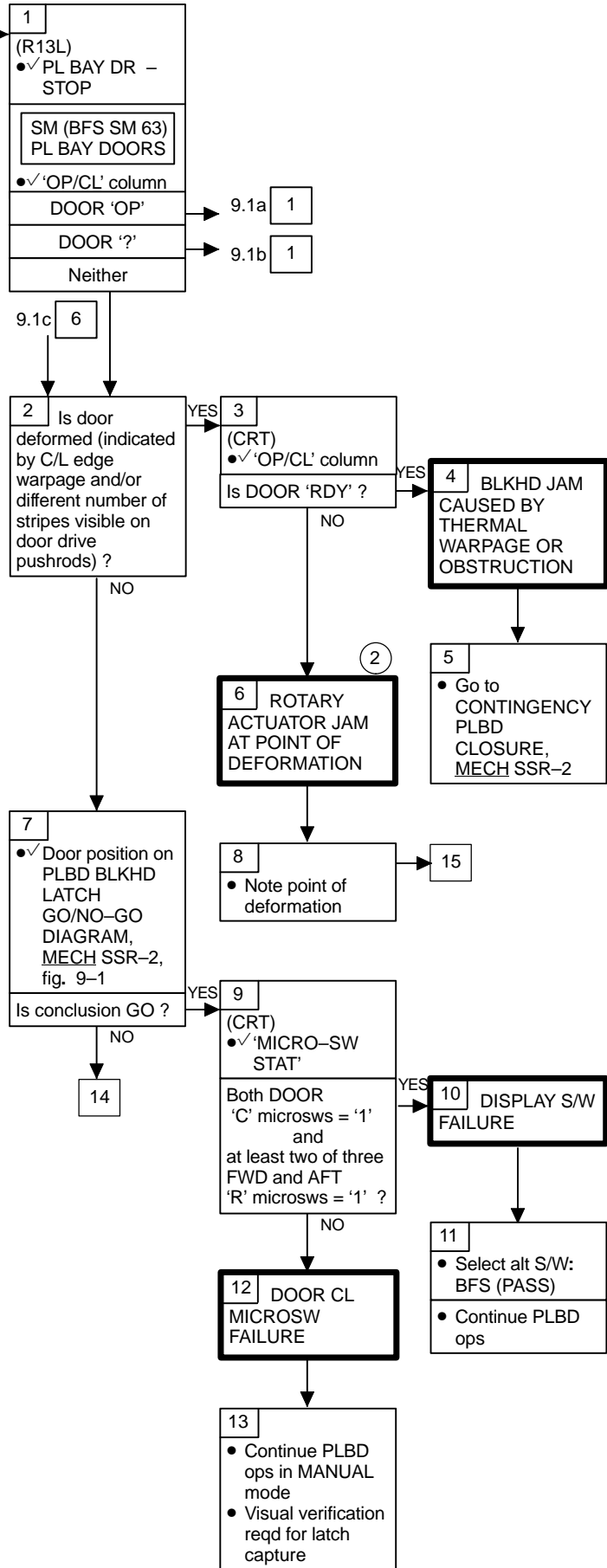
- ③ EVA reqd to disconnect PDU
- ⑦ No EVA reqd to close door

MECH

9.1g DOOR NOT 'CL' IN SINGLE MTR TIME

①
Door Does Not indicate 'CL' in Single Mtr Drive Time

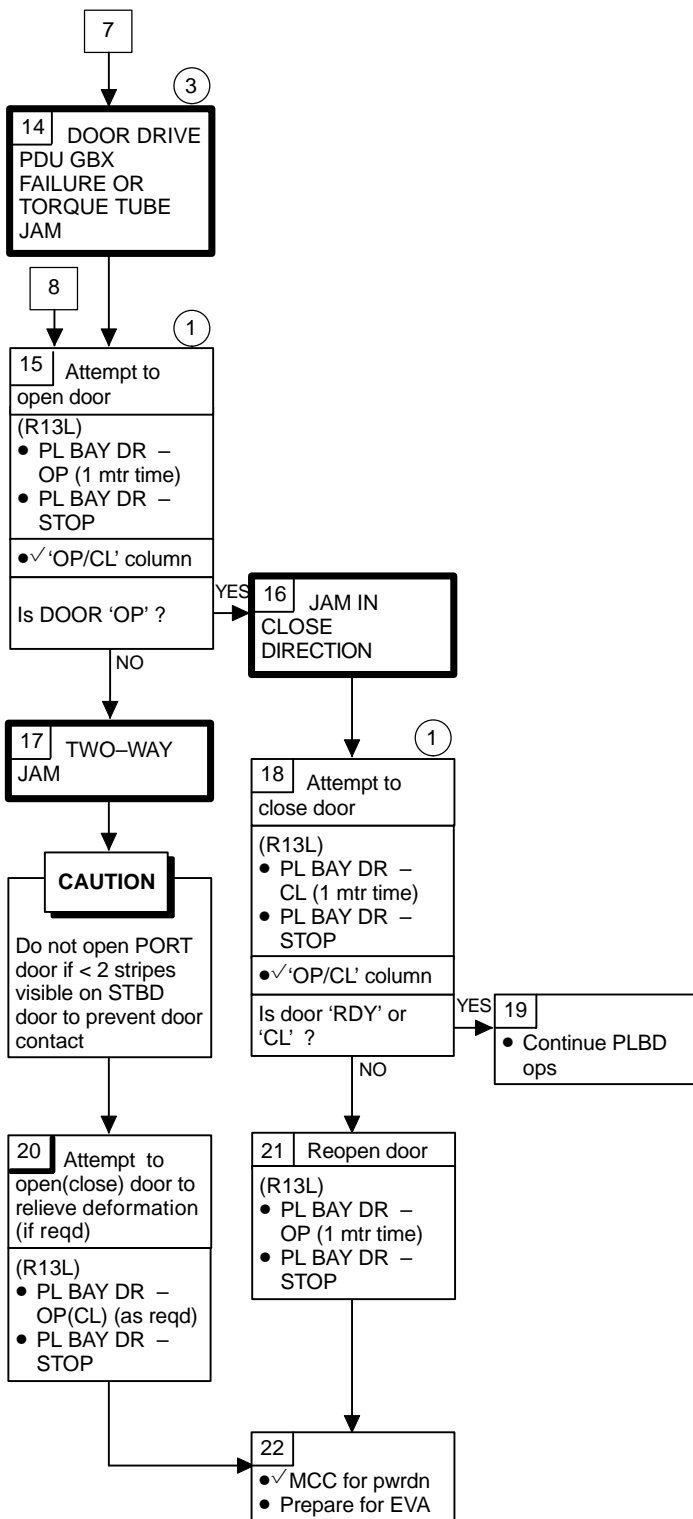
Nominal Config:
(R13L)
PL BAY DR
SYS 1,2 (two) – ENA
(MA73C)
MCA LOGIC
MNA MID 1,3 (two) – ON
MNB MID 2,4 (two) – ON
MNC MID 2,4 (two) – ON
cb MCA PWR
AC1 3Φ MID 1,3 (two) – cl
AC2 3Φ MID 2,4 (two) – cl
AC3 3Φ MID 2,4 (two) – cl
(CRT)
AC POWER – ON
(ITEM 1 – *)



① **Ops Times**
CENTER LATCHES
2 mtrs –20 sec
1 mtr –40 sec
FWD,AFT LATCHES
2 mtrs –30 sec
1 mtr –60 sec
DOORS
2 mtrs –63 sec
1 mtr –126 sec

② EVA reqd to cut PLB door drive linkage for at least one rotary actuator (i.e., one nearest point of deformation)

MECH 9.1g (Cont)



- ① Ops Times
 CENTER LATCHES
 2 mtrs ~20 sec
 1 mtr ~40 sec
 FWD,AFT
 LATCHES
 2 mtrs ~30 sec
 1 mtr ~60 sec
 DOORS
 2 mtrs ~63 sec
 1 mtr ~126 sec
- ③ EVA reqd to
 disconnect PDU

MECH

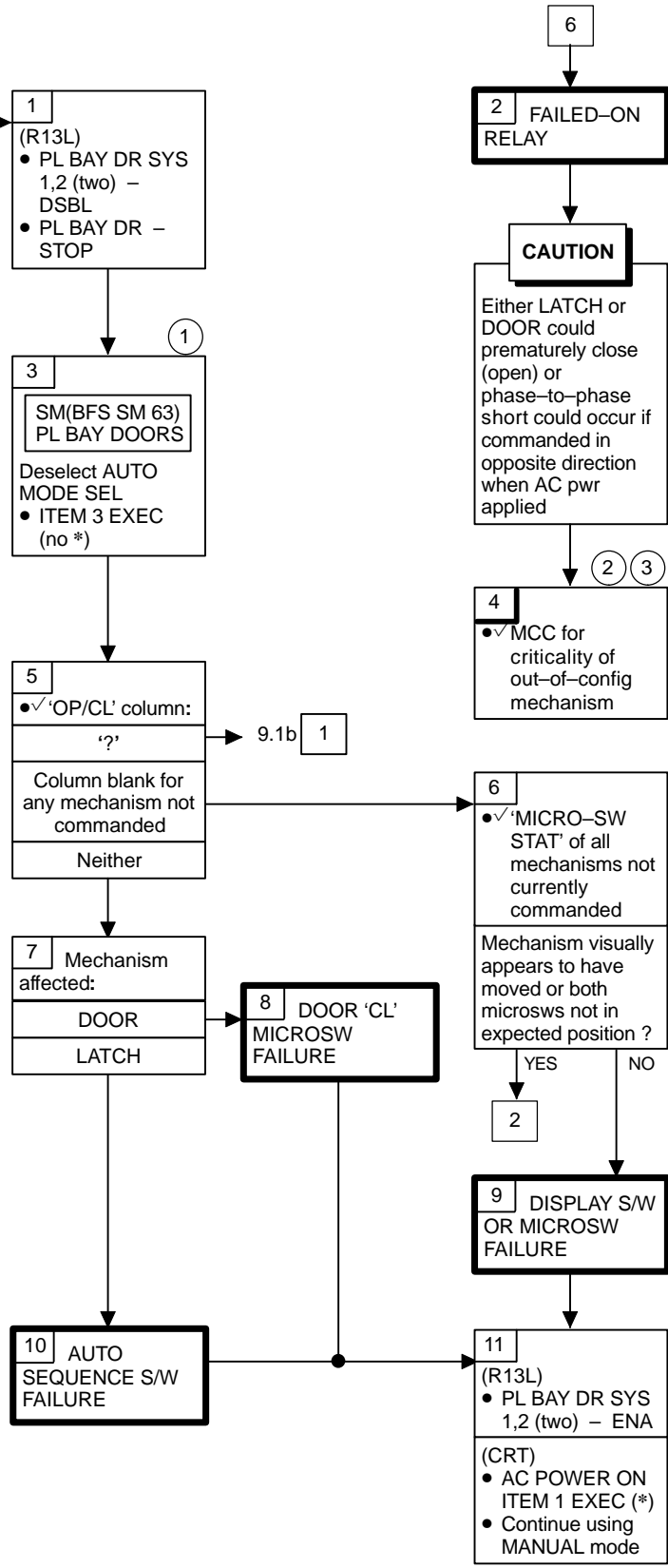
9.1h PBD CONFIG

PASS
PBD CONFIG

BFS
S63 PBD CONFIG

If:
Mechanism in transit or microsw failed other than those currently commanded in AUTO mode

Nominal Config:
(R13L)
PL BAY DR
SYS 1,2 (two) – ENA
(MA73C)
MCA LOGIC
MNA MID 1,3 (two) – ON
MNB MID 2,4 (two) – ON
MNC MID 2,4 (two) – ON
cb MCA PWR
AC1 3φ MID 1,3 (two) – cl
AC2 3φ MID 2,4 (two) – cl
AC3 3φ MID 2,4 (two) – cl
(CRT)
AC POWER – ON (ITEM 1 – *)
AUTO MODE – SEL (ITEM 3 – *)



- ① PBD CONFIG will reset ITEM 1 (AC POWER) to OFF, and disable any current commands
- ② MCC to recommend removal of pwr and/or repositioning affected mechanism
- ③ Use manual mode for all subsequent PLBD ops

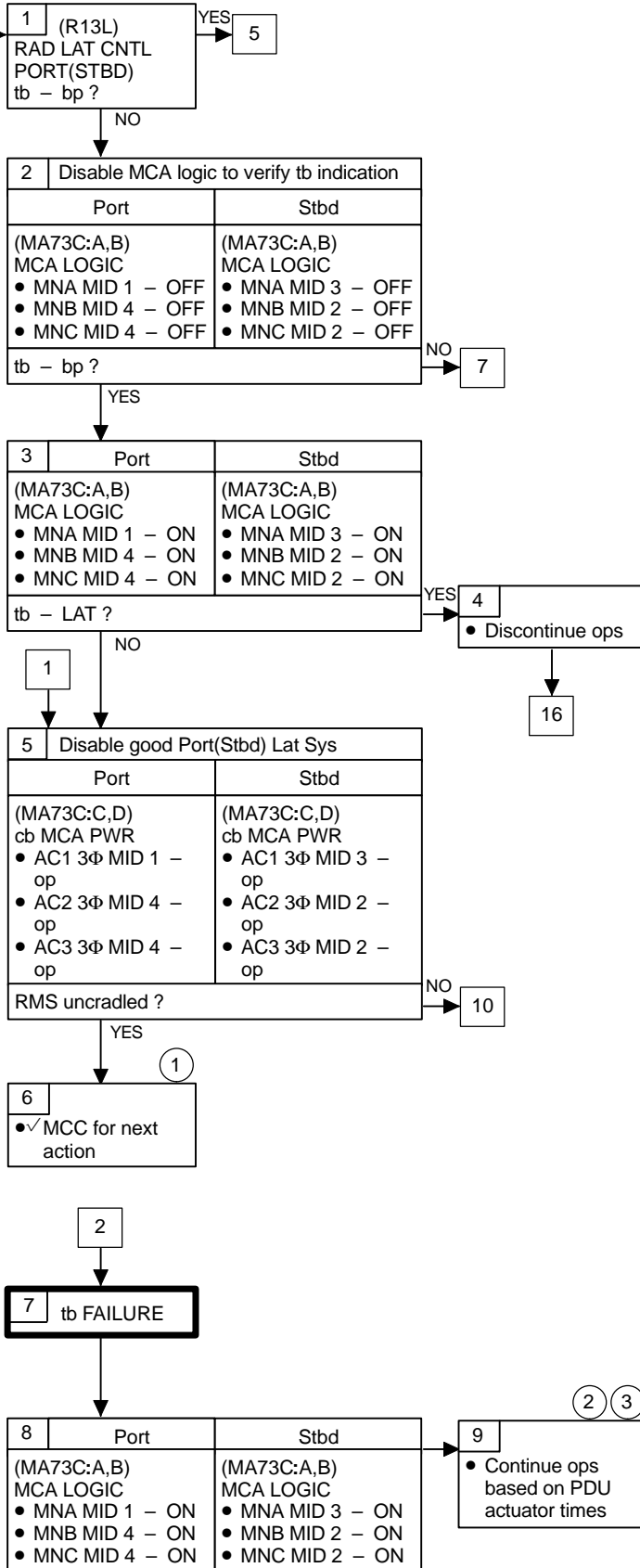
MECH

9.2a RAD LAT CNTL PORT(STBD) tb NOT LAT IN 60 SEC OR REL IN 30 SEC

RAD LAT CNTL PORT(STBD) tb Not LAT in 60 Sec or REL in 30 Sec

Nominal Config:

- (MA73C)
- MNA LOGIC
 - MNA MID 1,3 (two) – ON
 - MNB MID 2,4 (two) – ON
 - MNC MID 2,4 (two) – ON
- cb MCA PWR
- AC1 3Φ MID 1,3 (two) – cl
- AC2 3Φ MID 2,4 (two) – cl
- AC3 3Φ MID 2,4 (two) – cl
- (R13L)
- PL BAY MECH PWR SYS 1,2 (two) – ON
- RAD LAT CNTL SYS (two) – OFF
- RAD CNTL SYS (two) – OFF
- If RMS uncradled: (MA73C)
- cb MCA PWR
- AC2 3Φ MID 2 – op
- AC3 3Φ MID 4 – op

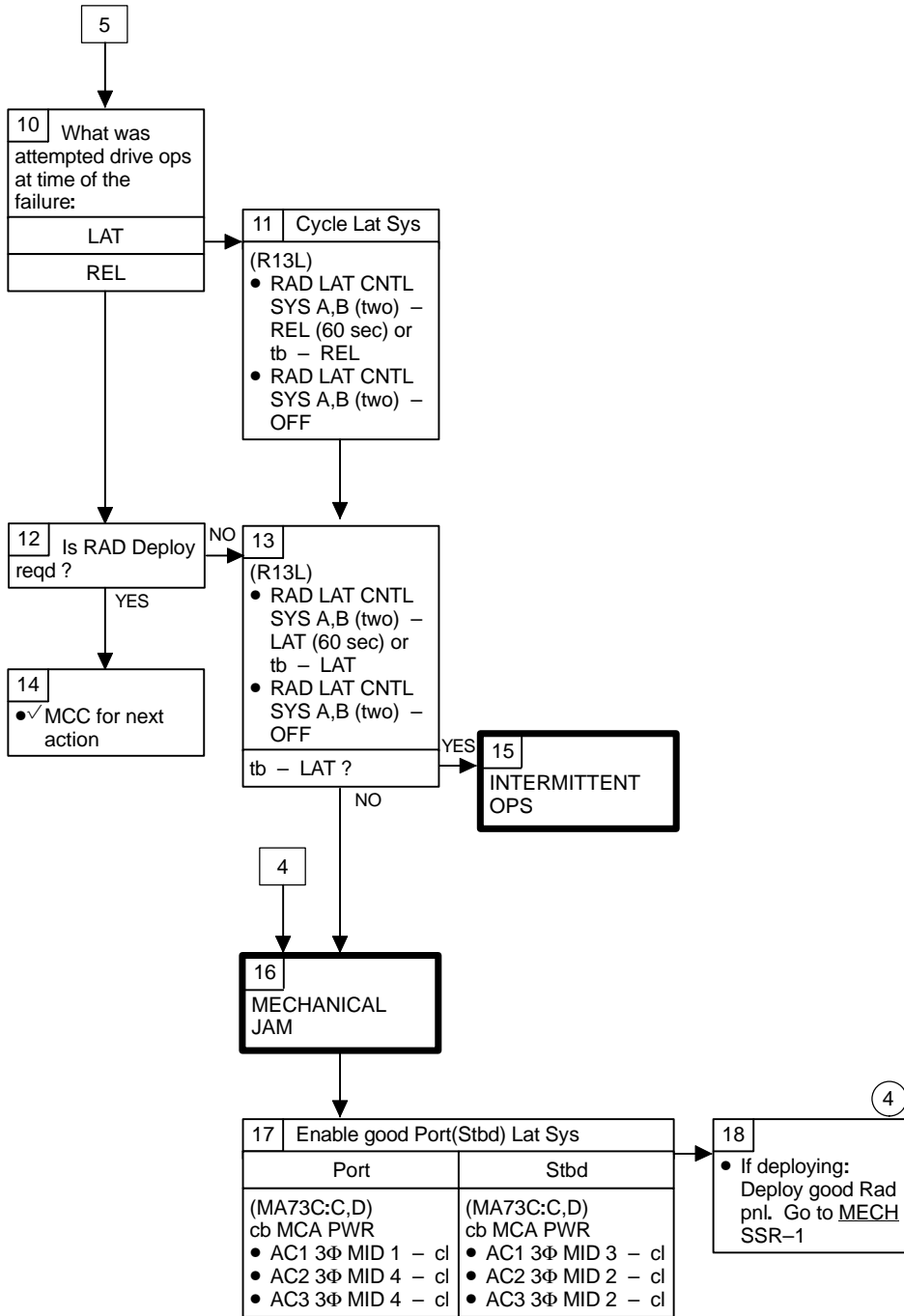


① Opened MCA cbs (for RMS uncradled) prevent verification of dual motor ops during RAD troubleshooting

② PDU Actuator Times
 NORMAL
 Lat – 30 sec
 Rad – 50 sec
 SINGLE MTR
 Lat – 60 sec
 Rad – 100 sec

③ Need MCC verification of microsw status for failed tb

MECH 9.2a (Cont)



④ ✓ MCC to determine pwrdn reqd, if any

MECH

9.2b RAD CNTL tb NOT DPY OR STO WITHIN 50 SEC AND NO MOTION

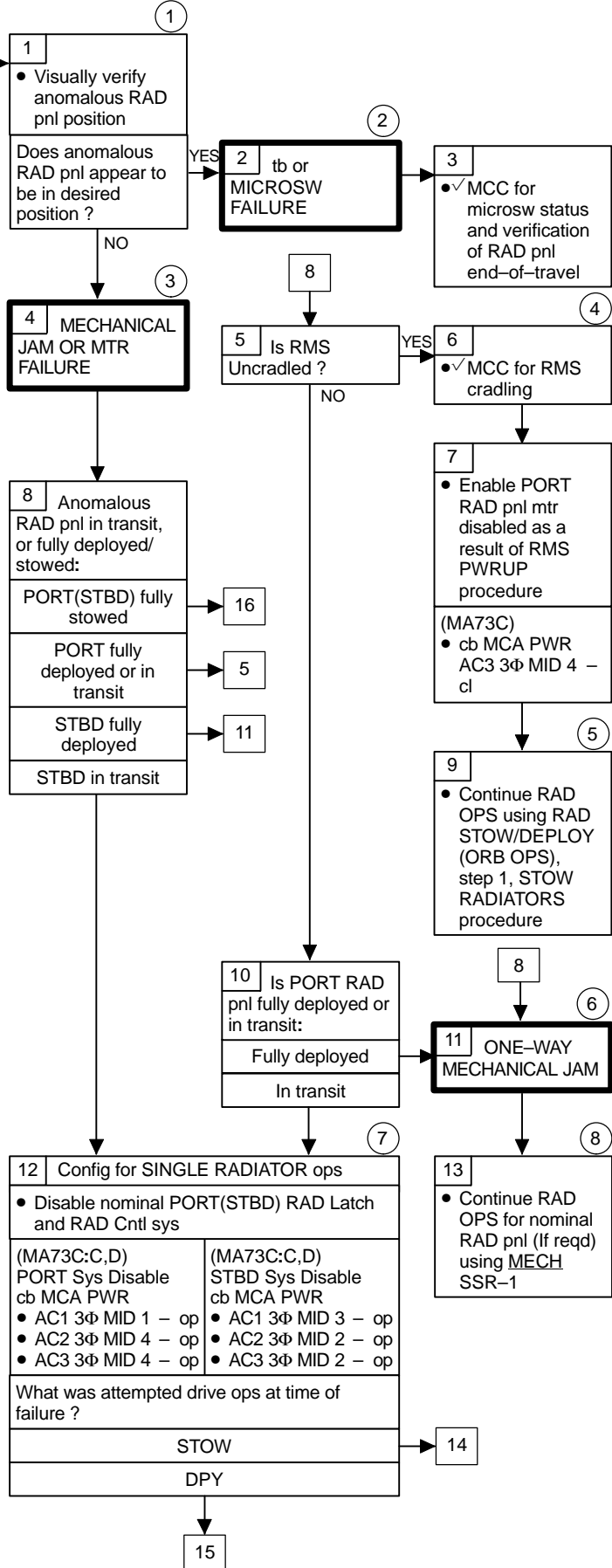
RAD tb not bp after 10 Sec and No Motion

RAD Pnl(s) in Transit and No Motion

RAD CNTL tb Not DPY/STO within 50 Sec

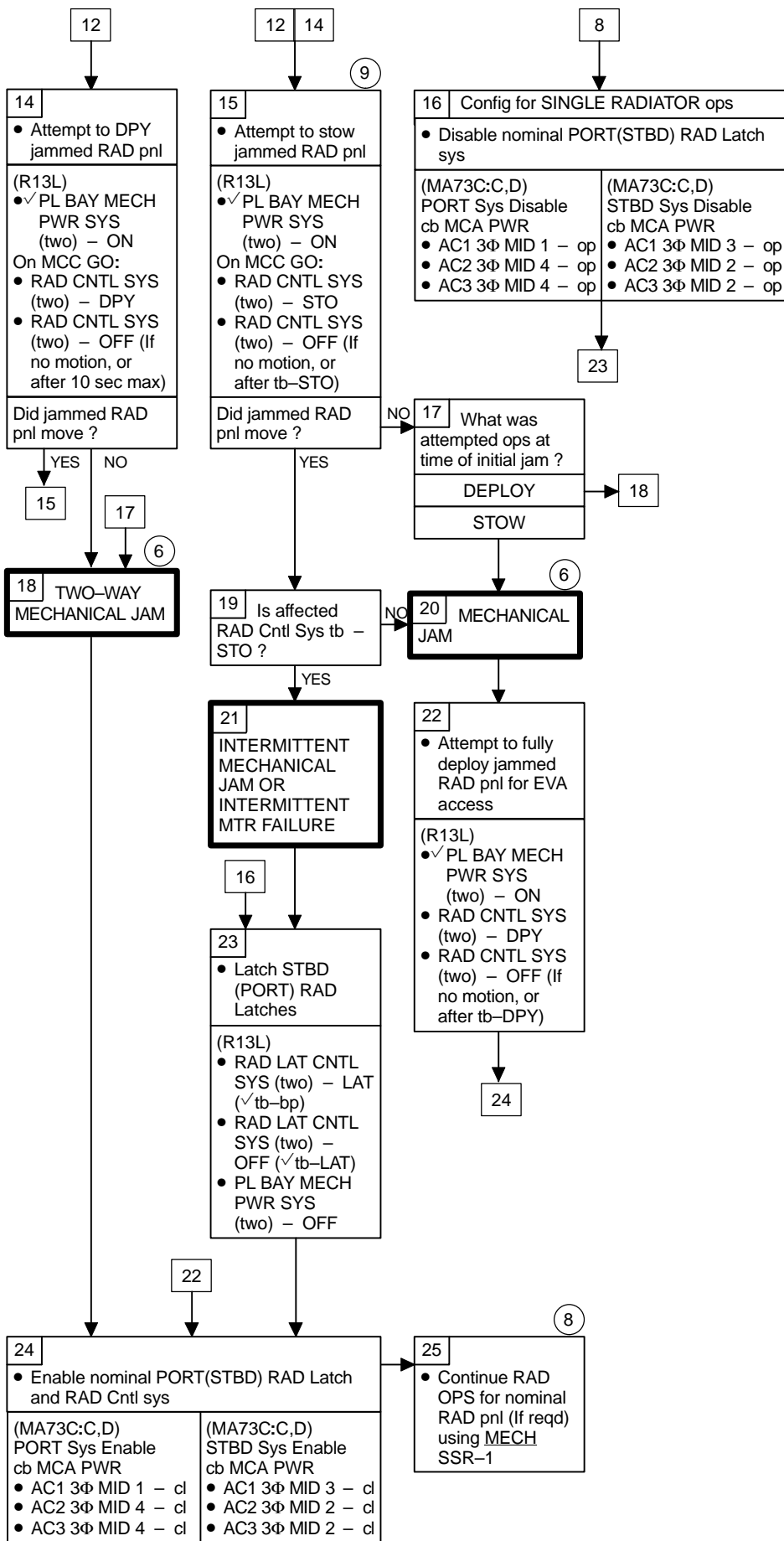
Nominal Config:
 (MA73C)
 MNA LOGIC
 MNA MID 1,3 (two) – ON
 MNB MID 2,4 (two) – ON
 cb MCA PWR
 AC1 3Φ MID 1,3 (two) – cl
 AC2 3Φ MID 2,4 (two) – cl
 AC3 3Φ MID 2,4 (two) – cl
 (R13L)
 PL BAY MECH PWR SYS 1,2 (two) – ON
 RAD LAT CNTL SYS (two) – OFF
 RAD CNTL SYS (two) – OFF

If RMS uncradled:
 (MA73C)
 cb MCA PWR
 AC2 3Φ MID 2 – op
 AC3 3Φ MID 4 – op



- ① Compare PORT (STBD) RAD pnl with fixed RAD pnls or deployed STBD(PORT) RAD pnl
- ② If dual microsw failure, microsws can be bypassed to regain mtrs function (refer to MECH SSR-8)
- ③ Both redundant deploy mtrs must be operational to be GO for deploy
- ④ Opened MCA cbs (if RMS uncradled) conflict with Rad troubleshooting
- ⑤ Resume in block 12 if RAD STOW/DPY OPS unsuccessful, and affected RAD pnl failed in transit
- ⑥ EVA reqd to stow jammed Rad pnl
- ⑦ If RMS uncradled, expect single mtr drive time for PORT RAD
- ⑧ ✓MCC to determine if pwrdrn is reqd

MECH 9.2b (Cont)



- ⑥ EVA reqd to stow jammed Rad pnl
 - ⑧ ✓MCC to determine if pwrdrn is reqd
 - ⑨ PDU Actuator
- Times
- Dual Mtr
- Lat – 30 sec
 - Rad – 50 sec
- Single Mtr
- Lat – 60 sec
 - Rad – 100 sec

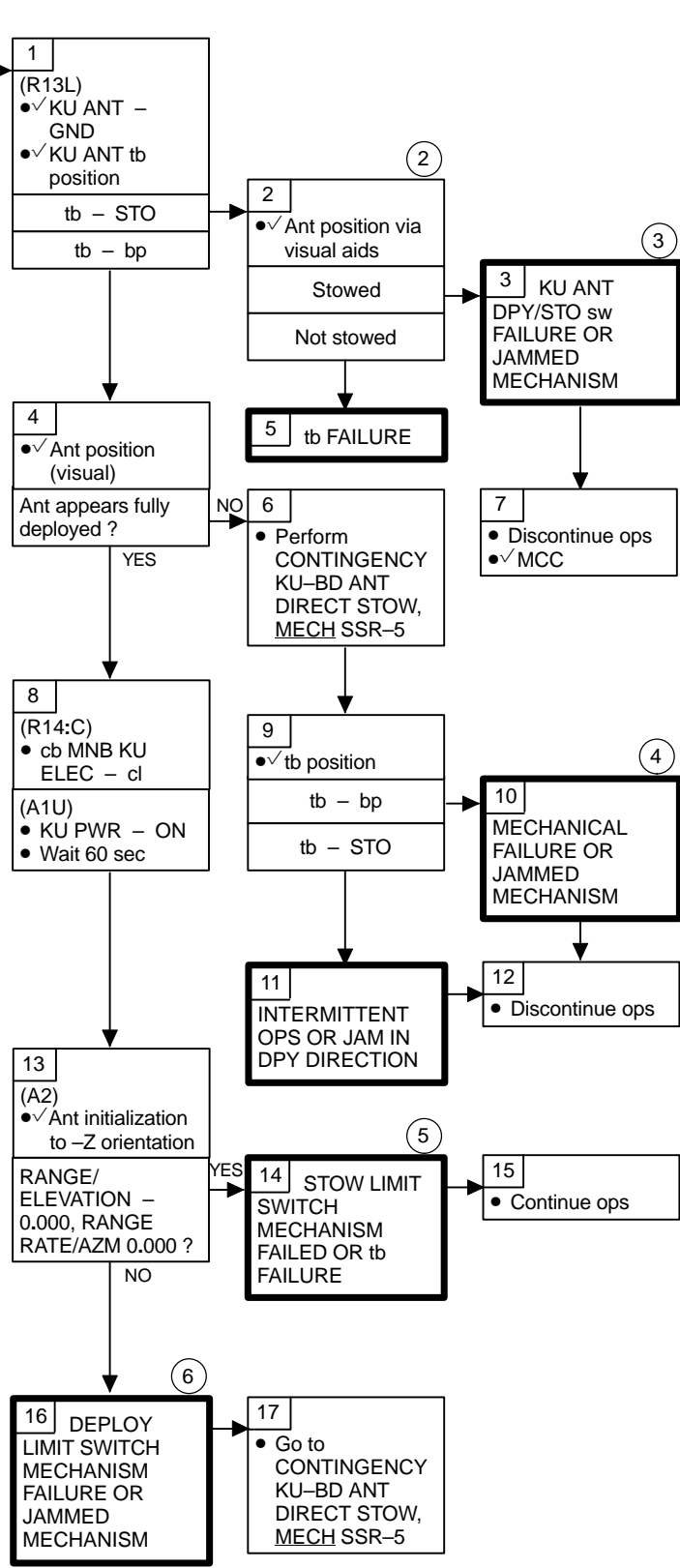
KU ANT

9.3

MECH

9.3a KU ANT tb NOT DPY IN 46 SEC

Nominal Config:
 (MA73C:A)
 MCA LOGIC
 MNC MID 2 – ON
 (MA73C:B)
 MCA LOGIC
 MNB MID 4 – ON
 (MA73C:C)
 cb MCA PWR AC3
 3Φ MID 2 – cl
 (MA73C:D)
 cb MCA PWR AC2
 3Φ MID 4 – cl
 (R13L)
 PL BAY MECH PWR
 SYS (two) – ON
 KU ANT – DPY
 (A1U)
 KU PWR – OFF
 (A2)
 DIGI-DIS SEL –
 EL/AZ
 (R14:C)
 cb MNB KU ELEC –
 op



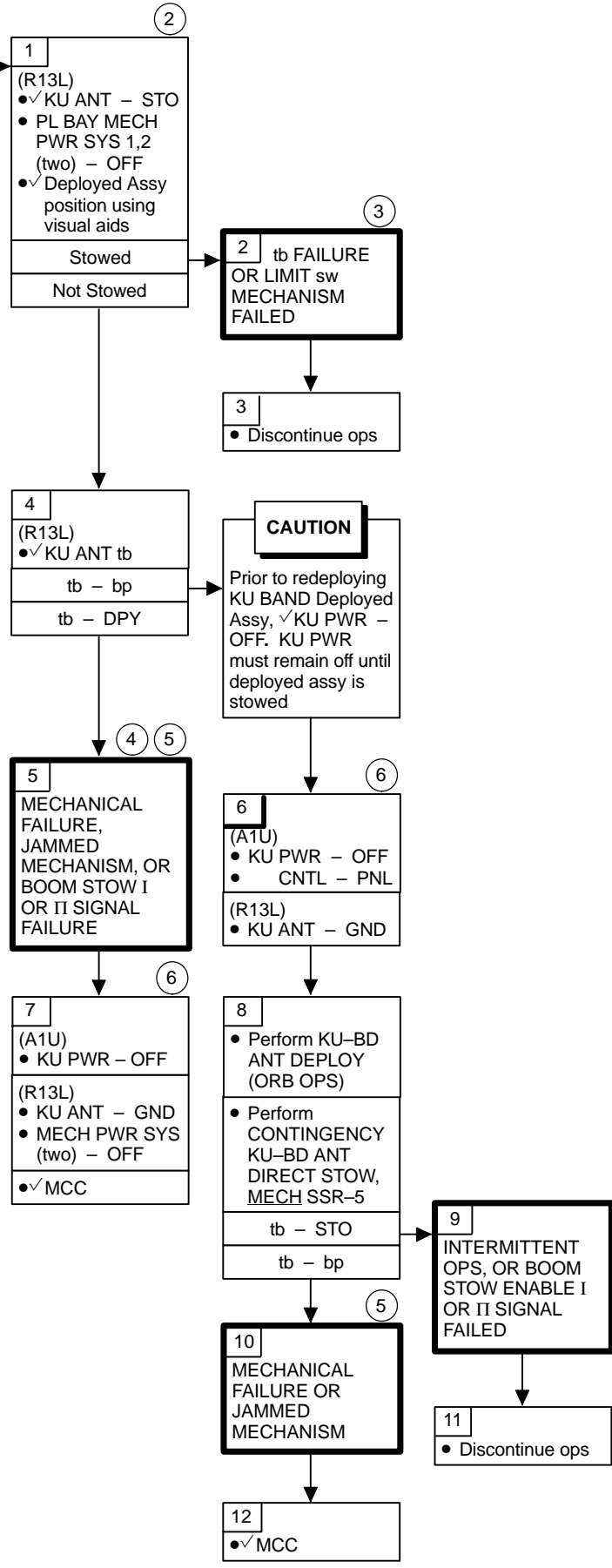
- ① Drive Time
Single mtr – 46 sec
Dual mtr – 23 sec
- ② KU-BD CCTV overlay located in Middeck Transparency Kit
- ③ KU-BAND ANTENNA CONTINGENCY DEPLOY/STOW FAILED DEPLOY STOW SWITCH (IFM) may be reqd
- ④ Possible Ant jettison reqd
- ⑤ If limit sw mechanism failed in stow position, MECH SSR-7 reqd for stow ops
- ⑥ If limit sw mechanism failed to transfer deploy signal, failure results in loss of Ku-Bd comm and radar ops

MECH

9.3b KU ANT tb NOT STO IN 46 SEC

①
 KU ANT
 tb Not
 STO in 46 Sec

Nominal Config:
 (MA73C:A)
 MCA LOGIC
 MNC MID 2 – ON
 (MA73C:B)
 MCA LOGIC
 MNB MID 4 – ON
 (MA73C:C)
 cb MCA PWR
 AC3 3Φ MID 2 –
 cl
 (MA73C:D)
 cb MCA PWR
 AC2 3Φ MID 4 –
 cl
 (R13L)
 PL BAY MECH PWR
 SYS (two) – ON
 KU ANT – STO
 (A1U)
 KU PWR – ON
 (R14:C)
 cb MNB KU
 ELEC – cl



- ① **Drive Time**
 Single mtr – 46 sec
 Dual mtr – 23 sec
- ② KU-BAND
 CCTV overlay
 located in Middeck
 Transparency Kit
- ③ If limit sw
 mechanism failed in
 deploy position,
 MECH SSR-7 reqd
 for subsequent
 deploy ops
- ④ If Boom Stow
 Enable signal failure,
 MECH SSR-5 reqd
 for stow ops
- ⑤ Antenna jettison
 may be reqd; KU-BD
 ANT JETTISON
 (ORB OPS)
- ⑥ KU PWR must
 be turned off prior to
 taking KU ANT –
 GND to prevent
 gimbal locking pins
 from retracting

MECH

9.3c KU ANT GIMBAL ANGLES INCORRECT AFTER 50 SEC

KU ANT Gimbal Movement within 50 Sec and/or Gimbal Angles Incorrect after 50 Sec

Nominal Config:
 (MA73C:A)
 MCA LOGIC
 MNC MID 2 - ON
 (MA73C:B)
 MCA LOGIC
 MNB MID 4 - ON
 (MA73C:C)
 cb MCA PWR
 AC3 3φ MID 2 - cl
 (MA73C:D)
 cb MCA PWR
 AC2 3φ MID 4 - cl
 (R13L)
 PL BAY MECH PWR
 SYS (two) - OFF
 KU ANT - STO
 (A1U)
 KU PWR - ON
 (R14:C)
 cb MNB KU
 ELEC - cl

1
 (R13L)
 •✓ KU ANT - STO
 •✓ PL BAY MECH PWR SYS 1,2 (two) - OFF

(A2)
 •✓ KU ANT GIMBAL ANGLES

RANGE/ELEVATION = -27.0 (± 1.0) and RANGE RATE/AZM = -123.0 (± 1.0)

Different config

1
 2 KU ANT sw FAILURE

3
 (R13L)
 • KU ANT - GND
 •✓ MCC

2
 4 GIMBAL LOCK FAILURE, α/β GIMBAL FAILURE, OR EA-1 FAILURE

3
 5
 (R13L)
 • KU ANT - GND
 •✓ MCC

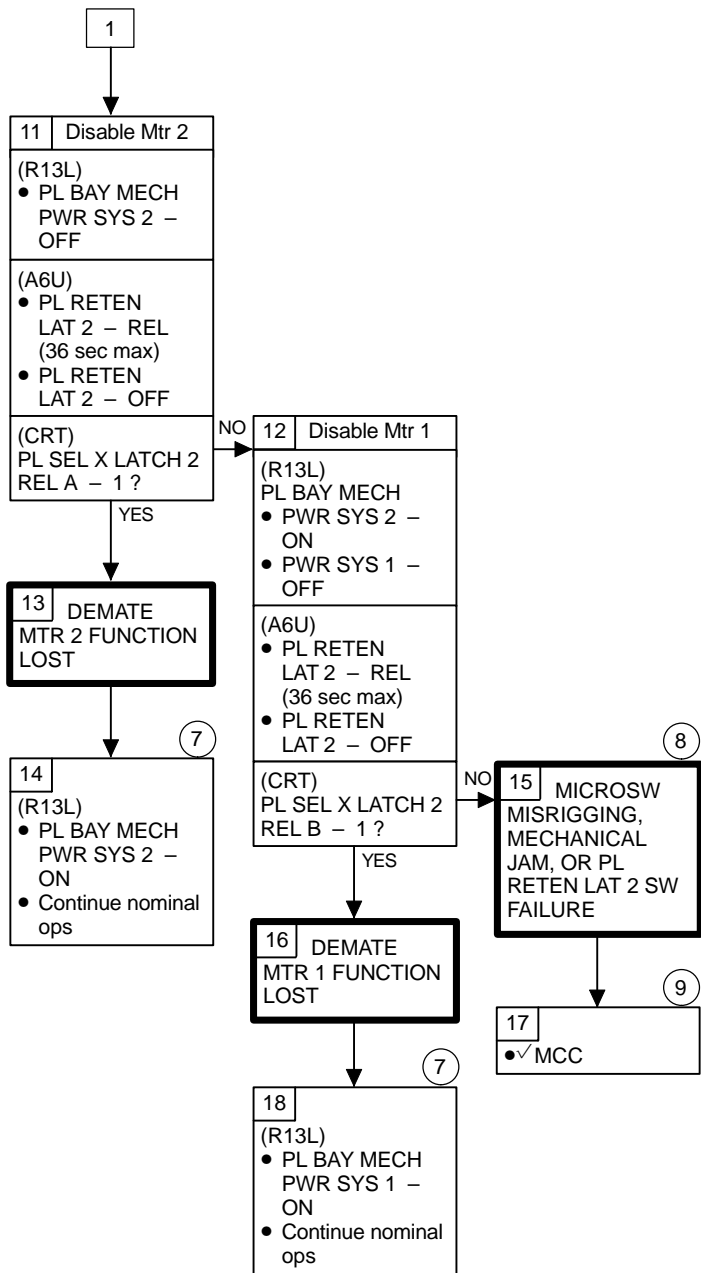
- ① KU-BAND ANTENNA CONTINGENCY DEPLOY/STOW - FAILED DEPLOY/STOW SWITCH (IFM) may be reqd
- ② EVA and/or KU-BAND ANTENNA CONTINGENCY STOW-GIMBAL LOCK (IFM) may be reqd
- ③ Selecting GND will allow ant to assume safe config

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**MEC
ROEU**

9.4

MECH 9.4a (Cont)



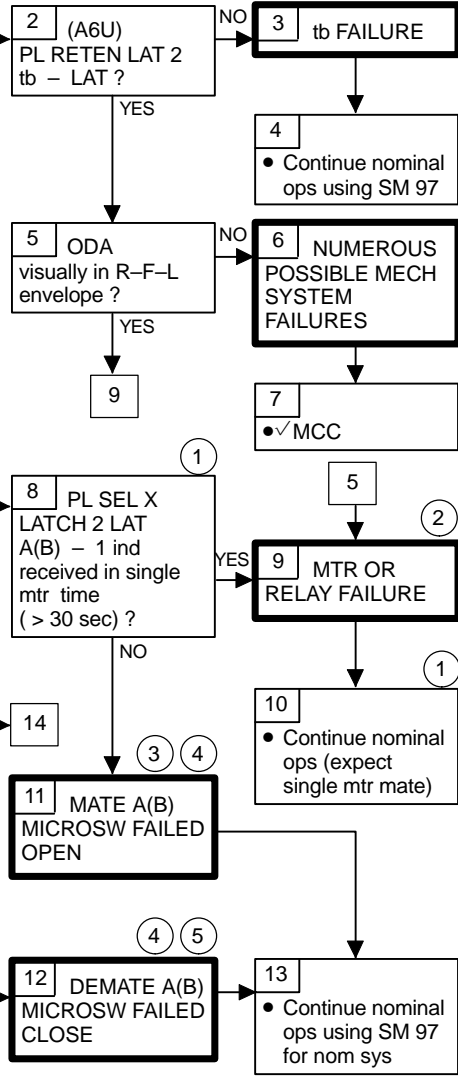
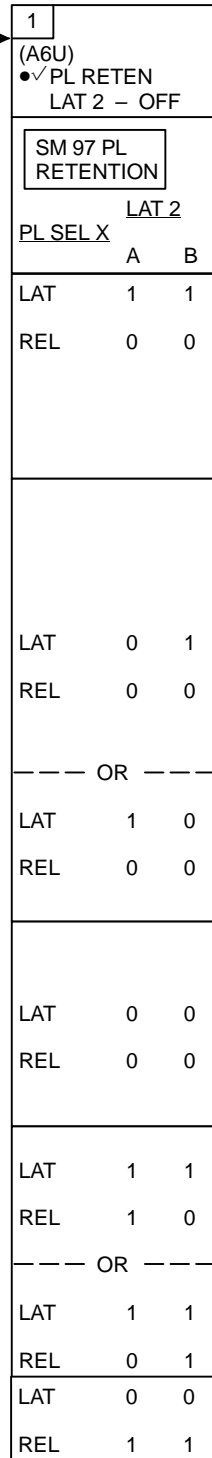
- ⑦ One mtr Φ lost. Good mtr will backdrive failed mtr. Subsequent mate, relax, and demate ops will be performed on single mtr. Good mtr will be isolated by turning PL BAY MECH PWR OFF for failed system
- ⑧ EVA capability exists to perform ROEU demate
- ⑨ MCC can determine if switch is failed

MECH

9.4b ROEU MATE – tb NOT LAT, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME

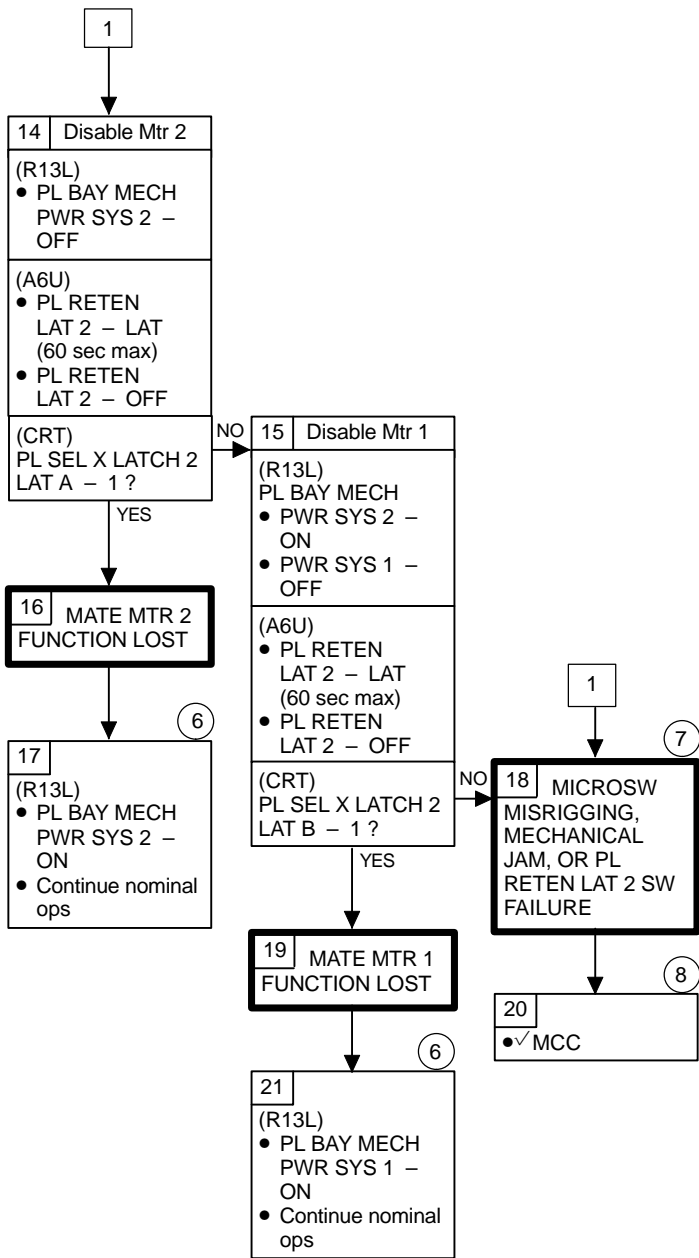
Mate tb Not Lat
or
SM 97 PL RETENTION
Microsw LAT/REL Ind Not Nominal
or
Single Mtr Drive Time > 30 sec
or
Not Visually R-F-L

Nominal Config:
(R13L)
PL BAY MECH PWR (two) – ON
(A6U)
PL RETEN LOGIC PWR (two) – ON
PL SEL 3(1,2)
(MA73C:C)
cb MCA PWR AC1 3Φ MID 1 – cl
(MA73C:D)
cb MCA PWR AC2 3Φ MID 3 – cl



- ① If PL SEL X LATCH 2 LAT A(B) – 1 ind received in single mtr time, microsw misrigged
- ② MCC can determine which condition exists
- ③ One mtr will continue to drive while mating until PL RETEN LAT 2 sw turned OFF
- ④ If SYS A Microsw failed, tb will be inaccurate
- ⑤ Expect single mtr drive time for demate

MECH 9.4b (Cont)



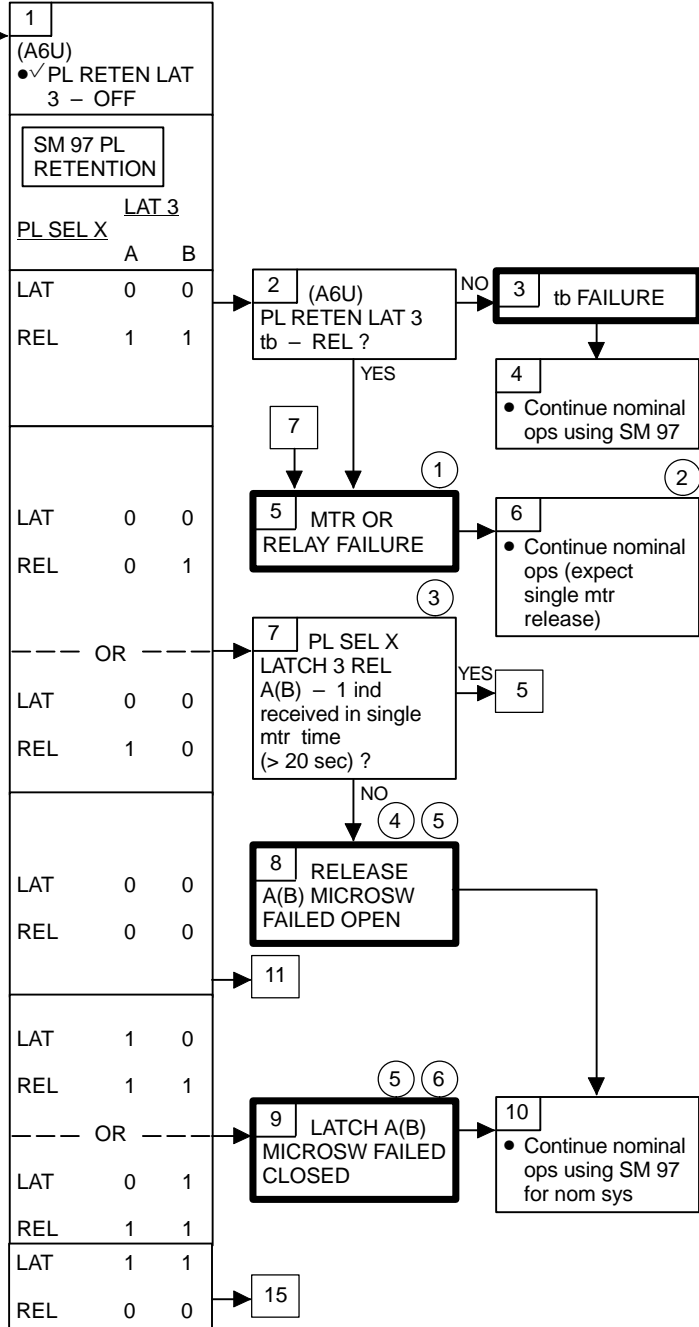
- ⑥ One mtr Φ lost. Good mtr will backdrive failed mtr. Subsequent mate, relax, and demate ops will be performed on single mtr. Good mtr will be isolated by turning PL BAY MECH PWR OFF for failed system
- ⑦ EVA capability exists to perform ROEU demate
- ⑧ MCC can determine if switch is failed

MECH

9.4c ROEU RELEASE – tb NOT REL, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME

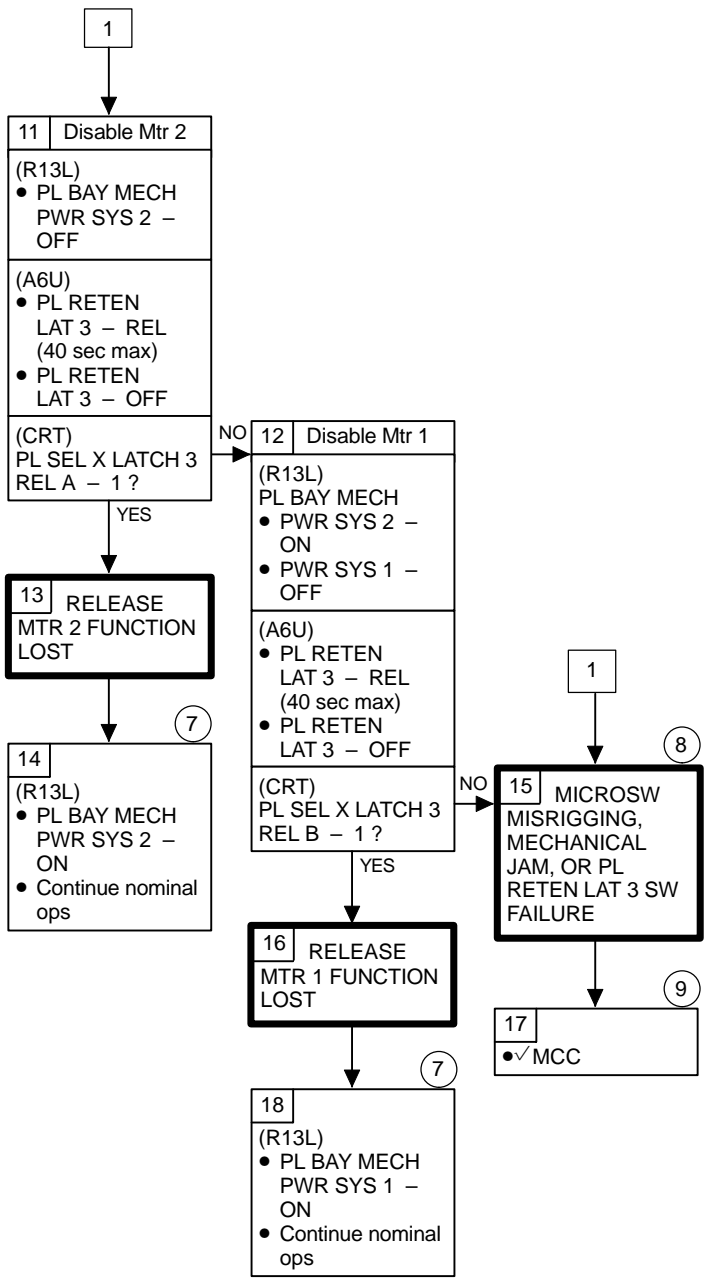
Release tb Not Rel
or
SM 97 PL RETENTION
Microsw LAT/REL Ind Not Nominal or Single Mtr Drive Time > 20 sec

Nominal Config:
(R13L)
PL BAY MECH PWR (two) – ON
(A6U)
PL RETEN LOGIC PWR (two) – ON
PL SEL 3(1,2)
(MA73C:C)
cb MCA PWR AC1 3Φ MID 1 – cl
(MA73C:D)
cb MCA PWR AC2 3Φ MID 3 – cl



- ① MCC can determine which condition exists
- ② Expect single mtr latch/release for mtr failure
- ③ If PL SEL X LATCH 3 REL A(B) – 1 ind received in single mtr time, microsw misrigged
- ④ One mtr will continue to drive while releasing until PL RETEN LAT 3 sw turned OFF
- ⑤ If SYS A Microsw failed, tb will be inaccurate
- ⑥ Expect single mtr drive time for latch

MECH 9.4c (Cont)



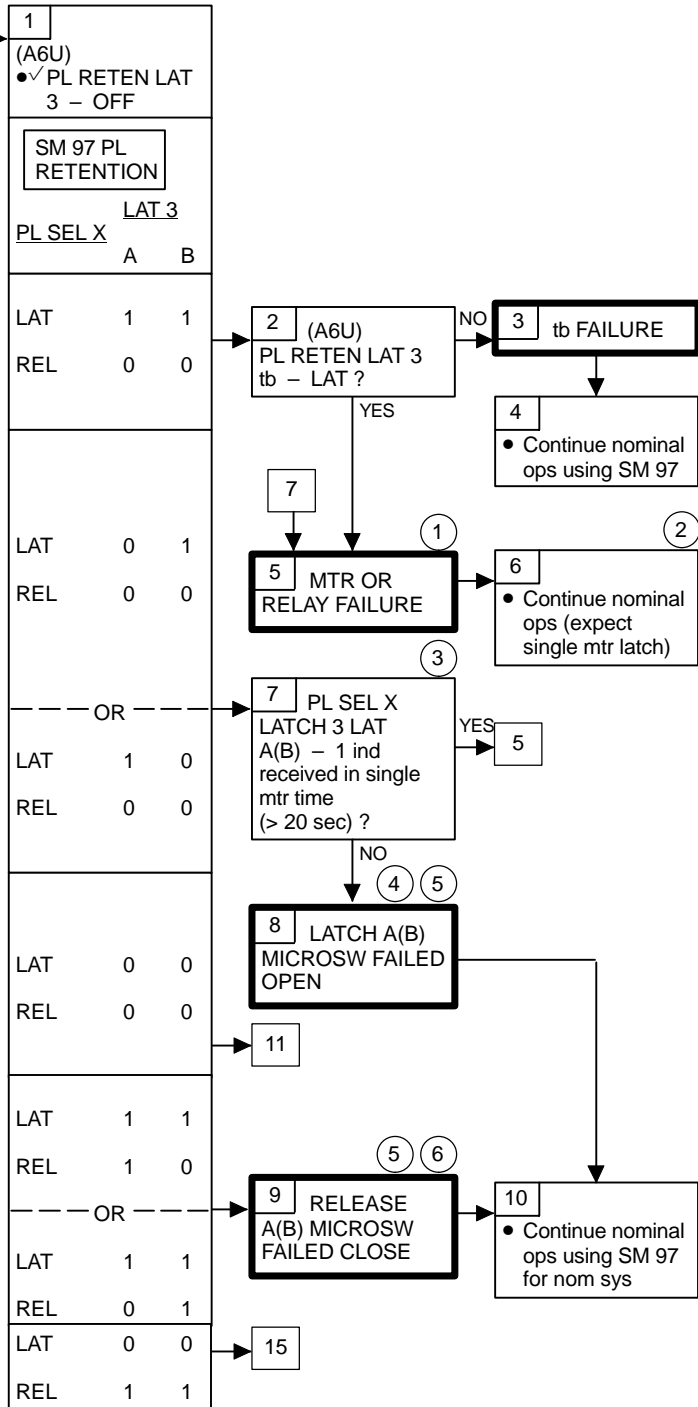
- ⑦ One mtr Φ lost. Good mtr will backdrive failed mtr. Subsequent release and latch ops will be performed on single mtr. Good mtr will be isolated by turning PL BAY MECH PWR OFF for failed system
- ⑧ EVA capability exists to perform ROEU releaseE
- ⑨ MCC can determine if switch is failed

MECH

9.4d ROEU LATCH – tb NOT LAT, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME

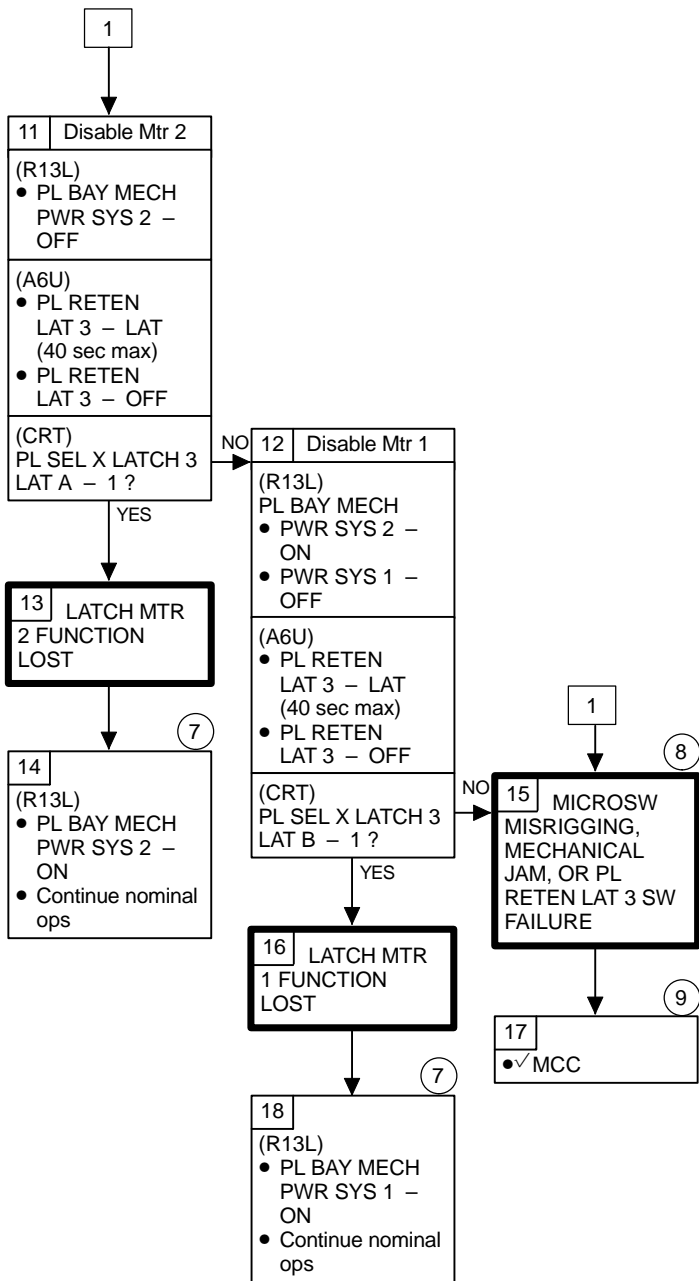
Latch tb Not Lat or
SM 97 PL RETENTION
 Microsw LAT/REL Ind Not Nominal or Single Mtr Drive Time > 20 sec

Nominal Config:
 (R13L)
 PL BAY MECH PWR (two) – ON (A6U)
 PL RETEN LOGIC PWR (two) – ON (MA73C:C)
 PL SEL – 3 (1,2) (MA73C:D)
 cb MCA PWR AC1 3Φ MID 1 – cl (MA73C:D)
 cb MCA PWR AC2 3Φ MID 3 – cl



- ① MCC can determine which condition exists
- ② Expect single mtr latch/release for mtr failure
- ③ If PL SEL X LATCH 3 LAT A(B) – 1 ind received in single mtr time, microsw misrigged
- ④ One mtr will continue to drive while latching until PL RETEN LAT 3 sw turned OFF
- ⑤ If SYS A Microsw failed, tb will be inaccurate
- ⑥ Expect single mtr drive time for release/latch

MECH 9.4d (Cont)



- ⑦ One mtr Φ lost. Good mtr will backdrive failed mtr. Subsequent release and latch ops will be performed on single mtr. Good mtr will be isolated by turning PL BAY MECH PWR OFF for failed system
- ⑧ EVA capability exists to perform ROEU latch
- ⑨ MCC can determine if switch is failed

MECH

9.4e ROEU RELAX – tb NOT NOMINAL, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME

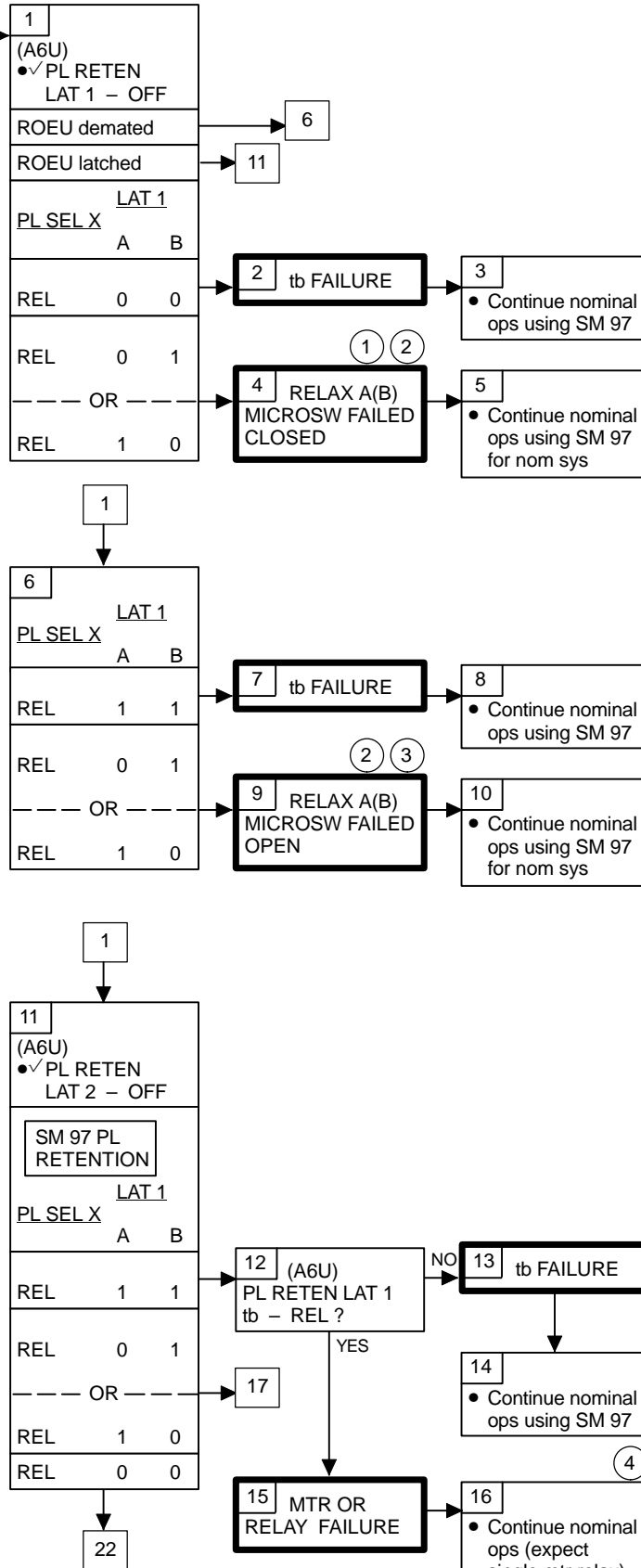
RELAX tb Not Nominal or
SM 97 PL RETENTION
 Microsw REL Ind Not Nominal or Single Mtr Drive Time > 12 sec

Nominal Config:
 (R13L)
 PL BAY MECH PWR (two) – ON
 (A6U)
 PL RETEN LOGIC PWR (two) – ON
 PL SEL – 3(1,2)
 (MA73C:C)
 cb MCA PWR AC1 3Φ MID 1 – cl
 (MA73C:D)
 cb MCA PWR AC2 3Φ MID 3 – cl

If DEMATED (A6U)
 PL RETEN LAT 1 tb – REL
SM 97 PL RETENTION
 PL SEL X LATCH 1 REL A,B – 1

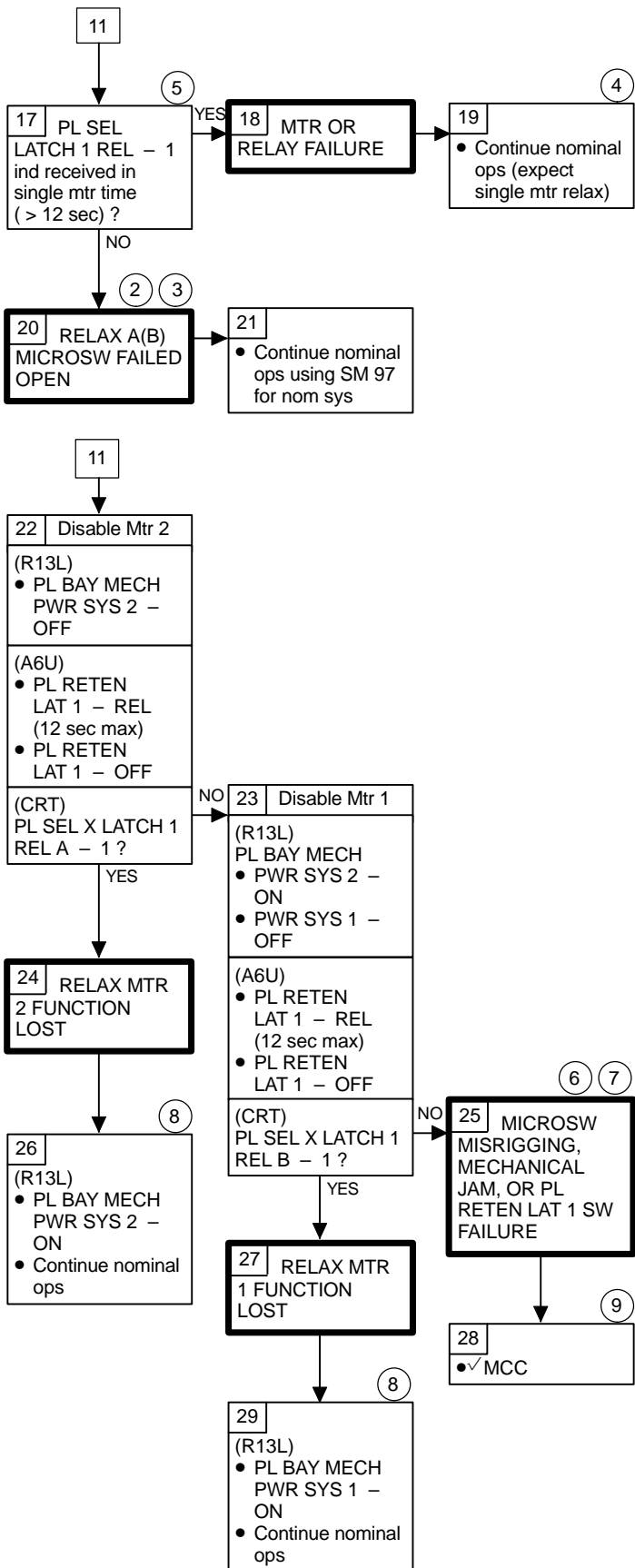
If MATED and RELAXED (A6U)
 PL RETEN LAT 1 tb – REL
SM 97 PL RETENTION
 PL SEL X LATCH 1 REL A,B – 1

If MATED and UNLATCHED (A6U)
 PL RETEN LAT 1 tb – bp
SM 97 PL RETENTION
 PL SEL X LATCH 1 REL A,B – 0



- ① Expect single mtr drive time for relax
- ② If SYS A Microsw failed, tb will be inaccurate
- ③ One mtr will continue to drive while relaxing until PL RETEN LAT 1 sw turned OFF
- ④ MCC can determine which condition exists. If MTR failure, demate, mate and relax will be single mtr time

MECH 9.4e (Cont)



- ② If SYS A Microsw failed, tb will be inaccurate
- ③ One mtr will continue to drive while relaxing until PL RETEN LAT 1 sw turned OFF
- ④ MCC can determine which condition exists. If MTR failure, demate, mate and relax will be single mtr time
- ⑤ If PL SEL LATCH 1 REL - 1 ind received in single mtr time, microsw misrigged
- ⑥ EVA capability exists to perform ROEU relax
- ⑦ PL RETEN LAT 2 sw to demate may be used to relax ROEU. MCC will explain implementation
- ⑧ Subsequent mate, relax, and demate ops will be performed on single mtr. Good mtr will be isolated by turning PL BAY MECH PWR OFF for failed system
- ⑨ MCC can determine if switch is failed

MECH

9.4f ROEU ELEC CONT – tb NOT NOMINAL OR IND NOT NOMINAL

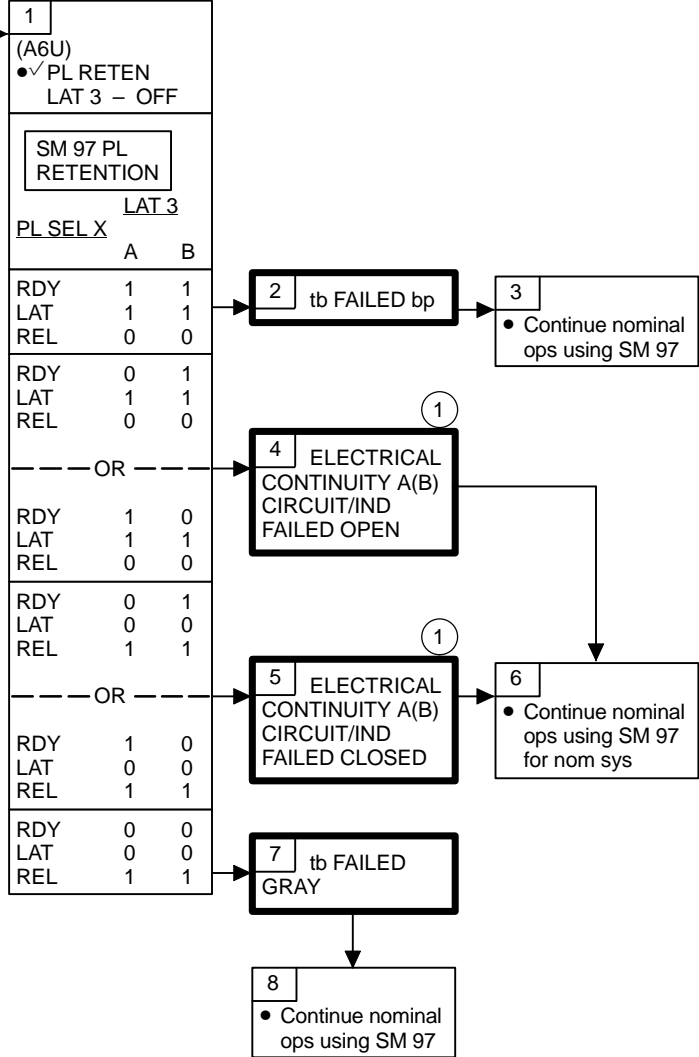
① If SYS A Microsw failed, tb will be inaccurate

ELEC CONT tb Not Nominal or SM 97 PL RETENTION RDY Ind Not Nominal

Nominal Config:
(R13L)
PL BAY MECH PWR (two) – ON
(A6U)
PL RETEN LOGIC PWR (two) – ON
PL SEL – 3(1,2) (MA73C:C)
cb MCA PWR AC1 3Φ MID 1 – cl (MA73C:D)
cb MCA PWR AC2 3Φ MID 3 – cl

If LATCHED
(A6U)
PL RETEN RDY 1 tb – gray
SM 97 PL RETENTION
PL SEL X LATCH 3 RDY A,B – 1

If UNLATCHED
(A6U)
PL RETEN RDY 1 tb – bp
SM 97 PL RETENTION
PL SEL X LATCH 3 RDY A,B – 0



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MECH SSR

MECH SSR-1 PORT(STBD) RAD OPS

WARNING

To preclude failures causing inadvertent MPM cycling, RMS must be cradled. This procedure assumes that the RMS (if flown) is cradled

- 1** Disable STBD(PORT) RAD sys
- STBD Panel Disable (MA73C:D,C)
cb MCA PWR
- AC1 3Φ MID 3 - op
 - AC2 3Φ MID 2 - op
 - AC3 3Φ MID 2 - op
- PORT Panel Disable (MA73C:C,D)
cb MCA PWR
- AC1 3Φ MID 1 - op
 - AC2 3Φ MID 4 - op
 - AC3 3Φ MID 4 - op

- 2** PORT(STBD) ops reqd:
- STO
- DPY

- 3** Stow,latch PORT(STBD)
- (R13L)
- PL BAY MECH PWR SYS 1,2 - ON
 - RAD CNTL SYS A,B - STO
 - PORT(STBD) tb - STO
 - SYS A,B - OFF
 - LAT CNTL SYS A,B - LAT
 - RAD LAT CNTL PORT(STBD) tb - LAT
 - RAD LAT CNTL SYS A,B - OFF
 - PL BAY MECH PWR SYS 1,2 - OFF

- 4** Release,deploy PORT(STBD) RAD
- (R13L)
- PL BAY MECH PWR SYS 1,2 - ON
 - RAD LAT CNTL SYS A,B - REL
 - RAD LAT CNTL PORT(STBD) tb - REL
 - RAD LAT CNTL SYS A,B - OFF
 - RAD CNTL SYS A,B - DPY
 - RAD CNTL PORT(STBD) tb - DPY
 - RAD CNTL SYS A,B - OFF
 - PL BAY MECH PWR SYS 1,2 - OFF

- 5** Enable STBD(PORT) RAD sys
- STBD (MA73C:D,C)
cb MCA PWR
- AC1 3Φ MID 3 - cl
 - AC2 3Φ MID 2 - cl
 - AC3 3Φ MID 2 - cl
- PORT (MA73C:C,D)
cb MCA PWR
- AC1 3Φ MID 1 - cl
 - AC2 3Φ MID 4 - cl
 - AC3 3Φ MID 4 - cl

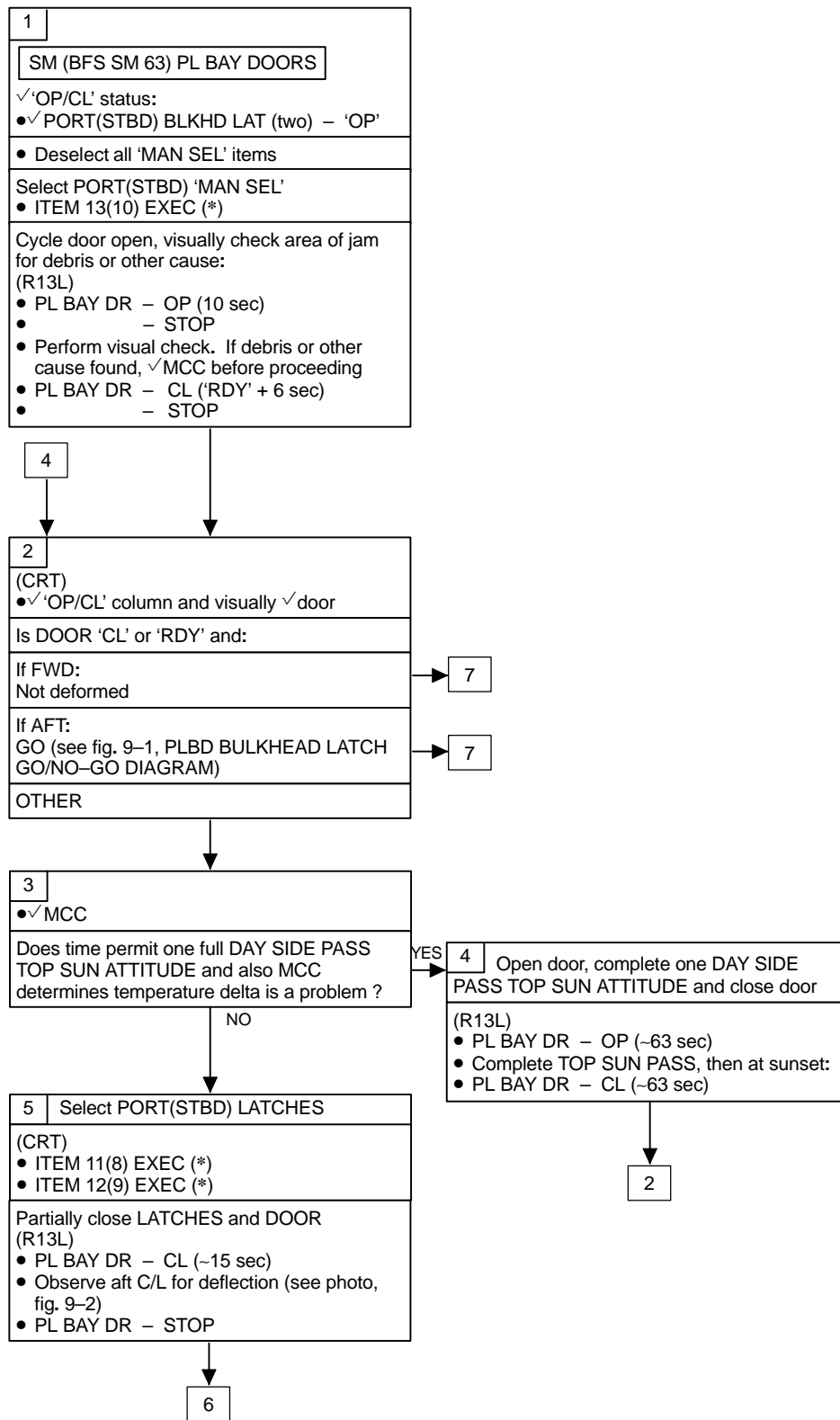
- 1** PDU Actuator Times Normal (2 mtr)
- Lat - 30 sec
 - Rad - 50 sec
- Single Mtr
- Lat - 60 sec
 - Rad - 100 sec

MECH SSR

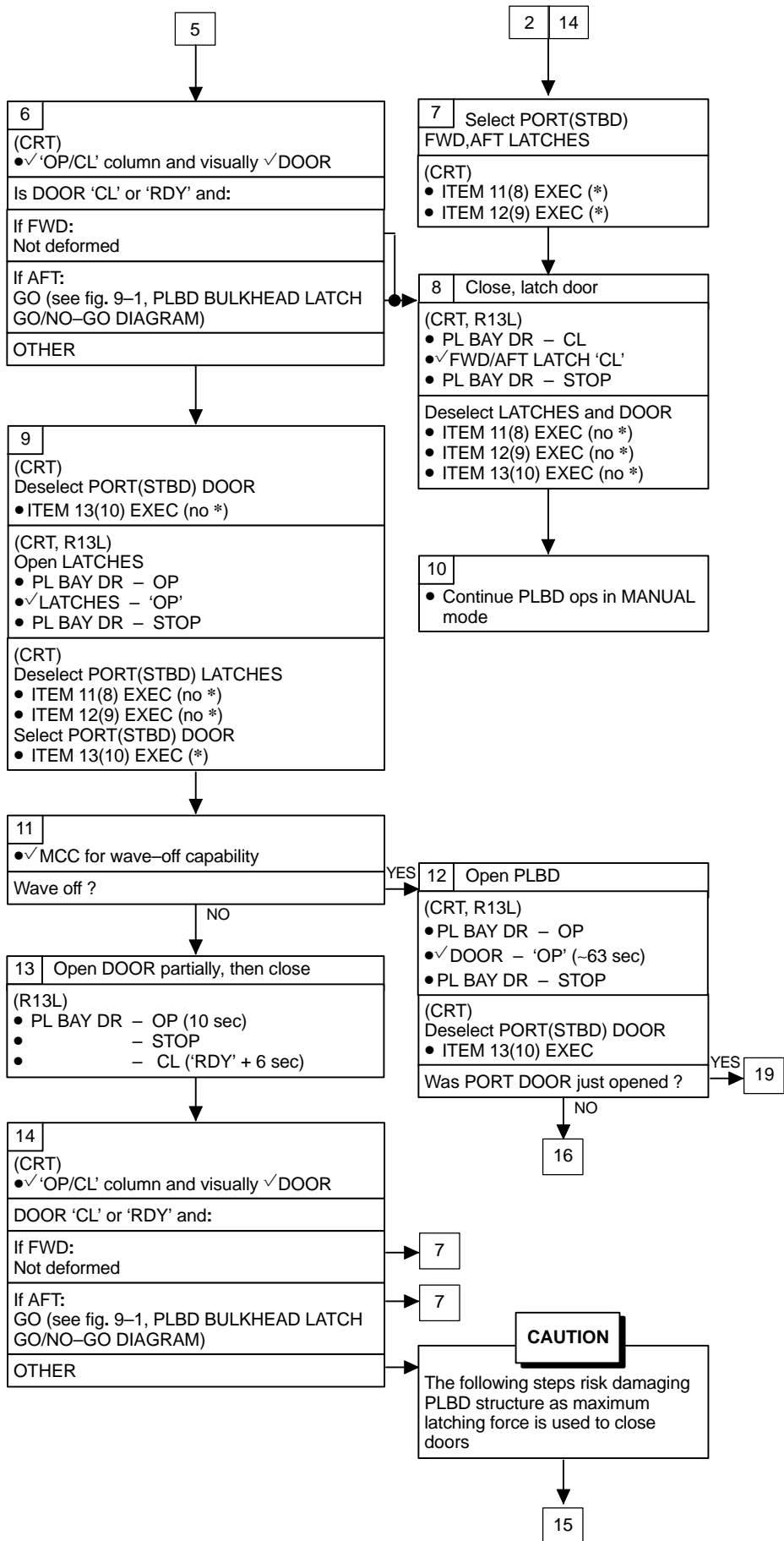
MECH SSR-2 CONTINGENCY PLBD CLOSURE

NOTE

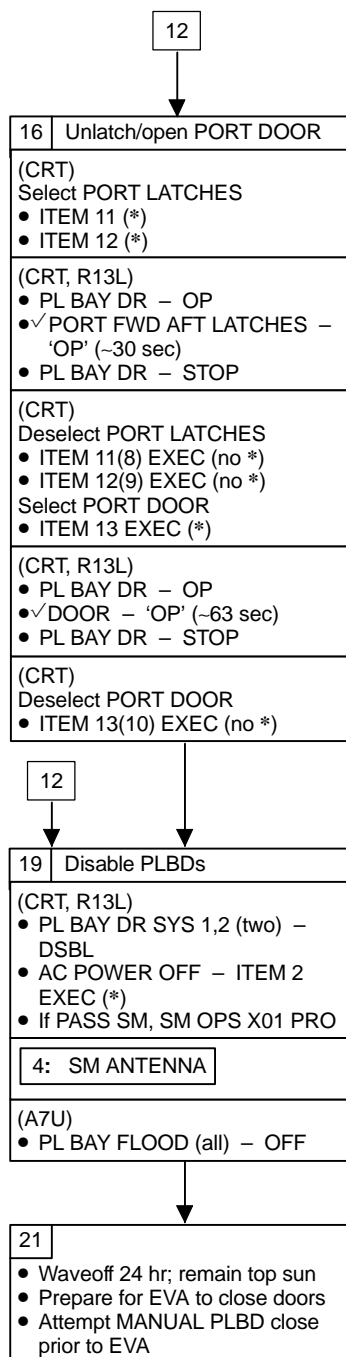
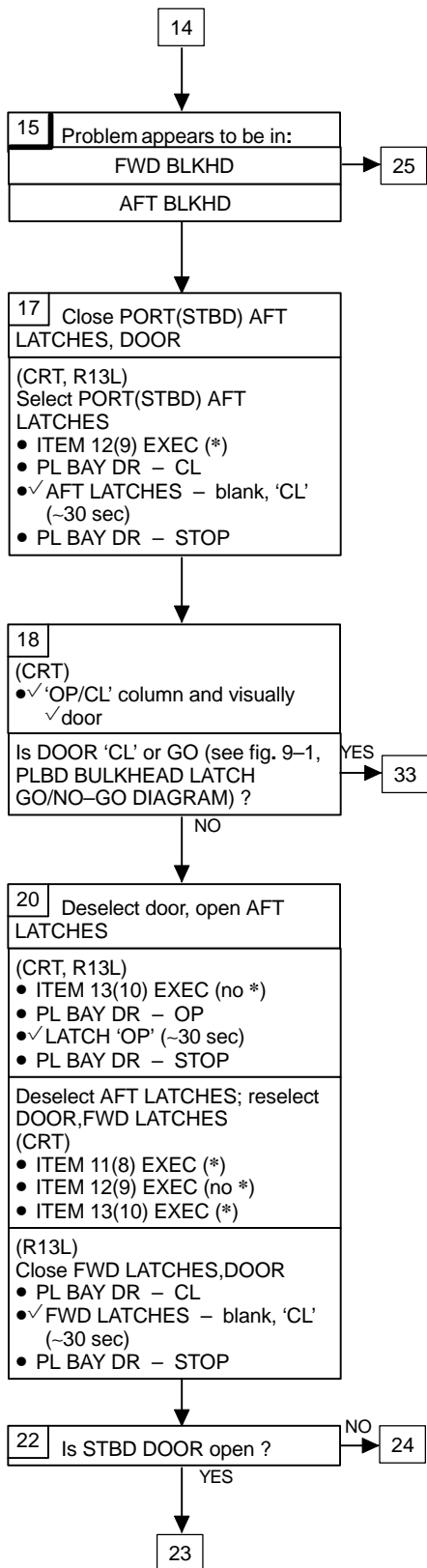
This procedure assumes that DOOR has jammed in 'RDY' position resulting from orbiter thermal warpage or debris



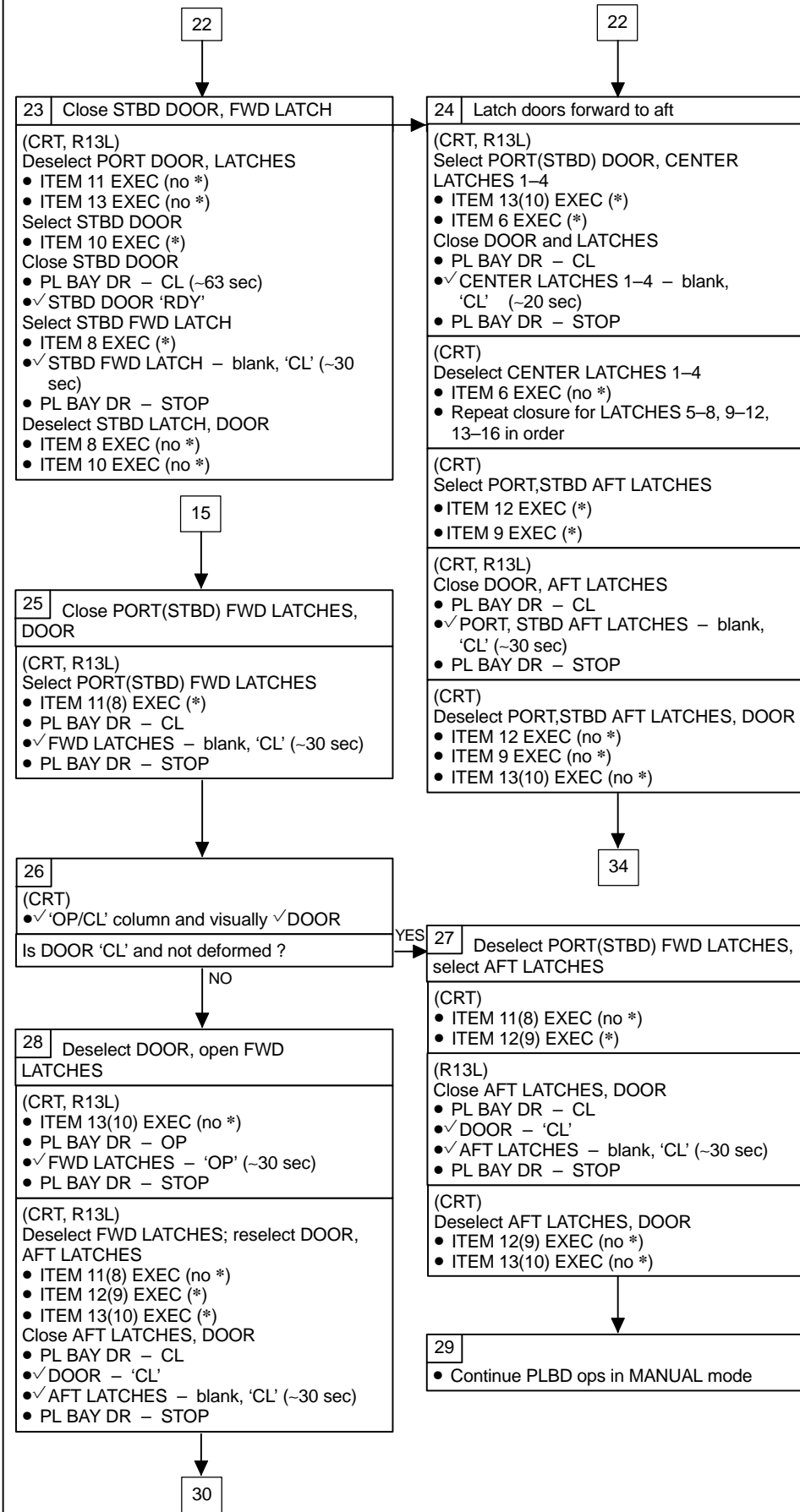
MECH SSR-2 (Cont)



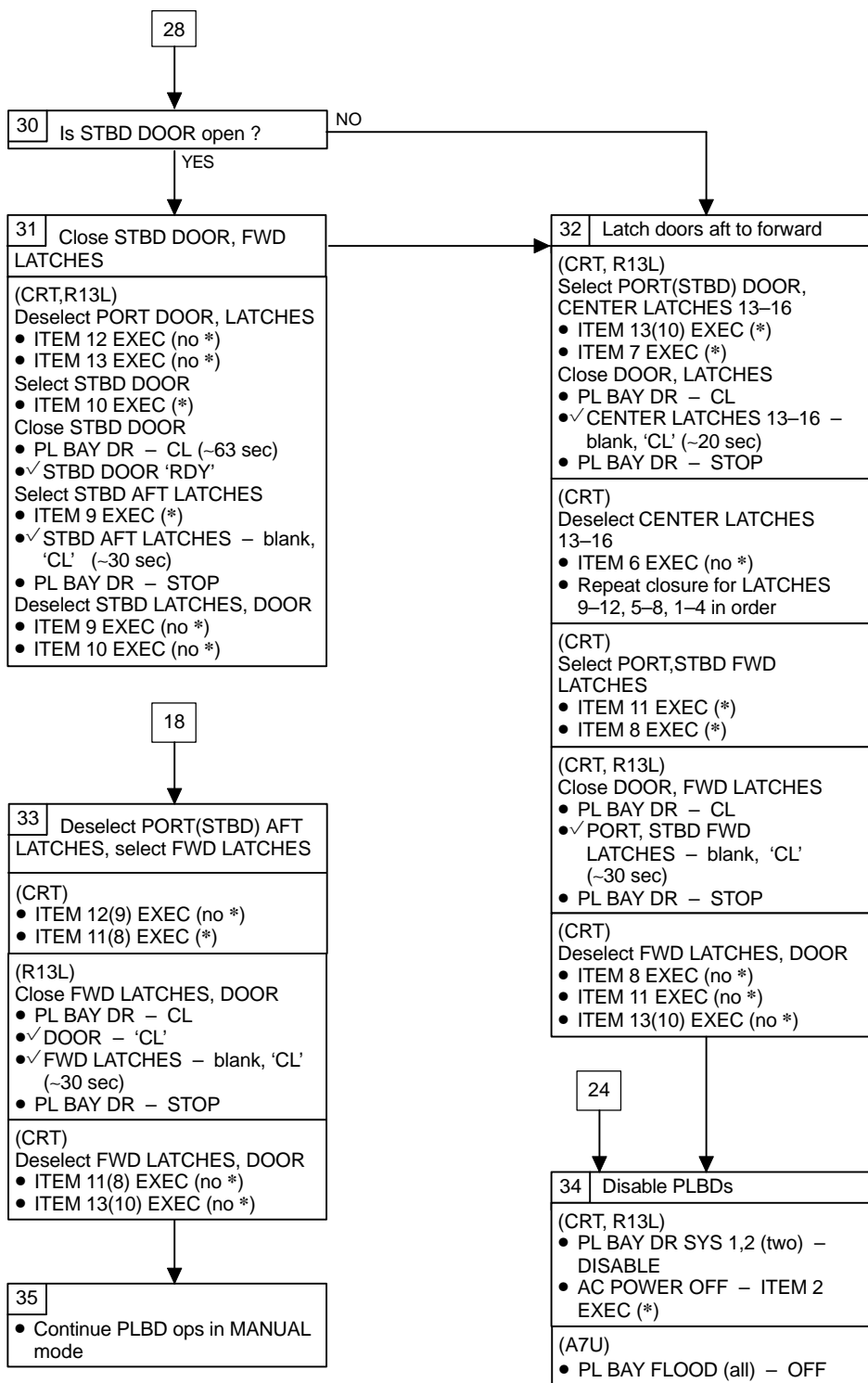
MECH SSR-2 (Cont)



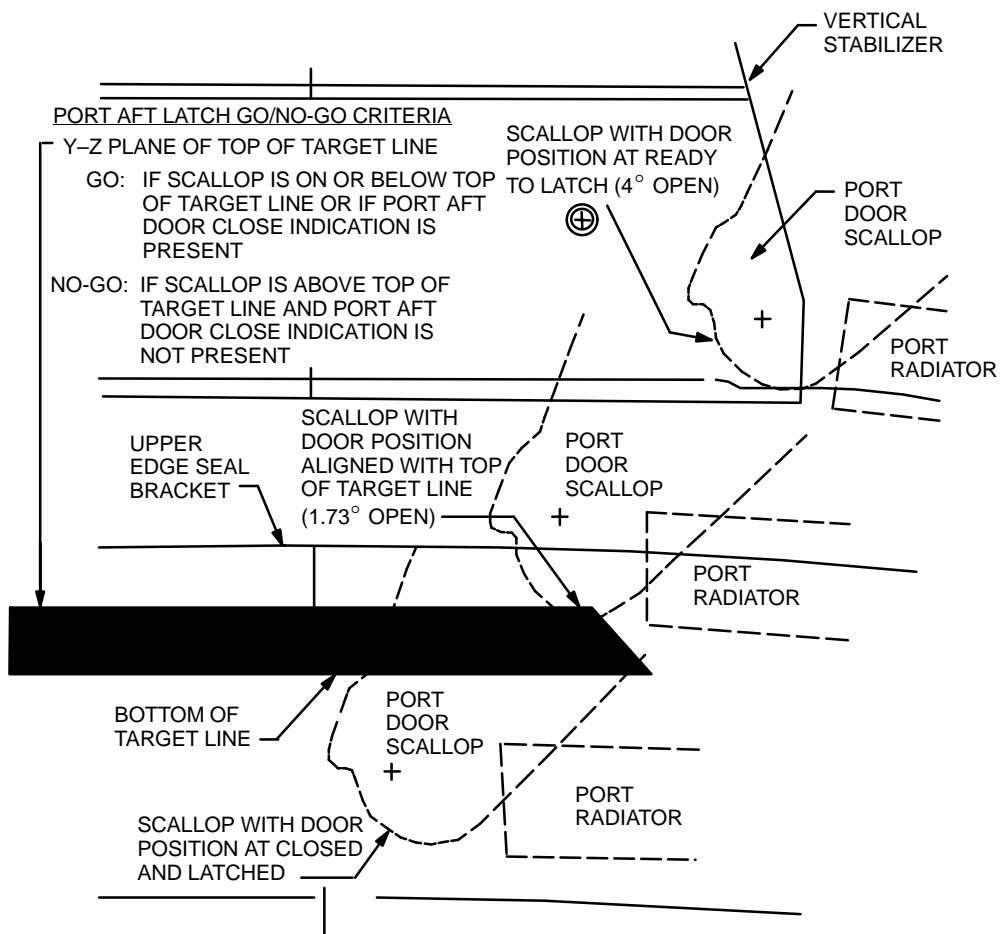
MECH SSR-2 (Cont)



MECH SSR-2 (Cont)



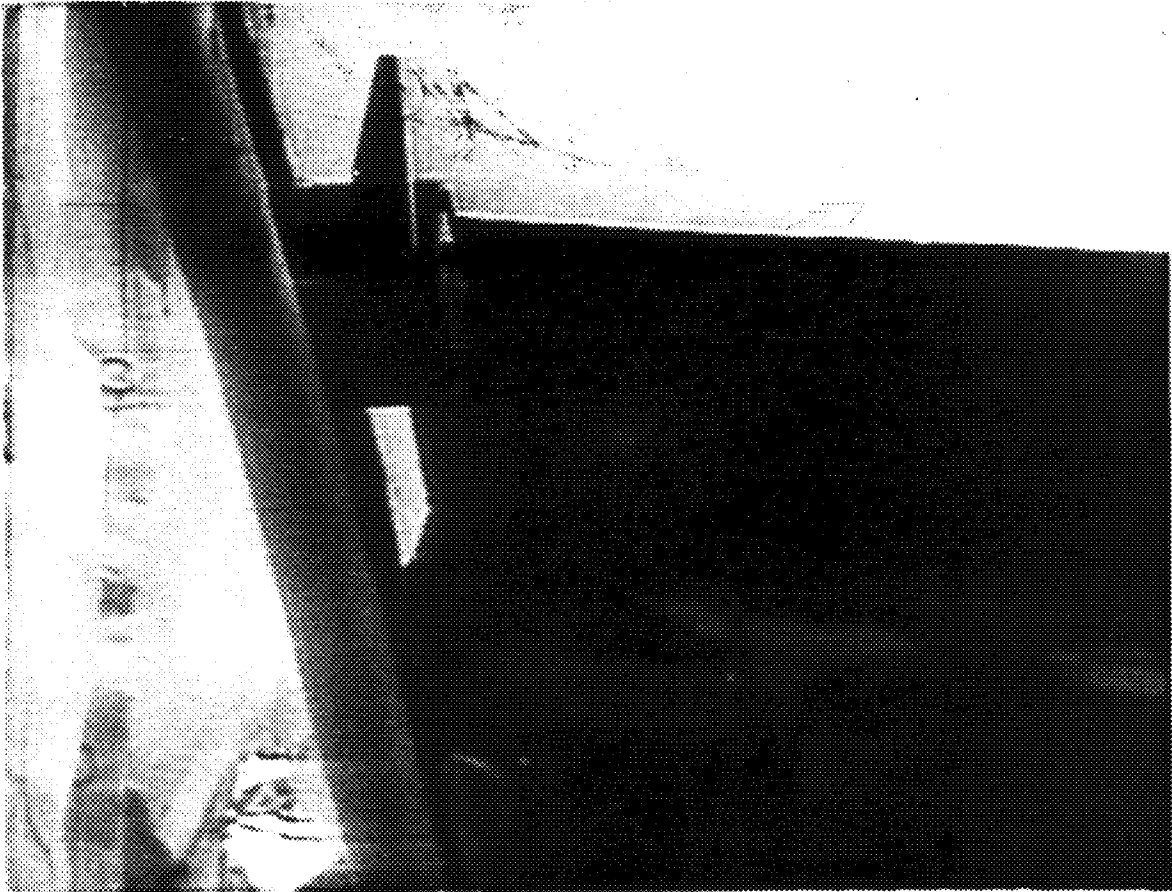
MECH SSR-2 (Cont)



(REVERSE FOR STBD DOOR)

Figure 9-1.- PLBD bulkhead latch GO/NO-GO diagram.

MECH SSR-2 (Cont)



Shows worst case deflection up of aft breather panel seen on STS-4

Figure 9-2.- Port Aft C/L viewed by Camr C.

MECH SSR-3 SIMULTANEOUS PLBD CL

Excessive C/L Overlap Noted with PORT DOOR Closed and Latched Entry Req'd Next Opportunity

STBD DOOR extended guide roller trajectory is above point D on DEORBIT PREP C/L NO-GO Diagram

① Allows LATCHES to unlatch partially while remaining captured

1 Disable one mtr in each actuator (R13L)
 • PL BAY DR SYS
 1 - DSBL

4 SM (BFS SM 63) PL BAY DOORS
 Deselect 'AUTO MODE SEL'
 • ITEM 3 EXEC (no *)
 • ✓ 'MAN SEL' (ten) - (no *)

5 Open STBD DOOR 2-3 stripes
 (CRT)
 • ✓ STBD FWD, AFT LATCHES (two) - 'OP'

Select STBD DOOR
 • ITEM 10 EXEC (*)

(CRT, R13L)
 • PL BAY DR - OP (~25 sec)
 • ✓ STBD DOOR - 'RDY', blank
 • PL BAY DR - STOP

(CRT)
 Deselect STBD DOOR:
 • ITEM 10 EXEC (no *)

9 Open PORT BLKHDS 19 sec

(CRT)
 Select PORT FWD, AFT LATCHES
 • ITEM 11 EXEC (*)
 • ITEM 12 EXEC (*)

(CRT, R13L)
 • PL BAY DR - OP (19 sec)
 • ✓ PORT FWD, AFT LATCHES - blank
 • PL BAY DR - STOP

(CRT)
 Deselect PORT FWD, AFT LATCHES
 • ITEM 11 EXEC (no *)
 • ITEM 12 EXEC (no *)

9 Close STBD DOOR until just before contact with PORT DOOR

(CRT)
 Select STBD DOOR
 • ITEM 10 EXEC (*)

(CRT, R13L)
 • PL BAY DR - CL
 • ✓ STBD DOOR - blank, 'RDY'
 • PL BAY DR - STOP

(CRT)
 Deselect STBD DOOR
 • ITEM 10 EXEC (no *)

6 ✓ ENTRY DAY NO-GO DIAGRAM C/L LATCH EXTENDED GUIDE ROLLER TRAJECTORY, fig. 9-3
 NO-GO for PLBD closing ?
 NO YES

8 Open STBD DOOR 2-3 stripes

(CRT)
 Select STBD DOOR
 • ITEM 10 EXEC (*)

(CRT, R13L)
 • PL BAY DR - OP (~25 sec)
 • ✓ STBD DOOR - 'RDY', blank
 • PL BAY DR - STOP

(CRT)
 Deselect STBD DR
 • ITEM 10 EXEC (no *)

3 Open PORT BLKHDS to 'OP'

(CRT)
 Select PORT FWD, AFT LATCHES
 • ITEM 11 EXEC (*)
 • ITEM 12 EXEC (*)

(CRT, R13L)
 • PL BAY DR - OP
 • ✓ PORT FWD, AFT LATCHES (two) - blank, 'OP' (~41 sec)
 • PL BAY DR - STOP

(CRT)
 Deselect PORT FWD, AFT LATCHES
 • ITEM 11 EXEC (no *)
 • ITEM 12 EXEC (no *)

7 Close STBD DOOR until just before contact with PORT DOOR

(CRT)
 Select STBD DOOR
 • ITEM 10 EXEC (*)

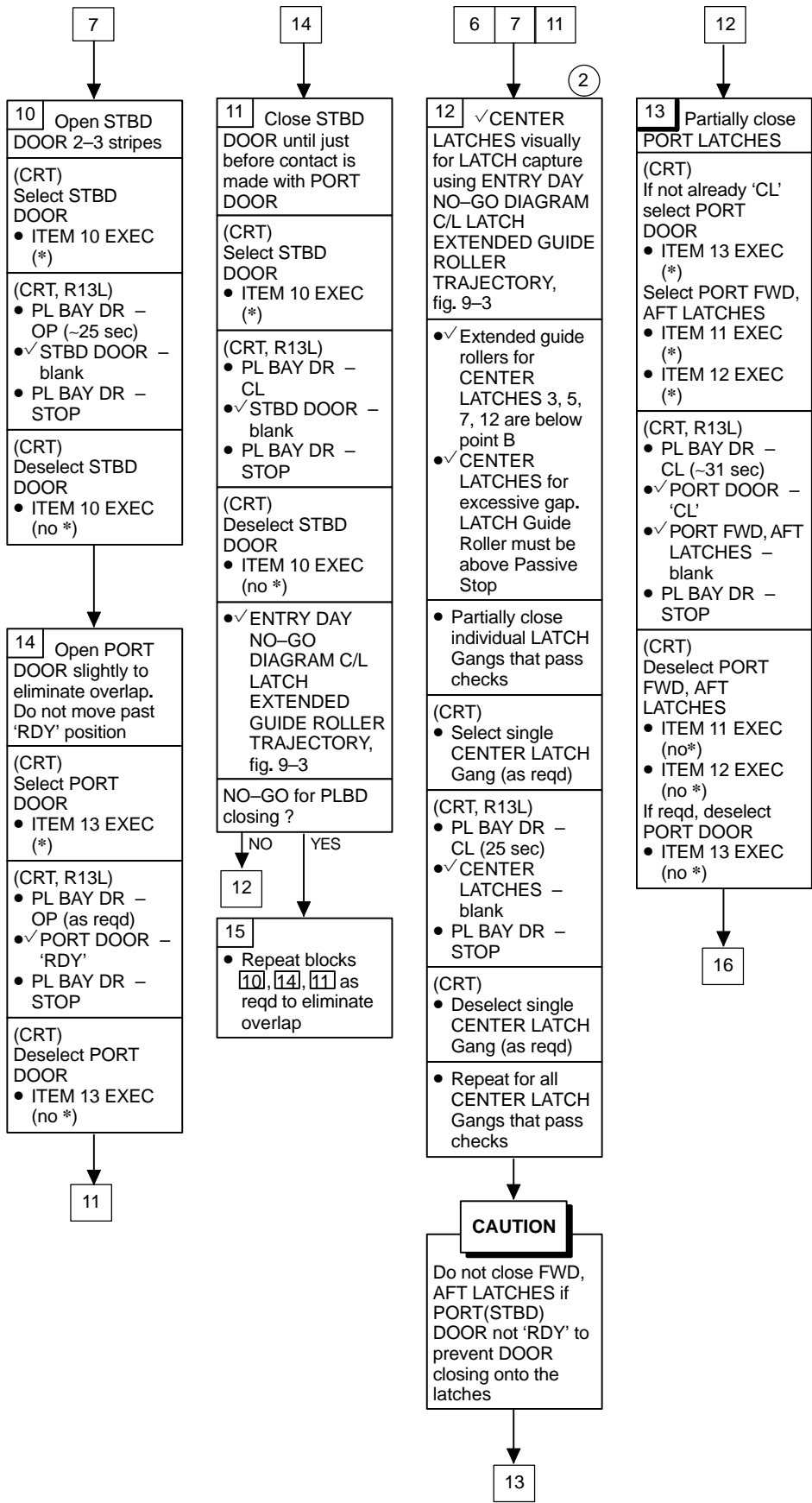
(CRT, R13L)
 • PL BAY DR - CL
 • ✓ STBD DOOR - blank
 • PL BAY DR - STOP

(CRT)
 Deselect STBD DOOR
 • ITEM 10 EXEC (no *)
 • ✓ ENTRY DAY NO-GO DIAGRAM C/L LATCH EXTENDED GUIDE ROLLER TRAJECTORY, fig. 9-3

NO-GO for PLBD closing ?

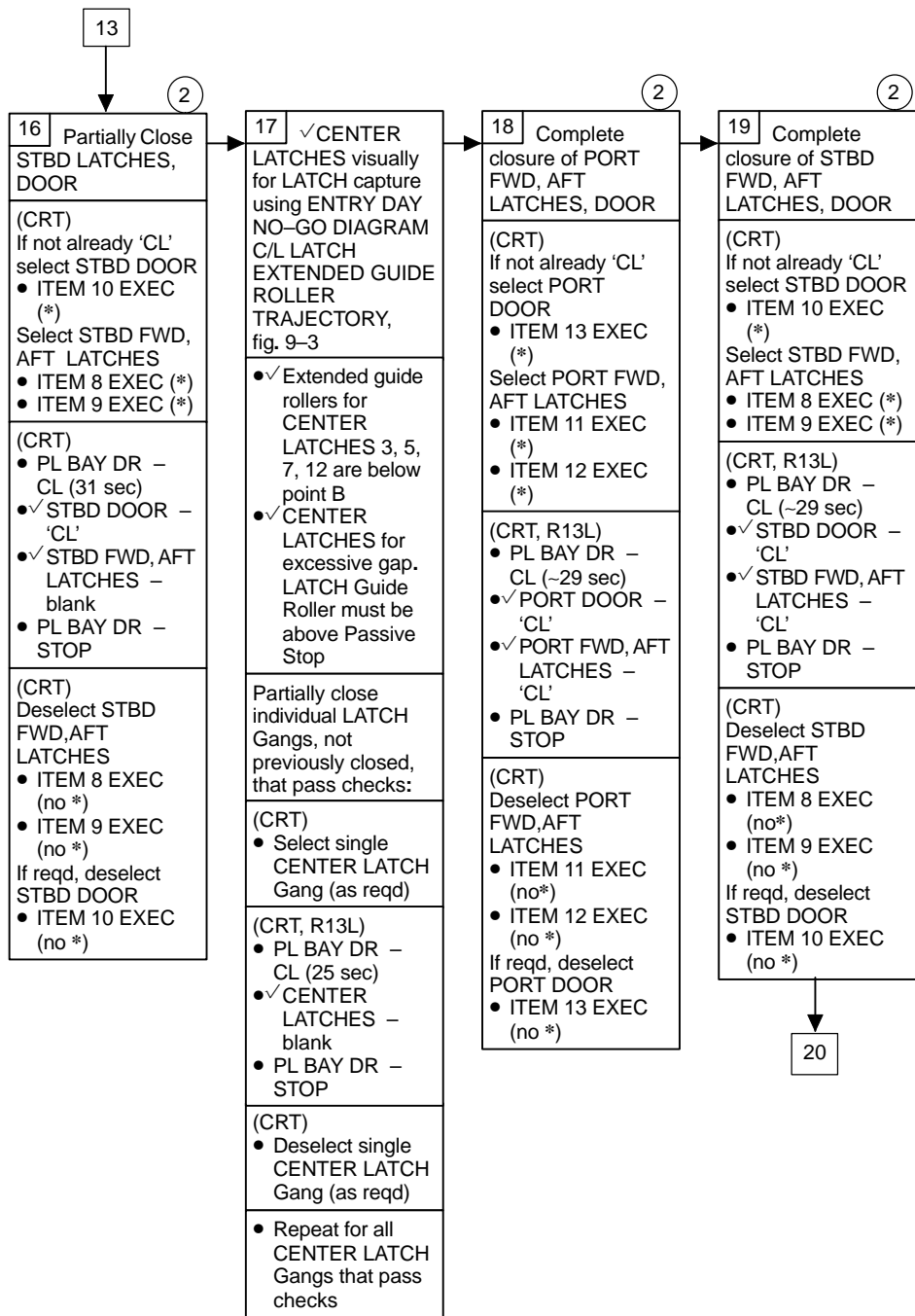
YES NO
 10 12

MECH SSR-3 (Cont)



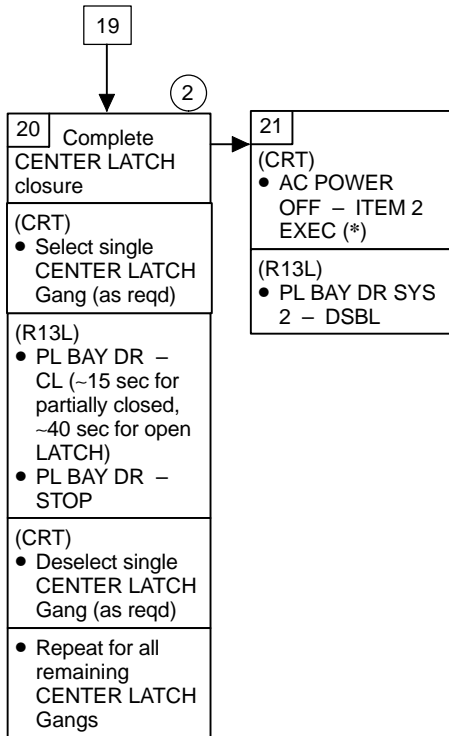
② Allows LATCHES to latch partially

MECH SSR-3 (Cont)



② Allows LATCHES to latch partially

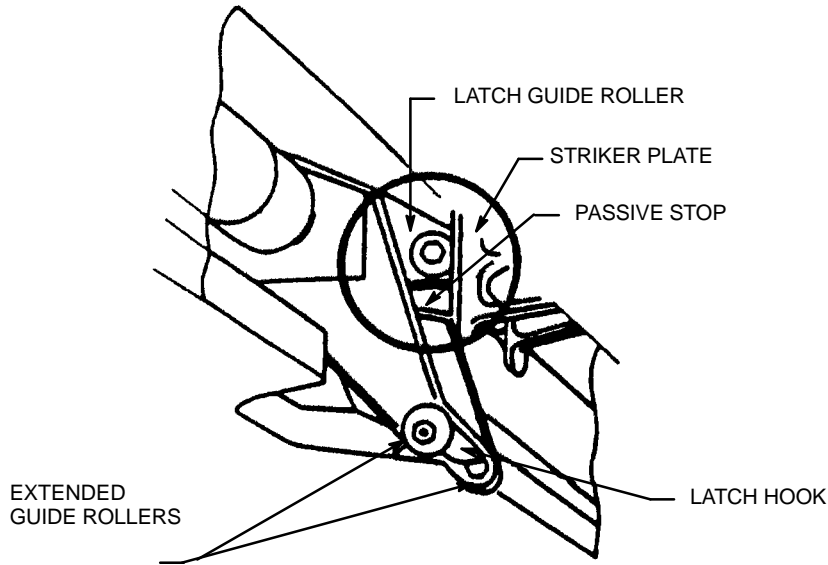
MECH SSR-3 (Cont)



② Allows LATCHES to latch partially

MECH SSR-3 (Cont)

NO. 1 LATCH AREA TO CHECK FOR EXCESSIVE GAP



VIEW OF NO. 1 C_L LATCH FROM PORT AFT WINDOW

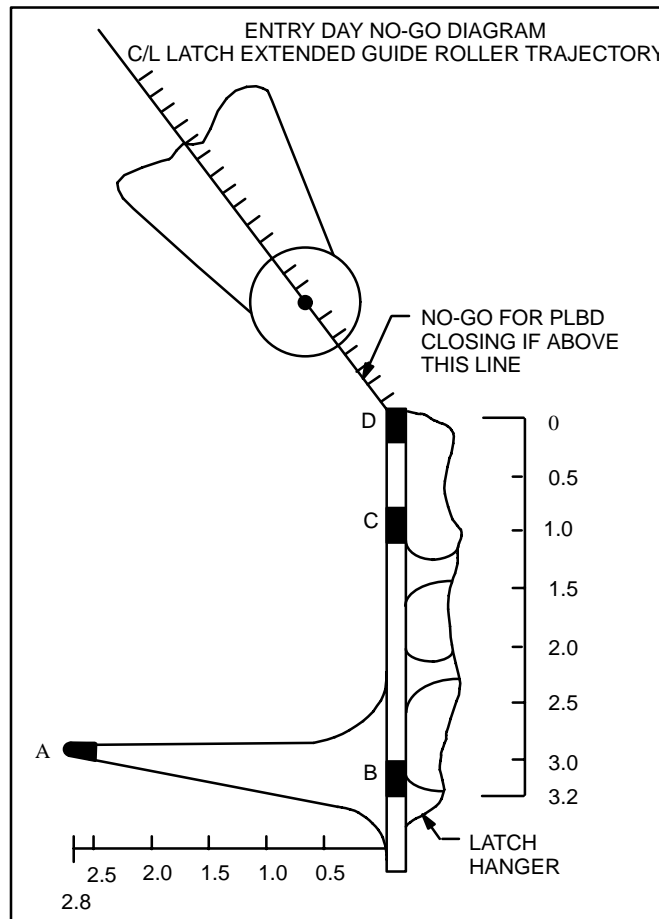
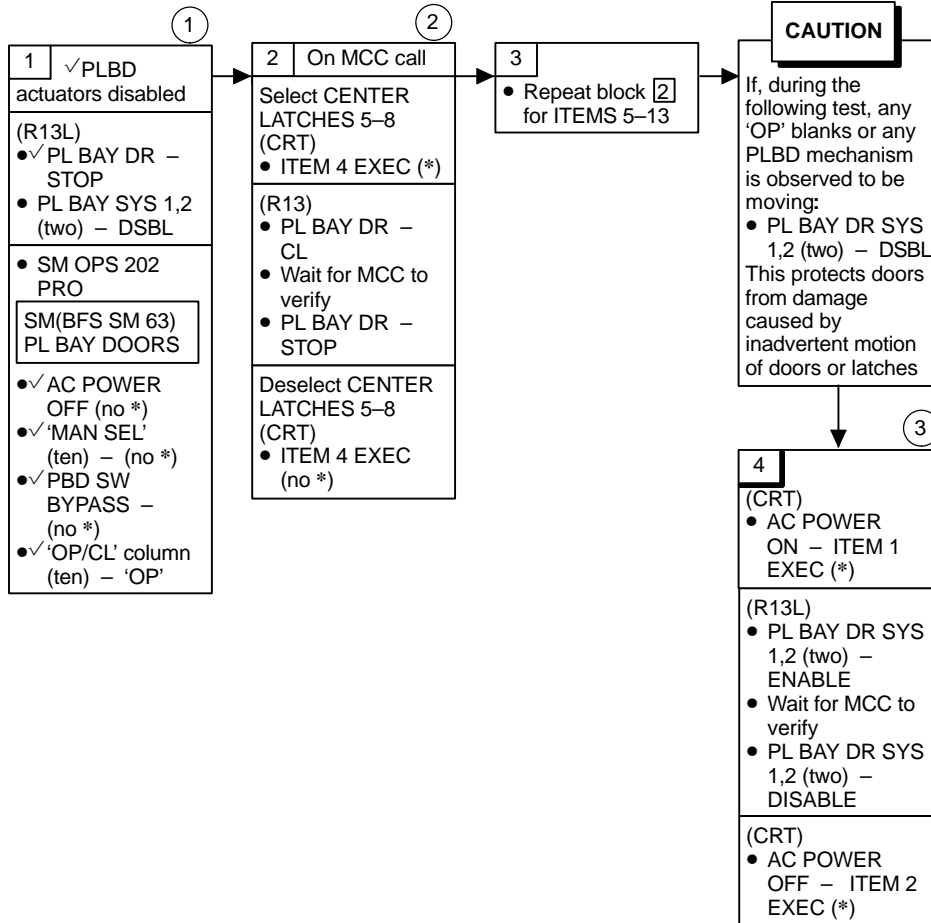


Figure 9-3.- Entry day NO-GO diagram.

MECH SSR-4 PLBD CHECKOUT AFTER MDM CHANGEOUT



- ① Procedure assumes doors and latches open
- ② MCC to check MCA relay status
- ③ MCC to check enable relay status

MECH SSR-5

CONTINGENCY KU-BD ANT DIRECT STOW

CAUTION

✓MCC to verify Gimbals are locked
before applying this procedure

Config CCTVs to monitor KU Ant motion
Point CCTV as reqd
Record all motion on VTR

R13L ✓ PL BAY MECH PWR SYS (two) – OFF
A1U KU PWR – OFF
CNTL – PNL
R13L ANT – GND

CAUTION

Ku Ant switch must be in GND position prior
to use of Direct Stow sw to prevent
phase-to-phase short of STO/DPY mtrs

KU ANT DIRECT STO – ON
PL BAY MECH PWR SYS (two) – ON
✓ KU ANT tb – bp

When KU ANT tb – STO (~23-46 sec),
KU ANT DIRECT STO – OFF
PL BAY MECH PWR SYS (two) – OFF

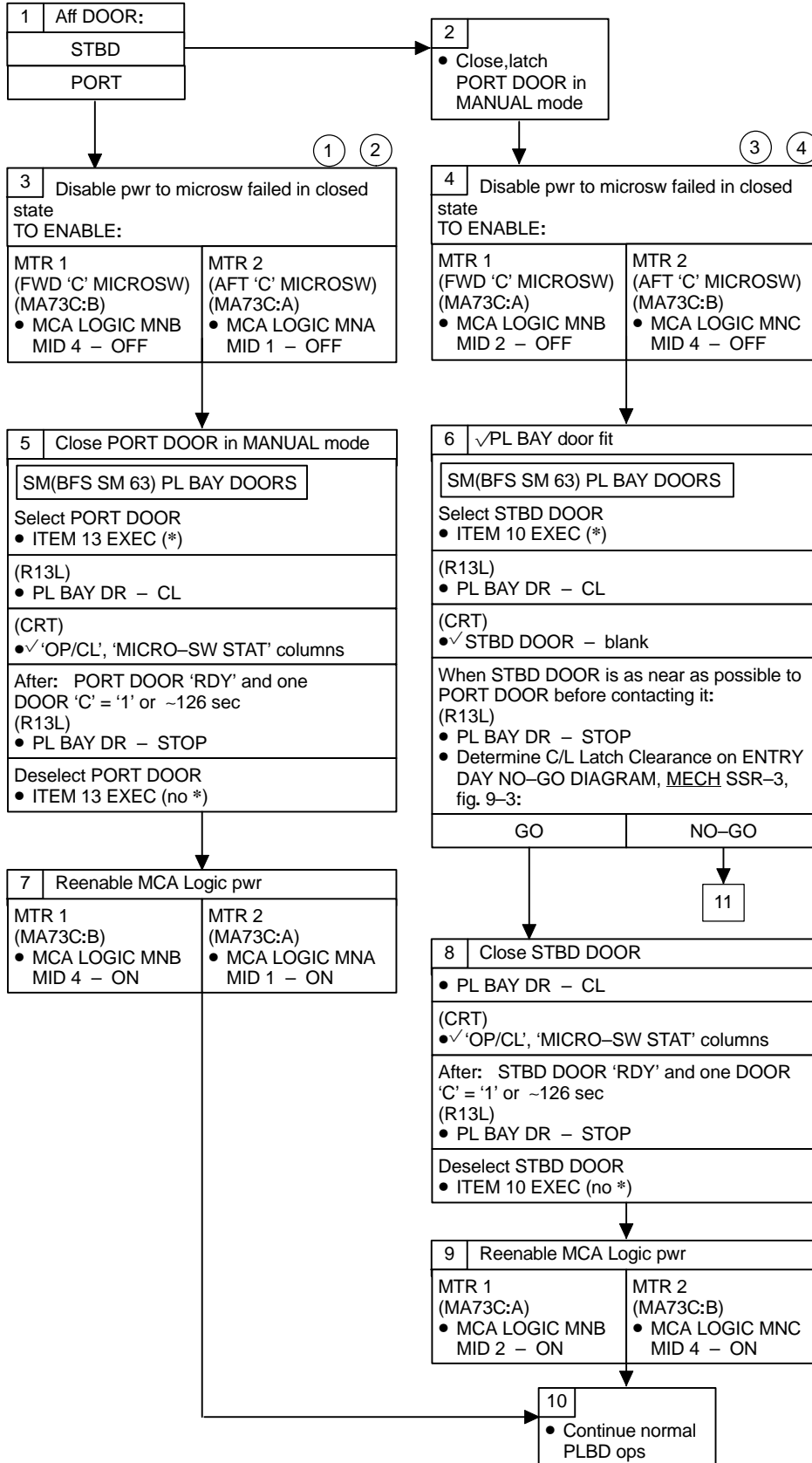
✓ KU-BD is within STO envelope

NOTE

KU-BD CCTV overlay is located in
Middeck Transparency Kit

MECH SSR-6 PLBD CL MICROSW FAILURE WORKAROUND

This procedure regains door close capability for door-closed microsw failed-on (closed) (Mtr 1 or Mtr 2 inhibited from running). Procedure will not work for opening or closing latches or opening doors



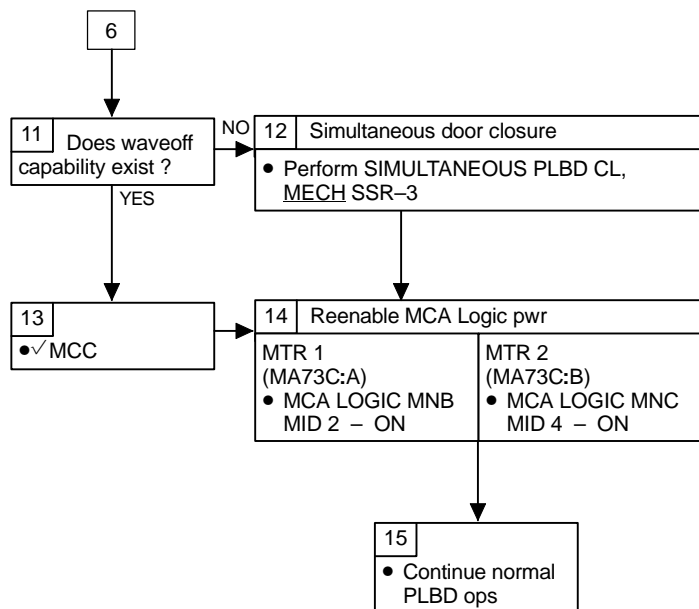
① To enable mtr 1, this step also disables pwr to:
PORT FWD BLKHD
MTR 2
STBD DOOR
MTR 2
STBD FWD BLKHD
MTR 2

② To enable mtr 2, this step also disables pwr to:
PORT FWD BLKHD
MTR 1
STBD DOOR
MTR 1
STBD FWD BLKHD
MTR 1
C/L 9-12 MTR 1

③ To enable mtr 1, this step also disables pwr to:
PORT DOOR
MTR 2
STBD AFT BLKHD
MTR 2
C/L 13-16 MTR 2

④ To enable mtr 2, this step also disables pwr to:
PORT DOOR
MTR 1
STBD AFT BLKHD
MTR 1
C/L 9-12 MTR 2
C/L 13-16 MTR 1

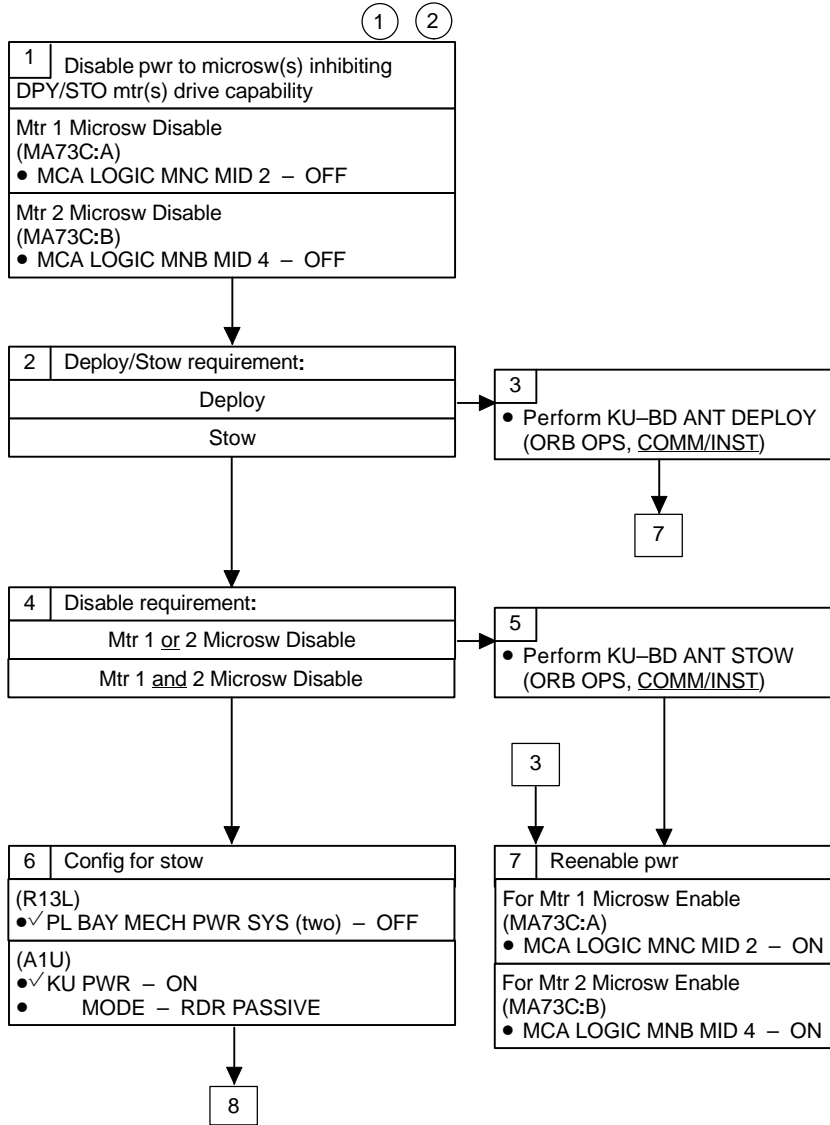
MECH SSR-6 (Cont)



MECH SSR-7 KU-BAND ANTENNA DPY/STO MICROSW FAILURE

NOTE

This procedure regains capability to deploy or stow antenna if (DPY/STO) microsw(s) is (are) failed on, inhibiting deploy/stow mtr ops



- ① Logic pwr does not inhibit mtr drive capability if pwrd off
- ② Inhibiting logic pwr to both mtr microswitches inhibits pwr for Boom Stow Enable II signals. KU ANT DIRECT STOW sw must be used to stow deployed assy

MECH SSR-7 (Cont)

6

8	Lock Gimbals
<ul style="list-style-type: none"> • DAP: VERN(FREE) 	
(A1U)	
<ul style="list-style-type: none"> • SLEW RATE – as reqd • ELEV – as reqd 	
(A2)	
<ul style="list-style-type: none"> • R/EL ind: $-27.0 (\pm 1^\circ)$ 	
(A1U)	
<ul style="list-style-type: none"> • SLEW AZM – as reqd 	
(A2)	
<ul style="list-style-type: none"> • R/AZM ind: $-123.0 (\pm 1^\circ)$ 	
(R13L)	
<ul style="list-style-type: none"> • KU ANT – STOW 	

CAUTION

KU ANT sw must remain in STOW until after KU PWR sw is in OFF

9	
After 50 sec:	
(A2)	
<ul style="list-style-type: none"> • ✓ R/EL ind: $-29.0 (\pm 1^\circ)$ • ✓ R/AZM ind: $-125.0 (\pm 1^\circ)$ 	
(A1U)	
<ul style="list-style-type: none"> • KU PWR – OFF • CNTL – PNL 	
(R14C)	
<ul style="list-style-type: none"> • cb MNB KU ELEC – op • MNC KU SIG PROC – op 	
(R13L)	
<ul style="list-style-type: none"> • KU ANT – GND 	
<ul style="list-style-type: none"> • DAP: as reqd 	

2 3

10	Stow deployed assy
(R13L)	
<ul style="list-style-type: none"> • KU ANT DIRECT STO – ON • PL BAY MECH PWR SYS (two) – ON 	
After 23 sec max:	
<ul style="list-style-type: none"> • PL BAY MECH PWR SYS (two) – OFF • KU ANT DIRECT STO – OFF 	
<ul style="list-style-type: none"> • ✓ KU-BD deployed assy is within GO FOR PLBD CLOSURE envelope 	

11	Reenable pwr
For Mtr 1 Microsw Enable (MA73C:A)	
<ul style="list-style-type: none"> • MCA LOGIC MNC MID 2 – ON 	
For Mtr 2 Microsw Enable (MA73C:B)	
<ul style="list-style-type: none"> • MCA LOGIC MNB MID 4 – ON 	

2 Inhibiting logic pwr to both mtr microswitches inhibits pwr for Boom Stow Enable II signals. KU ANT DIRECT STOW sw must be used to stow deployed assy

3 KU-BD CCTV overlay is located in Middeck Transparency Kit

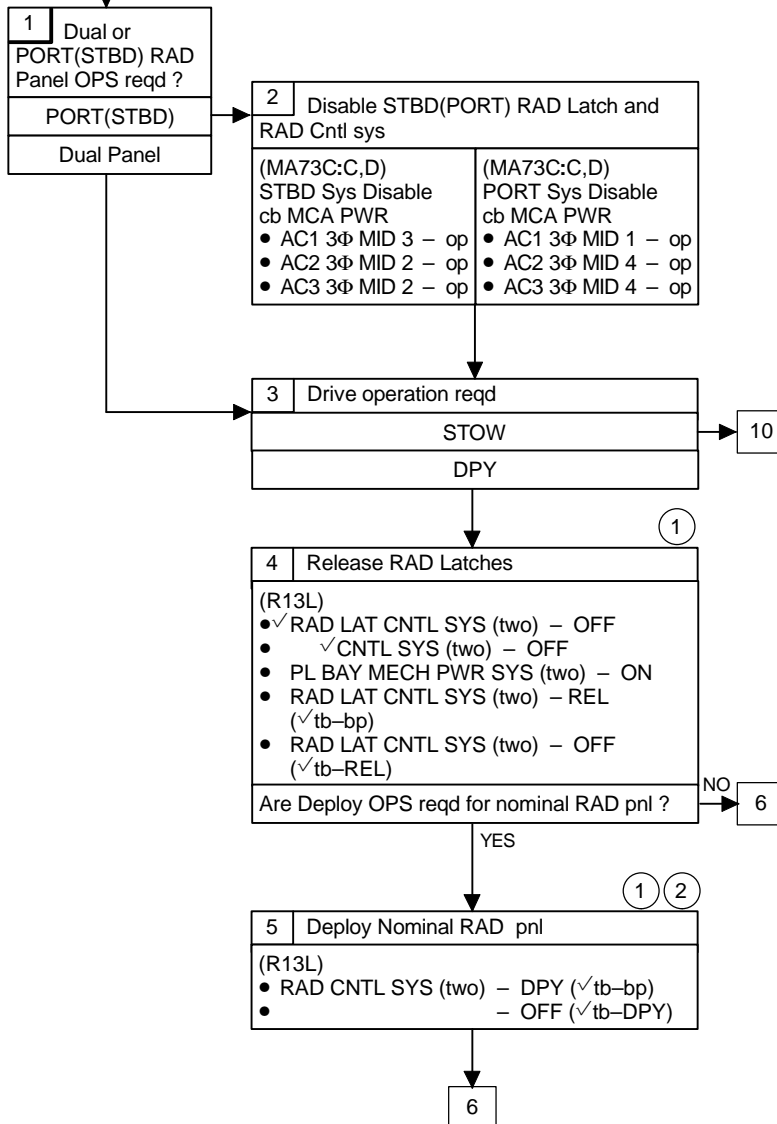
MECH SSR-8 RAD DPY/STO MICROSW FAILURE WORKAROUND

NOTE

This procedure regains radiator panel deploy or stow capability if DPY/STO microsw(s) is (are) failed on, inhibiting deploy/stow mtr ops. This procedure accommodates PORT(STBD) and/or dual panel ops

WARNING

To preclude failures causing inadvertent MPM cycling, the RMS (if flown) must be cradled if PORT RAD deploy ops are required. This procedure assumes that the RMS is cradled



1 PDU Actuator Times (Dual Mtr)
Lat - 30 sec
Rad - 50 sec (Single Mtr)
Lat - 60 sec
Rad - 100 sec

2 For either a dual microsw or microsw/mtr failure, failed pnl will be inhibited from driving

MECH SSR-8 (Cont)

4 5

6 | Disable pwr to failed-on microsw(s)	
Port	Stbd
(MA73C:A) MTR 1 Microsw Disable • MCA LOGIC MNC MID 2 – OFF	(MA73C:B) MTR 1 Microsw Disable • MCA LOGIC MNC MID 4 – OFF
(MA73C:B) MTR 2 Microsw Disable • MCA LOGIC MNA MID 3 – OFF	(MA73C:B) MTR 2 Microsw Disable • MCA LOGIC MNA MID 1 – OFF

① ③ ④

7 | DPY RAD pnl with failed-on microsw(s)
(R13L) On MCC GO: • RAD CNTL SYS (two) – DPY • RAD CNTL SYS (two) – OFF (After 50 sec max) • Visually verify RAD pnl is deployed • ✓ MCC to confirm RAD pnl is deployed • PL BAY MECH PWR SYS (two) – OFF

8 | Enable pwr to failed-on microsw(s)	
Port	Stbd
(MA73C:A) MTR 1 Microsw Enable • MCA LOGIC MNC MID 2 – ON	(MA73C:B) MTR 1 Microsw Enable • MCA LOGIC MNC MID 4 – ON
(MA73C:B) MTR 2 Microsw Enable • MCA LOGIC MNA MID 3 – ON	(MA73C:B) MTR 2 Microsw Enable • MCA LOGIC MNA MID 1 – ON

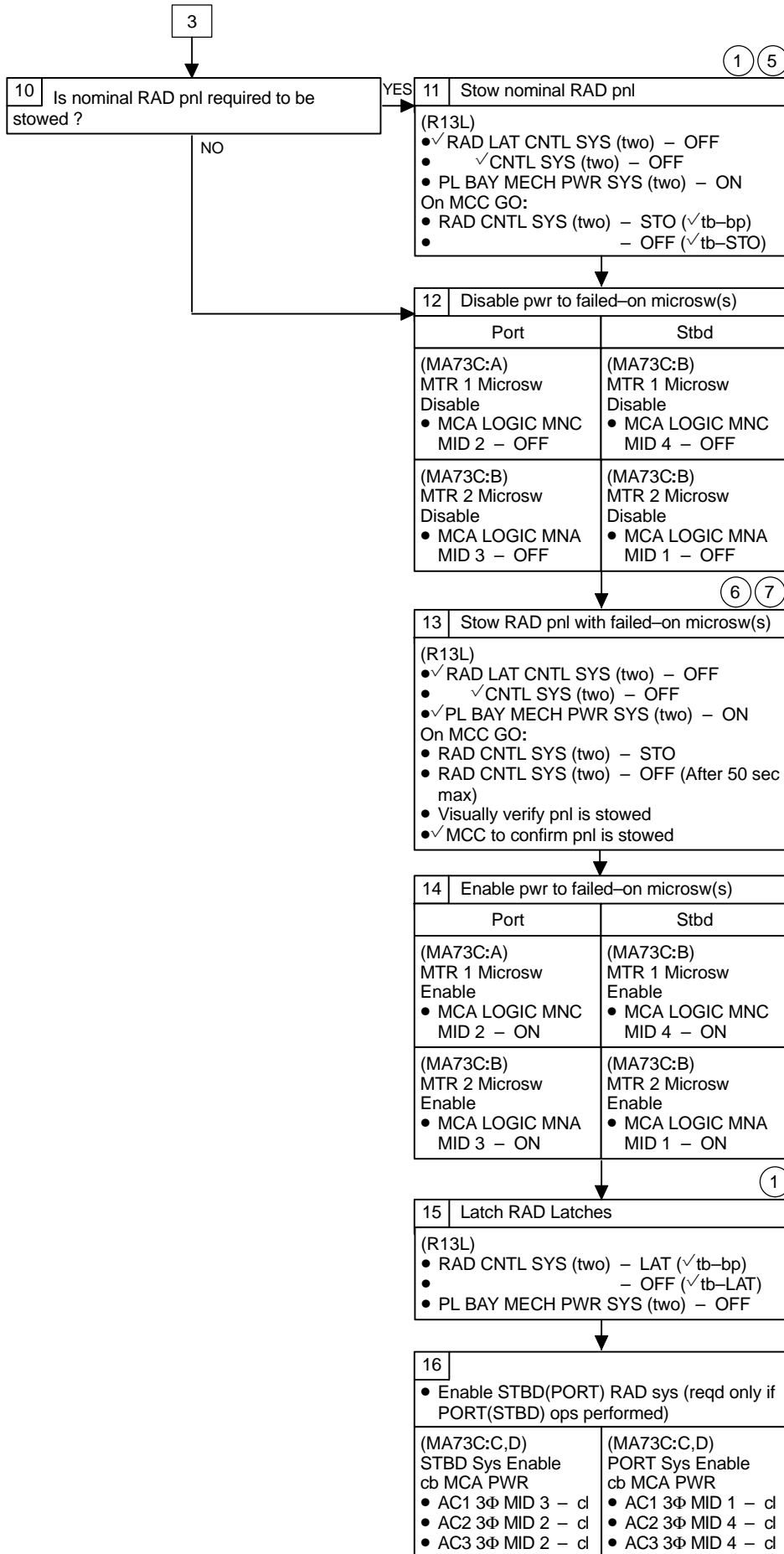
9 |	
• Enable STBD(PORT) RAD sys (if reqd)	
(MA73C:C,D) STBD Sys Enable cb MCA PWR • AC1 3Φ MID 3 – cl • AC2 3Φ MID 2 – cl • AC3 3Φ MID 2 – cl	(MA73C:C,D) PORT Sys Enable cb MCA PWR • AC1 3Φ MID 1 – cl • AC2 3Φ MID 4 – cl • AC3 3Φ MID 4 – cl

① PDU Actuator Times (Dual Mtr)
Lat – 30 sec
Rad – 50 sec
(Single Mtr)
Lat – 60 sec
Rad – 100 sec

③ Only nominal RAD Panel tb will be operational. MCC verification of AC bus slip currents will verify mechanism end-of-travel

④ For dual microsw failure expect dual mtr drive time. Expect single mtr drive time (drive for 100 sec) for microsw/mtr failure

MECH SSR-8 (Cont)



- ① **PDU Actuator Times (Dual Mtr)**
Lat – 30 sec
Rad – 50 sec
(Single Mtr)
Lat – 60 sec
Rad – 100 sec
- ⑤ For either dual microsw or microsw and mtr failure, failed pnl will be inhibited from driving
- ⑥ For dual microsw failure, expect dual mtr drive time. For microsw and mtr failure, expect single mtr drive time (drive for 100 sec)
- ⑦ RAD pnl tb is not operational. MCC verification of AC bus slip currents will verify mechanism end-of-travel

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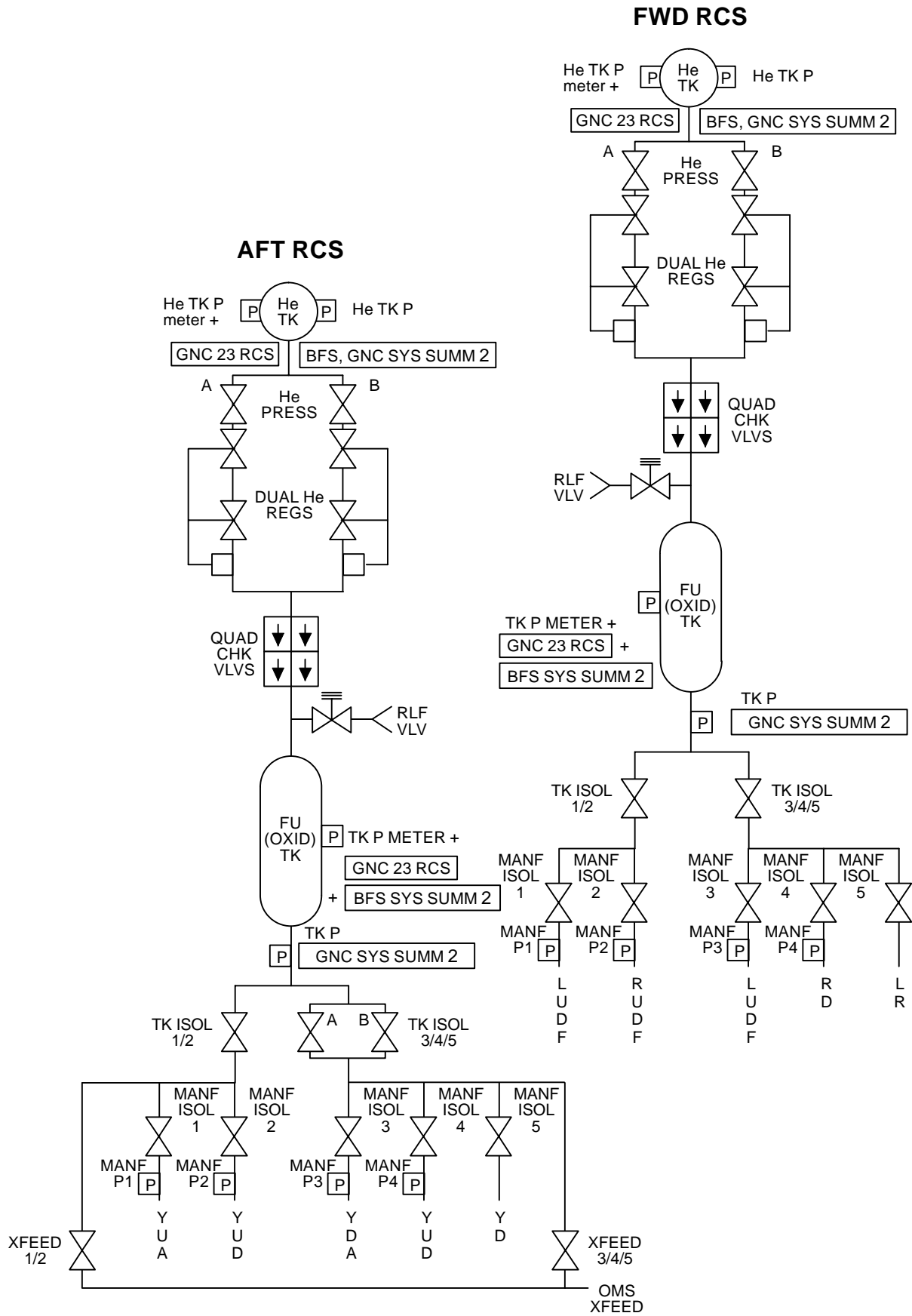
RCS

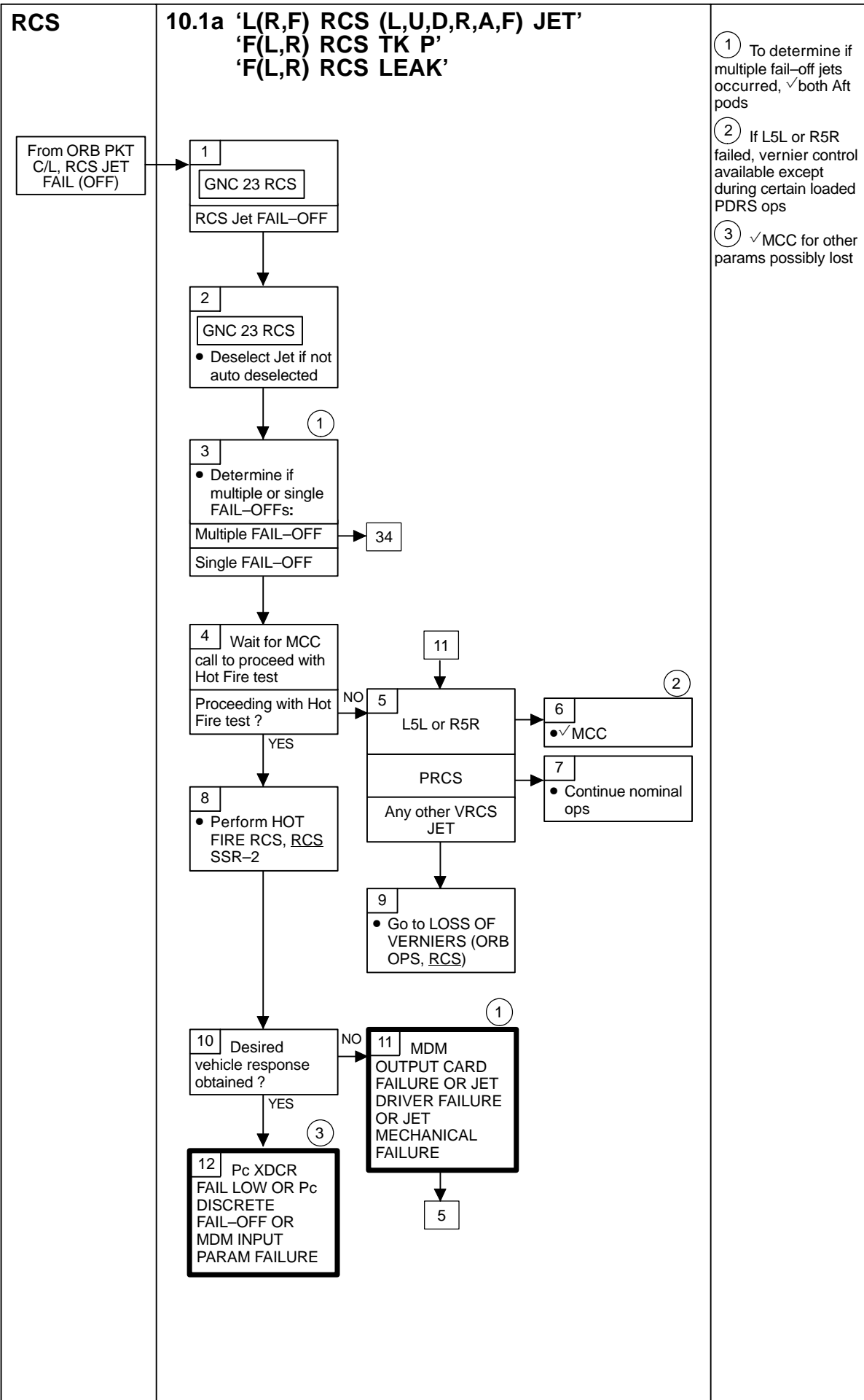
RCS SCHEMATIC	10-3
<u>10.1</u> <u>RCS JET/DLMA/PWR</u>	
10.1a 'L(R,F) RCS (L,U,D,R,A,F) JET', 'F(L,R) RCS TK P', 'F(L,R) RCS LEAK'	10-4
10.1b 'RM DLMA MANF'	10-10
10.1c 'RCS PWR FAIL'	10-11
<u>10.2</u> <u>RCS VLV MISCOMP</u>	
10.2a RCS VLV tb - bp	10-12
10.2b tb AND sw POSITION DISAGREE	10-15
<u>10.3</u> <u>RCS PRPLT THERM/SYS</u>	
10.3a 'S89 PRPLT THRM RCS'	10-16
10.3b 'G23 RCS SYSTEM F(L,R)'	10-17
<u>RCS SSR</u>	
RCS SSR-1 RCS MIXED XFEED MEM READ/WRITE	10-20
SSR-2 HOT FIRE RCS	10-22
SSR-3 AFT RCS MANF/LEG PRESS, READ/WRITE	10-25
SSR-4 STAGED, MANF REPRESS	10-27
SSR-5 LEAKING RCS PRPLT/He BURN	10-28

The following Fault Msgs have no corresponding MAL procedures in this book:

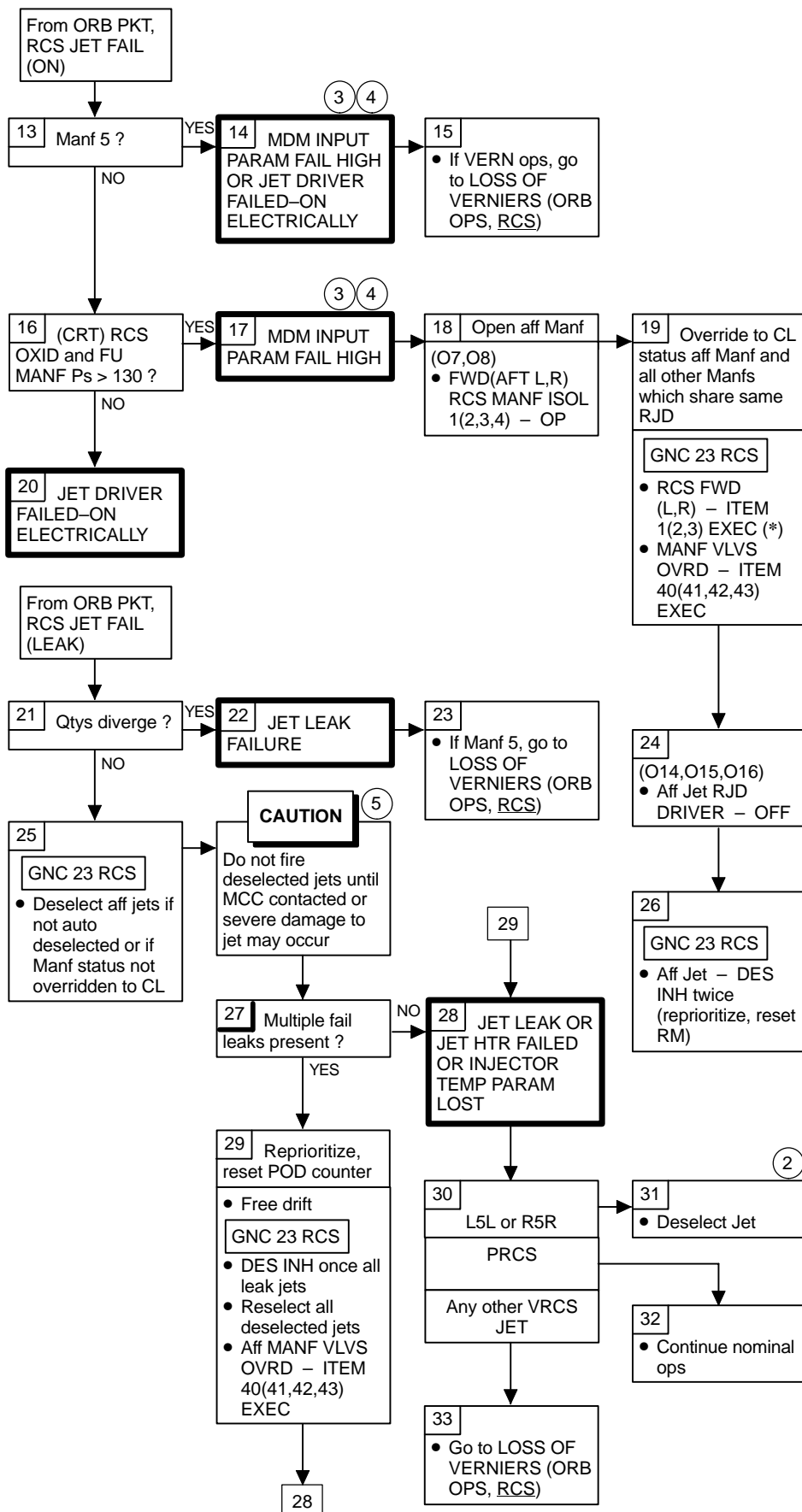
ET SEP AUTO (INH,MAN)
F(L,R) RCS PVT
F(L,R) RCS He P
G23 OMS/RCS QTY
RCS XFEED L(R)

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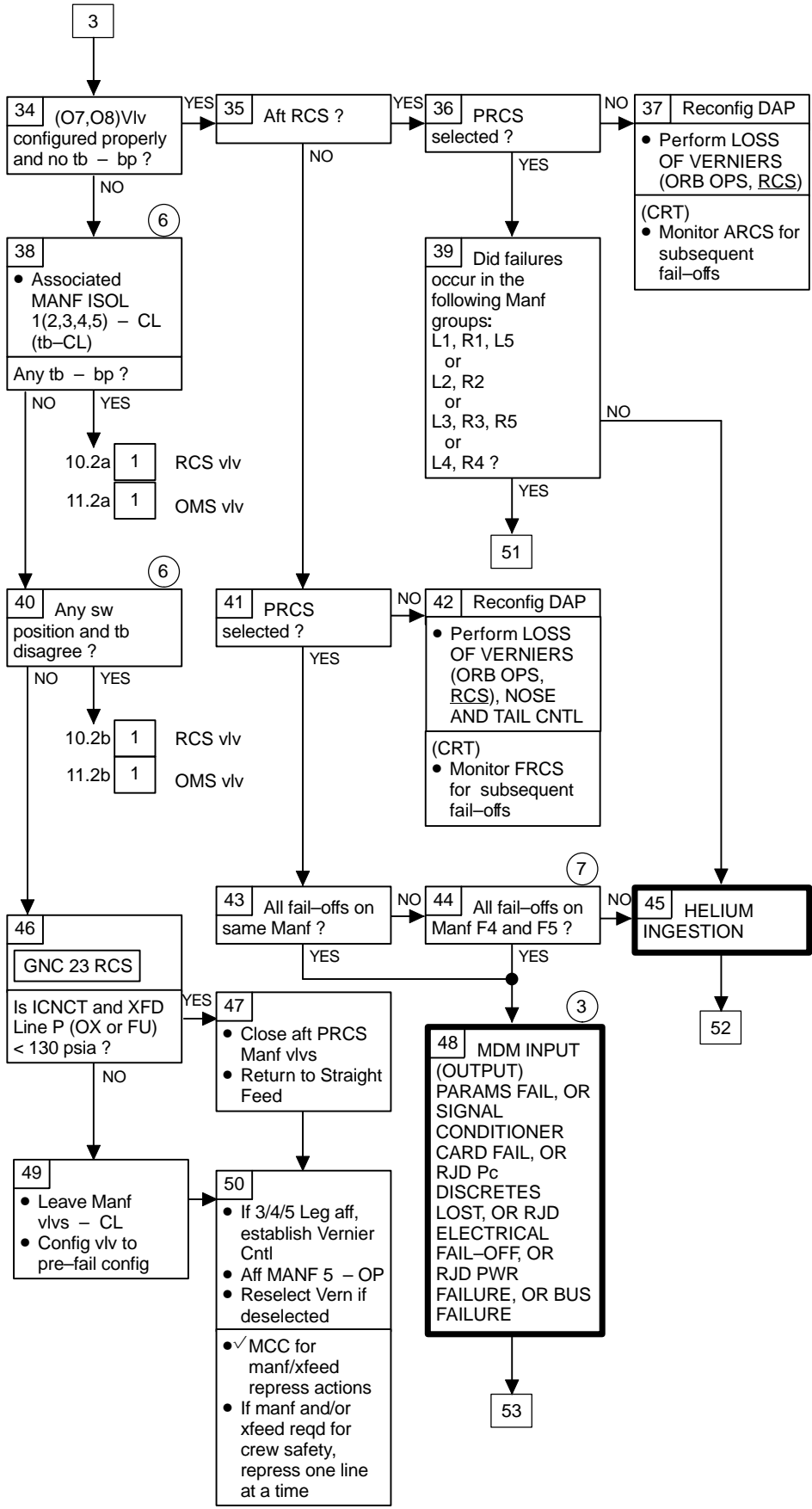


RCS 10.1a (Cont)



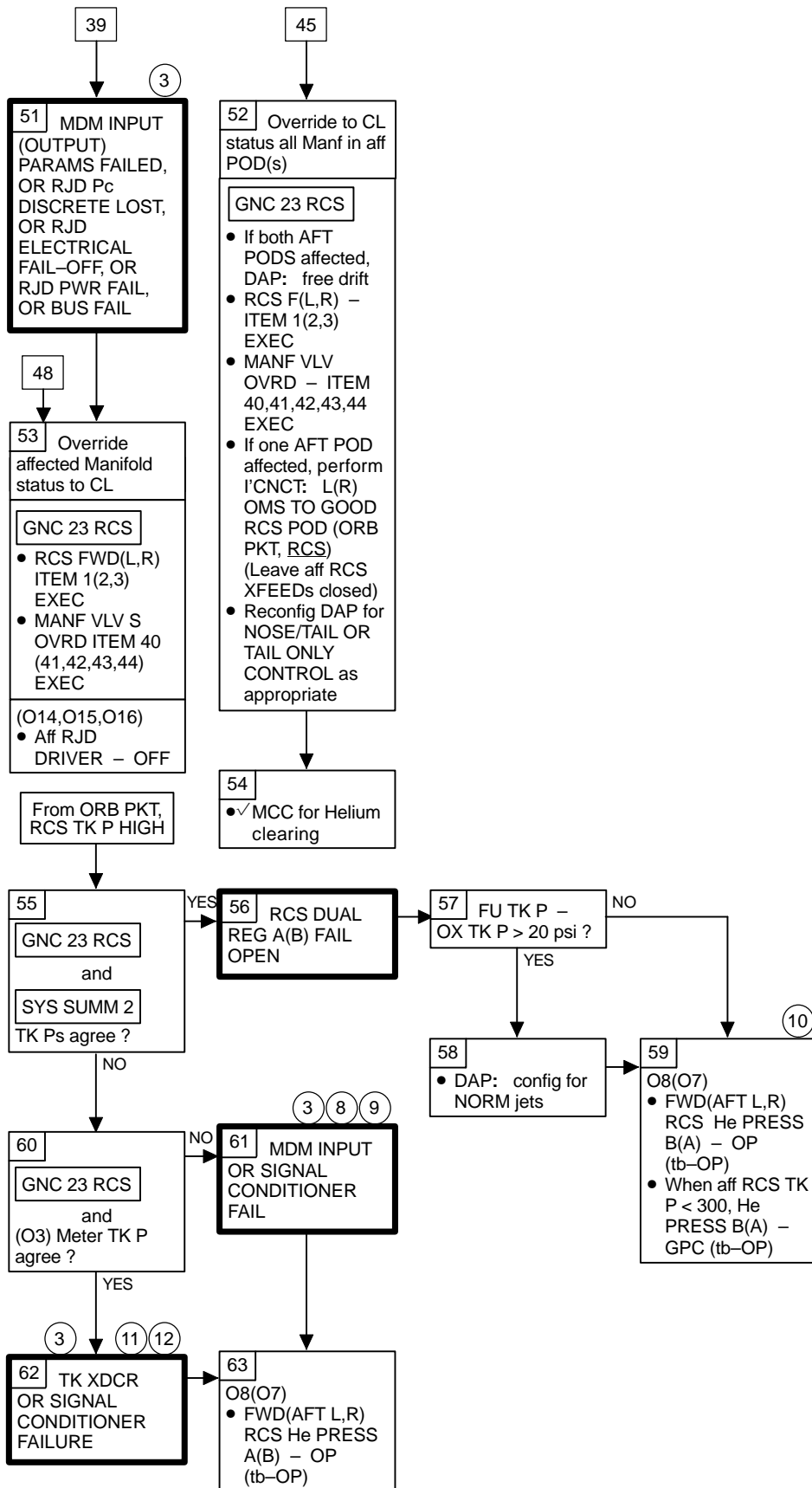
- ② If L5L or R5R failed, vernier control available except during certain loaded PDRS ops
- ③ ✓MCC for other params possibly lost
- ④ Fail-on protection lost for affected jet
- ⑤ MCC call based on jet injector temps

RCS 10.1a (Cont)



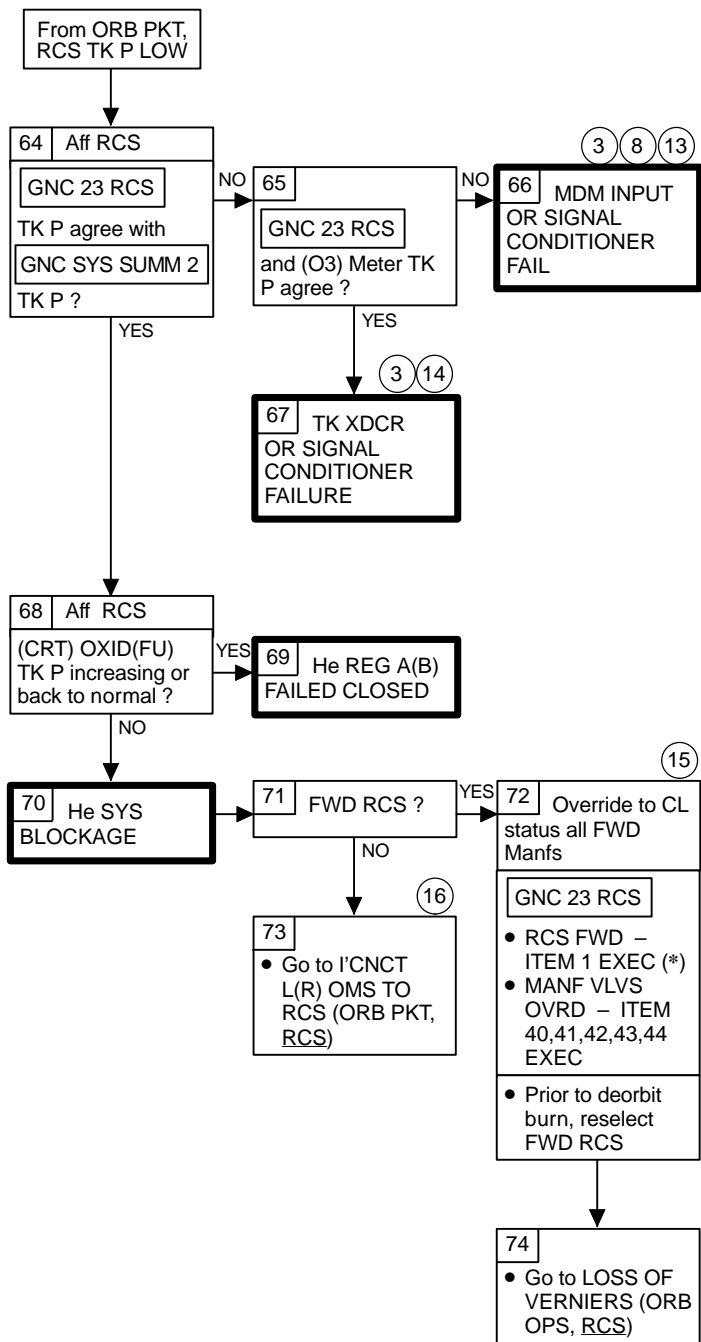
- ③ ✓MCC for other params possibly lost
- ⑥ Evacuated Manfs need to be repressed. ✓MCC for config and repress procedure
- ⑦ Both F4,F5 commanded by FF3 and return telemetry by DSC OF2

RCS 10.1a (Cont)



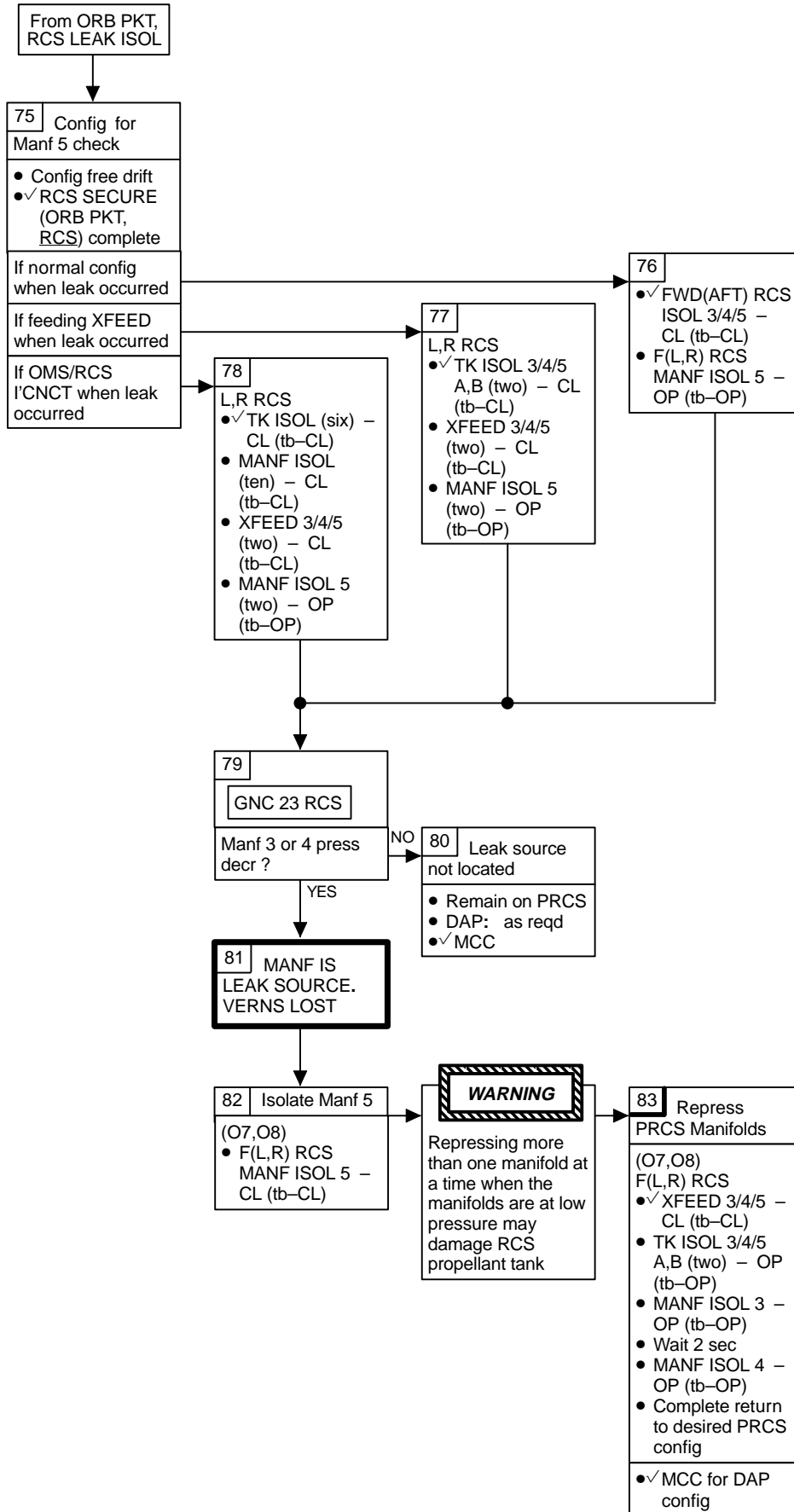
- (3) ✓MCC for other params possibly lost
- (8) H/W C&W remains
- (9) TK P can be monitored using **SYS SUMM**
- or (O3) Meter
- (10) Vern jets can be used when FU TK P – OX TK P ≤ 20 psi
- (11) Aff POD FU(OX) can be used for qty
- (12) TK P can only be monitored in **SYS SUMM**

RCS 10.1a (Cont)



- ③ ✓MCC for other params possibly lost
- ⑧ H/W C&W remains
- ⑬ Use **SYS SUMM 2** or (O3) meter TK P only (O3) Meter
- ⑭ RCS PVT for aff OX(FU) may be in error. Use aff pod FU(OX) for qty
- ⑮ Prior to deorbit burn, reselect FWD RCS. Secure FWD RCS when TK P < 190
- ⑯ Xfeed from good RCS prior to deorbit. Propellant with He blockage available until TK P < 190 psi if reqd

RCS 10.1a (Cont)



RCS

10.1b 'RM DLMA MANF'

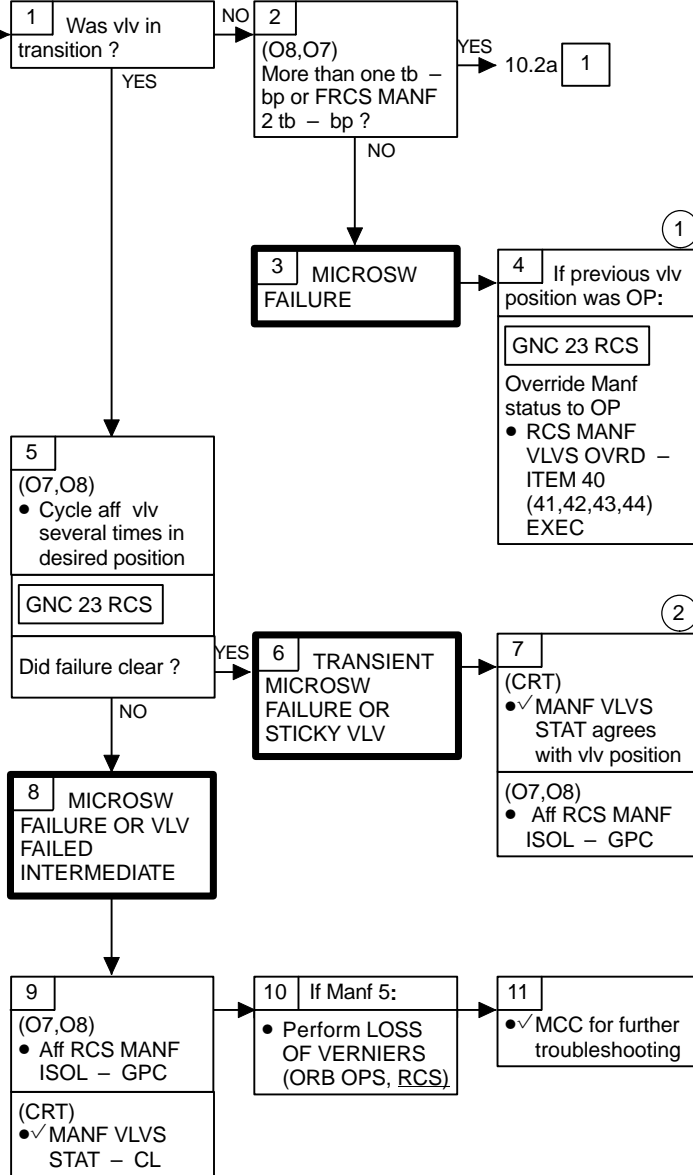
SM
ALERT

From ORB PKT,
RM DLMA
MANF

If:
OX and/or FU vlv
mismatch, propellant
flow path cannot be
verified open

Nominal Config:

- (MA73C:A)
- MCA LOGIC
- MNA FWD 1 – ON
- MNB FWD 2 – ON
- MNC FWD 3 – ON
- (MA73C:I)
- AFT POD VLV
LOGIC GP 1/3 – ON
- AFT POD VLV
LOGIC GP 1/2 – ON
- AFT POD VLV
LOGIC GP 2/3 – ON



- ① If position discretues are intermediate, MANF ISOL STAT will be evaluated at each change of state. It may be necessary to repeat RCS MANF VLVs OVRD later
- ② Prevent continuous pwr if microsw fails again

RCS

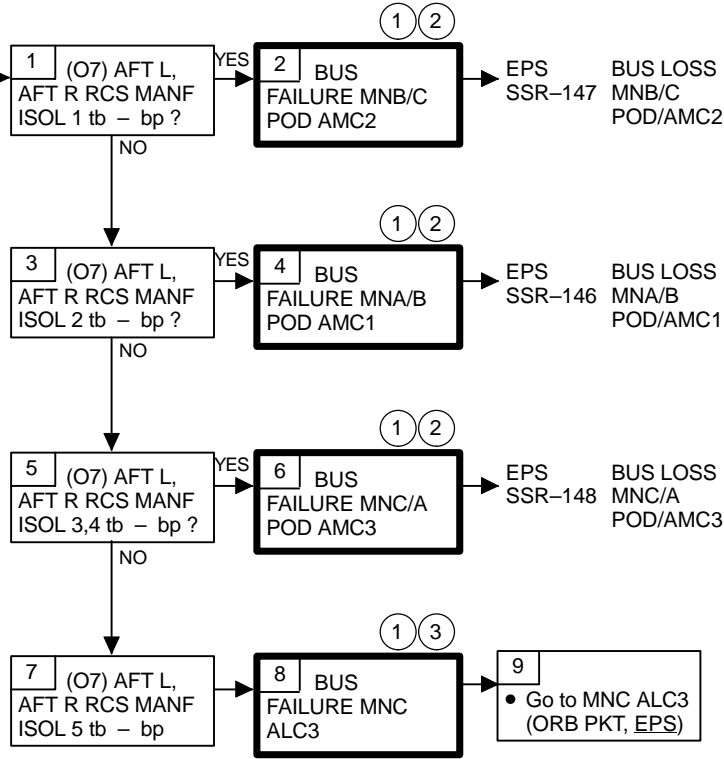
10.1c 'RCS PWR FAIL'

SM
ALERT

RCS PWR
FAIL

If loss of vlv logic
pwr to:
(O7)
AFT L, AFT R
RCS MANF
ISOL 1
or
ISOL 2
or
ISOL 3,4
or
ISOL 5

Nominal Config:
(MA73C:A)
MCA LOGIC
MNC FWD 3 – ON
(MA73C:I)
AFT POD VLV
LOGIC GP 1/3 –
ON
LOGIC GP 1/2 –
ON
LOGIC GP 2/3 –
ON



① If subsequent
leak on affected
manf:

GNC 23 RCS

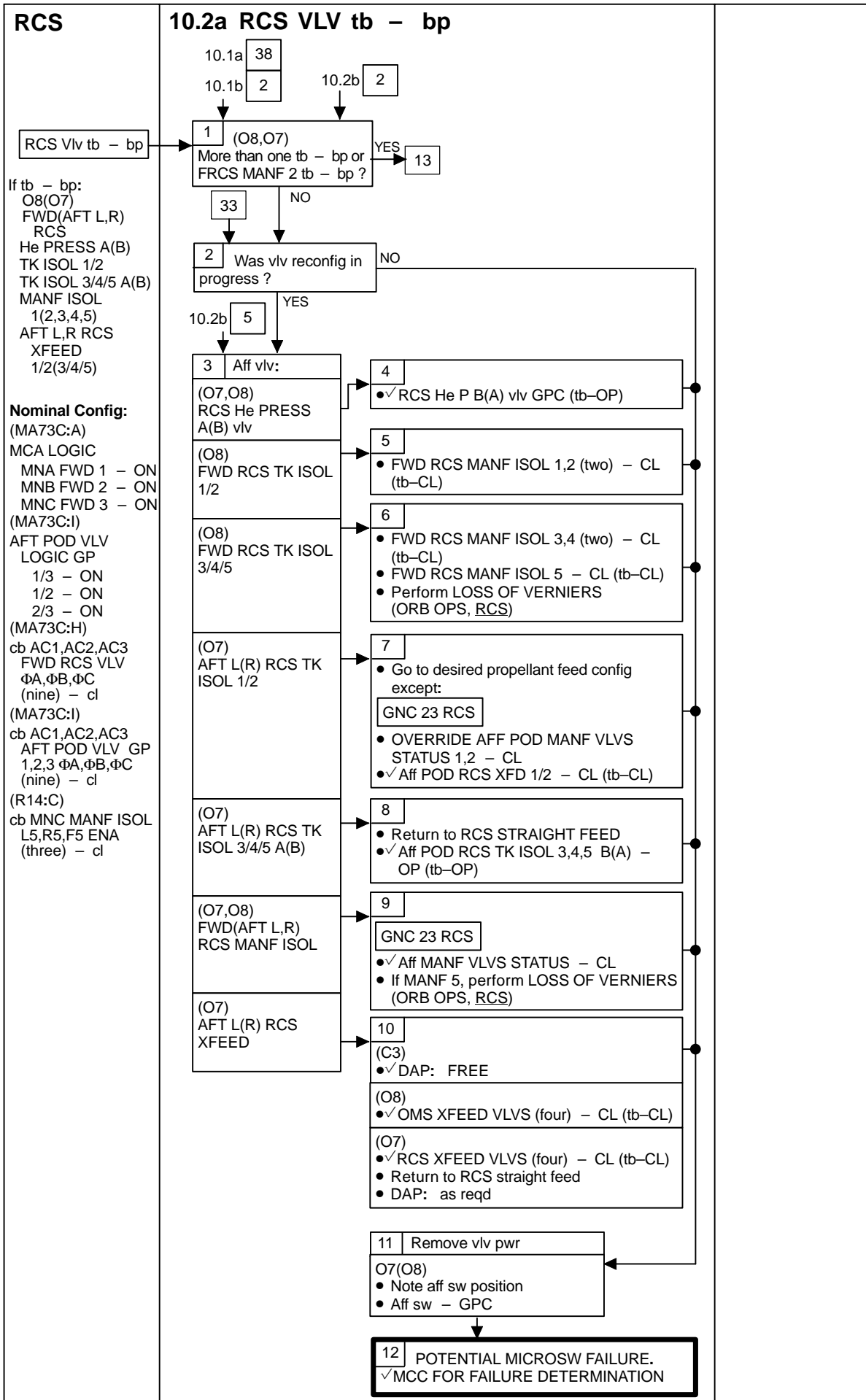
ITEM 2(3) EXEC (as
reqd). ✓ Manf status:
If OP, override to CL
with ITEM 40-43. To
isolate leak, close TK
ISOL vlv. Affected
RCS MANF ISOL vlv
cannot be moved
from current status

② Failure possibly
caused by dual CNTL
or dual APC bus
failures or CNTL and
APC bus failure

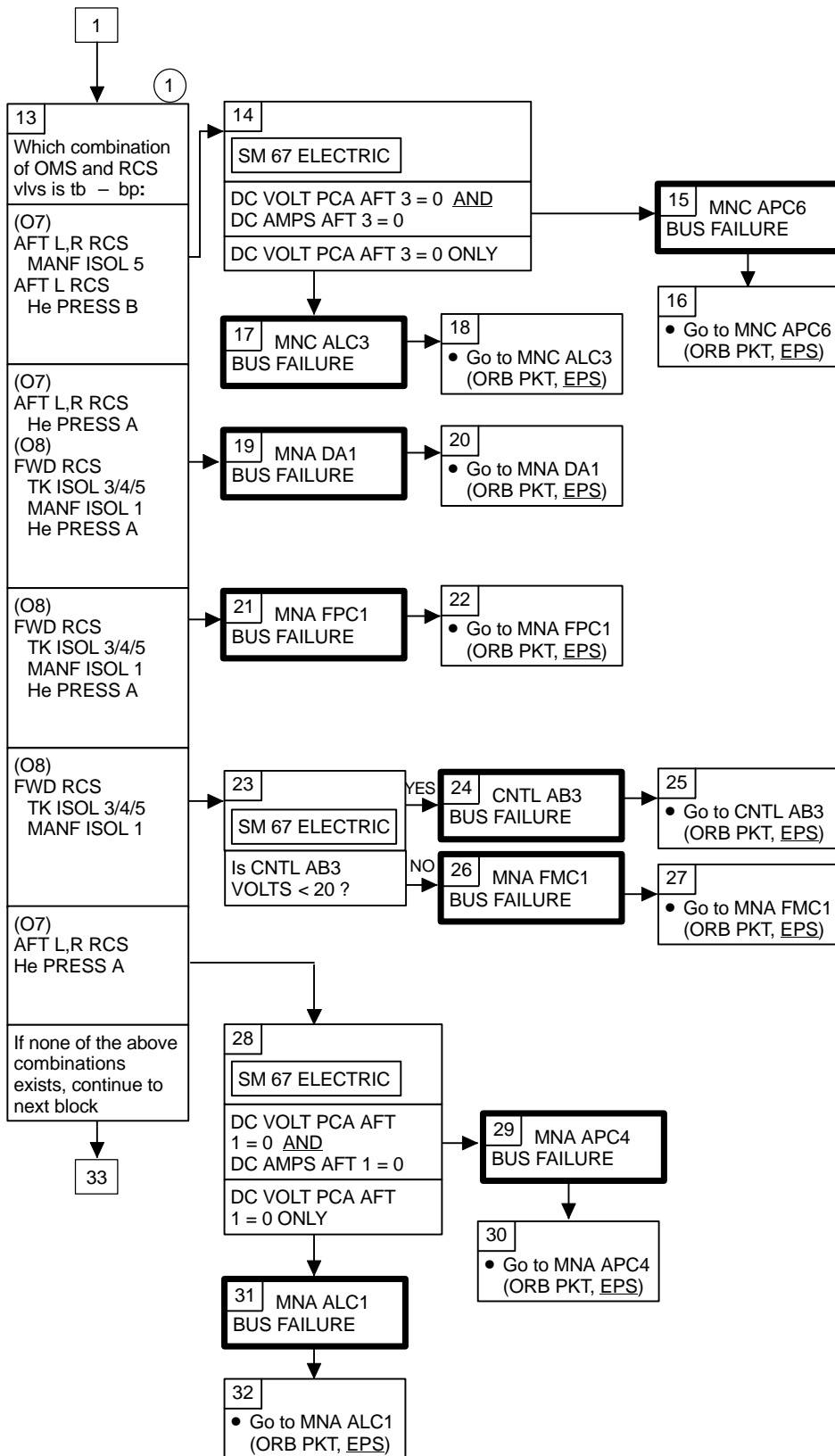
③ Failure possibly
caused by loss of
MNC APC6 or MNC
DA3

**RCS VLV
MISCOMP**

10.2

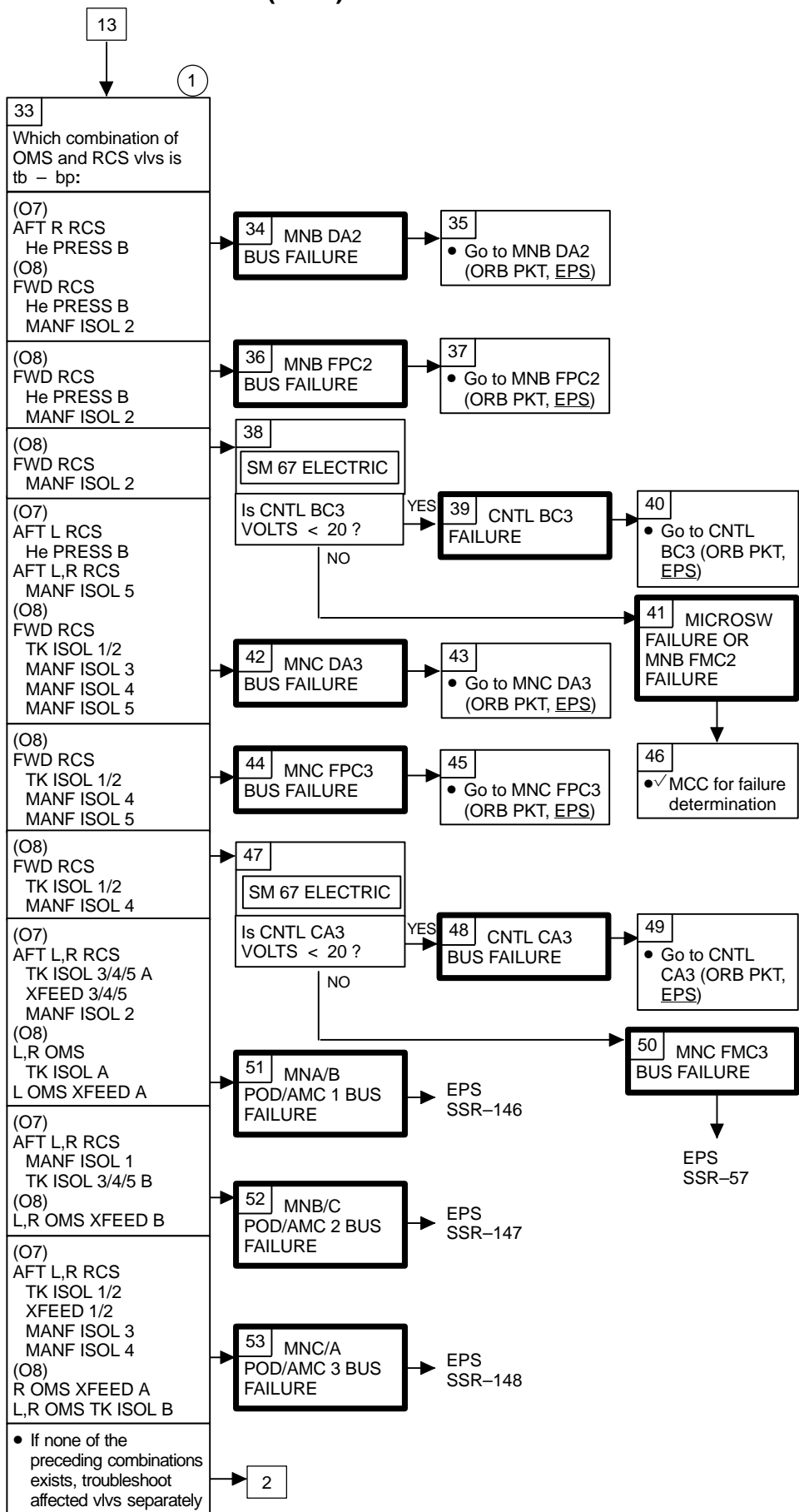


RCS 10.2a (Cont)



① Refer to BUS LOSS ID Table (ORB PKT, EPS) for bus loss verification. Proceed to BUS LOSS SSR if bus loss confirmed. For OMS/RCS function loss, refer to OMS/RCS operational Slide Rule for appropriate bus failure

RCS 10.2a (Cont)



1 Refer to BUS LOSS ID Table (ORB PKT, EPS) for bus loss verification. Proceed to BUS LOSS SSR if bus loss confirmed. For OMS/RCS function loss, refer to OMS/RCS operational Slide Rule for appropriate bus failure

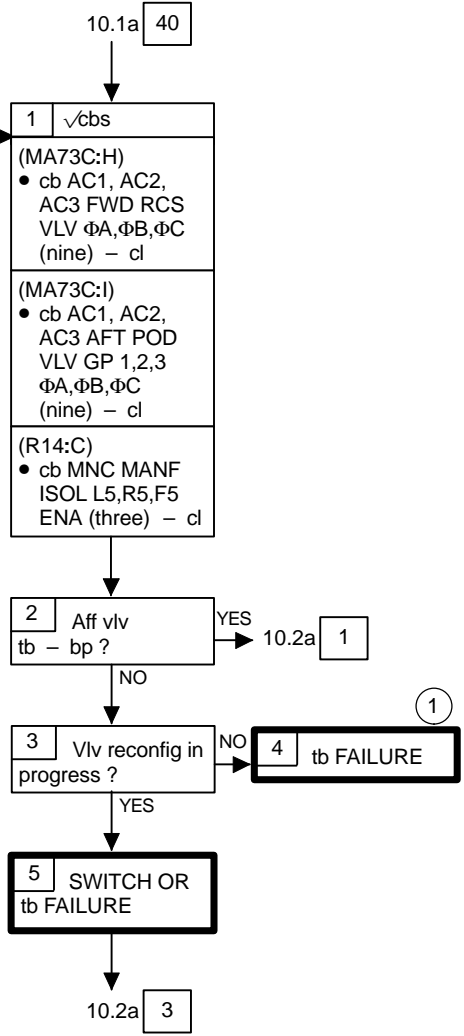
RCS

10.2b RCS VLV tb AND sw POSITION DISAGREE

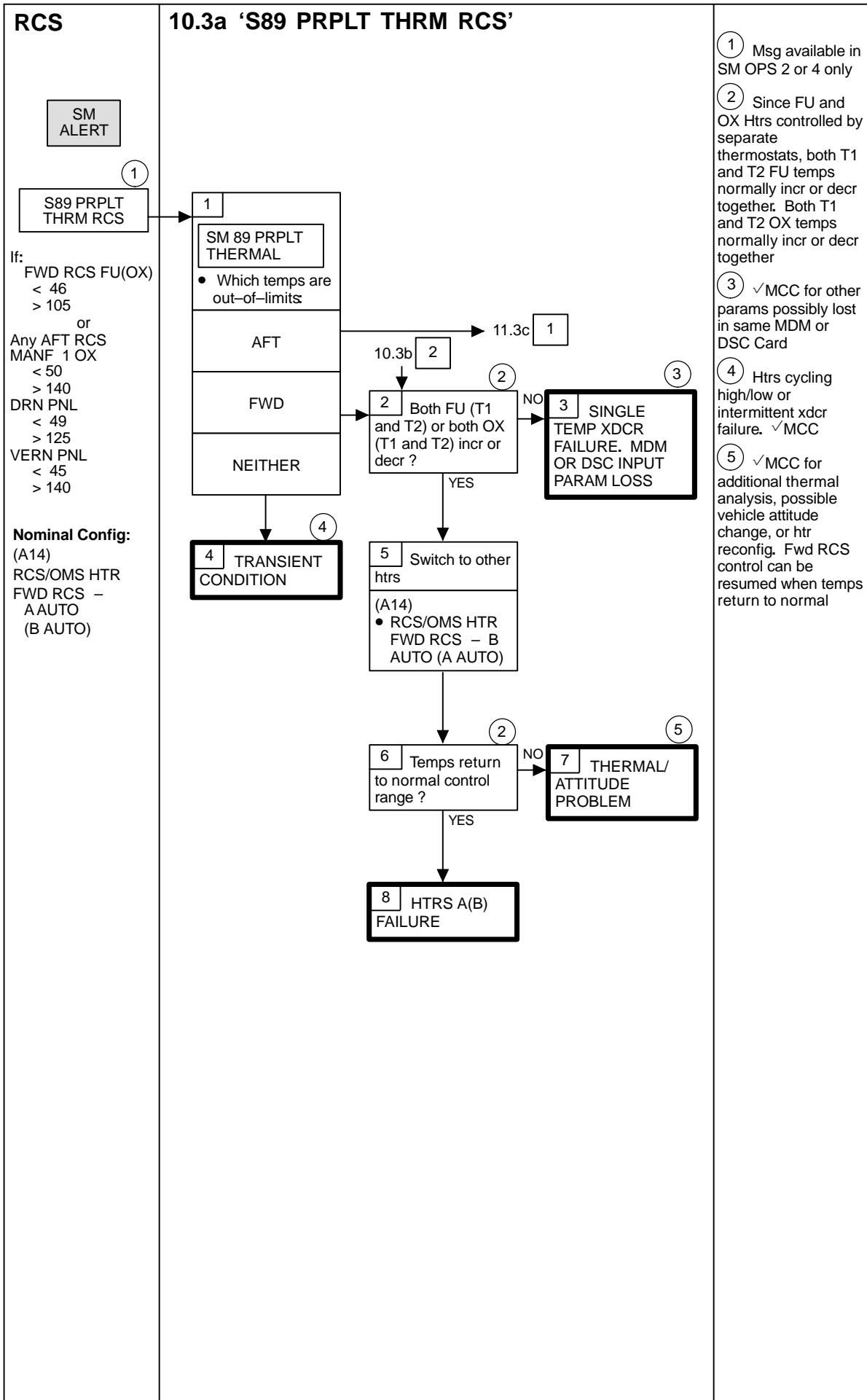
① ignore tb. Vlv in commanded position

RCS Vlv tb and sw Position Disagree

Nominal Config:
 (MA73C:H)
 cb AC1,AC2,AC3
 FWD RCS VLV
 ΦA,ΦB,ΦC
 (nine) – cl
 (MA73C:I)
 cb AC1,AC2,AC3
 AFT POD VLV GP
 1,2,3 ΦA,ΦB,ΦC
 (nine) – cl
 (R14:C)
 cb MNC MANF
 ISOL L5, R5, F5
 ENA (three) – cl



RCS PRPLT THERM/SYS 10.3



RCS

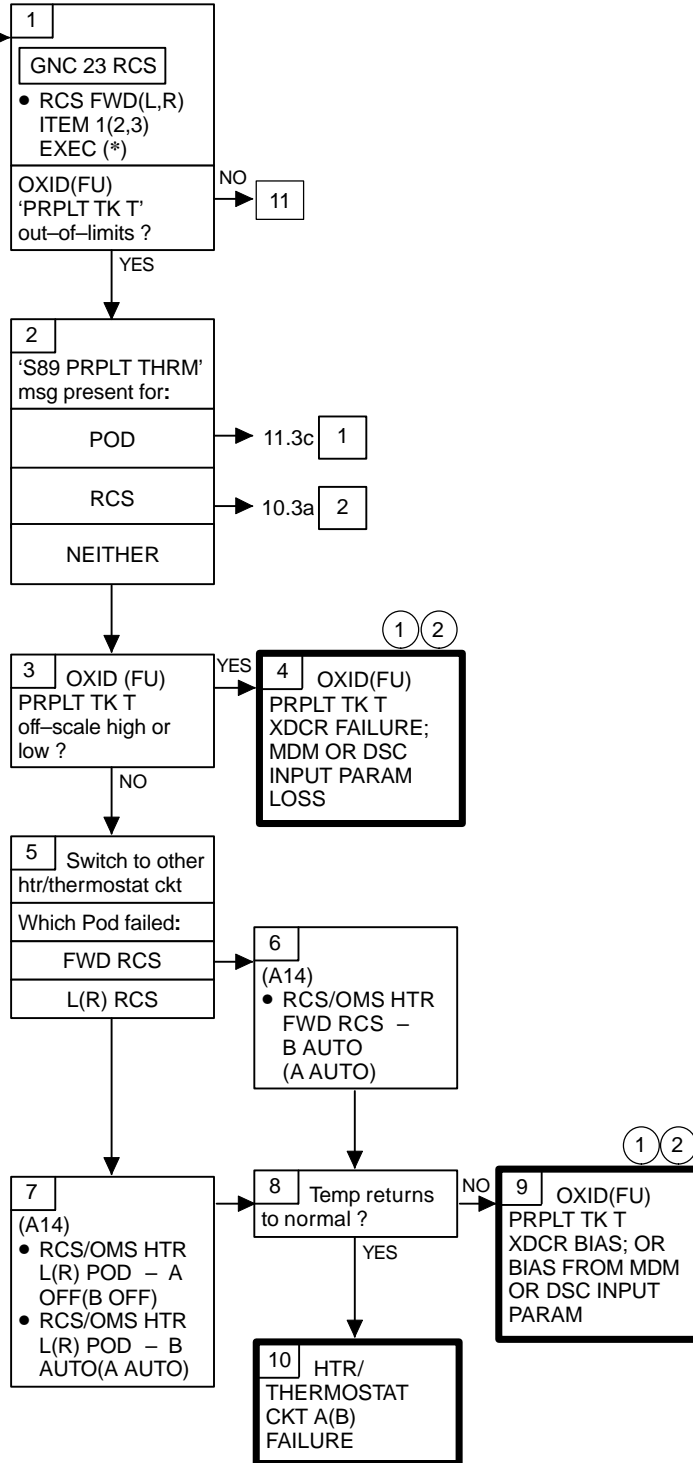
10.3b 'G23 RCS SYSTEM F(L,R)'

SM
ALERT

G23 RCS SYSTEM F(L,R)

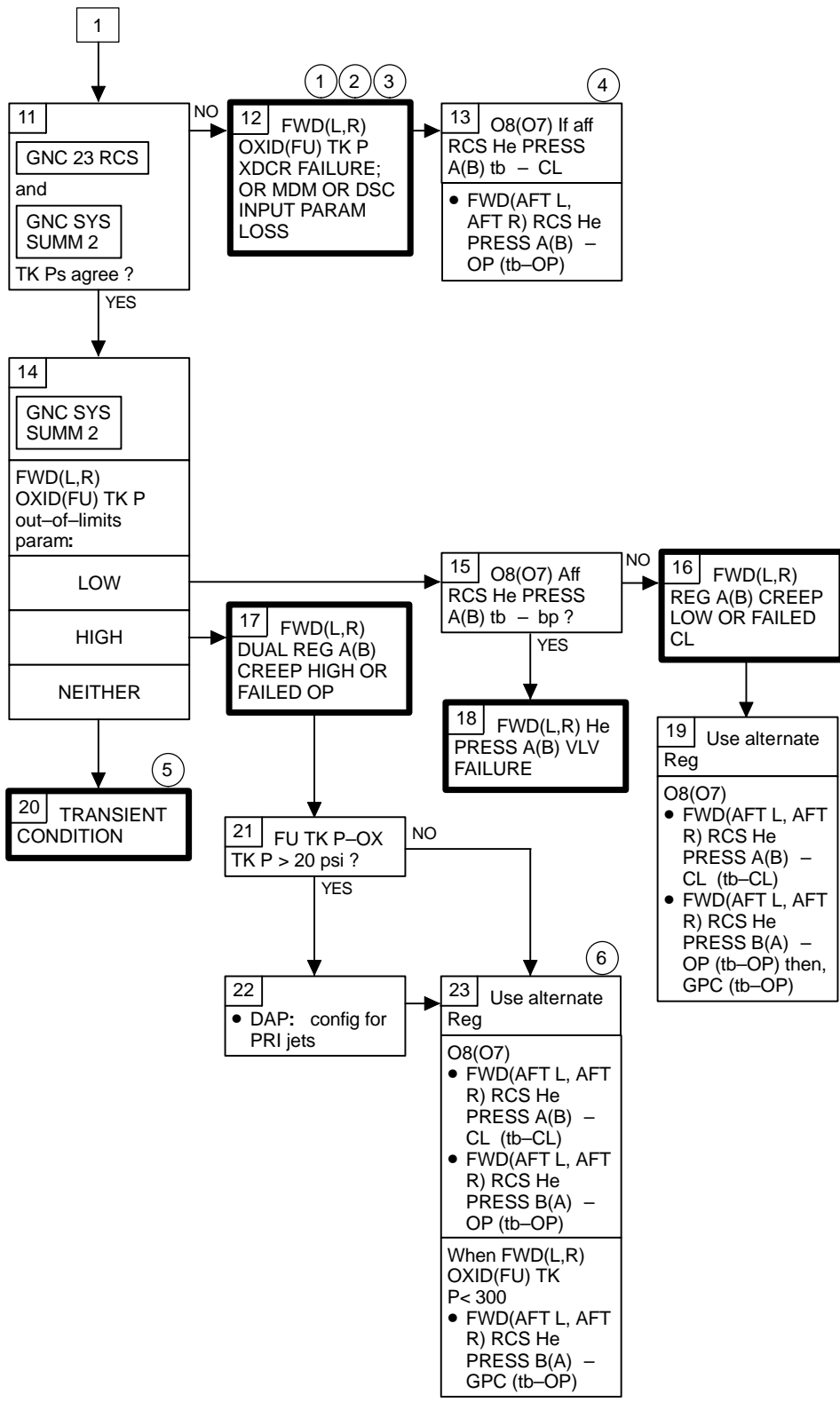
If:
 FWD RCS
 OXID(FU) PRPLT
 TK T
 < 50 degF
 > 90 degF
 or L,R RCS
 OXID(FU) PRPLT
 TK T
 < 50 degF
 > 100 degF
 or GNC SYS
 SUMM 2
 FWD(L,R) OXID
 (FU) TK P
 < 220 psi
 > 300 psi

Nominal Config:
 O8(O7)
 FWD(AFT L, AFT R)
 RCS He PRESS
 A(B) - GPC
 (tb-OP)
 B(A) - CL
 (tb-CL)
 (A14)
 RCS/OMS HTR
 FWD RCS -
 A AUTO
 (B AUTO)
 RCS/OMS HTR L
 POD (two) -
 A AUTO(B AUTO)
 B OFF(A OFF)
 RCS/OMS HTR R
 POD (two) -
 A AUTO(B AUTO)
 B OFF(A OFF)



- ① MCC can determine other params possibly lost in same MDM or DSC Card
- ② RCS PVT for affected OXID(FU) may be in error for failed or biased temp or press Xdcr

RCS 10.3b (Cont)



- ① MCC can determine other params possibly lost in same MDM or DSC Card
- ② RCS PVT for affected OXID(FU) may be in error for failed or biased temp or press Xdcr
- ③ OXID (FU) PRPLT TK P can be monitored on GNC 23 RCS display or RCS/OMS Press meter (pnl O3)
- ④ Overpress protection lost
- ⑤ Transient Xdcr bias or pressure surge
- ⑥ Vern jets can be used when FU TK P-OX TK P ≤ 20 psi

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RCS SSR

RCS SSR-1

RCS MIXED XFEED MEM READ/WRITE

NOTE

This procedure must be performed in OPS 3. OMS/RCS interconnect is assumed to be the initial configuration. A backout procedure is provided in the event of a deorbit waveoff, which would require a return from Mixed RCS Crossfeed to OMS-RCS Interconnect. Address locations are S/W release dependent and will be supplied by the MCC. This procedure requires realtime ground verification (24 hr) prior to use

- O7 1. Check config:
 - ✓AFT L,R RCS TK ISOL (six) – CL (tb-CL)
 - ✓XFEED (four) – OP (tb-OP)
- O8
 - ✓L,R OMS XFEED A (two) – CL (tb-CL)
 - ✓L(R) OMS XFEED B – OP (tb-OP)
 - ✓R(L) OMS XFEED B – CL (tb-CL)
- O7 2. MSTR RCS XFEED – FEED FROM L

NOTE

ADD IDs, TABLEs A, B, C, and D will be supplied by MCC

- 3. Zero (0) the appropriate RCS TK ISOL reset command:

GNC 0 GPC MEMORY

- ✓HEX – ITEM 27 (*)
- BIT RST – ITEM 23 EXEC (*)
- Enter ADD IDs and DESIRED values

ADD ID	DESIRED	TABLE A	TABLE B
28 _____	29 1000	_____	_____
30 _____	31 0400	_____	_____
32 _____	33 1000	_____	_____
34 _____	35 0400	_____	_____
36 _____	37 1000	_____	_____
38 _____	39 0400	_____	_____

- ✓Data values in ACTUAL column agree with TABLE A
- WRITE – ITEM 25 EXEC
- ✓Data values in ACTUAL column agree with TABLE B

- 4. Set to one (1) the appropriate RCS TK ISOL set command
- BIT SET – ITEM 22 EXEC (*)
- Enter ADD IDs and DESIRED values

ADD ID	DESIRED	TABLE C	TABLE D
28 _____	29 1000	_____	_____
30 _____	31 0400	_____	_____
32 _____	33 1000	_____	_____
34 _____	35 0400	_____	_____
36 _____	37 1000	_____	_____
38 _____	39 0400	_____	_____

- ✓Data values in ACTUAL column agree with TABLE C
- WRITE – ITEM 25 EXEC
- ✓Data values in ACTUAL column agree with TABLE D

RCS SSR

RCS SSR-1 (Cont)

5. During AOS, perform ARCS reconfig
DAP: INRTL
DAP ROT: PULSE/PULSE/PULSE
O8 L,R OMS XFEED (four) – CL (tb-CL)
O7 AFT L,R RCS XFEED (four) – CL (tb-CL)
TK ISOL (six) – GPC (tb-bp)

CAUTION
Wait for MCC verification of
correct config

AFT L,R RCS XFEED (four) – OP (tb-OP)

6. Resume attitude control:
DAP: as reqd

RCS MIXED XFEED TERMINATE (PERFORM IN OPS 3)

Establish L(R) OMS interconnect config:

- F7 1. ✓ FLT CNTLR PWR – OFF
C3 DAP: INRTL
DAP ROT: PULSE/PULSE/PULSE
- O7 2. L,R RCS TK ISOL (six) – CL (tb-CL)
✓ XFEED (four) – OP (tb-OP)
3. If RCS MANF P (OX and FU) > 130, continue
Otherwise, ✓ MCC >>
- O8 4. ✓ L(R) OMS He PRESS/VAP ISOL (two) – CL
TK ISOL (two) – OP (tb-OP)
✓ R(L) OMS XFEED (two) – CL (tb-CL)
L(R) OMS XFEED A – CL (tb-CL)
B – OP (tb-OP)
- O7 5. MSTR RCS XFEED – OFF
- C3 6. DAP: as reqd

NOTE
Gauging not avail in OPS 3

7. After OPS 2 transition:

GNC 23 RCS

OMS PRESS ENA L(R) OMS – ITEM 5(6) EXEC

RCS SSR-2

HOT FIRE RCS

- O7(O8) ✓ Prop feed vlvs – OP
 - O14(O15,O16) ✓ Appropriate RJD LOGIC, DRIVER – ON
- Perform Hot Fire during AOS

CONFIG DAP FREE DRIFT FOR HOT FIRE

1. If OPS 2:

GNC 20 DAP CONFIG

If PRI:
ITEM 13 +0.3 EXEC
ITEM 17 +0.1 EXEC
If VERN:
ITEM 26 +0.0 3 EXEC

DAP: A/FREE/PRI(VERN)
DAP TRANS: PULSE/PULSE/PULSE

If OPS 3:
DAP: INRTL
DAP ROT: PULSE/PULSE/PULSE

SET UP FOR HOT FIRE

2. GNC 23 RCS

Deselect jets per table

3. If jet to be selected is fail-off,
reselect affected jet (Do not toggle RM)

- O14,O15,O16 4. ✓cb L(R) DDU (two) – cl
If VERN Hotfire:

GNC 25 RM ORBIT

- F7/F8 SW RM INH – ITEM 16 (*)
FLT CNTLR PWR L(R) – ON
SW RM INH – ITEM 16 (no *)

- F7/F8 If PRI Hotfire:
FLT CNTLR PWR L(R) – ON

HOT FIRE (Perform during AOS)

5. If OPS 2:
Command maneuver per table with RHC(THC) and release
If OPS 3:
Command maneuver per table with RHC(THC)
If THC, command for approximately 1 sec and release
If RHC, command past soft stop (ACCEL mode) for approximately 1 sec and release

RCS SSR-2 (Cont)

6. GNC 23 RCS

If primary jet:

- If correct response (Failure indication was false. Have lost fail-off protection). Perform following steps to place jet in last priority and to regain fail LK auto deselect protection:
 - DES INH twice (reprioritize, reset RM)
 - Repeat maneuver (expect jet fail-off)
 - Reselect jet (in order to reset auto deselect counter)

NOTE

If > 1 jet/pod/dir lost fail-off RM,
after OPS 301 transition, reselect jets

- If no response:
 - Deselect jet

NOTE

During entry, reselect jet if reqd to
maintain 1 pitch or 2 yaw Aft RCS jets

If vernier jet:

- If jet fired (✓MCC):
 - Continue vernier control (Failure indication was false. Have lost fail-off protection)
- If jet did not fire (✓MCC):
 - If L5L or R5R:
 - Deselect jet
 - Continue vernier control
 - If F5L, F5R, L5D, or R5D:
 - Deselect jet
 - Perform LOSS OF VERN (ORB OPS, RCS)

CLEAN UP AFTER HOT FIRE

7. GNC 23 RCS

Reselect jets deselected in step 2

- C3 8. Config DAP: as reqd
- F7(F8) 9. FLT CNTLR PWR L(R) – OFF
- O14,
O15,
O16 10. Config cb L,R DDU (four) – as reqd

RCS SSR-2 (Cont)

HOT FIRE TABLE

SUBJECT JET	DESELECT JETS	MANEUVER REQD
F1F F2F F3F	F2F, F3F F1F, F3F F1F, F2F	(-) X TRANSLATION
F1L F3L F5L	F3L, R1R, R2R, R3R, R4R F1L, R1R, R2R, R3R, R4R R5R	(+) YAW
F2R F4R F5R	F4R, L1L, L2L, L3L, L4L F2R, L1L, L2L, L3L, L4L L5L	(-) YAW
F1U F2U F3U	F2U, F3U, L2D, L3D, L4D, R2D, R3D, R4D F1U, F3U, L2D, L3D, L4D, R2D, R3D, R4D F1U, F2U, L2D, L3D, L4D, R2D, R3D, R4D	(-) PITCH
F1D F2D F3D F4D	F2D, F3D, F4D, L1U, L2U, L4U, R1U, R2U, R4U F1D, F3D, F4D, L1U, L2U, L4U, R1U, R2U, R4U F1D, F2D, F4D, L1U, L2U, L4U, R1U, R2U, R4U F1D, F2D, F3D, L1U, L2U, L4U, R1U, R2U, R4U	(+) PITCH
L1L L2L L3L L4L L5L	L2L, L3L, L4L, F2R, F4R L1L, L3L, L4L, F2R, F4R L1L, L2L, L4L, F2R, F4R L1L, L2L, L3L, F2R, F4R F5R	(-) YAW
L1A L3A	L3A, R1A, R3A L1A, R1A, R3A	(+) X TRANSLATION
L1U L2U L4U	L2U, L4U, R1U, R2U, R4U, F1D, F2D, F3D, F4D L1U, L4U, R1U, R2U, R4U, F1D, F2D, F3D, F4D L1U, L2U, R1U, R2U, R4U, F1D, F2D, F3D, F4D	(+) PITCH
L2D L3D L4D L5D	L3D, L4D, R2D, R3D, R4D, F1U, F2U, F3U L2D, L4D, R2D, R3D, R4D, F1U, F2U, F3U L2D, L3D, R2D, R3D, R4D, F1U, F2U, F3U R5D	(-) PITCH
R1R R2R R3R R4R R5R	R2R, R3R, R4R, F1L, F3L R1R, R3R, R4R, F1L, F3L R1R, R2R, R4R, F1L, F3L R1R, R2R, R3R, F1L, F3L F5L	(+) YAW
R1A R3A	R3A, L1A, L3A R1A, L1A, L3A	(+) X TRANSLATION
R1U R2U R4U	R2U, R4U, L1U, L2U, L4U, F1D, F2D, F3D, F4D R1U, R4U, L1U, L2U, L4U, F1D, F2D, F3D, F4D R1U, R2U, L1U, L2U, L4U, F1D, F2D, F3D, F4D	(+) PITCH
R2D R3D R4D R5D	R3D, R4D, L2D, L3D, L4D, F1U, F2U, F3U R2D, R4D, L2D, L3D, L4D, F1U, F2U, F3U R2D, R3D, L2D, L3D, L4D, F1U, F2U, F3U L5D	(-) PITCH

RCS SSR-3

AFT RCS MANF/LEG PRESS, READ/WRITE

NOTE

This procedure is used when affected RCS propellant lines, both oxidizer and fuel (manifold or leg) pressure, is less than or equal to propellant vapor pressure plus instrumentation error (OX P < 49 psia, FU P < 35 psia).

Starting condition for this procedure is straight RCS feed with appropriate MANF or TK ISOL vlv upstream of evacuated section closed.

Manually repressing evacuated aft RCS propellant line (manifold or leg) can result in jet thruster vlv bounce and/or seal leakage. This can result in 'zot' firings which can damage respective thruster(s). Zot firings can be avoided by staggering opening of upstream OX and FU vlvs. However, since both vlvs are gang-commanded by manual switch settings, one of the vlvs must be individually commanded by using GMEM R/W. This procedure uses GMEM R/W to repress evacuated line, from same pod OMS propellant tanks, by setting appropriate GPC open command bit for RCS XFEED OX vlv, then manually opening appropriate FU vlv. Once line repress has been completed, nominal RCS propellant feed is resumed.

Reqd GPC address locations for TABLES 1 and 2 are software release dependent and will be supplied by MCC

1. DAP: FREE
- 07 2. Config RCS for repress:
 - ✓Aff RCS TK ISOL 1/2(3/4/5 A,B) - CL (tb-CL)
 - ✓XFEED 1/2(3/4/5) - CL (tb-CL)
 - MANF ISOL 1,2(3,4,5) - OP (tb-OP)
- 08 3. Config SAME side OMS vlv:
 - ✓L(R) OMS TK ISOL A,B - OP (tb-OP)
 - ✓XFEED A - CL (tb-CL)
 - XFEED B - OP (tb-OP)
4. Zero (0) appropriate RCS XFEED VLV reset command:

GNC 0 GPC MEMORY

 - ✓HEX 27*
 - BIT RST - ITEM 23 EXEC
 - Obtain and enter ADD IDs and DESIRED values from TABLE 1

ADD ID	DESIRED	Value A	Value B
28 _ _ _ _ _	29 _ _ _ _ _	_ _ _ _ _	_ _ _ _ _

 - ✓Data values in ACTUAL column agree with Value A (MCC supplied)
 - WRITE - ITEM 25 EXEC
 - ✓Data values in ACTUAL column agree with Value B (MCC supplied)
5. Set to One (1) the appropriate RCS XFEED VLV set command:
 - BIT SET - ITEM 22 EXEC
 - Obtain and enter ADD IDs and DESIRED values from TABLE 2

ADD ID	DESIRED	Value C
28 _ _ _ _ _	29 _ _ _ _ _	_ _ _ _ _

 - ✓Data values in ACTUAL column agree with Value C (MCC supplied)
 - WRITE - ITEM 25 EXEC
 - ✓Data values in ACTUAL column agree with DESIRED
- 07 6. During AOS, perform OX line repress from OMS
 - L(R) RCS XFEED 1/2(3/4/5) - GPC (tb-bp)
 - Wait 10 sec

GNC 23 RCS

 - ✓OX MANF P > 130 psia

RCS SSR-3 (Cont)

```

CRT      * If MANF P < 130 psia:
O8      *   L(R) OMS XFEED VLV A,B      - CL (tb-CL) *
O7      *   RCS XFEED VLV 1/2(3/4/5) - CL (tb-CL) *
        *   Set aff MANF VLVS STAT to CL
        *   GNC 23 RCS
        *   ITEM 2(3) EXEC
        *   ITEM 40,41(42,43,44) EXEC
        *   DAP: as reqd
        *   ✓ MCC >>
    
```

```

7. Perform FU line repress from OMS
O7      L(R) RCS XFEED 1/2(3/4/5) - OP (tb-OP)
        Wait 10 sec
CRT     ✓ FU MANF P > 130 psia
    
```

```

O8      * If MANF P < 130 psia:
O7      *   L(R) OMS XFEED A,B      - CL (tb-CL) *
        *   RCS XFEED 1/2(3/4/5) - CL (tb-CL) *
        *   Set aff MANF VLVS STAT to CL
        *   GNC 23 RCS
        *   ITEM 2(3) EXEC
        *   ITEM 40,41(42,43,44) EXEC
        *   DAP: as reqd
        *   ✓ MCC >>
    
```

```

8. Cleanup and reconfig:
O8      L(R) OMS XFEED A,B      - CL (tb-CL)
O7      RCS XFEED 1/2(3/4/5) - CL (tb-CL)
        ISOL 1/2(3/4/5 A,B) - OP (tb-OP)
        ✓ MANF ISOL 1,2(3,4,5) - OP (tb-OP)
    
```

9. Reselect jets as reqd

10. DAP: as reqd

11. Zero (0) the appropriate RCS XFEED VLV set command:

GNC 0 GPC MEMORY

✓ HEX 27*

BIT RST - ITEM 23 EXEC

Obtain and enter ADD IDs and DESIRED values from TABLE 2

ADD ID	DESIRED	Value D	Value E
28 <input style="width: 40px;" type="text"/>	29 <input style="width: 40px;" type="text"/>	<input style="width: 40px;" type="text"/>	<input style="width: 40px;" type="text"/>

✓ Data values in ACTUAL column agree with Value D (MCC supplied)

WRITE - ITEM 25 EXEC

✓ Data values in ACTUAL column agree with Value E (MCC supplied)

12. Set to One (1) the appropriate RCS XFEED VLV reset command:

BIT SET - ITEM 22 EXEC

Obtain and enter ADD IDs and DESIRED values from TABLE 1

ADD ID	DESIRED	Value F	Value G
28 <input style="width: 40px;" type="text"/>	29 <input style="width: 40px;" type="text"/>	<input style="width: 40px;" type="text"/>	<input style="width: 40px;" type="text"/>

✓ Data values in ACTUAL column agree with Value F (MCC supplied)

WRITE - ITEM 25 EXEC

✓ Data values in ACTUAL column agree with Value G (MCC supplied)

RCS SSR-3 (Cont)

TABLE 1			
X-REF	ADD ID BIT RESET ADDRESS	COMMANDS	DESIRED
(1)	-----	L RCS OX 1/2 XFEED	4 0 0 0
(2)	-----	L RCS OX 3/4/5 XFEED	0 0 4 0
(3)	-----	R RCS OX 1/2 XFEED	4 0 0 0
(4)	-----	R RCS OX 3/4/5 XFEED	0 0 1 0

TABLE 2			
X-REF	ADD ID BIT SET ADDRESS	COMMANDS	DESIRED
(1)	-----	L RCS OX 1/2 XFEED	4 0 0 0
(2)	-----	L RCS OX 3/4/5 XFEED	0 0 4 0
(3)	-----	R RCS OX 1/2 XFEED	4 0 0 0
(4)	-----	R RCS OX 3/4/5 XFEED	0 0 1 0

RCS SSR-4 STAGED, MANF REPRESS

NOTE

1. This procedure attempts to pressurize non-leaking Manf P (OX or FU) to greater than 130 psia, so manifold can then be repressed directly from tank
2. Do not use this procedure if OX MANF P < 49 psia and FU MANF P < 35 psia
3. All manifolds on same tank leg will be affected

WARNING

Repressing more than one manifold at a time may damage RCS propellant tanks when manifolds are below vapor pressure (See Note 2.)

GNC 23 RCS

1. DAP: FREE
- 07(O8) 2. Aff RCS XFEED(s) - CL (tb-CL)
TK ISOL(s) - CL (tb-CL)
MANF ISOL(s) - OP (tb-OP)
3. If aff MANF P(s) < 130 (OX and FU):
Aff RCS MANF ISOL(s) - CL (tb-CL)
TK ISOL(s) - OP (tb-OP)
Repeat step 2
4. If aff MANF P(s) > 130 (OX or FU):
Aff RCS MANF ISOL(s) - CL (tb-CL)
TK ISOL(s) - OP (tb-OP)
MANF ISOL(s) - OP (tb-OP) one at a time
5. DAP: as reqd

RCS SSR-5

LEAKING RCS PRPLT/He BURN

TERMINATE CONDITIONS

Terminate RCS burn/dump when any one of the following conditions exists:

If He LEAK:

- Aff He P < 456 psia, or
- CUR HP = 95 nmi, or
- Dump Time from below table expired

	RCS PRPLT TO BE DUMPED TO ACHIEVE MAX BLOWDN CURRENT NON-LEAKING (OX OR FU)%														
	24	25	30	35	40	45	50	55	60	65	70	75	80	85	90
FRCS -X,AFT +X DUMP (2 JETS)	0:00	0:03	0:19	0:34	0:49	1:05	1:20	1:36	1:51	2:07	2:22	2:36	2:53	3:08	3:24
OPS 3 FRCS DUMP (4 JETS)	0:00	0:02	0:11	0:20	0:29	0:38	0:47	0:56	1:05	1:14	1:23	1:32	1:41	1:50	1:59

TIME FROM DUMP INITIATION (M:S)

If PRPLT LEAK:

- First RCS jet FAIL OFF or
- CUR HP = 95 nmi

If FWD RCS LEAK, perform either -X TRANSLATION (uses OPS 2, part A) or FRCS DUMP (uses OPS 3, part B)

(If no MCC, perform -X TRANSLATION)

A. If FRCS -X TRANSLATION:

- O8
1. RCS BURN PREP
 FWD He PRESS A(B) - OP (tb-OP)
 B(A) - CL (tb-CL)
 ✓TK ISOL (two) - OP (tb-OP)
 ✓MANF ISOL 1,2,3,4 (four) - OP (tb-OP)
 GNC 55 GPS STATUS
 ✓GPS TO NAV - INH (*)
 2. MNVR TO BURN ATTITUDE
 ✓MCC for preferred burn
 If no COMM, maneuver to closest out-of-plane attitude and execute burn ASAP
 DAP: B1/AUTO/PRI
 GNC UNIV PTG
 TGT ID: 2
- C2
- If retro burn (heads down):
 BODY VECTOR: 5
 P: 88
 Y: 0
 OM: 180
 Start TRK - ITEM 19 EXEC (CUR - *)
 GNC, OPS 202 PRO
 GNC ORBIT MNVR EXEC
 RCS SEL - ITEM 4 EXEC
 TIG - ITEM 10 +(consult MCC) EXEC
 ΔVX - ITEM 19 -1 0 0 EXEC
 ΔVY - ITEM 20 +0 EXEC
 ΔVZ - ITEM 21 +0 EXEC
 LOAD - ITEM 22 EXEC
 TIMER - ITEM 23 EXEC
- Do not maneuver, ignore computed ATT, perform burn in final ATT
 Go to step A3
- If out-of-plane burn:
 BODY VECTOR: 3
 OM: 90 (270 for nose south)
 Start TRK - ITEM 19 EXEC (CUR - *)

RCS SSR-5 (Cont)

- F6(F8) 3. BURN EXEC
ADI ERROR/RATE – MED
If retro burn:
ADI ATT – LVLH
 ✓ATT

 Retro
 Heads Down
R: 180
P: 358
Y: 000
If burning OOP, verify burn attitude, execute burn ASAP, and ignore TIG references
GNC 20 DAP CONFIG
- F7 P,Y OPTION – ITEM 35,36 EXEC (NOSE)
FLT CNTLR PWR – ON
DAP TRANS: NORM/PULSE/PULSE
- TIG-0:30> DAP: B1/INRTL/PRI
ADI ATT – REF
ATT REF pb – push
- F5 At TIG: THC – X (pull)
When terminate conditions are met:
 THC – release
If burn is terminated at CUR Hp = 95, finish burn out-of-plane (step A2)
- F7 4. POST BURN RECONFIG
C2 FLT CNTLR PWR – OFF
If retro burn: GNC, OPS 201 PRO
DAP TRANS: PULSE/PULSE/PULSE
GNC 20 DAP CONFIG
P,Y OPTION – ITEM 15,16 EXEC (TAIL)
 – ITEM 35,36 EXEC (TAIL)
- O8 If He leak:
 FWD He PRESS A(B) – CL (tb-CL)
 MANF ISOL 5 – OP (tb-OP), GPC
If Prplt leak:
 Perform RCS SECURE (FWD,AFT) (ORB PKT, RCS)
- O16 RJD L5/F5/R5 DRIVER – OFF
DAP: as reqd >>
- B. **If FRCS DUMP:**
- O8 1. RCS DUMP PREP
FWD He PRESS A(B) – OP (tb-OP)
 B(A) – CL (tb-CL)
 TK ISOL (two) – OP (tb-OP)
 MANF ISOL 1,2,3,4 (four) – OP (tb-OP)
Perform G2/G8 TO G3 TRANS (ENT PKT, DPS)
2. PERFORM FWD RCS DUMP
GNC DEORB MNVR COAST
FWD RCS ARM – ITEM 36 EXEC
DUMP – ITEM 37 EXEC
When terminate conditions met:
 FWD RCS OFF – ITEM 38 EXEC
3. POST DUMP RECONFIG
Perform G3 to G2/G8 TRANS (ENT PKT, DPS)
Reconfig NBAT to pre-dump config
GNC 20 DAP CONFIG
P,Y OPTION – ITEM 15,16 EXEC (TAIL)
 – ITEM 35,36 EXEC (TAIL)
- O8 If He leak:
 FWD He PRESS A(B) – CL (tb-CL)
 MANF ISOL 5 – OP (tb-OP), GPC
If Prplt leak: Perform RCS SECURE (FWD,AFT) (ORB PKT, RCS)
- O16 RJD L5/F5/R5 DRIVER – OFF
DAP: as reqd >>

RCS SSR-5 (Cont)

C. If AFT RCS LEAK, perform +X TRANSLATION:

1. XFEED FROM LEAKING RCS 1/2 LEG TO GOOD RCS 1/2 LEG
 - ✓ DAP: FREE
 - O8 ✓ L,R OMS XFEED (four) - CL (tb-CL)
 - O7 AFT L,R RCS TK ISOL 3/4/5 (four) - CL (tb-CL)
 - Good AFT RCS TK ISOL 1/2 - CL (tb-CL)
 - Leaking AFT RCS TK ISOL 1/2 - OP (tb-OP)
 - He PRESS A(B) - OP (tb-OP)
 - B(A) - CL (tb-CL)
 - AFT L,R RCS MANF ISOL 1 (two) - OP (tb-OP)
 - 2,3,4 (six) - CL (tb-CL)
 - 5 (two) - CL (tb-CL), GPC
 - XFEED 1/2 (two) - OP (tb-OP)
 - 3/4/5 (two) - CL (tb-CL)

If prior config was interconnect:

GNC 23 RCS

OMS PRESS ENA OFF - ITEM 7 EXEC (*)

GNC UNIV PTG

CNCL - ITEM 21 EXEC
 2. MNVR TO BURN ATTITUDE
 - ✓ MCC for preferred burn
 - If no COMM, maneuver to closest out-of-plane attitude and execute burn ASAP
 - DAP: B1/AUTO/PRI

GNC 55 GPS STATUS

 - C2 ✓ GPS TO NAV - INH (*)
 - GNC, OPS 202 PRO

GNC ORBIT MNVR EXEC

RCS SEL - ITEM 4 EXEC

TV ROLL - ITEM 5 +1 8 0 EXEC

If out-of-plane burn:

 - TIG - ITEM 10 + (current MET + 10 min) EXEC
 - ΔV_X - ITEM 19 +0 EXEC
 - ΔV_Y - ITEM 20 -1 0 0 EXEC (+1 0 0 for nose south) EXEC
 - ΔV_Z - ITEM 21 +0 EXEC
 - LOAD - ITEM 22 EXEC
 - TIMER - ITEM 23 EXEC
 - MNVR - ITEM 27 EXEC (*)
 - Go to step C3

If retro burn:

 - TIG - ITEM 10 +(consult MCC) EXEC
 - ΔV_X - ITEM 19 -1 0 0 EXEC
 - ΔV_Y - ITEM 20 +0 EXEC
 - ΔV_Z - ITEM 21 +0 EXEC
 - LOAD - ITEM 22 EXEC
 - TIMER - ITEM 23 EXEC
 - MNVR - ITEM 27 EXEC (*)
 3. BURN EXEC
 - F6(F8) ADI ERR/RATE - MED
 - ATT - INRTL
 - ✓ ADI ATT
 - ADI ATT - REF
 - ATT REF pb - push
 - If burning out-of-plane, execute burn ASAP and ignore TIG references

GNC 20 DAP CONFIG

 - F7 DAP B: P,Y OPTION - ITEM 35,36 EXEC (TAIL)
 - FLT CNTLR PWR - ON
 - DAP TRANS: NORM/PULSE/PULSE
- TIG-0:30 DAP: B/INRTL/PRI

RCS SSR-5 (Cont)

- F5 At TIG: THC +X
When terminate conditions are met:
THC - release
If burn was terminated at CUR Hp = 95, finish burn out-of-plane (step C2)
DAP: FREE
- O7 Leaking RCS He PRESS A(B) - CL (tb-CL)
C2 GNC, OPS 201 PRO
If He leak, go to step C10
4. SETUP TO CLEAR He
O7 Leaking RCS TK ISOL 1/2 - CL (tb-CL)
O8 ✓ L OMS TK ISOL (two) - OP (tb-OP)
XFEED B(A) - OP (tb-OP)
- GNC 23 RCS
L OMS PRESS ENA - ITEM 5 EXEC
Reselect failed-off jets
- Set L,R pod fail limit to 0:
RCS L - ITEM 2 EXEC
FAIL LIM - ITEM 4 +Q EXEC
RCS R - ITEM 3 EXEC
FAIL LIM - ITEM 4 +Q EXEC
5. SET UP DAP
GNC 20 DAP CONFIG
Change DAP A to A1
6. CLEAR He FROM LEFT RCS +X
DAP: A/INRTL/PRI
TRANS: NORM/NORM/NORM
If Hp ≤ 98, maneuver out-of-plane
- F5 THC +X
After 7 sec,
THC - release
7. CLEAR He FROM XFEED LINE AND RIGHT RCS +X
GNC 23 RCS
Deselect L1A:
RCS L - ITEM 2 EXEC
JET DES - ITEM 33 EXEC
- F5 THC +X
After 16 sec,
THC - release

|
|

RCS SSR-5 (Cont)

8. CLEAR He FROM RCS MANF 1 PITCH AND YAW
 DAP: B/FREE/PRI
 TRANS: NORM/NORM/NORM
- RHC +yaw past soft stop (ACCEL mode) for 2 sec
 RHC -yaw past soft stop (ACCEL mode) for 2 sec
- RHC +pitch past soft stop (ACCEL mode) for 2 sec
 DAP: A/INRTL/PRI
 TRANS: PULSE/PULSE/PULSE
- F7 9. POST He CLEAR CLEANUP
 FLT CNTLR PWR - OFF
- GNC 23 RCS
- Reselect L1A:
 JET DES - ITEM 33 EXEC
- Reset L,R Pod Fail Limit to 2:
 FAIL LIM - ITEM 4 +2 EXEC
 RCS R - ITEM 3 EXEC
 FAIL LIM - ITEM 4 +2 EXEC
- Reset RCS RM fail counters on all jets:
 JET RESET - ITEM 45 EXEC
- DAP: FREE
 AFT L,R RCS XFEED 3/4/5 (two) - OP (tb-OP)
 MANF ISOL 2, 3, 4 (six) - OP (tb-OP)
 5 (two) - OP (tb-OP), GPC
- DAP: A,B as reqd >>
- F7 10. SYSTEMS CLEANUP FOR He LEAKS
 FLT CNTLR PWR - OFF
 DAP: FREE
- O7 Leaking RCS TK ISOL 1/2 - CL (tb-CL)
 AFT L,R RCS XFEED 3/4/5 (two) - OP (tb-OP)
 MANF ISOL 2,3,4, (six) - OP (tb-OP)
 5 (two) - OP (tb-OP), GPC
- ✓L OMS TK ISOL (two) - OP (tb-OP)
 XFEED B(A) - OP (tb-OP)
- GNC 23 RCS
- Initiate interconnect usage counter:
 L OMS PRESS ENA - ITEM 5 EXEC
- DAP TRANS: as reqd
 DAP: A,B as reqd

OMS

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The following Fault Msgs have no corresponding MAL procedures in this book:

- S89 L(R) OMS TEMP
- G23 OMS/RCS QTY
- L(R) OMS GMBL
- L(R) OMS VLV
- L(R) OMS QTY
- L(R) OMS PC

NOTE A

The identified MAL represents a support procedure that is entered from other procedures or on MCC call

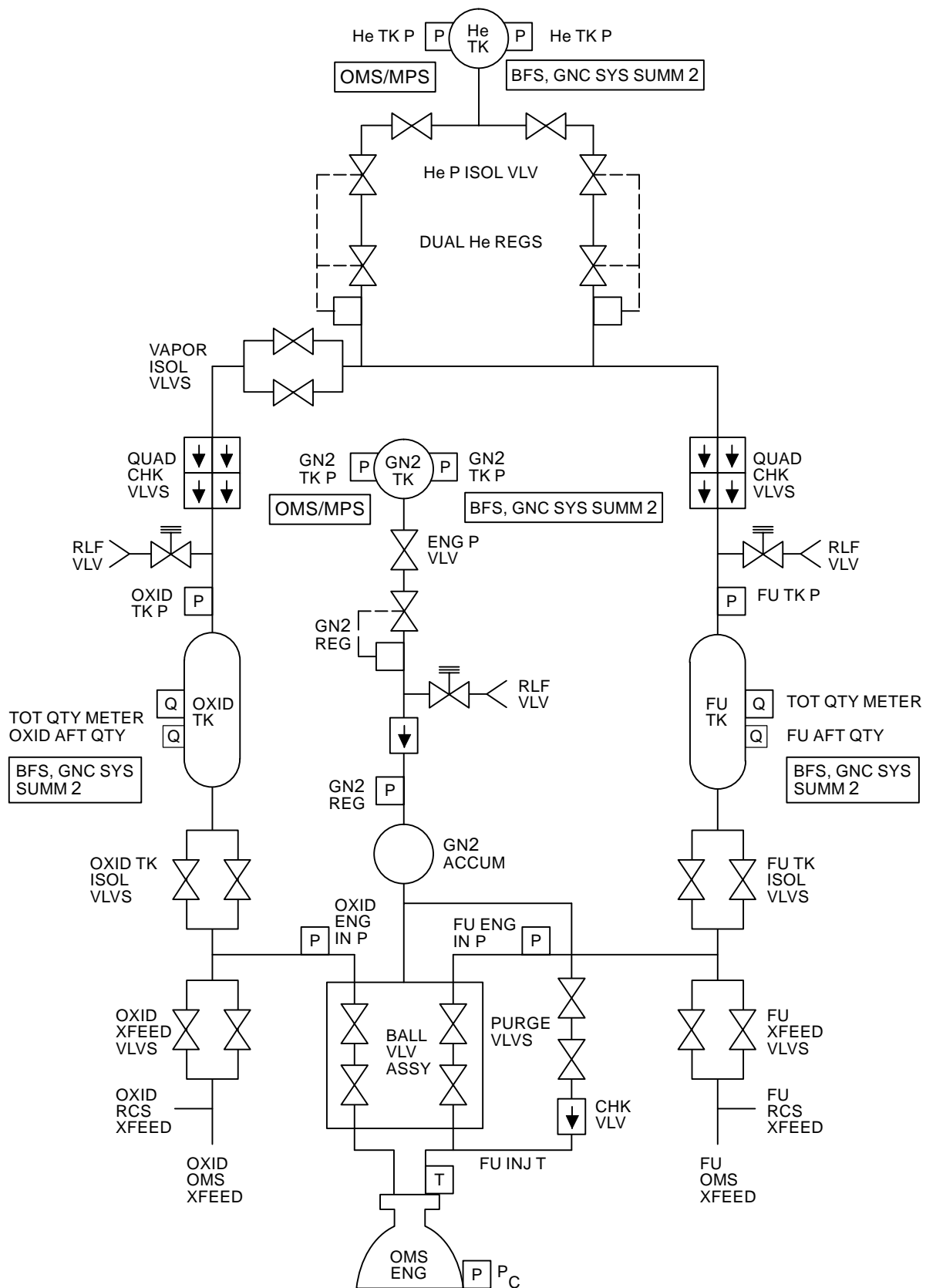
BFS FSM INDEX

11.3 OMS PRPLT THERMAL
11.3b 'SM 0 THRM PRPLT' – THRM PRPLT 11-15

OMS

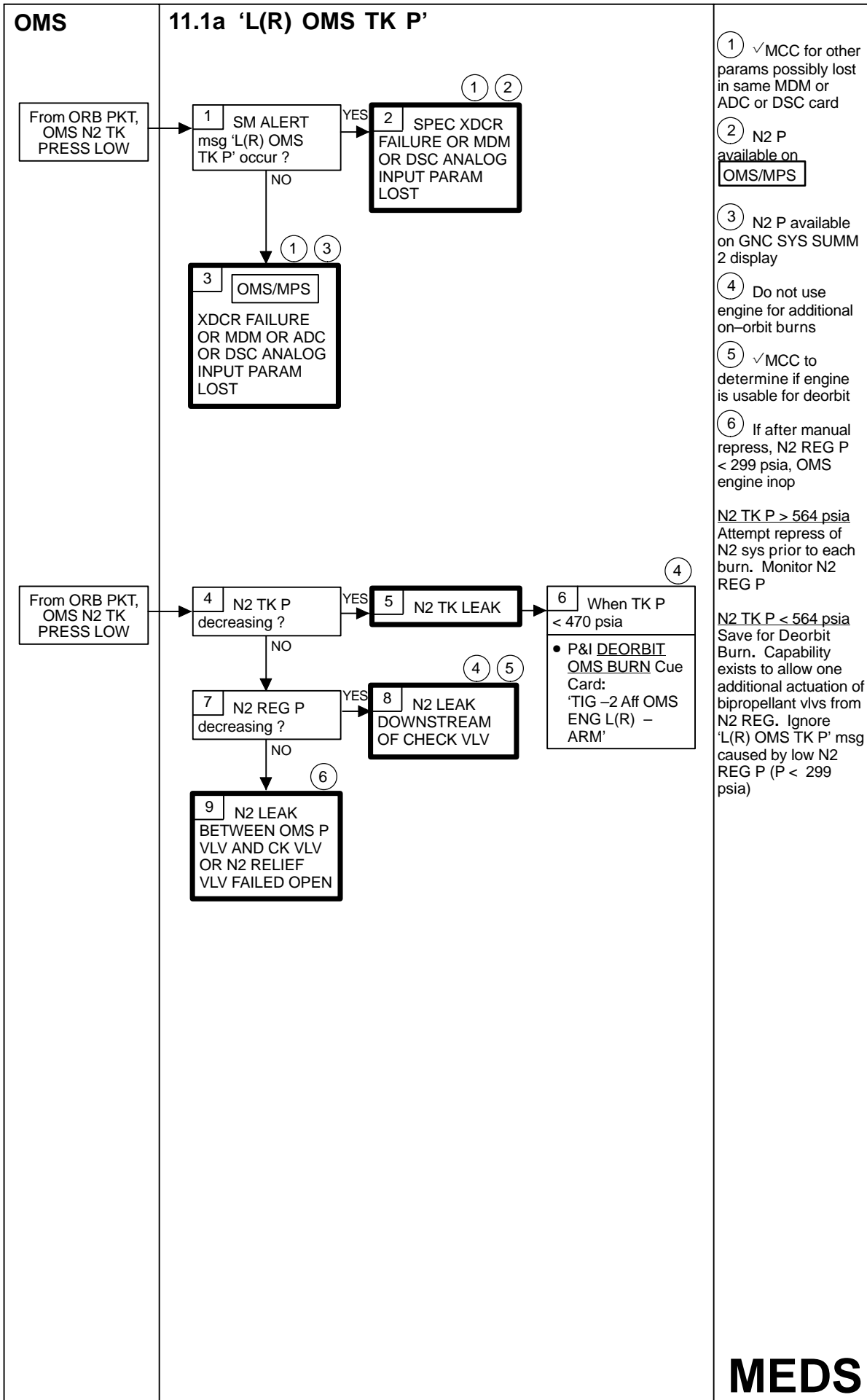
11

OMS SCHEMATIC

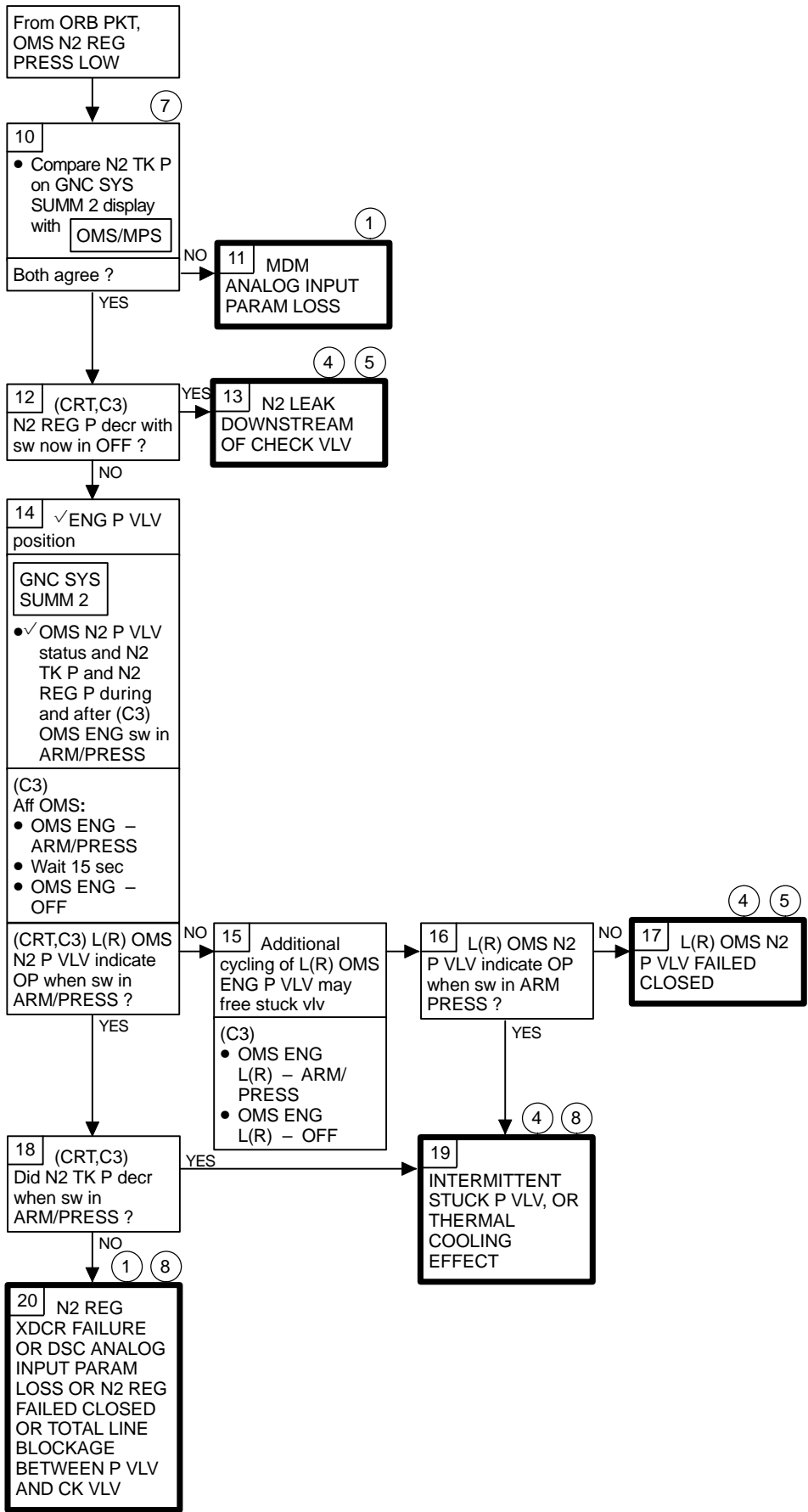


L(R) OMS
11.1

MEDS



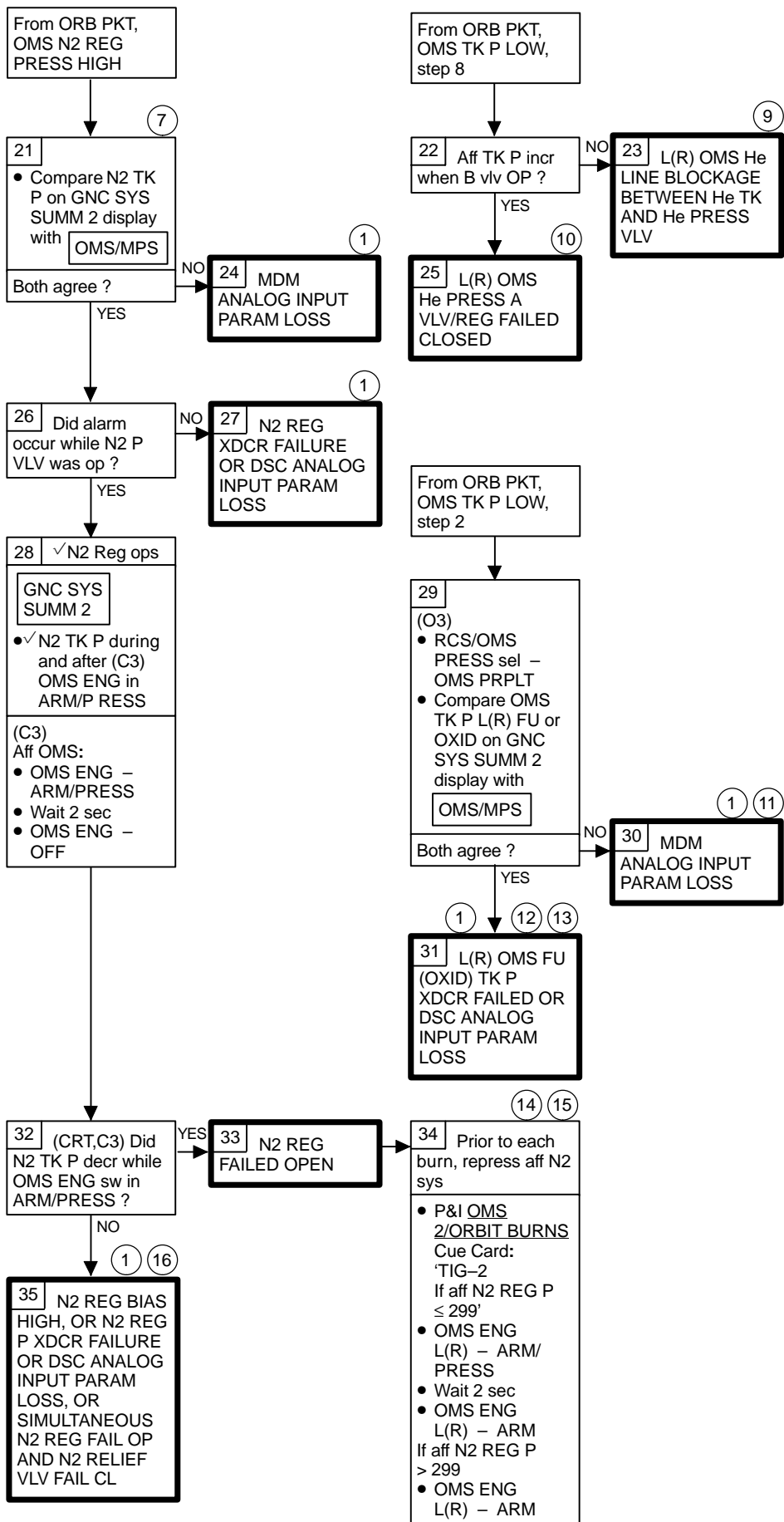
OMS 11.1a (Cont)



- ① ✓MCC for other params possibly lost in same MDM or DSC card
- ④ Do not use engine for additional on-orbit burns
- ⑤ ✓MCC to determine if engine is usable for deorbit
- ⑦ N2 REG xdcr and N2 TK P xdcr on CRT have common MDM card. This check detects MDM card failure
- ⑧ ✓MCC for further engine use

MEDS

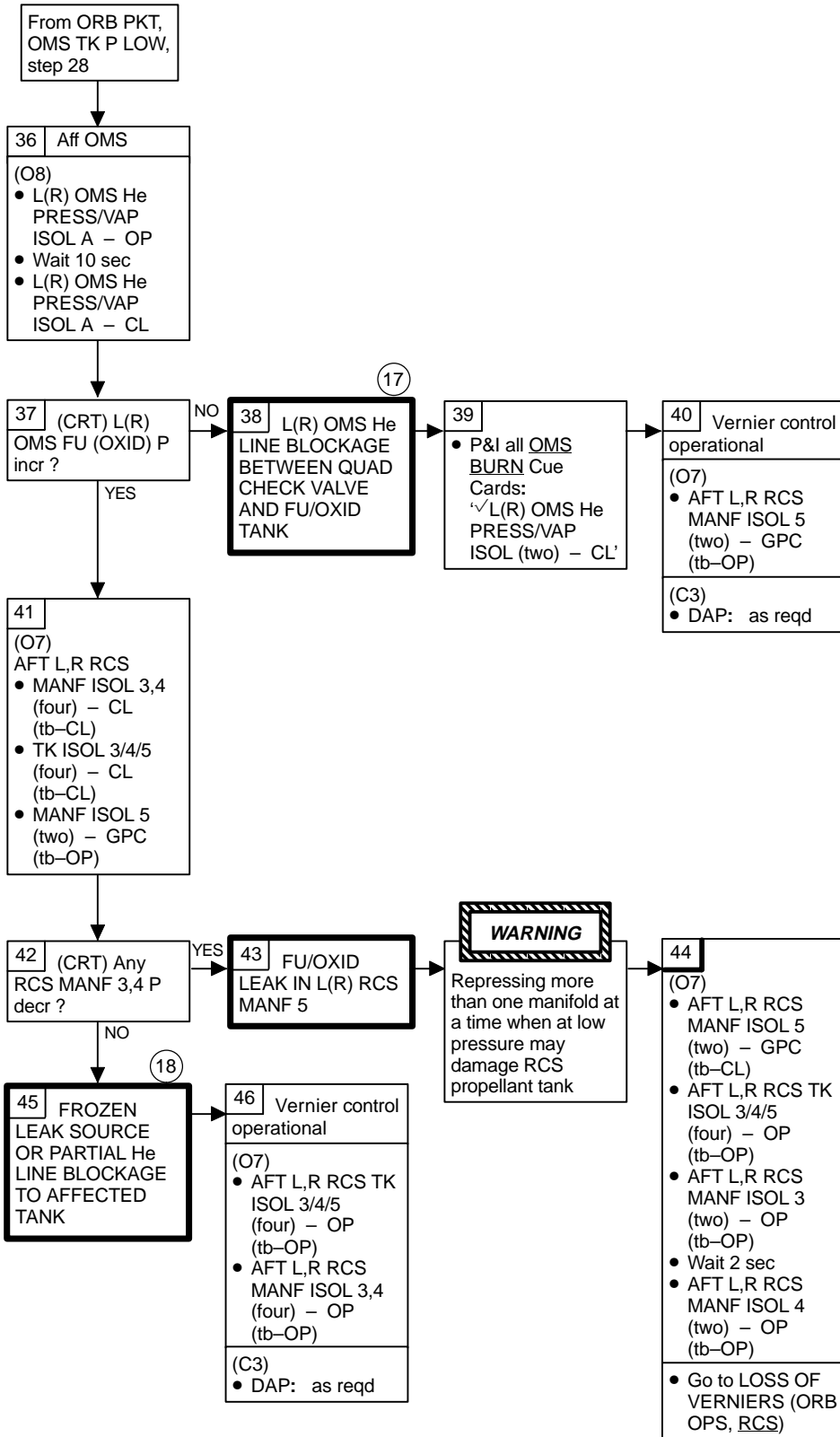
OMS 11.1a (Cont)



- ① ✓MCC for other params possibly lost in same MDM or DSC card
- ⑦ N2 REG xdcr and N2 TK P xdcr on CRT have a common MDM card. This check detects MDM card failure
- ⑨ ✓MCC for blowdown capability. If full blowdown exists, continue with nominal mission profile. If not full blowdown, save available blowdown for deorbit burn
- ⑩ OMS and RCS operational in nominal config. When reqd or on MCC call, use (O8) L(R) OMS He PRESS VAP ISOL B to repress
- ⑪ CRT display of affected TK P and associated msg are invalid. Use OMS/MPS and C/W for status
- ⑫ On GNC SYS SUMM 2 display, use ENG IN P as B/U to failed PRPLT TK P xdcr
- ⑬ H/W C/W lost for affected TK P
- ⑭ Flow through failed Reg will exceed relief vlv setting: 450 psig – RELIEF400 psig – RESEAT
- ⑮ If affected N2 TK P < 564 psia, do NOT use engine for orbit burns
- ⑯ Single failure can result in N2 Reg failing OP and N2 Relief vlv failing CL (N2 Reg P > 500 psia)

MEDS

OMS 11.1a (Cont)

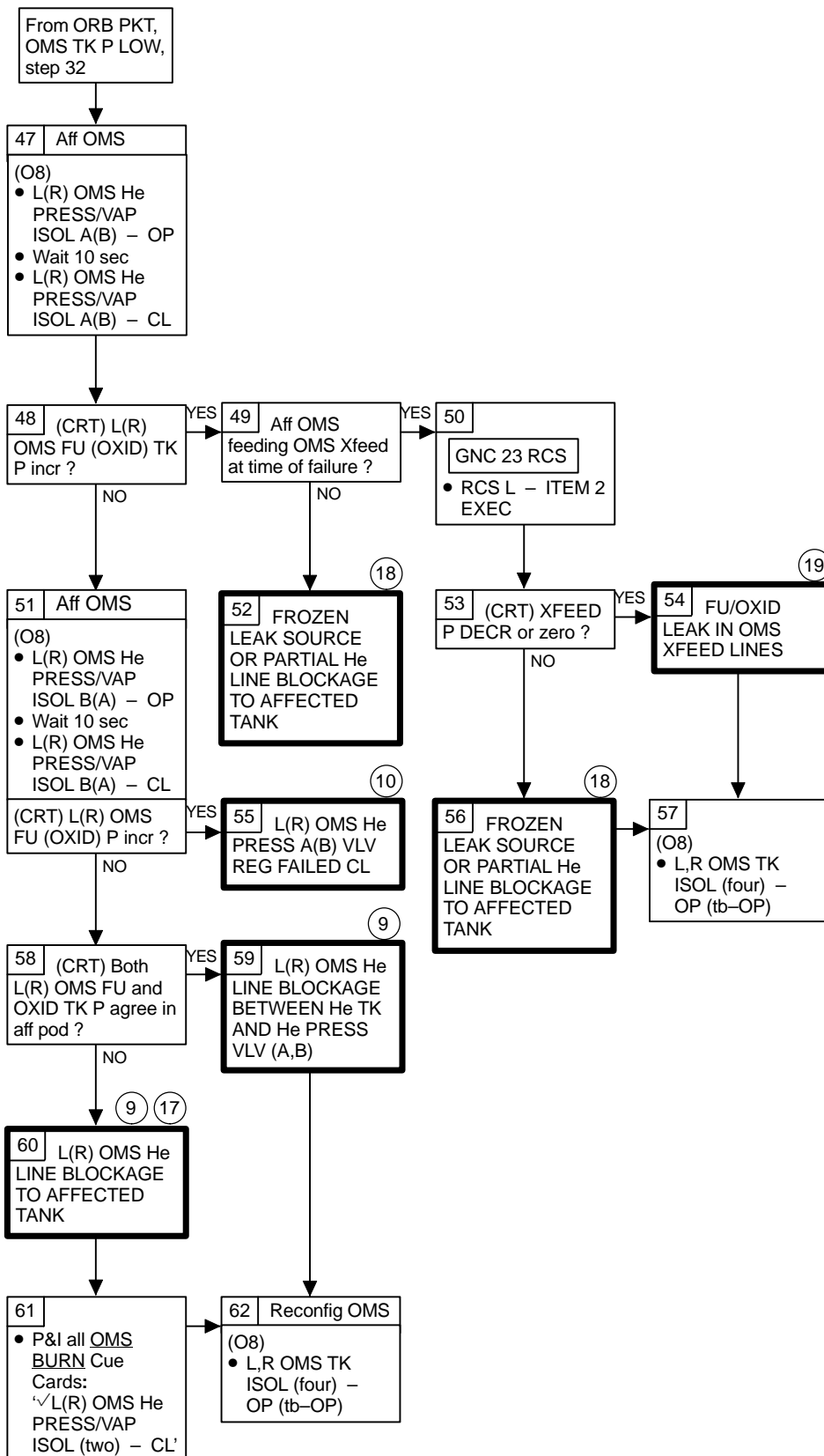


⑰ Perform subsequent burns in blowdown in affected pod to prevent mixture ratio variations

⑱ ✓MCC on action to be taken to minimize failure effects and config for subsequent burns

MEDS

OMS 11.1a (Cont)



9 ✓MCC for blowdown capability. If full blowdown exists, continue with nominal mission profile. If not full blowdown, save available blowdown for deorbit burn

10 OMS and RCS operational in nominal config. When reqd or on MCC call, use (O8) L(R) OMS He PRESS VAP ISOL B to repress

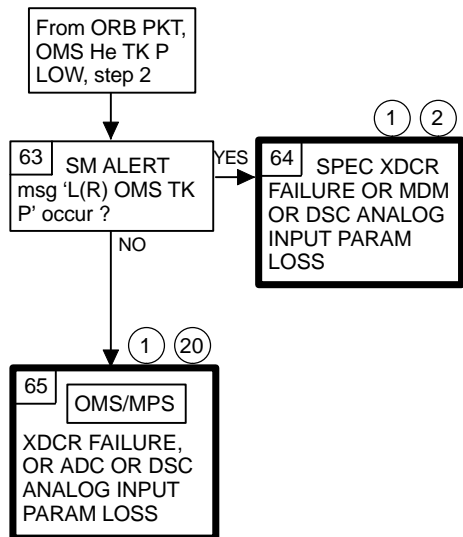
17 Perform subsequent burns in blowdown in affected pod to prevent mixture ratio variations

18 ✓MCC on action to be taken to minimize failure effects and config for subsequent burns

19 OMS and RCS operational in nominal config. Do not Xfeed or i'cnct

MEDS

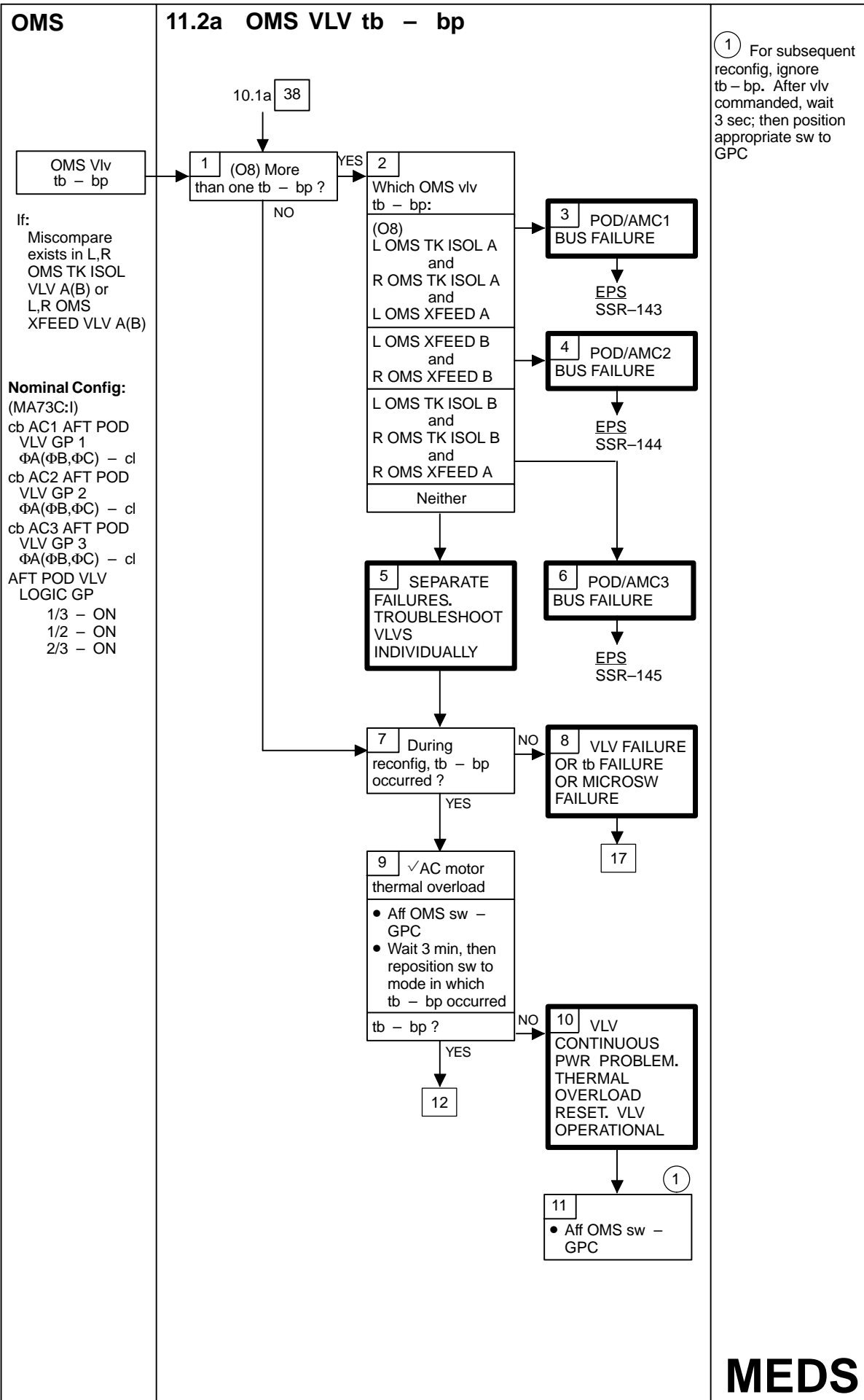
OMS 11.1a (Cont)

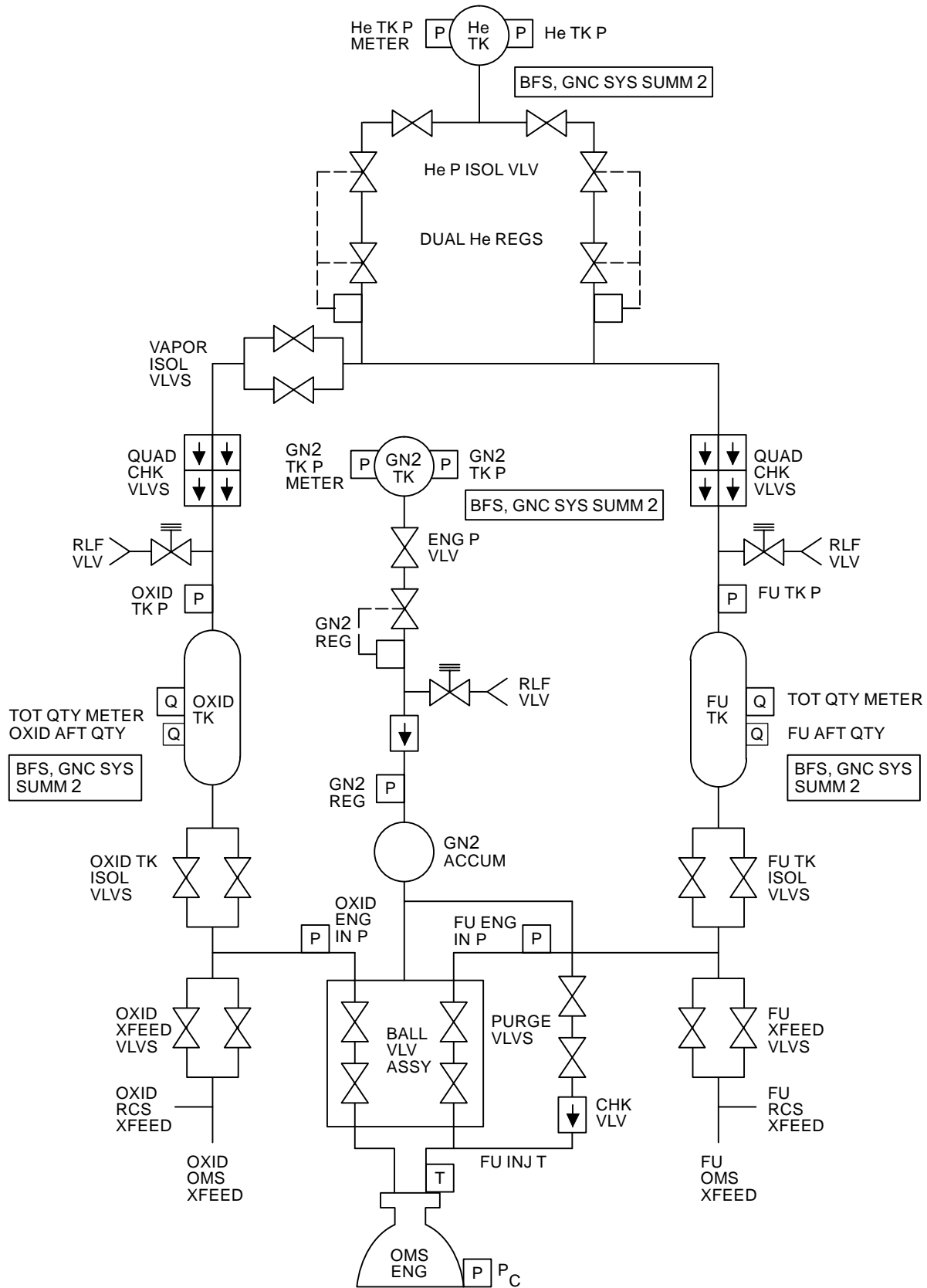


- ① ✓MCC for other params possibly lost in same MDM or DSC card
- ② N2 P available on **OMS/MPS**
- ②① He P available on GNC SYS SUMM 2 display

**OMS SW/VLV
MISCOMP
11.2**

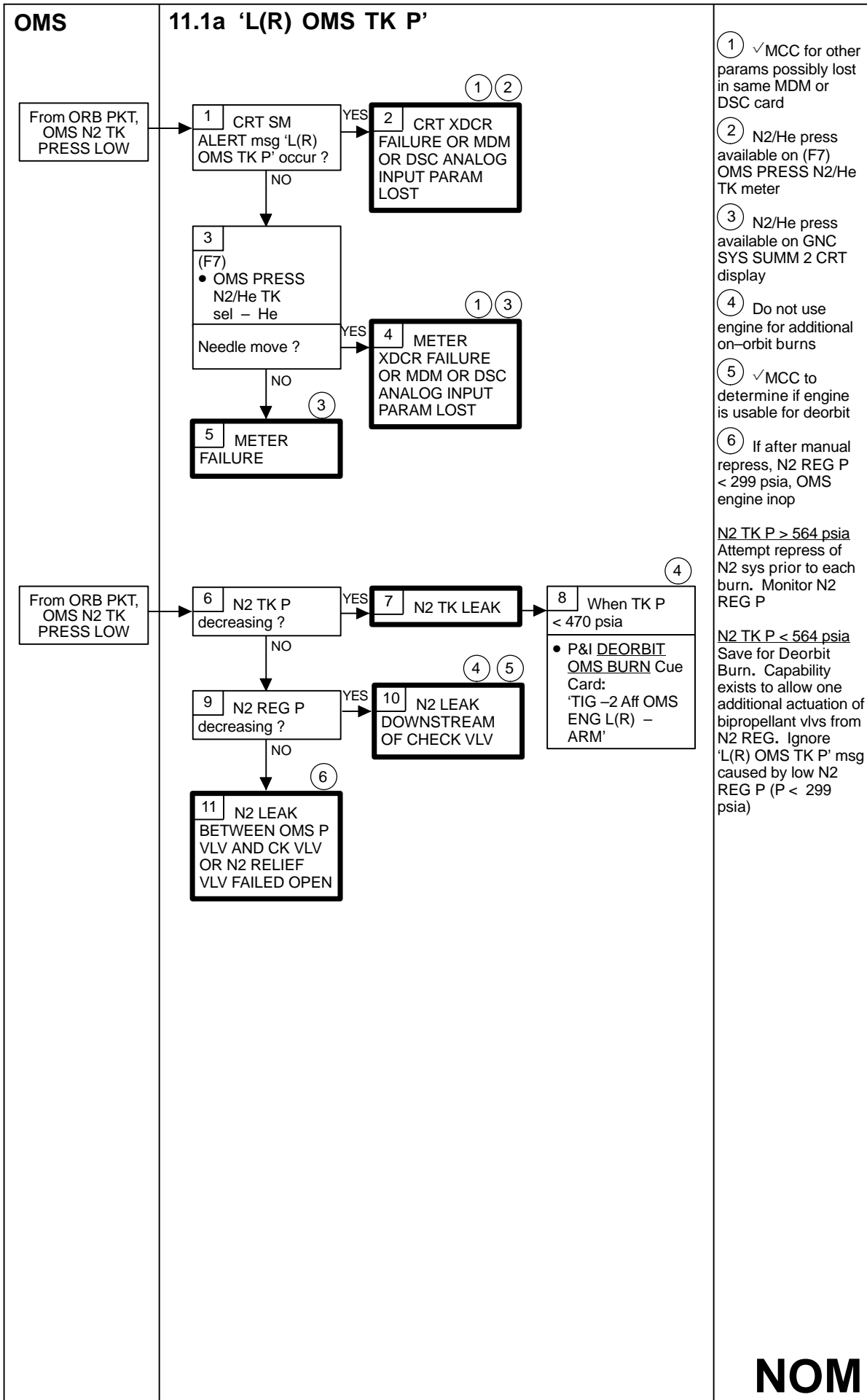
MEDS



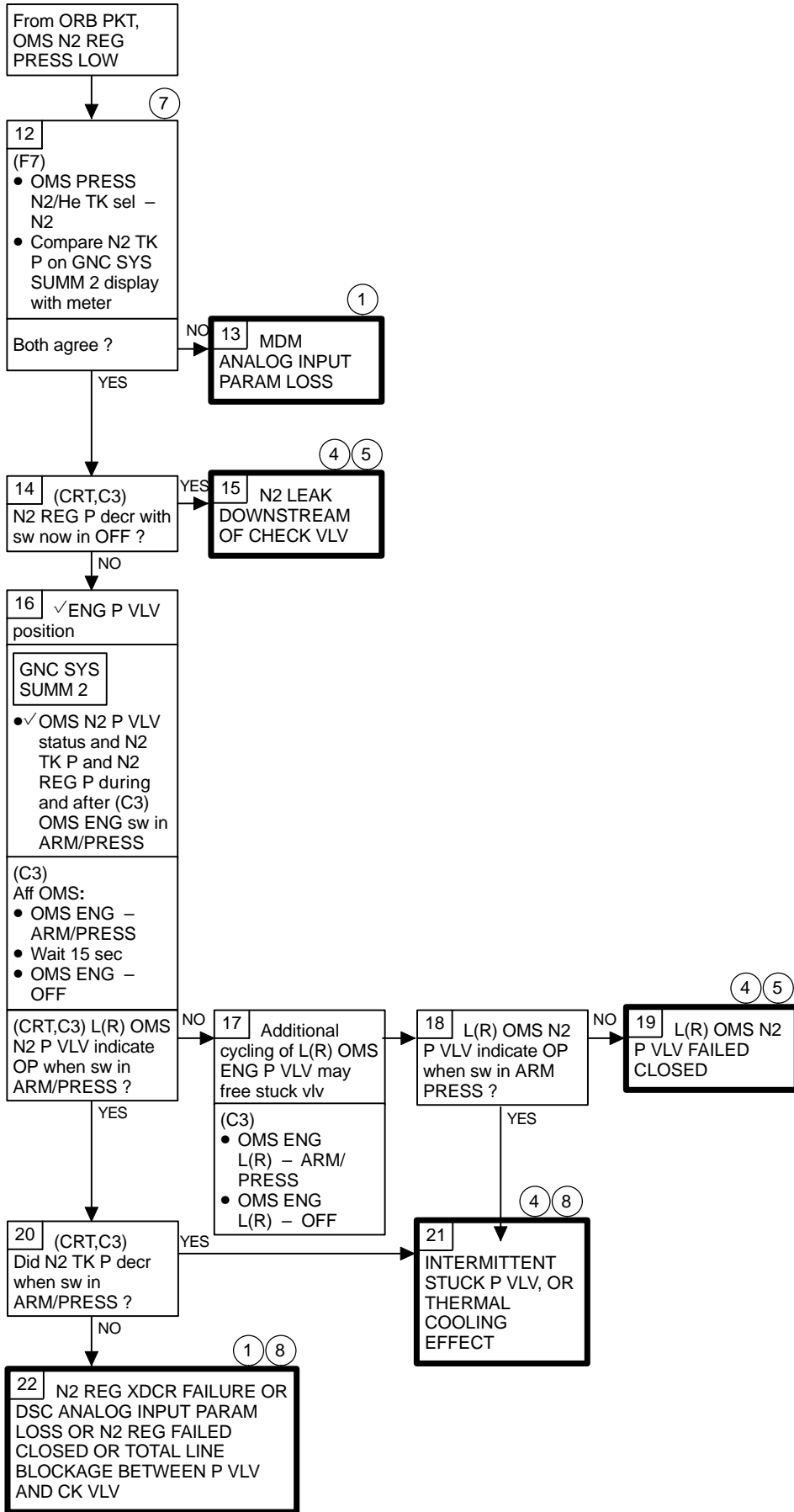


L(R) OMS

11.1



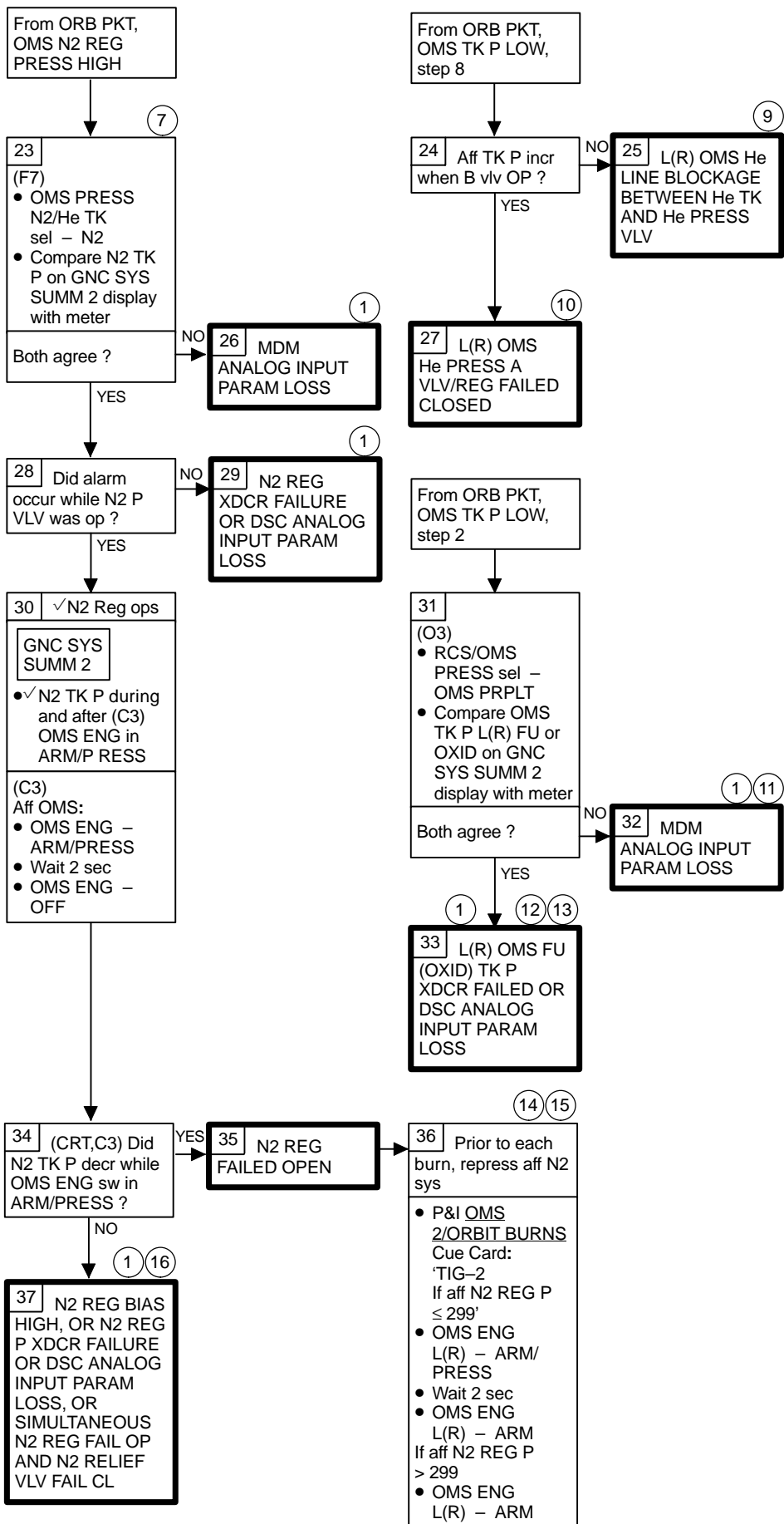
OMS 11.1a (Cont)



- ① ✓MCC for other params possibly lost in same MDM or DSC card
- ④ Do not use engine for additional on-orbit burns
- ⑤ ✓MCC to determine if engine is usable for deorbit
- ⑦ N2 REG xdcr and N2 TK P xdcr on CRT have common MDM card. This check detects MDM card failure
- ⑧ ✓MCC for further engine use

NOM

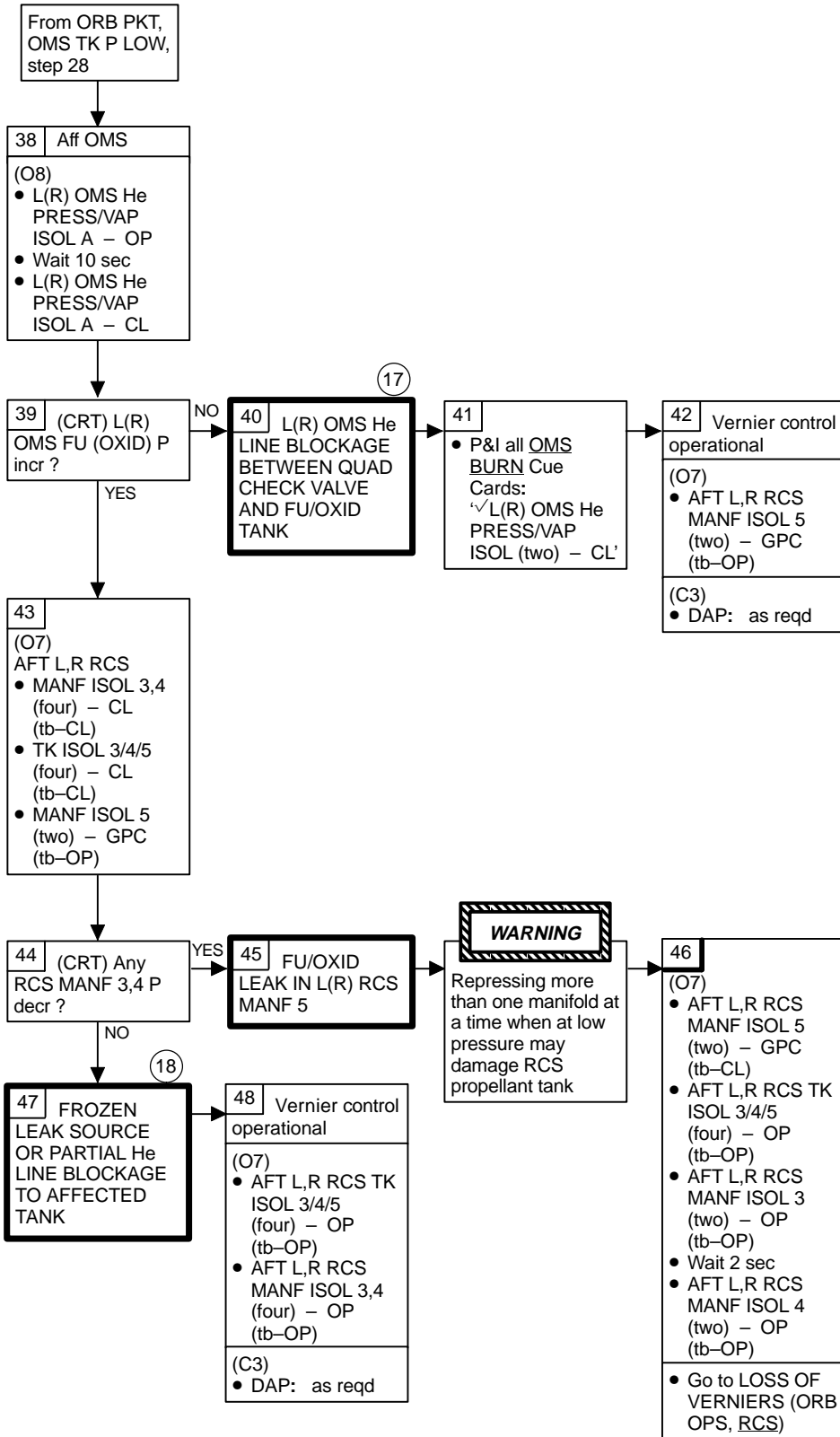
OMS 11.1a (Cont)



- ① ✓MCC for other params possibly lost in same MDM or DSC card
- ⑦ N2 REG xdcr and N2 TK P xdcr on CRT have a common MDM card. This check detects MDM card failure
- ⑨ ✓MCC for blowdown capability. If full blowdown exists, continue with nominal mission profile. If not full blowdown, save available blowdown for deorbit burn
- ⑩ OMS and RCS operational in nominal config. When reqd or on MCC call, use (O8) L(R) OMS He PRESS VAP ISOL B to repress
- ⑪ CRT display of affected TK P and associated msg are invalid. Use meter and C/W for status
- ⑫ On GNC SYS SUMM 2 display, use ENG IN P as B/U to failed PRPLT TK P xdcr
- ⑬ H/W C/W lost for affected TK P
- ⑭ Flow through failed Reg will exceed relief vlv setting: 450 psig - RELIEF 400 psig - RESEAT
- ⑮ If affected N2 TK P < 564 psia, do NOT use engine for orbit burns
- ⑯ Single failure can result in N2 Reg failing OP and N2 Relief vlv failing CL (N2 Reg P > 500 psia)

NOM

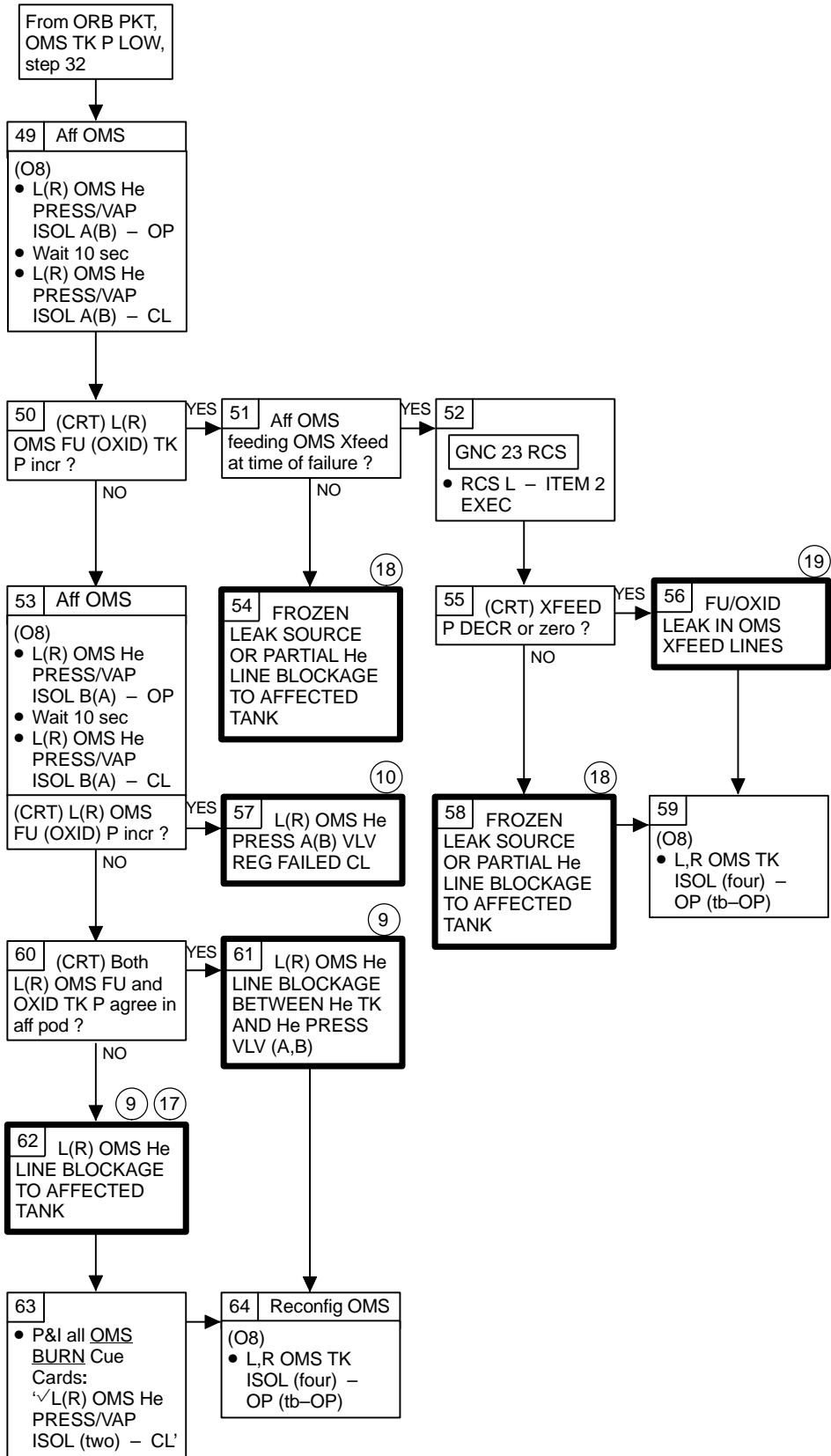
OMS 11.1a (Cont)



- ①⑦ Perform subsequent burns in blowdown in affected pod to prevent mixture ratio variations
- ①⑧ ✓MCC on action to be taken to minimize failure effects and config for subsequent burns

NOM

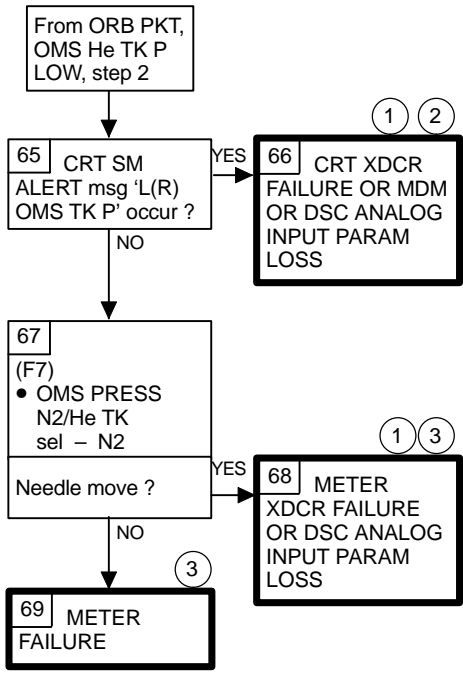
OMS 11.1a (Cont)



- ⑨ ✓MCC for blowdown capability. If full blowdown exists, continue with nominal mission profile. If not full blowdown, save available blowdown for deorbit burn
- ⑩ OMS and RCS operational in nominal config. When reqd or on MCC call, use (O8) L(R) OMS He PRESS VAP ISOL B to repress
- ⑰ Perform subsequent burns in blowdown in affected pod to prevent mixture ratio variations
- ⑱ ✓MCC on action to be taken to minimize failure effects and config for subsequent burns
- ⑲ OMS and RCS operational in nominal config. Do not Xfeed or i'cnct

NOM

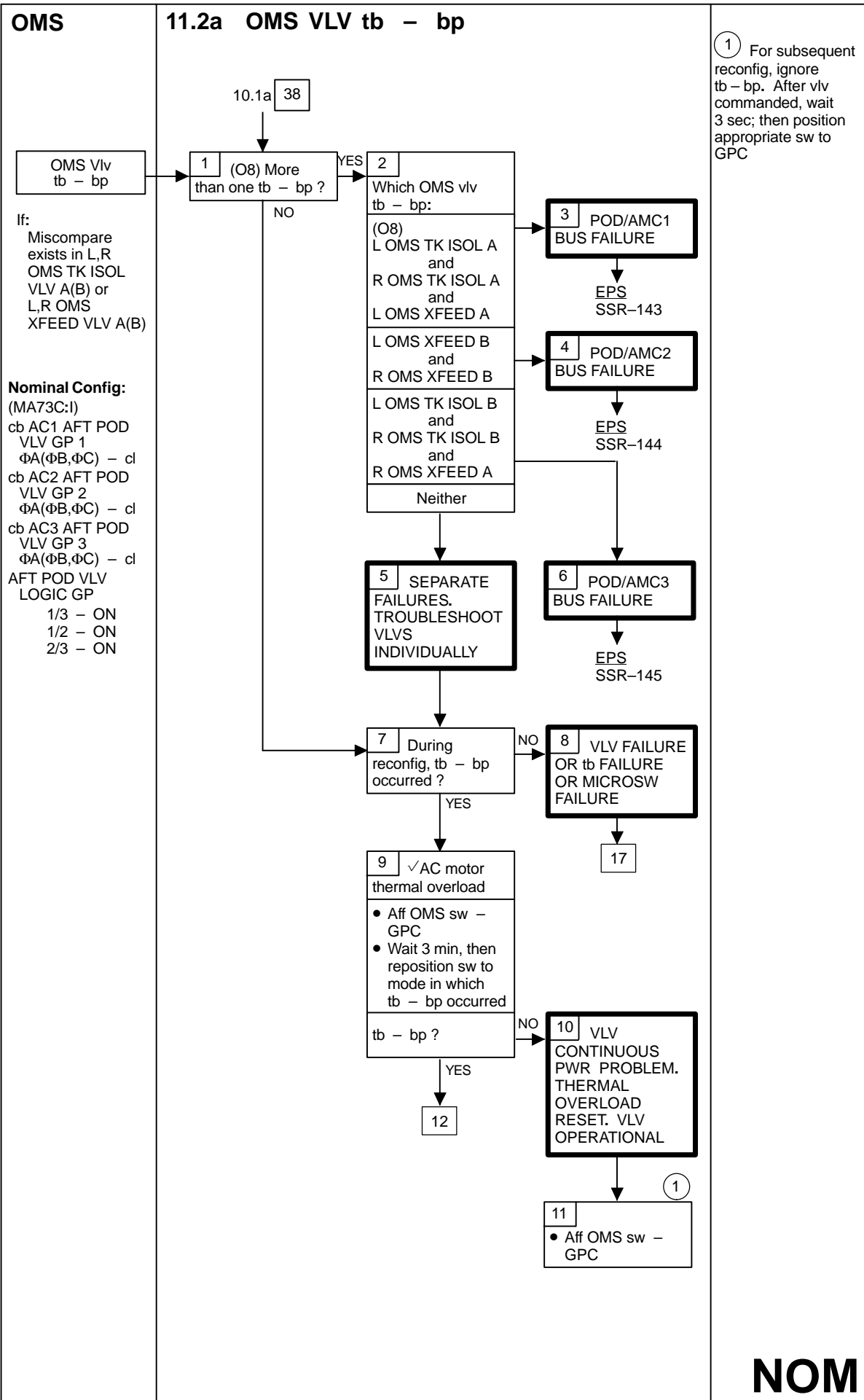
OMS 11.1a (Cont)



- ① ✓MCC for other params possibly lost in same MDM or DSC card
- ② N2/He press available on (F7) OMS PRESS N2/He TK meter
- ③ N2/He press available on GNC SYS SUMM 2 CRT display

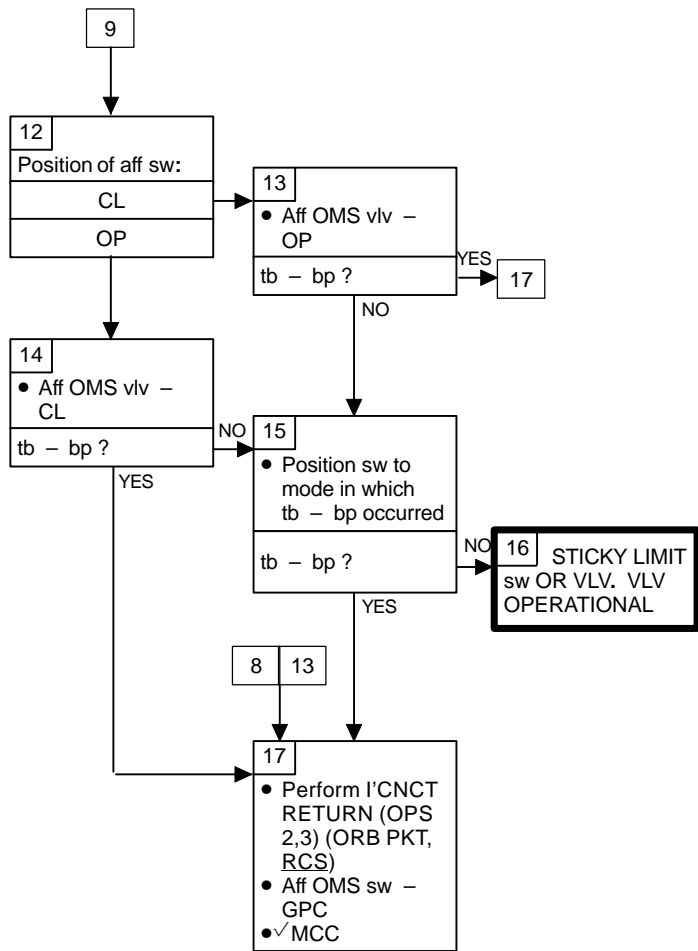
**OMS SW/VLV
MISCOMP
11.2**

NOM



NOM

OMS 11.2a (Cont)



OMS

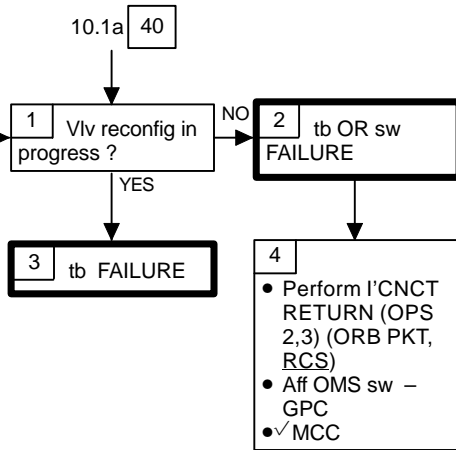
11.2b OMS VLV tb AND sw POSITION DISAGREE

OMS Vlv
tb and sw
Disagree

If:
OMS vlv tb – OP
but sw closed
OMS vlv tb – CL
but sw open

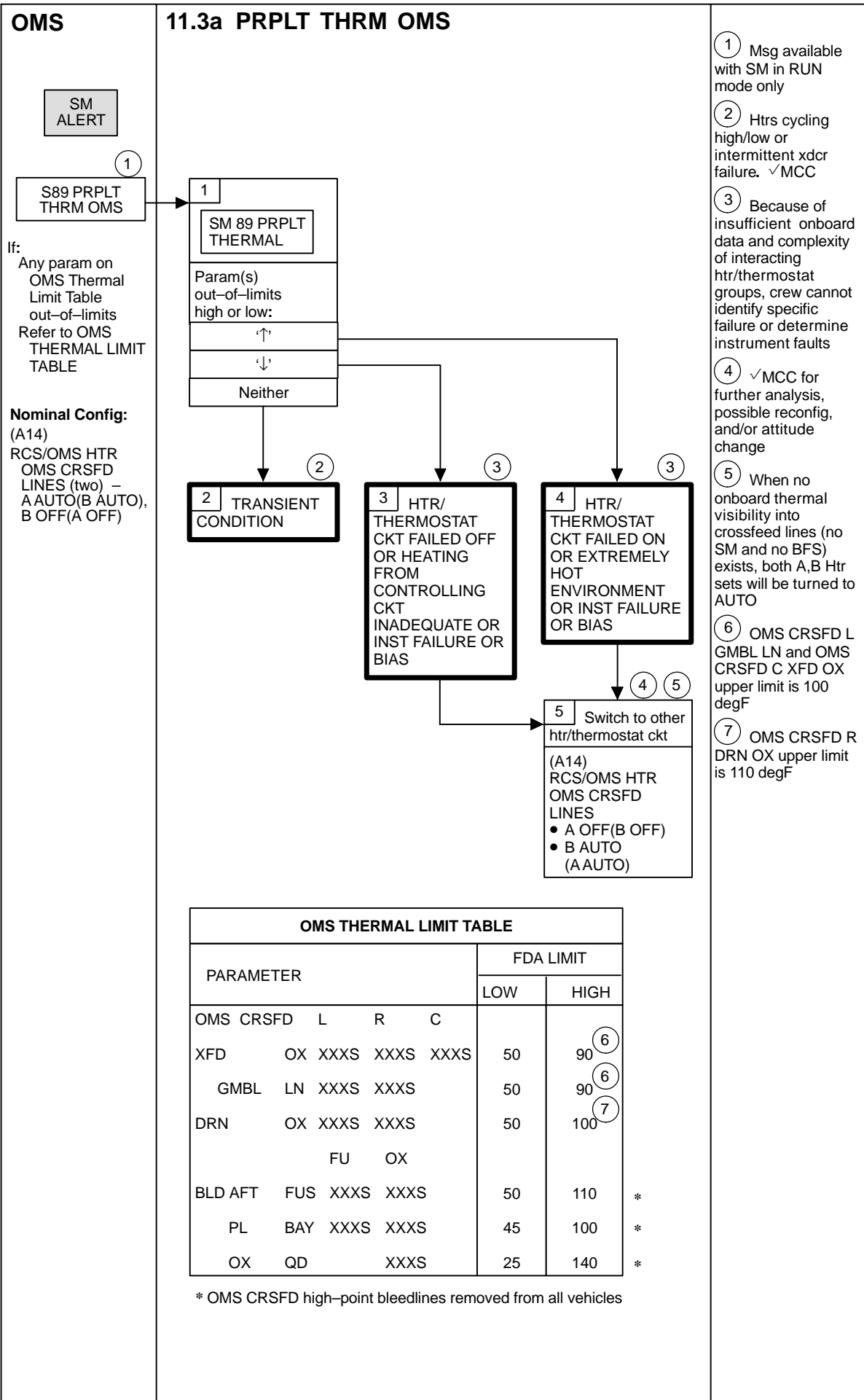
Nominal Config:

(MA73C:I)
cb AC1 AFT POD
VLV GP 1
ΦA(ΦB,ΦC) – cl
cb AC2 AFT POD
VLV GP 2
ΦA(ΦB,ΦC) – cl
cb AC3 AFT POD
VLV GP 3
ΦA(ΦB,ΦC) – cl
AFT POD VLV
LOGIC GP
1/3 – ON
1/2 – ON
2/3 – ON



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**OMS PRPLT
THERMAL
11.3**



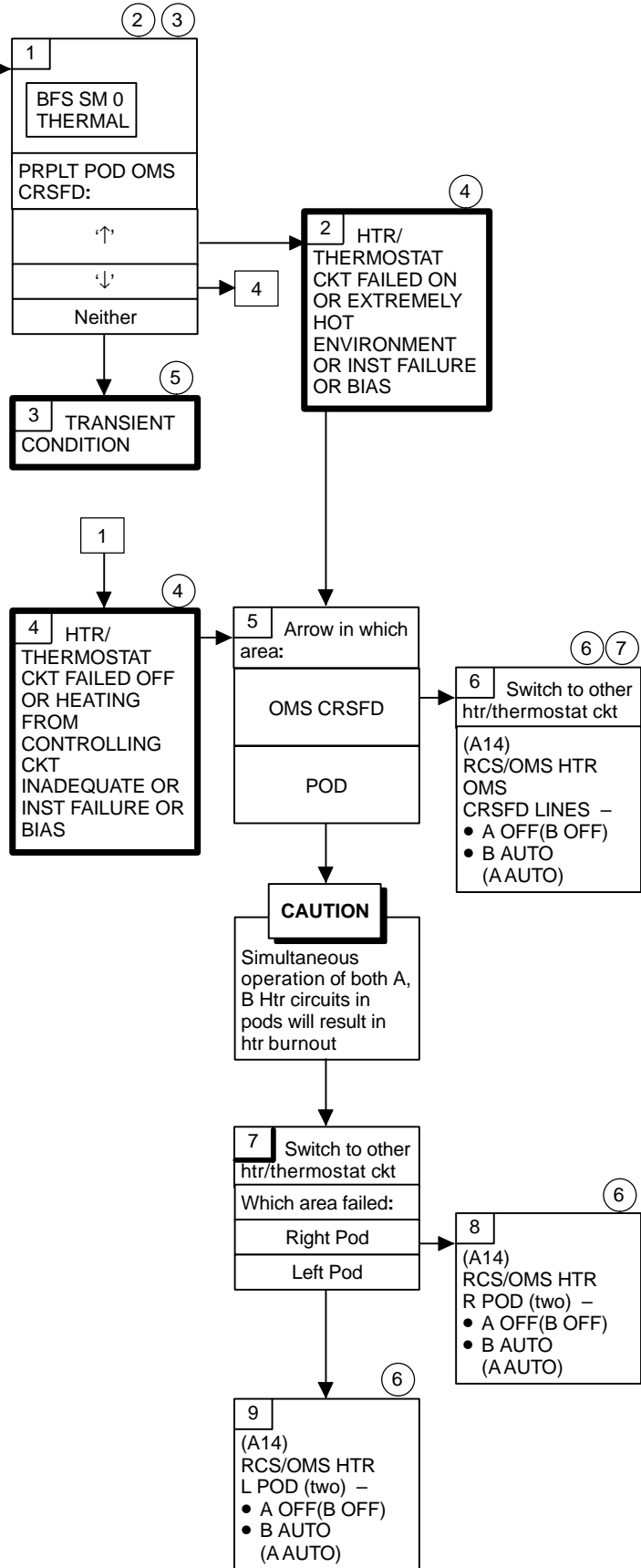
OMS

11.3b THRM PRPLT

① SM 0 THRM PRPLT

If:
Any up or down arrows displayed on PRPLT POD or PRPLT OMS CRSFD lines of BFS SM 0 THERMAL display

Nominal Config:
(A14)
RCS/OMS HTR
L POD (two) – A AUTO(B AUTO), B OFF(A OFF)
R POD (two) – A AUTO(B AUTO), B OFF(A OFF)
CRSFD LINES (two) – A AUTO (B AUTO) B OFF(A OFF)



- ① BFS msg available in MM 104, 105, 106, 301, 302, 303, and when BFS in OPS 0
- ② If SM 89 PRPLT THERMAL is available, display may be used to provide insight into problem, with MCC consultation
- ③ THERMAL display available only from BFS. No values displayed, only ↑, ↓, M, H, or L
- ④ Because of insufficient onboard data and complexity of interfacing htr/thermostat groups, crew cannot identify specific failure or determine instrument faults
- ⑤ Htrs cycling high/low or intermittent xcdr failure. ✓MCC
- ⑥ ✓MCC for further analysis, possible reconfig, and/or attitude change
- ⑦ When no onboard thermal visibility into CRSFD LINES (no SM and no BFS) exists, both A,B Htr sets will be turned to AUTO

OMS

11.3c PRPLT THRM POD

SM ALERT

1
S89 PRPLT THRM POD

If:
Any param on Pod Thermal Limit Table except ENG I/F FU INJ temp out-of-limits

Nominal Config:
(A14)
RCS/OMS HTR
L POD (two) – A AUTO(B AUTO), B OFF(A OFF)
R POD (two) – A AUTO(B AUTO), B OFF(A OFF)

10.3a 1
10.3b 2

1
SM 89 PRPLT THERMAL
Param(s) out-of-limits ?
WEB KEEL
OX DRN PNL
TEST HE/OX
RCS DRN PNL
RCS VERN PNL

2 Both params 1,2 out-of-limits ?

3 INST FAILURE

4
Param(s) out-of-limits high or low:
↑
↓
Neither

5 HTR/THERMOSTAT CKT FAILED ON OR EXTREMELY HOT ENVIRONMENT OR INST FAILURE OR BIAS

6 HTR/THERMOSTAT CKT FAILED OFF OR HEATING FROM CONTROLLING CKT INADEQUATE OR INST FAILURE OR BIAS

7 TRANSIENT CONDITION

CAUTION

Simultaneous ops of both A,B HTR ckts in pods will result in burnout of htrs

8 Switch to other htr/thermostat ckt
Which area failed:
Right Pod
Left Pod

9 (A14)
RCS/OMS HTR
R POD (two) –
• A OFF(B OFF)
• B AUTO (A AUTO)

10 (A14)
RCS/OMS HTR
L POD (two) –
• A OFF(B OFF)
• B AUTO (A AUTO)

- 1 Msg available with SM in RUN mode only
- 2 ✓MCC for verification
- 3 Because of insufficient onboard data and complexity of interacting htr/thermostat groups, crew cannot identify specific failure or determine instrument faults
- 4 Htrs cycling high/low or intermittent xdcr failure. ✓MCC
- 5 ✓MCC for further analysis, possible reconfig, and/or attitude change

11.3c (Cont)

POD THERMAL LIMIT TABLE

PARAM					FDA LIMIT	
					LOW	HIGH
POD			L	R		
O MS	TK	OX	XXXX	XXXX	45	95
		FU	XXXX	XXXX	45	95
E NG	I/F	OX	XXXX	XXXX	45	110
		FU	XXXX	XXXX	45	110
		OX VLV	XXXX	XXXX	40	122
		FU INJ	XXXX	XXXX	36	260
W EB	KEEL	1	XXXX	XXXX	45	100
		2	XXXX	XXXX	45	100
	Y	OB	XXXX	XXXX	45	120
		UP	XXXX	XXXX	45	120
O X	DRN PNL	1	XXXX	XXXX	45	110
		2	XXXX	XXXX	45	110
E NG	COVER		XXXX	XXXX	45	
	SERV PNL		XXXX	XXXX	45	140
G SE	SERV PNL		XXXX	XXXX	45	120
T EST	HE/OX	1	XXXX	XXXX	35	95
		2	XXXX	XXXX	35	95

O MS SSR

OMS SSR-1

MIXED XFD: OMS PRPLT FAILURE

NOTE

Procedure uses MEMORY READ/WRITE to set appropriate OMS TK ISOL vlv and OMS XFEED vlv commands in order to connect usable OMS tk to opposite side. For single tank or single inlet failures, select engine in good pod. Unstow ASC PKT and reference DEORBIT MIXED XFD BURN PREP procedure on 7-6 for reqd address IDs. Desired values are given in Tables 1 thru 8

- O8 1. L,R OMS TK ISOL (four) – CL (tb-CL)
XFEED (four) – CL (tb-CL)
- O7 2. AFT L,R RCS XFEED (four) – CL (tb-CL)
✓ MSTR RCS XFEED – OFF

WARNING
Do not use MSTR RCS XFEED until post burn or loss of Deorbit capability may occur

- 3. Select failure case table

Single Failures	Use Table	Dual Failures	Use Table
L OMS OX TK	4	L OMS FU TK AND R OMS OX TK	1
L OMS OX INLET	4	L OMS OX TK AND R OMS FU TK	2
L OMS FU TK	6	L OMS FU TK AND R OMS OX INLET	3
L OMS FU INLET	6	L OMS OX INLET AND R OMS FU TK	4
R OMS OX TK	3	L OMS OX TK AND R OMS FU INLET	5
R OMS OX INLET	3	L OMS FU INLET AND R OMS OX TK	6
R OMS FU TK	5	L OMS OX INLET AND R OMS FU INLET	7
R OMS FU INLET	5	L OMS FU INLET AND R OMS OX INLET	8

- CRT 4. Set up GPC vlvs

GNC 0 GPC MEMORY

- ✓ HEX 27*
BIT RST – ITEM 23 EXEC (*)
Obtain and enter ADD ID from ASC PKT, 7-6, DEORBIT MIXED XFD BURN PREP, step 3.
Obtain and enter DESIRED values from Tables 1 thru 8

ADD ID		DESIRED	
28	_____	29	_____
30	_____	31	_____
32	_____	33	_____
34	_____	35	_____

} From Tables 1-8

Table A	Table B
_____	_____
_____	_____
_____	_____
_____	_____

- ✓ Data values in ACTUAL column agree with Table A (MCC supplied)
WRITE – ITEM 25 EXEC
- ✓ Data values in ACTUAL column agree with Table B (MCC supplied)

- 5. BIT SET – ITEM 22 EXEC (*)
Obtain and enter ADD ID from ASC PKT, 7-6, DEORBIT MIXED XFD BURN PREP, step 4.
Obtain and enter DESIRED values from Tables 1 thru 8

ADD ID		DESIRED	
28	_____	29	_____
30	_____	31	_____
32	_____	33	_____
34	_____	35	_____

} From Tables 1-8

Table C
0 0 0 0
0 0 0 0
0 0 0 0
0 0 0 0

- ✓ Data values in ACTUAL column agree with Table C
WRITE – ITEM 25 EXEC
- ✓ Data values in ACTUAL column agree with DESIRED

- O8 6. During AOS, perform reconfig:
L,R OMS TK ISOL (four) – GPC
XFEED (four) – GPC
✓ Vlv config with MCC
- 7. Go to DEORBIT BURN (MIXED XFEED) (Cue Card) to perform deorbit burn
(✓ Burn engine in Tables 1 thru 8)

OMS SSR

OMS SSR-1 (Cont)

TABLE 1

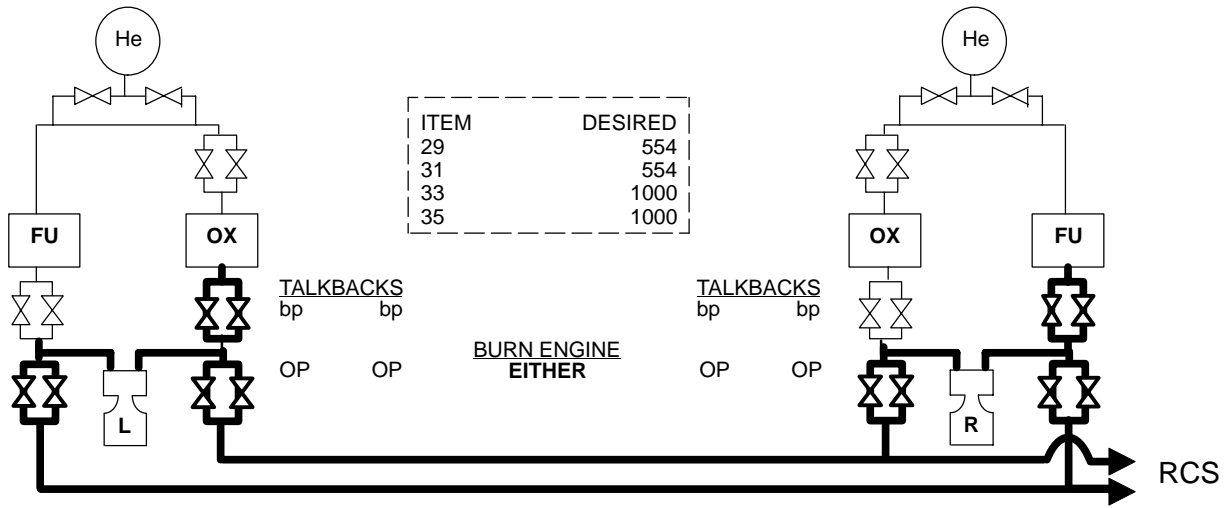
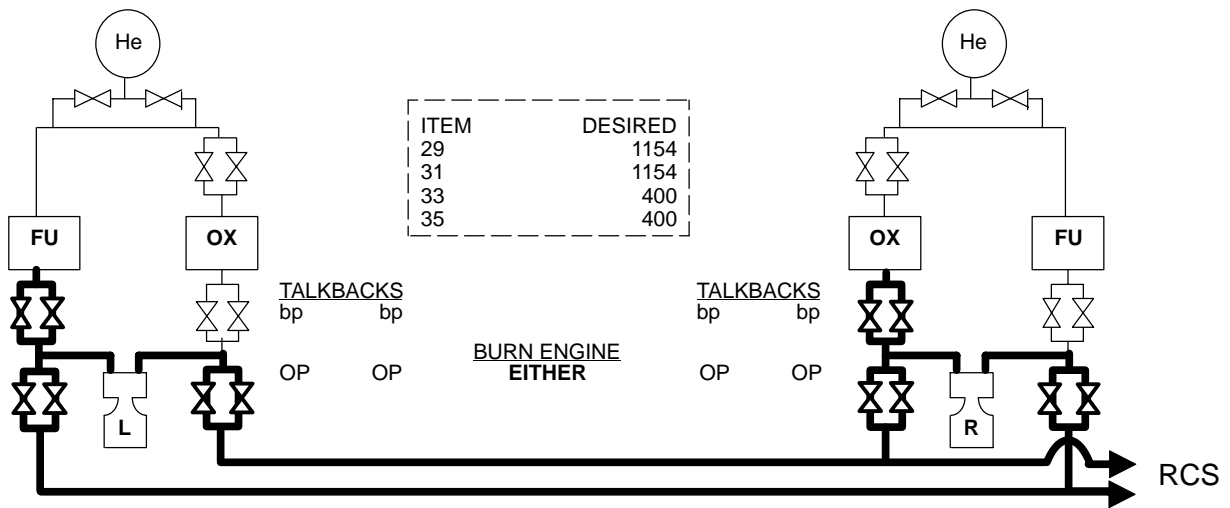


TABLE 2



OMS SSR-1 (Cont)

TABLE 3

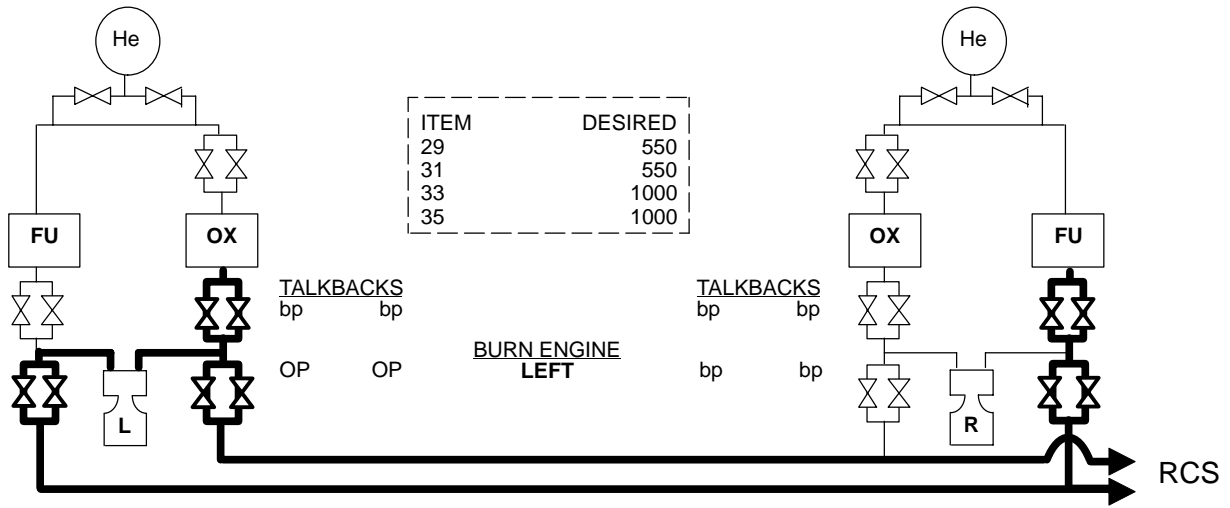
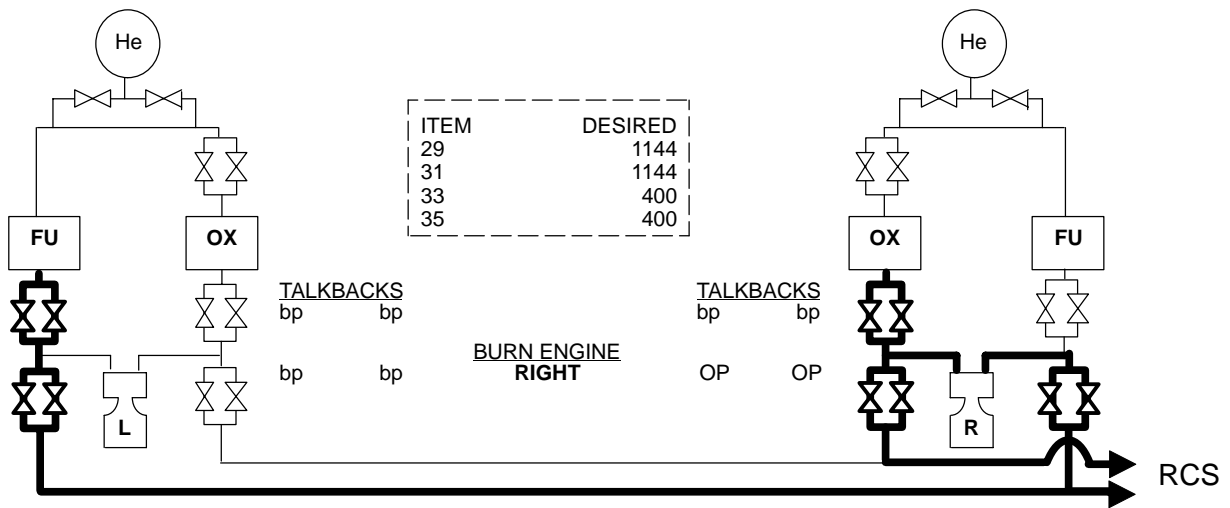


TABLE 4



OMS SSR-1 (Cont)

TABLE 5

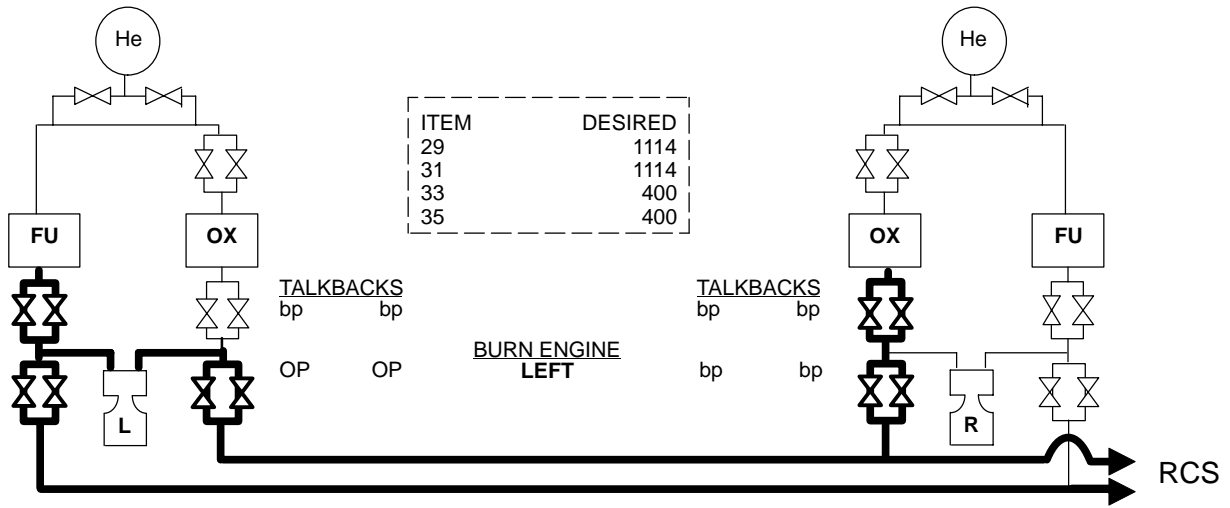
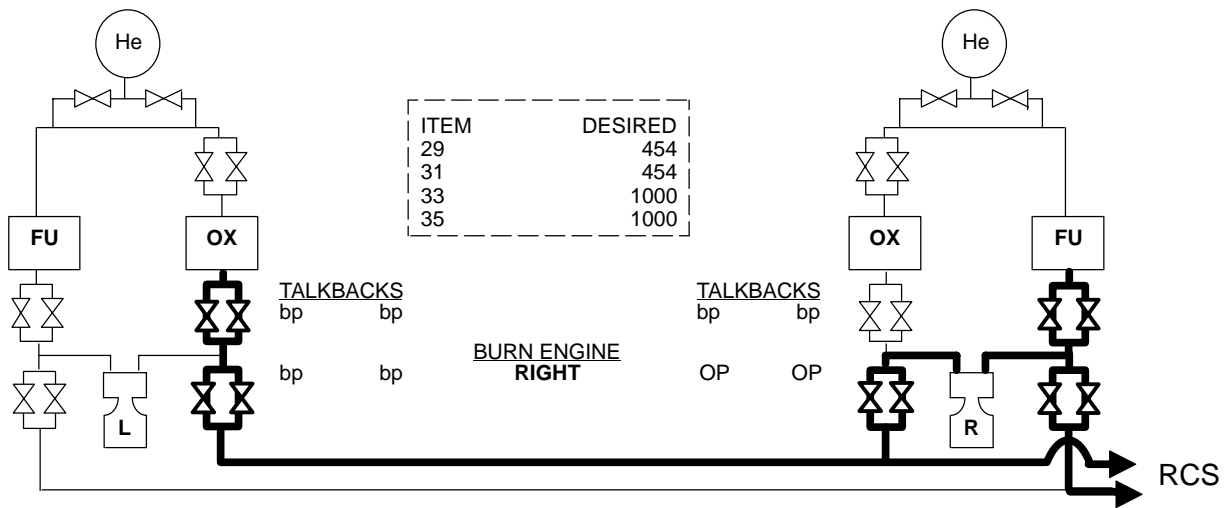


TABLE 6



OMS SSR-1 (Cont)

TABLE 7

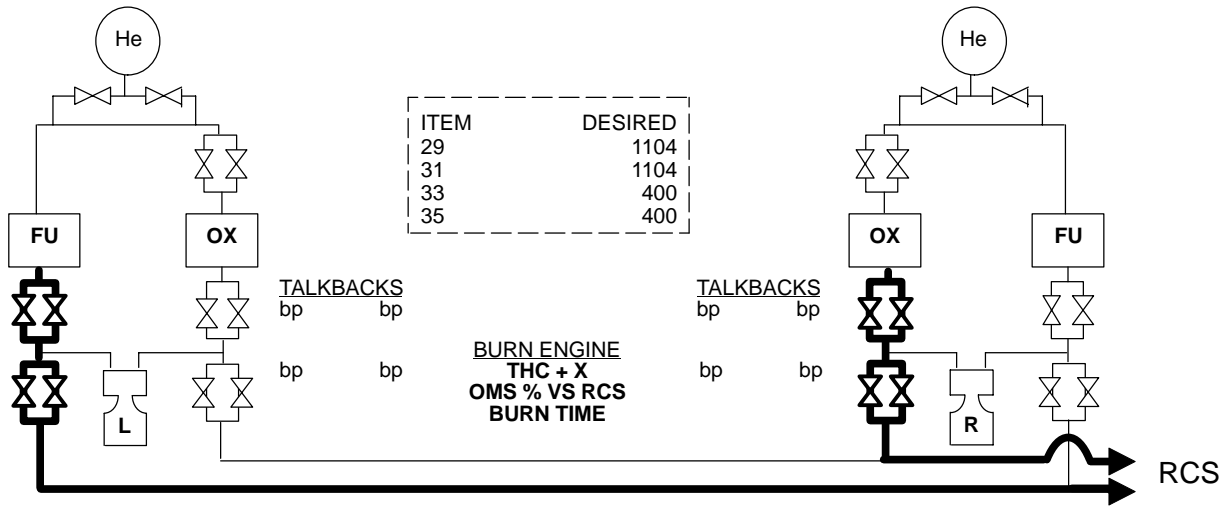
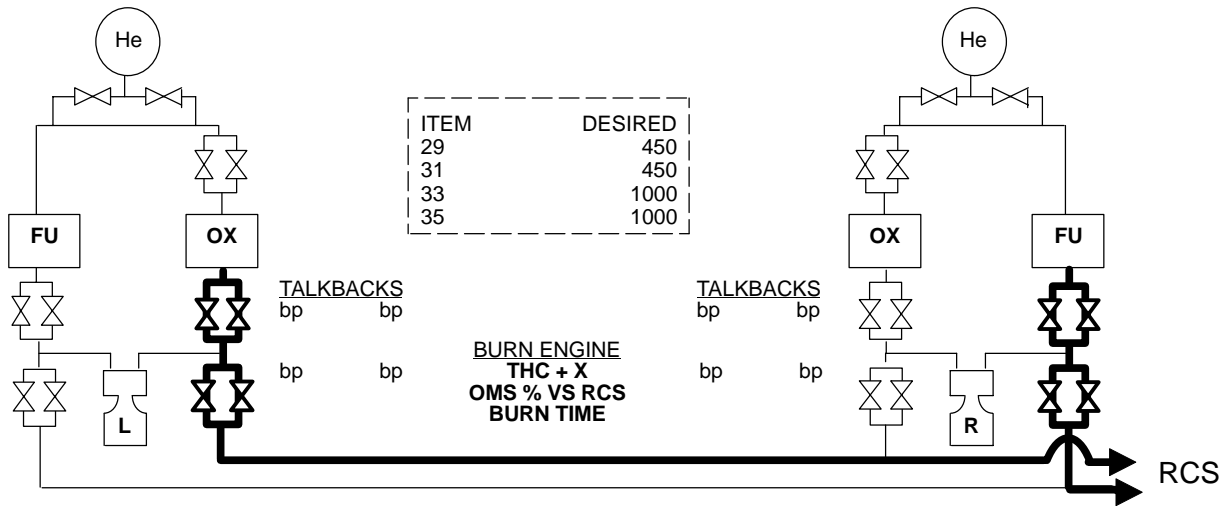


TABLE 8



PDRS

<u>12.1</u>	<u>RMS C/W</u>	
12.1a	C/W LT(S) ON, BUT RMS MSTR ALARM LT/TONE OFF	12-4
12.1b	MULTIPLE C/W LTS AND PDRS MSGS	12-5
12.1c	C/W MCIU LT	12-6
12.1d	ABE LT OR S96 PDRS ABE COMM(SY, SP, EP, WP, WY, WR) ...	12-8
12.1e	CONTR ERR LT - S96 PDRS CNTL SY(SP, EP, WP, WY, WR) OR PDRS CNTL POR	12-19
12.1f	GPC DATA LT OR BCE BYP MCIU	12-22
12.1g	CHECK CRT LT	12-24
12.1h	- S96 PDRS CKCRT D	12-26
12.1i	- S96 PDRS TEST SPA	12-27
12.1j	- S96 PDRS CKCRT SY(SP, EP, WP, WY, WR)	12-31
12.1k	- S96 PDRS CKCRT EE	12-33
12.1l	- S96 PDRS CKCRT T CK	12-36
12.1m	- S96 PDRS CKCRT HC	12-37
12.1n	- PDRS SLIP SY(SP, EP, WP, WY, WR, ALL) ..	12-38
12.1o	- S94 PDRS WR R	12-39
12.1p	- PDRS TEST BRK(C/W, NMI, FS, LOSS)	12-40
12.1q	- S96 PDRS CKCRT FS	12-42
12.1r	RELEASE LT - PDRS REL	12-43
12.1s	- PDRS REL (CUE CARD EXECUTED)	12-44
12.1t	DERIGIDIZE LT - PDRS DERIG	12-45
12.1u	- PDRS DERIG (CUE CARD EXECUTED)	12-48
12.1v	PORT TEMP LT - PDRS TEMP PORT	12-49
<u>12.2</u>	<u>RMS D&C</u>	
12.2a	MSTR ALARM ON, BUT C/W LT(S) OFF	12-52
12.2b	BRAKES - ON, BUT BRAKES tb - OFF	12-53
12.2c	- OFF, BUT BRAKES tb - ON	12-54
12.2d	SAFING - AUTO, BUT SAFING tb - bp	12-55
12.2e	RESERVED	not used
12.2f	RESERVED	not used
12.2g	SELECTED MODE ANNUN - OFF OR ALL A8 LTS - OFF	12-57
12.2h	SHLDR BRACE REL tb - bp AFTER CMD	12-60
<u>12.3</u>	<u>END EFFECTOR</u>	
12.3a	EE FAILS TO CAPTURE/RIGIDIZE IN AUTO	12-62
12.3b	RELEASE/DERIGIDIZE IN AUTO	12-66
12.3c	CLOSE IN EE MODE - MAN (EE C/O ONLY)	12-70
12.3d	EE FAILS TO RIGIDIZE IN EE MODE - MAN (EE CHECKOUT ONLY)	12-71
12.3e	EE FAILS TO RELEASE IN EE MODE - MAN	12-73
12.3f	DERIGIDIZE/EXTEND IN MANUAL	12-75
12.3g	EE tb ABNORMAL WHILE NO EE CMDS (EE MODE - AUTO OR MAN)	12-77
12.3h	EE tb ABNORMAL WHILE EE MODE OFF	12-79
12.3i	CAPTURE SEQ ABORTED (CUE CARD EXECUTED)	12-81
12.3j	NO AUTO RELEASE (CUE CARD EXECUTED)	12-82
12.3k	MANUAL RELEASE (CUE CARD EXECUTED)	12-84
12.3l	DERIGID (CUE CARD EXECUTED)	12-86

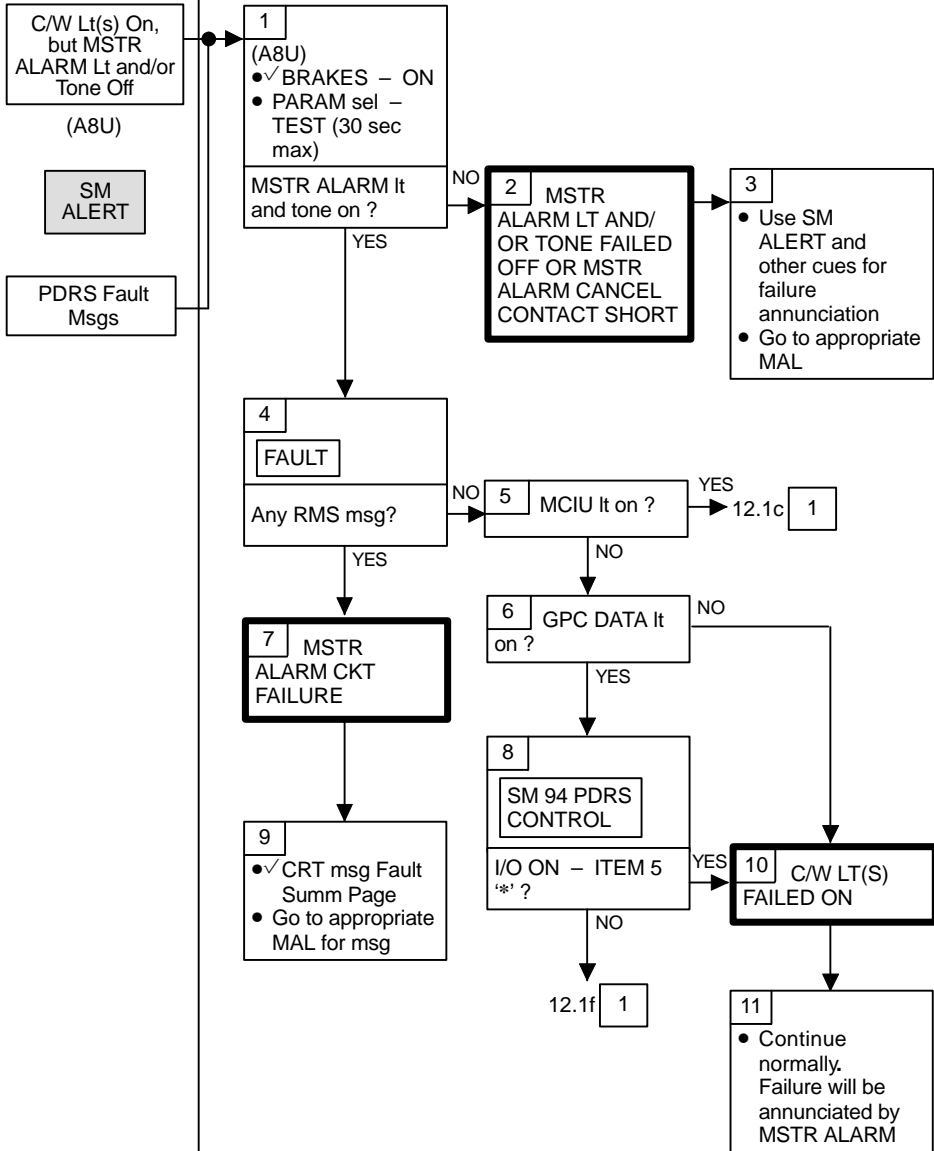
<u>12.4</u>	<u>RMS OPS</u>	
12.4a	ARM RESPONSE ABNORMAL IN MANUAL MODES	12-88
12.4b	AUTO MODES	12-90
12.4c	JOINT RESPONSE ABNORMAL IN SINGLE MODE	12-92
12.4d	DIRECT MODE	12-95
<u>12.5</u>	<u>MPM/MRL</u>	
12.5a	MPM DPY – tb NOT DPY, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME	12-98
12.5b	MPM STO – tb NOT STO, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME	12-100
12.5c	MRL REL – tb NOT REL, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME	12-102
12.5d	MRL LAT – tb NOT LAT, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME	12-104
12.5e	PORT RMS RETEN LATCHES R-F-L tb – bp WHEN CRADLED	12-106
12.5f	PORT RMS RETEN LATCHES R-F-L tb – gray WHEN UNCRADLED	12-106
<u>12.6</u>	<u>OSVS</u>	
12.6a	OSVS LCDM BLANK DURING POWERUP	12-108
12.6b	OSVS POWER LED NOT ON	12-109
12.6c	OSVS DOES NOT INITIALZE	12-110
12.6d	OSVS NO SYNC SIGNAL DETECTED	12-111
12.6e	OSVS USER INTERFACE FROZEN	12-112
12.6f	OSVS HALT SYMBOL PRESENT OR ACTIVITY INDICATOR INACTIVE	12-113
12.6g	OSVS VIDEO ABSENT OR DISTORTED ON LCDM/AFD MONITOR	12-114
12.6h	OSVS DATABASE FILE ERRORS	12-115
12.6i	OSVS CAMERA COMMANDS DO NOT FUNCTION	12-116
12.6j	OSVS OUT OF RANGE TEMP/VOLTAGE	12-117
<u>PDRS SSR</u>		
PDRS	SSR-1 MPM MTR INHIBIT DISABLE	12-118
	SSR-2 RMS JOINT FAILED PAD	12-119
	SSR-3 BACKDRIVE TECHNIQUE – JOINT FREE	12-120
	SSR-4 RMS IFM D&C KIT	12-128
	SSR-5 OSVS CMOS SETTINGS	12-131
	SSR-6 OSVS DATABASE MAINTENANCE	12-132

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RMS C/W

12.1

12.1a C/W LT(S) ON, BUT RMS MSTR ALARM LT/TONE OFF

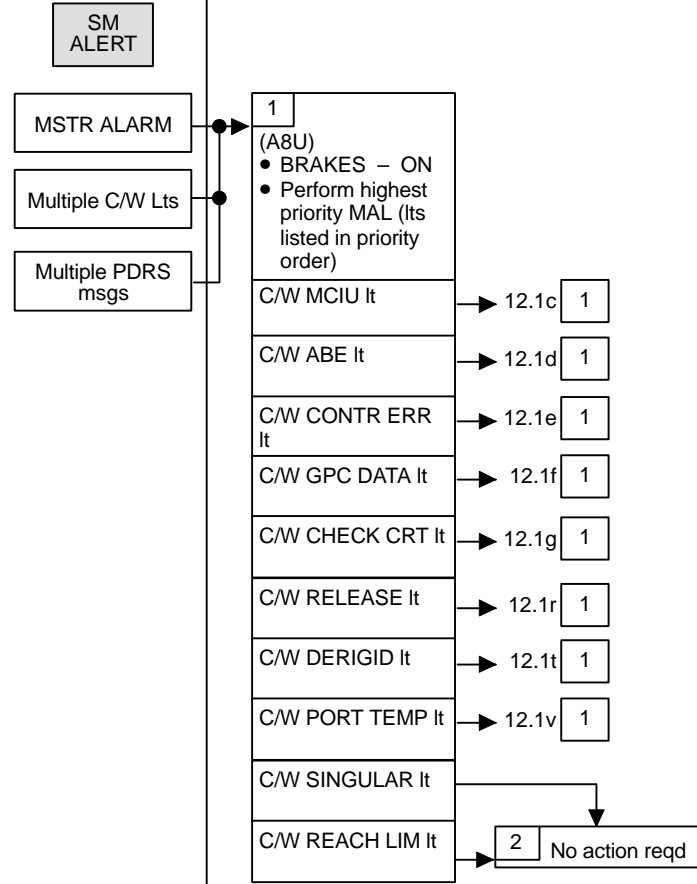


RMS C/W

12.1

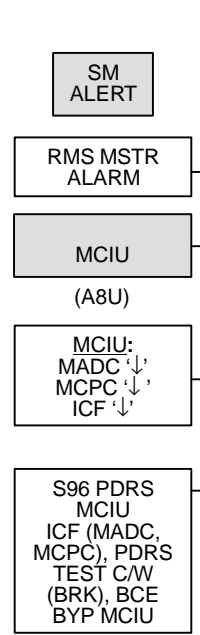
PDRS

12.1b MULTIPLE C/W LTS AND PDRS MSGS



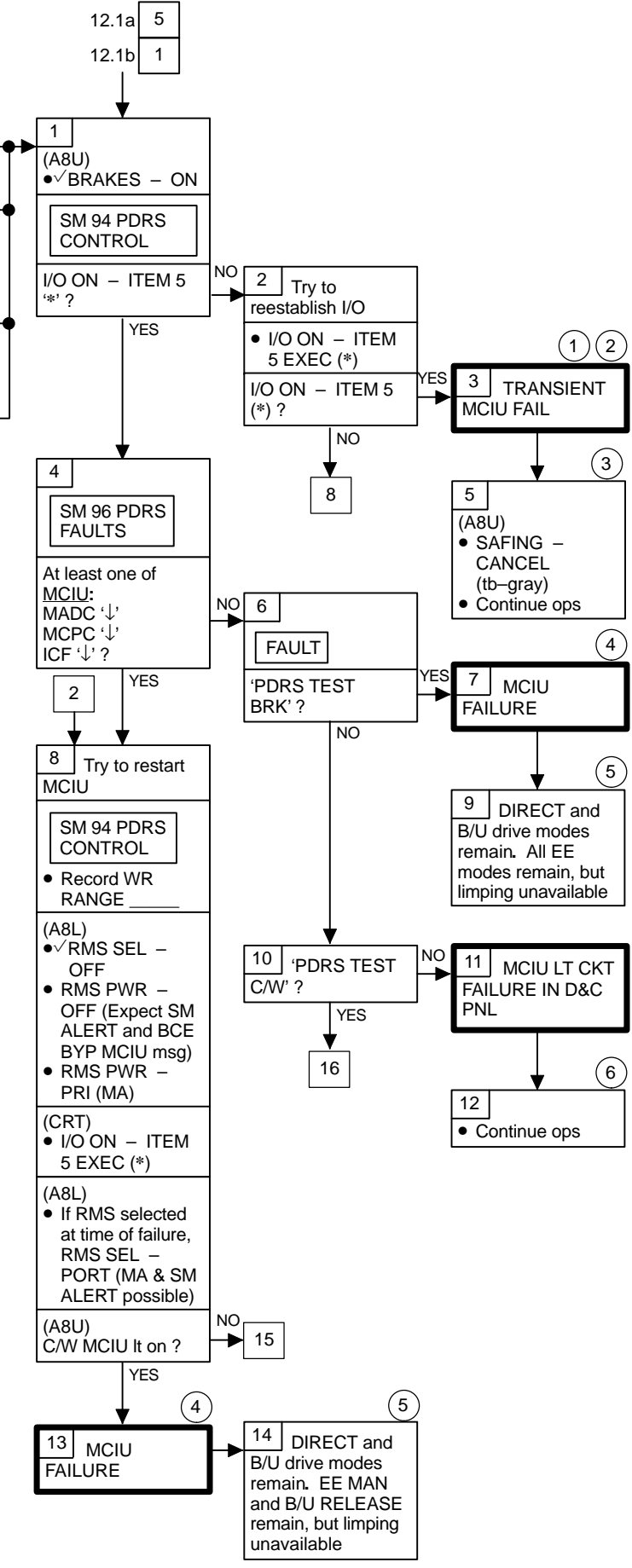
PDRS

12.1c C/W MCIU LT



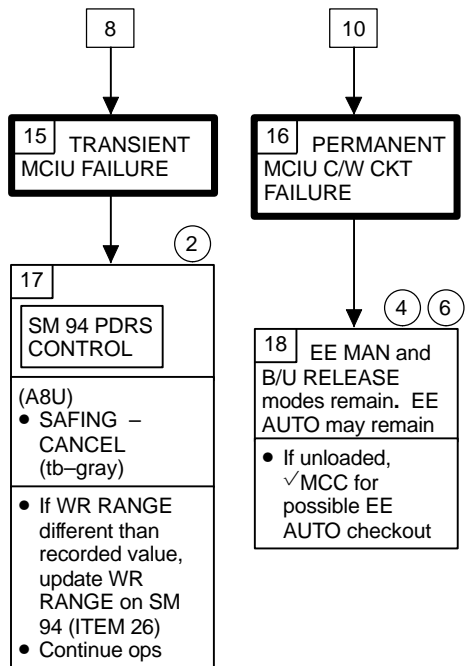
If: MADC, MCPC, ICF, Frame Sync, MCIU failure warning circuit failure

Nominal Config:
(A8L)
RMS PWR – PRI



- ① Ground can detect if failure was NON-MASKABLE INTERRUPT (NMI) before removing brakes
- ② Additional transients possible
- ③ Taking brakes off will clear MCIU lt and related down arrows
- ④ Full capability may be restored with RMS MCIU CHANGEOUT (IFM)
- ⑤ Display data may be unreliable. Additional fault msgs and C&W lights possible
- ⑥ MCIU lt not available for subsequent MCIU failures, but MSTR ALARM still available

PDRS 12.1c (Cont)

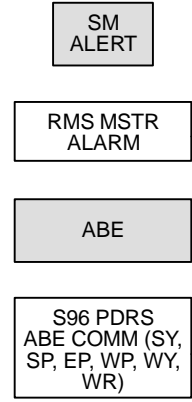


- ② Additional transients possible
- ④ Full capability may be restored with RMS MCIU CHANGEOUT (IFM)
- ⑥ MCIU It not available for subsequent MCIU failures, but MSTR ALARM still available

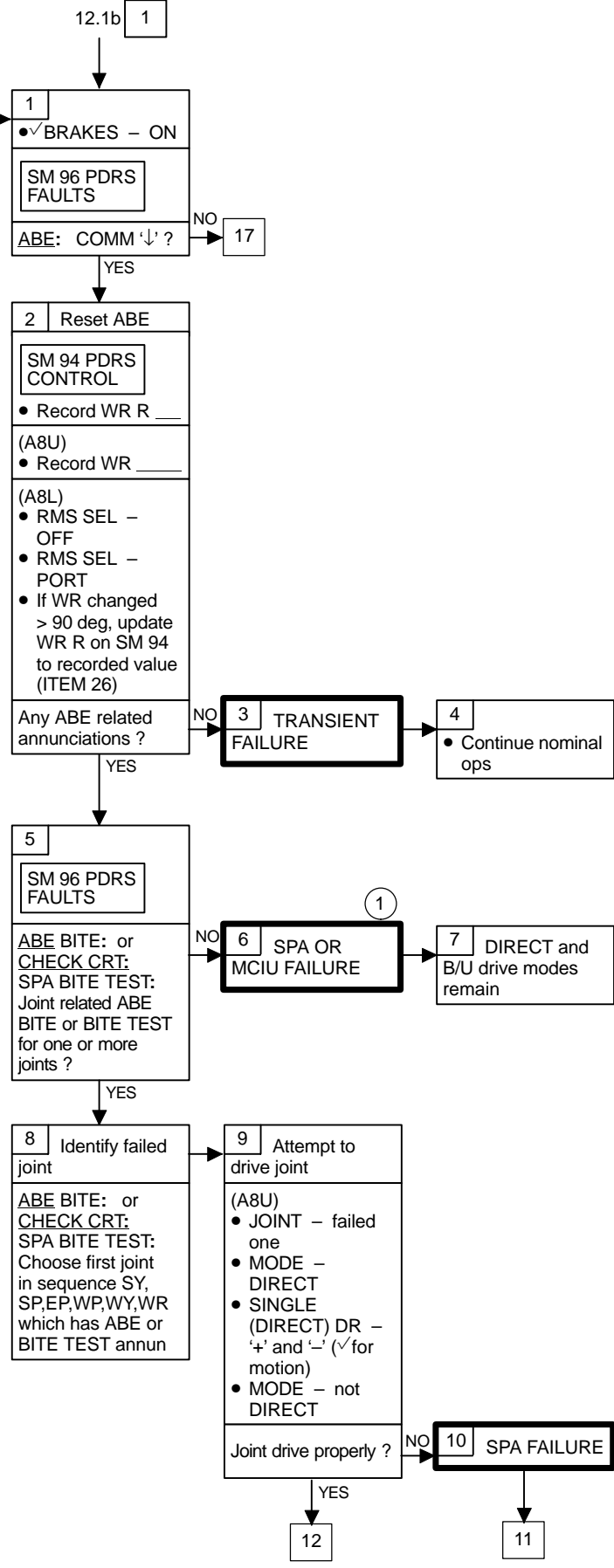
PDRS

12.1d C/W ABE LT OR S96 PDRS ABE COMM (SY, SP, EP, WP, WY, WR)

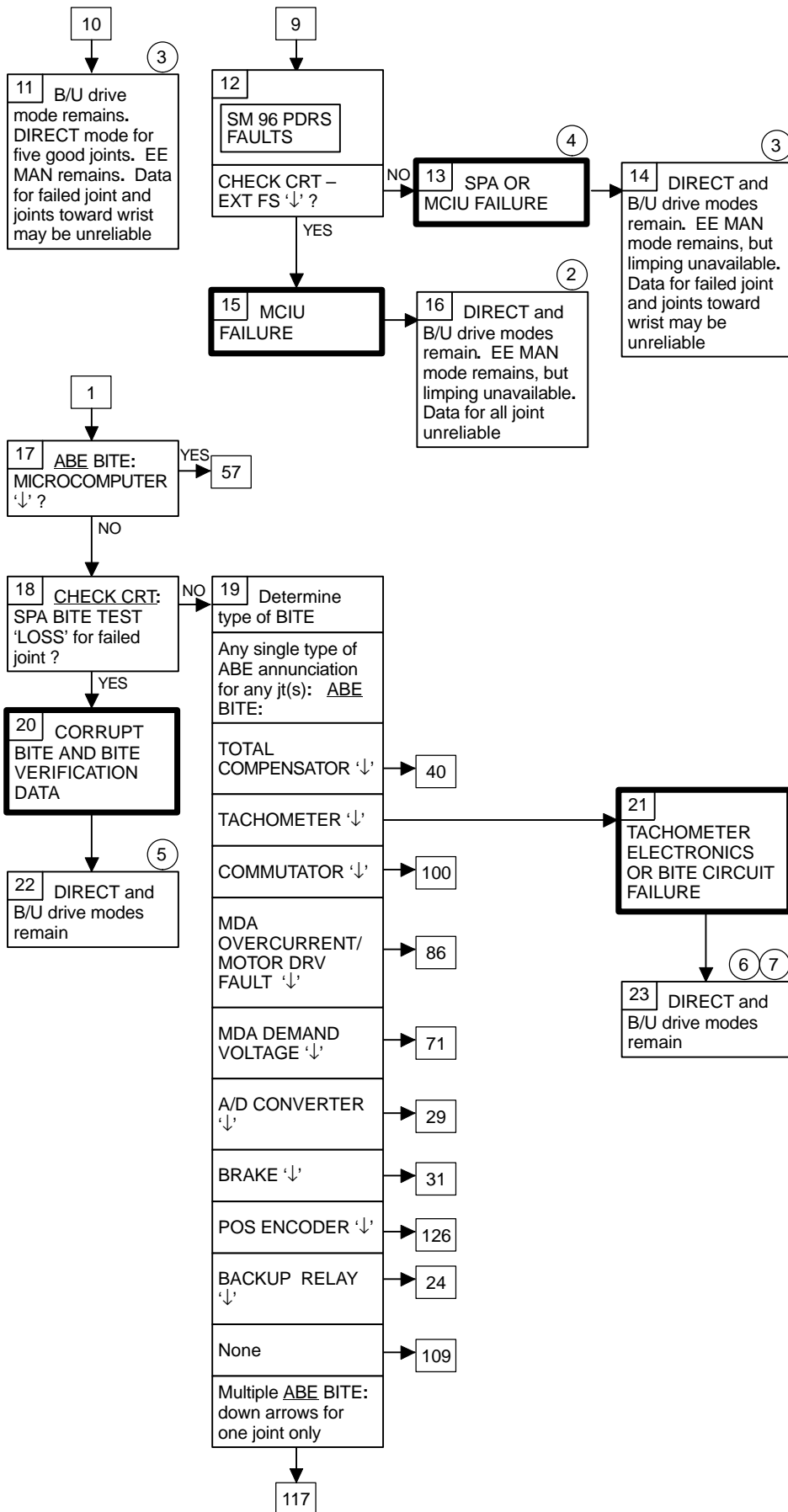
① Full capability may be regained by RMS MCIU CHANGEOUT (IFM)



Nominal Config:
 (A8L)
 RMS PWR – PRI
 RMS SEL – PORT (CRT)
 SM 94 I/O ON – ITEM 5 (*)



PDRS 12.1d (Cont)



② Full capability will be regained by RMS MCIU CHANGEOUT (IFM)

③ If any wrist joint data is unreliable, EE Auto mode may be lost

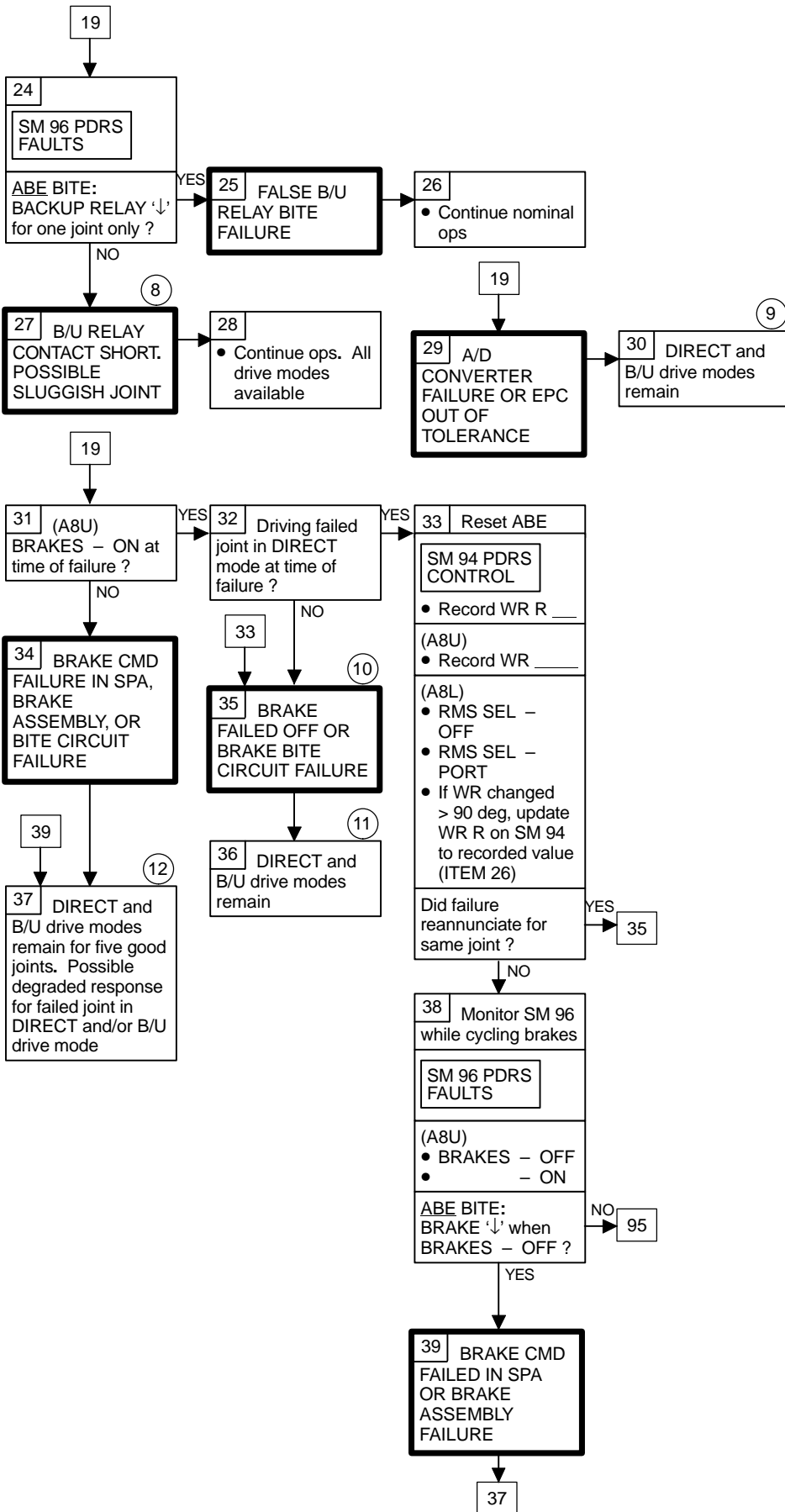
④ If annunciation for all six joints is identical, full capability may be regained by RMS MCIU CHANGEOUT (IFM). If annunciation is not for all six joints, then SPA failure

⑤ Computer supported modes available but subsequent SPA failure for same joint may not be annunciated or protected by autobrakes. May receive spurious SPA or EEEU annunciations

⑥ For BITE circuit failure, MCIU OVERRIDE: ABE OVRD A (ITEM 36) on SPEC 95, PDRS OVERRIDE, can be used to remove autobrakes and regain computer supported modes (on MCC GO). Subsequent tachometer failure for same joint will be annunciated by CONTR ERR and protected by autobrakes

⑦ For tach failure, rate data is unreliable

PDRS 12.1d (Cont)



⑧ Possible TOTAL COMPENSATOR BITE for failed joint while driving. Direct Drive joint test may determine failed joint

⑨ For A/D Converter failure MCIU OVERRIDE ABE OVRD C (ITEM 38) on SPEC 95, PDRS OVERRIDE, can be used to remove autobrakes and regain computer supported modes (on MCC GO). Subsequent failures for same joint will be annunciated by CONTR ERR and protected by autobrakes

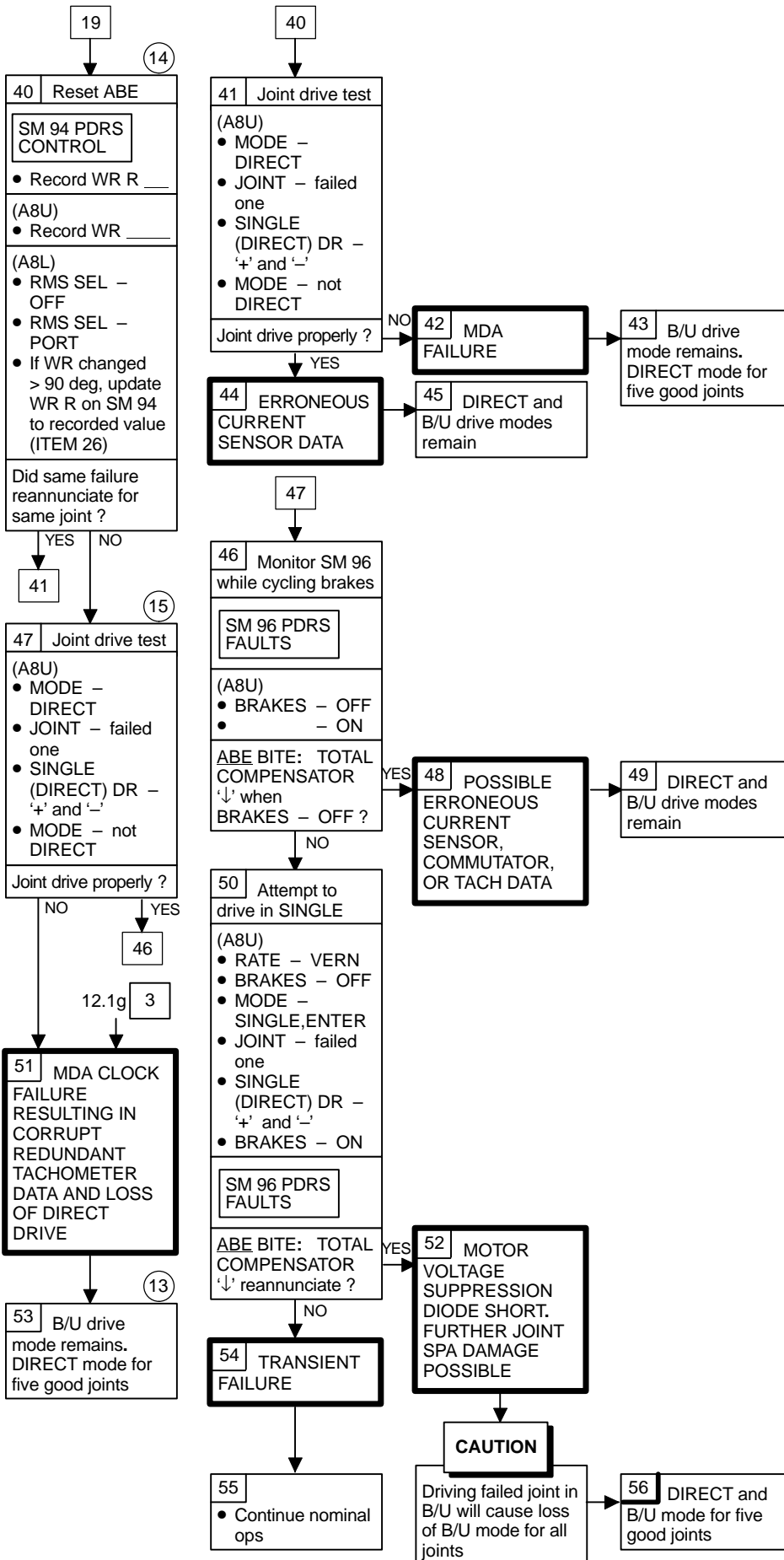
⑩ MCIU OVERRIDE: ABE OVRD B (ITEM 37) on SPEC 95, PDRS OVERRIDE, can be used to remove autobrakes and regain computer supported modes (on MCC GO). Subsequent failure for same joint will not be annunciated or protected by autobrakes

⑪ If brake failed off, brakes available for five good joints and dynamic braking for failed joint

⑫ MCIU OVERRIDE: ABE OVRD B (ITEM 37) on SPEC 95, PDRS OVERRIDE, can be used to remove autobrakes and regain computer supported modes (on MCC GO). Possible brake overdrive for failed joint. Ground may determine if joint is sluggish

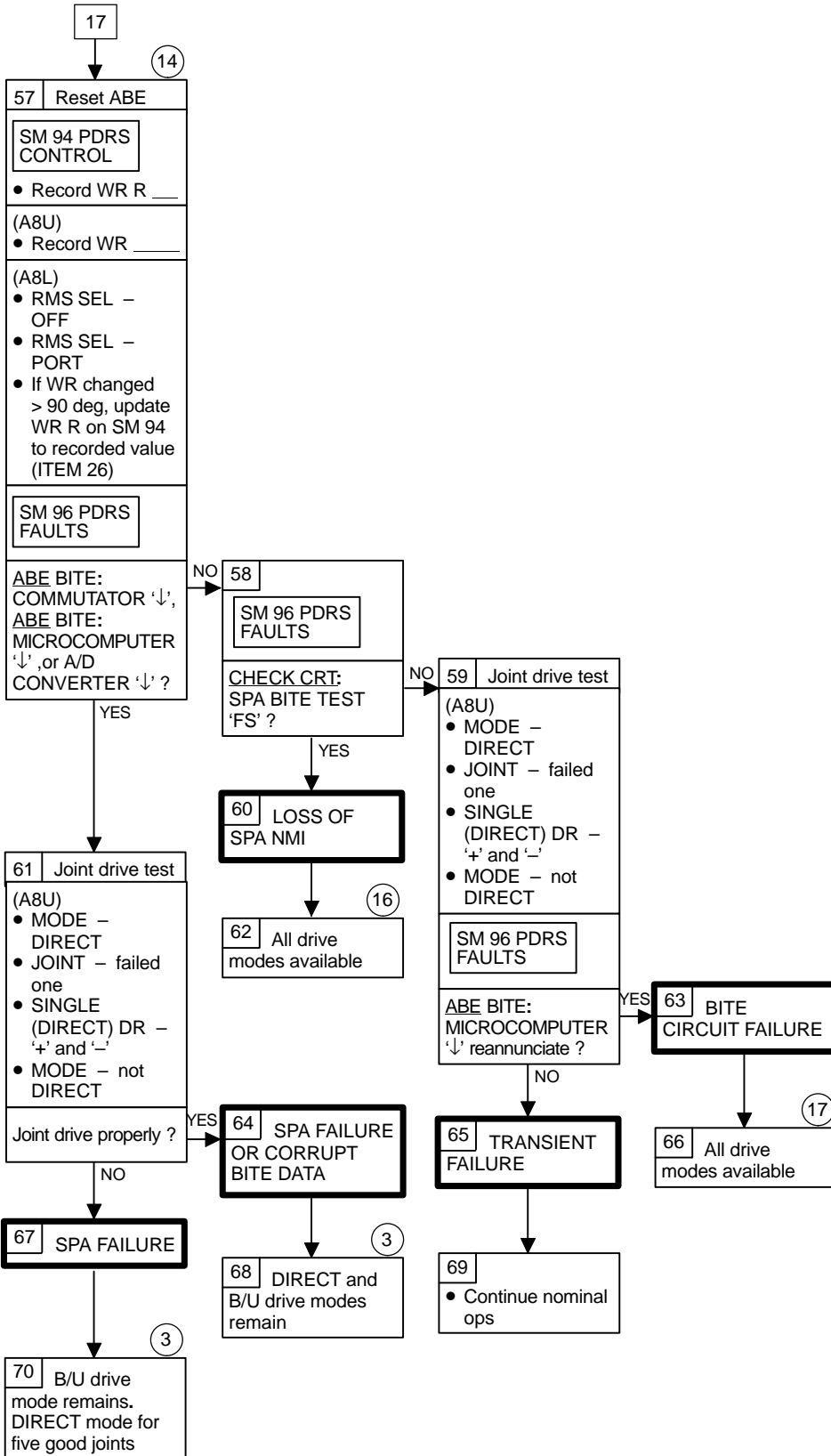
PDRS

12.1d (Cont)



- 13** MCIU OVERRIDE: ABE OVRD C (ITEM 38) on SPEC 95, PDRS OVERRIDE, can be used to remove autobrakes and regain computer supported modes (on MCC GO). Subsequent failures for same joint will be annunciated by CONTR ERR and protected by autobrakes
- 14** Additional annunciations may be received after ABE reset
- 15** May receive CHECK CRT and DIRECT DRIVE BITE annunciation when driving in Direct mode. Cycle Brake sw to clear failure

PDRS 12.1d (Cont)



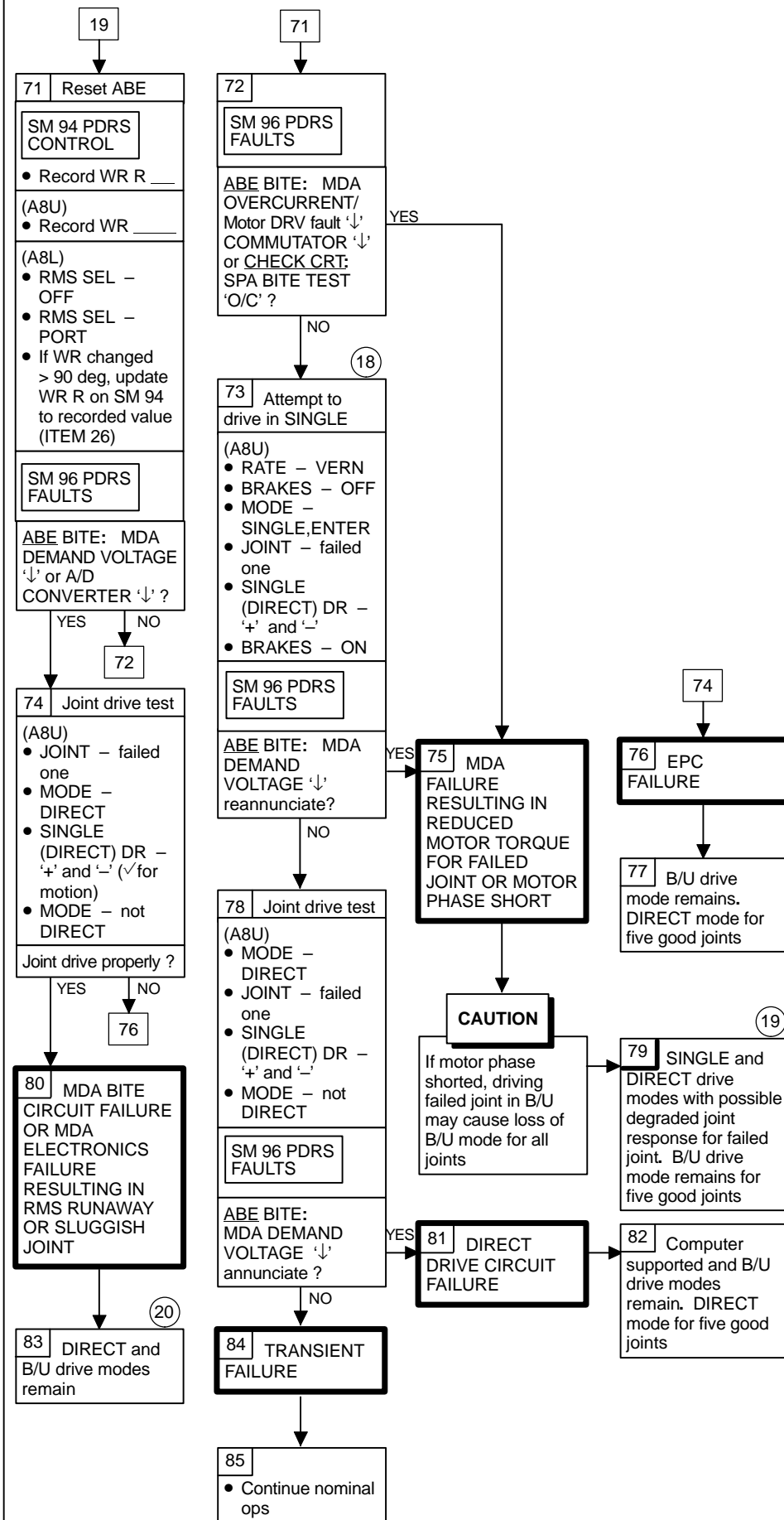
③ If any wrist joint data is unreliable, EE Auto mode may be lost

⑭ Additional annunciations may be received after ABE reset

⑮ One failure away from possible uncommanded motion, but protected by auto brakes and annunciated by CONTR ERR

⑯ When driving failed joint in DIRECT, failure will reannunciate. Recycle arm select to regain computer supported modes

PDRS 12.1d (Cont)

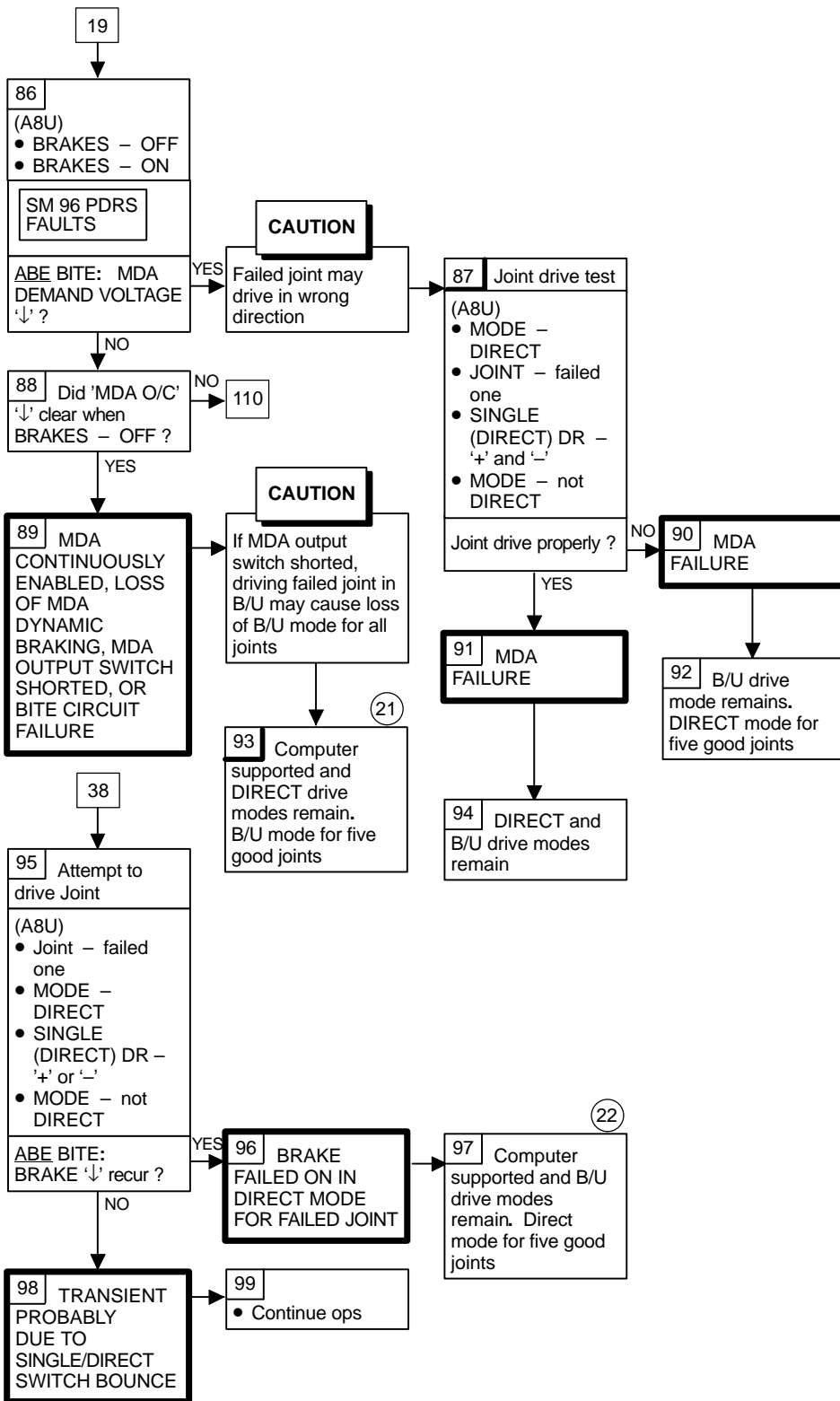


18 Removing brakes may result in reannunciation of failure and autobrakes

19 Subsequent MDA Demand Voltage BITE possible while driving failed joint. For commutator and MDA demand voltage failures, MCIU OVERRIDE ABE OVRD B (ITEM 37) on SPEC 95, PDRS OVERRIDE, can be used to remove autobrakes and regain SINGLE drive mode (on MCC GO). Subsequent failure for same joint will not be annunciated or protected by autobrakes

20 For MDA BITE circuit failure or sluggish joint, MCIU OVERRIDE: ABE OVRD B (ITEM 37) on SPEC 95, PDRS OVERRIDE, can be used to remove autobrakes and regain computer supported modes or SINGLE drive mode respectively (on MCC GO). Subsequent failures for same joint will be annunciated by CONTR ERR and protected by autobrakes

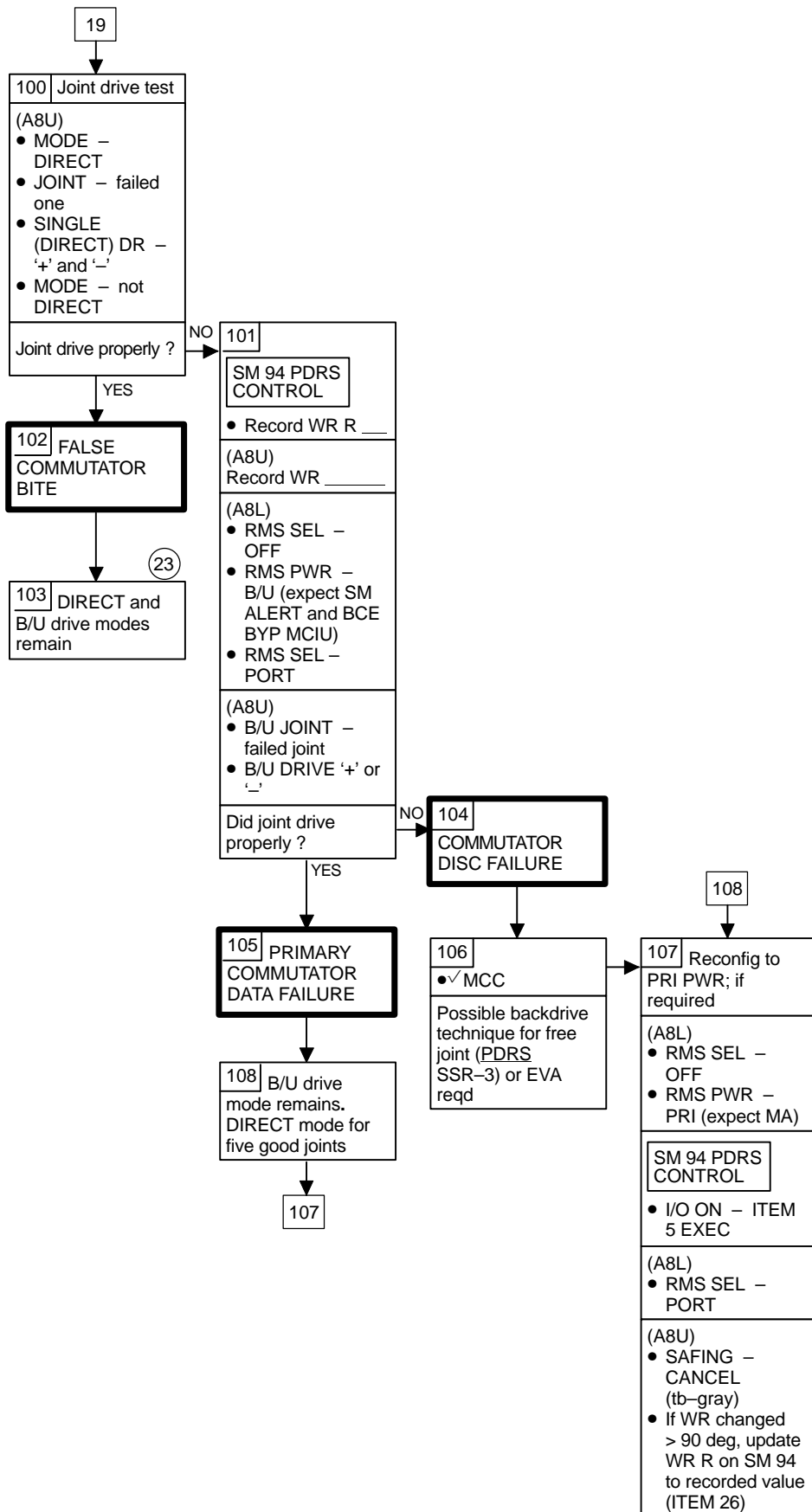
PDRS 12.1d (Cont)



21 For MDA continuously enabled or loss of dynamic braking, subsequent failure (runaway or failed free joint) will be annunciated but not stopped by autobrakes or dynamic braking respectively

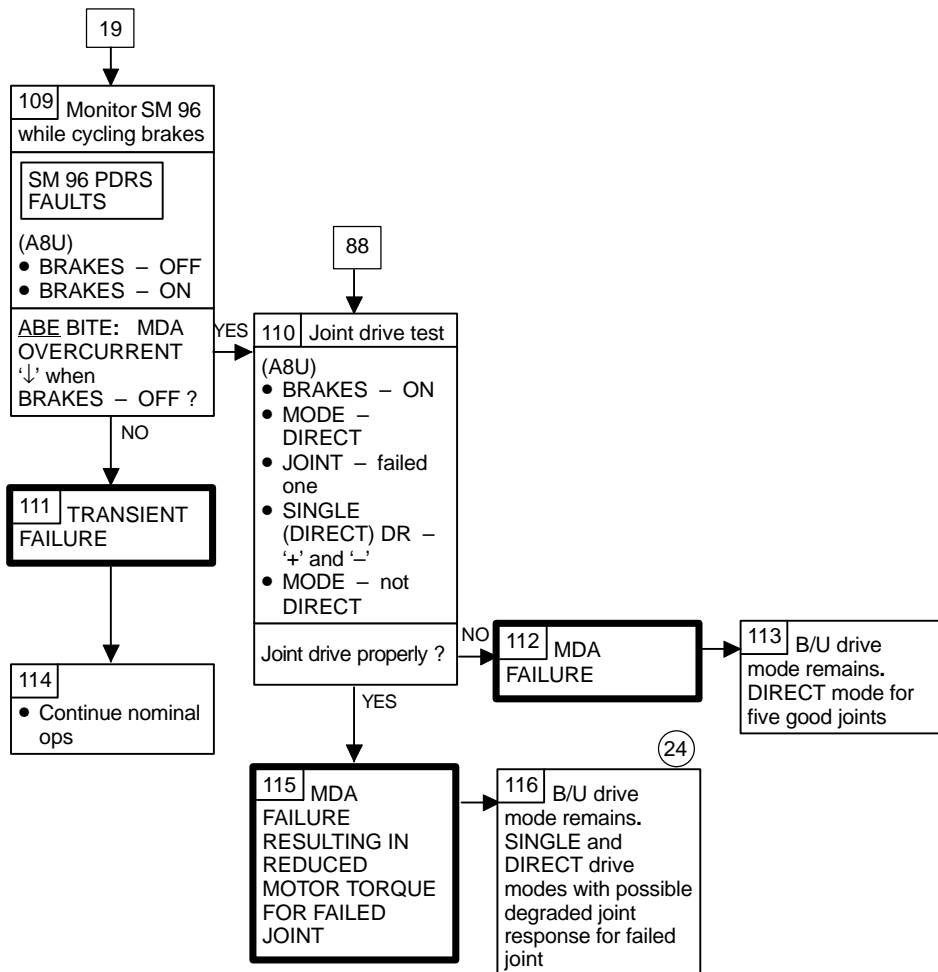
22 Port RMS SEL will need to be cycled to regain computer supported modes

PDRS 12.1d (Cont)



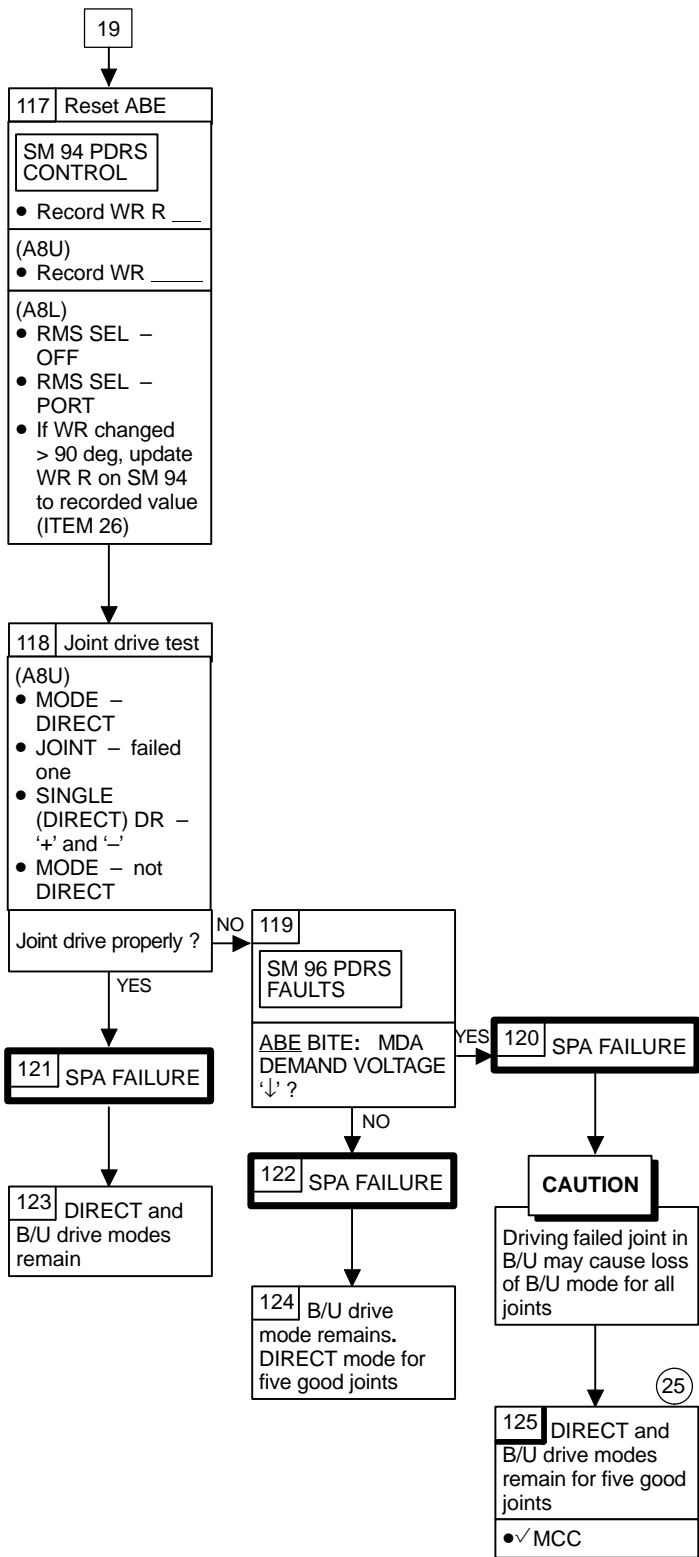
23 MCIU OVERRIDE: ABE OVRD B (ITEM 37) on SPEC 95, PDRS OVERRIDE, can be used to remove autobrakes and regain single mode for five good joints (on MCC GO)

PDRS 12.1d (Cont)



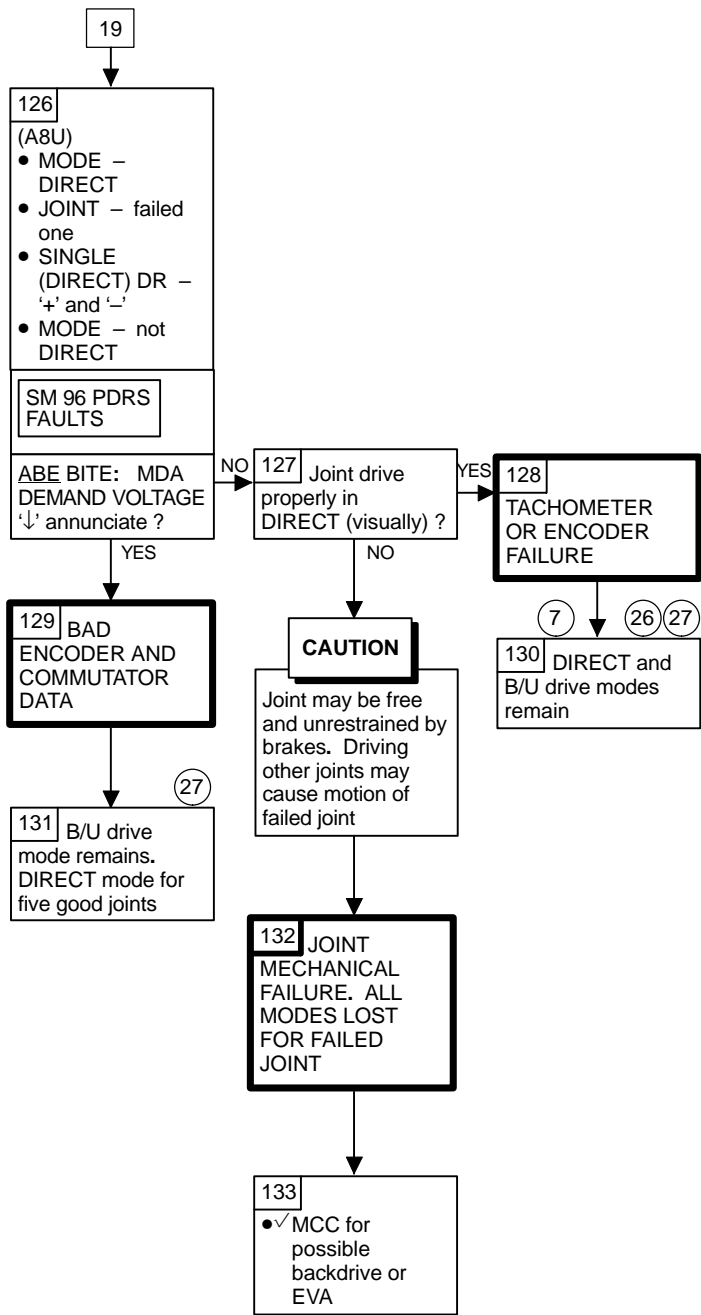
②④ Subsequent MDA Demand Voltage BITE possible while driving failed joint

PDRS 12.1d (Cont)



25 Additional annunciations of TOTAL COMPENSATOR or BACKUP RELAY is good indication that driving failed joint in B/U will cause loss of B/U for all joints

PDRS 12.1d (Cont)



⑦ For tach failure, rate data is unreliable

②⑥ For encoder failure, MCIU OVERRIDE: ABE OVRD A (ITEM 36) on SPEC 95, PDRS OVERRIDE, can be used to remove autobrakes and regain SINGLE mode (on MCC GO). Position hold is not functional for failed joint. Subsequent TACH failure will be annunciated by CONTR ERR or TOTAL COMPENSATOR and protected by autobrakes

②⑦ For encoder failure, joint data is unreliable. REACH LIMIT and SOFT STOP annunciations not available for failed joint

PDRS

12.1e C/W CONTR ERR LT – S96 PDRS CNTL SY(SP, EP, WP, WY, WR) OR PDRS CNTL POR

SM ALERT

RMS MSTR ALARM

CONTR ERR (A8U)

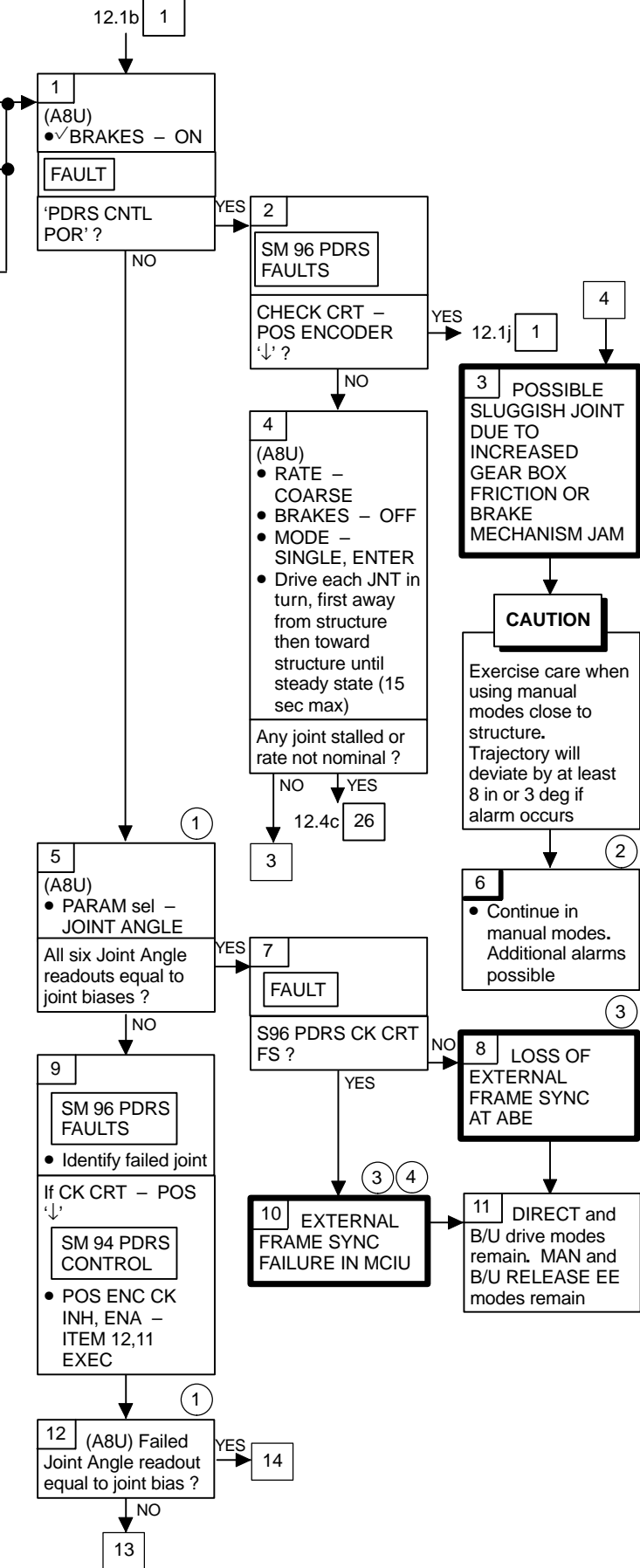
PDRS CNTL SY (SP, EP, WP, WY, WR) or PDRS CNTL POR

If:

SM 96 PDRS FAULTS

CONTROL ERR SY (SP,EP,WP,WY,WR) '↓' (Joint Consistency Check failed)

Nominal Config: (A8L)
RMS PWR – PRI
SEL – PORT



① Joint biases

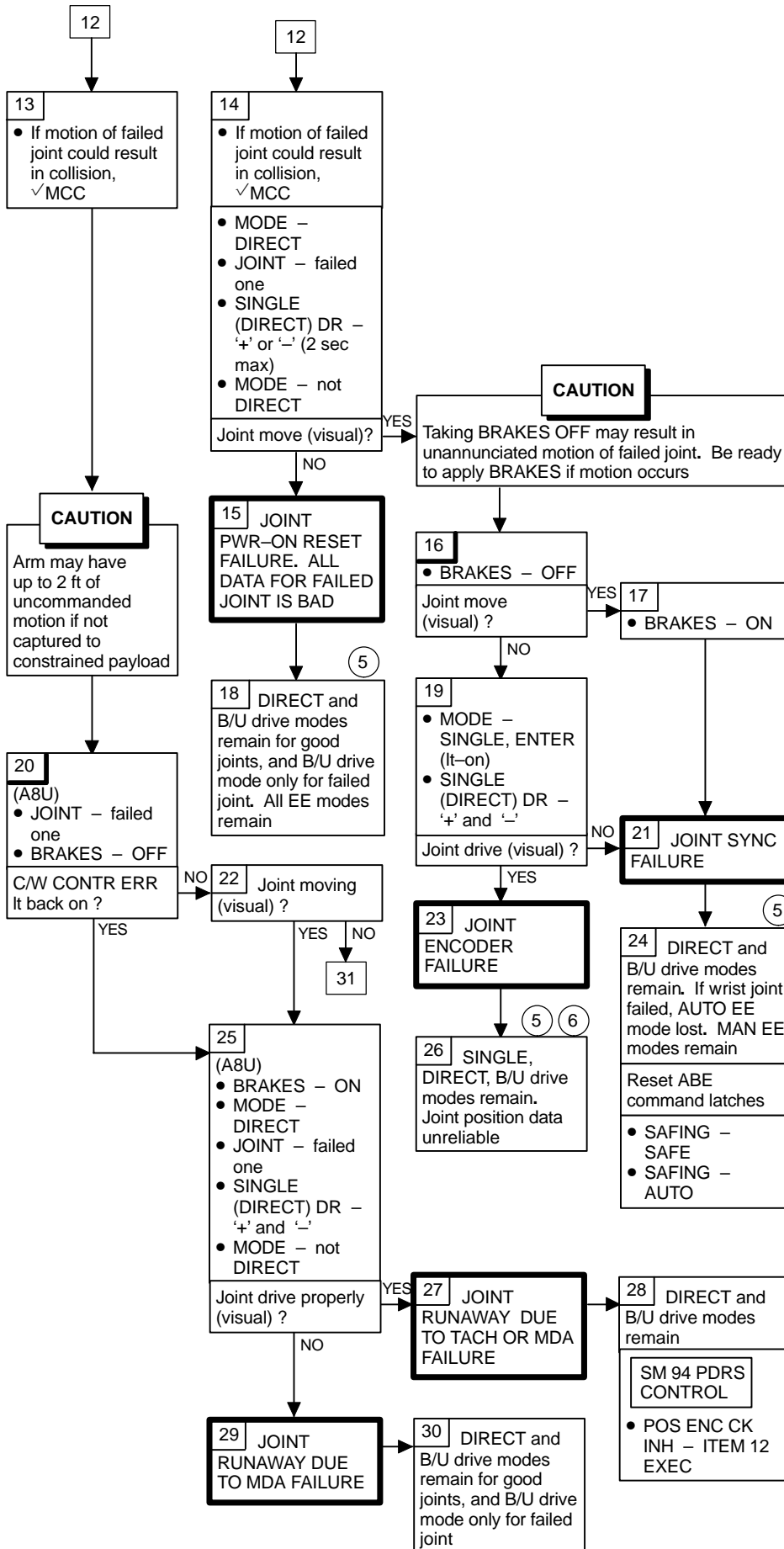
DDT&E (#201)	
SY	-2.5
SP	+2.0
EP	+0.5
WP	-0.4
WY	-1.0
WR	+0.1
FOP1 (#301)	
SY	-0.9
SP	+2.4
EP	-0.0
WP	-1.0
WY	-1.9
WR	+0.3
FOP3 (#303)	
SY	-2.4
SP	+4.0
EP	+3.6
WP	+0.9
WY	+0.1
WR	+2.8
(#202)	
SY	+0.6
SP	+1.3
EP	-0.6
WP	-0.8
WY	+0.9
WR	+2.6

② If alarms become a nuisance, use vernier rates, OCAS, or SINGLE

③ EE tb(s) inaccurate. All display data bad

④ Full capability may be restored with RMS MCIU CHANGEOUT (IFM)

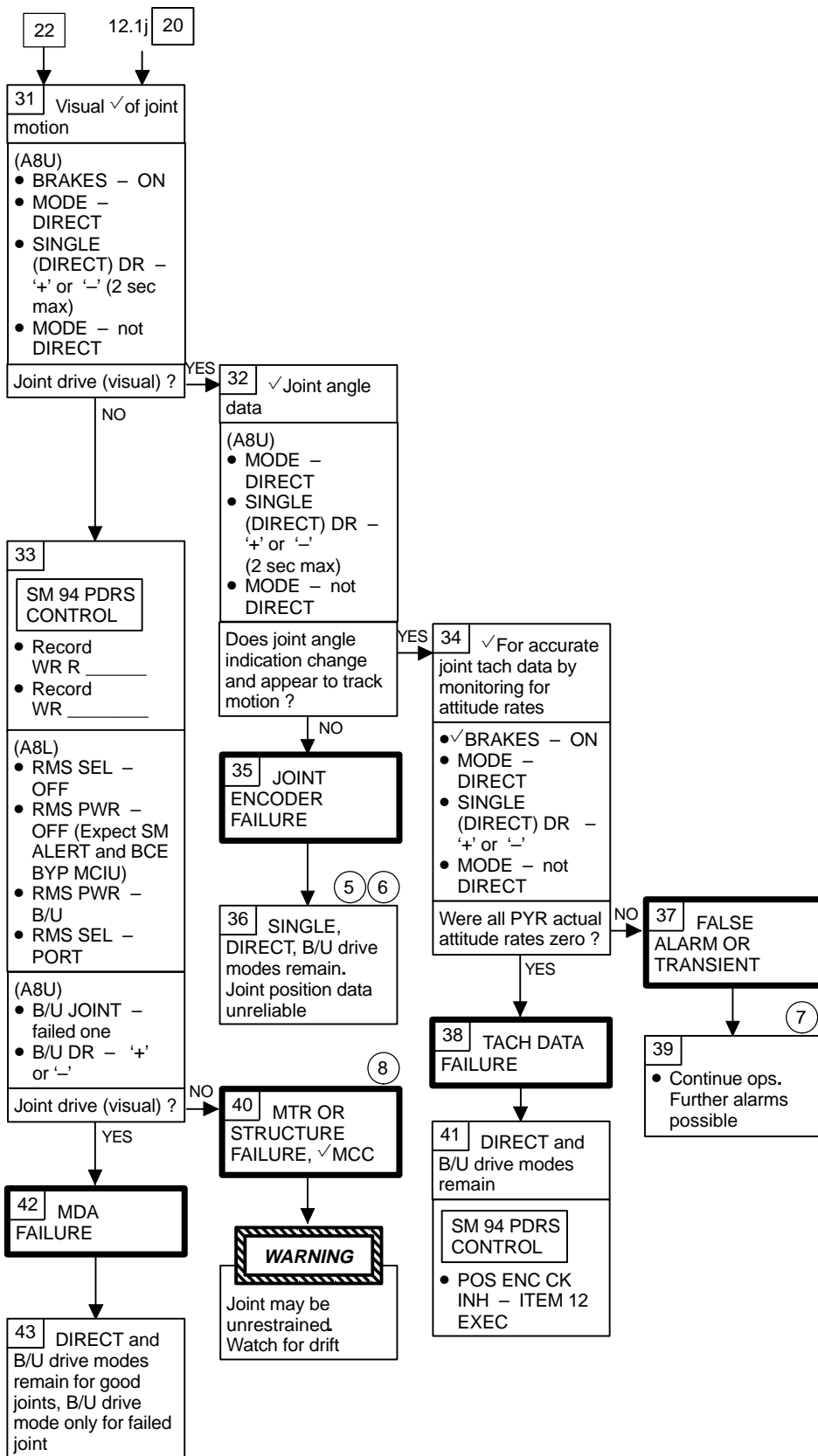
PDRS 12.1e (Cont)



⑤ REACH LIMITs and SOFT STOPs annunciation not available for failed joint

⑥ Position hold function will not work for failed joint

PDRS 12.1e (Cont)



- ⑤ REACH LIMITs and SOFT STOPs annunciation not available for failed joint
- ⑥ Position hold function will not work for failed joint
- ⑦ MCC can determine if fwd/backdrive flag failure is cause of false alarm
- ⑧ Whiplash technique or EVA may be reqd to cradle arm

PDRS

12.1f C/W GPC DATA LT OR BCE BYP MCIU

SM ALERT

GPC DATA (A8U)

RMS MSTR ALARM

BCE BYP MCIU

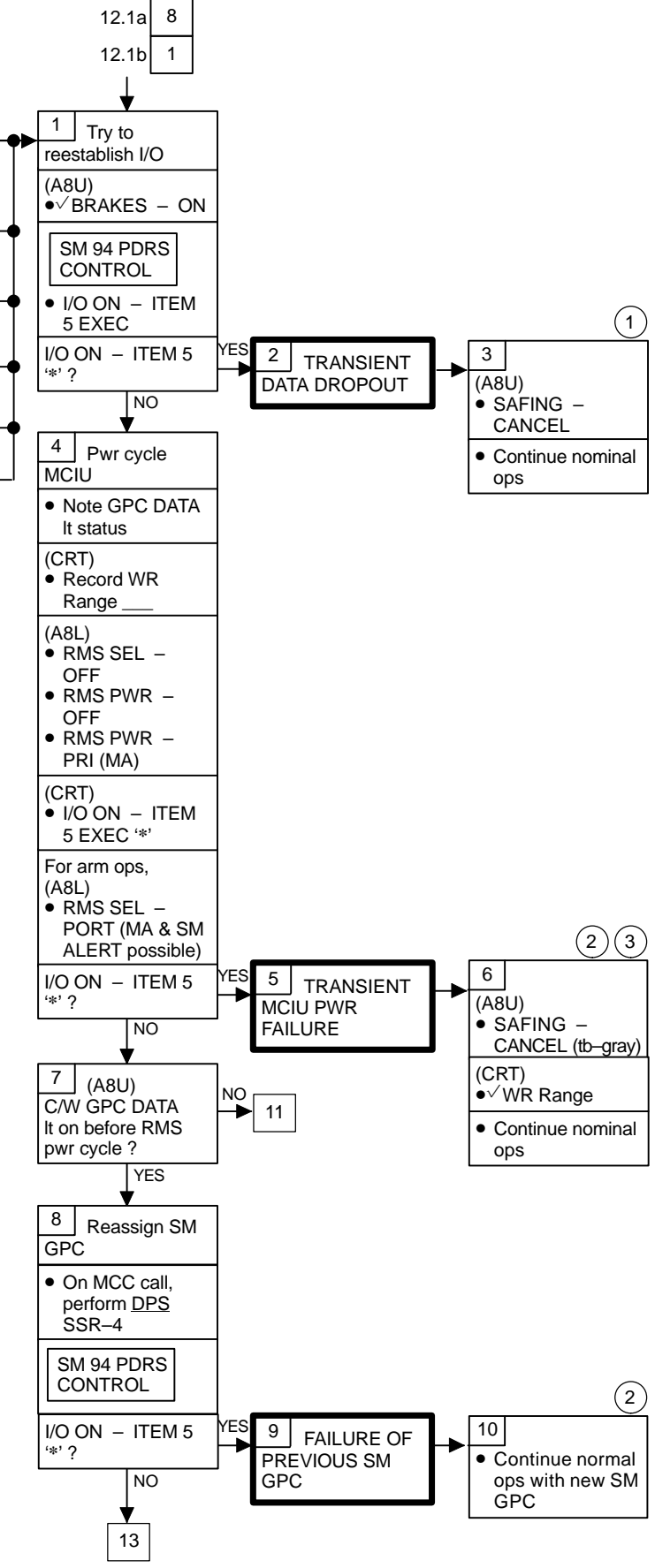
SM 94 I/O OFF ITEM 6 '*'

No SM Msgs

SAFING tb - bp

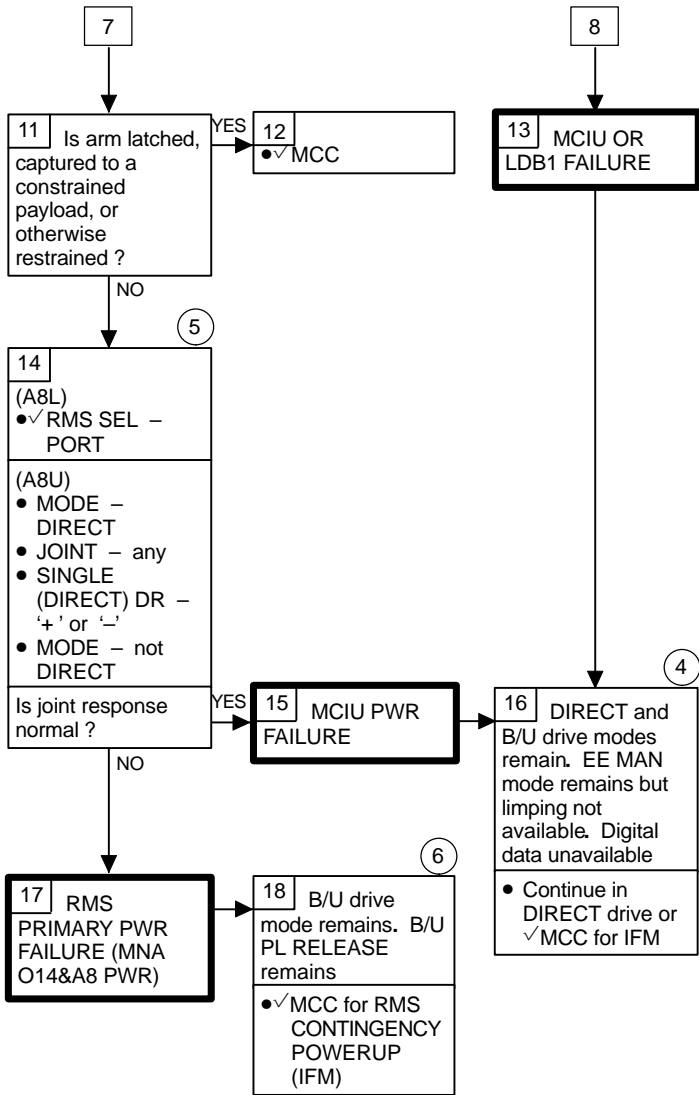
If: Loss of MCIU I/O

Nominal Config:
(A8L)
RMS PWR - PRI



- ① Further transients are possible; and if they continue, full capability can be restored with SM GPC REASSIGNMENT and/or RMS MCIU CHANGEOUT (IFM)
- ② If WRR is updated, expect CHECK CRT lt. Lt can be cleared by ITEM 12, 11 on SM 94
- ③ Further transients are possible; and if they continue, full capability can be restored with RMS MCIU CHANGEOUT (IFM)

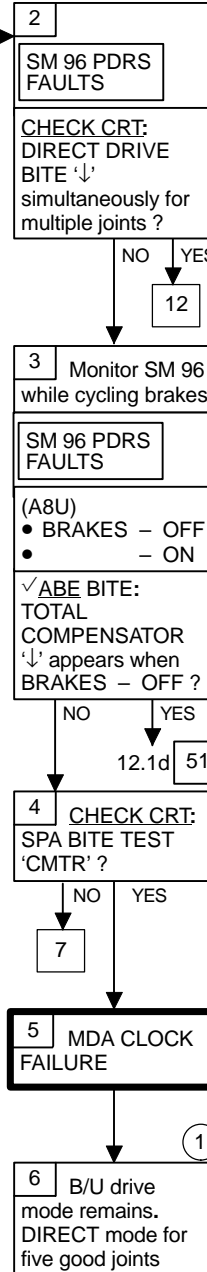
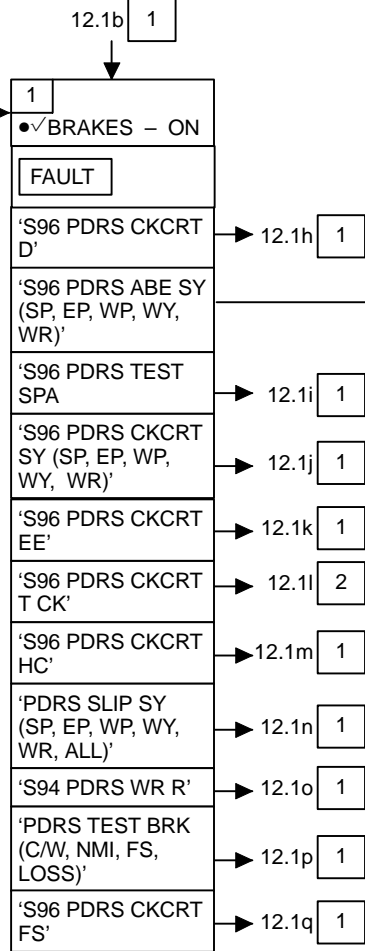
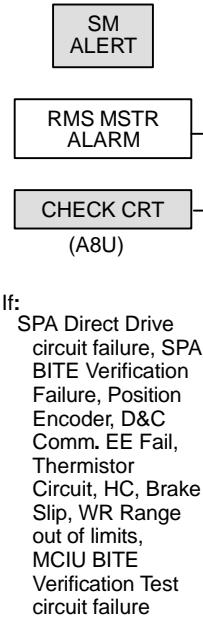
PDRS 12.1f (Cont)



- ④ Full capability may be restored with MCIU CHANGEOUT (IFM)
- ⑤ Mode It may not illuminate
- ⑥ Primary pwr may be restored following IFM. Panel edge lighting may not be available

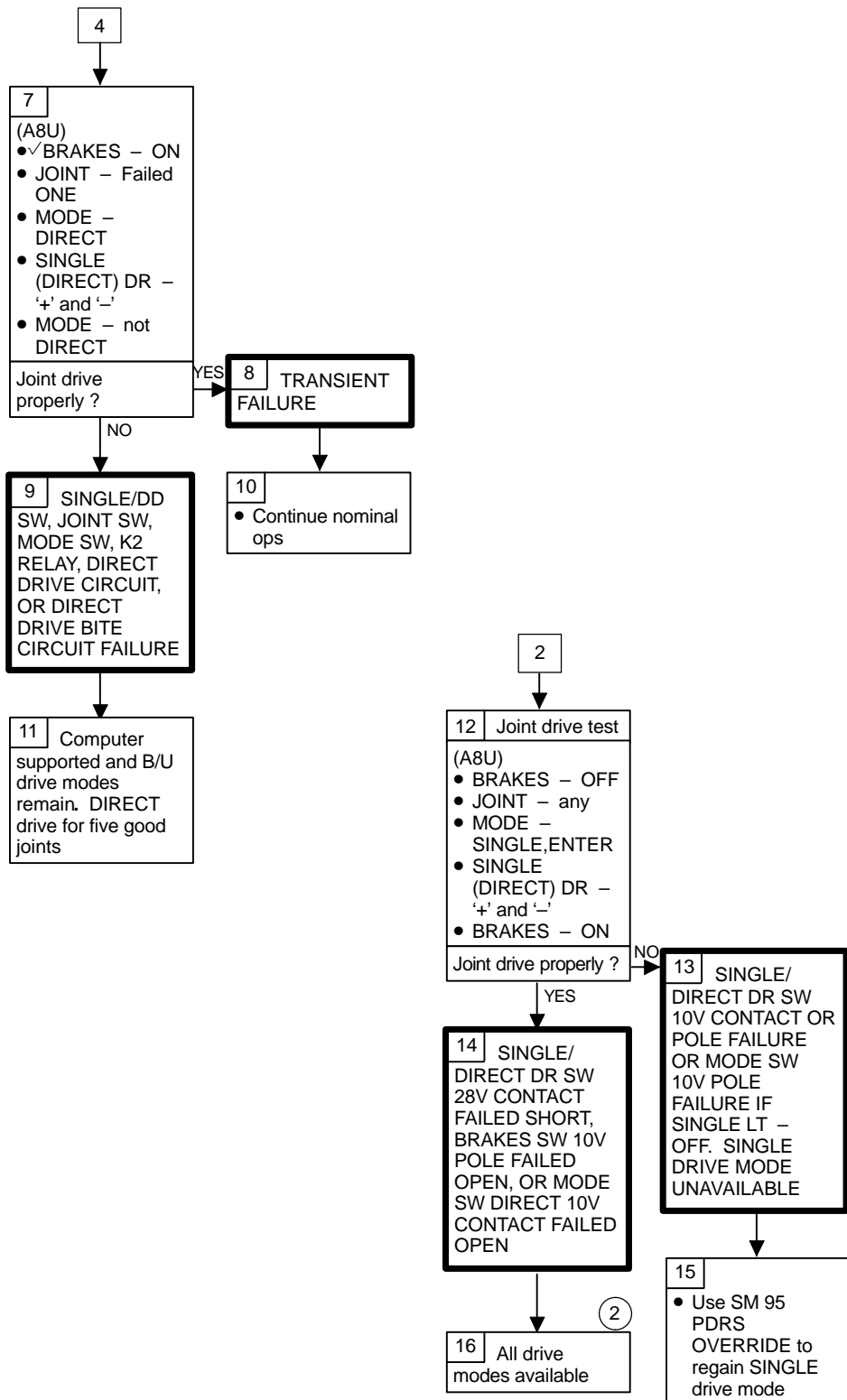
PDRS

12.1g C/W CHECK CRT LT



① Computer supported modes available but subsequent commutator failure for same joint will not be annunciated or protected by autobrakes

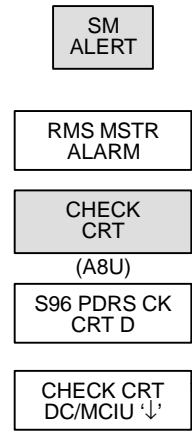
PDRS 12.1g (Cont)



② One failure away from uncommanded joint drive in DIRECT

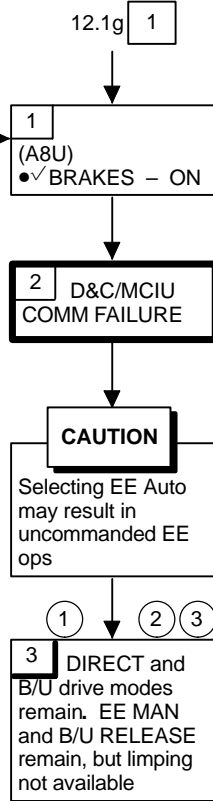
PDRS

12.1h C/W CHECK CRT LT – S96 PDRS CKCRT D



If:
 D&C – MCIU transmission parity error, Testword miscompare, or address check fail

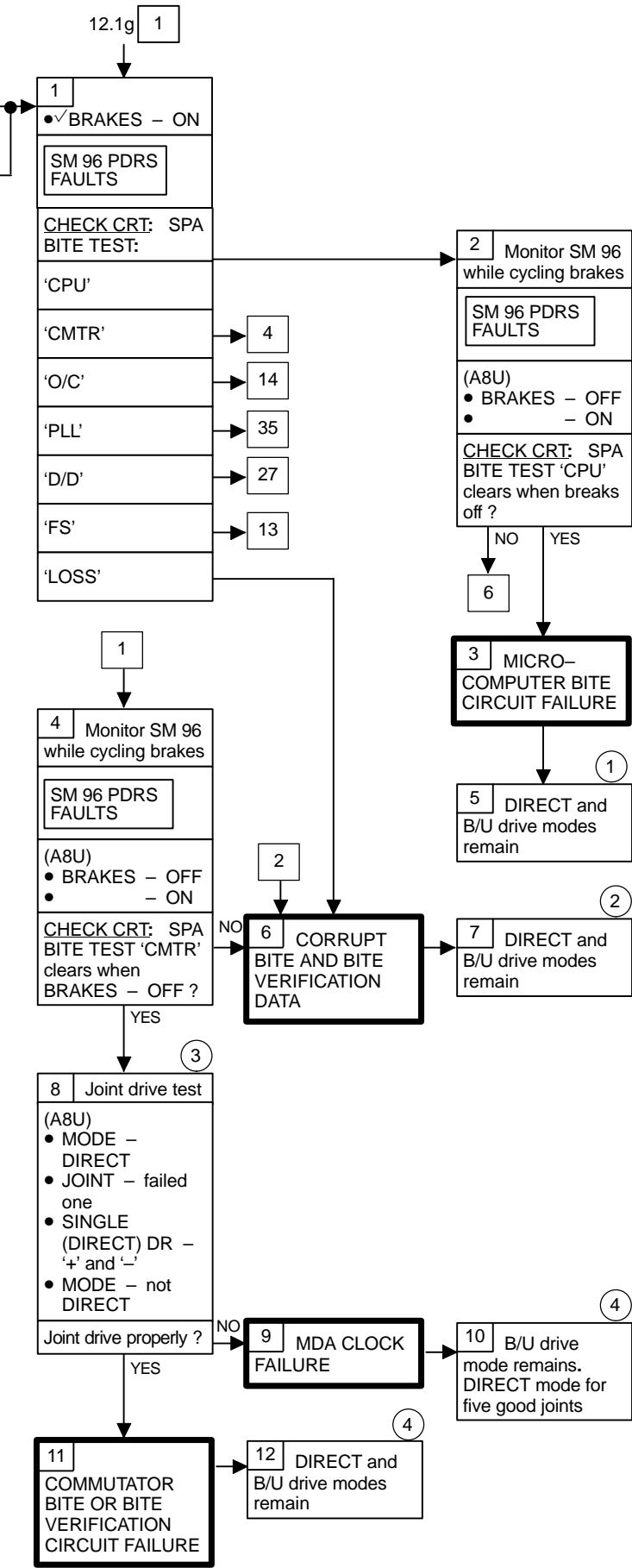
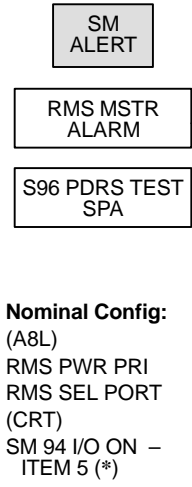
Nominal Config:
 (A8L)
 RMS PWR – PRI (CRT)
 SM 94 I/O ON – ITEM 5 ‘*’



- ① Data may be unreliable on D&C pnl. ABE data on SM 169 still good
- ② Full capability may be restored with RMS MCIU CHANGEOUT (IFM). If problem is in D&C pnl, MCIU changeout will not restore capability
- ③ Possible PDRS SLIP msgs if driving in DIRECT (once per joint). Possible PDRS DERIG and PDRS RELEASE msgs when performing EE release

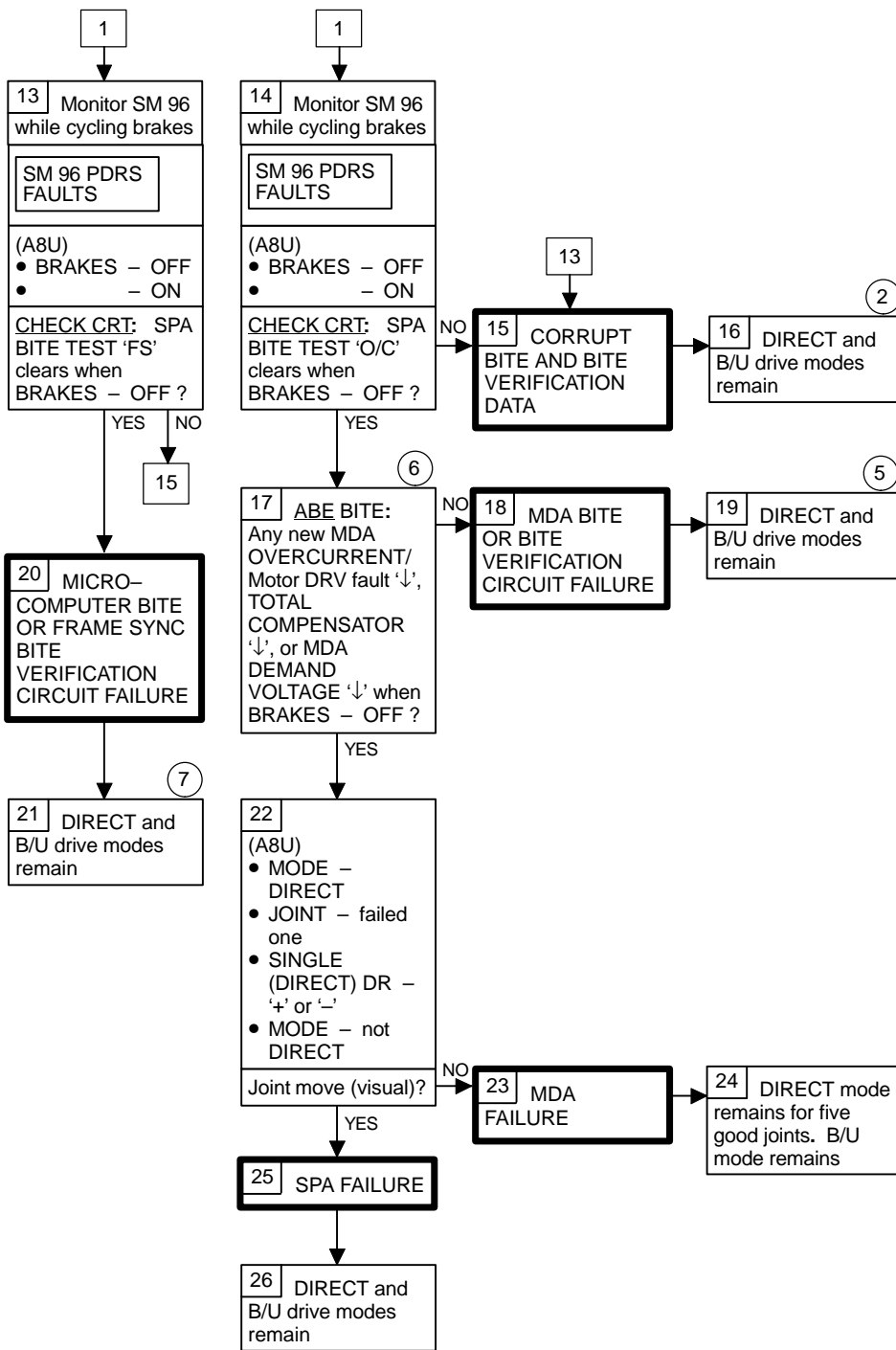
PDRS

12.1i S96 PDRS TEST SPA



- ① For loss of microcomputer BITE, computer supported modes available but subsequent failure for same joint may not be annunciated or protected by autobrakes
- ② Computer supported modes available but subsequent SPA failure for same joint may not be annunciated or protected by autobrakes. May receive spurious SPA or EEEU annunciations
- ③ May receive CHECK CRT and DIRECT DRIVE BITE annunciation when driving in Direct Mode. Cycle Brake sw to clear failure
- ④ Computer supported modes available but subsequent commutator failure for same joint may not be annunciated or protected by autobrakes

PDRS 12.1i (Cont)



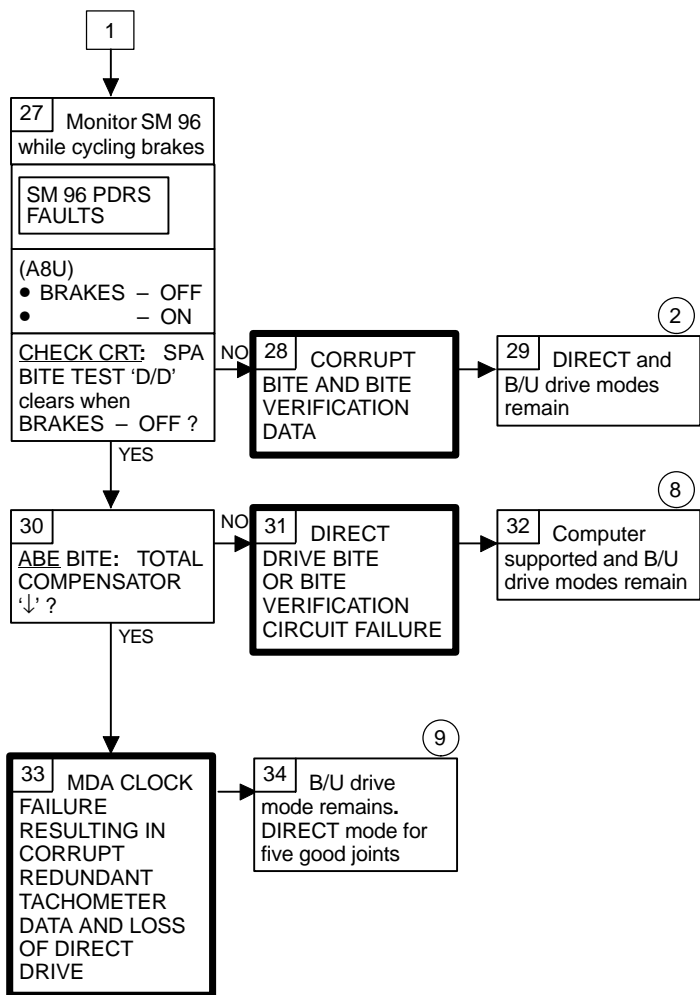
② Computer supported modes available but subsequent SPA failure for same joint may not be annunciated or protected by autobrakes. May receive spurious SPA or EEEU annunciations

⑤ For MDA BITE circuit failure, computer supported modes available but subsequent MDA failure for same joint will not be annunciated or protected by autobrakes

⑥ IF TOTAL COMPENSATOR and MDA DEMAND VOLTAGE occur together, BRAKE and A/D CONVERTER will annunciate due to multiple failure combination

⑦ For loss of microcomputer BITE, computer supported modes available but subsequent failure for same joint will not be annunciated or protected by autobrakes

PDRS 12.1i (Cont)

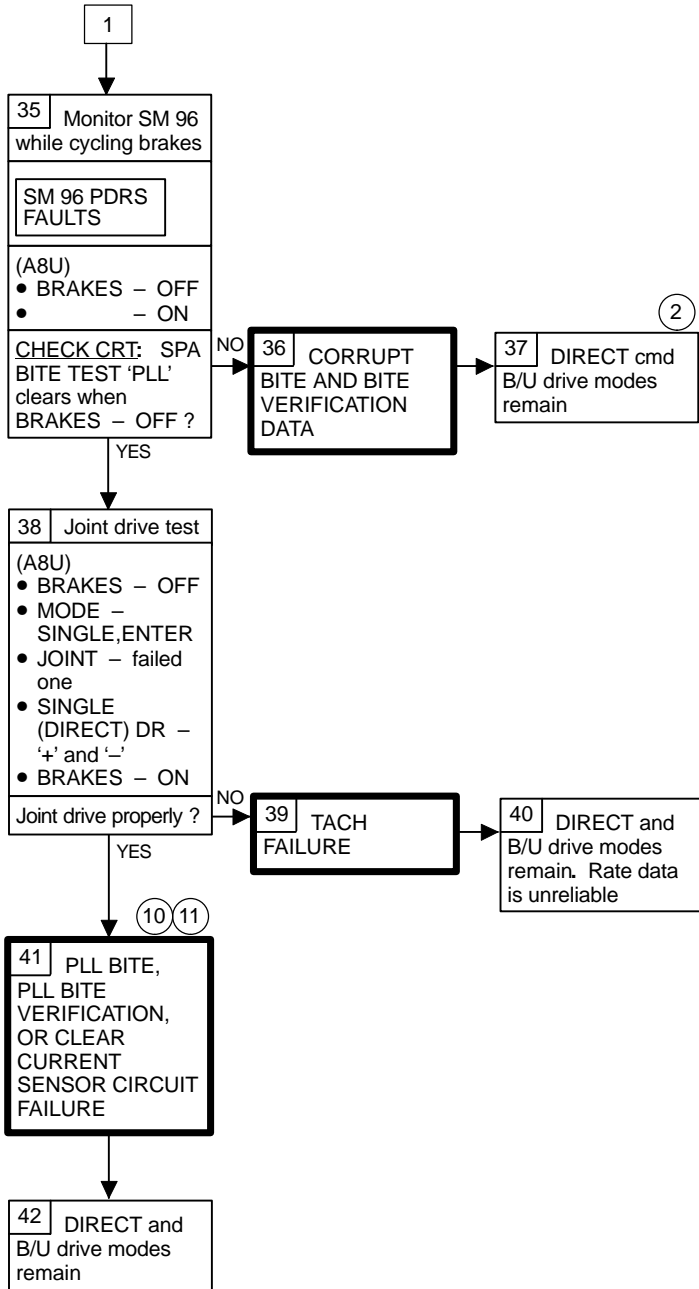


② Computer supported modes available but subsequent SPA failure for same joint may not be annunciated or protected by autobrakes. May receive spurious SPA or EEUU annunciations

⑧ For DIRECT DRIVE BITE failure, DIRECT mode available but for subsequent failure joint could drive in wrong direction or drive two joints simultaneously

⑨ MCIU OVERRIDE: ABE OVRD C (ITEM 38) on SPEC 95, PDRS OVERRIDE, can be used to remove autobrakes and regain computer supported modes (on MCC GO). Subsequent failures for same joint will be annunciated by CONTR ERR and protected by autobrakes

PDRS 12.1i (Cont)

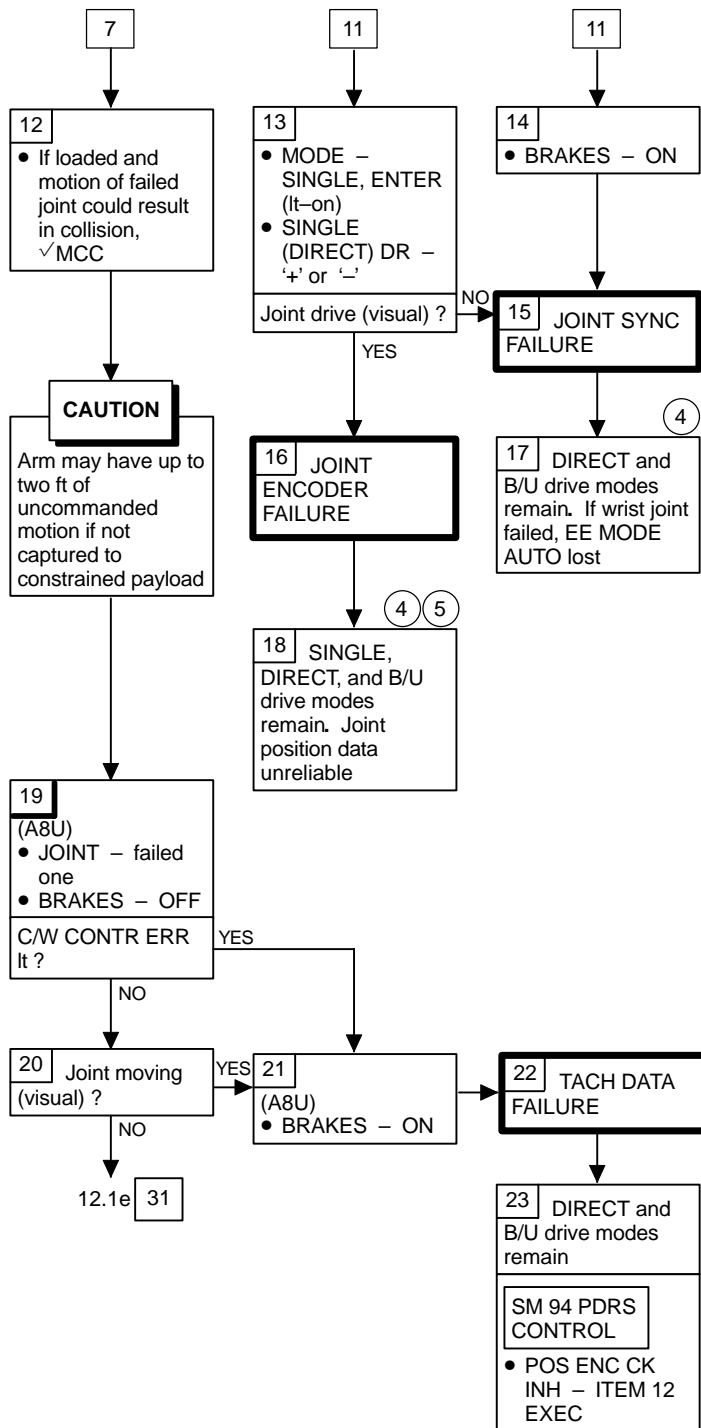


② Computer supported modes available but subsequent SPA failure for same joint may not be annunciated or protected by autobrakes. May receive spurious SPA or EEEU annunciations

⑩ For PLL BITE Circuit Failure Subsequent tachometer failure for same joint will be annunciated by POS ENCODER BITE and protected by autobrakes

⑪ For clear current sensor circuit failure, subsequent loss of 12.8 MHz clock will result in joint driving at last commanded rate. Not annunciated or protected by auto brakes

PDRS 12.1j (Cont)



④ REACH LIMITs and SOFT STOPs annunciation not available for failed joint

⑤ Position hold function will not work for failed joint

PDRS

12.1k C/W CHECK CRT LT – S96 PDRS CKCRT EE

SM ALERT

CHECK CRT (A8U)

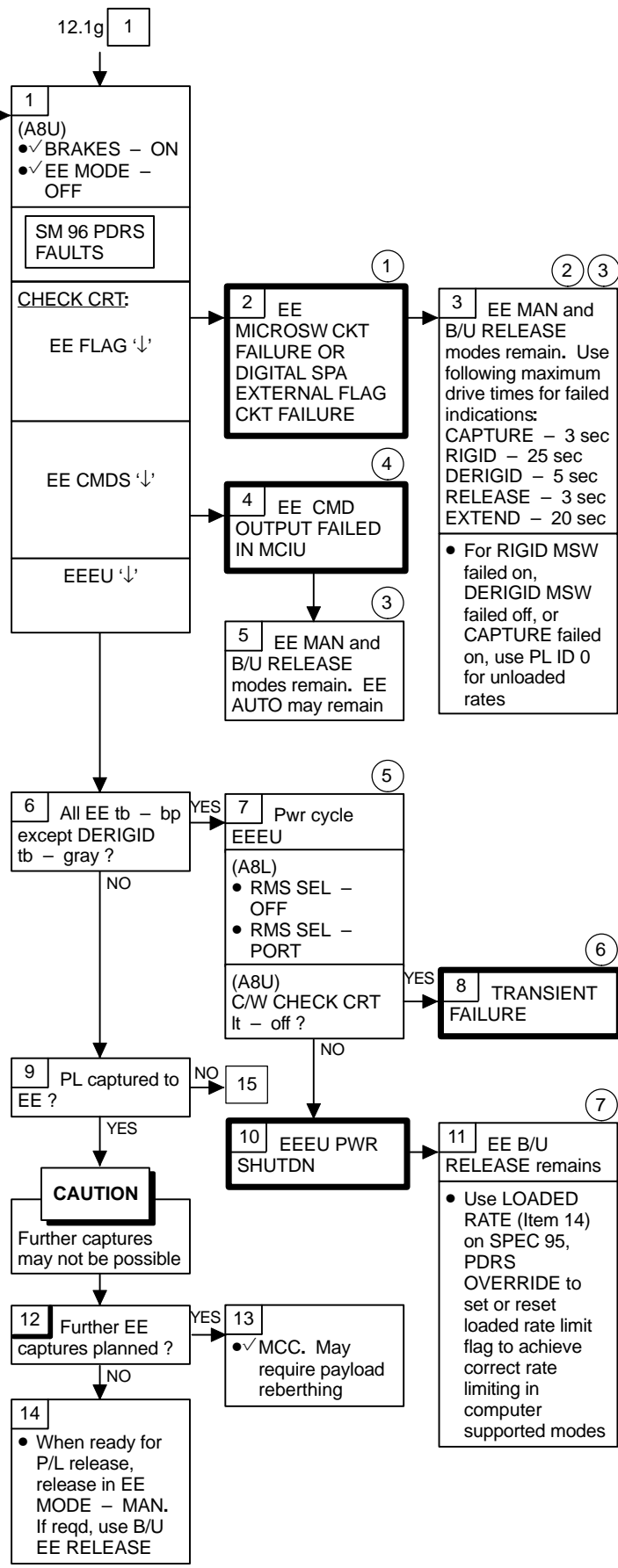
RMS MSTR ALARM

'S96 PDRS CKCRT EE'

CHECK CRT: EE FLAG '↓'
EEEEU '↓'
EE CMDS '↓'

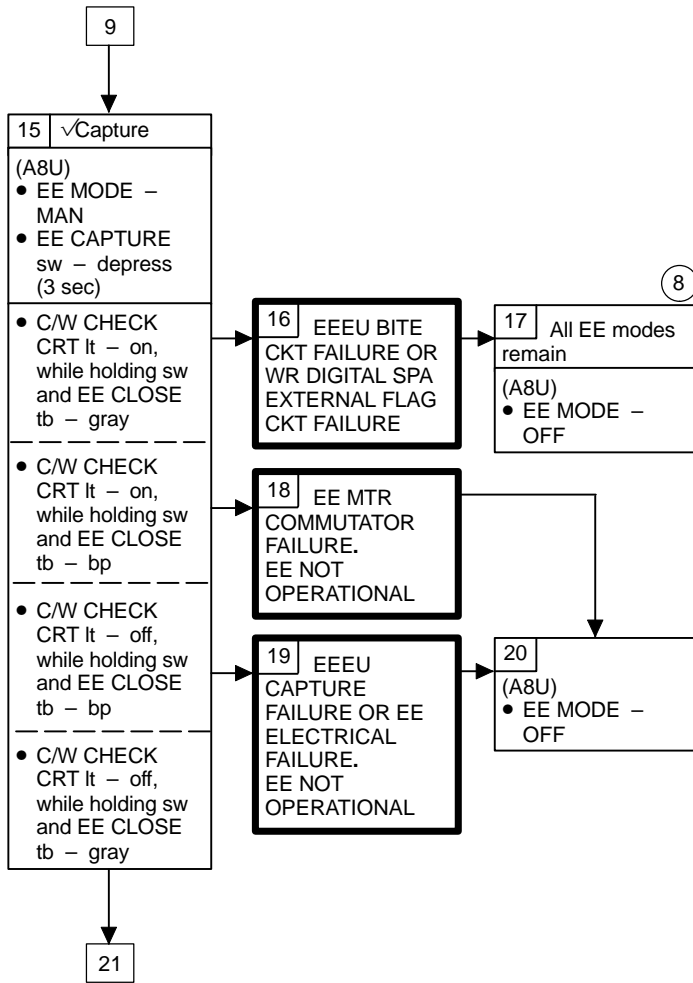
If: EE CMDS out of tolerance, EEEU BITE, or EE FLAG mismatch

Nominal Config:
(A8L)
RMS PWR – PRI
SEL – PORT
DAP: VERN(FREE)



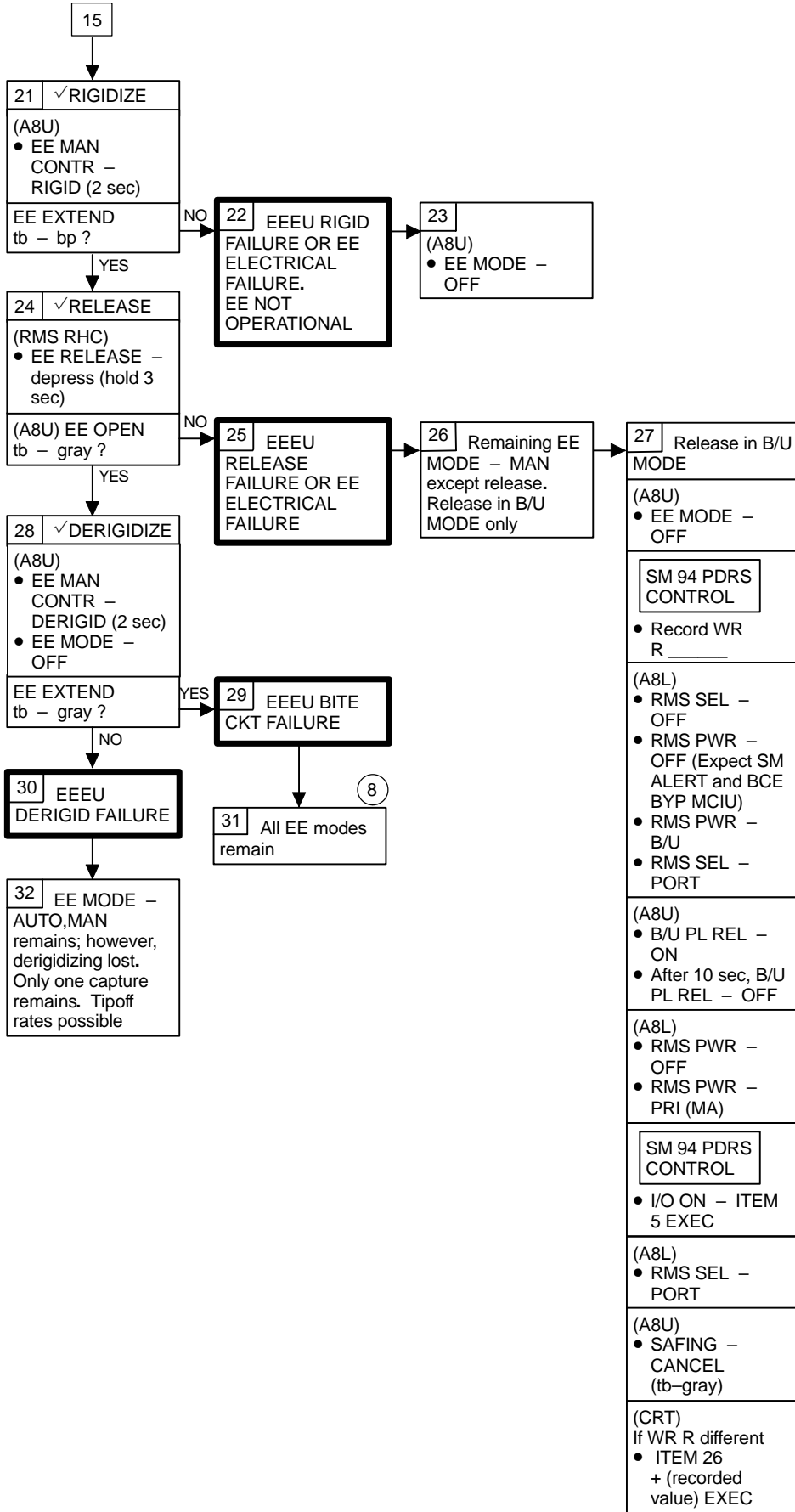
- ① For digital SPA failure, external flags can fail in pairs: CAP/EXTEND OPEN/RIG DERIG/CLOSE
- ② Other CHECK CRT failures will be annunciated with MA and SM msg
- ③ Ground can determine which EE Auto functions remain
- ④ Full EE AUTO capability may be regained with an MCIU CHANGEOUT (IFM)
- ⑤ ✓WR roll range value. Deselecting and reselecting RMS may cause WR roll range value to be incorrect
- ⑥ Additional alarms possible
- ⑦ Subsequent uncommanded release or derigidization will not be annunciated

PDRS 12.1k (Cont)



⑧ EEEU BITE checks will be masked. Other CHECK CRT failures will be annunciated with MA and SM msg

PDRS 12.1k (Cont)

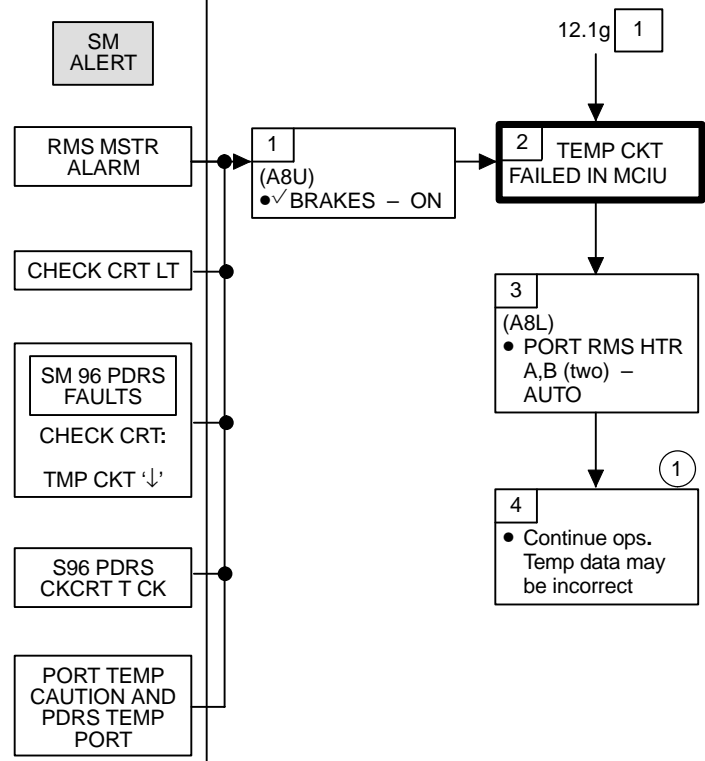


⑧ EEEU BITE checks will be masked. Other CHECK CRT failures will be annunciated with MA and SM msg

PDRS

**12.1I C/W CHECK CRT LT – S96 PDRS
CKCRT T CK**

① MCC may
TMBU temp limits to
prevent nuisance
alarms



If:
Thermistor circuit
reference voltage
fail

Nominal Config:
(A8L)
PORT RMS
HTR A(B) – AUTO

PDRS

**12.1m C/W CHECK CRT LT – S96 PDRS
CKCRT HC**

SM ALERT

RMS MSTR ALARM

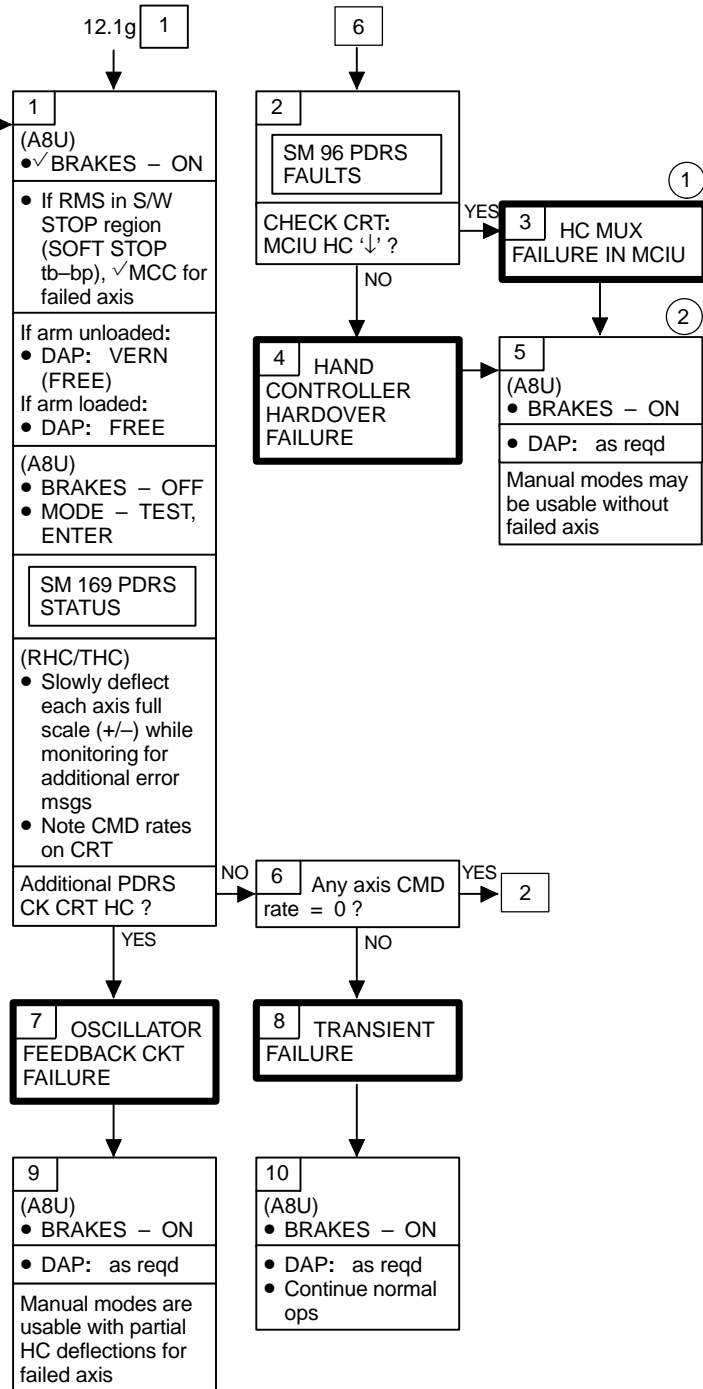
CHECK CRT (A8U)

S96 PDRS CKCRT HC

CHECK CRT: MCIU HC '↓'

If: HC hardover or MCIU MUX mismatch

Nominal Config:
(A8L)
RMS PWR – PRI
SEL – PORT



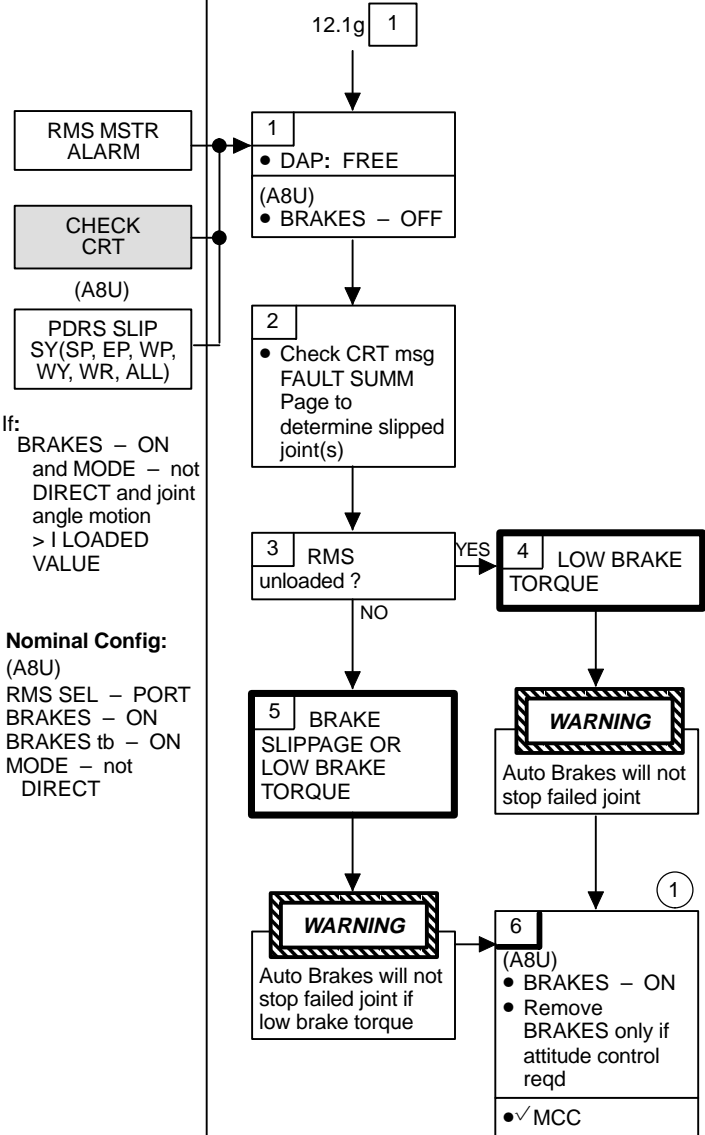
① Full capability may be restored with RMS MCIU CHANGEOUT (IFM)

② Single HC axis failure workaround capability exists via SM 95 PDRS OVERRIDE. Each time item 33 or 34 is toggled will result in MA and SM alert being reannunciated

PDRS

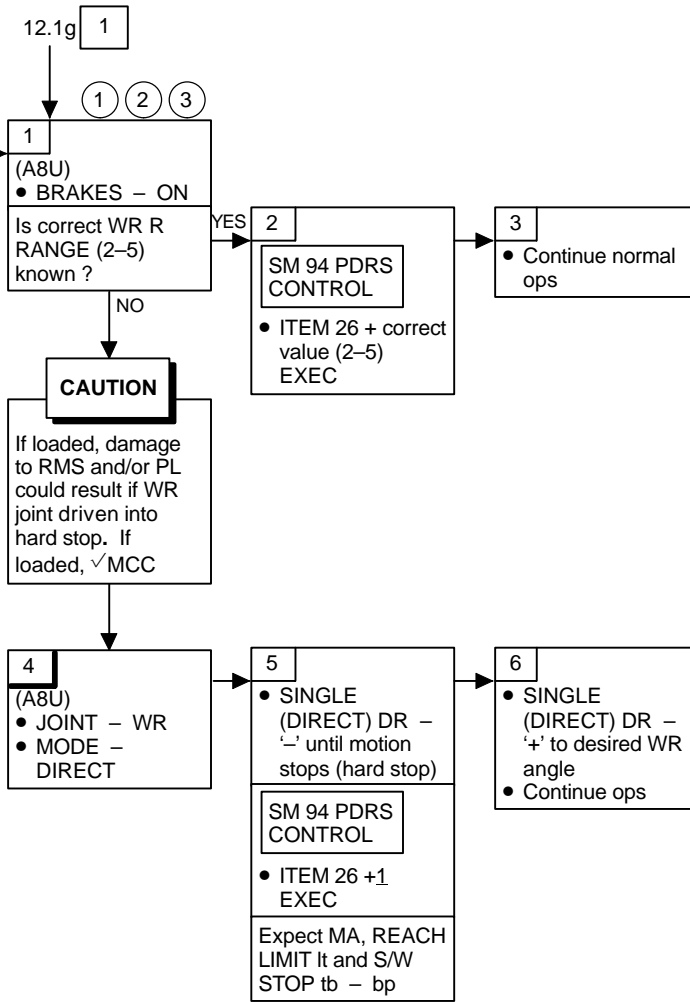
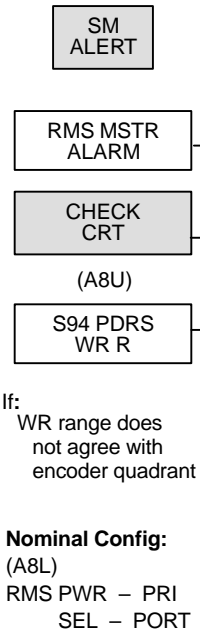
12.1n C/W CHECK CRT LT – PDRS SLIP SY(SP, EP, WP, WY, WR, ALL)

① MCC can attempt to correlate jet activity with 'PDRS SLIP' msg or may recommend a joint drive test to ascertain brake health



PDRS

12.1o C/W CHECK CRT LT – S94 PDRS WR R



① MCC may be able to determine correct value

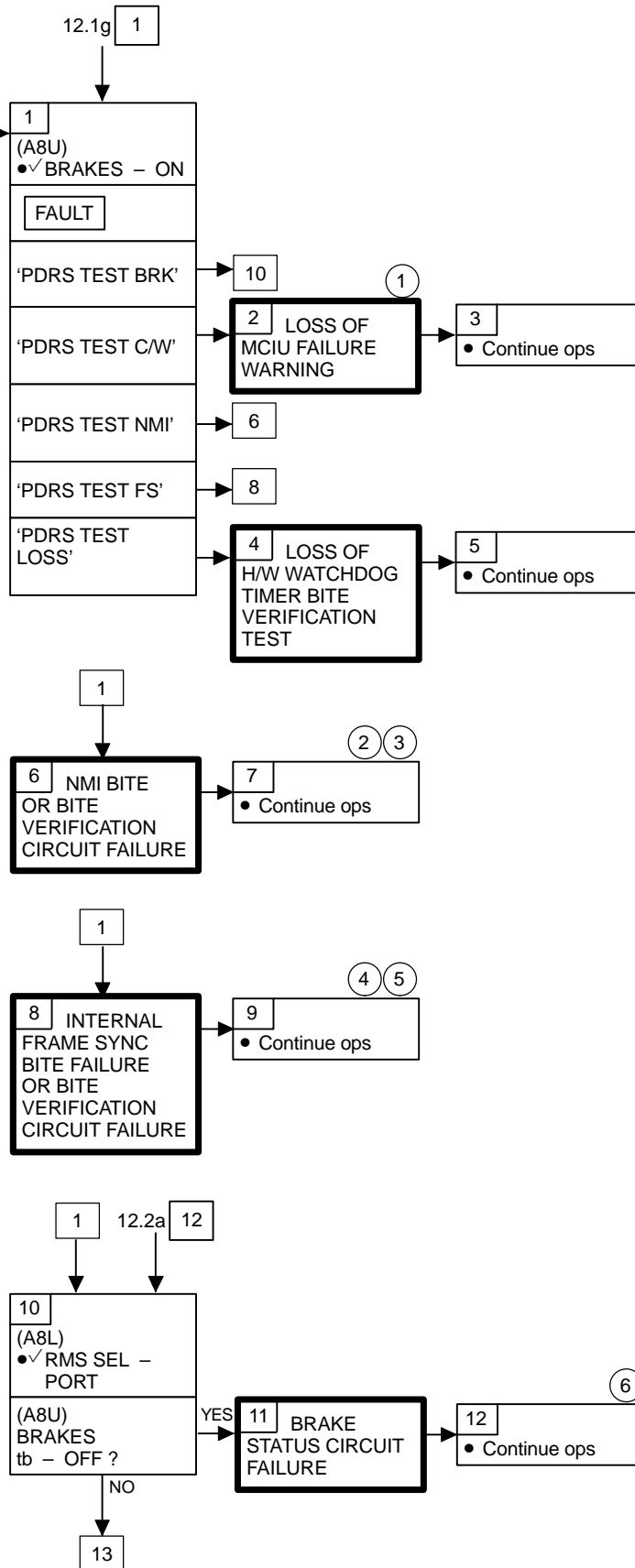
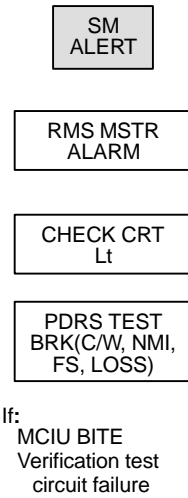
② Msg may result because of RMS deselect and reselect, driving WR in B/U, or SM major function move to another GPC

③

WR	WRR
-360 to -450	1
-180 to -360	2
0 to -180	3
0 to 180	4
180 to 360	5
360 to 450	6

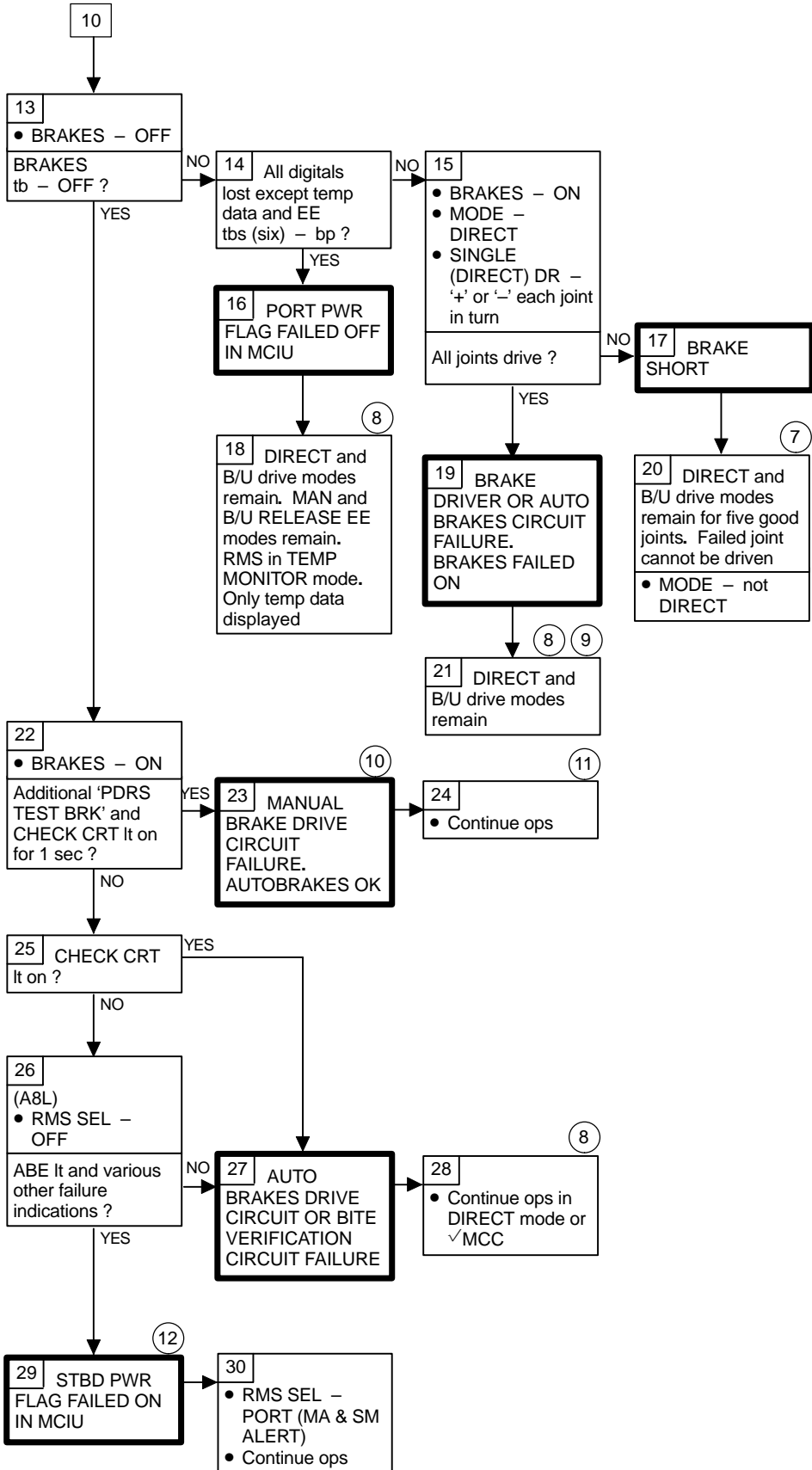
PDRS

12.1p C/W CHECK CRT LT – PDRS TEST BRK (C/W, NMI, FS, LOSS)



- ① MCIU failure warning/Master Alarm may not be available for subsequent failures. Autobrakes remain
- ② Subsequent MCIU failure warning may be accompanied by additional msgs
- ③ NMI may be lost for subsequent H/W Watchdog Timer failure. Autobrakes remain
- ④ Autobrakes may not be available for a subsequent loss of Internal Frame Sync
- ⑤ Next failure may result in a six-joint runaway at last commanded rates. Annunciated
- ⑥ Brakes operate nominally, but tb will remain OFF

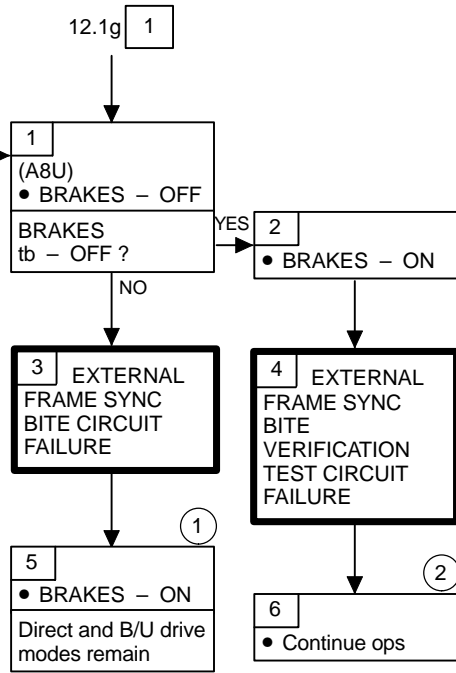
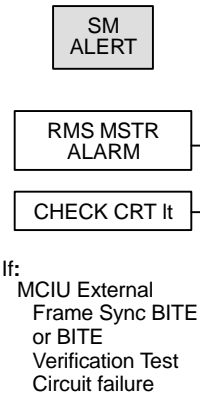
PDRS 12.1p (Cont)



- ⑦ Driving failed joint in B/U will blow +28V BDA fuse for all joints. EVA may be reqd to cradle arm
- ⑧ Full capability may be restored with RMS MCIU CHANGEOUT (IFM)
- ⑨ RMS limping will not exist during EE ops. Use EE MAN RELEASE for single joint ops
- ⑩ MCIU BITE verification test will apply brakes 1 sec after brake sw on
- ⑪ Failure will reannunciate with BRAKE sw transition from OFF to ON
- ⑫ RMS temperature monitor mode not available

PDRS

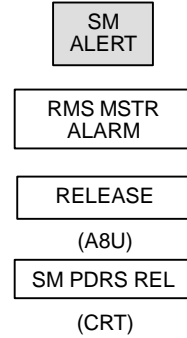
**12.1q C/W CHECK CRT LT – S96 PDRS
CKCRT FS**



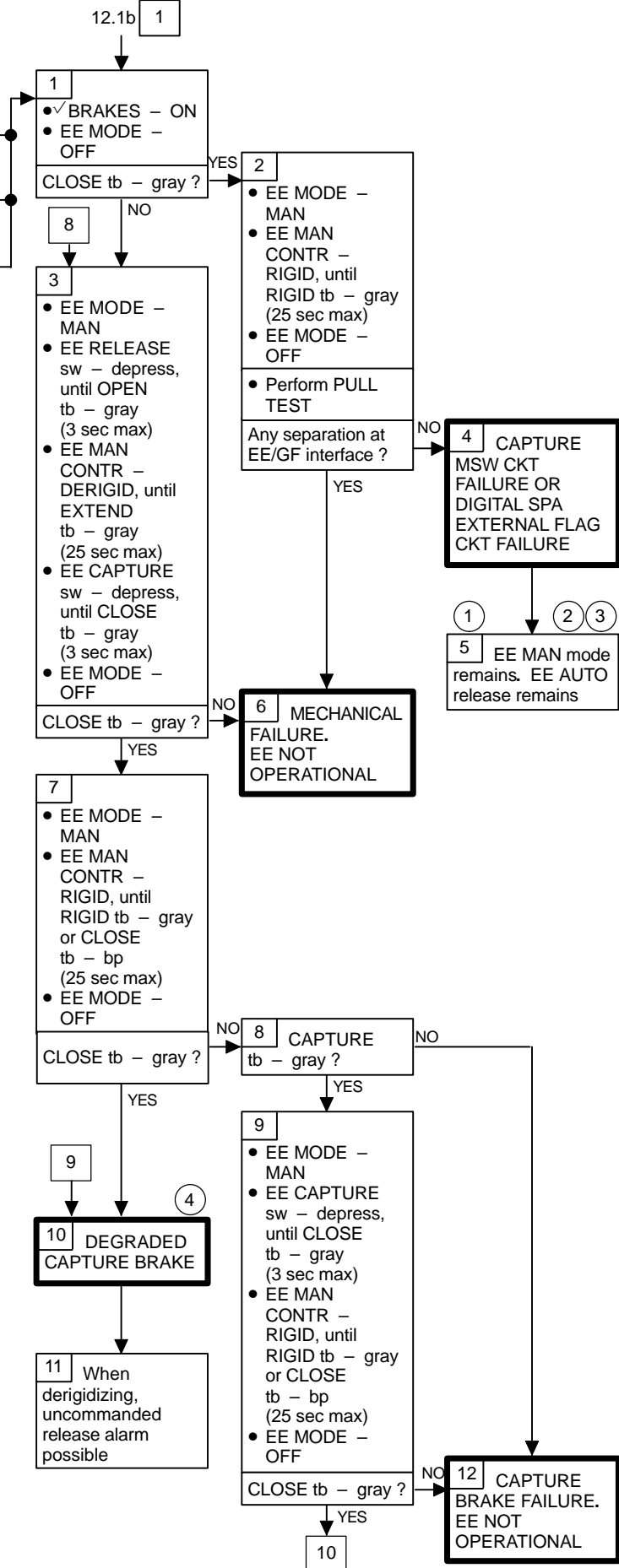
- ① Full capability will be restored with RMS MCIU CHANGEOUT (IFM)
- ② Auto brakes available for subsequent loss of External Frame Sync due to SPA detected loss of Frame Sync

PDRS

12.1r C/W RELEASE LT – PDRS REL



If: Uncommanded release warning



- ① Subsequent uncommanded release will not be annunciated
- ② RMS loaded rates can be set via SM 95 PDRS OVERRIDE
- ③ For digital SPA failure, EXTEND flag may be failed OFF causing EE motor to continue to drive until EE MODE - OFF during AUTO RELEASE
- ④ Rigidize brake is sufficient to hold EE drive train

PDRS

**12.1s C/W RELEASE LT – PDRS REL
(CUE CARD EXECUTED)**

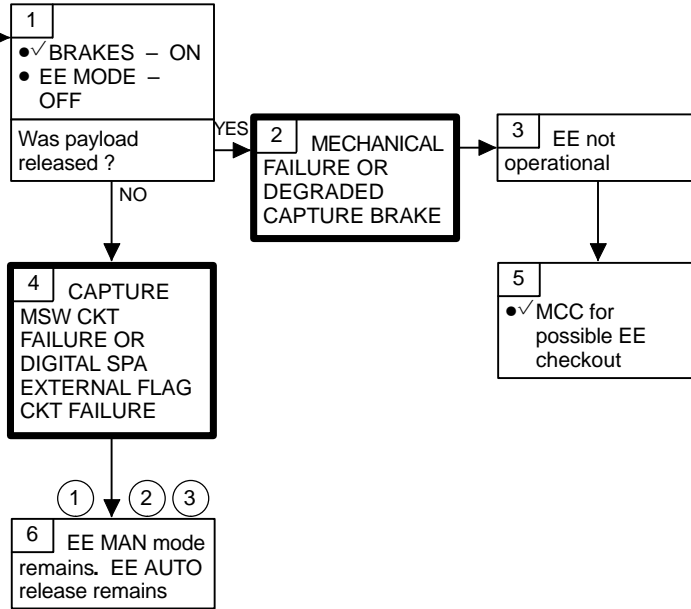
SM ALERT

RMS MSTR ALARM

RELEASE (A8U)

SM PDRS REL (CRT)

If: Uncommanded release warning



- ① Subsequent uncommanded release will not be annunciated
- ② For subsequent capture, RMS loaded rates can be set via SM 95 PDRS OVERRIDE
- ③ For digital SPA failure, EXTEND flag may be failed off causing EE motor to continue to drive until EE MODE – OFF during AUTO RELEASE

PDRS

12.1t C/W DERIGIDIZE LT – PDRS DERIG

SM ALERT

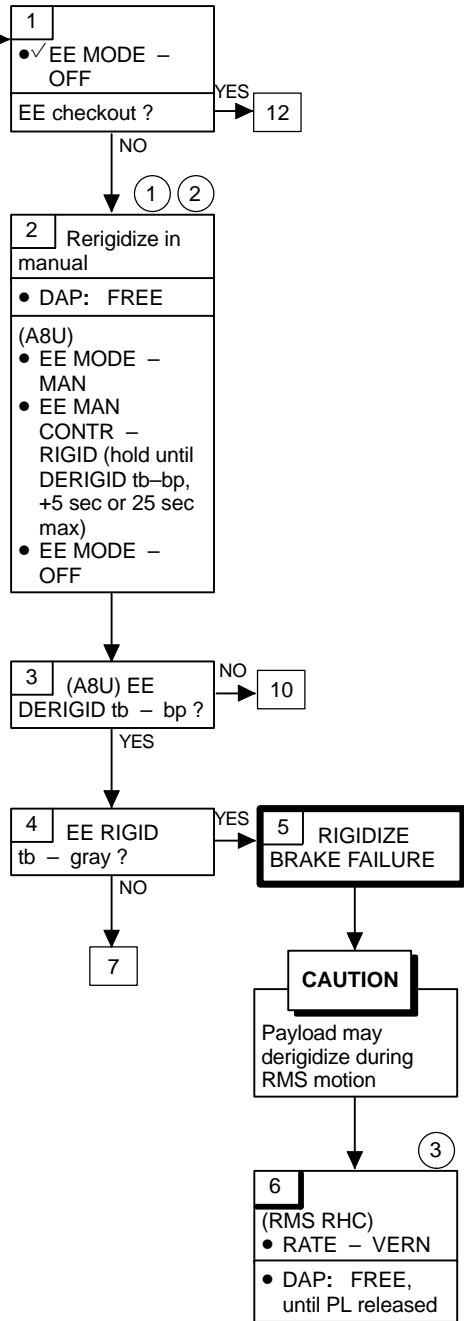
DERIGIDIZE (A8U)

RMS MSTR ALARM

SM PDRS DERIG (CRT)

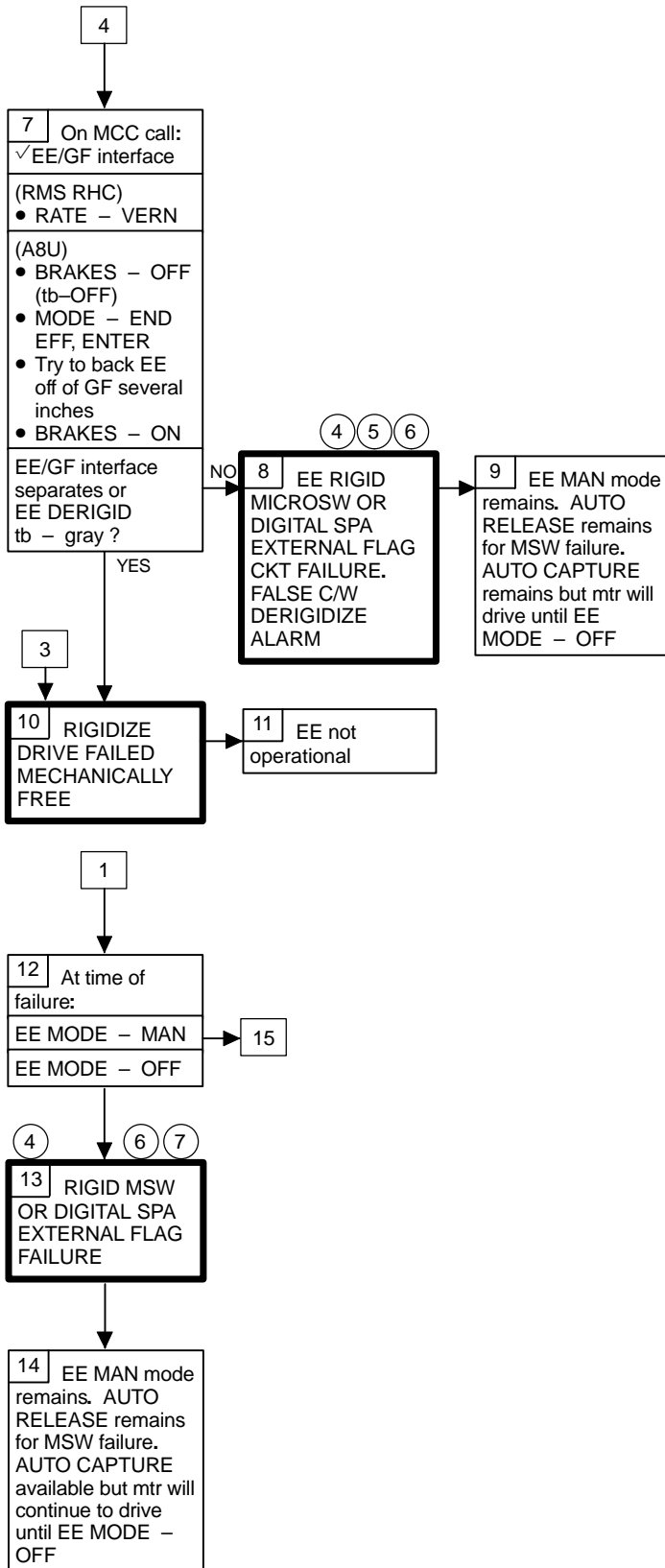
If: Uncommanded derigidize warning

Nominal Config:
DAP: VRCS or FREE



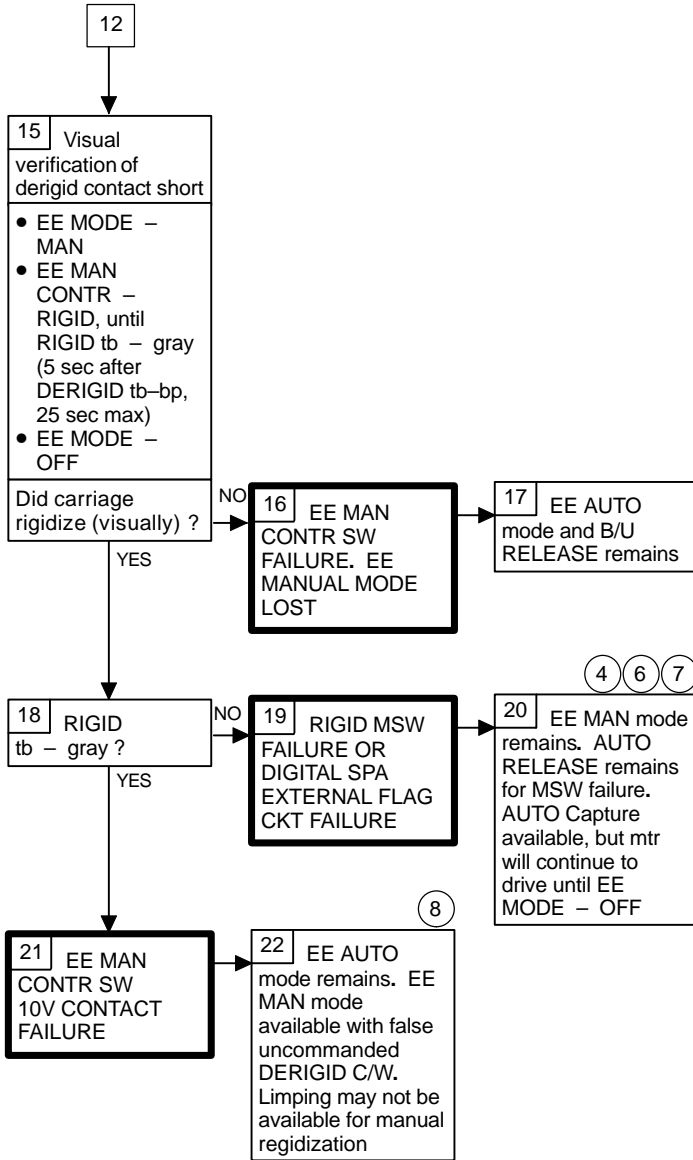
- ① DERIGID tb used because MSW failure affects RIGID tb
- ② RIGID CMD will reset C/W DERIGIDIZE
- ③ Additional DERIG alarms possible

PDRS 12.1t (Cont)



- ④ Further uncommanded derigidizations will not be annunciated
- ⑤ RMS loaded rates can be set via SM 95 PDRS OVERRIDE after next payload capture
- ⑥ For digital SPA failure, OPEN flag may be failed OFF
- ⑦ RMS loaded rates can be set via SM 95 PDRS OVERRIDE

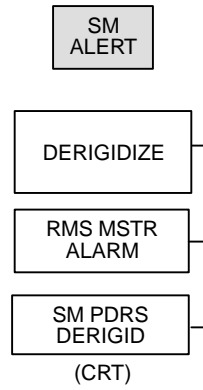
PDRS 12.1t (Cont)



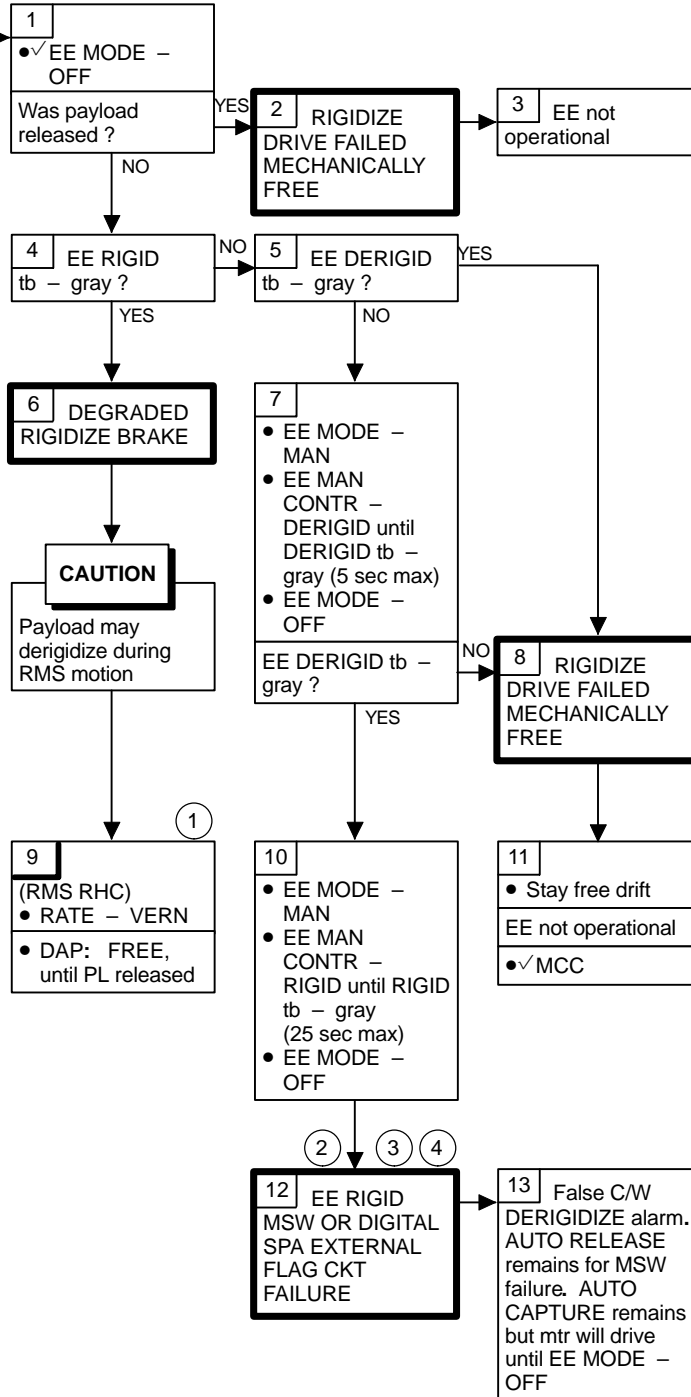
- ④ Further uncommanded derigidizations will not be annunciated
- ⑥ For digital SPA failure, OPEN flag may be failed OFF
- ⑦ RMS loaded rates can be set via SM 95 PDRS OVERRIDE
- ⑧ MCC can see 10V contact and determine if limping available for manual rigidization

PDRS

12.1u C/W DERIGIDIZE LT – PDRS DERIG (CUE CARD EXECUTED)

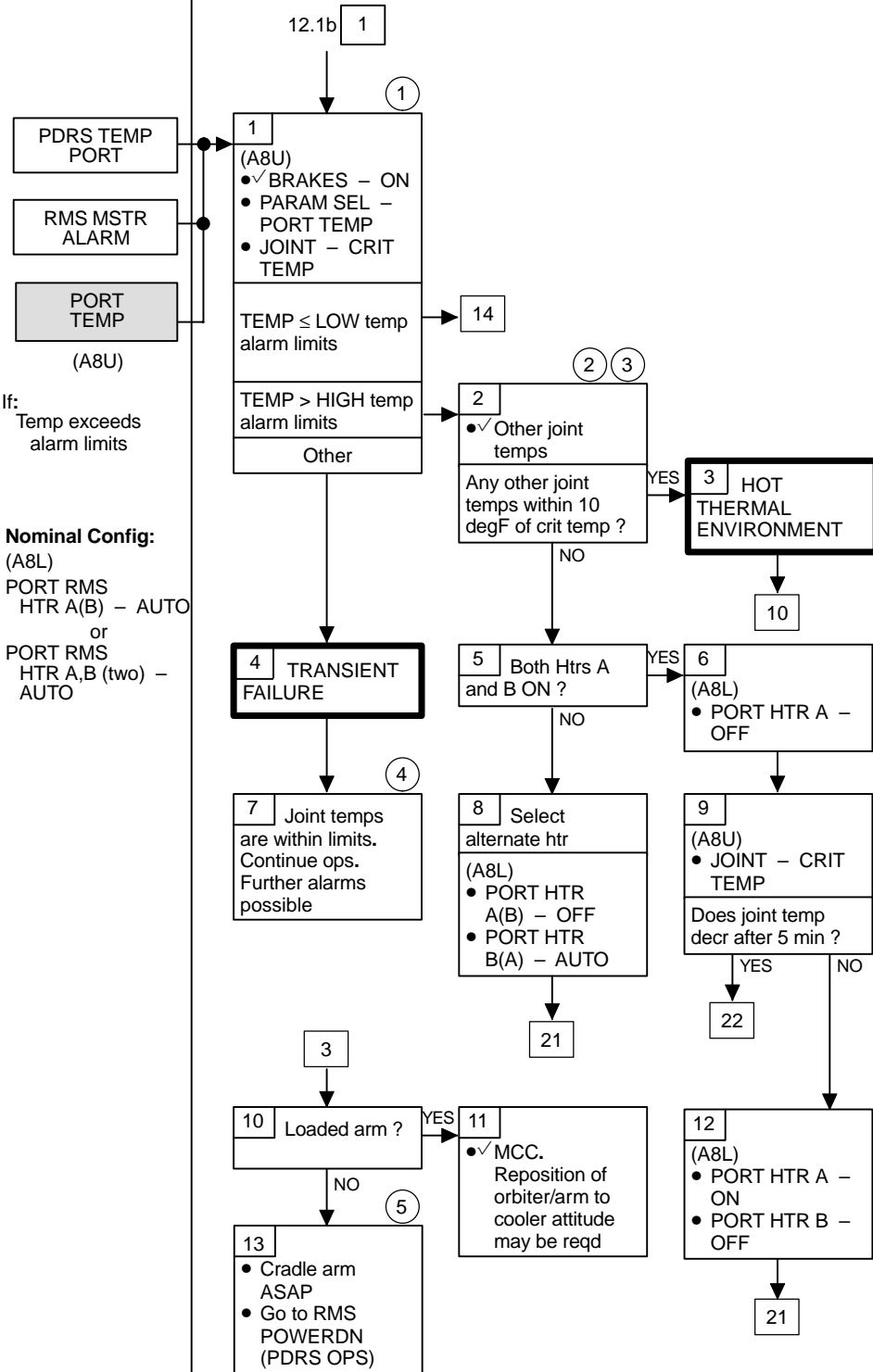


If: Uncommanded derigimize warning



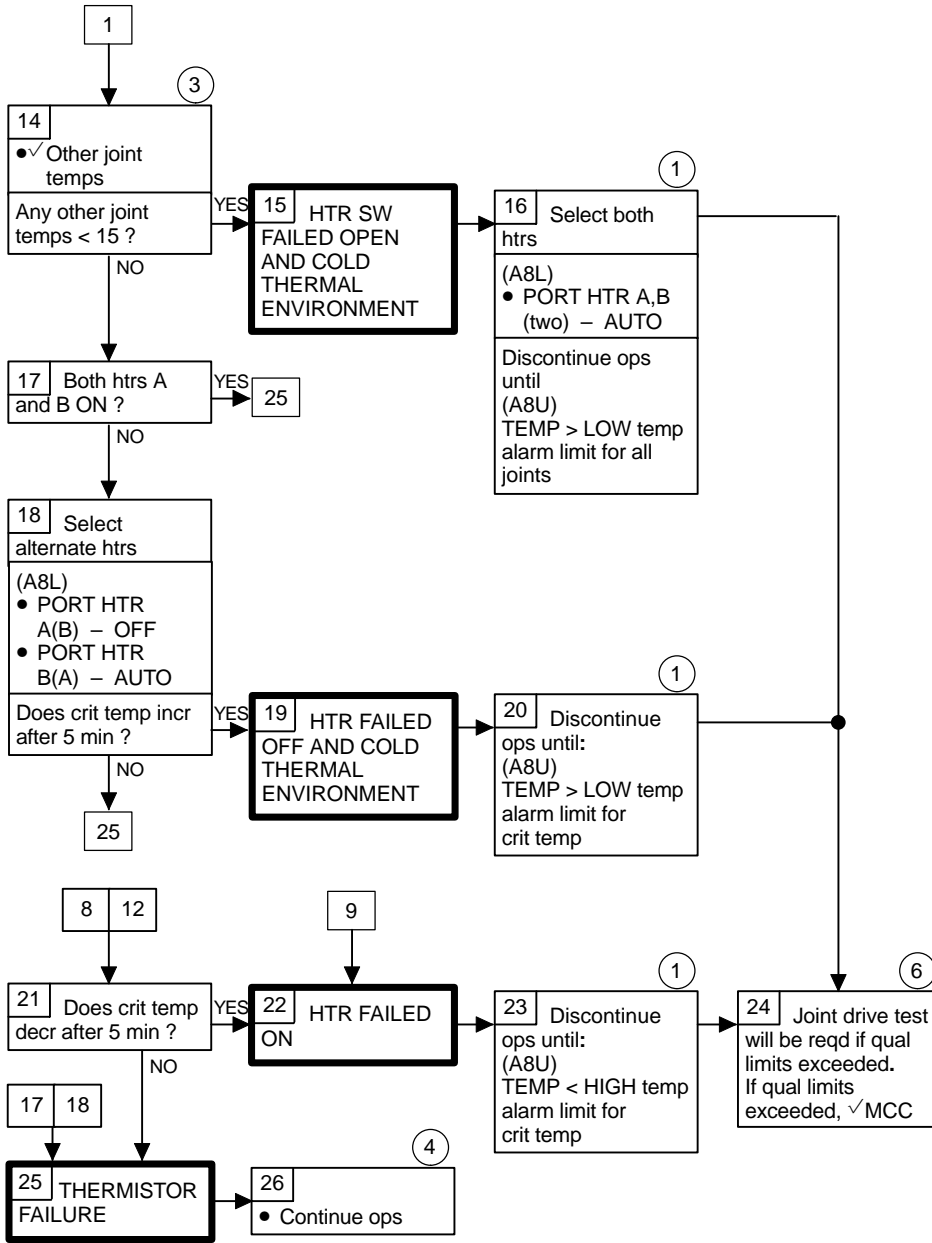
- ① Additional DERIGID alarms possible
- ② Further uncommanded derigidizations will not be annunciated
- ③ RMS loaded rates can be set via SM 95 PDRS OVERRIDE after next payload capture
- ④ For digital SPA failure, OPEN flag may be failed off

12.1v C/W PORT TEMP LT – PDRS TEMP PORT



- 1 HIGH temp alarm limits:
LED = 172
ABE (SPA) = 106
ABE (EE) = 144
LOW temp alarm limits:
LED = 0
ABE (ALL) = 0
- 2 Normally, joint temps vary between 15 degF and 60 degF
- 3 SP ABE and SY ABE represent single temp reading. WP ABE and WY ABE represent single temp reading
- 4 MCC may TMBU temp limits to prevent nuisance alarms
- 5 Arm must be cradled and latched before temp reaches acceptance temp limit (LED 181 degF, ABE SPA 117, ABE EE 154 degF). When arm reaches acceptance temp limit, pwr will be removed

PDRS 12.1v (Cont)



- ① HIGH temp alarm limits:
LED = 172
ABE (SPA) = 106
ABE (EE) = 144
LOW temp alarm limits:
LED = 0
ABE (ALL) = 0
- ③ SP ABE and SY ABE represent single temp reading. WP ABE and WY ABE represent single temp reading
- ④ MCC may TMBU temp limits to prevent nuisance alarms
- ⑥ Arm qual temp high limits:
LED = 202
ABE = (SPA) = 136
ABE (EE) = 176
Arm qual temp low limits:
LED = -10
ABE = -10

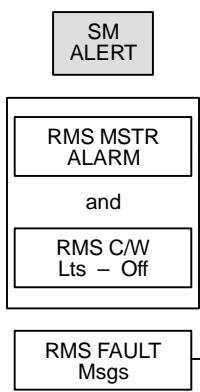
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RMS D&C
12.2

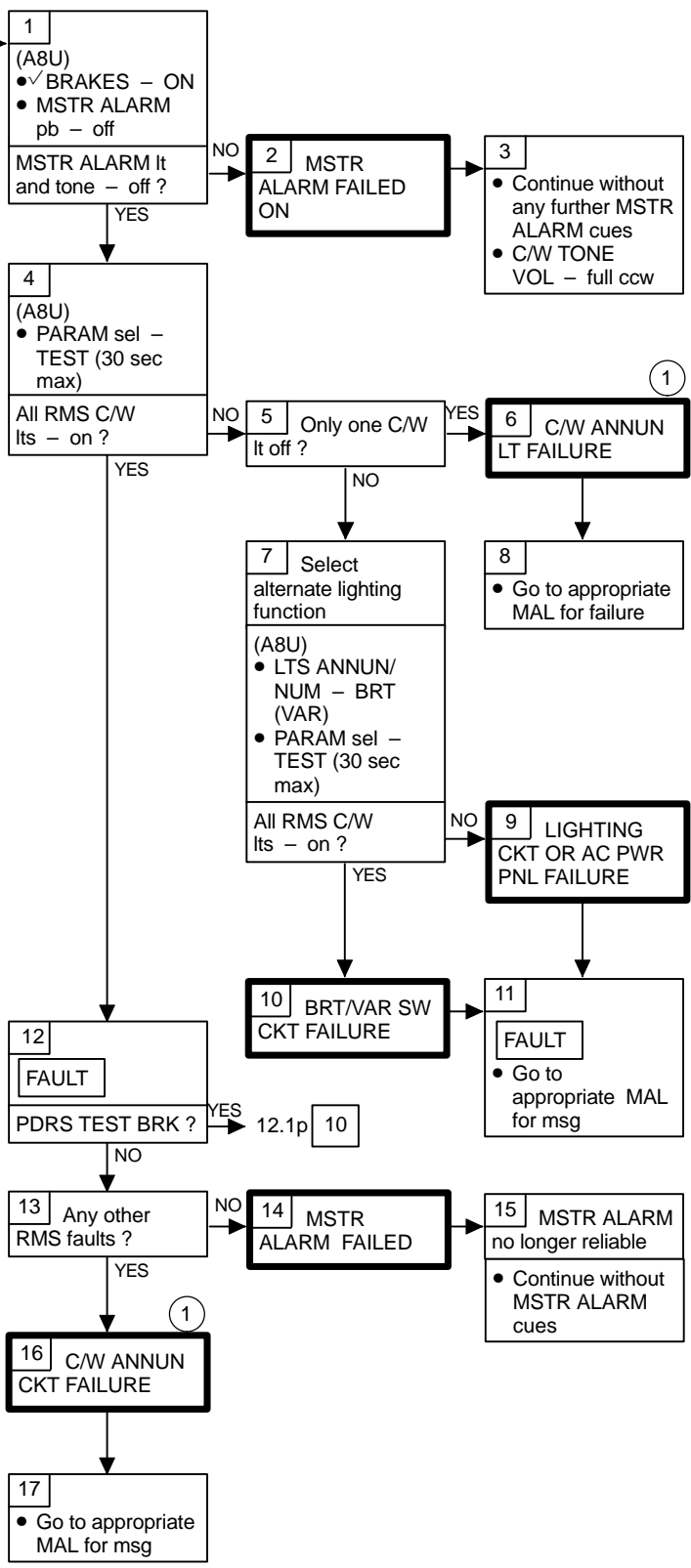
PDRS

12.2a MSTR ALARM ON, BUT C/W LT(S) OFF

① C/W Lt associated with fault msg will not illuminate



Nominal Config:
(MA73C:F)
cb AC1 RMS
PRIMARY A - cl



RMS D&C

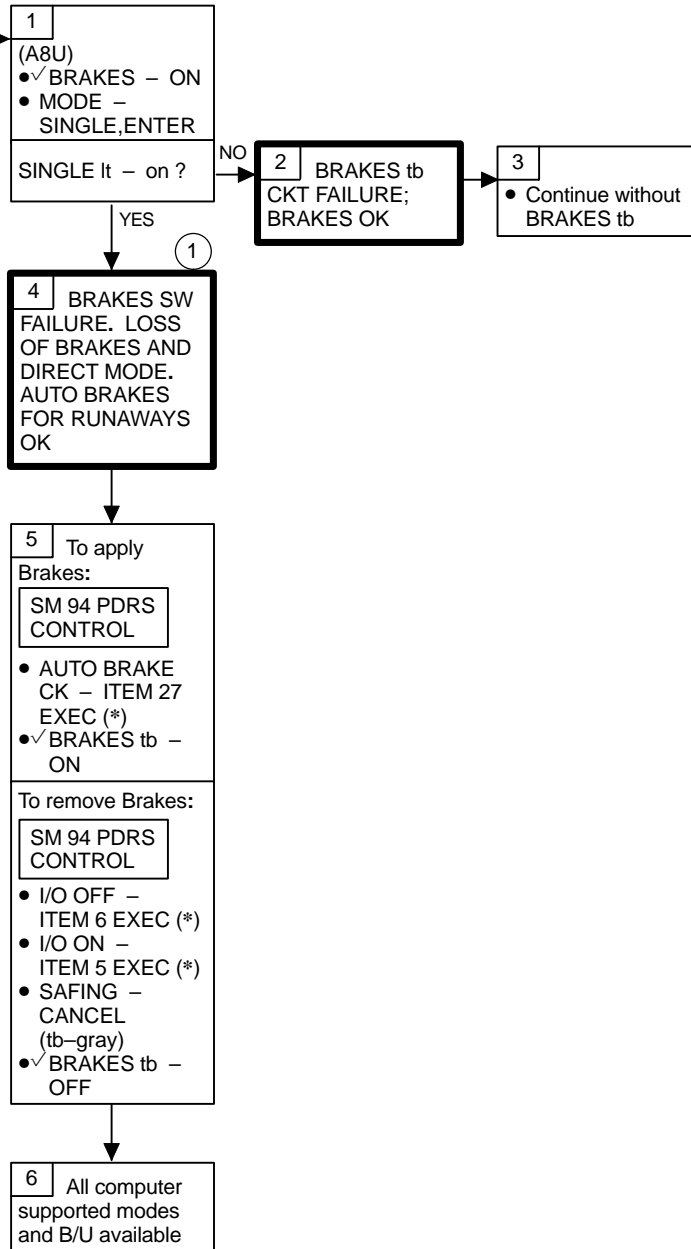
12.2

PDRS

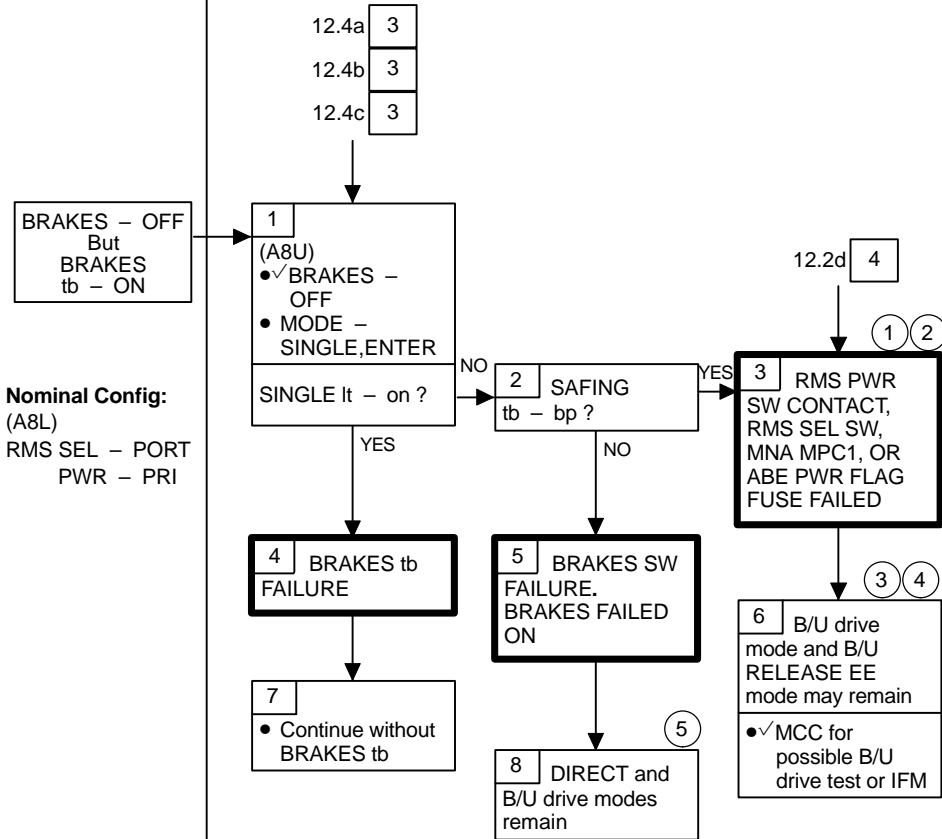
12.2b BRAKES – ON, BUT BRAKES tb – OFF

BRAKES – ON
But
BRAKES
tb – OFF

Nominal Config:
(A8L)
RMS PWR – PRI
SEL – PORT
(A8U)
BRAKES – ON



① RMS IFM D&C Kit available to regain DIRECT mode. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), AND PDRS SSR-4, RMS IFM D&C KIT

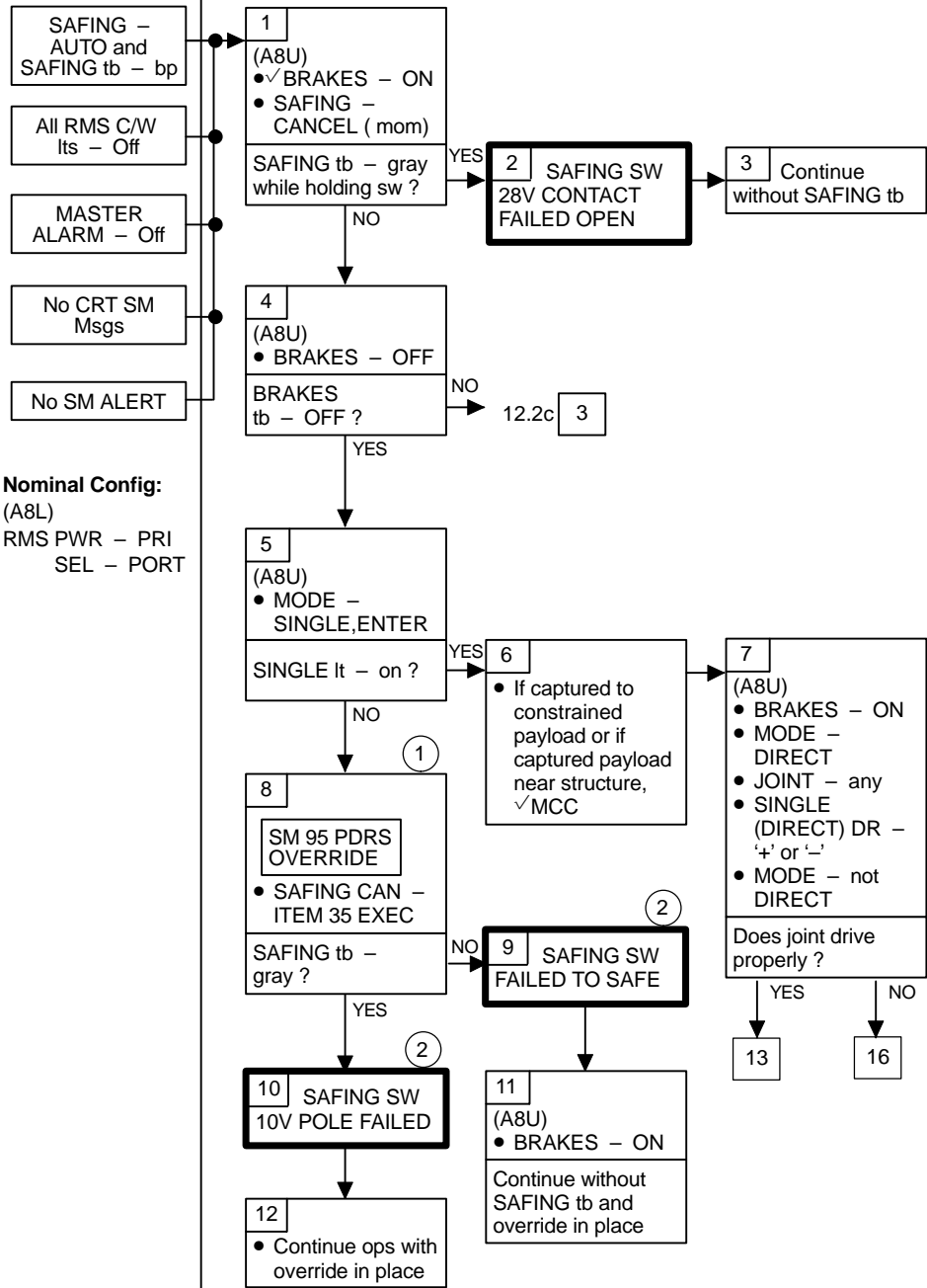


Nominal Config:
(A8L)
RMS SEL – PORT
PWR – PRI

- ① For RMS pwr sw failure, all ABE data lost. For all other failures, only arm temp data remains
- ② Ground can determine if RMS pwr sw is failed
- ③ RMS IFM D&C KIT available to regain DIRECT mode and EE – MAN modes for ABE PWR FLAG fuse, but ABE data will be unavailable. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT
- ④ For RMS pwr or RMS select sw, Contingency Powerup IFM is available to regain primary drive modes and end effector capability. Refer to CONTINGENCY POWERUP (IFM)
- ⑤ RMS limping will not exist during EE ops. Use EE MAN release for single joint ops

PDRS

12.2d SAFING – AUTO, BUT SAFING tb – bp

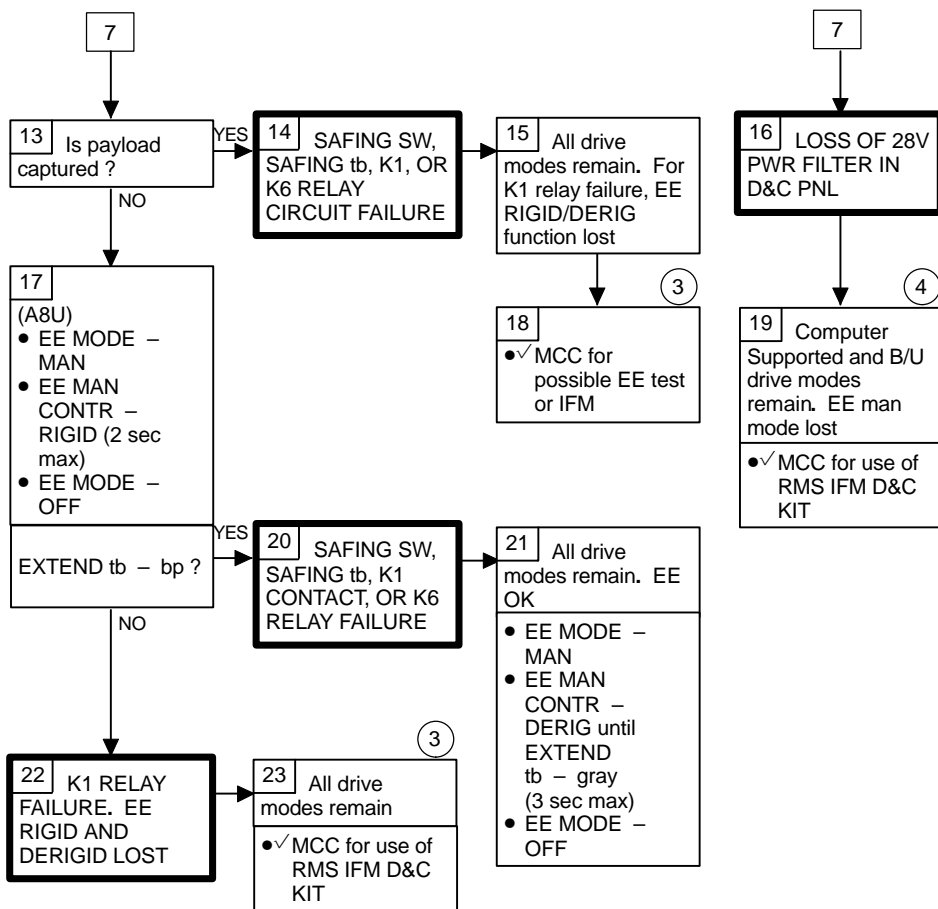


Nominal Config:
(A8L)
RMS PWR – PRI
SEL – PORT

① SM 95 ITEM 35 SAFING CAN override is a toggle. If left in place it will override a D&C panel safing command

② MCIU SAFING circuit still operational

PDRS 12.2d (Cont)



③ For K1 relay failure, EE MODE – MAN may be restored with RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

④ DIRECT drive, and EE MODE – MAN may be restored with RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

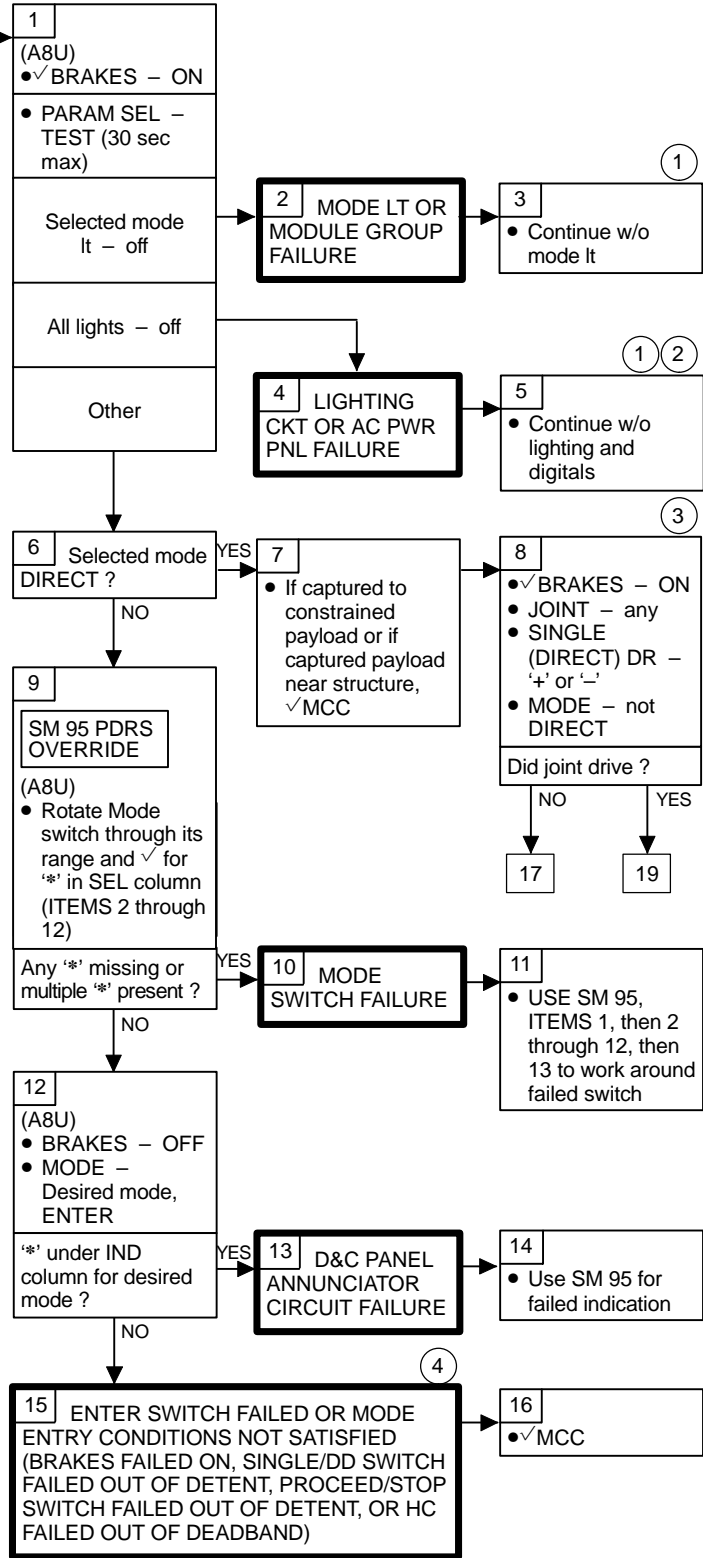
PDRS

12.2g SELECTED MODE ANNUN – OFF OR ALL A8 LTS – OFF

Selected Mode Lt Off

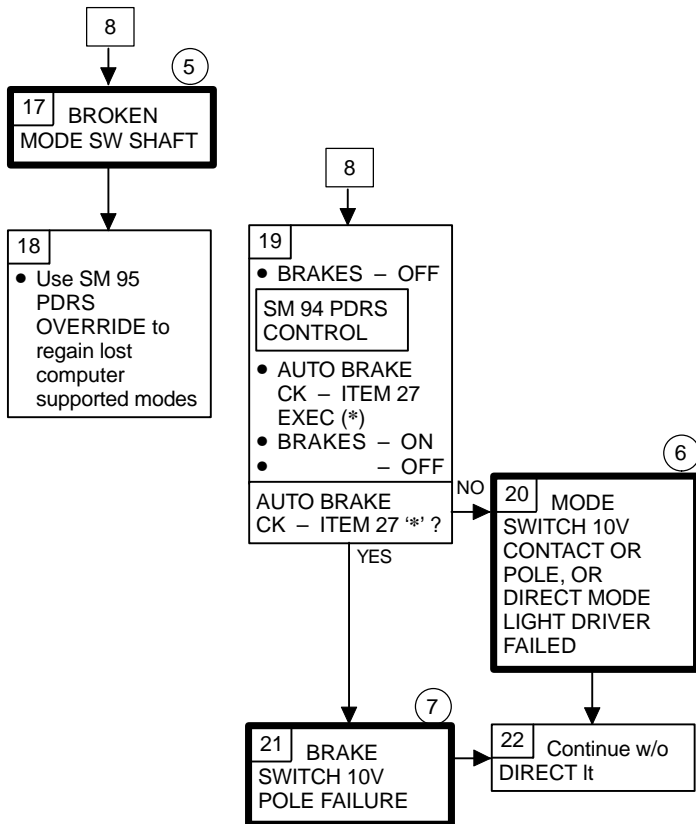
Nominal Config:
 (MA73C:F)
 cb AC1 RMS
 PRI φA – cl
 (A8U)
 SAFING tb – GRAY if mode not DIRECT
 S/W tb – GRAY if mode not DIRECT or SINGLE
 (A8L)
 RMS PWR – PRI
 SEL – PORT

If DIRECT:
 BRAKES – ON
 BRAKES tb – ON



- ① MODE indications can be read using SM 95 PDRS OVERRIDE
- ② Joint Angles can be read using SM 169 PDRS STATUS
- ③ May receive CK CRT Lt and DIRECT DRIVE BITE '↓' for one or more joints
- ④ SM 95 PDRS OVERRIDE available to work around ENTER pb, SINGLE/DD SW or PROCEED/STOP SW. Deflecting HCs may regain manual modes

PDRS 12.2g (Cont)



- ⑤ DIRECT mode can be regained with RMS IFM D&C KIT
- ⑥ For MODE sw pole failure, use SPEC 95 for computer supported modes
- ⑦ For brake sw failure, auto brakes can be removed via SM 94 PDRS CONTROL, ITEM 6, ITEM 5, and SAFING - CANCEL

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PDRS

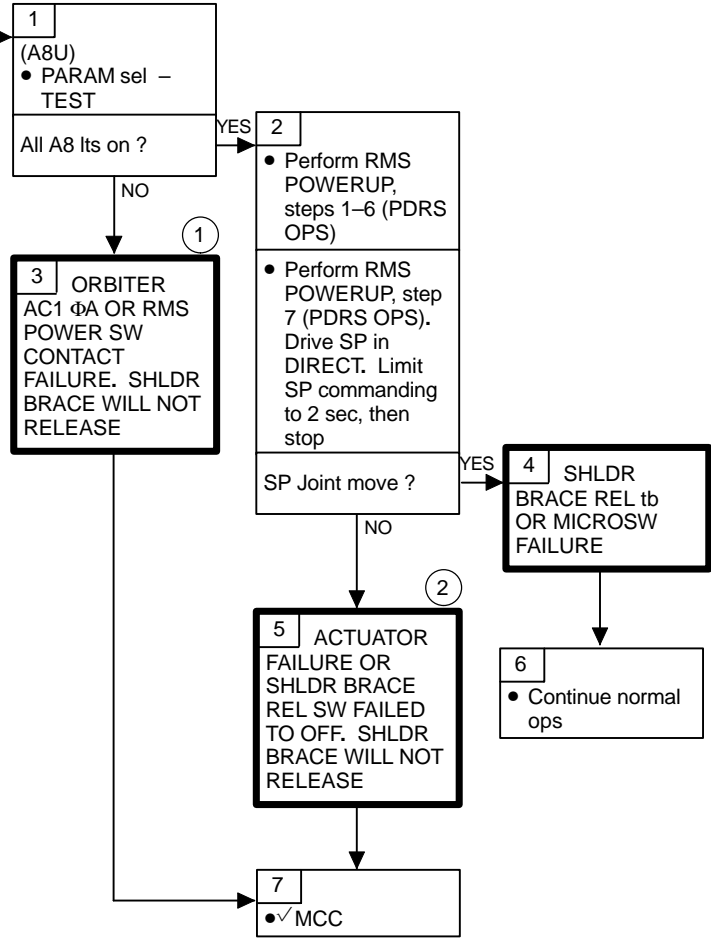
12.2h SHLDR BRACE REL tb – bp AFTER CMD

SHLDR BRACE
REL tb – bp
After Cmd

Nominal Config:
(MA73C:F)
cb AC1 RMS
PRI φA – cl
(A8L)
RMS PWR – PRI
SEL – PORT

SM 94 PDRS
CONTROL

I/O ON – ITEM 5(*)



- ① RMS IFM D&C KIT available to recover loss of AC1 φA for SHLDR brace release sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM) and PDRS SSR-4, RMS IFM D&C KIT
- ② If actuator failure, EVA possible to release shldr brace. If SW failure, RMS IFM D&C kit available to regain shldr brace

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**END
EFFECTOR**

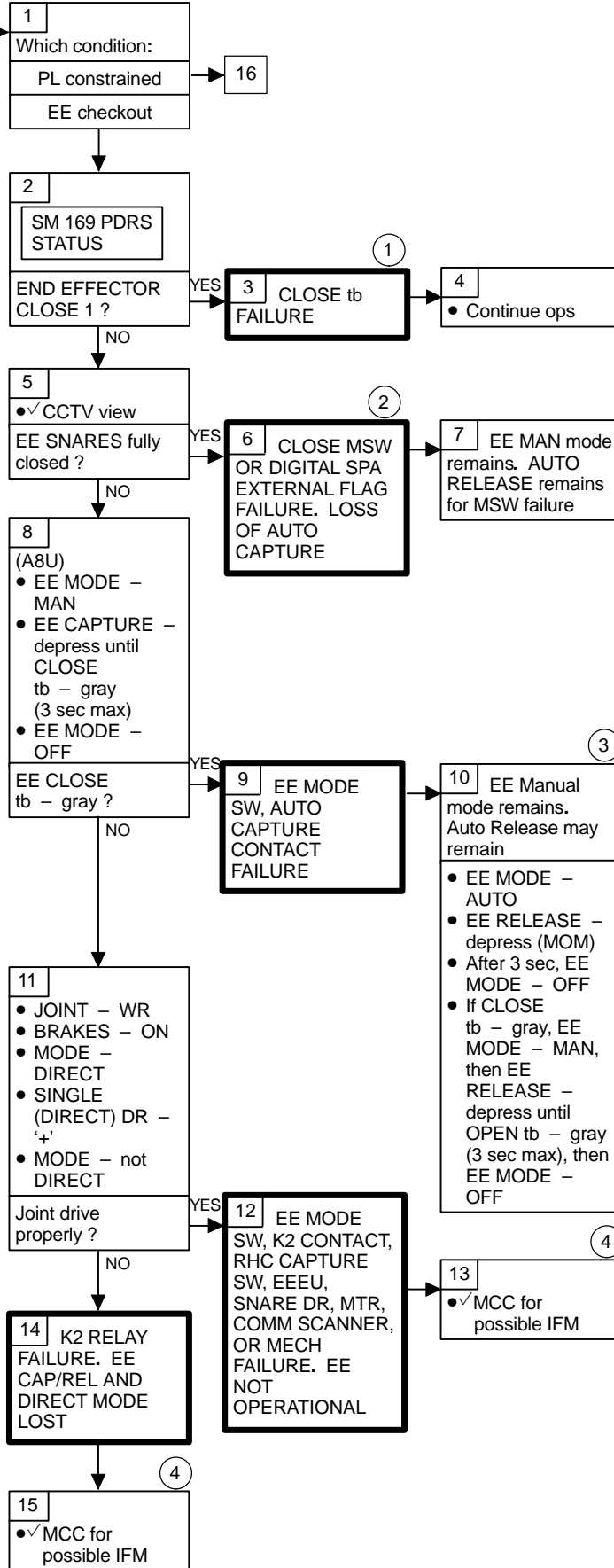
12.3

PDRS

12.3a EE FAILS TO CAPTURE/RIGIDIZE IN AUTO

If EE Failed to Capture and/ or Rigidize in AUTO

Nominal Config:
 DAP: VERN(FREE)
 (A8U)
 SAFING tb – gray

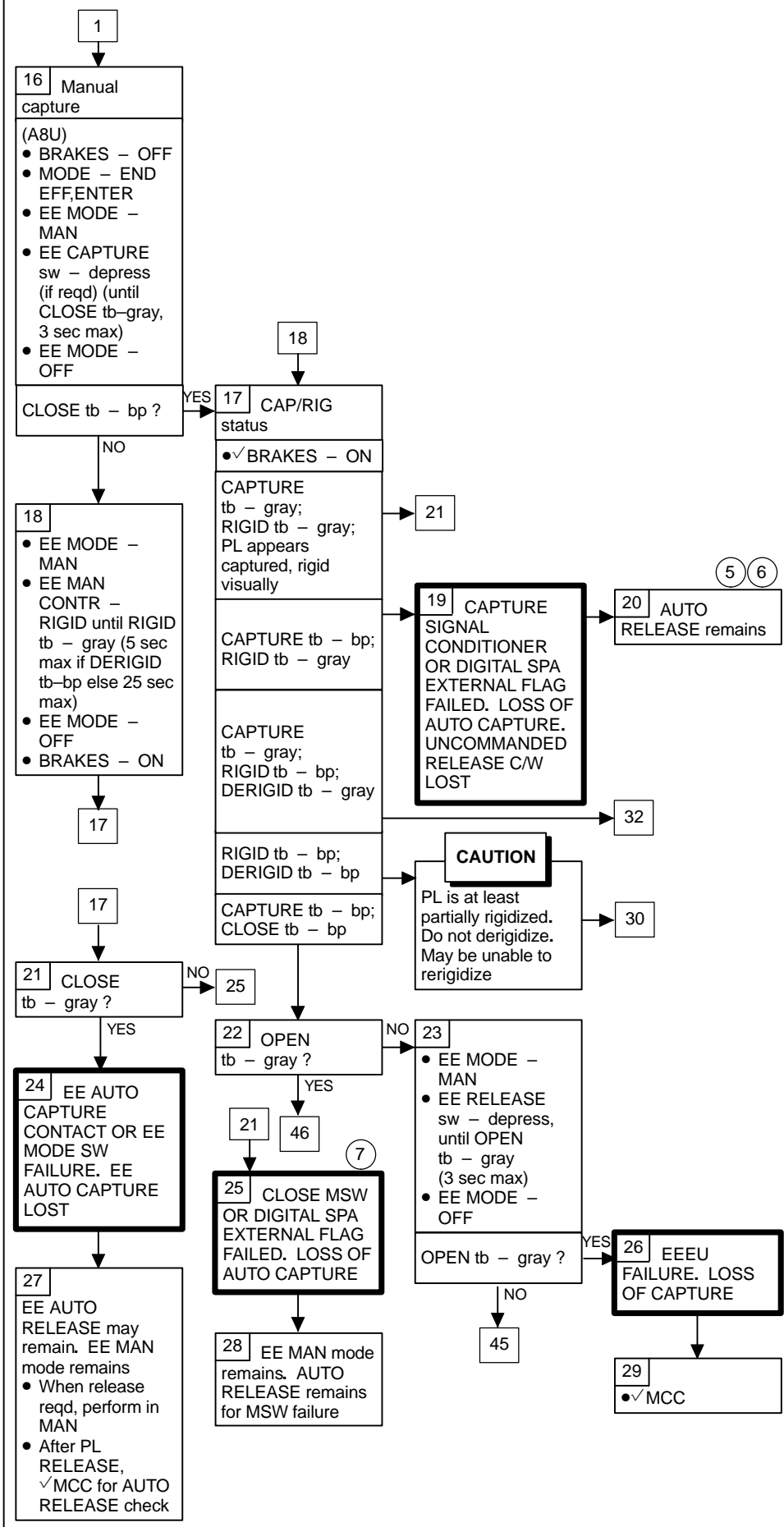


- ① For future EE OPS, use SM 94 PDRS CONTROL or SM 169 PDRS STATUS to determine status of affected EE tb
- ② For digital SPA failure, DERIG flag may be failed on
- ③ Limping will not occur in EE Manual for Auto Capture contact failure
- ④ RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS D&C IFM KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

END EFFECTOR

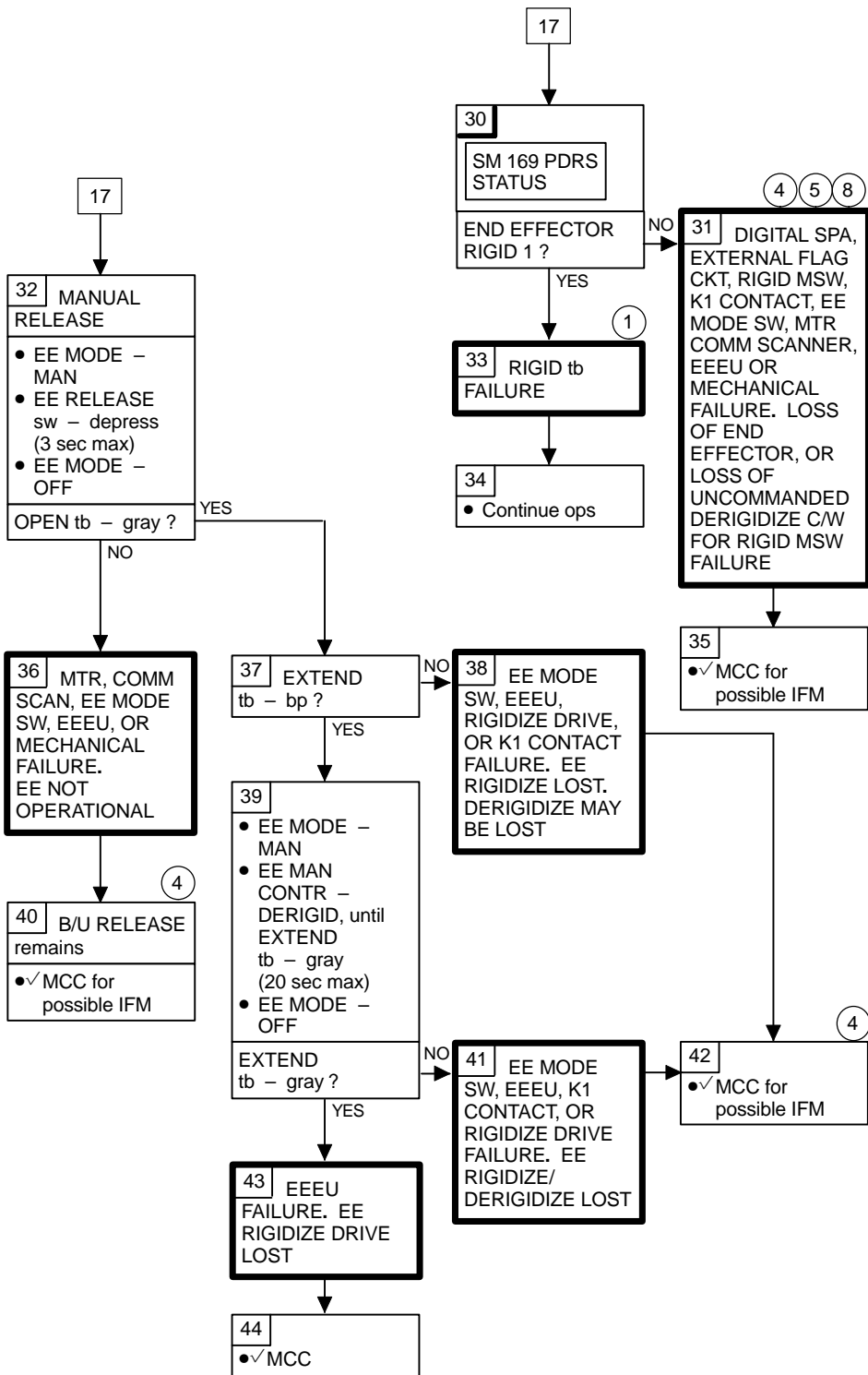
12.3

PDRS 12.3a (Cont)



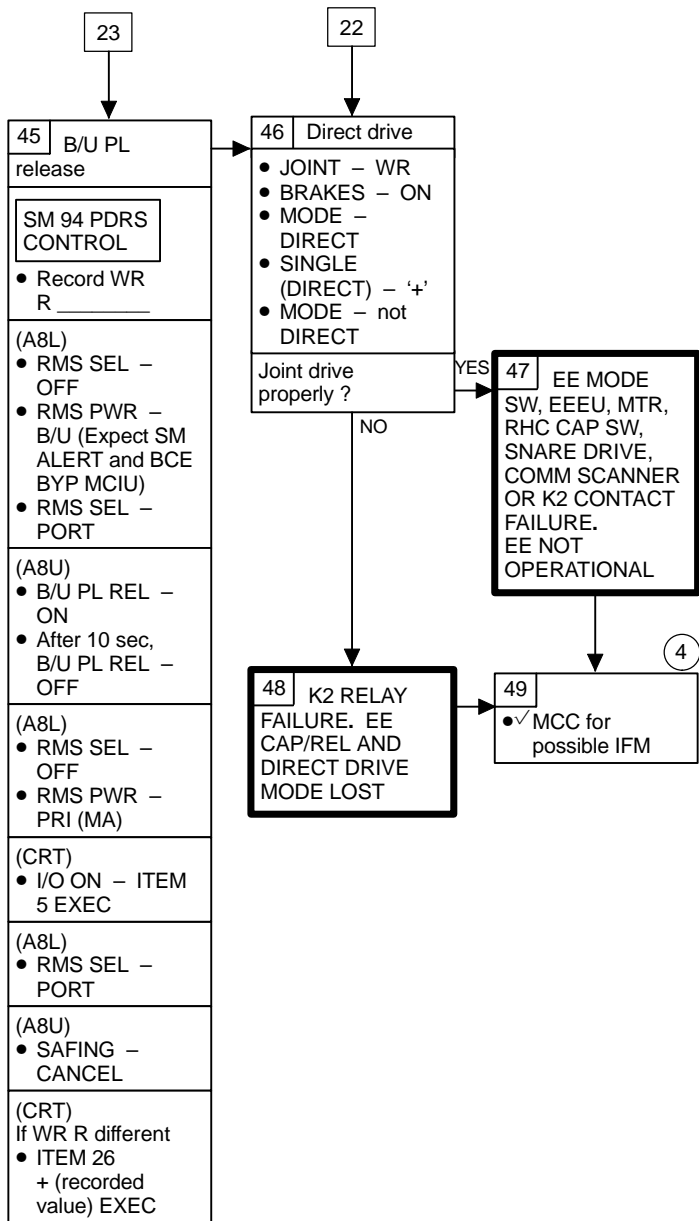
- ⑤ Arm will move at unloaded rates. RMS loaded rates can be set via SM 95 PDRS OVERRIDE
- ⑥ For digital SPA failure, EXTEND flag may be failed OFF causing motor to continue to drive until EE MODE – OFF
- ⑦ For digital SPA failure, DERIG flag may be failed ON

PDRS 12.3a (Cont)



- ① For future EE OPS, use SM 94 PDRS CONTROL or SM 169 PDRS STATUS to determine status of affected EE tb
- ④ RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KI
- ⑤ Arm will move at unloaded rates. RMS loaded rates can be set via SM 95 PDRS OVERRIDE
- ⑧ For digital SPA failure, OPEN flag may be failed OFF

PDRS 12.3a (Cont)



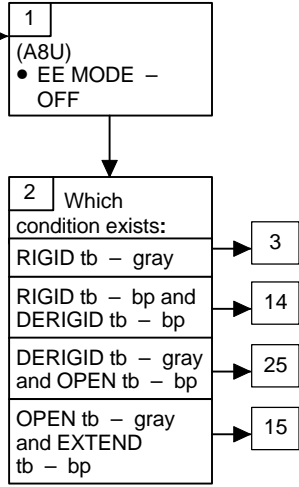
④ RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

PDRS

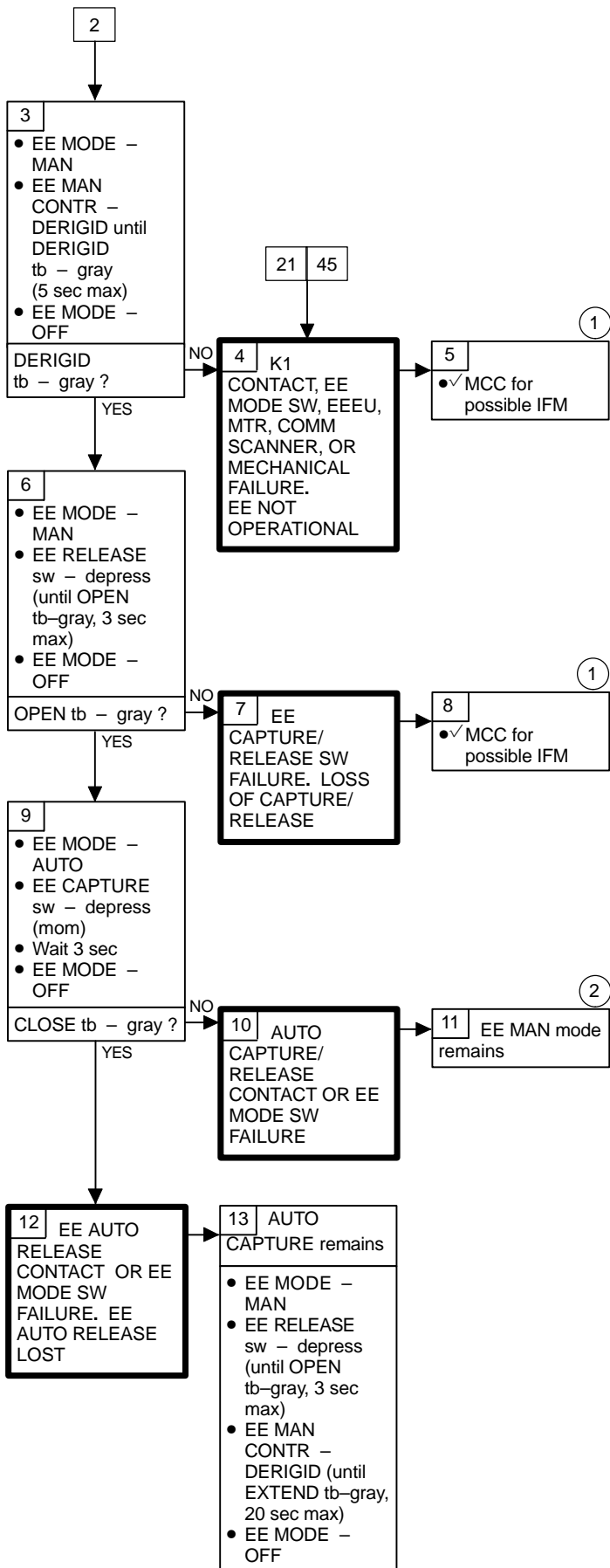
12.3b EE FAILS TO RELEASE/DERIGIDIZE IN AUTO

EE Fails to Derigidize or Release in AUTO

Nominal Config:
DAP: VERN(FREE)
(A8U)
SAFING tb - gray

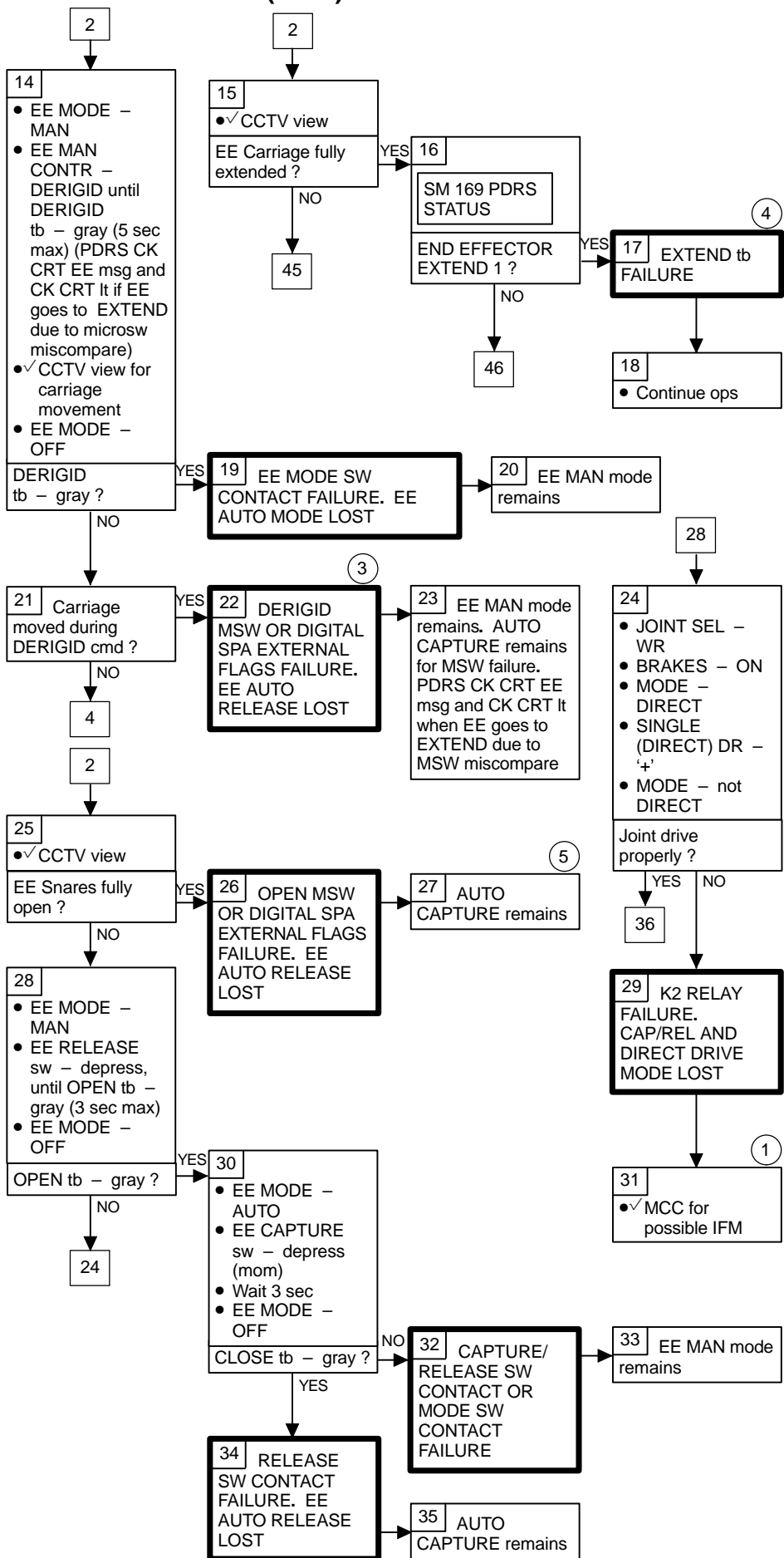


PDRS 12.3b (Cont)



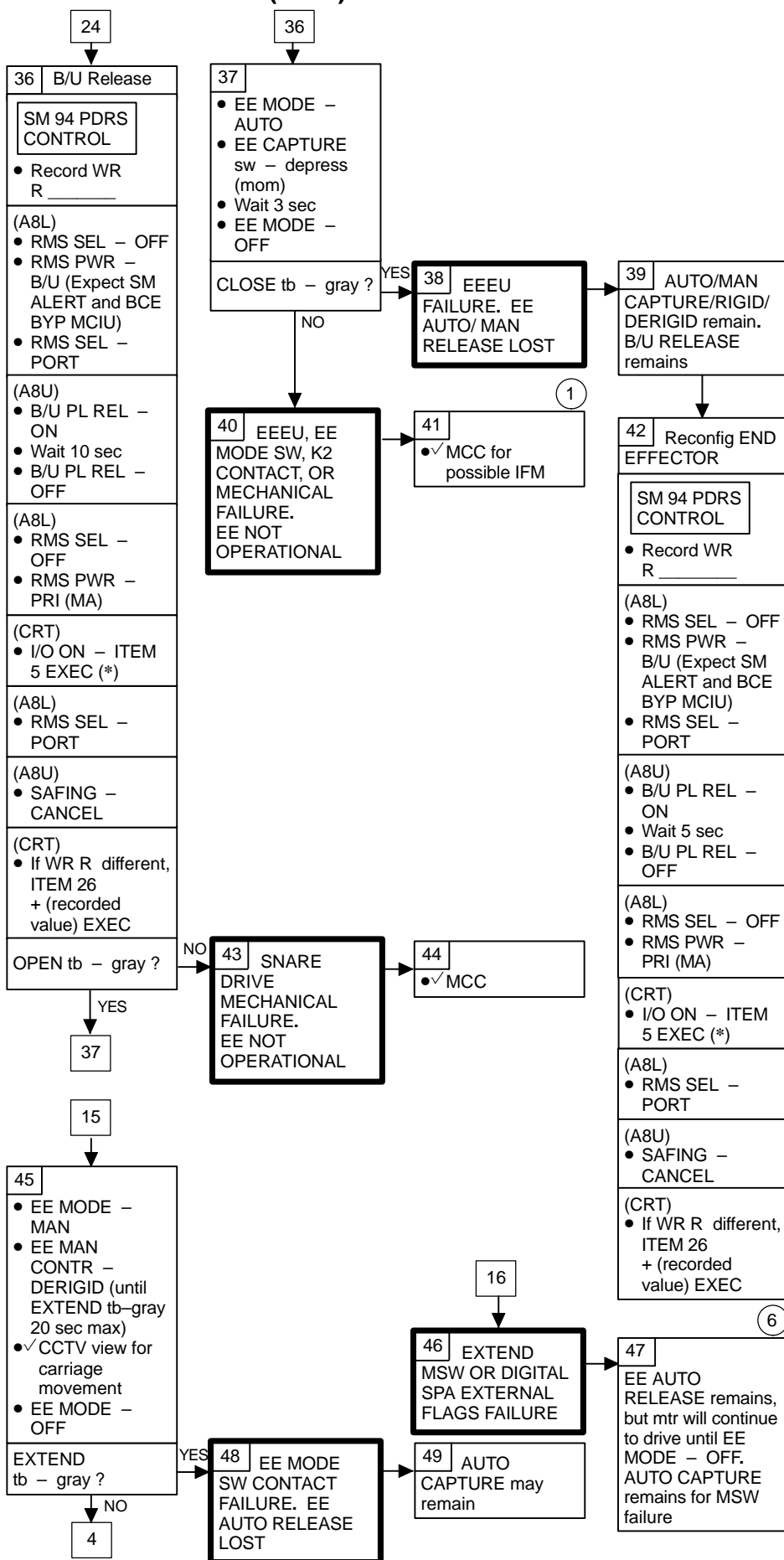
- ① RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT
- ② Limping will not occur in EE MANUAL for AUTO CAPTURE contact failure

PDRS 12.3b (Cont)



- ① RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT
- ③ For digital SPA, CLOSE flag may be failed ON
- ④ For future EE OPS, use SM 94 PDRS CONTROL or SM 169 PDRS STATUS to determine status of affected EE tb
- ⑤ For digital SPA failure, RIGID flag may be failed OFF causing loss of loaded rates and motor to continue to drive until EE MODE - OFF during AUTO CAPTURE. Loaded rates can be set via SM 95 PDRS OVERRIDE

PDRS 12.3b (Cont)



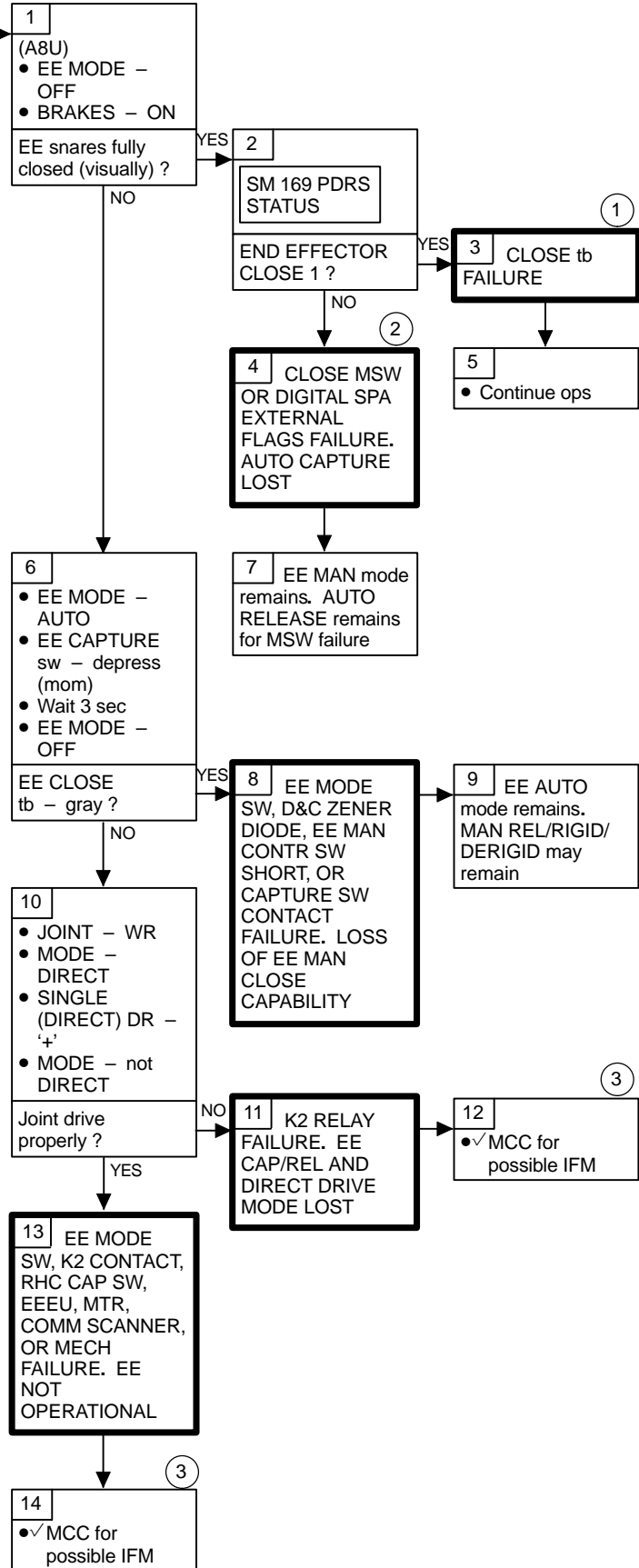
- ① RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT
- ⑥ For digital SPA failure CAPTURE flag may be failed OFF

PDRS

12.3c EE FAILS TO CLOSE IN EE MODE – MAN (EE C/O ONLY)

EE Fails To Close in EE Mode – Man

Nominal Config:
 DAP: VERN(FREE) (A8U)
 SAFING tb – gray



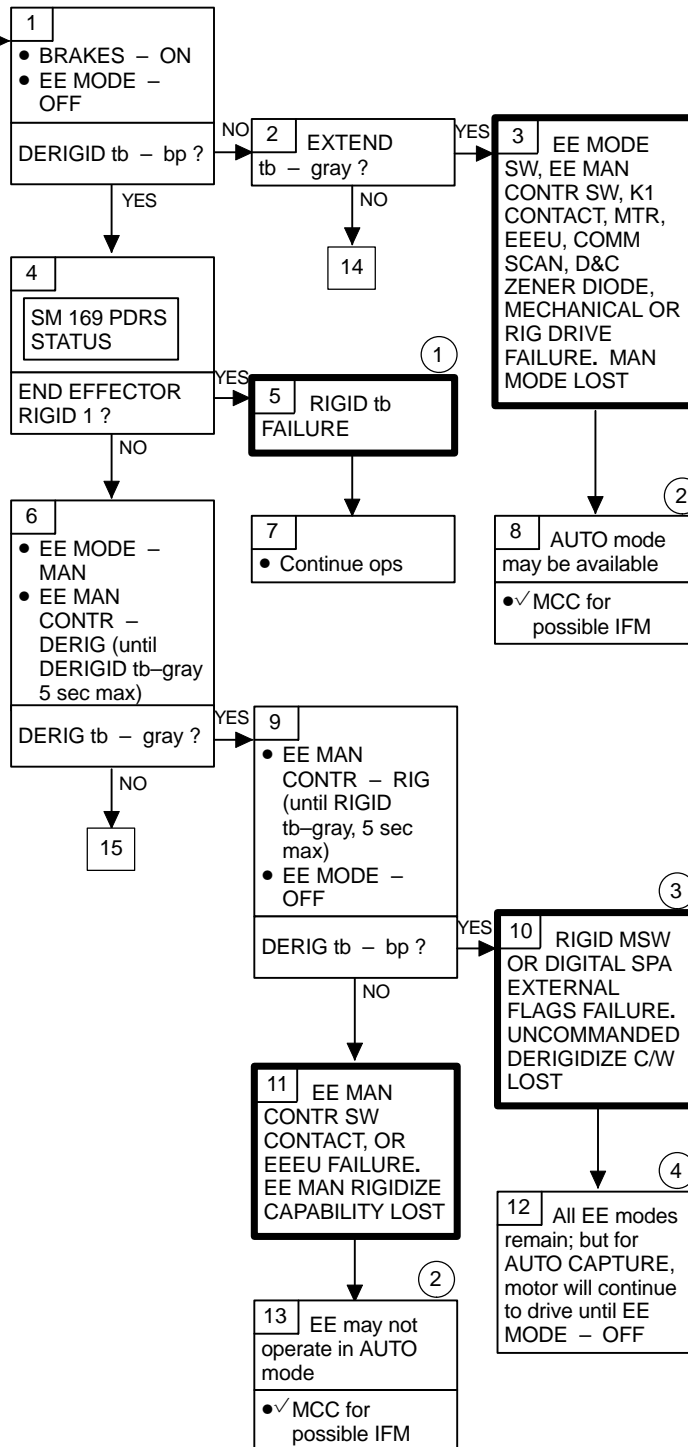
- ① For future EE OPS, use SM 94 PDRS CONTROL or SM 169 PDRS STATUS to determine status of affected EE tb
- ② For digital SPA failure, DERIG flag may be failed ON
- ③ RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC capture/release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

PDRS

12.3d EE FAILS TO RIGIDIZE IN EE MODE – MAN (EE CHECKOUT ONLY)

EE Failed to Rigidize in Manual (Rigid tb-bp)

Nominal Config:
 DAP: VERN(FREE)
 (A8U)
 SAFING tb – gray



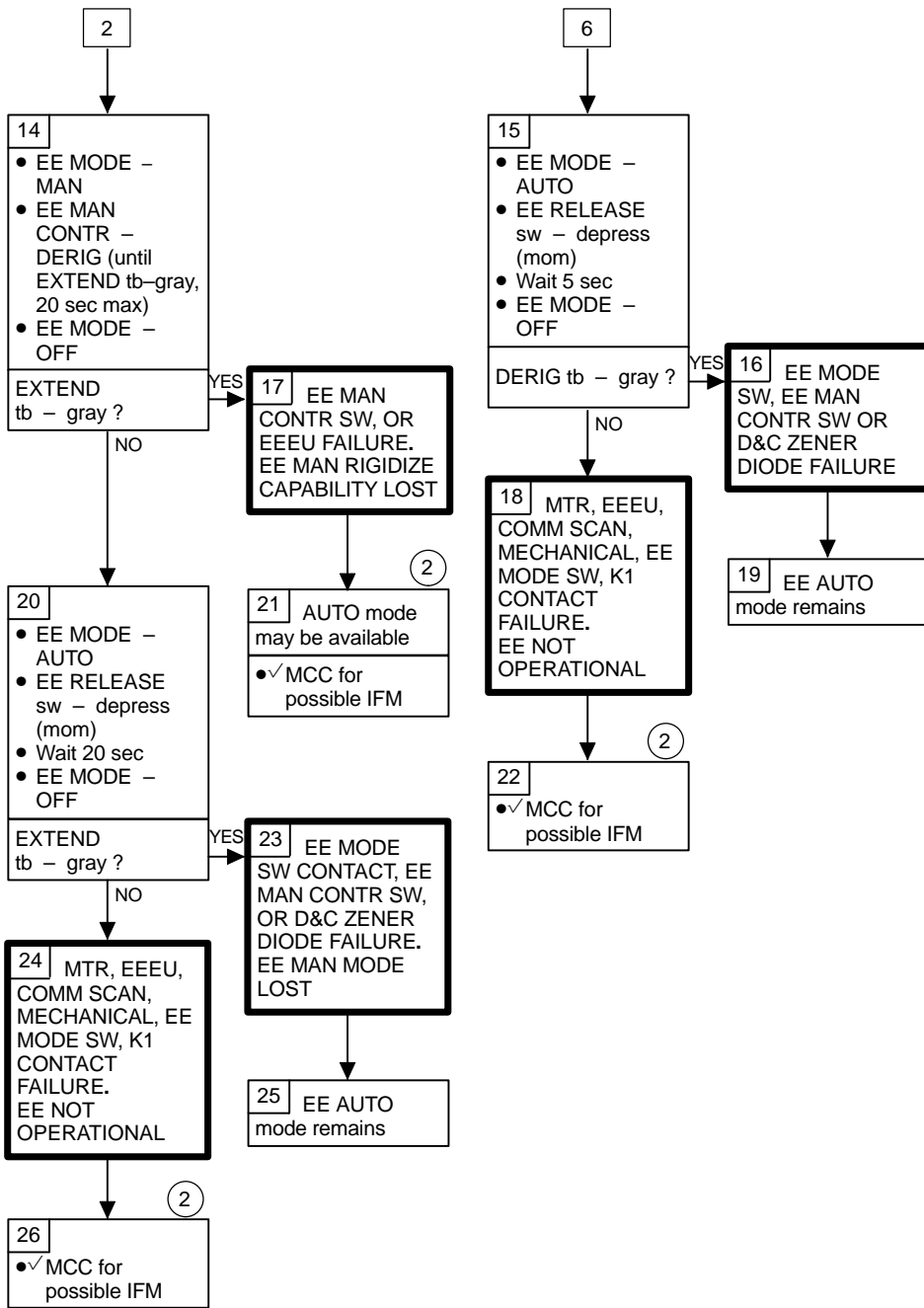
① For future EE OPS, use SM 94 PDRS CONTROL or SM 169 PDRS STATUS to determine status of affected EE tb

② RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC capture/release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

③ For digital SPA failure, OPEN flag may be failed OFF causing motor to continue to drive snares open during AUTO REL until EE MODE – OFF

④ Arm will move at unloaded rates. RMS loaded rates can be set via SM 95 PDRS OVERRIDE

PDRS 12.3d (Cont)



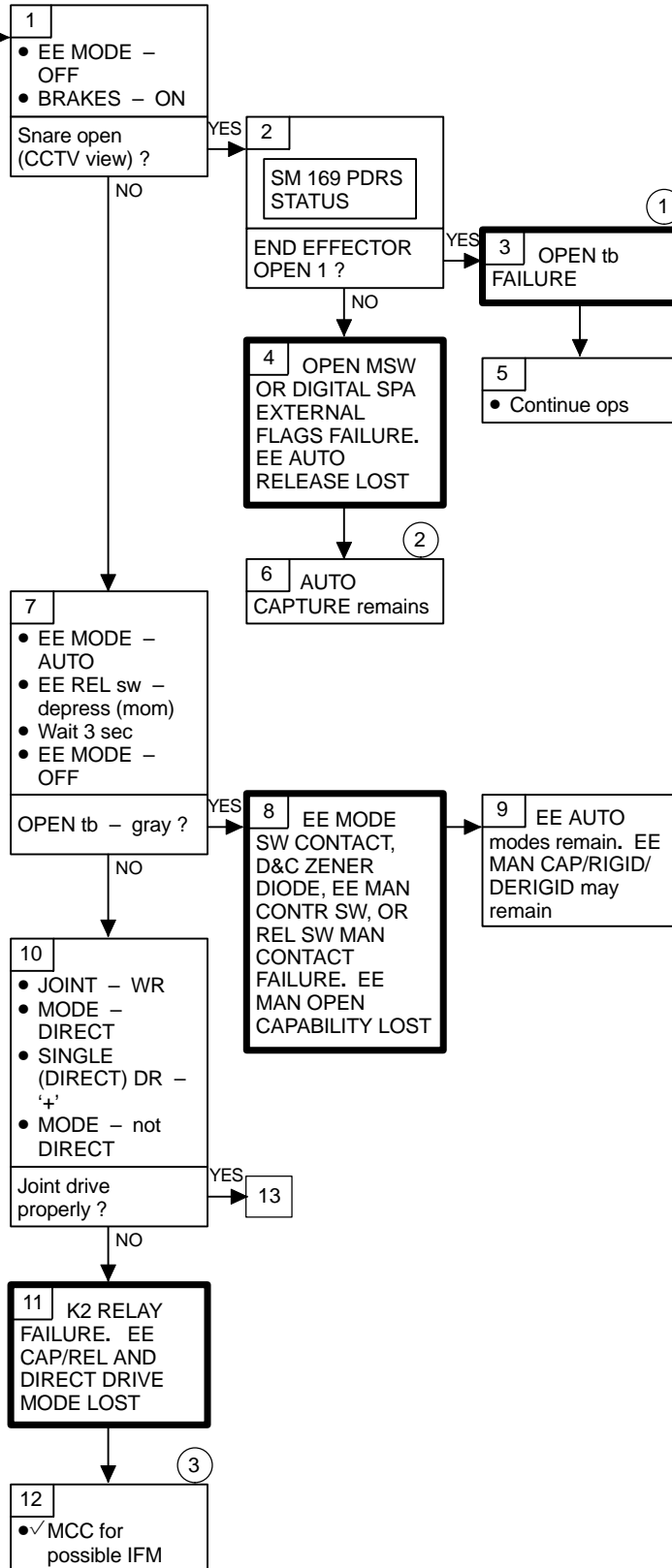
② RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC capture/release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

PDRS

12.3e EE FAILS TO RELEASE IN EE MODE – MAN

EE OPEN
tb – bp

Nominal Config:
DAP: VERN(FREE)
(A8U)
SAFING tb – gray

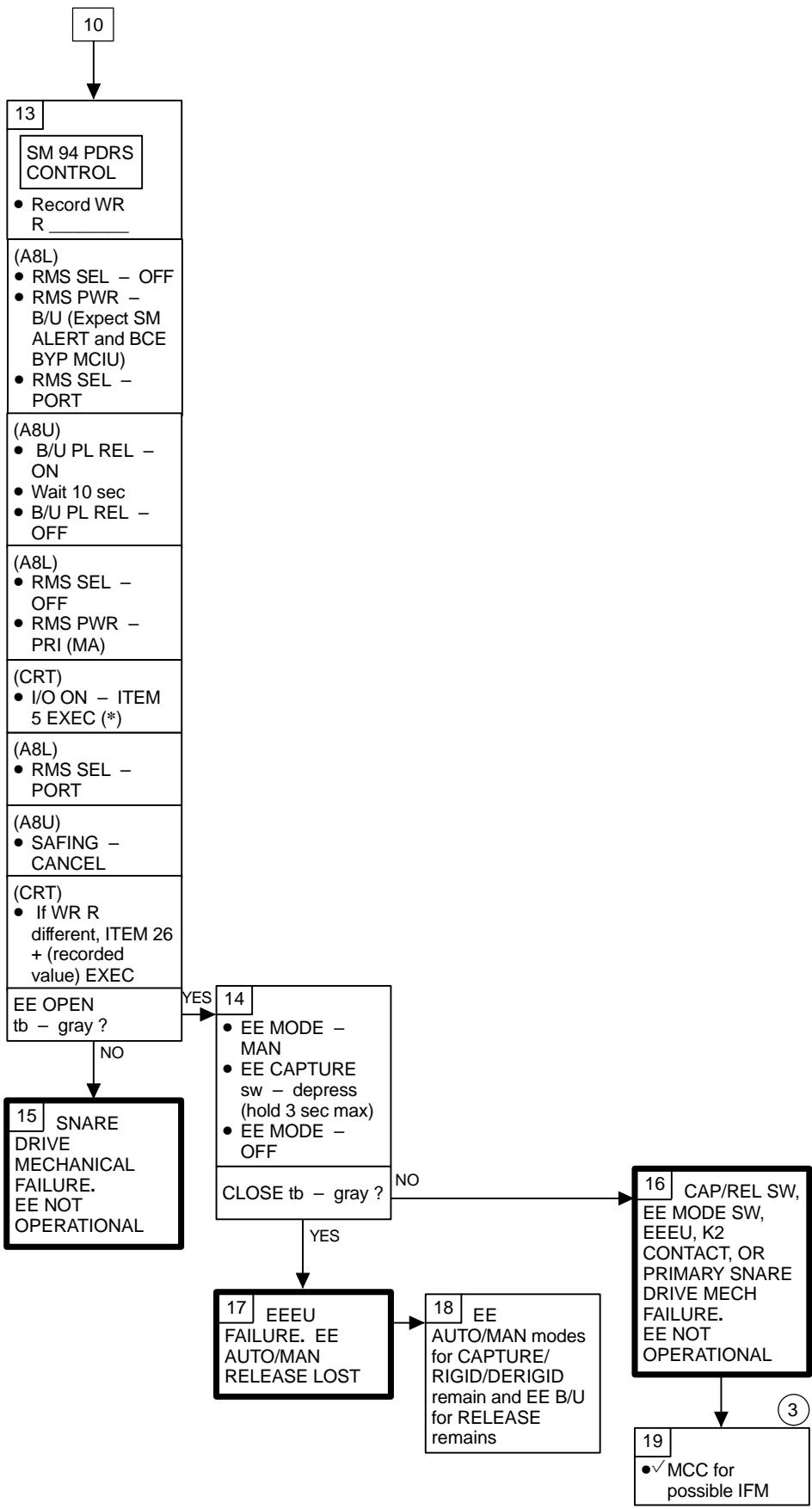


① For future EE OPS, use SM 94 PDRS CONTROL or SM 169 PDRS STATUS to determine status of affected EE tb

② For digital SPA failure, RIGID flag may be failed OFF causing loss of loaded rates and motor to continue to drive until EE MODE – OFF during AUTO capture. Loaded rates can be set via SM 95 PDRS OVERRIDE

③ RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC capture/release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

PDRS 12.3e (Cont)



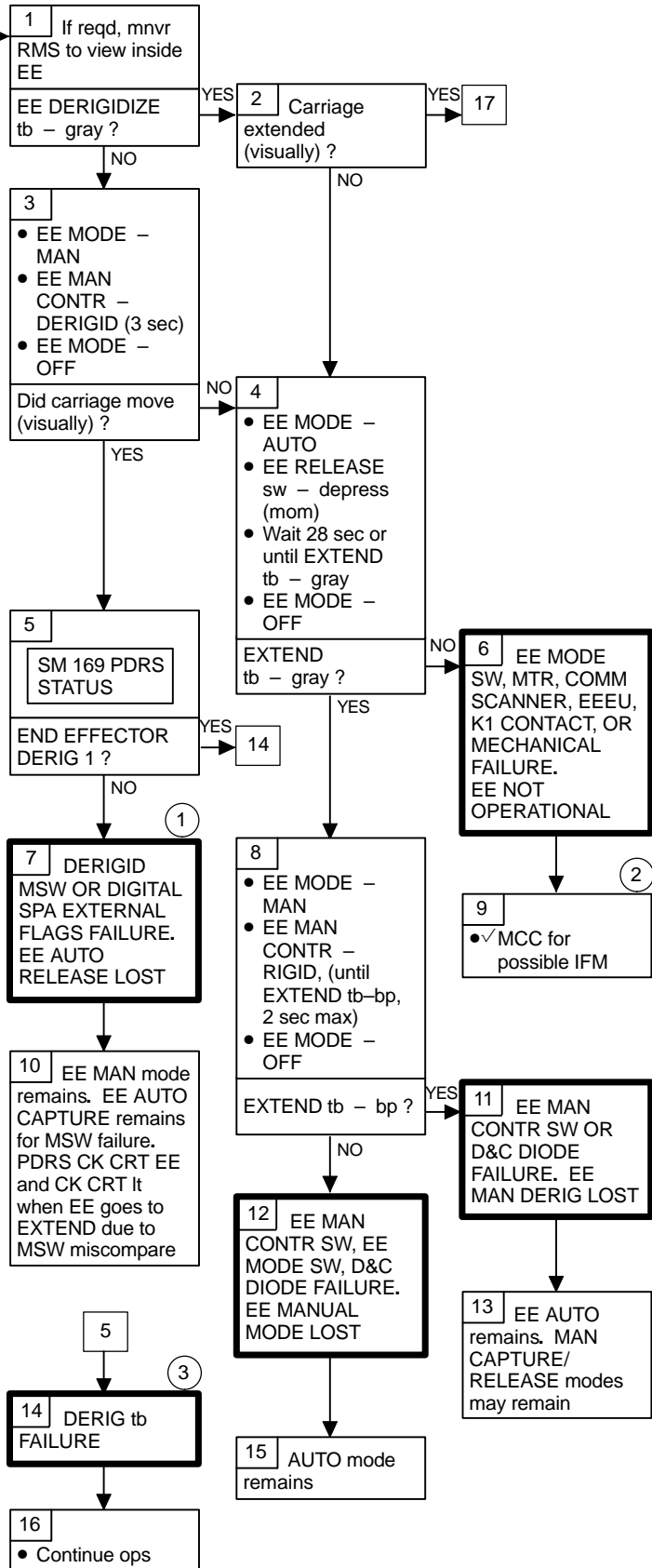
③ RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

PDRS

12.3f EE FAILS TO DERIGIDIZE/EXTEND IN MANUAL

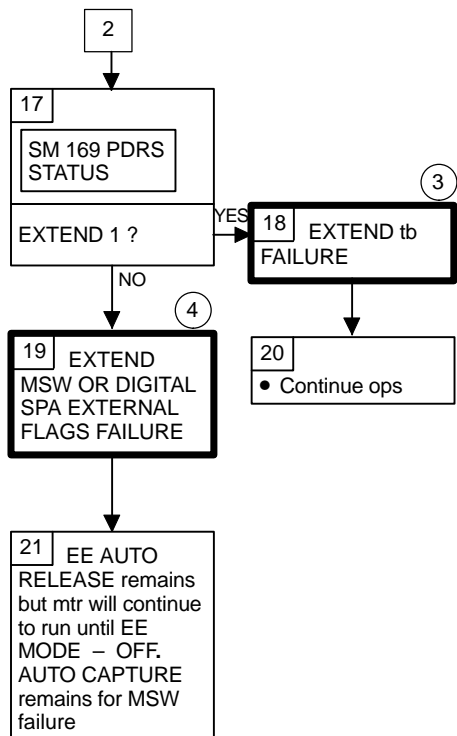
EE Fails to Derigidize in Manual, DERIGID tb - bp, or EXTEND - bp

Nominal Config:
 EE MODE - MAN
 DAP: VERN(FREE) (A8U)
 SAFING tb - gray



- ① For digital SPA failure, CLOSE flag may be failed ON
- ② RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC capture/release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT
- ③ For future EE OPS, use SM 94 PDRS CONTROL or SM 169 PDRS STATUS to determine status of affected EE tb

PDRS 12.3f (Cont)



③ For future EE OPS, use SM 94 PDRS CONTROL or SM 169 PDRS STATUS to determine status of affected EE tb

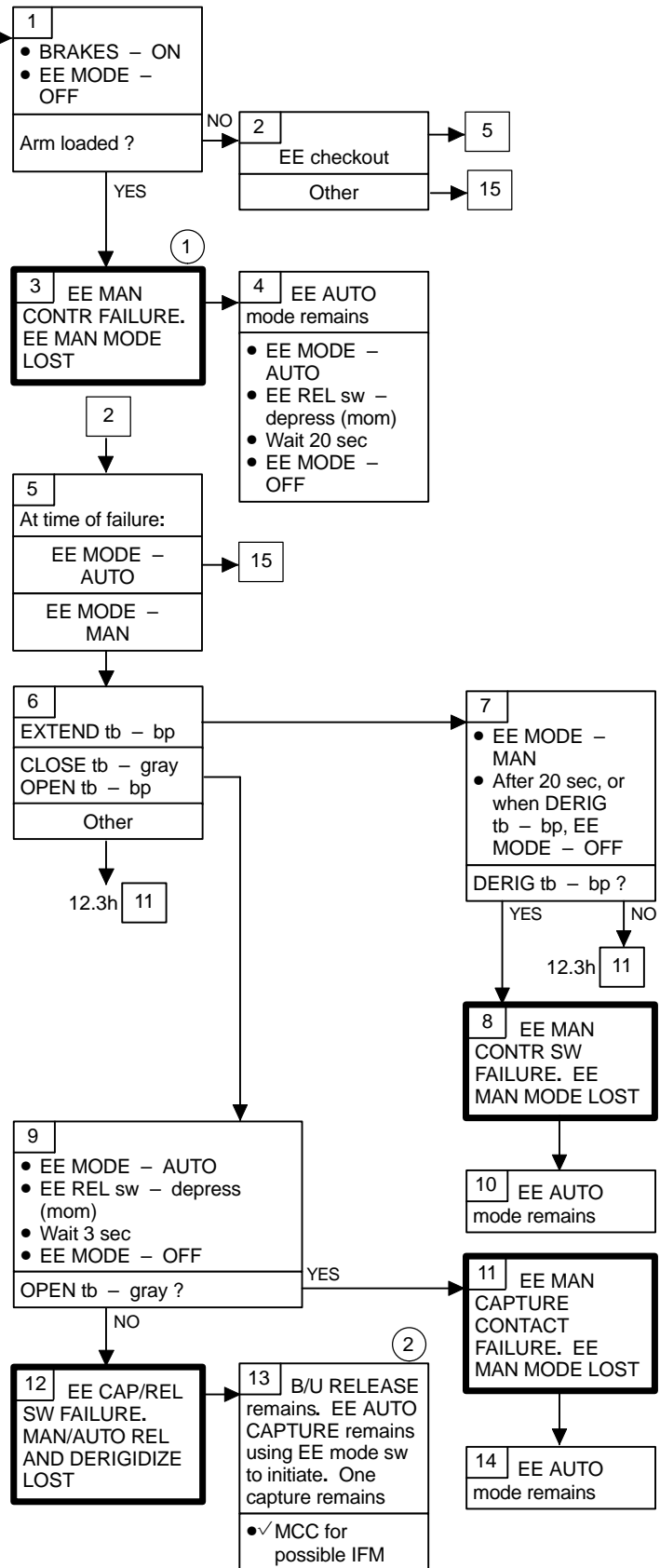
④ For digital SPA failure, CAPTURE flag may be failed OFF

PDRS

**12.3g EE tb ABNORMAL WHILE NO EE CMDS
(EE MODE - AUTO OR MAN)**

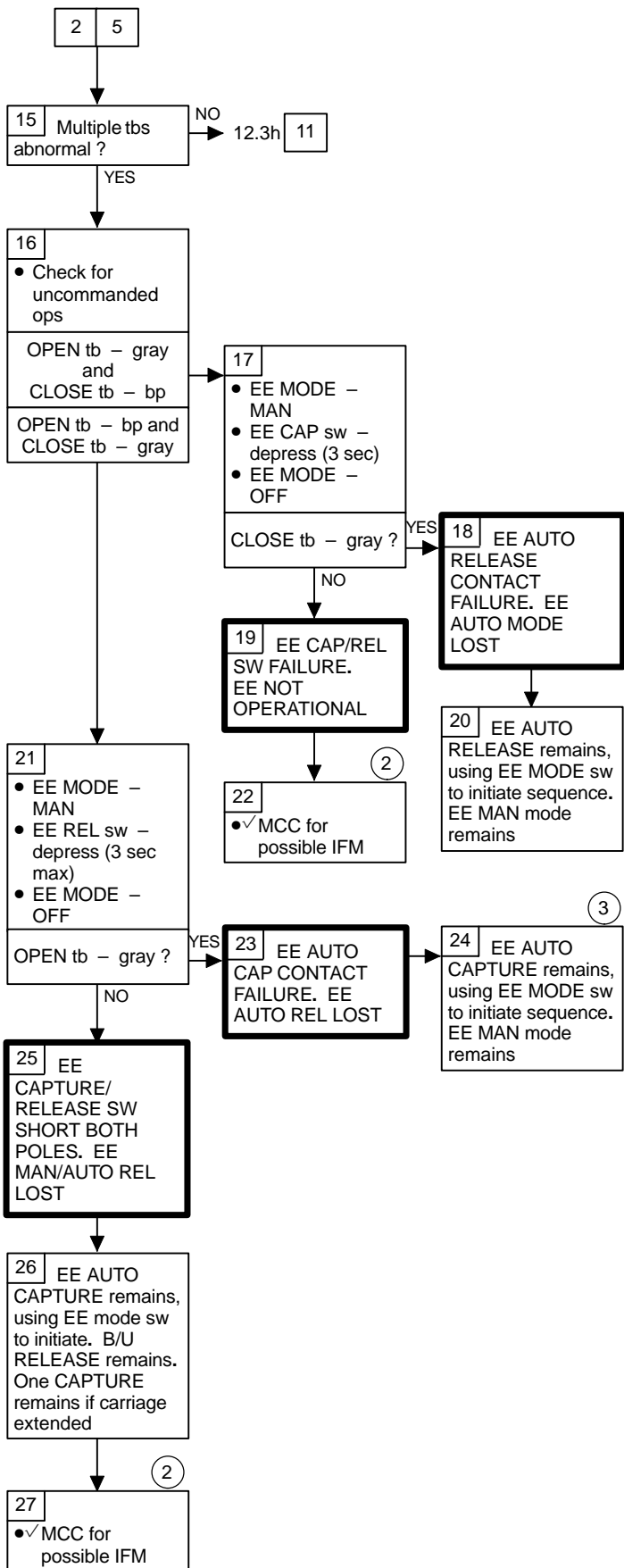
EE tb
Abnormal
While No EE
Commands

Nominal Config:
DAP: VERN(FREE)



- ① Assumes PL about to be released
- ② RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

PDRS 12.3g (Cont)



② RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

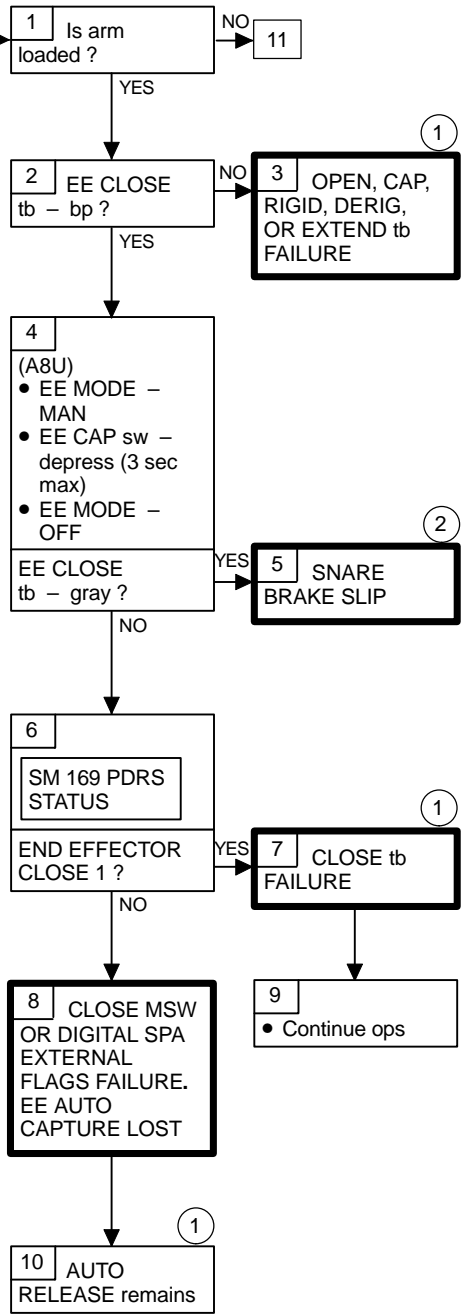
③ RMS limping will occur whenever EE MODE sw is not in OFF position and RMS is in computer supported mode

PDRS

12.3h EE tb ABNORMAL WHILE EE MODE OFF

EE tb
Abnormal
While EE
MODE - OFF

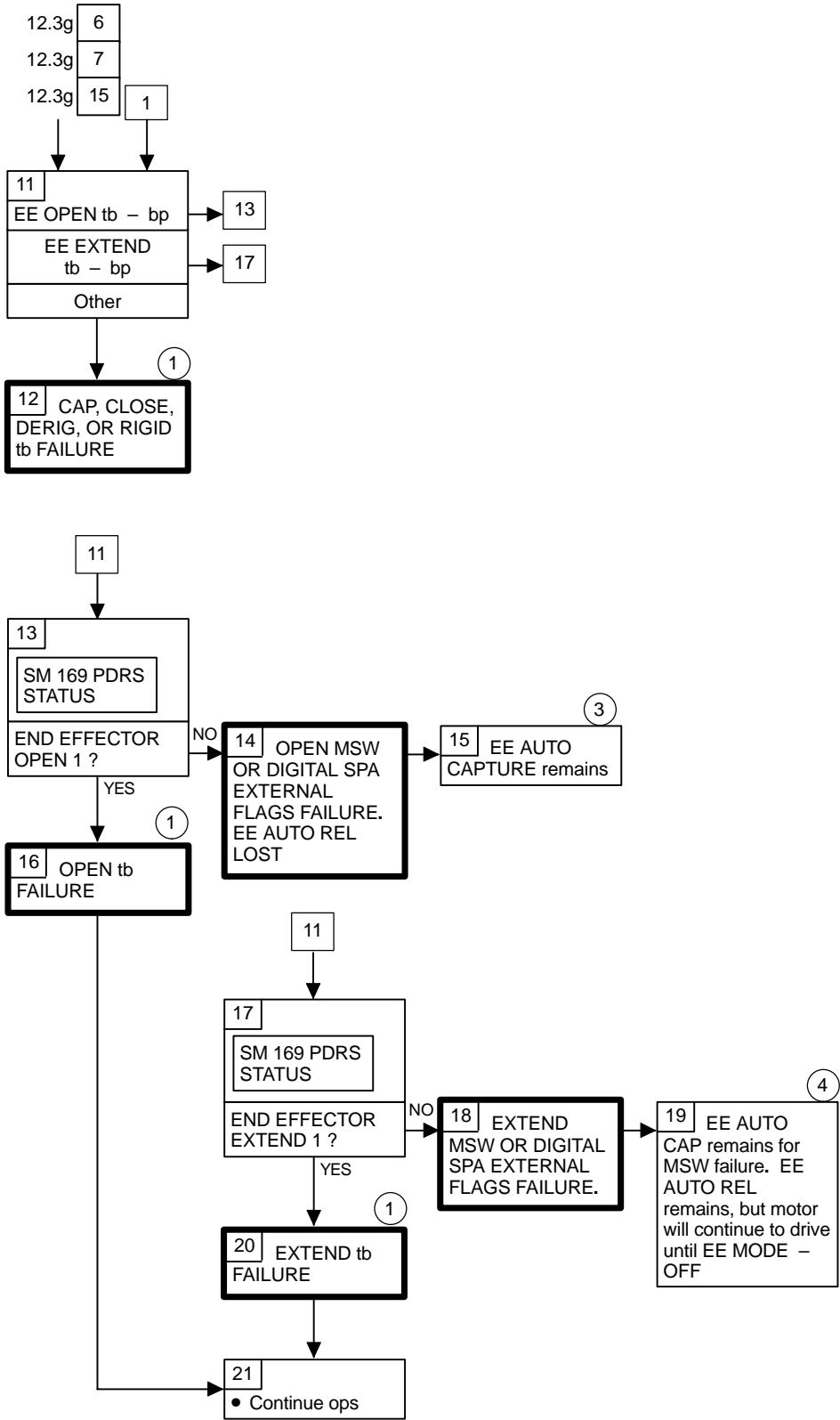
Nominal Config:
DAP: VERN(FREE)



① For future EE OPS, use SM 94 PDRS CONTROL or SM 169 PDRS STATUS to determine status of affected EE tb

② Subsequent slipping may occur

PDRS 12.3h (Cont)

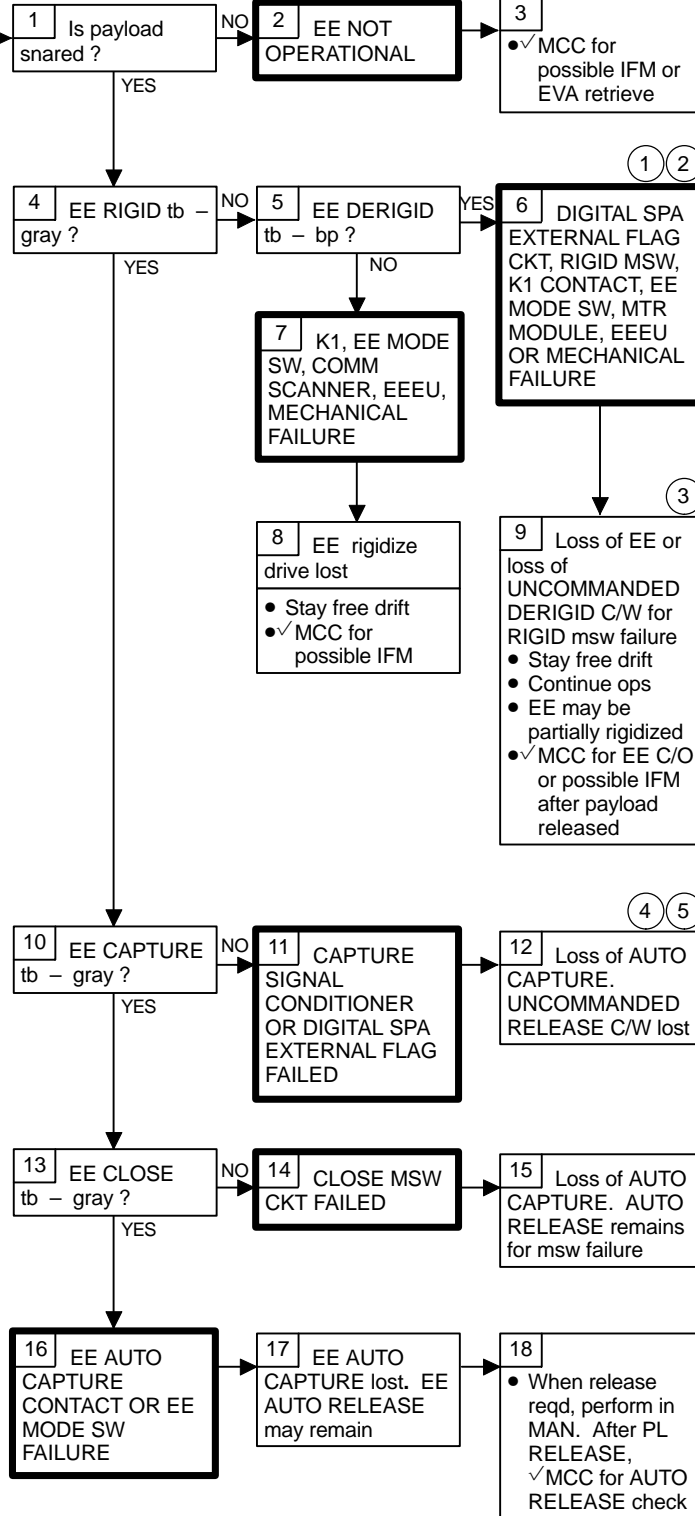


- ① For future EE OPS, use SM 94 PDRS CONTROL or SM 169 PDRS STATUS to determine status of affected EE tb
- ③ For digital SPA failure, RIGID flag may be failed OFF causing loss of loaded rates and motor to continue to drive until EE MODE - OFF during AUTO CAPTURE. Loaded rates can be sent via SM 95 PDRS OVERRIDE
- ④ For digital SPA failure, CAPTURE flag may be failed OFF

12.3i CAPTURE SEQ ABORTED
(CUE CARD EXECUTED)

If EE Fails to Capture and/or Rigidize in AUTO

Nominal Config:
SAFING tb – gray



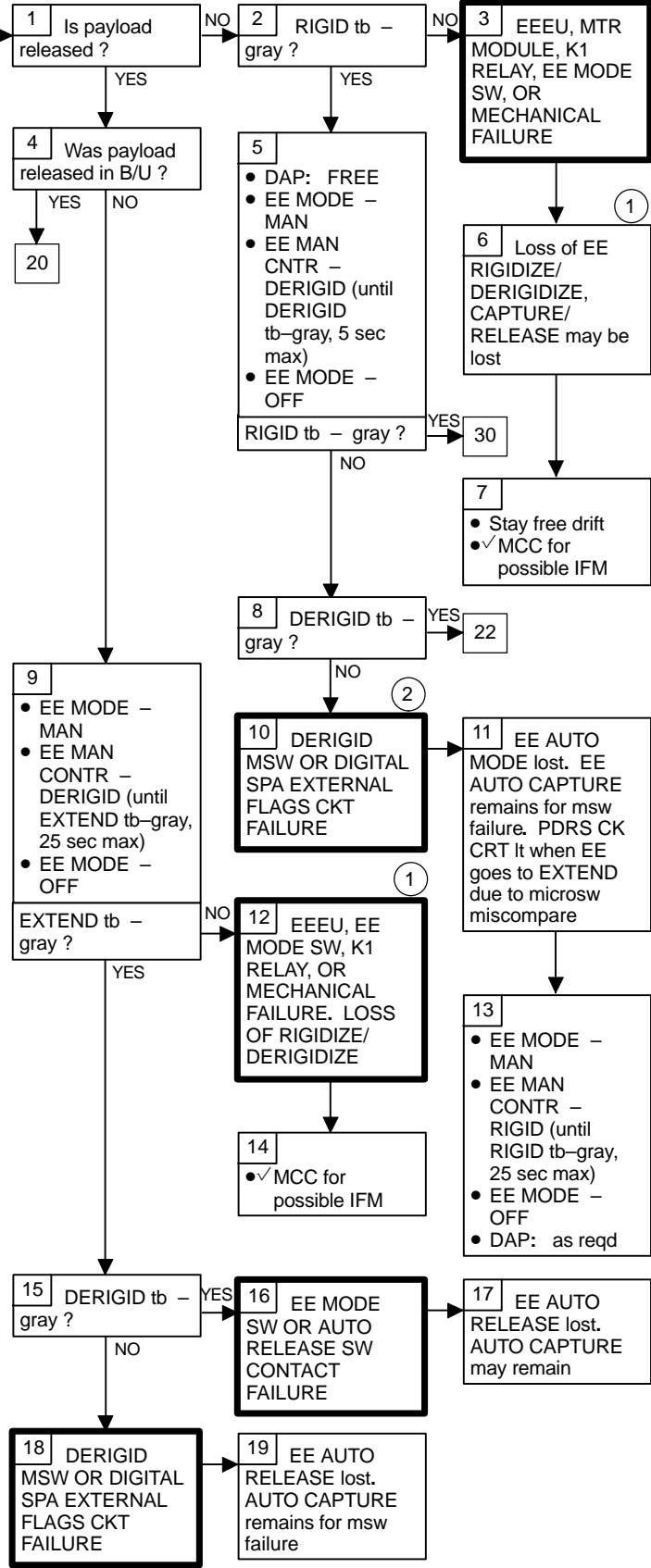
- ① Arm will move at unloaded rates. RMS loaded rates can be set via SM 95 PDRS OVERRIDE
- ② For digital SPA failure, OPEN flag may be failed off
- ③ RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT
- ④ Arm will move at unloaded rates. RMS loaded rates can be set via SM 95 PDRS OVERRIDE
- ⑤ For digital SPA failure, EXTEND flag may be failed off causing motor to continue to drive until EE MODE – OFF during AUTO RELEASE

PDRS

**12.3j NO AUTO RELEASE
(CUE CARD EXECUTED)**

EE Fails to Derigidize or Release in AUTO

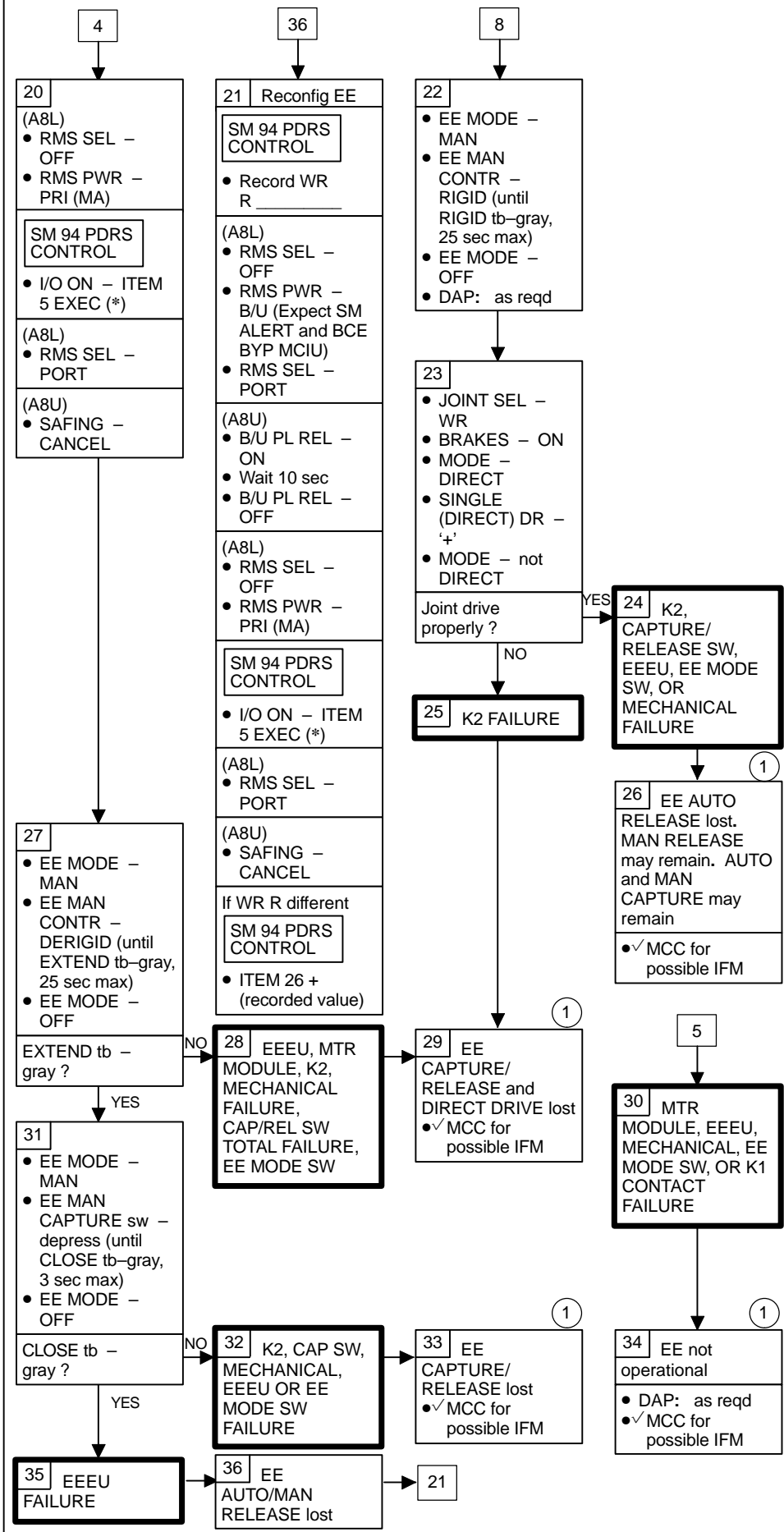
Nominal Config:
SAFING tb – gray



① RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

② For digital SPA, CLOSE flag may be failed ON

PDRS 12.3j (Cont)

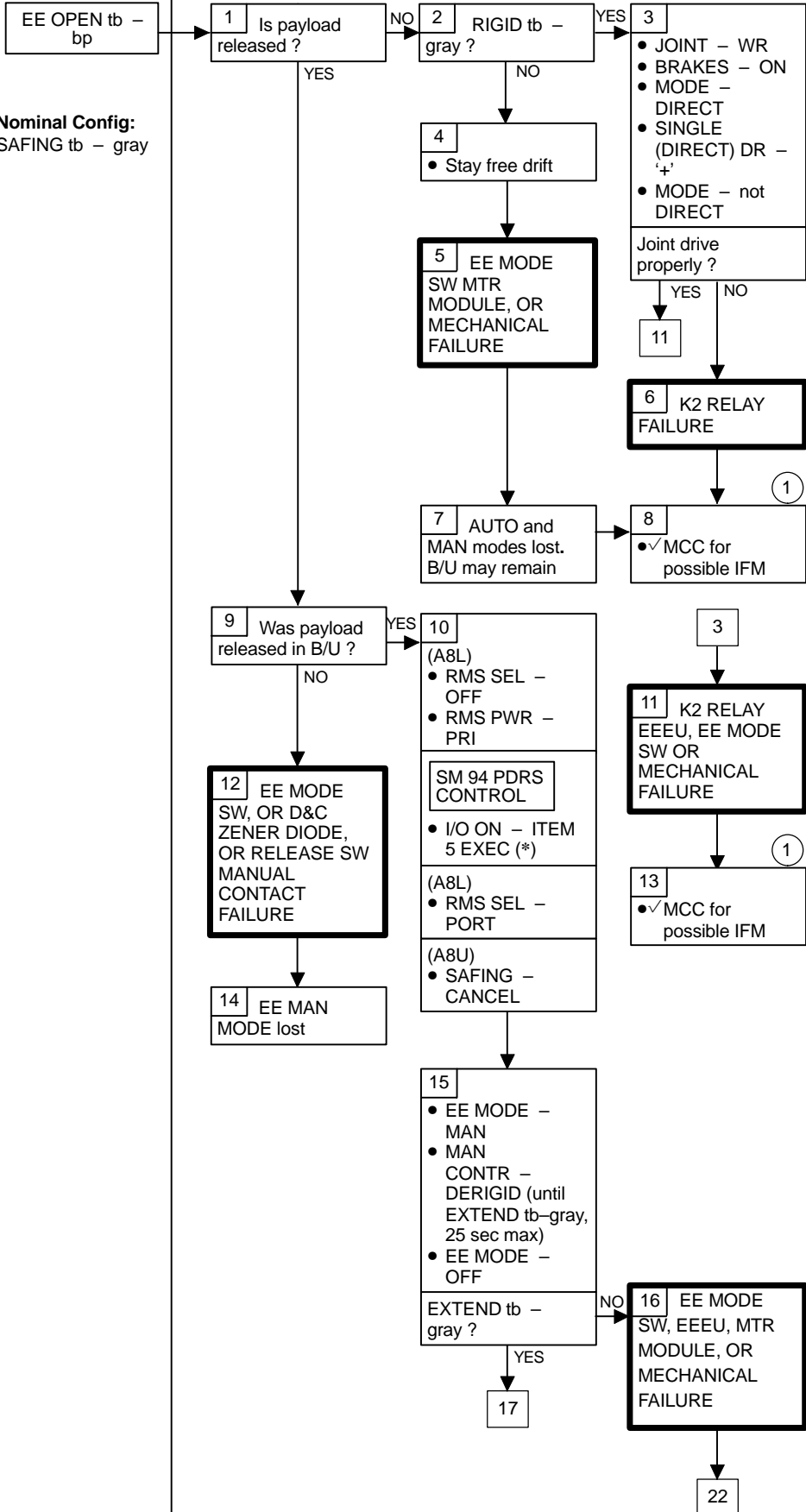


① RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

PDRS

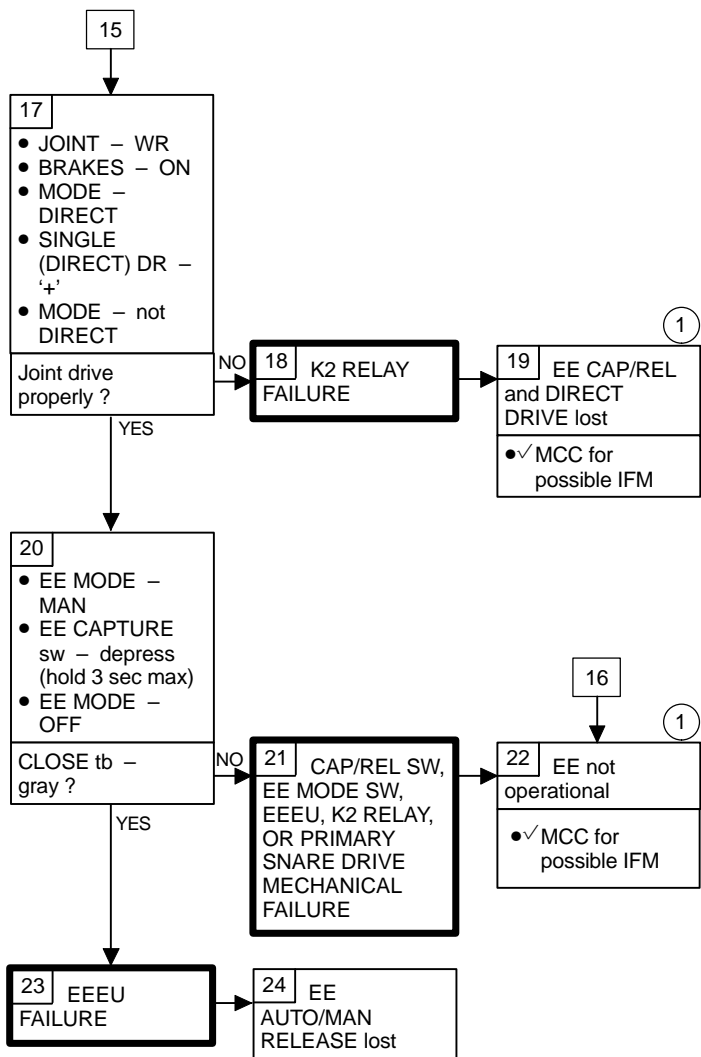
**12.3k NO MANUAL RELEASE
(CUE CARD EXECUTED)**

Nominal Config:
SAFING tb – gray



① RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

PDRS 12.3k (Cont)



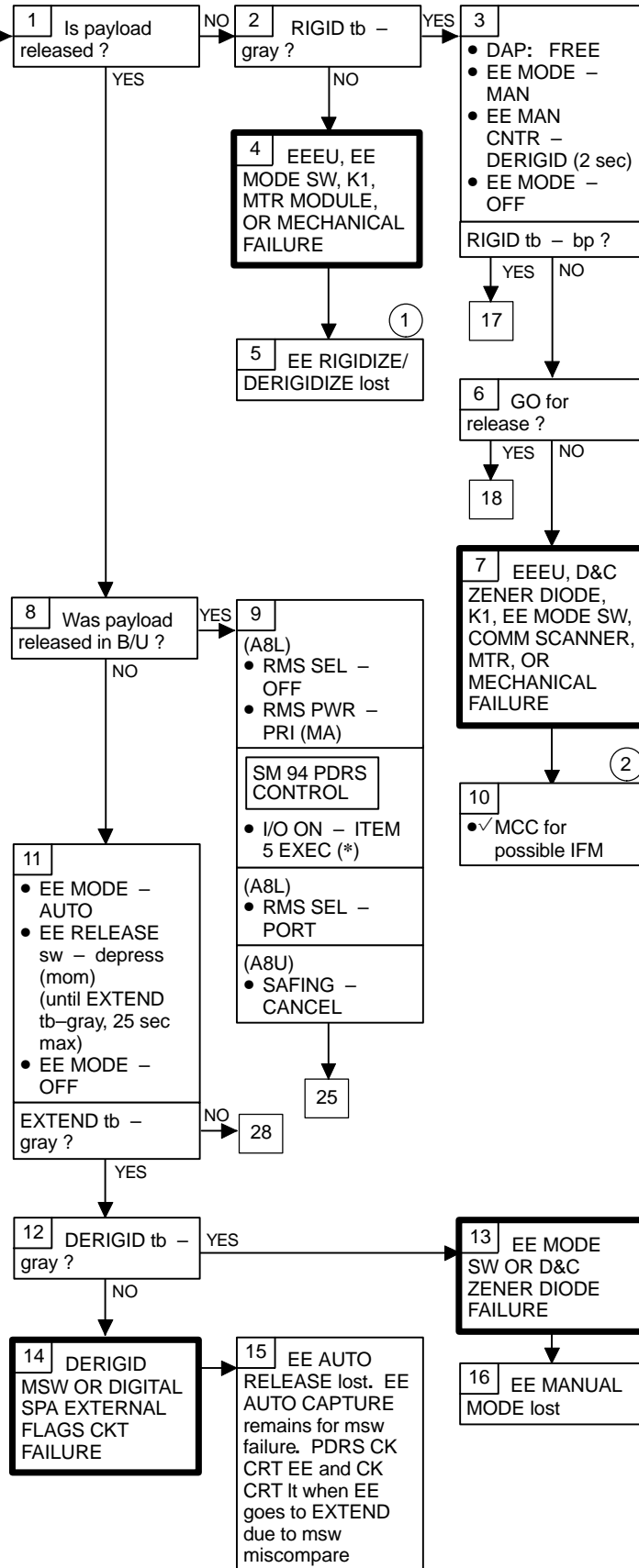
① RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

PDRS

**12.3I NO MANUAL DERIGID
(CUE CARD EXECUTED)**

EE Fails to Derigidize in Manual, DERIGID tb – bp or EXTEND – bp

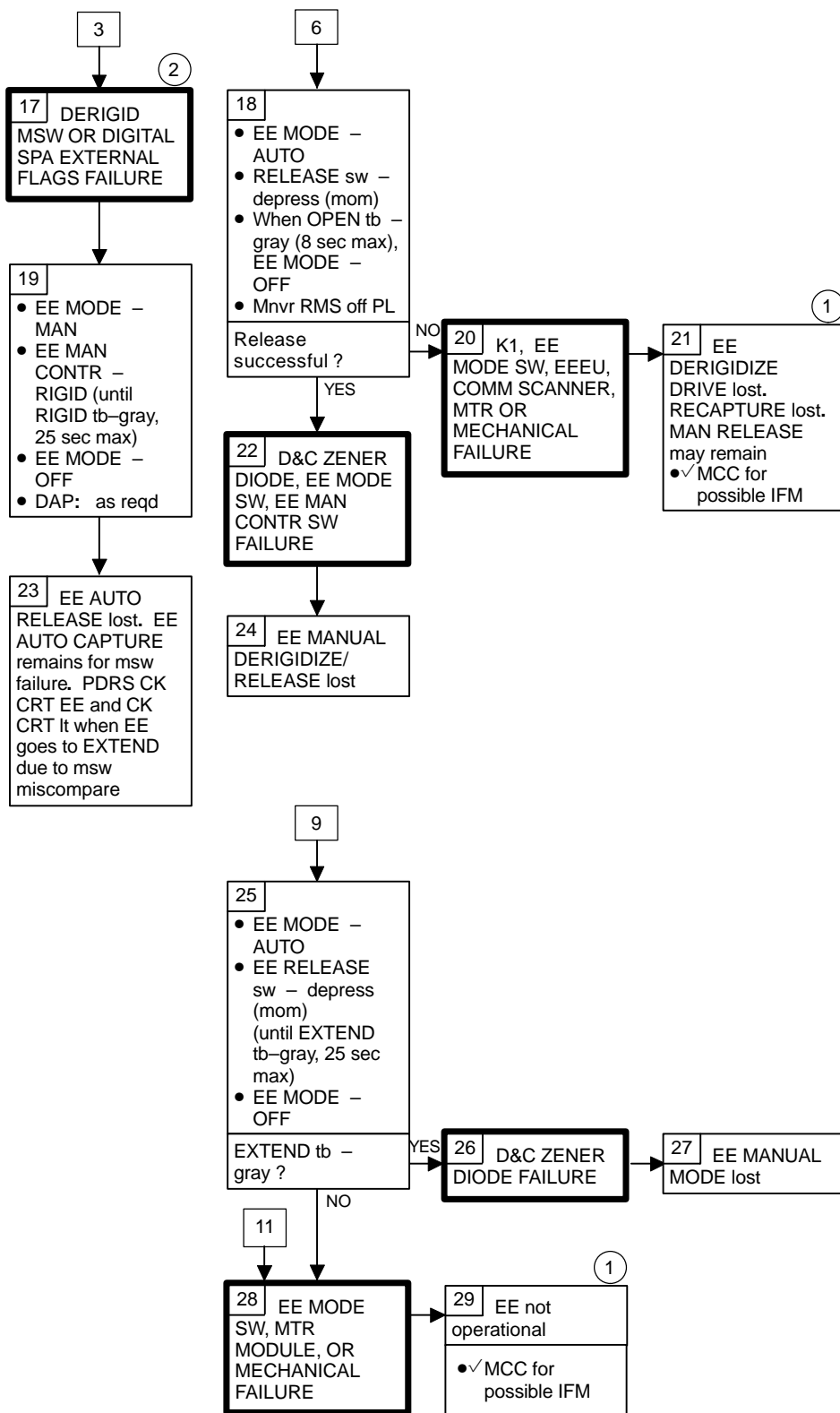
Nominal Config:
SAFING tb – gray



① RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

② For digital SPA, CLOSE flag may be failed ON

PDRS 12.3I (Cont)



① RMS IFM D&C KIT available to recover loss of K1, K2 relay, EE MODE sw, RHC Capture/Release sw, EE MAN CONTR sw. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

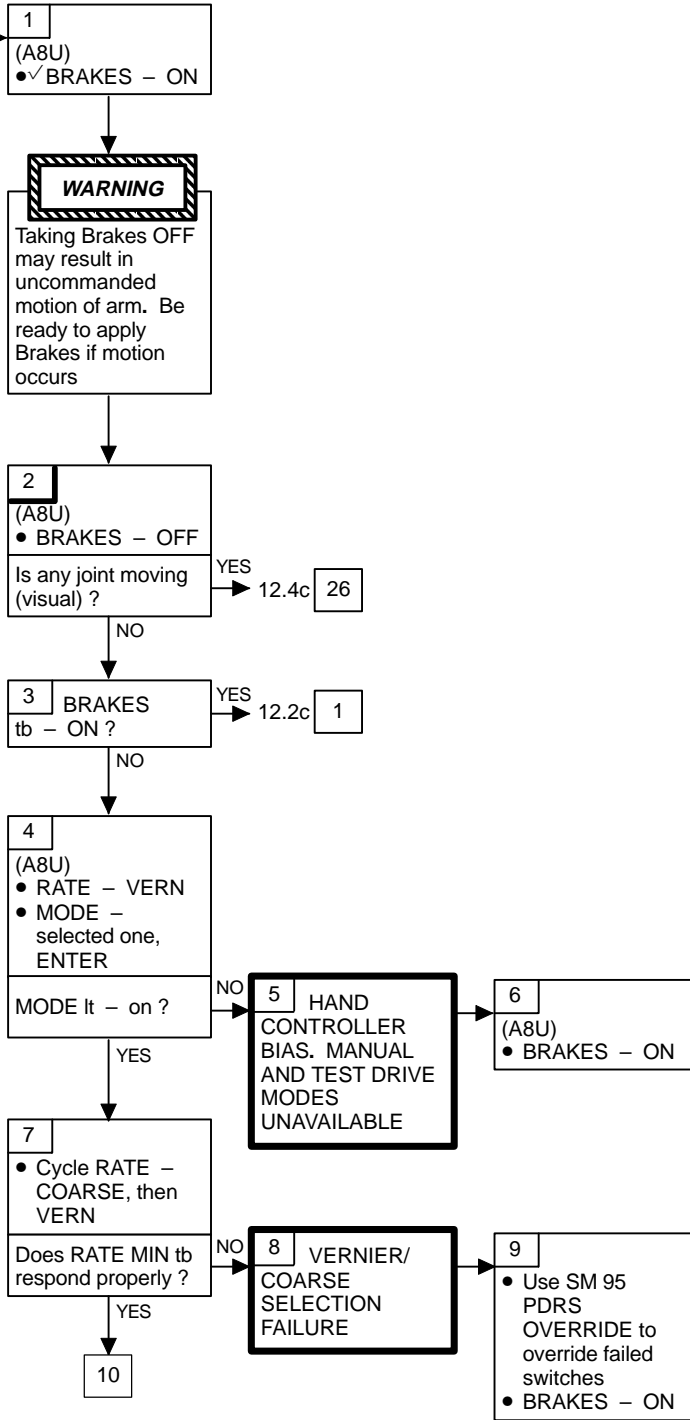
② For digital SPA, CLOSE flag may be failed ON

PDRS

12.4a ARM RESPONSE ABNORMAL IN MANUAL MODES

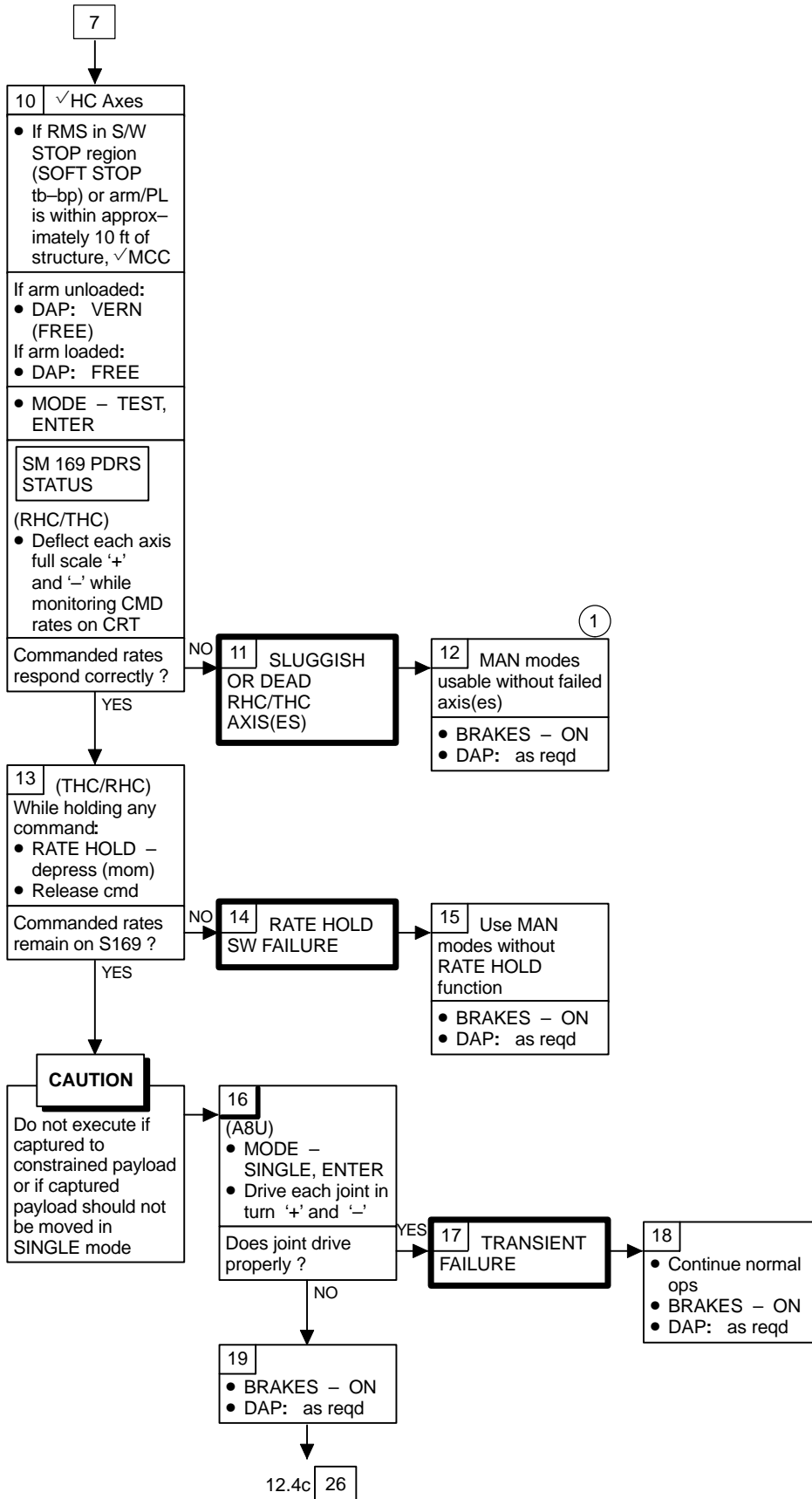
Arm Response Not Normal for Commands in Manual Modes

Nominal Config:
 (A8L)
 RMS PWR – PRI
 SEL – PORT
 (A8U)
 SAFING – AUTO
 SAFING tb – gray
 S/W STOP – gray
 EE MODE – OFF



PDRS 12.4a (Cont)

① Single HC axis failure workaround capability exists via SM 95 PDRS OVERRIDE



PDRS

12.4b ARM RESPONSE ABNORMAL IN AUTO MODES

Arm Response Not Normal for Commands in Auto Modes

Nominal Config:
(A8L)
RMS PWR – PRI
SEL – PORT
(A8U)
SAFING tb – gray
S/W STOP – gray
EE MODE – OFF

1
(A8U)
• ✓ BRAKES – ON

WARNING
Taking Brakes OFF may result in uncommanded motion of arm. Be ready to apply Brakes if motion occurs

2
(A8U)
• BRAKES – OFF
Is any joint moving (visual)?

YES → 12.4c 26

NO

3 BRAKES tb – ON?

YES → 12.2c 1

NO

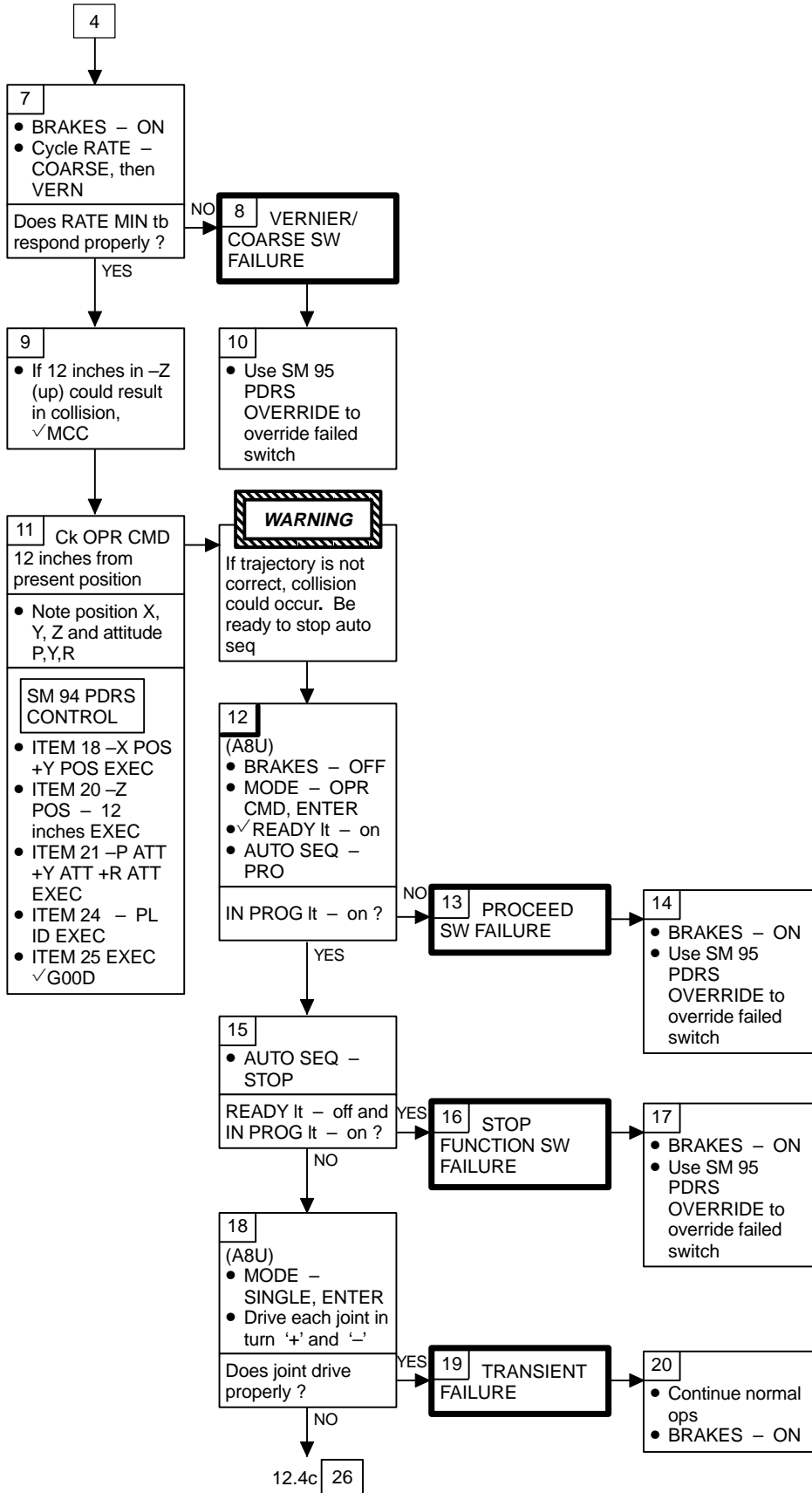
4
(A8U)
• RATE – VERN
• MODE – selected one, ENTER
MODE It – on?

NO → 5 STOP/ PROCEED SW FAILURE

YES → 7

6
(A8U)
• BRAKES – ON
• Use SM 95
PDRS
OVERRIDE to override failed switch

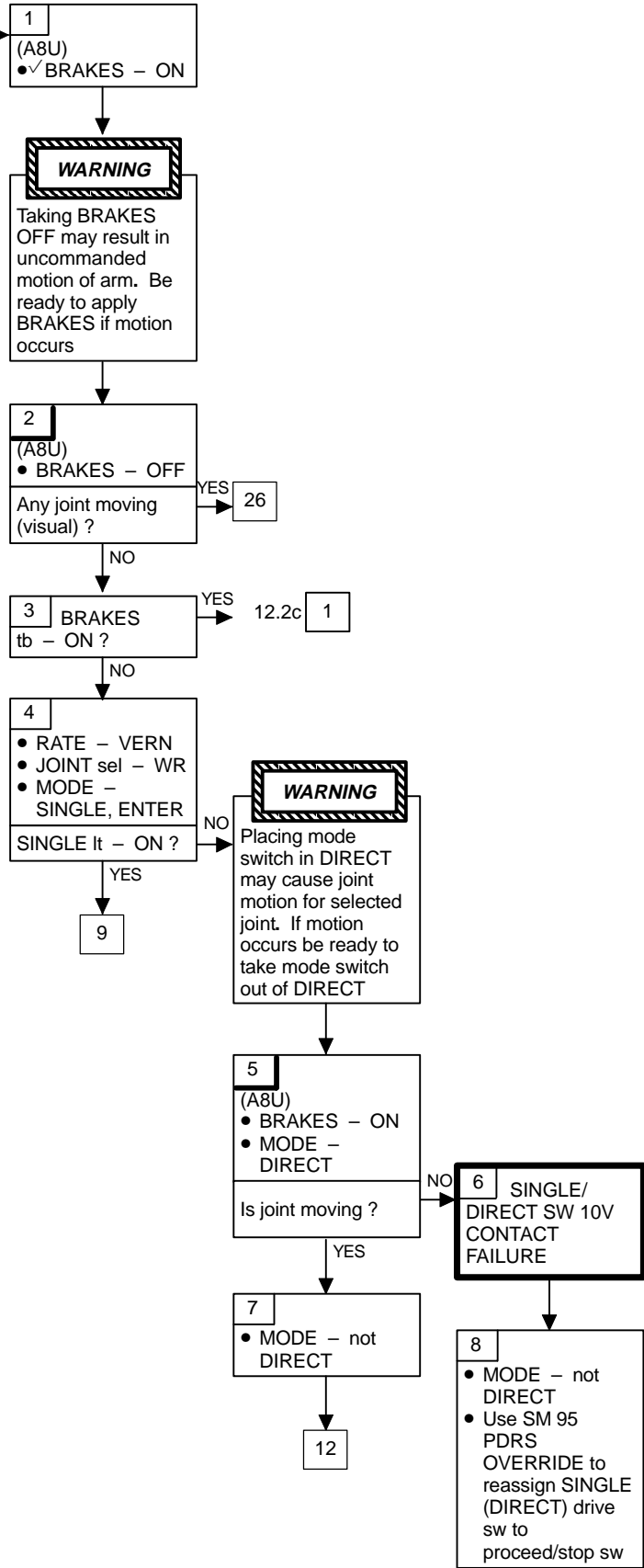
PDRS 12.4b (Cont)



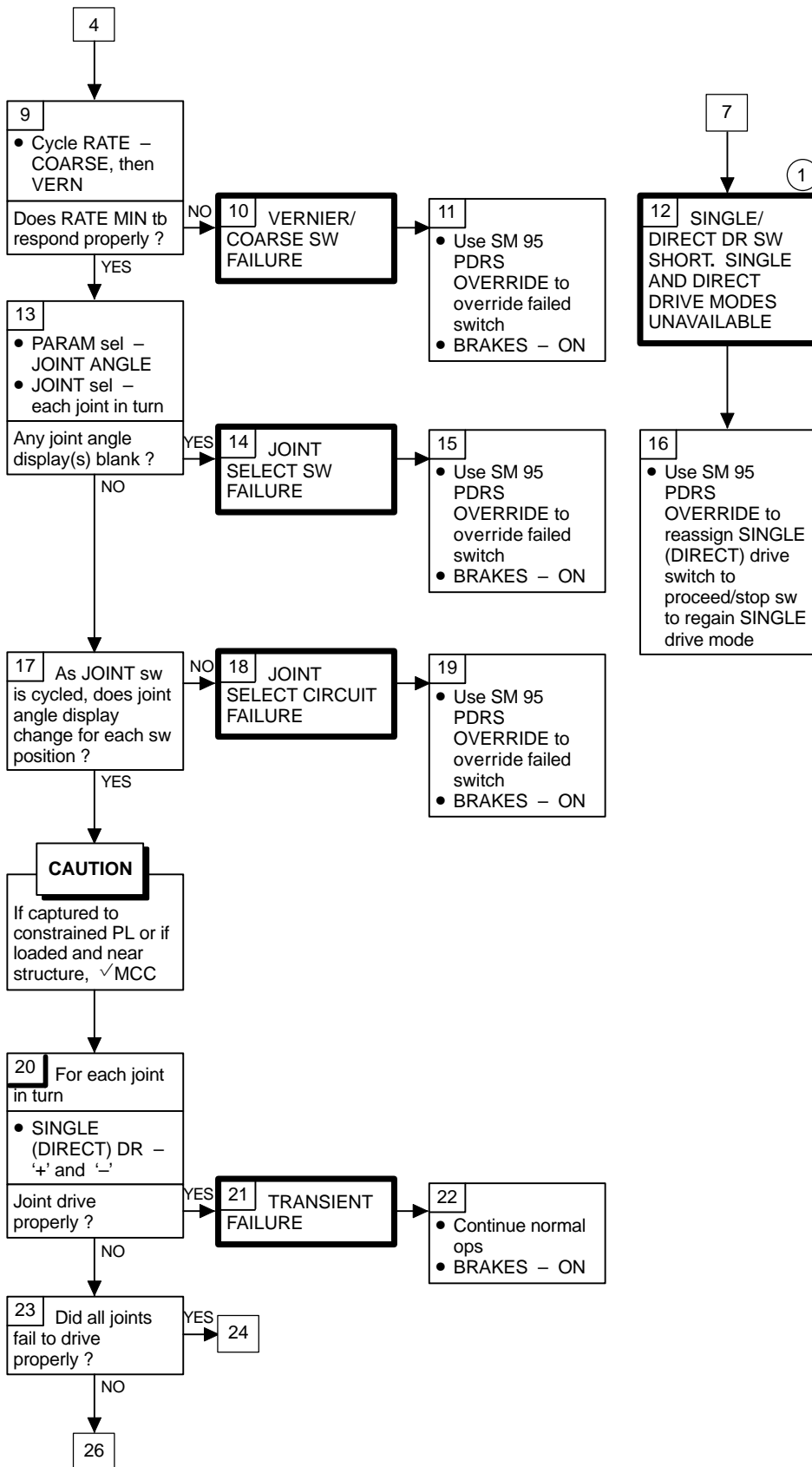
12.4c JOINT RESPONSE ABNORMAL IN SINGLE MODE

Joint Response Not Normal for Commands in Single Mode

Nominal Config:
 (A8L)
 RMS PWR – PRI
 SEL – PORT
 (A8U)
 SAFING tb – gray
 EE MODE – OFF

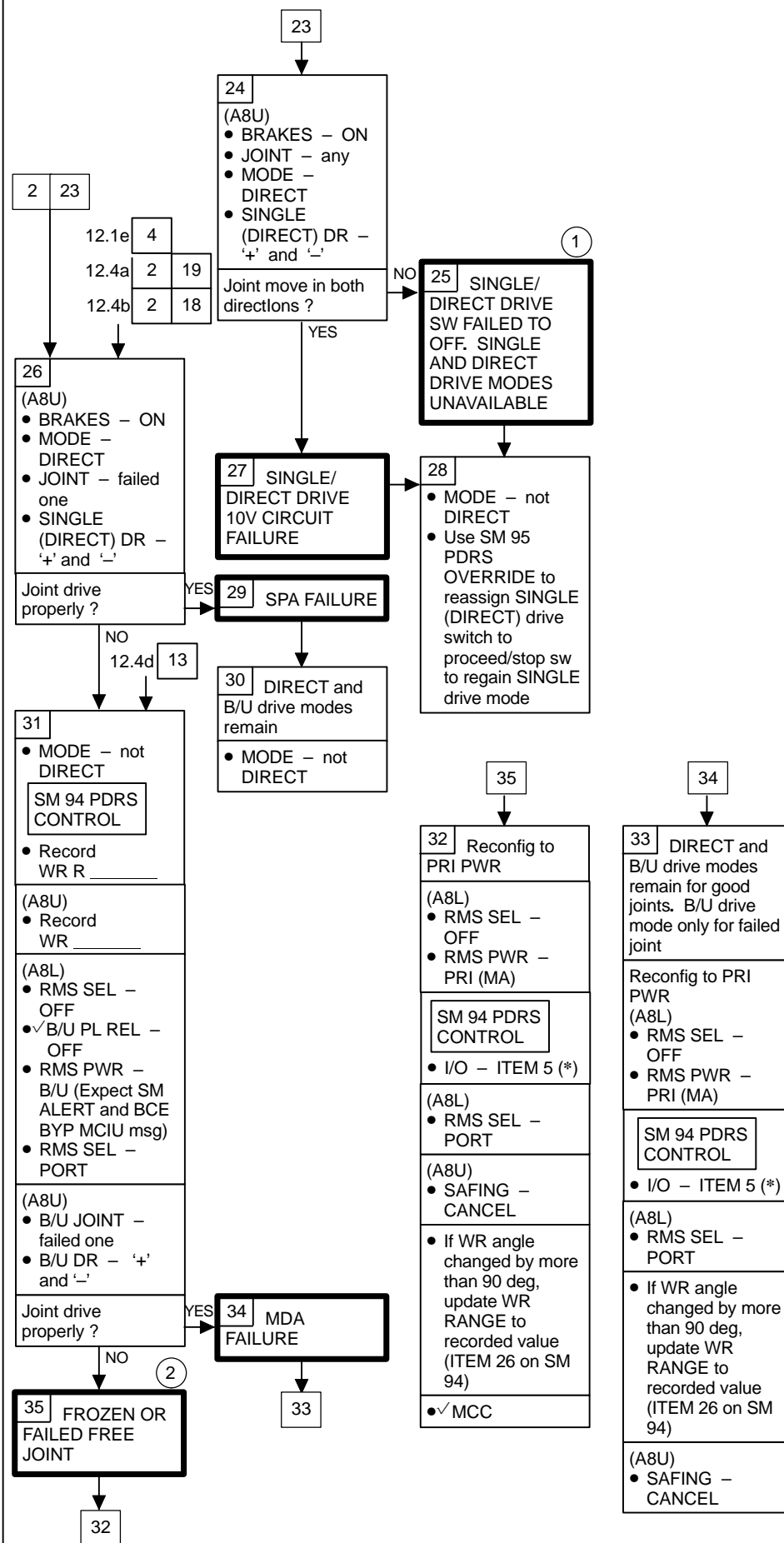


PDRS 12.4c (Cont)



① DIRECT mode can be regained with RMS IFM D&C KIT. Refer to RMS CONTINGENCY OPERATION/ INSTALLATION AND REMOVAL OF THE RMS IFM D&C KIT (IFM), and PDRS SSR-4 RMS IFM D&C KIT

PDRS 12.4c (Cont)



- ① DIRECT mode can be regained with RMS IFM D&C KIT. Refer to RMS CONTINGENCY OPERATION/ INSTALLATION AND REMOVAL OF THE RMS IFM D&C KIT (IFM), and PDRS SSR-4 RMS IFM D&C KIT
- ② BACKDRIVE TECHNIQUE – JOINT FREE, PDRS SSR-3 or EVA reqd to cradle arm for failed free joint

12.4d JOINT RESPONSE ABNORMAL IN DIRECT MODE

Joint Response Not Normal for Commands in Direct Mode

Nominal Config:
 (A8L)
 RMS PWR – PRI
 SEL – PORT
 (A8U)
 BRAKES – ON
 BRAKES tb – ON
 SAFING tb – gray

1
 (A8U)
 • ✓ BRAKES – ON
 • MODE – not DIRECT
 • JOINT – WR

WARNING

Placing mode switch in DIRECT may cause joint motion for selected joint. If motion occurs, be ready to take mode switch out of DIRECT

2
 (A8U)
 • MODE – DIRECT

Joint motion of selected joint ?

3
 • MODE – not DIRECT

WARNING

Driving in DIRECT may cause incorrect joint to drive or motion in incorrect direction. If captured to constrained PL or if loaded and near structure, ✓MCC

4 SINGLE/DIRECT DR SW SHORT. SINGLE AND DIRECT DRIVE MODES UNAVAILABLE

5
 • Use SM 95 PDRS OVERRIDE to reassign SINGLE (DIRECT) drive switch to regain SINGLE drive mode

6
 (A8U)
 • SINGLE (DIRECT) DR – each joint in turn '+' and '-'

Two joints drive simultaneously ?

7 6V/12V JOINT SEL SW CONTACT SHORT. DIRECT DRIVE MODE UNAVAILABLE

8 Any joint drive in wrong direction ?

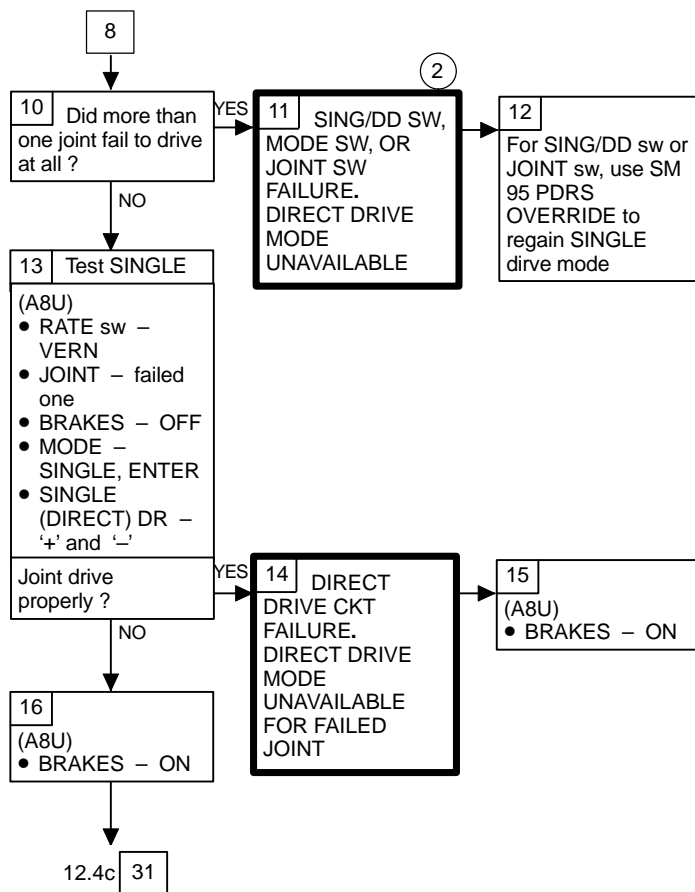
9 ZENER DIODE FAILURE. DIRECT DRIVE MODE LOST

10

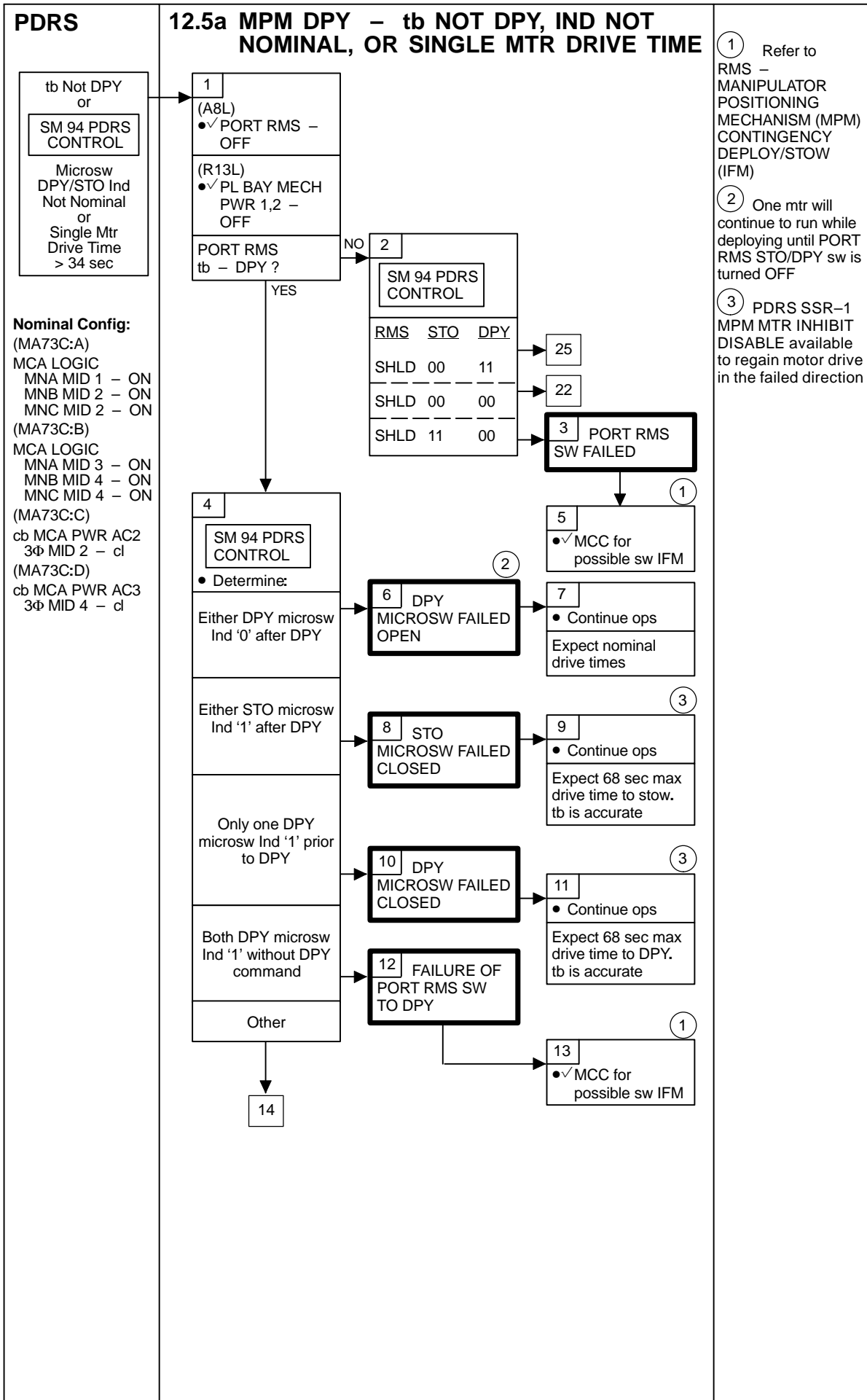
① DIRECT mode can be regained with RMS IFM D&C Kit. Refer to RMS CONTINGENCY OPERATION (INSTALLATION AND REMOVAL OF RMS IFM D&C KIT) (IFM), and PDRS SSR-4, RMS IFM D&C KIT

PDRS 12.4d (Cont)

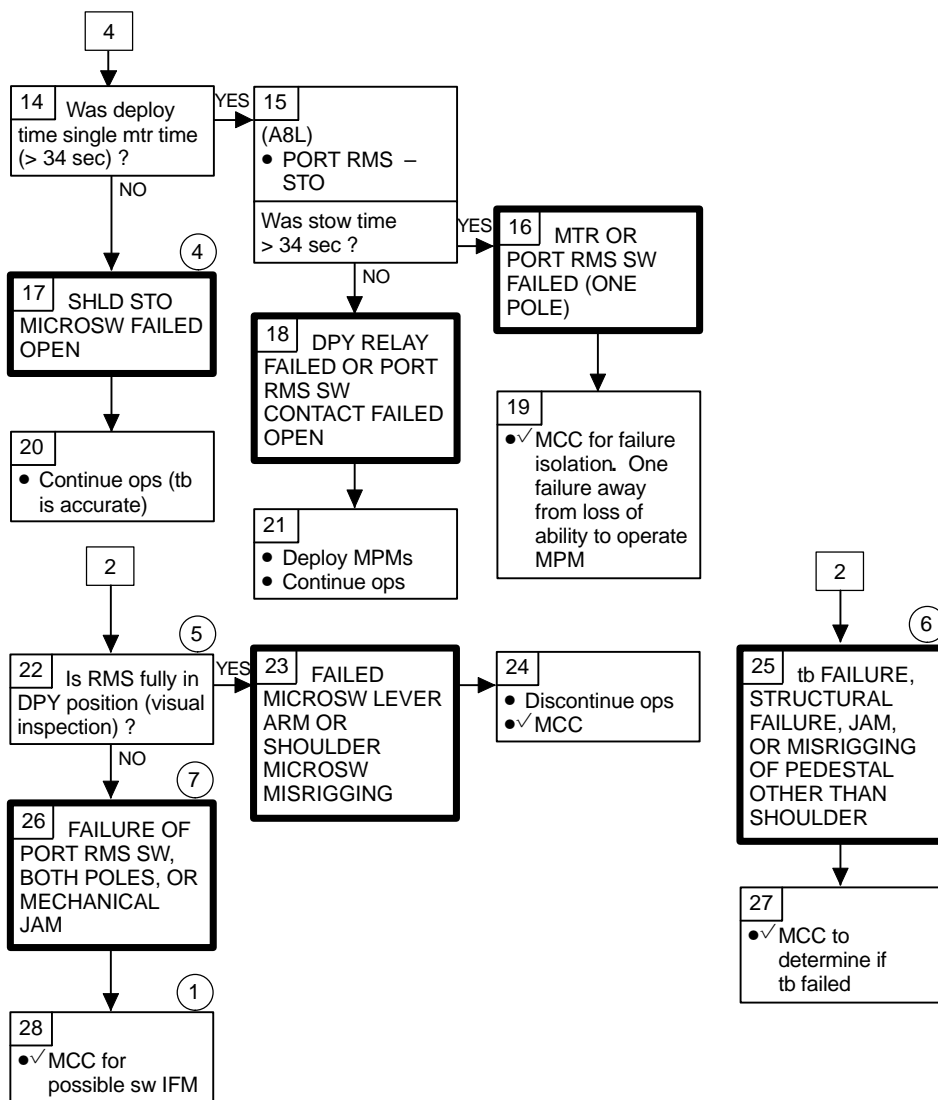
② DIRECT mode can be regained with RMS D&C IFM KIT



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PDRS 12.5a (Cont)



① Refer to RMS – MANIPULATOR POSITIONING MECHANISM (MPM) CONTINGENCY DEPLOY/STOW (IFM)

④ One mtr will continue to run while stowing until PORT RMS STO/DPY sw is turned OFF

⑤ RMS should not be used unless shoulder linkage is overcenter locked

⑥ Signals from Aft, Mid, Fwd, and Shld pedestals command tb. To trip tb, all four SYS 1 or SYS 2 indications are reqd

⑦ MCC can determine if switch is failed

PDRS

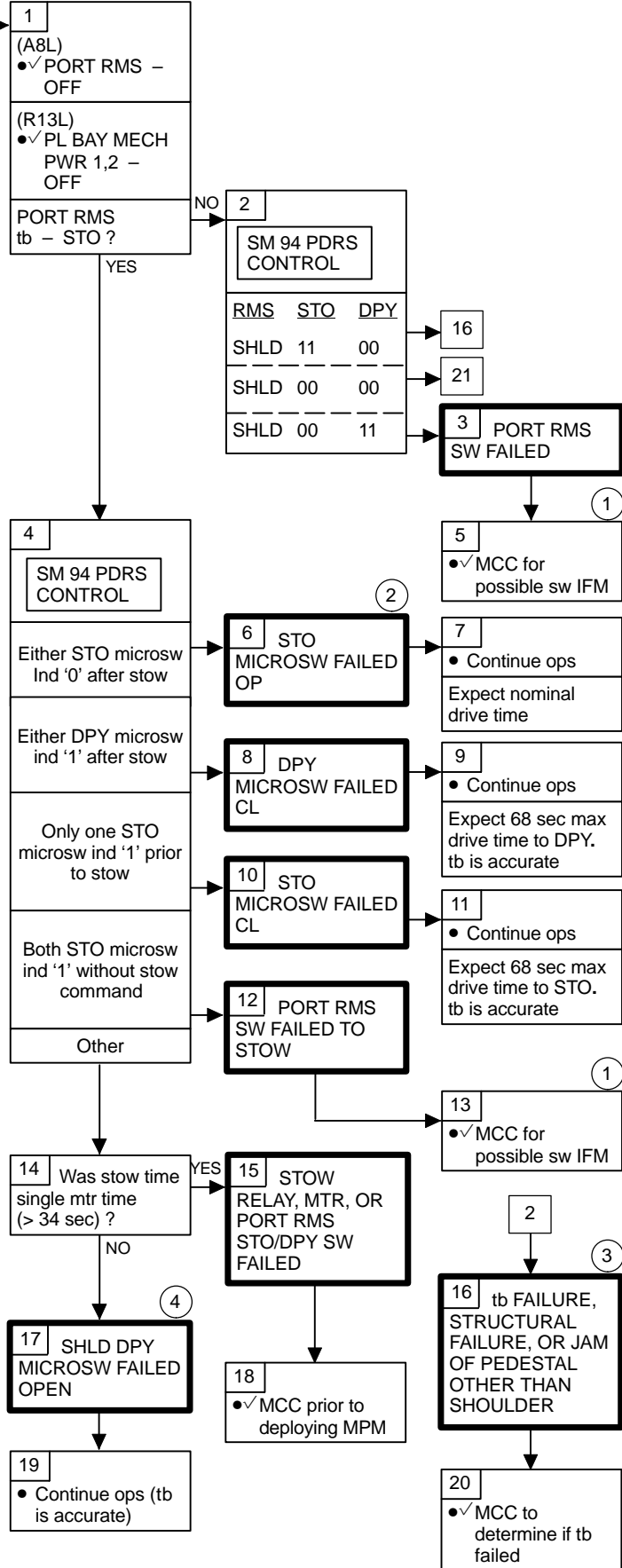
12.5b MPM STO – tb NOT STO, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME

tb Not STO
or
SM 94 PDRS CONTROL

Microsw DPY/STO Ind Not Nominal
or
Single Mtr Drive Time (> 34 sec)

Nominal Config:

- (MA73C:A)
- MCA LOGIC
- MNA MID 1 – ON
- MNB MID 2 – ON
- MNC MID 2 – ON
- (MA73C:B)
- MCA LOGIC
- MNA MID 3 – ON
- MNB MID 4 – ON
- MNC MID 4 – ON
- (MA73C:C)
- cb MCA PWR
- AC2 3Φ MID 2 – d
- (MA73C:D)
- cb MCA PWR
- AC3 3Φ MID 4 – d

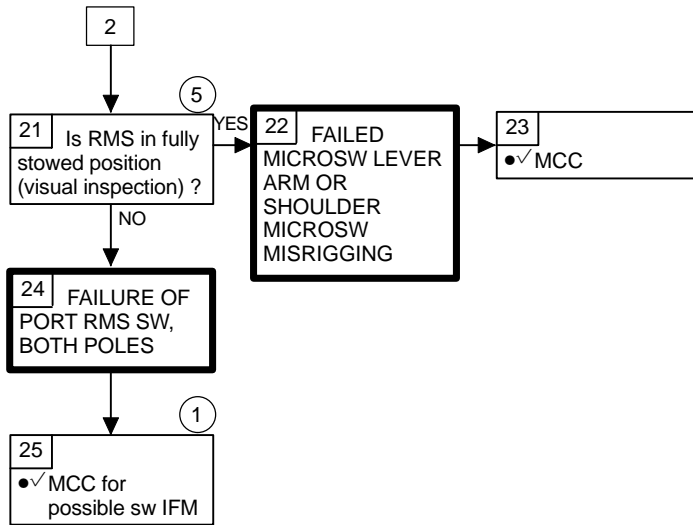


① Refer to RMS – MANIPULATOR POSITIONING MECHANISM (MPM) CONTINGENCY DEPLOY/STOW (IFM)

② One mtr will continue to run while stowing until Port RMS sw is turned OFF

③ Signals from AFT, MID, FWD, and SHLD pedestals command tb. To trip tb, all four SYS 1 or all four SYS 2 indications reqd

④ One mtr will continue to run while deploying until Port RMS STO/DPY sw is turned OFF



① Refer to RMS – MANIPULATOR POSITIONING MECHANISM (MPM) CONTINGENCY DEPLOY/STOW (IFM)

⑤ RMS should not be used unless shoulder linkage is overcenter locked

PDRS

12.5c MRL REL – tb NOT REL, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME

tb Not REL
or
SM 94 PDRS CONTROL

Microsw Rel/Lat Ind Not Nominal
or
Single Mtr Drive Time (> 8 sec)

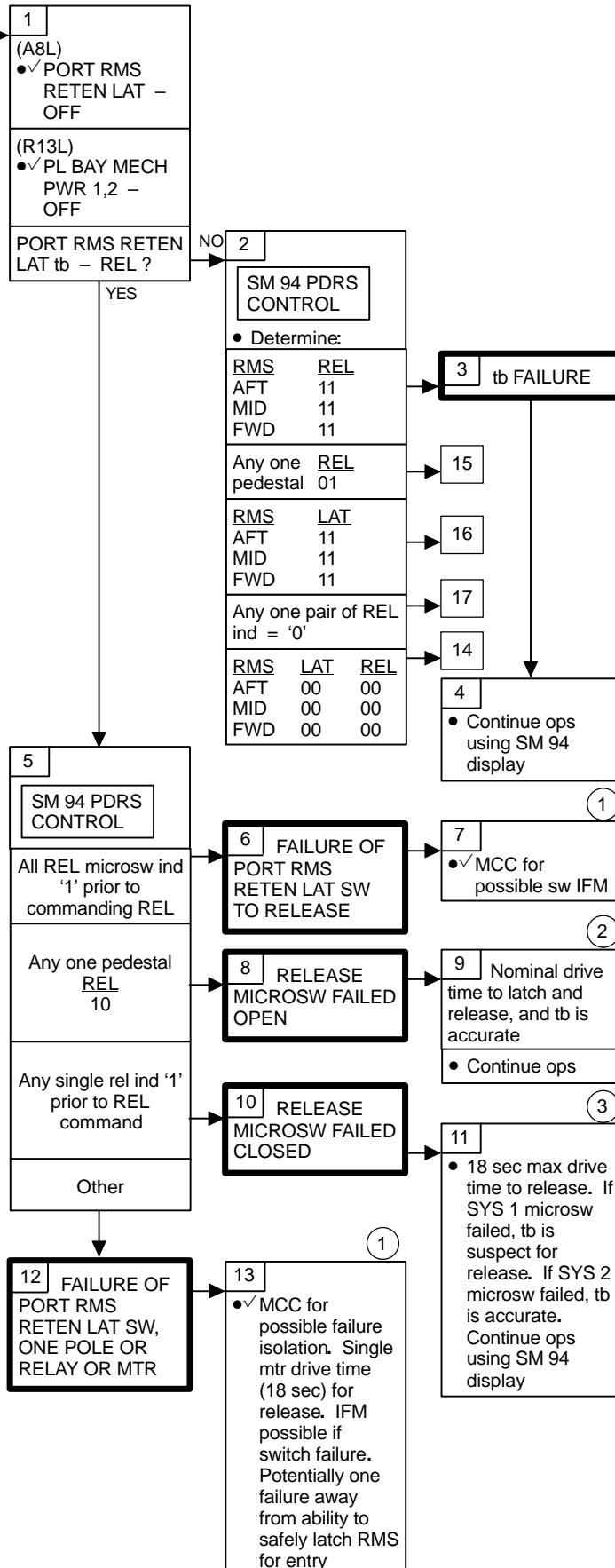
Nominal Config:

(MA73C:A)
MCA LOGIC
MNA MID 1 – ON
MNB MID 2 – ON
MNC MID 2 – ON

(MA73C:B)
MCA LOGIC
MNA MID 3 – ON
MNB MID 4 – ON
MNC MID 4 – ON

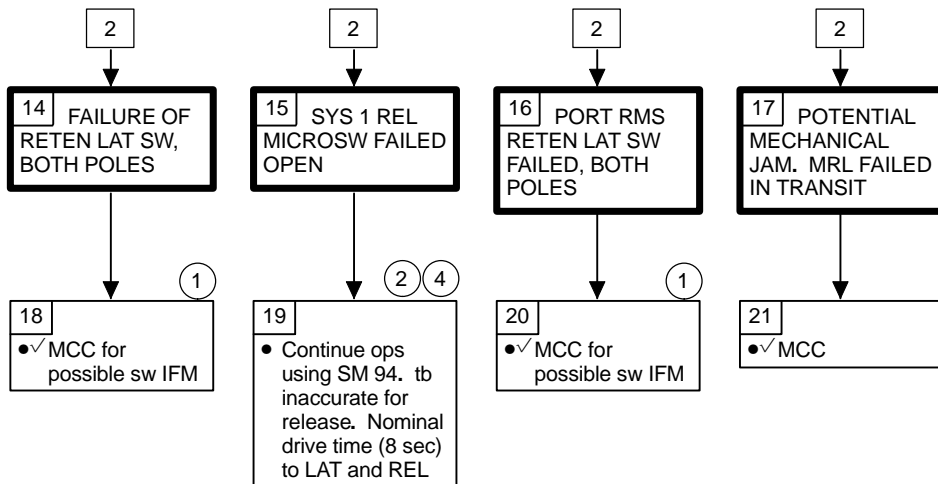
(MA73C:C)
cb MCA PWR
AC1 3Φ MID 1 – cl
AC2 3Φ MID 2 – cl
AC3 3Φ MID 2 – cl

(MA73C:D)
cb MCA PWR
AC1 3Φ MID 3 – cl
AC2 3Φ MID 4 – cl
AC3 3Φ MID 4 – cl



- ① Refer to RMS – MANIPULATOR RETENTION LATCHES (MRL) CONTINGENCY RELEASE/LATCH (IFM)
- ② One mtr will continue to drive when commanding release until PORT RMS RETEN LAT – OFF
- ③ Failed-on microsw disables one mtr. The tb is inaccurate from 8–18 sec (latch halfway open at 8 sec)

PDRS 12.5c (Cont)



- ① Refer to RMS – MANIPULATOR RETENTION LATCHES (MRL) CONTINGENCY RELEASE/LATCH (IFM)
- ② One mtr will continue to drive when commanding release until PORT RMS RETEN LAT – OFF
- ④ tb is activated by receiving all three microsw indications from SYS 1 only

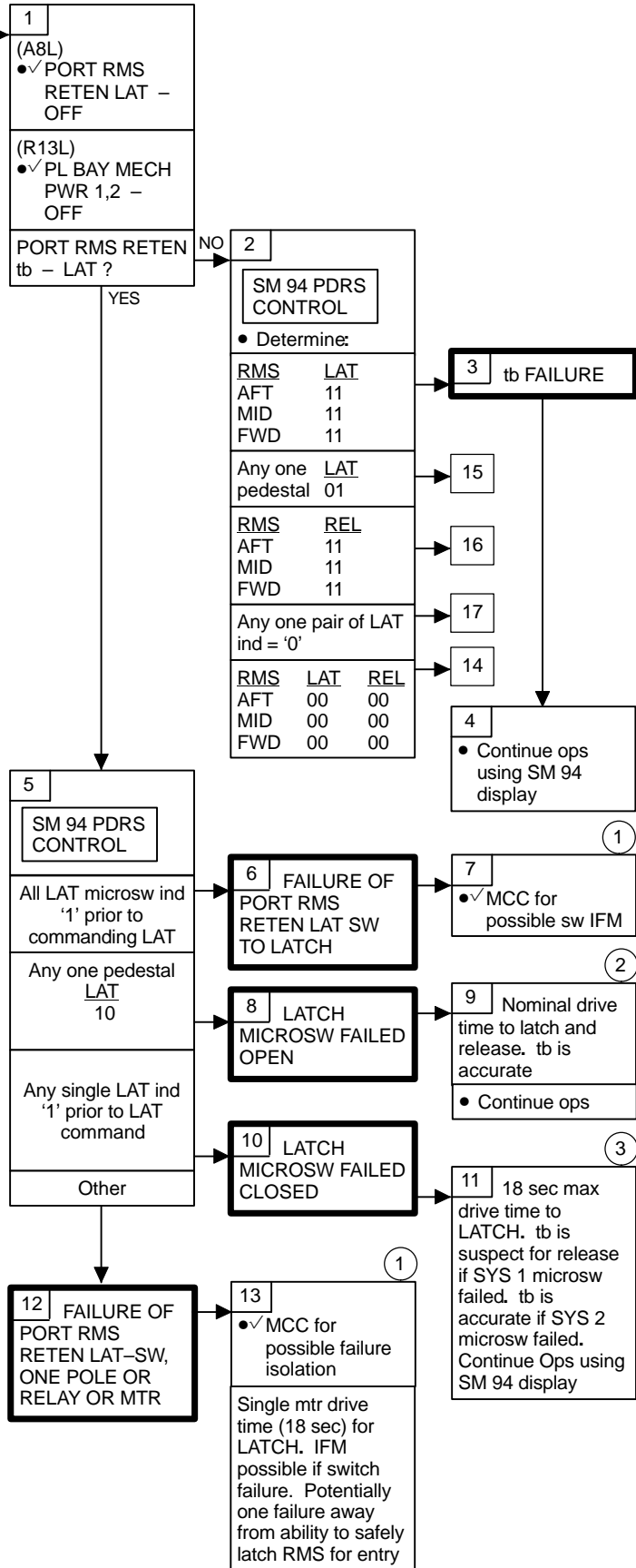
PDRS

12.5d MRL LAT – tb NOT LAT, IND NOT NOMINAL, OR SINGLE MTR DRIVE TIME

tb Not LAT
or
SM 94 PDRS CONTROL
Microsw Rel/Lat Ind Not Nominal
or
Single Mtr Drive Time (> 8 sec)

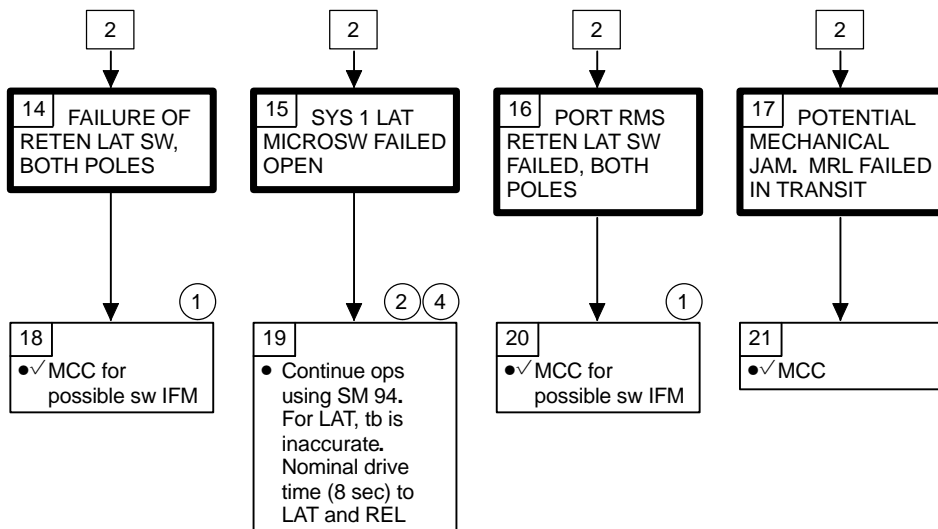
Nominal Config:

- (MA73C:A)
- MCA LOGIC
 - MNA MID 1 – ON
 - MNB MID 2 – ON
 - MNC MID 2 – ON
- (MA73C:B)
- MCA LOGIC
 - MNA MID 3 – ON
 - MNB MID 4 – ON
 - MNC MID 4 – ON
- (MA73C:C)
- cb MCA PWR
 - AC1 3Φ MID 1 – cl
 - AC2 3Φ MID 2 – cl
 - AC3 3Φ MID 2 – cl
- (MA73C:D)
- cb MCA PWR
 - AC1 3Φ MID 3 – cl
 - AC2 3Φ MID 4 – cl
 - AC3 3Φ MID 4 – cl

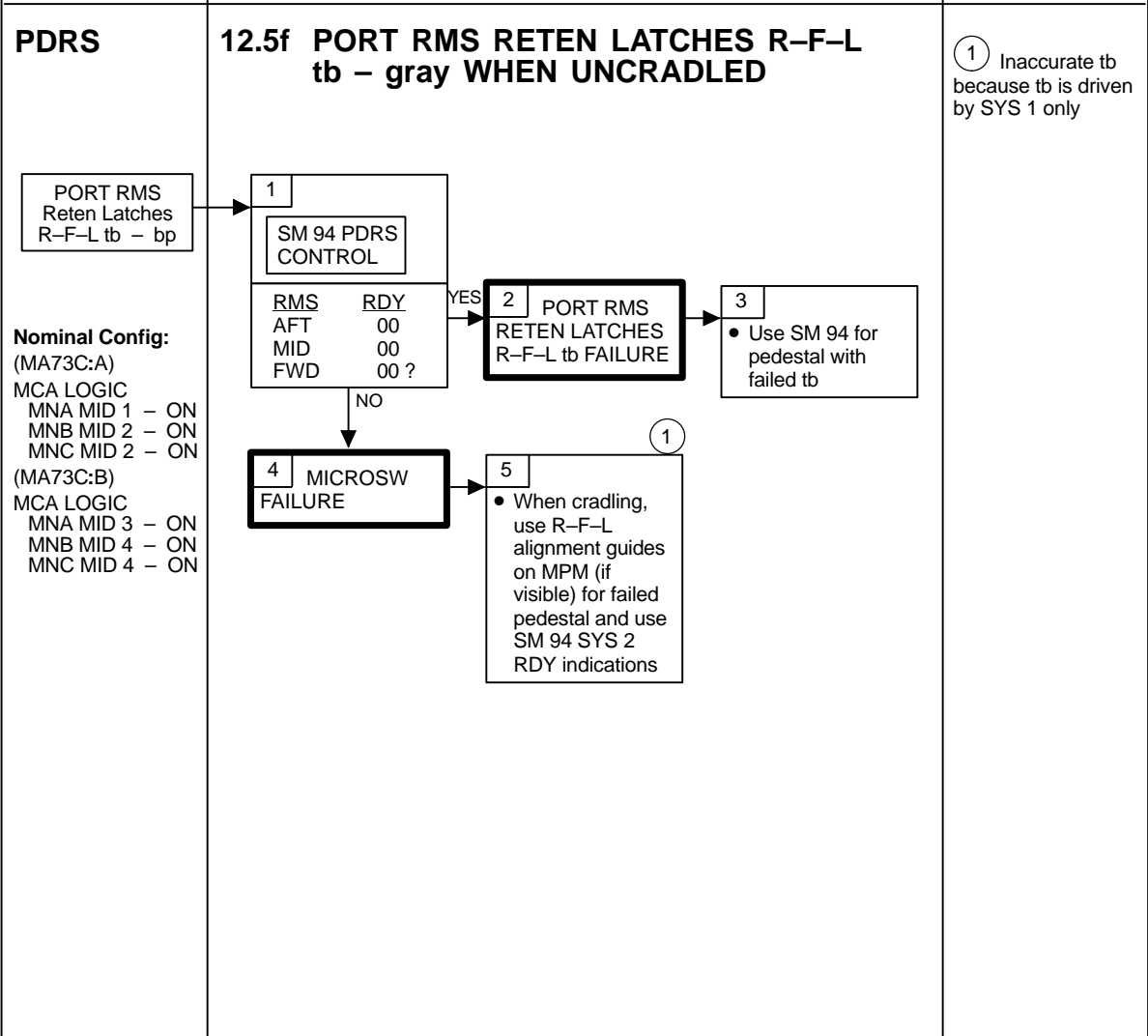
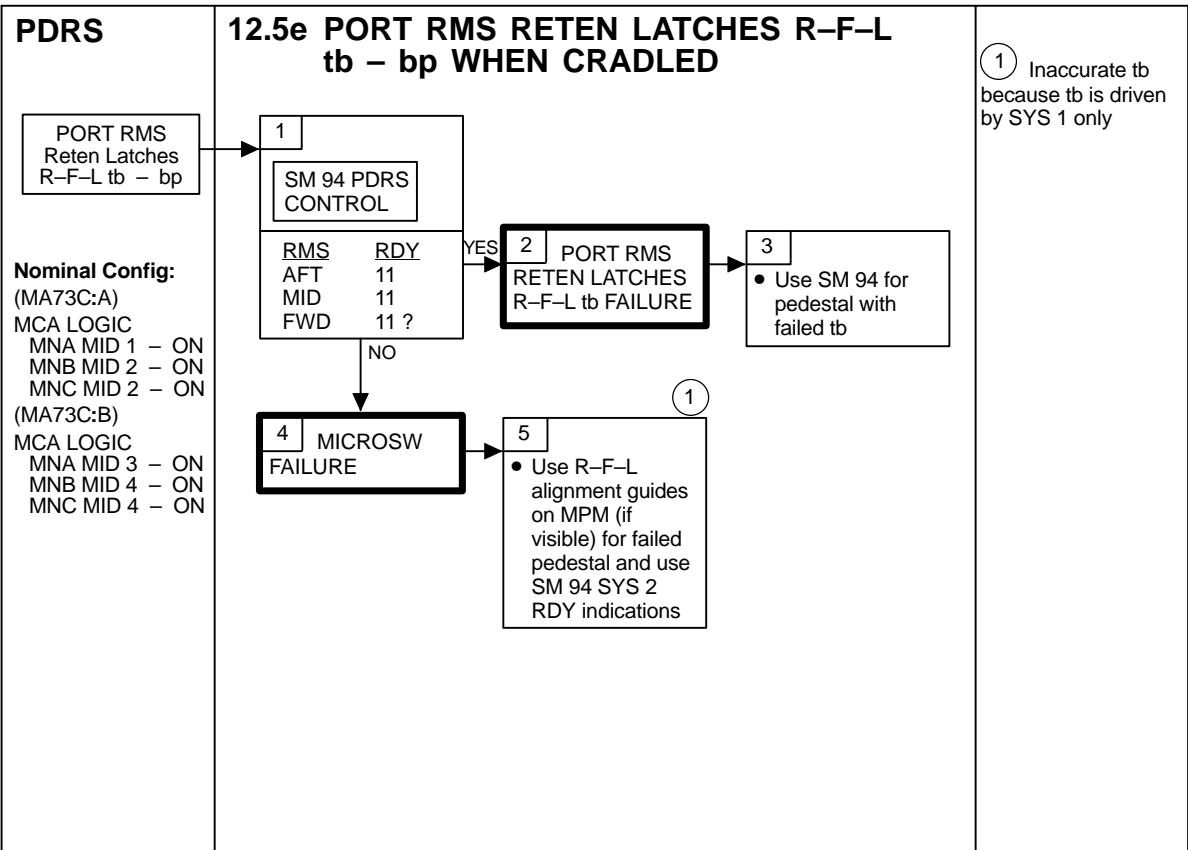


- ① Refer to RMS – MANIPULATOR RETENTION LATCHES (MRL CONTINGENCY RELEASE LATCH) (IFM)
- ② One mtr will continue to drive when commanding LATCH until Port RMS RETEN LAT switch is off
- ③ Failed-on microsw disables one mtr. The tb is inaccurate from 8–18 sec (latch halfway closed at 8 sec)

PDRS 12.5d (Cont)



- ① Refer to RMS – MANIPULATOR RETENTION LATCHES (MRL CONTINGENCY RELEASE/LATCH) (IFM)
- ② One mtr will continue to drive when commanding LATCH until Port RMS RETEN LAT switch is off
- ④ tb is activated by receiving all three microsw indications from SYS 1 only



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OSVS

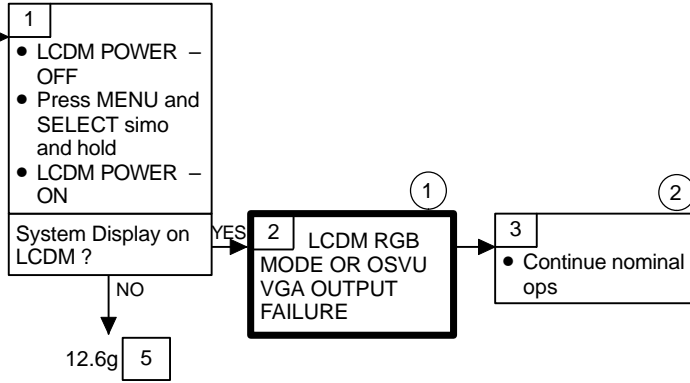
12.6

PDRS

12.6a OSVS LCDM BLANK DURING POWERUP

OSVS LCDM Blank During Powerup

Nominal Config:
(R12)
OSVU POWER LED – ON
(LCDM)
LCDM POWER – ON
LCDM set to RGB mode during first part of POWERUP (AFD)
OSVS System Display on AFD MON 2
(LCDM CABLE)
Cable connected correctly



① For subsequent powerup, alternate LCDM is available to isolate VGA failure

② For subsequent powerup, insight into BIOS or POST messages is lost

OSVS

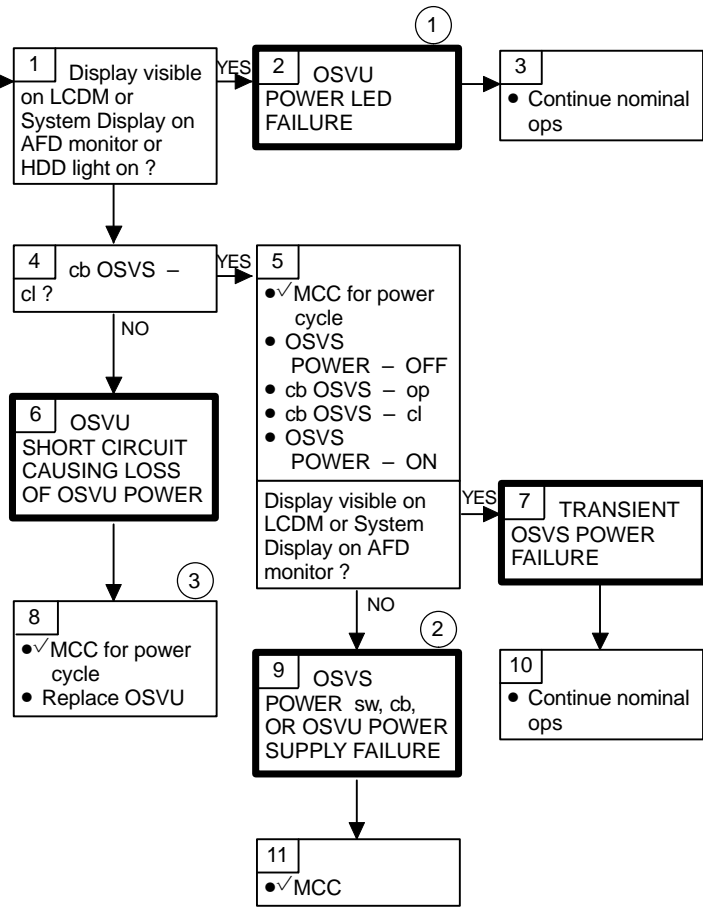
12.6

PDRS

12.6b OSVS POWER LED NOT ON

OSVS Power LED not ON

Nominal Config:
 (R12)
 OSVS POWER sw – ON
 (R1A1)
 P/L CAB – MNA (MNB)



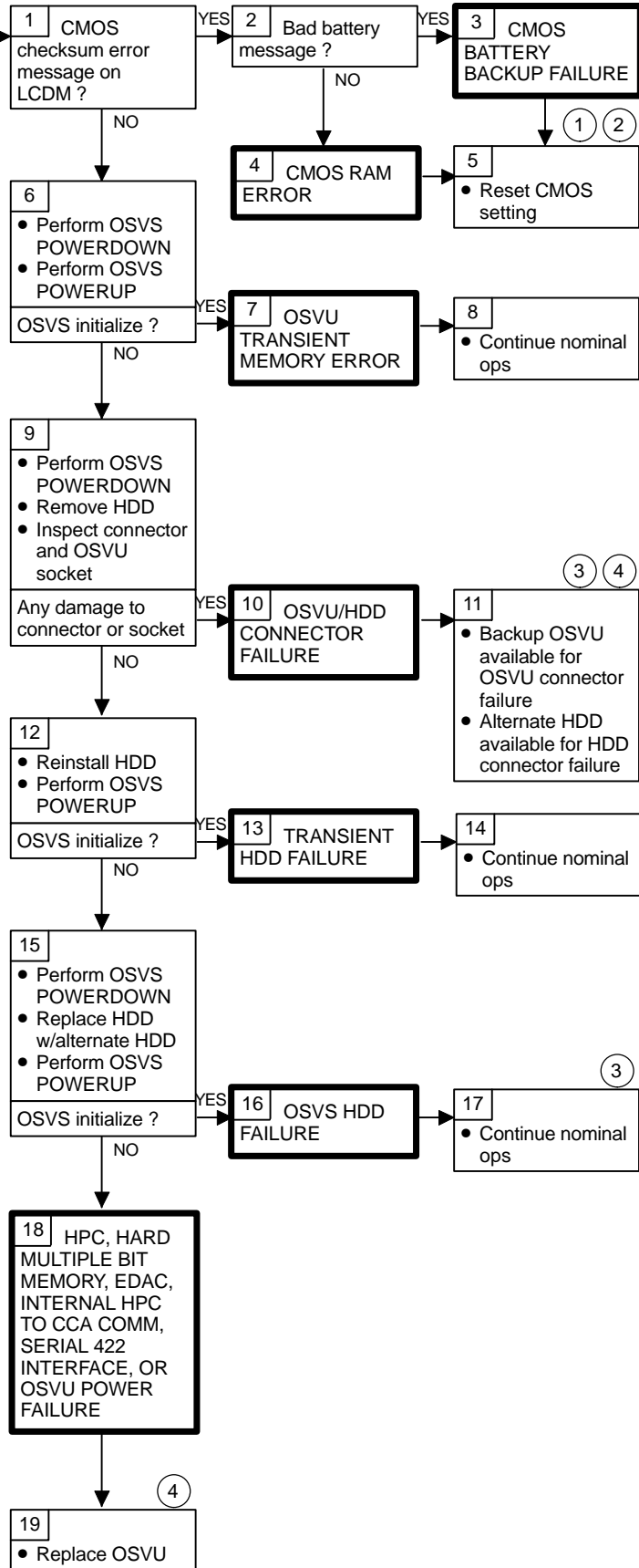
- ① For subsequent powerup, POWER LED will not be illuminated
- ② Perform OSVU REPLACEMENT (IFM)
- ③ OSVU REPLACEMENT (IFM) available for OSVU power supply failure. OSVU CONT PWRUP (IFM) available for OSVS POWER sw or cb failure

PDRS

12.6c OSVS DOES NOT INITIALZE

OSVS Does Not Initialize

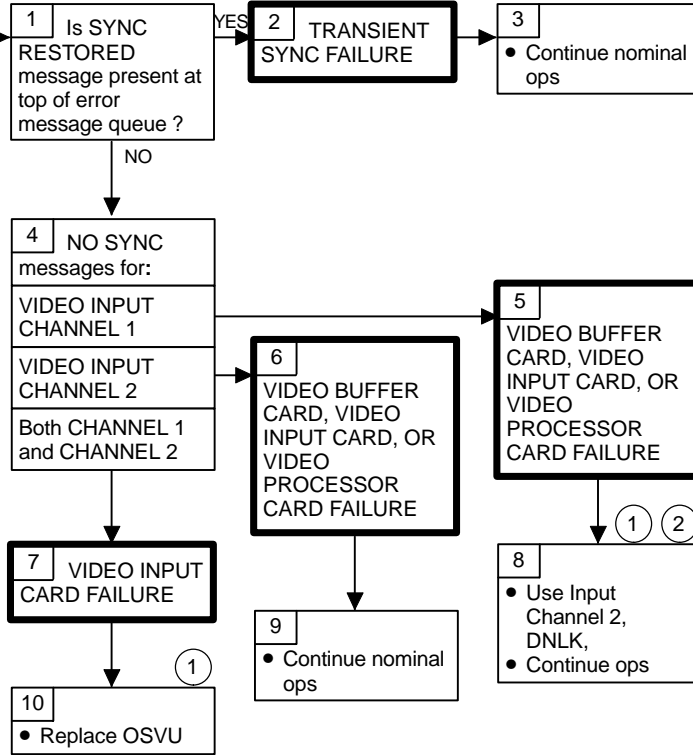
Nominal Config:
(AFD)
System Display not present after 2 min



- ① For battery backup failure, CMOS settings will need to be reset every time POWERUP is performed
- ② Perform PDRS SSR-5 to reset CMOS settings
- ③ Mark failed HDD and use alternate HDD for subsequent ops
- ④ Full capability will be restored with OSVU REPLACEMENT (IFM)

OSVS No Sync Signal Detected One or more 'No Sync' Messages

Nominal Config:
 CCTV system nominal
 VSU sync setting per procedure
 Cabling and video routing nominal

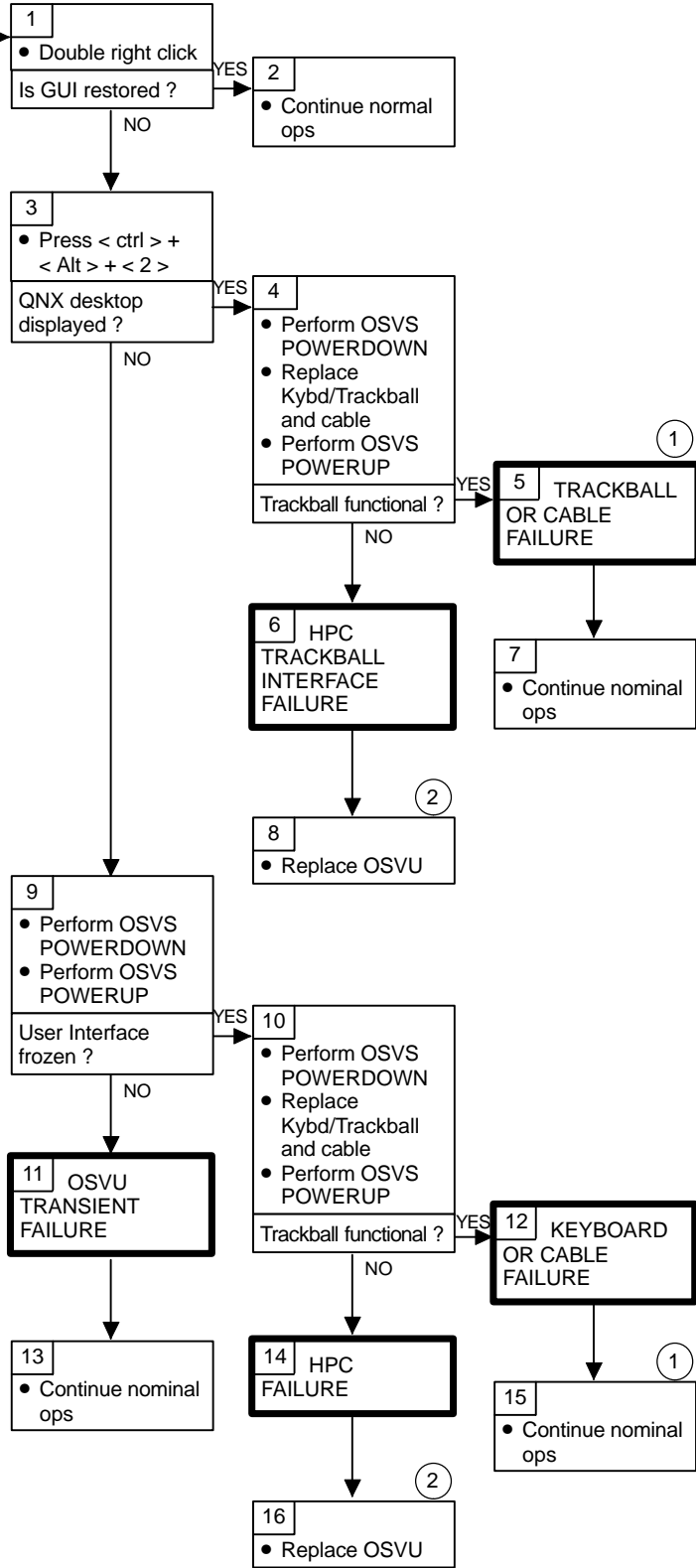


① Full capability will be restored with OSVU REPLACEMENT (IFM)

② Subsequent failure will require OSVU REPLACEMENT (IFM)

Kybd/Trackball Unresponsive and GUI Unresponsive

Nominal Config:
Keyboard cable connected properly



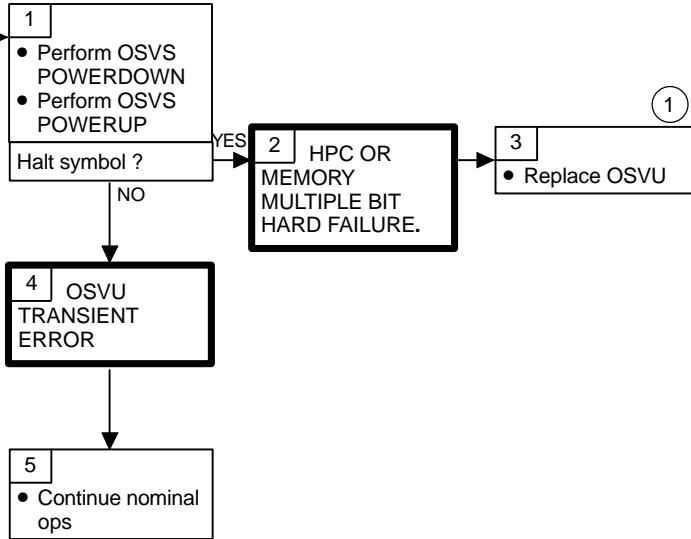
- ① Mark failed keyboard and cable and use alternate for all subsequent ops
- ② Full capability will be restored with OSVU REPLACEMENT (IFM)

PDRS

12.6f OSVS HALT SYMBOL PRESENT OR ACTIVITY INDICATOR INACTIVE

① Full capability will be restored with OSVU REPLACEMENT (IFM)

Halt symbol with fatal error message or Activity indicator not active while in RUN

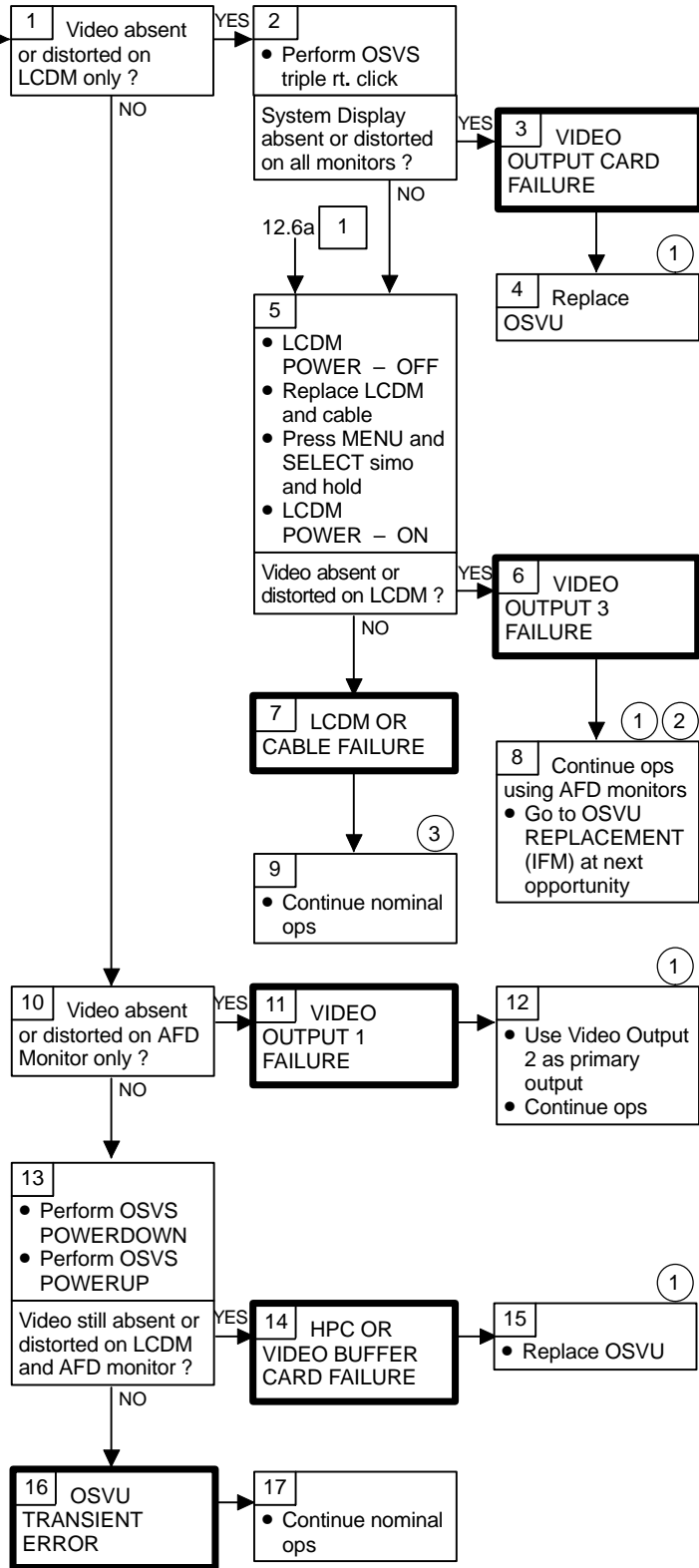


Nominal Config:
OSVU Steering
Display present

12.6g OSVS VIDEO ABSENT OR DISTORTED ON LCDM/AFD MONITOR

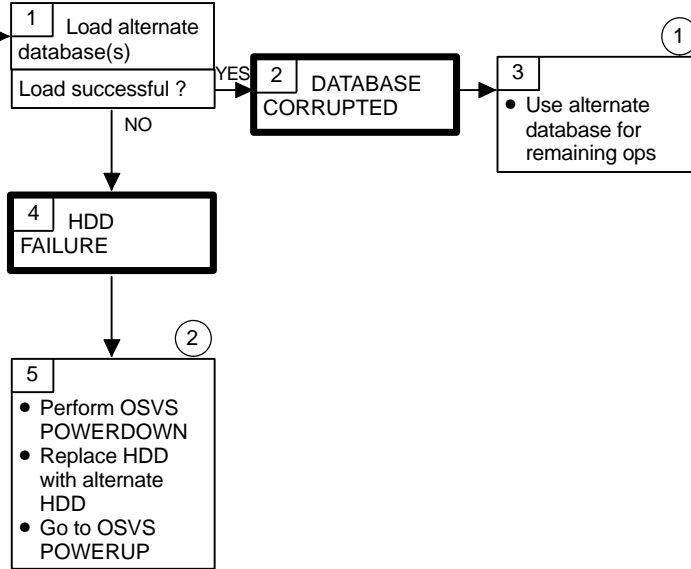
OSVS Video Absent or Distorted on LCDM/AFD Monitor

Nominal Config:
CCTV system nominal
Cabling and video routing nominal



- ① Full capability will be restored with OSVU REPLACEMENT (IFM)
- ② Triple right button click available to recover System Display on AFD monitor
- ③ Mark failed LCDM and cable and use alternate LCDM and cable for all subsequent ops

One or More DATABASE FILE Error Messages

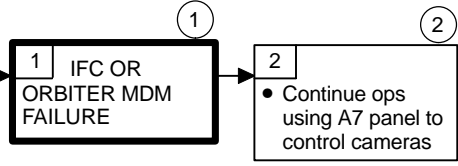


- ① Perform PDRS SSR-6 for database maintenance
- ② Mark failed HDD and use alternate HDD for all subsequent ops

PDRS

12.6i OSVS CAMERA COMMANDS DO NOT FUNCTION

MDM POST
Error Message or
Camera
Commands do
not work



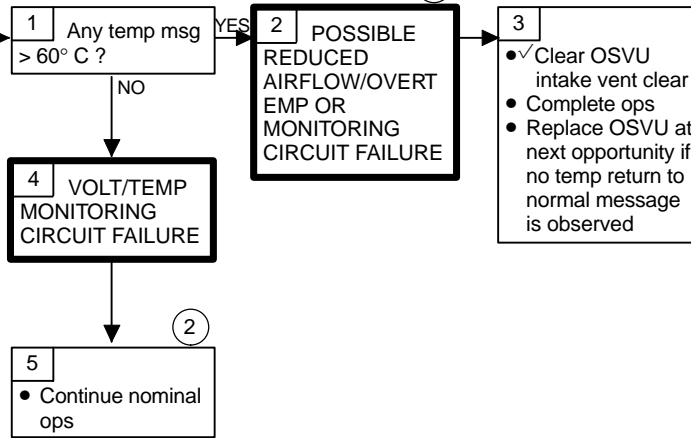
Nominal Config:
(A7U)
TV PWR CNTL –
CMD
ITEM 1 SPEC 225
enabled
CCTV system
nominal
Image Optimization,
Array Tracking
enabled
A7 panel configured
for OSVU camera
commands

- ① OSVU camera commands use the same path as ground issued camera commands. Ground can isolate MDM failure.
- ② For IFC failure, full capability will be restored with OSVU REPLACEMENT (IFM).

12.6j OSVS OUT OF RANGE TEMP/VOLTAGE

One or More 'Temperature' or 'Voltage' Messages

Nominal Config:
 (A7U)
 TV PWR CNTL – CMD
 ITEM 1 SPEC 225 enabled
 CCTV system nominal
 Image Optimization, Array Tracking enabled
 A7 panel configured for OSVU camera commands



① Temps close to 60° or multiple temps indicate real overtemp condition

② Full capability will be restored with OSVU REPLACEMENT (IFM)

PDRS SSR-1

MPM MTR INHIBIT DISABLE

NOTE

Use this procedure to replace step 6 of ON-ORBIT_INIT (PDRS OPS), or step 5 of RMS_PWRDN (PDRS OPS) or step 4 of RMS_PWRUP (PDRS OPS)

SM 94 PDRS CONTROL

If RMS STO/DPLY – 1 X 1 X :

MA73C:A 1. INHIBIT MICROSWITCH
MCA LOGIC MNC MID 2 – OFF

CRT ✓RMS STO/DPLY – 0 X 0 X

2. STOW(DEPLOY) MPM

CAUTION
If switch is not turned off, mtr will continue to run. Mechanical damage to mtr may result

A8L PORT RMS – STO(DPY) as reqd (68 sec max)
– OFF

CRT ✓MPM is stowed(deployed) using CRT indication (tb inaccurate):
Stowed: RMS STO/DPLY – 0 1 0 X
(Deployed: RMS STO/DPLY – 0 X 0 1)

MCC can verify status of FWD, MID, AFT pedestals

MA73C:A 3. ENABLE BUS
A8L MCA LOGIC MNC MID 2 – ON
✓PORT RMS tb – STO(DPY) >>

If RMS STO/DPLY – X 1 X 1:

MA73C:B 4. INHIBIT MICROSWITCH
MCA LOGIC MNB MID 4 – OFF

CRT ✓RMS STO/DPLY – X 0 X 0

5. STOW(DEPLOY) MPM

CAUTION
If switch is not turned off, mtr will continue to run. Mechanical damage to mtr may result

A8L PORT RMS – STO(DPY) as reqd (68 sec max)
– OFF

CRT ✓MPM is stowed(deployed) using CRT indication (tb accurate):
Stowed: RMS STO/DPLY – 1 0 X 0
(Deployed: RMS STO/DPLY – X 0 1 0)

MCC can verify status of FWD, MID, AFT pedestals

MA73C:B 6. ENABLE BUS
A8L MCA LOGIC MNB MID 4 – ON
✓PORT RMS tb – STO(DPY)

PDRS SSR-2
RMS JOINT FAILED PAD

A8U

✓BRAKES – ON (tb-ON)

If joint failed free,

✓DAP: VERN(FREE)

BRAKES – as reqd

MODE – _____ (✓MCC)

Maneuver to:

	SY	SP	EP	WP	WY	WR
1						
2						
3						
4						
5						

✓BRAKES – ON (tb-ON)

MODE – not DIRECT (lts off)

PDRS SSR-3

BACKDRIVE TECHNIQUE – JOINT FREE

SP – FAILED

WARNING
PORT RADIATOR must be stowed

NOTE

Can expect CONT ERR and Master Alarm

1. **SETUP**
If RADIATORS deployed:
Perform RAD STOW (ORB OPS, ECLS)

✓BRAKES – ON (tb-ON)
PARAM sel – JOINT ANGLE

✓DAP: VERN(FREE)

If SP < 7.5 deg, go to step 3

Calculate IC: If SP < 45, IC = $-(2 \times SP)$
Otherwise, IC = -90

MODE – DIRECT (lt on)

DIRECT DR to:

SY	SP	EP	WP	WY	WR
+ 75	FREE	IC	0	0	0

MODE – not DIRECT (lt off)

SM 94 PDRS CONTROL

AUTO BRAKES INH – ITEM 10 EXEC (*)

2. **BACKDRIVE OPERATION**

NOTE

Hold SINGLE DR command for 4 sec,
apply BRAKES – ON, then release
SINGLE DR command

RATE – COARSE (RATE MIN tb-OFF)

JOINT sel – EP
BRAKES – OFF (tb-OFF)
MODE – SINGLE, ENTER

SINGLE DR – '+' after 4 sec and while holding sw
BRAKES – ON (tb-ON)

If SP < 7.5 deg, go to step 3

If EP \geq -15 deg, reconfig EP:
MODE – DIRECT (lt on)
DIRECT DR EP to: $-(2 \times SP)$ or max -90
MODE – not DIRECT (lt off)

Repeat step 2

PDRS SSR-3 (Cont)

3. RECONFIG JOINTS FOR CRADLE

CAUTION
Use CCTVs to monitor
proximity of RMS to orbiter

- ✓BRAKES – ON (tb-ON)
MODE – DIRECT (lt on)

DIRECT DR to:

SY	SP	EP	WP	WY	WR
CURRENT VALUE	FREE	+1	+10	0	0
0					
		-1			

MODE – not DIRECT (lt off)

4. START RMS CRADLE

NOTE

Hold SINGLE DR command for 1/2 sec
Apply BRAKES – ON then release
SINGLE DR command

JOINT sel – EP
BRAKES – OFF (tb-OFF)
MODE – SINGLE, ENTER

SINGLE DR – '+' after 1/2 sec and while holding sw
BRAKES – ON (tb-ON)

If PORT RMS R-F-L FWD tb – gray, go to step 5

If EP ≥ +1 deg, reconfig EP:
MODE – DIRECT (lt on)
DIRECT DR EP to: 0
MODE – not DIRECT (lt off)

Repeat step 4

5. COMPLETE RMS CRADLE

- ✓BRAKES – ON (tb-ON)
MODE – DIRECT (lt on)

DIRECT DR to:

SY	SP	EP	WP	WY	WR
0	FREE	0	0	0	0

MODE – not DIRECT (lt off)

- ✓PORT RMS R-F-L tb (three) – gray

Go to step 3, RMS PWRDN (PDRS OPS) >>

|

PDRS SSR-3 (Cont)

EP - FAILED

NOTE

Can expect CONT ERR and Master Alarm

1. SETUP

✓BRAKES - ON (tb-ON)
PARAM sel - JOINT ANGLE

✓DAP: VERN(FREE)

If EP \geq -1 deg, go to step 3

Calculate IC: If EP > -65, IC = -(2 x EP)
Otherwise, IC = +130

MODE - DIRECT (lt on)

DIRECT DR to:

SY	SP	EP	WP	WY	WR
CURRENT VALUE	IC	FREE	+5	0	0
0					

MODE - not DIRECT (lt off)

SM 94 PDRS CONTROL

AUTO BRAKES INH - ITEM 10 EXEC (*)

2. BACKDRIVE OPERATION

NOTE

Hold SINGLE DR command for 4 sec
Apply BRAKES - ON, then release
SINGLE DR command

RATE - COARSE (RATE MIN tb-OFF)

JOINT sel - SP
BRAKES - OFF (tb-OFF)
MODE - SINGLE, ENTER

SINGLE DR - '-' after 4 sec and while holding sw
BRAKES - ON (tb-ON)

If EP \geq -1 deg, go to step 3

If SP < -(EP), reconfig SP:
MODE - DIRECT (lt on)
DIRECT DR SP to: -(2 x EP) or max +130
MODE - not DIRECT (lt off)

Repeat step 2

PDRS SSR-3 (Cont)

3. RECONFIG FOR CRADLE

- ✓ BRAKES – ON (tb-ON)
- MODE – DIRECT (lt on)

DIRECT DR to:

SY	SP	EP	WP	WY	WR
CURRENT VALUE	+ 15	FREE	+ 10	0	0
0					

MODE – not DIRECT (lt off)

4. START RMS CRADLE

NOTE

Hold SINGLE DR command for 1/2 sec
Apply BRAKES – ON, then release
SINGLE DR command

JOINT sel – SP
BRAKES – OFF (tb-OFF)
MODE – SINGLE, ENTER

If EP > +0.1:

SINGLE DR – '+' after 1/2 sec and while holding sw
BRAKES – ON (tb-ON)

If EP < -0.1:

SINGLE DR – '-' after 1/2 sec and while holding sw
BRAKES – ON (tb-ON)

Repeat step 4 until $-0.1 < EP < +0.1$

5. COMPLETE RMS CRADLE

- ✓ BRAKES – ON (tb-ON)
- MODE – DIRECT (lt on)

DIRECT DR to:

SY	SP	EP	WP	WY	WR
0	0	FREE	0	0	0

MODE – not DIRECT (lt off)

- ✓ PORT RMS R-F-L tb (three) – gray

Go to step 3, RMS PWRDN (PDRS OPS)

I

PDRS SSR-3 (Cont)

WP – FAILED

NOTE

Can expect CONT ERR and Master Alarm

1. SETUP

- ✓ BRAKES – ON (tb-ON)
- ✓ DAP: VERN(FREE)
MODE – DIRECT (lt on)

DIRECT DR to:

SY	SP	EP	WP	WY	WR
0	+ 90	- 90	Free	0	+ 19.5

MODE – not DIRECT (lt off)

PARAM sel – JOINT ANGLE

SM 94 PDRS CONTROL

AUTO BRAKES INH – ITEM 10 EXEC (*)

2. BACKDRIVE OPERATION (To config $-0.1 \leq WP \leq +0.1$ deg)

NOTE

For steps 2a and 2b, THC input will be at 1/3 to 1/2 deflection. After 2–3 sec, quickly command full scale deflection in opposite direction. When WP joint angle displayed is constant, apply BRAKES – ON and release THC

2a. If $WP < -0.1$ deg

RATE sw – COARSE (RATE MIN tb-OFF)
If $WP > -2.0$ deg,
RATE sw – VERN (RATE MIN tb-ON)

- ✓ JOINT sel – WP
BRAKES – OFF (tb-OFF)
MODE – END EFF, ENTER

THC – ‘-Z’ (UP) 1/3 to 1/2 deflection

After 2–3 sec,
THC – ‘+Z’ (DOWN) full deflection

When WP joint angle is constant:
BRAKES – ON (tb-ON)
Release THC

If $-0.1 \leq WP \leq +0.1$, go to step 2c

If $SP > 120$ deg or < 60 deg, go to step 3

If $WP < -0.1$ deg, repeat step 2a

If $WP > +0.1$ deg, go to step 2b

2b. If $WP > +0.1$ deg

- ✓ RATE sw – COARSE (RATE MIN tb-OFF)
If $WP < +2.0$ deg,
RATE sw – VERN (RATE MIN tb-ON)

- ✓ JOINT sel – WP
BRAKES – OFF (tb-OFF)
MODE – END EFF, ENTER

THC – ‘+Z’ (DOWN) 1/3 to 1/2 deflection

After 2–3 sec,
THC – ‘-Z’ (UP) full deflection

When WP joint angle is constant:
BRAKES – ON (tb-ON)
Release THC

PDRS SSR-3 (Cont)

If $-0.1 \leq WP \leq +0.1$, go to step 2c

If $SP > 120$ deg or < 60 deg, reconfig per step 3

If $WP > +0.1$ deg, repeat step 2b

If $WP < -0.1$ deg, go to step 2a

2c. If $-0.1 \leq WP \leq +0.1$ deg

✓ BRAKES – ON (tb-ON)
MODE – DIRECT (lt on)

DIRECT DR to cradle:

SY	SP	EP	WP	WY	WR
0	CURRENT VALUE	+ 1 MA	FREE	0	0
	0 (MA)	0			

MODE – not DIRECT (lt off)

✓ PORT RMS R-F-L tb (three) – gray

Go to step 3, RMS PWRDN (PDRS OPS) >>

3. RECONFIG OF JOINTS

✓ BRAKES – ON (tb-ON)
MODE – DIRECT (lt on)

DIRECT DR to:

SY	SP	EP	WP	WY	WR
0	+ 90	- 90	FREE	0	+ 19.5

MODE – not DIRECT (lt off)

If $WP < -0.1$ deg, go to step 2a

If $WP > +0.1$ deg, go to step 2b

I

PDRS SSR-3 (Cont)

WY - FAILED

NOTE

Can expect CONT ERR and Master Alarm

1. SETUP

- ✓ BRAKES - ON (tb-ON)
- ✓ DAP: VERN(FREE)
- MODE - DIRECT (lt on)

DIRECT DR to:

SY	SP	EP	WP	WY	WR
0	+90	-90	0	FREE	+19.5

MODE - not DIRECT (lt off)
PARAM sel - JOINT ANGLE

SM 94 PDRS CONTROL

AUTO BRAKES INH - ITEM 10 EXEC (*)

2. BACKDRIVE OPERATION (To config $-0.1 \leq WY \leq +0.1$ deg)

NOTE

For steps 2a and 2b, THC input will be at 1/3 to 1/2 deflection. After 2-3 sec, quickly command full scale deflection in opposite direction. When WY joint angle displayed is constant, apply BRAKES - ON and release THC

2a. If $WY < -0.1$ deg

RATE sw - COARSE (RATE MIN tb-OFF)
If $WP > -2.0$ deg,
RATE sw - VERN (RATE MIN tb-ON)

- ✓ JOINT sel - WY
- BRAKES - OFF (tb-OFF)
- MODE - END EFF, ENTER

THC - '+Y' (PORT) 1/3 to 1/2 deflection

After 2-3 sec,
THC - '-Y' (STBD) full deflection

When WY joint angle is constant:
BRAKES - ON (tb-ON)
Release THC

If $-0.1 \leq WY \leq +0.1$ deg, go to step 2c

If $SP > 120$ deg or < 60 deg, go to step 3

If $WP < -0.1$ deg, repeat step 2a

If $WP > +0.1$ deg, go to step 2b

2b. If $WY > +0.1$ deg

- ✓ RATE sw - COARSE (RATE MIN tb-OFF)
- If $WY < +2.0$ deg,
RATE sw - VERN (RATE MIN tb-ON)

- ✓ JOINT - WY
- BRAKES - OFF (tb-OFF)
- MODE - END EFF, ENTER

THC - '-Y' (STBD) 1/3 to 1/2 deflection

After 2-3 sec,
THC - '+Y' (PORT) full deflection

When WY joint angle is constant:
BRAKES - ON (tb-ON)
Release THC

PDRS SSR-3 (Cont)

If $-0.1 \leq WY \leq +0.1$ deg, go to step 2c

If $SP > 120$ deg or < 60 deg, go to step 3

If $WP > +0.1$ deg, repeat step 2b

If $WP < -0.1$ deg, go to step 2a

2c. If $-0.1 \leq WY \leq 0.1$ deg

✓ BRAKES – ON (tb-ON)
MODE – DIRECT (lt on)

DIRECT DR to cradle:

SY	SP	EP	WP	WY	WR
0	CURRENT VALUE	+ 1 MA	+ 5	FREE	0
	0	0	0		

MODE – not DIRECT (lt off)

✓ PORT RMS R-F-L tb (three) – gray

Go to step 3, RMS PWRDN (PDRS OPS) >>

3. RECONFIG OF JOINTS

✓ BRAKES – ON (tb-ON)
MODE – DIRECT (lt on)

DIRECT DR to:

SY	SP	EP	WP	WY	WR
0	+ 90	- 90	0	FREE	+ 19.5

MODE – not DIRECT (lt off)

If $WP < -0.1$ deg, go to step 2a

If $WP > +0.1$ deg, go to step 2b

|

PDRS SSR-4 RMS IFM D&C KIT

NOTE

Applicable AC/DC sw powering kit will remain OFF until immediately prior to reqd operation and will be returned to OFF immediately after operation is completed. When kit is powered, RMS is one failure away from uncommanded motion and/or End Effector ops.

If unexpected arm motion occurs during D&C Kit ops, turn RMS PWR (pnl A8L) to OFF, take DC UTIL PWR MNA (pnl O19) to OFF, then ✓MCC. If failure causing unexpected motion is in D&C Kit, applying brakes will be ineffective.

All pnl A8U, A8L tbs and C/W annunciators are functional with RMS IFM D&C Kit installed. All pnl A8U functions available except those provided by RMS IFM D&C Kit.

Operation of kit END EFFECTOR, JOINT SELECT, DIRECT DRIVE switches is similar to corresponding pnl A8U switches. Limping of arm not available for End Effector functions. May get brakeslip msg during direct drive ops. Cancel MSTR ALARM, and cycle BRAKES sw or cycle RMS SEL sw. TMBU can prevent subsequent msg.

For loaded RMS ops, downlink must be available to confirm lack of End Effector stall currents.

Orbiter pilot must be available to perform separation in case of uncommanded release. Review RMS-LOADED/RELEASE (Cue Card)

1. SETUP

Install RMS IFM D&C KIT, RMS CONTINGENCY OPERATION/INSTALLATION AND REMOVAL OF THE RMS IFM D&C KIT (IFM, PROCEDURES M THRU R)

A8L RMS PWR – PRI (MA)

SM 94 PDRS CONTROL

I/O ON – ITEM 5 EXEC (*)

A8L RMS SEL – PORT
A8U SAFING – CANCEL (tb-gray)

CRT If WR R different,
ITEM 26 +(recorded value) EXEC

2. IF SHOULDER BRACE RELEASE REQD

O19 COAS PWR – ON

D&C Kit SHOULDER BRACE – RELEASE (Hold for 2 sec following tb-gray on pnl A8U)

O19 COAS PWR – OFF
Go to step 7

3. INITIAL D&C KIT POWERUP FOR END EFFECTOR/DIRECT DRIVE

Position RMS/payload at least 5 ft away from structure, using best available mode on pnl A8U

D&C Kit If unloaded:
JOINT sw – WRIST YAW

If loaded:

✓MCC for JOINT sw position for benign motion if uncommanded direct drive occurs and for RMS position for payload rotations due to uncommanded derig/release

WARNING

If unexpected arm/payload motion occurs, (A8L) RMS PWR – OFF, (O19) DC UTIL PWR MNA – OFF, then ✓MCC

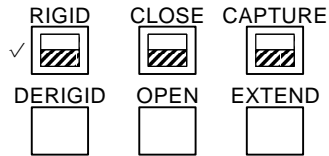
O19 DC UTIL PWR MNA – ON
✓No arm/payload motion
DC UTIL PWR MNA – OFF

PDRS SSR-4 (Cont)

4. UNLOADED END EFFECTOR TEST
 (Reqd for End Effector ops, Direct Drive)

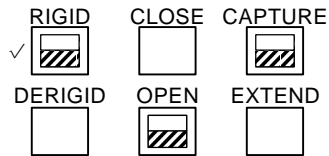
CAUTION
 End Effector test must be completed within
 2.5 min of DC UTIL PWR MNA sw – ON
 or End Effector mtr burnout could occur

A8U ✓BRAKES – ON (tb-ON)
 ✓tb(s)



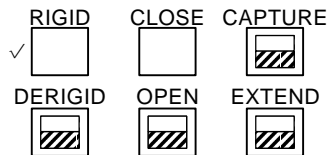
O19 DC UTIL PWR MNA – ON
 ✓No tb(s) change

D&C Kit EE CAPTURE/RELEASE sw – CAPTURE, until CLOSE tb – gray (3 sec max)



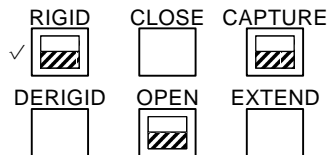
✓No tb(s) change after capture

EE RIGID/DERIGID sw – RIGID, until RIGID tb – gray (20 sec max)



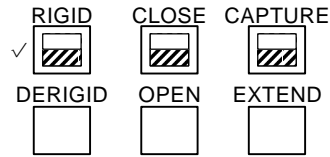
✓No tb(s) change after rigidizing

EE RIGID/DERIGID sw – DERIGID; until DERIGID,EXTEND tb – gray (20 sec max)
 (MA, DERIGIDIZE It – ON)



PDRS SSR-4 (Cont)

EE CAPTURE/RELEASE sw – RELEASE, until OPEN tb – gray (3 sec max)
(Expect MA, RELEASE It – on during actual Payload Release)



O19 DC UTIL PWR MNA – OFF

To extinguish DERIGIDIZE It, take EE MAN CONTR sw to RIGID momentarily or cycle RMS SEL sw

A8U 5. DIRECT DRIVE TEST (For Direct Drive ops only)
✓BRAKES – ON (tb-ON)
PARAM sel – JOINT ANGLE

O19 DC UTIL PWR MNA – ON

D&C Kit For first joint:
Drive '+' then '-'
✓Correct joint responses and that only selected joint drives
(Expect MA, CK CRT It on, and 'S96 PDRS ABE' for five undriven joints)

For other joints:
Drive '+'
✓Correct joint responses
(Expect MA, CK CRT It on, and 'S96 PDRS ABE' for five undriven joints)

O19 DC UTIL PWR MNA – OFF

6. END EFFECTOR/DIRECT DRIVE

NOTE

(Pnl O19) DC UTIL PWR MNA sw – OFF immediately after completing Direct Drive, or End Effector ops, or when unattended

DC UTIL PWR MNA – ON

Perform RMS IFM D&C Kit End Effector/Direct Drive function as reqd

DC UTIL PWR MNA – OFF

7. RECONFIG

Remove RMS IFM D&C KIT, RMS CONTINGENCY OPERATION/INSTALLATION AND REMOVAL OF THE RMS IFM D&C KIT (IFM, PROCEDURES M THRU R)

Power up RMS if further ops reqd
Refer to ON-ORBIT INITIALIZATION, step 2 and RMS POWERUP, step 2 (PDRS OPS)
(Note: disregard joint angle and position data)

PDRS SSR-5 OSVS CMOS SETTINGS

1. CHECKSUM ERROR

NOTE

If the following messages are not visible on the LCDM, go to step 3

'CMOS Checksum Bad'
'Run Setup'
'Press F1 to resume'

2. RESET BIOS

Press < F1 >
✓ BIOS setup menu on LCDM

Press < ESC >
Press < ENTER >
✓ Boot sequence continues on LCDM >>

3. POWER CYCLE

OPP OSVS Pwr – OFF
OSVU ✓ OSVS Pwr It – OFF

NOTE

Hold down the < END > key while powering OSVS ON

OPP OSVS Pwr – ON
OSVU ✓ OSVS Pwr It – ON

Perform step 2

PDRS SSR-6 OSVS DATABASE MAINTENANCE

1. SAVE CORRUPTED DATABASE

Sel File
Sel Save As

Sel the svb.dat file to svb_bad.dat

2. OPEN A QNX SHELL

Press < Ctrl >+< Alt >+< 2 >

✓ QNX Desktop displayed on LCDM

Rt. Click on the Desktop and select "Shell"

3. OVERWRITE THE DEFAULT DATABASE

NOTE

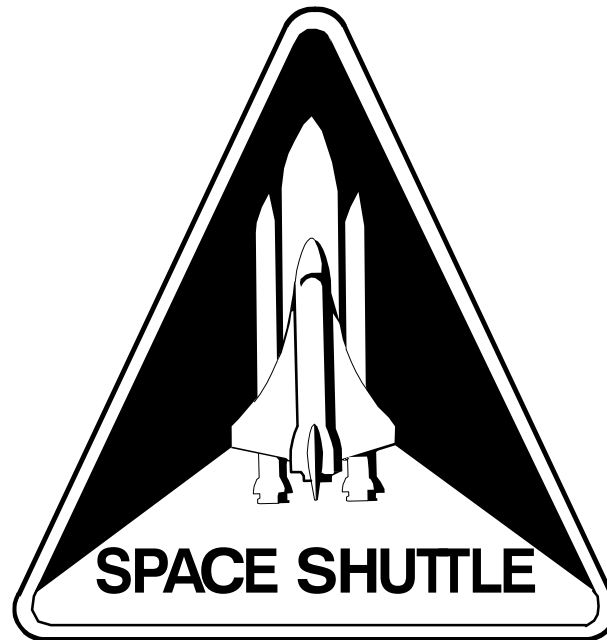
"XXvbb" is the flight specific database. MCC can verify the file name.

At the command prompt, type the following:

```
cp/csvs/sys/stsXXvbb.dat svb.dat
```

4. CLOSE THE QNX SHELL

Close QNX shell



**MALFUNCTION
PROCEDURES**

**STS
ALL**